The Corporation of the Town of Tecumseh
Public Works & Environmental Services

Quality Management Systems

A QMS is a system to:
• establish policy and objectives and achieve those objectives, and
• direct and control an organization with regard to quality.

Quality management for Ontario's municipal drinking water systems will occur through the development and implementation of a QMS for each system based upon the DWQMS.

Drinking Water Quality Management System
Water Services Operational Plan

Version 9

Contents

1. Quality Management System

This Operational Plan documents the Drinking Water Quality Management System for The Corporation of Town of Tecumseh Water Distribution System. The Corporation of the Town of Tecumseh Water Distribution System is owned and operated by The Corporation of the Town of Tecumseh. The Drinking Water Quality Management System (DWQMS) for The Corporation of the Town of Tecumseh covers the transmission and distribution of potable drinking water to consumers within the Town of Tecumseh.

Under the terms and conditions of the 2004 Water Agreement executed among the Windsor Utilities Commission (WUC), City of Windsor and The Corporation of the Town of Tecumseh, the Tecumseh water distribution system (formerly north and south Tecumseh water distribution systems) is currently supplied by the Windsor Water System.

Treated potable drinking water is purchased from the Windsor Utilities Treatment Plant, which is owned by the Windsor Utilities Commission (WUC) and is a separately held entity managed by ENWIN Utilities, which operates and manages the production and distribution of potable water.

The potable water enters The Corporation of the Town of Tecumseh Water Distribution System through 12 locations bordering the City of Windsor, Town of LaSalle and the Town of Tecumseh. Each location is metered and monitored using a Supervisory Control and Data Acquisition system (SCADA). Storage for equalization and peak hour flow of water for Tecumseh is the responsibility of the Windsor Utilities Commission (WUC).

The Corporation of the Town of Tecumseh, in turn, supplies potable drinking water to the Town of Lakeshore at 4 locations all bordering Manning Road: Scott Side Rd; County Rd. 42; Little Baseline; and Amy Croft.

The Corporation of the Town of Lakeshore owns and operates the production and distribution facilities of potable water within their boundary. The Corporation of the Town of Lakeshore is a fully owned local government and is represented by elected officials of the Town of Lakeshore.

The Corporation of the Town of Tecumseh is connected with the Town of LaSalle at one location bordering Howard Avenue. The Corporation of the Town of LaSalle owns and operates the distribution facilities of potable water within their boundary. Town of LaSalle`s treated potable drinking water is purchased from the Windsor Utilities Treatment Plant, which is owned by the Windsor Utilities Commission (WUC) and is a separately held entity managed by ENWIN Utilities, which operates and manages the production and distribution of potable water. The Corporation of the Town of LaSalle is a fully owned local government and is represented by elected officials of the Town of LaSalle.

Additional details about the Town of Tecumseh Water Distribution System is included in section 6.

2. Quality Management System Policy

The Corporation of the Town of Tecumseh is committed to supplying a safe, consistent, drinking water supply while maintaining strict adherence to all applicable legislative and regulatory requirements. The Corporation of the Town of Tecumseh will strive to achieve these goals through the implementation of a management system and staff competency to our consumers.

The municipal owners, management and the employees of The Corporation of the Town of Tecumseh who are directly involved in the supply of drinking water, share in the responsibilities of implementing, maintaining, and contributing to the continual improvement of the Drinking Water Quality Management System (DWQMS).

The Quality Management System Policy is available on the Town's website at www.tecumseh.ca > Town Hall > Departmental Services > Water Services > Quality Management System Policy link (link is listed under "Water links").

3. Commitments and Endorsement

This Operational Plan has been reviewed and approved by The Corporation of the Town of Tecumseh. The purpose of this document is for the planning, operation, and maintenance of The Corporation of the Town of Tecumseh Water Distribution System.

This document will be reviewed and approved by:

- ***Municipal Owner/Operating Authority*** – Mayor and Council
- ***Top Management***- Chief Administrative Officer, Director of Public Works and Environmental Services and the Manager, Water & Wastewater ORO *(Overall Responsible Operator)*

Top Management and Owner endorsement includes the following commitments:

a) ensuring that a Quality Management System is in place that meets the requirements of the Drinking Water Quality Management Standard,
b) ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements,
c) communicating the Quality Management System according to the procedure for communications, and
d) determining, obtaining or providing the resources needed to maintain and continually improve the Quality Management System.

The DWQMS Representative will keep the DWQMS document up-to-date and promote continual improvement. All recommended changes are to be approved by Municipal Owner/Operating Authority resolution. ***(See Appendix 1- Commitments and Endorsement)***

4. Drinking Water Quality Management System (DWQMS) Representative

The Corporation of the Town of Tecumseh has designated a DWQMS Representative and an alternate DWQMS Representative:

DWQMS Representative:
Name: Brad Dupuis
Position: Water Operator

Alternate DWQMS Representative:
Name: Denis Berthiaume
Position: Manager, Water & Wastewater/ORO

The DWQMS Representative is responsible for the following:

- Ensures that processes and procedures needed for the DWQMS are established and maintained,
- Reports to Top Management on the performance of the DWQMS and any need for improvement, as needed, or during the Management Review meetings,
- Ensures that current versions of documents required by the QMS are being used at all times, and reviews DWQMS documentation and record control,
- With members of top management, ensures that personnel are aware of all applicable legislative and regulatory requirements that pertain to their duties for the operation of the drinking water system, and
- Promotes awareness of the DWQMS throughout the Water Services division and The Corporation of the Town of Tecumseh.

5. Document and Records Control

This procedure is applicable to the following DWQMS documents:

- Operational Plan and associated procedures
- DWQMS Forms
- Equipment Manuals
- As Built Drawings
- Applicable drinking water regulations (e.g. O. Reg. 170/03 and O. Reg. 128/04)

Creating New or Updating Existing Documents

The need for document changes or for new documents may be identified through audits, Management Reviews, DWQMS Committee or staff. The DWQMS Representative will delegate the task of creating the new documents to be approved (if necessary) by the Manager, Water and Wastewater, Top Management and/or Municipal Owner/Operating Authority if necessary.

Any employee of the Water Services division may request a change to an existing DWQMS document. The request must be made in writing, dated and submitted to the DWQMS Representative.

The request must include the following information:

- Reason for the new or changed document (one of the following needs to apply):
  - Is it required by the DWQMS?
  - Will it enhance process control?
  - Can it reduce risk?
  - Will it support regulatory requirements?
  - Will it improve operational efficiency?

- A proposed document change or new document content when applicable to the Water Services division or the Operational Plan.

Proposed Document Change or New Document Content

The requester shall develop the new/changed document and submit it to the DWQMS Representative for review.

The DWQMS Committee shall review the document, make any changes as required, and approve changes if applicable.

Approving Documents

- DWQMS-related documents may be approved by Municipal Owner; Operating Authority's Top Management: CAO, Director of Public Works & Environmental Services, Manager of Water & Wastewater / ORO; or the DWQMS Representative.
- DWQMS documentation shall be stored at the Water Services division office or electronically on The Corporation of the Town of Tecumseh network servers.
- Water Services staff has read-only access to the electronic version of the documentation. The Manager, Water & Wastewater/ORO, DWQMS Representative and Clerical Staff have access rights to manage and/or edit the electronic version of DWQMS-related documents
- The DWQMS Representative is responsible to ensure that new or changed documents are communicated and /or distributed to the appropriate staff members
- Documents shall be collected, archived, stored, and disposed as per legislation under the *Safe Drinking Water Act 2002* and The Corporation of the Town of Tecumseh municipal by-law.

Reviewing Documents

The Operational Plan and procedures shall be reviewed by the DWQMS Committee for applicability and relevance.

Document Availability

- The current copy of the Operational Plan, procedures and associated documents are retained electronically on The Corporation of the Town of Tecumseh network servers and at the Water Services division office.
- Original sets of equipment manuals / specifications and drinking water regulations are kept at the Water Services division office.
- Copies of As-Builts are stored at the Water Services division office and electronically on The Corporation of the Town of Tecumseh network servers.

DWQMS Records Control

This procedure is applicable to all records that demonstrate conformance to the DWQMS and compliance to legislative requirements:

DWQMS records include (and not limited to) Council Resolutions (for Operational Plan endorsement); risk assessment outcomes, training information, evidence of communications, procurement-related (e.g. specifications for essential supplies and services), evidence of infrastructure reviews, evidence of equipment maintenance and calibration, emergency preparedness-related, results of internal and external audits, and management review meetings.

Compliance records demonstrate compliance with legislative requirements and include (and not limited to) the records required by the Safe Drinking Water Act and related regulations (e.g. O. Reg. 170/03, O. Reg. 128/04, O. Reg. 169/03, etc.), the Municipal Drinking Water Licence (and its parts, including: Drinking Water Works Permit, approved Financial Plan, Accreditation) and all related records (e.g. annual reports, Operator certification, sampling and testing, forms documenting changes to the distribution system, etc.).

Records are stored in such a manner as to prevent their deterioration. All records are filed and/or archived (as per retention table) at the Water Services division office and The Corporation of the Town of Tecumseh network servers.

Records Management

Records are stored and protected to ensure that they are kept legible, readily identifiable, and are retrievable when they are required by personnel of the Town of Tecumseh Drinking Water System.

Paper records are maintained on-site in file folders, filing cabinets, binders, or by other means deemed acceptable by individual responsible for the records. Electronic records are stored on the organization's network, and within the Town of Tecumseh's Management System Software. Regularly scheduled back-ups help protect electronic information from damage or loss.

All employees have access to the files appropriate to their roles and responsibilities. The Management System Software is also used to facilitate access to and retrieval of the required information.

Minimum record retention periods are determined according to appropriate legislative and regulatory requirements. Retention periods for records not governed by standards or legislation are established through the by-laws of the Town of Tecumseh. Records specific to the Town of Tecumseh Water Distribution System have been documented on a Record Retention Table. The records will be disposed of by either recycling, shredding, or in the case of electronic documentation archival and deletion.

6. Drinking Water System

System Overview

Section 1 of this Operational Plan provides a general overview of the Town of Tecumseh's Water Distribution System and its connections to other area municipalities' water systems with different Owners and Operating Authorities.

The Town is responsible for its own distribution system within the boundaries of Tecumseh and is responsible for any new storage works that may be required to supply its fire flow of water. The Town of Tecumseh also has a 4,546m^3 water tower, located in the North end of Tecumseh. This water tower is monitored by Windsor Utilities Commission (WUC) and the Town of Tecumseh through SCADA (Supervisory Control and Data Acquisition system).

The north Tecumseh water service area (north of Highway 401) includes the urban settlement areas of Tecumseh, St. Clair Beach and Tecumseh Hamlet, and rural areas north of Highway 401; and is supplied from the Windsor Water System through metering facilities at the Town boundary on Dillon Drive, McNorton Street, Tecumseh Road, County Road 22, County Road 42, Baseline Road and, in the future, on Intersection Road.

The south Tecumseh water service area (south of Highway 401) includes urban settlement areas of Oldcastle Hamlet, and Maidstone Hamlet, and rural areas south of Highway 401; and is supplied from the Windsor Water System through existing supply connections at the Town boundary on, and at the Town boundary in Oldcastle Hamlet on the 8th Concession Road, County Road 46, Walker Road, North Talbot Road and Howard Avenue.

Service Areas and Water Distribution System Components:

North Tecumseh Water Service Area

The distribution system in the north Tecumseh water service area is operated by The Corporation of the Town of Tecumseh and consisting of watermains ranging in size from 100 mm (4") to 600 mm (24") in diameter. ***(See Appendix 2- The north service area boundary is identified on Map #1)***

The feedermains on Dillon Drive, McNorton Street and Tecumseh Road extend from the Town boundary through the centre of Tecumseh (Planning Area) to the elevated water tank on Tecumseh Road, and are

interconnected through a new 300 mm feedermain on Lesperance Road and the existing 400 mm trunk watermain on Lacasse Boulevard. The 600 mm diameter feedermain on County Road 22 extends from the Town boundary to Manning Road (County Road 19) and is connected to the 400 mm diameter feedermain on Tecumseh Road. The 600 mm diameter feedermain on County Road 42 extends from the Town Boundary to Lesperance Road and is connected to the 300 mm diameter distribution mains on St. Alphonse Avenue and on Lesperance Road.

South Tecumseh Water Service Area

The distribution system in the south Tecumseh water service area is operated by The Corporation of the Town of Tecumseh consisting of watermains ranging in size from 100 mm (4") to 600 mm (24") in diameter. ***(See Appendix 2 -The south service area boundary is identified on Map #2)***

The feedermains on 8th Concession Road and County Road 46 supply the north east end of Oldcastle Hamlet. The 300 mm diameter feedermain on Walker Road and North Talbot Street connect to the 300 mm diameter trunk watermain on Talbot Road (Highway 3) which supplies Oldcastle Hamlet, the rural areas south of Highway 401, and Maidstone Hamlet.

Consolidated Water Distribution System

The existing water distribution system will be operated as a single distribution system with connections through the Windsor Supply System. In the future, the Town intends to extend trunk watermains from County Road 42 to connect to the south service area to improve system performance. A copy of the approved Water and Wastewater Master Plan can be viewed at the Water Services division office. ***(See Appendix 2 – Table # 1 Watermain Material Type and Length in Tecumseh Water Distribution System)***

Procedures in place to maintain disinfectant residuals within the distribution system:

Tecumseh Water Distribution System staff sample and monitor disinfectant residuals on a regular basis through regulatory sampling programs and during response activities related to consumer water quality calls.

Staff also carry-out work to improve disinfectant residuals within the distribution system through:

- regular maintenance programs (e.g. flushing);
- the practice of cycling water in the water tower (reducing water age);
- optimizing distribution system flows (e.g. close-looping and eliminating system dead ends); and
- by responding in a timely manner to watermain breaks (and carrying out proper disinfection in accordance with the province's Watermain Disinfection Procedure).

7. Risk Assessment

Risk Assessment Team

The Risk Assessment Team shall be no less than a three-member forum and will be made up of the Manager, Water & Wastewater/ORO in conjunction with the Lead Water Operator and one other Water Operator.

The Risk Assessment Team shall meet once a calendar year to review the validity of the assumptions and the currency of the information used in the risk assessment. A comprehensive risk assessment will be redone every thirty-six months unless changing conditions indicate that it should be done more frequently. In each of the risk assessment update activities, the risk assessment outcomes are presented to Top Management at Management Review for their official review and approval.

The Risk Assessment Team considers the Ministry's "Potential Hazardous Events for Municipal Drinking Water Systems" (dated February 2017) in the risk assessment process and is to identify and assess:

- Potential hazardous events and associated hazards as listed in the Ministry's document, and any additional potential hazardous events,
- The risks with the occurrence of potential hazardous events which could affect the water system,
- The ranking of hazardous events according to the associated risk,
- The control measures to address the potential hazards and hazardous events,
- The Critical Control Points and their respective Critical Control Limits,
- The associated procedures and/or processes to monitor Critical Control Limits,
- The procedures to respond to deviations from the Critical Control Limits,
- The procedures for reporting and recording deviations from the Critical Control Limits, and
- Consideration of the reliability and redundancy of equipment.

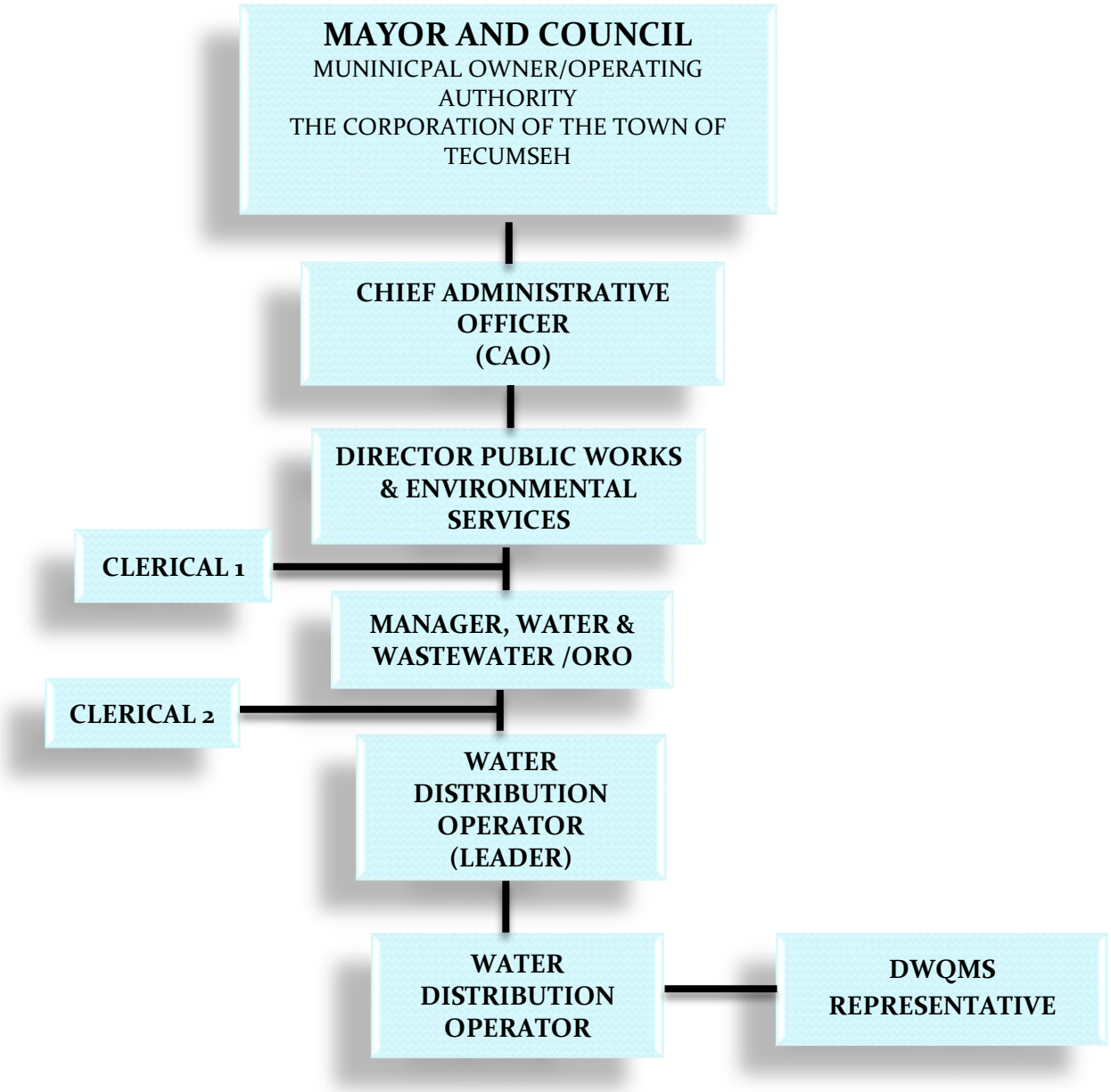
8. Risk Assessment Outcomes

The risk assessment will be facilitated by developing and completing Risk Assessment Tables. As the Risk Assessment Team conducts this assessment, it will document the results of each step of the risk assessment procedure. The risk assessment process is an ongoing activity.

The DWQMS Representative shall ensure that relevant information is circulated to all members of the Risk Assessment Team; and update the outcomes of each risk assessment activity (whether it is for the calendar year or thirty-six-month update).

- ***(See Appendix 3 – Risk Assessment)***
- ***(See Appendix 4 - Risk Assessment Outcomes)***

9. Organizational Structure, Roles, Responsibilities and Authorities



The Corporation of the Town of Tecumseh

Water Services - Organizational Chart

Operational Roles, Responsibilities and Authorities:

Municipal Owner/Operating Authority (Mayor and Council)

Responsibilities

In addition to ensuring the provision of safe and reliable municipal water supply to the serviced areas of The Corporation of the Town of Tecumseh Council is also responsible for:

- Complete legal oversight of The Corporation of The Town of Tecumseh Water Distribution System and the DWQMS,
- Ultimate responsibility for the provision of safe potable drinking water under the *Safe Drinking Water Act 2002,*
- Ensures compliance with applicable legislation and regulations,
- Participating in Council meetings and Council committee meetings and meetings of other bodies to which they are appointed by the Council,
- Obtaining and giving due consideration to information about the operation or administration of the municipality from the Chief Administrative Officer, (CAO) and from other appropriate Town staff,
- Evaluating the policies and programs of the municipality such as bylaw enforcement, taxation, property permits and inspections, planning, public works (roads, water, and sewer), parks and recreation, fire services, police services, and
- Endorsing the DWQMS and providing a representative to participate on the DWQMS Management Review Committee.

Authorities

On behalf of the electorate of The Corporation of the Town of Tecumseh, and in accordance with the Municipal Act, Council is authorized to:

- Implement Drinking water system and DWQMS improvements or changes,
- Authorize resources to improve or change the drinking water system and DWQMS,
- Approve and review policies for the management and operation of Town assets,
- Review, revise, and approve proposed and existing bylaws, expenditures, user fees, taxation rates,
- Hire, evaluate, discipline, or terminate Town Management Staff and contracted service providers, and
- Provide financial, administrative authority related to the distribution of safe drinking water.

Top Management

Top Management is comprised of the following: Chief Administrative Officer; Director, Public Works & Environmental Services; and Manager, Water & Wastewater/Overall Responsible Operator (ORO).

Chief Administrative Officer (CAO)

Responsibilities

As the senior Town staff person reporting to Council, the Chief Administrative Officer (CAO) responsibilities include:

- Oversight of the operation and management of all Town departments,
- Ensuring that the policies and direction from Council are effectively communicated to senior department managers,
- Ensuring that policies and direction from Council is carried out by the appropriate Town departments,
- Direct supervision of senior department directors and managers, and
- Endorsing the ongoing development of the DWQMS and participating on the DWQMS Management Review Committee.

Authorities

Authorities of the Chief Administrative Officer (CAO) include:

- Communicate information from senior managers directly to Council,
- Request expenditure approval from Council and implement approved expenditures,
- To convey and mandate council policy and direction to the department senior managers,
- To hire, evaluate, discipline, or terminate utility management staff, and
- Staffing (within the guidelines of The Corporation of the Town of Tecumseh and any collective agreements).

Director, Public Works & Environmental Services

Responsibilities

Reporting to the Chief Administrative Officer (CAO), the responsibilities of the Director of Environmental Services and Public Works responsibilities include:

- Ensuring the safe, reliable, and compliant management and operation of all of the Towns physical infrastructure as well as Water Distribution System,
- Direct supervision of Environmental Services and Public Works department supervisors and administrative staff,
- Coordinating budget preparation,
- Preparation and presentation of Environmental Services Department Reports to Council,
- Administration of the Collective Bargaining Agreement for department personnel,
- Ensuring adequate and competent staffing,
- Ensuring appropriate staff training,
- Investigating and responding to public complaints and inquiries, and
- Participate and represent the Municipal Owner/Operating Authority (Mayor and Council) on the DWQMS Committee and Management Review Committee.

Authorities

The Director of Environmental Services and Public Works is authorized to:

- Evaluate and prioritize long-term department needs,
- Prepare, review, and approve design specifications,
- Select contractors, and equipment,
- Develop and implement departmental administrative and technical policy,
- Recruit, hire, evaluate, discipline, or terminate Environmental Services Department staff in accordance with Town policies,
- Within the scope of the Environmental Services Department and Public Works, communicate directly with regulatory agencies and the public on behalf of the Town Municipal Owner/Operating Authority,
- When necessary, will appoint a temporary Overall Responsible Operator (ORO) position, in absence of the designated ORO.

Manager, Water & Wastewater/Overall Responsible Operator (ORO)

Responsibilities

Reporting to the Director of Environmental Services and Public Works, the responsibilities include:

- Ensuring the efficient, safe and compliant operation of the Towns Water Distribution System,
- Providing supervision, technical direction and training to water distribution staff,
- Maintaining provincial operator certification,
- Assisting the Director of Environmental Services and Public Works with the water distribution budget preparation and long-term planning,
- Communicating with regulatory authorities to ensure compliance with applicable legislation,
- Preparing and presenting Municipal distribution information to Council, Town staff, managers and the public, and
- Serving as an alternate DWQMS Representative and participating on the DWQMS Committee and Management Review Committee.

Authorities

The Manager Water & Wastewater /ORO, Water System is authorized to:

- Act and is the Overall Responsible Operator (ORO) and therefore must be available to be contacted 24/7. The ORO will make arrangements with the Director of Environmental Services for a designated ORO in the event he/she is not available and cannot be contacted,
- Develop, approve and implement operations, maintenance and safety policies and procedures related to water distribution,
- Supervise and inspect the work of contractors,
- Evaluate and prioritize the long-term rehabilitation and upgrade to the Town's infrastructure(s),
- Participate in hiring, evaluation and discipline of unionized and non-unionized staff in accordance with Town Policies,
- Communicate with Regulatory Agencies,
- Order/purchase necessary supplies and services, and
- Apply various Town By-laws.

DWQMS Representative

Responsibilities

Reporting to the Town Municipal Owner/Operating Authority and Top Management, the responsibilities include:

- Promotes awareness of the DWQMS,
- Reports DWQMS results to staff,
- Ensures DWQMS documentation is prepared and maintained, as needed,
- Provides all staff with technical and administrative consultation related to DWQMS document preparation and implementation, as needed,
- Reviews and may approve DWQMS documentation,
- Implements and oversees document control procedure,
- Coordinates internal auditing acts as the external audit liaison,
- Communicates DWQMS information to staff and facilitates training when needed,
- May report DWQMS results to Municipal Owner/Operating Authority and Top Management, and any needs for improvement, and
- Assist Municipal Owner/Operating Authority and Top Management, that personnel who directly impact drinking water for The Corporation of the Town of Tecumseh are aware of all applicable legislative and regulatory requirements that pertain to their duties if reference to the DWQMS.

Authorities

The DWQMS Representative is authorized to:

- The overall managing role, responsible for overseeing the development and implementation of the DWQMS.

Designated DWQMS Representative Alternate

- Performs all roles of Designated DWQMS Representative.

Water Distribution Certified Operator (Leader)

Responsibilities

Reporting to the Water & Wastewater/Overall Responsible Operator (ORO), the responsibilities include:

- Oversees day-to-day activities relating to maintenance of the water distribution system,
- Communicates and liaises with the Manager, Water & Wastewater, Water Operators and Clerical Staff,
- Works with the Manager, Water & Wastewater in completing the Water Operators' performance assessments,
- Assists with developing procedures and processes for assuring water quality, and
- Has input into the development of procedures and processes for assuring water quality.

Authorities

The Water Distribution Certified Operator (Leader) is authorized to:

- Directs Operators in day-to-day operations of water distribution system,
- Orders day-to-day supplies as needed,
- Respond to public complaints as relayed from Manager, Water & Wastewater, Clerical Staff and/or after-hours answering service.

Water Distribution Certified Operator

Responsibilities

Reporting to the Water & Wastewater/Overall Responsible Operator (ORO) and the Water Distribution Certified Operator (Leader), the responsibilities include:

- Performs weekly testing of drinking water,
- Performs regular maintenance of the water distribution system,
- Reports any incidents of non-compliance, and
- Responds to repairs.

Authorities

The Water Distribution Certified Operator is authorized to:

- Monitors process and equipment of day-to-day operations of the water distribution system,
- Respond to public complaints as relayed from Manager, Water & Wastewater, Clerical Staff, Water Operator Leader and/or after-hours answering service.

Clerical Staff

Responsibilities

Reporting to the Director of Environmental Services and Public Works Water & Wastewater/Overall Responsible Operator (ORO), the responsibilities include:

- Communicates/liaises with the following: Director, Public Works & Environmental Services; Manager, Water & Wastewater; Water Operator (Leader); and Water Operators,
- Responds to and documents public complaints. Example- drinking water quality complaints, broken watermain, hydrant hit by car etc.,
- Inputs lab results,
- Prepares reports as required by regulations and circulates to management,
- Assists with DWQMS documentation and record control, and
- Assists with communication during emergency situations.

Authorities

The Clerical Staff is authorized to:

- Updates and implements document changes as directed by applicable administration identified in the Water Services division Organizational Chart.

10. Competencies

The Ministry of the Environment, Conservation and Parks classified The Corporation of the Town of Tecumseh a "*Water Distribution Subsystem Class II*". The following identifies the competencies required of staff whose performance may have a direct impact on drinking water quality.

Municipal Owners / Operating Authorities

Municipal Owners/Operating Authorities who have complete legal oversight of The Corporation of The Town of Tecumseh Water Distribution System and the DWQMS are briefed on operating conditions and are provided updates by senior management to ensure that personnel are aware of the relevance of their duties and how they affect safe drinking water, and shall maintain records of these activities. They may also attend relevant drinking water training courses, conferences, and seminars to assist in their overall knowledge pertaining to regulatory and legislative requirements.

Director of Public Works & Environmental Services

The Director shall possess advanced theoretical and working knowledge of administrative skills expected of a senior level manager. In addition, the Director shall possess an intermediate theoretical and working knowledge of the *Safe Drinking Water Act* and applicable regulations and legislations, and The

Corporation of the Town of Tecumseh drinking water distribution system. When necessary, will appoint a temporary Over All Responsible Operator (ORO) position, in absence of the designated ORO

Manager, Water & Wastewater and Overall Responsible Operator (ORO)

Shall possess advanced theoretical and working knowledge of administrative skills. The Manager, Water and Wastewater and ORO shall also possess advanced theoretical and working knowledge of the *Safe Drinking Water Act* and applicable regulations and legislation. The Manager, Water and Wastewater and ORO should also have a good working knowledge of The Corporation of the Town of Tecumseh drinking water distribution system and it components. Is the Overall Responsible Operator (ORO) and therefore must be available to be contacted 24/7. The ORO will make arrangements with the Director of Environmental Services for a designated ORO in the event he/she is not available and cannot be contacted.

New Operators (OIT's)

Must complete the OIT Water Distribution Prep Course and OIT exam as per Ministry of the Environment, Conservation and Parks (MECP) O.Reg.128/04 requirements.

Class I Water Distribution Operators

The operator must successfully complete the Class I Water Distribution Exam to become a Class I Water Distribution Operator as per MECP O.Reg.128/04 requirements.

Class II Water Distribution Operators

Class I level, the operator can advance to a Class II Water Distribution operator by successfully completing the Class II Water Distribution Exam as per MECP O.Reg.128/04 requirements.

Class III Water Distribution Operators

Class II level, the operator can advance to a Class III Water Distribution operator by successfully completing the Class III Water Distribution Exam as per MECP O.Reg.128/04 requirements.

Water Operator Competencies

- Water Operators Shall posses an OIT or Class 1 Operating Certificate as per Ontario Regulation 128/04 requirements
- The ORO shall have a minimum Class II Water Distribution Certificate as per Ontario Regulation 128/04 requirements

Water Operator Skills and Knowledge

- The Water Operator performs a variety of skilled and semi-skilled tasks including: operates equipment used in the construction, repair and maintenance of the water distribution system and various public buildings and facilities; utilizes private contractors as authorized; oversees the contractors' work; and performs other related duties as required.
- The Water Operator will work with Town's Water Operators, other Town employees and / or contractors and provide direction to contractors as needed.

- The Water Operator will work with minimum supervision and shall comply with all safety rules and regulations and will work unsupervised if required.

Methods to Develop, Assess and Maintain Competencies

The following methods develop, assess and maintain the required competencies for personnel performing duties directly affecting drinking water quality:

Identify Training Requirements

The Manager, Water & Wastewater and Water Operators must meet the training requirements as per Ministry of the Environment, Conservation and Parks (MECP) O.Reg.128/04 requirements.

The required competencies include, but are not limited to the following:

- Class 1 Water Distribution Operator Certificate
- Understanding the Quality Management System
- Familiarity with the Town's water distribution system
- Knowledge of regulations and identifying, reporting and responding to adverse drinking water conditions as required by regulations.

Assess Competencies

The Corporation of the Town of Tecumseh may administer certain tests, conduct interviews, verify references and/or request specific documentation as part of the hiring process in order to verify skills, experience and knowledge.

In order to meet the ongoing changes to technology, software, the requirements of O. Reg. 128/04 and the Water Services division processes, Water Operators shall receive training as required by O. Reg. 128/04, at a minimum. The training may be provided on or off site by qualified employees or contracted subject matter experts. Training effectiveness is evaluated when appropriate through testing, or a demonstration of knowledge gained.

Training records are maintained by the Manager, Water & Wastewater, stored in document control software and filed in hard copy in the Water Services division office as proof that the required training has been successfully completed. The Manager, Water & Wastewater is responsible for ensuring that all identified training is completed.

Maintain Competencies

The Manager, Water & Wastewater will ensure that the Standard Operating Procedures and Quality Management System are reviewed every calendar year. These duties are included in the Annual Schedule of Duties maintained and tracked by the ORO. Furthermore, the Water Operators will meet or exceed the training hours required by Ministry of the Environment, Conservation and Parks O.Reg.128/04 to maintain Water Distribution Water Distribution Operator Certificates. Training hours and courses completed by

the Water Distribution Operators are logged and tracked by the Manager, Water & Wastewater and are documented in document control software.

11. Personnel Coverage

Water Services division is staffed as per the Collective Agreement between the Corporation of the Town of Tecumseh and the Outside Bargaining workers represented by CUPE Local 702.1. The Manager, Water & Wastewater is the designated ORO. After hours calls are managed by the Water Operator (Leader) using an emergency call-out service with the staff seniority list for overtime as set out by the Collective Agreement.

Regular Hours Coverage

- All work orders are generated through the Water Services division office during regular working hours
- Created work orders will have date and time of the call, location of the problem, details of the problem, name and contact information of person initiating service call.
- Work orders are distributed through the Manager, Water & Wastewater/ORO and the Water Operator (Leader)

After Hours Coverage

- The Water Operator (Leader) receives a call from the answering service, assesses information and provides direction
- If the Lead Water Operator cannot be contacted, the call will bump to the next Water Operator according to seniority
- When necessary, staff is called in to do repairs, and or deal with public complaints
- All reports and forms are authorized by the Manager, Water & Wastewater/ORO
- Reports, forms and or work orders, will have date and time of the call, location of the problem, details of the problem, name and contact information of person initiating service call.
- If required, sub-contractors are approved by the Manager, Water & Wastewater/ORO and are used in digression of the Water Operator

Pandemic, Strikes and/or Lockouts

- The provisions for personnel coverage during situations where staff may not be available to work include the following:

Pandemic

- Should a pandemic occur the Town will request from surrounding municipalities with qualified licensed operators as well as private contractors for assistance.

- If needed the Town will also contact the Ministry of the Environment, Conservation and Parks to request advice or assistance should an emergency of this nature arise.

Strikes and/or Lockouts

- The Manager, Water & Wastewater is designated as the Overall Responsible Operator (ORO) for the distribution system and has the appropriate Water Distribution Operators License. In the event of a union strike and/or lockout, the ORO is qualified to maintain the water distribution system.
- In the event the ORO is not available or if additional staff is required to maintain the distribution system, Town will request from surrounding municipalities with qualified licensed operators as well as private contractors for assistance.
- If needed the Town will also contact the Ministry of the Environment, Conservation and Parks to request advice or assistance should an emergency of this nature arise.

12. Communications

The DWQMS Representative shall ensure the Municipal Owner/Operating Authority and Top Management is provided with a current copy of the Operational Plan. The DWQMS Representative shall keep the Municipal Owner/Operating Authority and Top Management informed of any changes to the DWQMS as a result of Management Review and other DWQMS issues when necessary.

A current version of the Operational Plan is available to staff at the Water Services division office. A hard copy DWQMS Operational Plan will be kept at the Water Services division office and an electronic copy can be obtained using the document control software. Personnel will be informed of DWQMS changes or updates through regular staff meetings with the DWQMS Representative or the Manager, Water & Wastewater.

Any suggested revisions or recommendations to the DWQMS Operational Plan submitted by staff will be documented and provided to the DWQMS Representative.

The DWQMS Committee will meet to review and update the Operational Plan and review any staff recommendations.

Town of Tecumseh Water Services will utilize a web-based survey/questionnaire to allow the public and essential suppliers to have input and communication with all levels of the town's Water Services and Management. The Manager, Water and Wastewater/ORO will collect and analyze all data communicated to the town. The Manager, Water and Wastewater/ORO will then make changes if necessary/ or may make recommendations to the Municipal Owners/ Operating Authority any changes or improvements identified

Essential suppliers and service providers receive relevant DWQMS information regarding product or service requirements from the purchaser in the form of quality / quantity specifications and timeframes, as required by regulations, the Municipal Drinking Water Licence and Drinking Water Works Permit.

Notification is provided to The Corporation of the Town of Tecumseh suppliers and service providers that a copy of the current Water Distribution System Standards and Material Specifications is available on the Town's website or in hardcopy from the Water Services division.

The DWQMS Policy is available to the consumers of The Corporation of the Town of Tecumseh water distribution system at the Water Services division office, Town Hall and can be viewed on the Town's website www.tecumseh.ca.

13. Essential Supplies and Services

Where applicable, supplies must meet AWWA and NSF/ANSI standards. Supplies are verified against the order requisition when received. ***(See Appendix 5 - Essential Supplies and Service List)***

14. Review and Provision of Infrastructure

Infrastructure for The Corporation of the Town of Tecumseh consists of a water distribution system, water tower and monitoring equipment at the boundary meters. The Corporation of the Town of Tecumseh has in place a Water & Wastewater Master Plan, which has been accepted and adopted by the Municipal Owners/Operating Authority.

Rehabilitation and renewal of the water distribution system is performed on a needs schedule in association with the Water & Wastewater Master Plan. Capital and operational money is allocated each calendar year for improvements to the system.

The Director, Public Works & Environmental Services, under the advisement of the Manager, Water & Wastewater and Manager, Engineering Services, will identify areas needed for rehabilitation and renewal in accordance with risk assessment.

A report detailing the maintenance programs, any requirements for infrastructure, rehabilitation and renewal is prepared annually by the Director, Public Works & Environmental Services and Director, Financial Services/Treasurer. The capital requirements are then submitted to Top Management and Municipal Owner/Operating Authority for budgetary approval.

15. Infrastructure Maintenance, Rehabilitation and Renewal

The Manager, Water and Wastewater will annually review the planned and unplanned maintenance reports and programs. A summary will be prepared and communicated to the Director, Public Works & Environmental Services under advisement of the Manager, Engineering Services and will identify areas that may need rehabilitation and renewal planning. ***See Appendix 6: ("Public Works & Environmental Services Capital Works Plan")***

Planned Maintenance

All planned maintenance is scheduled and communicated to staff by the Manager, Water & Wastewater. All records are retained at the Water Services division office.

- Annual valve exercising programs
- Annual flushing programs
- Annual hydrant inspection, maintenance and painting

Planned maintenance is scheduled on an electronic spreadsheet stored on the central office computer server. Server files are backed up daily. The long-term forecast of major infrastructure maintenance, rehabilitation and renewal activities is kept current by reviewing planned rehabilitation and renewal programs on an annual basis as capital works are planned for each calendar year by the Manager, Water & Wastewater with the following: Director, Public Works & Environmental Services; Director, Financial Services/Treasurer; Manager, Engineering Services; and Manager, Roads & Fleet.

Scheduled tasks are typically defined by manufacturer's literature when available and revised as needed according to operator experience/observations. Planned maintenance tasks are communicated to the person responsible by issuance of work orders from the Manager, Water & Wastewater ORO or the Water Operator (Leader). Completed work orders are reviewed and signed by the Manager, Water & Wastewater ORO or DWQMS Representative.

If feasible, rehabilitation or replacement of water distribution piping is coordinated with the Town's scheduled wastewater and road resurfacing projects.

Unplanned Maintenance

Unplanned maintenance is conducted as required. All unplanned maintenance activities are authorized by the Manager, Water& Wastewater.

- Service leaks
- Meter repairs
- Emergency hydrant repairs
- Water quality complaints
- General customers inquiries

16. Sampling, Testing and Monitoring

Sampling, testing and monitoring of the treated water produced at the Windsor Utilities Commission (WUC) Water Treatment Plant is conducted by Windsor Utilities Commission Water Operators as required by Ontario Regulation 170/03.

A competent certified Water Operator for the Town performs all in house sampling. Results are recorded on a weekly log sheet and monitored by Water Operators. Detailed procedures for all tests performed on-site are provided in Standard Operating Procedures (SOP's).

The operators ensure that the water supplied to The Corporation of the Town of Tecumseh Water Distribution System meets the *Safe Drinking Water Act, 2002*. Sampling and testing for The Corporation of the Town of Tecumseh Water Distribution System is limited to the distribution system only as required by Ontario Regulation 170/03.

The results at all boundary meters and the water tower are displayed and recorded on the SCADA system and monitored by the Manager, Water & Wastewater and Water Operators.

Free chlorine will be done in-house. All other regulatory testing is contracted out and performed by an accredited lab chosen by The Corporation of the Town of Tecumseh. Records and logs are kept at the Water Services division office.

Sampling and monitoring Standard Operating Procedures (SOP) are established for operating the water distribution system. Provisions have been made when sampling and monitory under abnormal circumstances.

Adverse Water Quality Sample

- If the accredited laboratory discovers adverse water quality in a sample, they are obligated to notify Water Services division within 24 hours. All adverse water results prescribed by Schedule 16 of O.Reg.170/03 must be immediately reported by Water Services division to the Medical Officer of Health, Spill Action Centre and the Ministry of the Environment, Conservation and Parks.
- During adverse water quality incidents, maps and drawings are provided to the local health authority whereby direction is given to the Town as to the locations of sampling and monitoring upstream and downstream of the location from which the adverse sample was found.

Power/Communication Loss

- Water Services staff is alerted via telephone in the event of a power/communication loss that affects the SCADA system (refer to Element 11 for call-out procedure during working hours and after working hours)
- The SCADA system is programmed to continue calling the emergency contact list until the alarm is acknowledged

Inclement Weather

- Additional staff and/or equipment will be provided for as needed

17. Measurement and Recording Equipment Calibration and Maintenance

The portable chlorine analyzers and flow meters are calibrated by contractors according to the manufacturers' specifications or as mandated by legislation. All calibrations are recorded and filed at the Water Services division office.

Contractors are used for performing calibrations are identified in the "Essential Supplies and Services List". ***(See appendix 5 - Essential Supplies and Services List)***

18. Emergency Management

The Corporation of the Town of Tecumseh's Water Operators have emergency training and are aware of the location of written procedures to deal with emergencies in the water distribution system. Specific instructions for responding to emergencies, including emergency situations that have the potential to result in acute drinking water health risks, are included in hardcopy in the Water Services division office and electronically in the document control software. Once a year, a training exercise will be conducted to test selected emergency procedures. If present methods should change, or if new employees are brought into the system, semi-annual training will occur on dealing with emergencies. Senior employees or direct supervisors would provide this training. All training is documented and placed in employee training files.

Water Operators are on twenty-four hour call to ensure that a qualified staff member will attend and assess any water emergency.

Emergencies

- Adverse Water Quality
- Water distribution cannot supply fire protection or safe drinking water
- Situations in the water distribution system that has the potential to result in acute drinking water health risks

In the event of an identified emergency the Manager, Water & Wastewater shall be contacted immediately. The Manager, Water & Wastewater is designated to be responsible for overall management, decision-making, and communications at the entail level of emergency.

In the event the Manager, Water & Wastewater ORO is unavailable, the Director of Public Works and Environmental Services shall be contacted and will appoint a temporary ORO.

The Manager, Water & Wastewater will then report all incidents and corrective actions to the Director, Public Works and Environmental Services or designate.

The Director, Public Works and Environmental Services, in collaboration with the Manager, Water & Wastewater, will advise the Municipal Owners/Operating Authorities of the system.

The Mayor and CAO of The Corporation of the Town of Tecumseh shall only be notified in the event that water cannot be supplied to the Town in sufficient amounts for fire protection, or that water quality poses an acute health risk to customers and a boil water advisory or drinking water advisory must be issued.

The Water Services Emergency Response Plan is an emergency plan consisting of a set of guidelines assembled to assist water staff in emergency response procedures and is intended to facilitate a systematic and coordinated response to a variety of water emergencies or major incidents. The Water Services Emergency Response Plan has been formulated to assign emergency response roles and responsibilities, and to guide immediate and long-term response to incidents adversely affecting the water operations.

In the event of a problem occurring greater then a water emergency the Corporation of the Town of Tecumseh Emergency Response Plan will be implemented. A hardcopy is stored in the Water Services division office and electronically in the document control software.

An extensive emergency contact list is provided within the Water Services Emergency Response Plan. There is a procedure in place to review and update the Water Services Emergency Response Plan on an annual basis.

19. Internal Audits

Internal audits will be performed in entirety at least once every calendar year as legislated, to ensure the DWQMS conforms to the requirements of the DWQMS Operational Plan. These requirements include ensuring that the DWQMS has been effectively implemented and properly maintained.

The Corporation of the Town of Tecumseh will conduct internal audits by trained auditors internally or by a contracted trained auditor chosen by The Corporation of the Town of Tecumseh.

Internal Audits Conducted by Town of Tecumseh Auditors

- The assignment of auditor's and schedules will be the responsibility of the DWQMS Representative
- Internal audits will be conducted by a person who has successfully completed a recognized Internal Auditor workshop
- Internal audits will be scheduled based on the availability and schedules of the participants.

- DWQMS will be audited as per the legislative requirements
- The auditor shall review all related DWQMS documentation
- The auditor shall observe activities, review records, review previous internal and external audit results, and interview personnel as necessary to ensure that the status of the audited Elements of the DWQMS has been effectively covered
- The auditor shall submit completed reports to the DWQMS Representative and the Manager, Water & Wastewater
- The report shall include any corrective actions requests required to address discrepancies
- Responses to corrective action request shall be designated to the responsible individual by the DWQMS Management Review Committee

20. Management Review

Management Review (Also referred to as the DWQMS Committee) ensures and evaluates the continuing suitability, adequacy and effectiveness of the DWQMS. This process reviews the effectiveness of the DWQMS by the Management Review Committee

Review Participants

Management Reviews shall be conducted during a meeting of the Management Review Committee that is comprised of the following:

- Chief Administrative Officer (CAO)
- The Director of Public Works & Environmental Services
- The Manager, Water and Wastewater /ORO
- The meeting is chaired by DWQMS Representative

The DWQMS Rep will communicate the meeting minutes to all management Review Committee members.

Review Frequency

Management Reviews shall be conducted after the internal audit has been completed and submitted to the DWQMS Representative by the Internal Auditor. The Management Review shall be conducted at least once a calendar year unless additional meetings are required as per the DWQMS Committee.

Review Input

The DWQMS Representative and/or Manager, Water & Wastewater shall provide information and data concerning the following categories for the review if requested:

- Incidents of regulatory non-compliance
- Incidents of adverse drinking water tests

- Deviations from Critical Control Point limits and response actions
- The effectiveness of the risk assessment process
- Results of internal and 3rd party audits
- Results of relevant emergency response testing
- Operational performance and water quality trends
- Follow-up on action items from previous Management Reviews
- Status of management action items (if any) identified between reviews
- Changes in resource requirements, infrastructure, process, personnel, the DWQMS or regulations that could affect the DWQMS
- Consumer feedback
- The resources needed to maintain the DWQMS
- The results of the infrastructure review
- Operational Plan, content, updates and staff suggestions

Review Process

The Management Review Committee shall review and discuss all information presented.

The Committee shall make recommendations and initiate an action plan, including the person(s) responsible for delivering the action items and the proposed timelines, to improve the content and implementation of the Operational Plan and related procedures, and to ensure the provision of adequate resources.

The DWQMS Representative shall be responsible for communication and implementation of the Management Review findings.

21. *Continual Improvement*

The Corporation of the Town of Tecumseh strives to continually improve the effectiveness of its DWQMS. Issues of non-compliance, non-conformance and opportunities for improvement are presented through:

- The review of best management practices (BMP's) at least once every 36 (including the review of MECP's BMP document, when published) will underdo the same schedule as the comprehensive risk assessment;
- MECP compliance inspections;
- Adverse water quality incidents;
- External DWQMS accreditation audits;
- Internal DWQMS audits;
- Management reviews;
- Staff suggestions;

- Customer calls; and
- Other means (e.g. near-misses, other utilities' experiences, etc.)

Using the Request for New or changed DWQMS Document form included in Appendix 7, the DWQMS Representative tracks and measures continual improvement.

Corrective actions are taken to address issues (e.g. non-conformities, non-compliances and other drinking water system failures) where:

- Causes of the issues are investigated;
- Actions taken to correct the issues are documented;
- Actions are taken to prevent the issues from re-occurring;
- Reviews of actions taken to correct / prevent the issues are carried out to verify they are implemented and effective in correcting / preventing the re-occurrence of the issue.

Preventive actions may also be taken to eliminate *potential issues* – and these are documented and reviewed to ensure they are implemented an effective in *preventing the potential issue* from occurring.

Appendices

Appendix 1 - Commitment and Endorsement

The endorsement of the Water Services Operational Plan by Municipal Owner/Operating Authority (The Corporation of the Town of Tecumseh, Municipal Council) report, submitted by Manager, Water & Wastewater /ORO will be added to this Appendix 1 when formerly approved

The Corporation of the Town of Tecumseh

Public Works & Environmental Services

To:	Mayor and Members of Council
From:	Denis Berthiaume, Manager Water & Wastewater Services
Date to Council:	February 26, 2019
Report Number:	PWES-2019-13
Subject:	Drinking Water Quality Management System Operational Plan Version 9

TO BE ADOPTED BY COUNCIL AT RCM 26FEB2019

Recommendations

It is recommended:

That the Drinking Water Quality Management System Operational Plan Version 9 **be endorsed and committed to**.

Background

Following the results of the Walkerton Inquiry in 2002, a key recommendation by Justice O'Connor was for municipalities across Ontario to develop and implement a Drinking Water Quality Management System (DWQMS). The Owners and Operating Authority are required to document a quality management system in an Operational Plan for the drinking water system it operates.

The Town's Water Services Division is legislatively required to annually review and update its Drinking Water Quality Management System Operational Plan. The [updated] Operational Plan must include a written endorsement of its contents by Top Management and the Owner [Council].

Comments

Council and Top Management's endorsement and commitment to the Town's DWQMS is a crucial element of the Operational Plan. Council and Top Management shall provide evidence of its commitment to an effective quality management system by:

Council Report-Master (Rev 2018-08-23)

- Ensuring that a Quality Management System is in place that meets the requirements of the standard as mandated through the Safe Drinking Water Act, 2002 (SDWA).
- Ensuring that the Operating Authority is aware of all applicable legislative and regulatory requirements.
- Communicating the Quality Management System according to the procedure for communications.
- Determining, obtaining or providing the resources needed to maintain and continually improve the Quality Management System.

Version 9 of the Operational Plan was submitted to the DWQMS Committee and approved. Version 9 of the Operational Plan is appended to this report as Attachment No. 1. The document changes include but are not limited to the following:

- The link to the Quality Management System Policy on the website.
- The various commitments the Owner and Top Management endorse with respect to the Town's Quality Management System.
- Greater detail respecting the Town's DWQMS Records Control.
- The procedures in place to maintain disinfectant residuals within the distribution system.
- Information pertaining to the Ministry of the Environment, Conservation and Parks (MECP) "Potential Hazardous Events for Municipal Drinking Water Systems" in the risk assessment process.
- An explanation of how opportunities for improvement come about.

The above-noted changes were incorporated into the Operational Plan due to:

- Legislative and regulatory changes;
- Management Review Committee recommendations (refer to Attachment No. 2);
- Corrective Action Records issued by the Internal Auditor and External Auditor; and
- The Town's administrative and/or policy changes.

Updates to the Operational Plan are necessary to continually improve the Town's Quality Management System.

Administration therefore recommends that Council commit to and endorse the Drinking Water Quality Management System Operational Plan Version 9.

Consultations

None

Financial Implications

There are no financial implications arising from this report.

Link to Strategic Priorities

Applicable	2017-18 Strategic Priorities
☐	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
☒	Ensure that the Town of Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
☒	Integrate the principles of health and wellness into all of the Town of Tecumseh's plans and priorities.
☒	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
☐	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☐

Website ☒ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

Cheryl Curran, BES
Clerk I Administrative Clerk

Reviewed by:

Brad Dupuis, C. Tech
Drinking Water Quality Management Standard Representative

Reviewed by:

Denis Berthiaume, ORO
Manager Water & Wastewater Services

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Environmental Services

Recommended by:

Tony Haddad, MSA, CMO, CPFA
Chief Administrative Officer

Attachment Number	Attachment Name
1	Drinking Water Quality Management System Operational Plan Version 9
2	Management Review Committee Meeting Minutes, February 19, 2019

Appendix 2 – Drinking Water System

Table # 1:

Watermain Material Type and Length in Tecumseh Water Distribution System

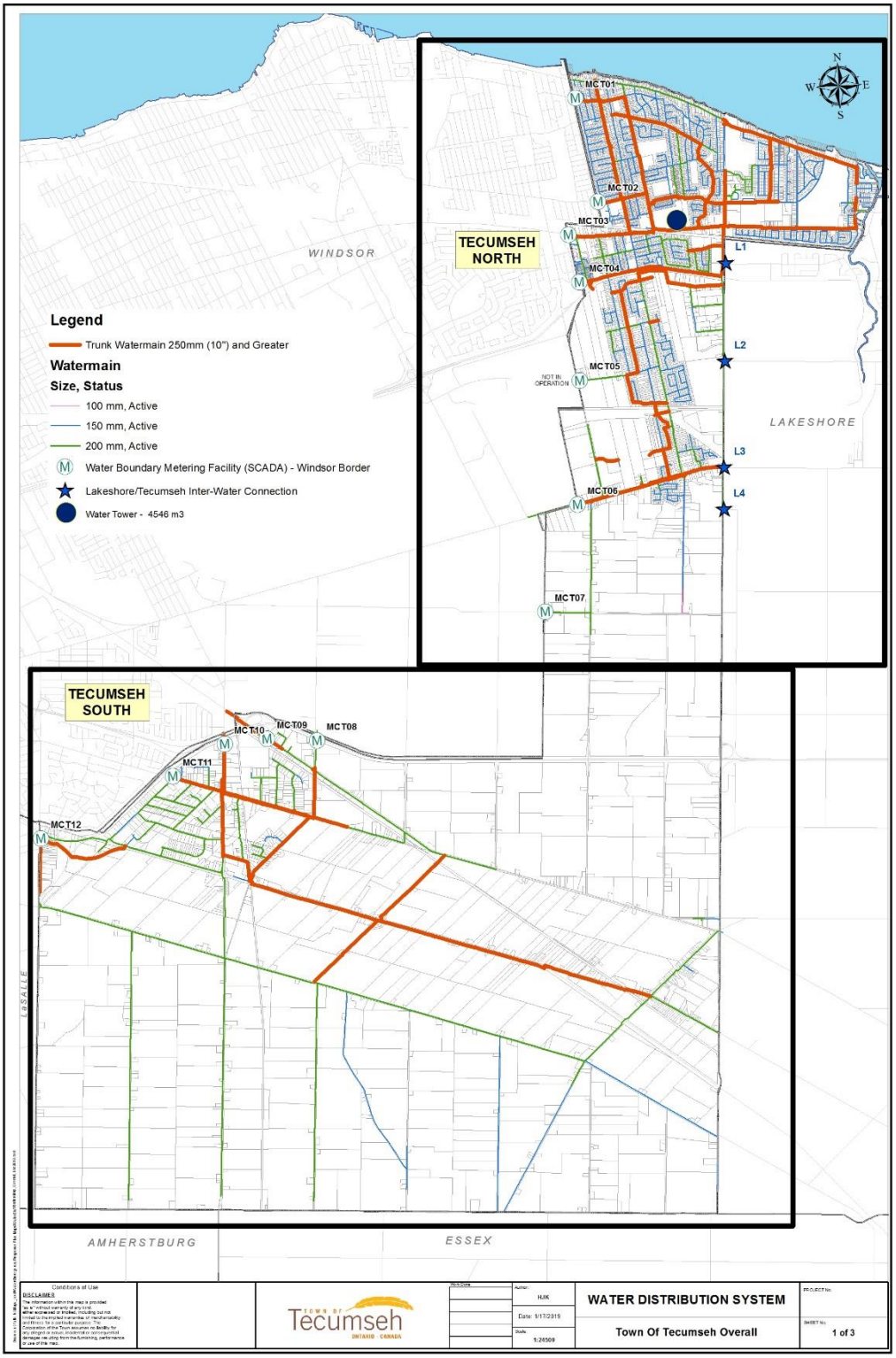
Watermain Material, Size & Length in Meters
Cast Iron Watermain – 19,573 Meters • 100mm Pipe = 151 Meters • 150mm Pipe = 18,429 Meters • 200mm Pipe = 106 Meters • 250mm Pipe = 519 Meters • 400mm Pipe = 368 Meters
Concrete Watermain - 2,524.00 Meters • 250mm Pipe = 2.0 Meters • 400mm Pipe = 2522 Meters
Ductile Iron Watermain - 26,681.00 Meters • 150mm Pipe = 9,275 Meters • 200mm Pipe = 12,021 Meters • 250mm Pipe = 1160 Meters • 300mm Pipe = 1661 Meters • 400mm Pipe = 2,064 Meters • 600mm Pipe = 497 Meters
PolyVinylChloride (PVC)Watermain -173,592 Meters • 50mm Pipe = 300 Meters • 100mm Pipe = 1,674 Meters • 150mm Pipe = 59,818 Meters • 200mm Pipe = 65,994 Meters • 250mm Pipe = 15,277 Meters • 300mm Pipe = 18,275 Meters • 400mm Pipe = 8,524 Meters • 600mm Pipe = 3,733 Meters
Polyethylene Watermain - 250.00 Meters • 50mm Pipe = 8 Meters • 150mm Pipe = 242 Meters
Total Length of Watermain - 222,620 Meters

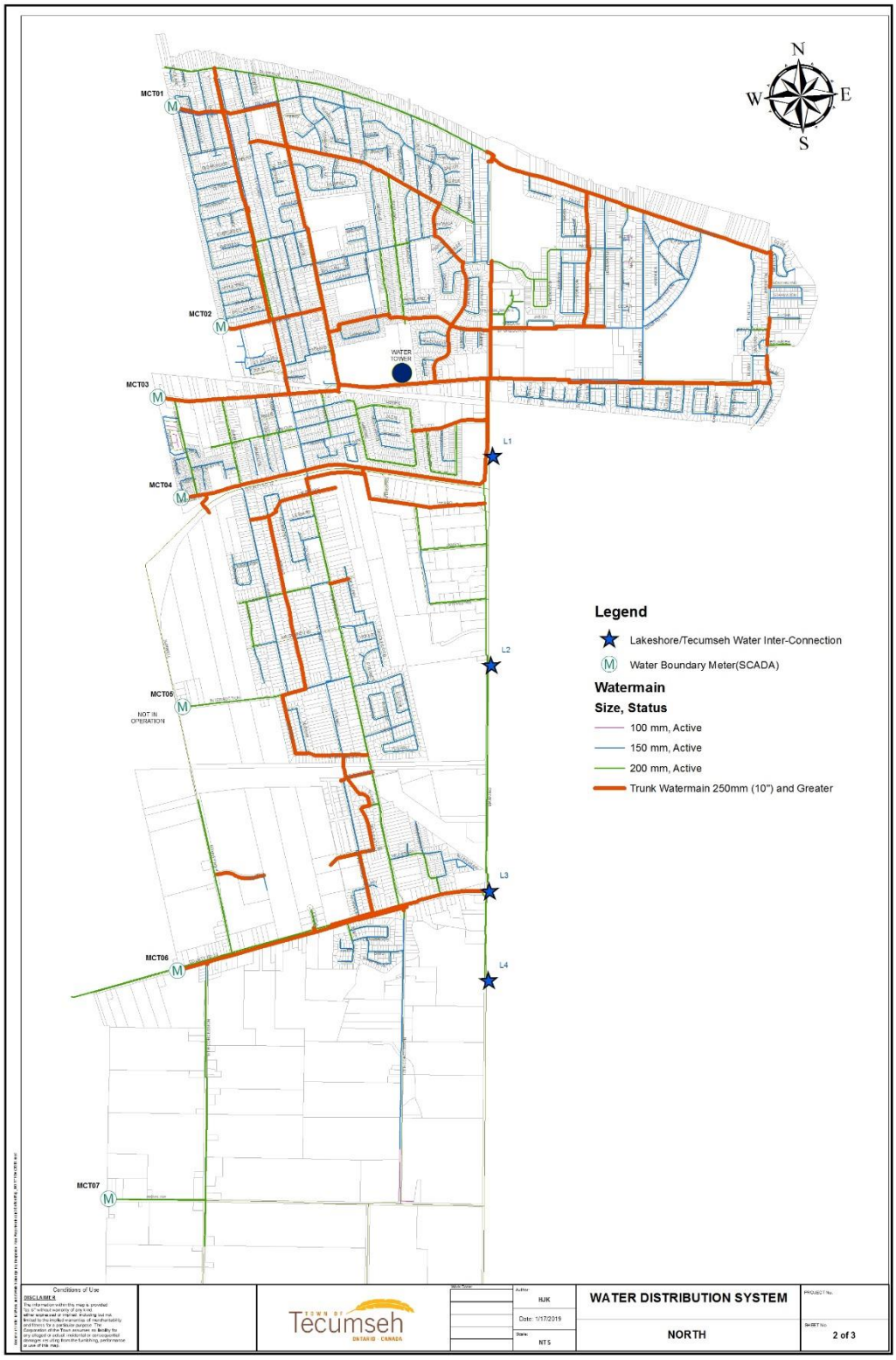
The north distribution system is currently supplied from the Windsor Water System through the following metering connection:

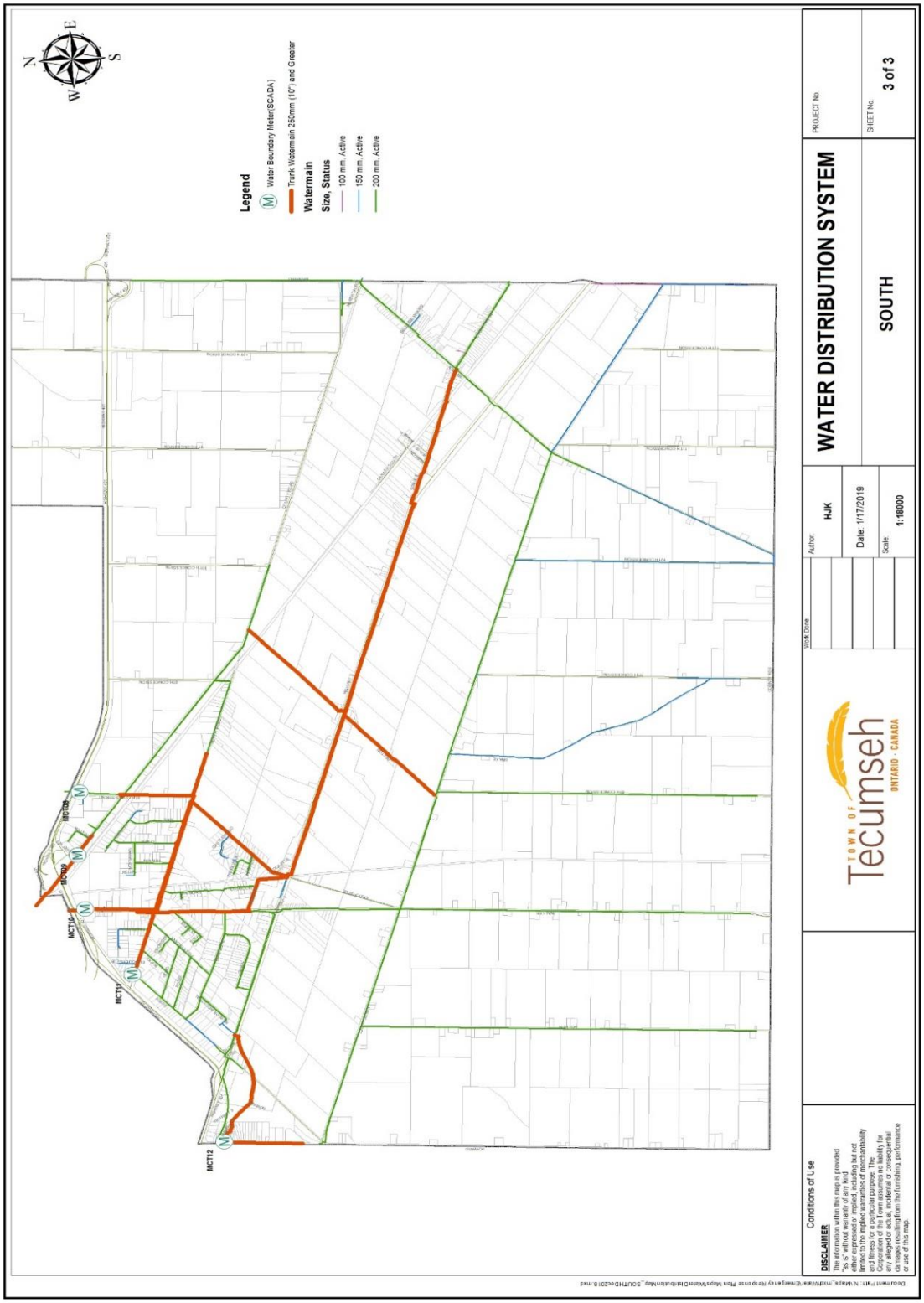
- 400 mm diameter feedermain on Dillon Drive
- 300 mm diameter feedermain on McNorton Street
- 400 mm diameter feedermain on Tecumseh Road
- 600 mm diameter feedermain on County Road 22
- 600 mm diameter feedermain on County Road 42
- (future) 600 mm diameter feedermain on Intersection Road

The south distribution system is currently supplied from the Windsor Water System through the following connections:

- 200 mm diameter feedermain on Baseline Road
- 200 mm diameter feedermain on 8th Concession Road
- 600 mm diameter feedermain on County Road 46
- 300 mm diameter feedermain on Walker Road
- 300 mm diameter feedermain on North Talbot Road
- 200 mm diameter feedermain on Talbot Road







Appendix 3 – Risk Assessment (Comprehensive Risk Assessment done January 24, 2019)

Completing the Hazard Analysis and Critical Control Point Worksheet Procedure:

The Risk Assessment Team is to complete the tasks outlined in section 7 Risk Assessment and section 8 Risk Assessment Outcomes (included as part of this Operational Plan) along with the instructions included as part of Appendix 3 – Risk Assessment (this section) and Appendix 4 – Risk Assessment Outcomes.

The Hazard Analysis & Critical Control Point (CCP) Worksheets included in Appendix 4 are reviewed and used to record the results of the risk assessment.

A. **Getting Started:** Follow the flow and process of receiving and delivering of clean drinking water to the consumer.

B. **Activity or Process Step:** This column refers to specific areas within a particular process step (pumps, tower, distribution system, etc.)

C. **Description of Hazard:** This column refers to an incident or situation that can lead to the presence of a hazard. Hazards and Hazardous events can result from natural or technological causes, or from human activities. At a minimum, the Ministry's "Potential Hazardous Events for Municipal Drinking Water Systems" (dated February 2017) is considered as part of this assessment. Any additional potential hazardous events and associated hazards also need to be included.

D. **Potential Result of Hazard:** This column refers to the source of danger or a property that may cause drinking water to be unsafe for human consumption. *Biological, Chemical, Physical and Radiological*. A description of each hazard is outline in (Table 1)

E. **Comments:** This column refers to any additional information that will help in the description of the hazard or identification.

F. **Available Monitoring & Control Measures:** This column refers to any monitoring and control measures in place or need to be identified as a need to be put in place. Control measures must be addressed for all potential hazards and hazardous events, regardless of whether they are CCP's or not. This may include monitoring, preventive measures, regular inspection, back-up equipment, written standard operating procedures etc.

G. **Emergency Procedures or Contingency Plan:** This column identifies any emergency procedure or contingency plan in place to deal with the hazards identified

H. **Likelihood, Consequence, Detectability and Total:** These columns refer to the ranking criteria identified in (Tables 2, 3, 4, 5.)

I. **Critical Control Point (CCP):** Identifies if the total value of the columns, and determines if the value are above or below the set threshold.

J. **Control Procedure:** This column is where you apply some sort of control, to prevent or eliminate a drinking water health hazard or to reduce the health hazard to an acceptable level

- Hazards identified as CCP's or Recommended Minimum CCP's require control measures, which are documented in procedures or work instructions.

Control Measures include:

- Work Instructions
- Monitoring, reporting and recording requirements
- Support information
- Response for a deviation from critical control point
- Recovery procedures if necessary
- Equipment reliability and redundancies

Determining the Level of Risk for each Hazard

A. Using the Ranking criteria set out at the bottom of each work sheet estimate the level of risk for each hazard

B. Using the criteria set out at the bottom of the work sheet assign a value to each ***Likelihood, Consequence and Detectability***

C. Once the value for each is assigned, add the three values together ***A+B+C=Total***

D. The ***Total*** will be ranked as per the criteria in the "*Total Analysis"* table found at the bottom of the work sheet

E. If the Total is in the High or Very High range as a hazard, it will require either a Critical Control Point procedure, or a response procedure.

Table 1- Hazards

Biological Hazards	Biological pathogens are usually considered the most significant drinking water health risk because the effects are acute; Waterborne biological hazards include bacterial, viral and parasitic organisms. These organisms are commonly associated with faecal wastes from humans and other animals, and some can occur naturally in the environment.
Chemical Hazards	Chemical hazards in drinking water may come from a source or occur in the treatment and distribution system. They include but are not limited to: toxic spills, naturally occurring minerals, heavy metals, dissolved gases (e.g. radon), pesticides, fertilizers, endocrine disruptors, personal care products and pharmaceutical residuals, cyanotoxins, flocculants, coagulants, lubricants, copper, iron, zinc, and lead from pipes and fittings.
Physical Hazards	Sediments are the most common physical hazard associated with drinking water and are of concern as they may carry with them microbiological hazards and interfere with disinfection system efficiency. Other physical hazards include biofilms, pipe materials etc.
Radiological Hazards	Radiological hazards may arise from man-made or natural sources, with naturally occurring chemicals (uranium, radon, etc.) most frequently found in groundwater.

Table 2 – Likelihood

Description	Likelihood of Hazardous Event Occurring	Rating
Rare	May occur in exceptional circumstances, and has not occurred in past.	**1**
Unlikely	Could occur at some time, historically has occurred less than once every five or 10 years.	**2**
Possible	Has occurred or may occur once or more per year.	**3**
Likely	Has occurred or may occur on a monthly to quarterly basis.	**4**
Very Likely	One or more occurrences on a monthly or more frequent basis.	**5**

Table 3- Consequence

Description	Consequence of Hazardous Event Occurring	Rating
Insignificant	Insignificant impact, little public exposure, little or no health risk.	**1**
Minor	Limited public exposure, minor health risk.	**2**
Moderate	Minor public exposure, health impact on small part of the population.	**3**
Major	Large part of population at risk.	**4**
Catastrophic	Major impact for large part of the population, complete failure of systems.	**5**

Table 4 – Detectability

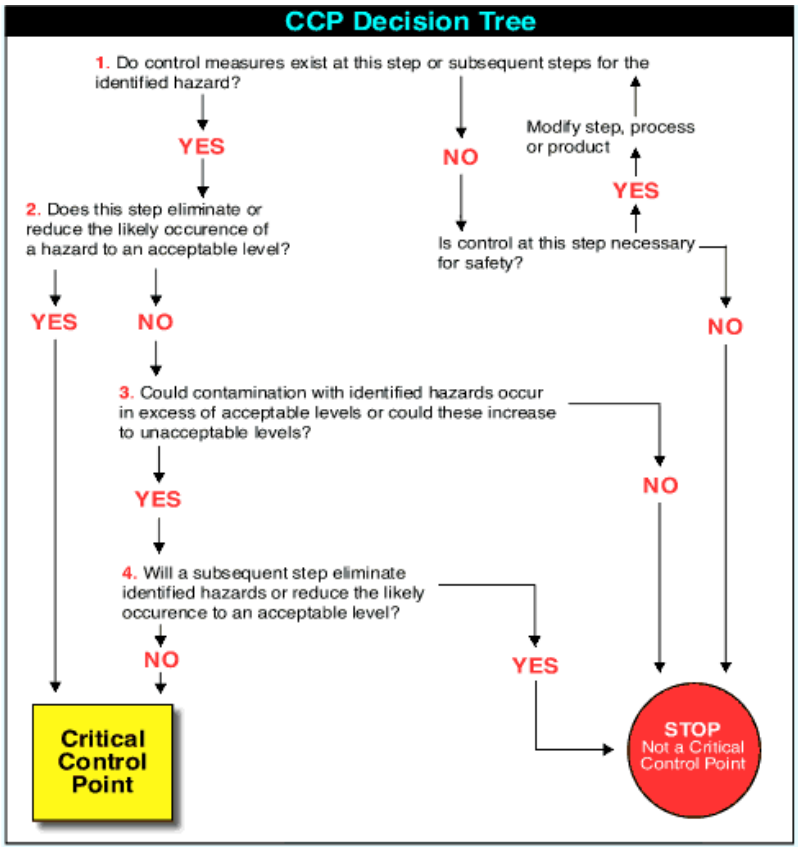
Description	Detectability of Hazardous Event	Rating
Very Detectable	Easy to detect, on-line monitoring through SCADA.	**1**
Moderately Detectable	Moderately detectable, alarm present but not in SCADA, may require operator to walk by and notice alarm; problem is indicated promptly by in-house lab test results.	**2**
Normally Detectable	Normally detectable, visually detectable on rounds or through regular maintenance.	**3**
Unlikely Detectable	Unlikely detectable, visually detectable but not inspected on a regular basis; not normally detected before problem becomes evident; lab tests are not done on a regular basis (e.g. quarterly).	**4**
Undetectable	Cannot be detected.	**5**

Table 5- Risk Analysis (Total)

Likelihood + Consequence+ Detectability	(Total) Risk Category
3 to 5	Low
6 to 7	Moderate
8 to 11	High
12 to 15	Very High

Appendix 4 –Risk Assessment Outcomes

Once the values for likelihood, consequence, and detectability are assessed, the determination of whether an identified risk is also a critical control point (CCP) is made using the following decision tree:



The control points generally meet the characteristics of an ideal critical control point as they typically are:

- Able to prevent, eliminate or reduce hazards,
- Monitored, preferably in real time,
- Able to have determined control limits, and,
- Essential to ensure the safety of the drinking water

These control points also provide important barriers in the multiple barrier process to ensure that pathogens that could be present in the water are effectively inactivated and/or removed, and that secondary disinfection is maintained in the distribution system.

CCP's often have corresponding Critical Control Limits, which are identified in the table included below:

Critical Control Point (CCP)	Hazard Description	Critical Control Limit (CCL)	Monitoring Process and/or Procedures	Response Procedures
Secondary Disinfection *To ensure the maintenance of a disinfectant residual throughout the distribution system.*	**Deterioration of Chlorine Residual** • Reduced water flows based on demand, pipe size, etc. • Occurrence of dead ends and Metered Areas • Increased water temperature (temporary mains) • Reaction with organic matter in watermains • Water age in the distribution system • Water age in storage facilities	<u>Free Chlorine</u> Target Residual in the Distribution System: • >0.20 mg/L (operational minimum) Reportable under the SDWA: • 0.05 mg/L <u>Turbidity</u> • <5 ntu in the distribution system <u>Customer Complaints</u> • Re: water quality characteristics (taste, odour, colour, other)	• Certified and competent operators • Sampling, testing and monitoring of control limits, as applicable • Watermain flushing programs • Installation of blow-offs in dead ends • Regular samples taken and analyzed for chlorine residual	Emergency Response procedures: • 2.1 Boil Water Advisory; • 2.2 Adverse Laboratory Water Quality Results; • 2.3 Loss of Primary Disinfectant (Chlorine); • 2.14 Water Shortage; • 2.16 Establishing Potable Water Filling Stations • Response to customer calls • Service Request tracking and monitoring • Repair and system rehabilitation • Use of appropriately certified and competent contractors and suppliers

Critical Control Point (CCP)	Hazard Description	Critical Control Limit (CCL)	Monitoring Process and/or Procedures	Response Procedures
Backflow Prevention *To prevent cross-contamination that can result from the flowing back of or reversal of the normal direction of flow of water.*	**System contamination from negative or reduced pressure** • Lack of backflow prevention device • Main breaks or blow-outs • Large services • Temporary connections • Firefighting drawdown • Depressurization from residential usage • Pipe failure (deterioration)	<u>System pressure</u> Alarm setpoint ranges for pressure: • 210 to 900 kPa <u>Consumer complaints</u> • Related to system pressure or water characteristics (taste, odour, colour, other).	• Backflow Prevention program • Where possible, implementation of backflow prevention devices and small mains • Proactive Watermain replacement program • Pressure monitoring though pressure	Emergency Response procedures: • 2.2 Adverse Laboratory Water Quality Results; • 2.4 Contamination of Water Transmission System • 2.14 Water Shortage • 2.16 Establishing Potable Water Filling Stations • Response to customer calls • Service Request tracking and monitoring • Water Services Emergency Plan procedures

Critical Control Point (CCP)	Hazard Description	Critical Control Limit (CCL)	Monitoring Process and/or Procedures	Response Procedures
Contamination within Distribution System	Contamination of treated water through watermain breaks, new watermain commissioning or other means.	Drinking Water Quality Standards (O. Reg. 169/03) • Water that meets ODWQS	• Certified and competent operators • Regulatory sampling, monitoring and test programs.	Emergency Response procedures: • 2.1 Boil Water Advisory (if bacteriological) • 2.2 Adverse Laboratory Water Quality Results; • 2.4 Contamination of Water Transmission System • 2.11 Watermain Break • 2.14 Water Shortage • 2.16 Establishing Potable Water Filling Stations • Contact MOH, MECP & SAC • Communicate water advisory issued by MOH • Follow corrective actions required by O.Reg. 170/03.

Risk Assessment - Hazard Analysis & Critical Control Points

Work Sheet No. & Description

Definitions of the abbreviations found in the Hazard Analysis & Critical Control Point Work Sheet:

- **SOP-** Standard Operating Procedures
- **CCP –** Critical Control Point
- **MECP-** Ministry of Environment, Conservation and Parks
- **MOH-** Medical Officer of Health
- **SAC-** Spills Action Centre (*a division of MECP Emergency Management*)
- **WUCTP-** Windsor Utilities Commission Water Treatment Plant
- **Cl_2 –** Chlorine
- **SCADA-** Supervisory Control and Data Acquisition

Hazard Analysis & Critical Control Points

Work Sheet No. 1: Contamination of Source Water

Activity or Process Step:
- Source Water (Windsor Utilities Commission)

Description of Hazard:
- Contamination of Source Water
  (water supply shortfall)

Potential Results of Hazard:
- Physical
- Biological
- Chemical

Comments:
- No Control

Available Monitoring & Control Measures:
- Weekly sampling throughout distribution system as per mandatory under O.Reg.170/03
- On-line monitoring at (WUCTP)

Emergency Procedure or Contingency Plan:
- Follow SOP *Bad Sample or Adverse Water Quality*
- Contacting MECP, MOH & SAC
- Communication with the (WUCTP)
- Conducting all sampling and testing as necessary or directed at points in the distribution system under the direction of the MOH

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	4
		Detectability	2
		(High Risk Threshold = 8)	***Total* = 7** **(CCP = No)**

Control Procedure
- There is no control for source water spills. However, there are ongoing sampling and monitoring programs; along with contingency plans, as noted above.
- Emergency Response Procedures:
  - ✓ 2.1 Boil Water Advisory
  - ✓ 2.4 Contamination of Water Transmission System;
  - ✓ 2.14 Water Shortage;
  - ✓ 2.16 Establishing Potable Water Filling Stations
  - ✓ 2.20 Pandemic

Work Sheet No. 2: Vandalism/Tampering of Water Tower/Storage

Activity or Process Step:
- Water Tower/ Storage

Description of Hazard:
- Vandalism/ Tampering

Potential Results of Hazard:
- Biological
- Chemical
- Damage to equipment

Comments:
- None

Available Monitoring & Control Measures:
- Security fence locked and gated
- Alarm system with SCADA
- Security Cameras

Emergency Procedure or Contingency Plan:
- SCADA Alarm Procedures SOP
- Contact Emergency Services, MOH, MECP & SAC
- Communicate drinking water advisory issued by MOH
- Sample water quality and take tower offline until two consecutive sample are negative within 48hrs
- Conduct sampling microbiological & Cl_2 residual
- Contact WUCTP about closure of water valve for tower

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	4
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 6** **(CCP = No)**

Control Procedure
- There are redundant security measures, including: secure fencing, intrusion alarms, SCADA monitoring related to Cl_2 residual, and other measures as noted above. Also, contingency plans exist, as noted above.
- Emergency Response Procedures:
  - ✓ 2.1 Boil Water Advisory
  - ✓ 2.4 Contamination of Water Transmission System
  - ✓ 2.5 Emergency Evacuation;
  - ✓ 2.6 Illegal Entry / Vandalism;
  - ✓ 2.9 Bomb Threat at any Water Facility;
  - ✓ 2.14 Water Shortage;
  - ✓ 2.16 Establishing Potable Water Filling Stations
  - ✓ 2.20 Pandemic

Work Sheet No. 3: Biofilm and Sediment Build-up in Water Tower/Storage

Activity or Process Step:
- Water Tower/ Storage

Description of Hazard:
- Biofilm and sediment buildup

Potential Results of Hazard:
- Biological
- Contamination

Comments:
- None

Available Monitoring & Control Measures:
- Inspection of tower 5 years as prescribed AWWA standards or per legislation
- Monitoring water levels
- Sampling testing of chlorine residuals weekly

Emergency Procedure or Contingency Plan:
- Cleaning tower using a qualified contractor

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	3
		Detectability	3
		(High Risk Threshold = 8)	***Total*= 7** **(CCP = No)**

Control Procedure
- There is an assessment of tower reliability: 5-year inspection program; and tower cleaning in response to issues once every 5 years. Ongoing sampling and monitoring programs as noted above.

Work Sheet No. 4: Terrorism

Activity or Process Step:
- Water Tower/ Storage

Description of Hazard:
- Terrorism

Potential Results of Hazard:
- Biological
- Chemical
- Damage to equipment

Comments:
- None

Available Monitoring & Control Measures:
- Security fence locked and gated
- Alarm system with SCADA
- Security Cameras

Emergency Procedure or Contingency Plan:
- Contact Emergency Services, MOH, MECP & SAC
- Communicate drinking water advisory issued by MOH
- Sample water quality and take tower offline until two consecutive sample are negative within 48hrs)
- Conduct sampling microbiological & Cl_2 residual
- Contact WUCTP about closure of water valve for tower

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	5
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 7** **(CCP = No)**

Control Procedure
- There are redundant security measures, including: secure fencing, intrusion alarms, SCADA monitoring related to Cl_2 residual, and other measures as noted above.
- Emergency Response Procedures:
  - ✓ 2.5 Emergency Evacuation;
  - ✓ 2.6 Illegal Entry / Vandalism;
  - ✓ 2.9 Bomb Threat at any Water Facility;
  - ✓ 2.14 Water Shortage;
  - ✓ 2.16 Establishing Potable Water Filling Stations
  - ✓ 2.20 Pandemic

Work Sheet No. 5: Spills from Freight Trains on Railway Tracks

Activity or Process Step:
- Water Tower/ Storage

Description of Hazard:
- Spills from CN freight trains on VIA tracks.

Potential Results of Hazard:
- Physical
- Chemical
- Biological
- Contamination

Comments:
- No Control

Available Monitoring & Control Measures:
- Alarm system with SCADA
- On-line monitoring at (WUCTP)
- Security Cameras
- Passenger & Freight trains limited to max speed of 50mph zone

Emergency Procedure or Contingency Plan:
- Contact Emergency Services, MOH, MECP & SAC
- Communicate drinking water advisory issued by MOH
- Sample water quality and take tower offline until two consecutive sample are negative within 48hrs
- Conduct sampling microbiological & Cl_2 residual
- Contact WUCTP about closer of water tower

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 5** **(CCP = No)**

Control Procedure
- There is no control for spills from freight trains. However, there are ongoing monitoring programs and contingencies, as noted above.
- Emergency Response Procedures:
  - ✓ 2.1 Boil Water Advisory;
  - ✓ 2.4 Contamination of Water Transmission System;
  - ✓ 2.5 Emergency Evacuation;
  - ✓ 2.8 Loss of Access to Facilities;
  - ✓ 2.12 On-Site Injury
  - ✓ 2.14 Water Shortage
  - ✓ 2.16 Establishing Potable Water Filling Stations

Work Sheet No. 6: Power Failure (Affecting Control Systems)

Activity or Process Step:
- Control Systems

Description of Hazard:
- Power failure
  (power loss in general and also from extreme weather conditions (tornadoes / ice storms))

Potential Results of Hazard:
- Loss of SCADA network

Comments:
- None

Available Monitoring & Control Measures:
- UPS battery backup at monitoring stations
- UPS battery backup on server
- System alarmed
- Backup generator for server – natural gas generator, tested at least once per month
- Regular daily scheduled working days SCADA system checks

Emergency Procedure or Contingency Plan:
- Data is backed up daily onto main server

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	2
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 4** **(CCP = No)**

Control Procedure
- Controls, reliability and redundancy measures exist as described above.
- Emergency Response Procedures:
  - ✓ 2.7 Interruption of SCADA Components;
  - ✓ 2.15 Failure of Control Systems;
  - ✓ 2.18 Equipment Failure;

Work Sheet No. 7: Loss of Communication/Control

Activity or Process Step:

- Control of System

Description of Hazard:

- Loss of Communications/Control
  (loss in general and also from extreme weather conditions (tornadoes / ice storm))

Potential Results of Hazard:

- Failure of business telephone lines
- Failure of local telephone provider's circuit connections, radio signals, and Ethernet connections
- Failure of cellular telephones

Comments:

- Refer to the Failure of Control Systems section of The Corporation of the Town of Tecumseh Water Services Emergency Response Plan

Available Monitoring & Control Measures:

- The response procedure for long-term failure of control systems and communication networks is detailed in the Failure of Control Systems section of The Corporation of the Town of Tecumseh Water Services Emergency Response Plan

Emergency Procedure or Contingency Plan:

- Follow the response procedure for long-term failure of control systems and communication networks in The Corporation of the Town of Tecumseh Water Services Emergency Response Plan

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	5
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 7** **(CCP = No)**

Control Procedure

- There are redundant communications systems in place for SCADA controls: fiber optic is main supply with cellular back-up.
- Emergency Response Procedures:
  - ✓ 2.7 Interruption of SCADA Components;
  - ✓ 2.15 Failure of Control Systems;
  - ✓ 2.18 Equipment Failure;

Work Sheet No. 8: Watermain Breaks within the Distribution System

Activity or Process Step:
- Distribution

Description of Hazard:
- Watermain breaks within the distribution system

Potential Results of Hazard:
- Physical
- Biological
- Chemical
- Quantity
- Quality

Comments:
- No elevated distribution system; Tecumseh tower and continuously pumping from WUCTP needed

Available Monitoring & Control Measures:
- Customer complaints; low pressure or visual inspection
- General inspection of distribution system
- Controlling valves, looping and replacing watermain
- SCADA alarm system

Emergency Procedure or Contingency Plan:
- Customer complaints; low pressure or visual inspection
- General inspection of distribution system
- Controlling valves, looping and replacing watermain

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	4
		Consequence	2
		Detectability	3
		(High Risk Threshold = 8)	***Total*= 9** **(CCP = No)**

Control Procedure
- System reliability evaluations are regularly carried out as noted above.
- There is a need for response procedures because the Risk Analysis Ranking value is greater than the high-risk threshold.
- Follow SOP *Watermain Repair Category 1-2*
- Emergency Response Procedures:
  - ✓ 2.1 Boil Water Advisory;
  - ✓ 2.3 Loss of Primary Disinfection;
  - ✓ 2.4 Contamination of Water Transmission System;
  - ✓ 2.11 Watermain Break
  - ✓ 2.13 Street Flooding Due to Watermain Break
  - ✓ 2.17 Damage to Main Supply Transmission Line

Work Sheet No. 9: Loss of Chlorine Residual (Secondary Disinfection)

Activity or Process Step:
- Distribution

Description of Hazard:
- Loss of chlorine residual (secondary disinfection)

Potential Results of Hazard:
- Biological

Comments:
- Legislated under O.Reg. 170/03

Available Monitoring & Control Measures:
- Weekly monitoring chlorine residuals throughout the distribution system

Emergency Procedure or Contingency Plan:
- Flush affected area to increase Cl_2 residual
- Follow corrective actions required by O.Reg. 170/03.
- Resample and follow corrective action as per SOP

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	2
		Consequence	3
		Detectability	3
		(High Risk Threshold = 8)	***Total*= 8** **(CCP = Yes)**

Control Procedure
- There is a need for control procedures because the Risk Analysis Ranking value is greater than the High-Risk Threshold, and through the CCP Decision Tree, maintenance of chlorine residual / secondary disinfection is determined to be a critical control point.
- Requirements for corrective action under O.Reg.170/03
- Follow SOP for *Low Chlorine Result Procedure*
- Emergency Response Procedures:
  - ✓ 2.1 Boil Water Advisory;
  - ✓ 2.2 Adverse Laboratory Water Quality Results;
  - ✓ 2.3 Loss of Primary Disinfectant (Chlorine);
  - ✓ 2.14 Water Shortage;
  - ✓ 2.16 Establishing Potable Water Filling Stations

Work Sheet No. 10: Commissioning New Watermains Causing Contamination

Activity or Process Step:
- Distribution

Description of Hazard:
- Commissioning new watermains causing contamination

Potential Results of Hazard:
- Biological
- Chemical

Comments:
- None

Available Monitoring & Control Measures:
- Follow SOP's as per C*ommissioning New Watermain*
- Check Cl_2 residuals
- Take microbiological testing

Emergency Procedure or Contingency Plan:
- Follow corrective action as per O.Reg.170/03
- If necessary, communicate issuance of boil water after consultation with MOH

Risk Analysis Ranking		*RISK ANALYSIS*	*RANKING*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 5** **(CCP = Yes)**

Control Procedure
- While the high-risk threshold was not reached for this hazardous event, "Commissioning New Watermains causing contamination" is determined a critical control point (following the CCP Decision Tree) because it can directly introduce contamination to the distribution system and can be controlled with proper disinfection.
- Follow control procedures as noted above.
- Emergency Response procedures:
  - ✓ 2.1 Boil Water Advisory (if bacteriological)
  - ✓ 2.2 Adverse Laboratory Water Quality Results;
  - ✓ 2.4 Contamination of Water Transmission System
  - ✓ 2.11 Watermain Break
  - ✓ 2.14 Water Shortage
  - ✓ 2.16 Establishing Potable Water Filling Stations

Work Sheet No. 11: Loss of Pressure Resulting from a Watermain Break

Activity or Process Step:
- Distribution

Description of Hazard:
- Loss of pressure due to watermain break

Potential Results of Hazard:
- Biological
- Chemical
- Physical
- Low pressure back-siphoning

Comments:
- None

Available Monitoring & Control Measures:
- Consumer complaints
- Pressure gauges on boundary meters and tower monitored and alarmed by SCADA
- Backflow prevention by-law and program

Emergency Procedure or Contingency Plan:
- Check pressures in affected area. If necessary, discuss with MOH and MECP/SAC
- If necessary, issue water advisory in consultation with MOH as per SOP
- Restore pressure and chlorine residuals and conduct testing and sampling in effected area
- Notify (WUCTP) of low-pressure alarms

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	2
		Consequence	4
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 7** **(CCP = Yes)**

Control Procedure
- System reliability / redundancy measures are in place, as noted in monitoring and control measures above.
- While the high-risk threshold was not reached for this hazardous event, backflow prevention is considered CCP's (following CCP Decision Tree) – as contaminants can be directly introduced to distribution system and with pressure and backflow prevention program monitoring and response, could be prevented.
- Follow SOP *Watermain Repair Category 2*
- Emergency Response procedures:
  - ✓ 2.2 Adverse Laboratory Water Quality Results;
  - ✓ 2.4 Contamination of Water Transmission System
  - ✓ 2.14 Water Shortage
  - ✓ 2.16 Establishing Potable Water Filling Stations

Work Sheet No. 12: Bacteriological Test Failure

Activity or Process Step:
- Distribution

Description of Hazard:
- Bacteriological test failure

Potential Results of Hazard:
- Biological

Comments:
- Legislated under O.Reg. 170/03

Available Monitoring & Control Measures:
- Weekly monitoring: bacteriological testing throughout the distribution system

Emergency Procedure or Contingency Plan:
- Contact MOH, MECP & SAC
- Communicate water advisory issued by MOH
- Sample water quality and take tower offline until two consecutive sample are negative within 48hrs
- Flush affected area to increase Cl_2 residual
- Follow corrective actions required by O.Reg. 170/03.
- Follow SOP *Bad Sample or Adverse Water Quality*

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	3
		Consequence	3
		Detectability	2
		(High Risk Threshold = 8)	***Total*= 8** **(CCP = Yes)**

Control Procedure
- There is a need for control procedures because the Risk Analysis Ranking value is greater than the high-risk threshold and is determined a CCP (through CCP Decision Tree) because contamination is direct to distribution system and response and contingency actions can be taken to address the issue.
- Requirements for corrective action under O.Reg.170/03
- Emergency Response Procedures:
  - ✓ 2.1 Boil Water Advisory;
  - ✓ 2.2 Adverse Laboratory Water Quality Results;
  - ✓ 2.3 Loss of Primary Disinfection (Chlorine)
  - ✓ 2.14 Water Shortage;
  - ✓ 2.16 Establishing Potable Water Filling Stations

Work Sheet No. 13: Failure of Backflow Prevention Device

Activity or Process Step:
- Distribution

Description of Hazard:
- Failure of Backflow Prevention Device

Potential Results of Hazard:
- Biological
- Chemical

Comments:
- Backflow preventers on all connections of concern

Available Monitoring & Control Measures:
- Visual on- site inspection
- Backflow prevention by-law and program

Emergency Procedure or Contingency Plan:
- If backflow is suspected, report to MOH and MECP, SAC
- Isolate area. Flush the system and sample as needed. Re-pressurize system

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	4
		Detectability	4
		(High Risk Threshold = 8)	***Total*= 9** **(CCP = Yes)**

Control Procedure
Backflow prevention is considered a CCP (following CCP Decision Tree) – as contaminants can be directly introduced to distribution system and with pressure and backflow prevention program monitoring and response, could be prevented.

- Emergency Response procedures:
  - ✓ 2.1 Boil Water Advisory (if bacteriological contamination);
  - ✓ 2.2 Adverse Laboratory Water Quality Results;
  - ✓ 2.4 Contamination of Water Transmission System
  - ✓ 2.14 Water Shortage
  - ✓ 2.15 Failure of Control Systems
  - ✓ 2.16 Establishing Potable Water Filling Stations
  - ✓ 2.18 Equipment Failure

Work Sheet No. 14: Adverse Drinking Water Lead Results

Activity or Process Step:
- Distribution

Description of Hazard:
- Adverse drinking water lead results

Potential Results of Hazard:
- Biological
- Chemical
- Positive lead sample from testing

Comments:
- Will follow legislations and Regulations as mandated by the MECP

Available Monitoring & Control Measures:
- Follow SOP *Community Lead Testing Program*

Emergency Procedure or Contingency Plan:
- O.Reg. 170/03 mandating every water system in Ontario to test for lead in the drinking water

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	2
		Detectability	2
		(High Risk Threshold = 8)	***Total*= 5** **(CCP = No)**

Control Procedure
- There is no need for control procedures because the Risk Analysis Ranking value is less than the high-risk threshold.
- Emergency Response procedures:
  - ✓ 2.2 Adverse Laboratory Water Quality Results

Work Sheet No. 15: Extreme Cold/Heat/Long-term Impacts of Climate Change

Activity or Process Step:
- Distribution

Description of Hazard:
- Extreme cold / heat / long-term impacts of climate change (including frozen pipes, potential for wildfires)

Potential Results of Hazard:
- Maintain fire protection
- No access to water from the distribution system if pipes are frozen
- Maintain reliable and safe drinking water to customers

Comments:
- None

Available Monitoring & Control Measures:
- SCADA (re: major fire); freezing conditions (re: alarms for water tower boundary meters)

Emergency Procedure or Contingency Plan:
- Emergency Response Plan

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	1
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 3** **(CCP = No)**

Control Procedure
- There is no need for control procedures because the Risk Analysis Ranking value is less than the high-risk threshold.
- Emergency Response procedures:
  - ✓ 2.14 Water Shortage
  - ✓ 2.16 Establishing Potable Water Filling Stations
  - ✓ 2.19 Serve Storm (tornado, Wind, Hurricane, Winter Storm etc)

Work Sheet No. 16: Loss of Pressure Resulting from Major Fire

Activity or Process Step:
- Distribution

Description of Hazard:
- Loss of pressure due to major fire

Potential Results of Hazard:
- Physical
- Chemical
- Low pressure back-siphoning
- Biological

Comments:
- None

Available Monitoring & Control Measures:
- Notification from the fire department
- Consumer complaints
- Pressure gauges on boundary meters and tower monitored and alarmed by SCADA
- Backflow prevention

Emergency Procedure or Contingency Plan:
- Check pressures in effected area. If necessary, discuss with MOH and MECP/SAC
- If necessary, issue water advisory with consultation of MOH as per SOP *Bad Sample or Adverse Water Quality*
- Restore pressure and chlorine residuals and conduct testing and sampling in effected area
- Notify (WUCTP) of low-pressure alarms

Risk Analysis Ranking		*RISK ANALYSIS*	*RANKING*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 5** **(CCP = Yes)**

Control Procedure
Backflow prevention is considered a CCP (following CCP Decision Tree) – as contaminants can be directly introduced to distribution system and with pressure and backflow prevention program monitoring and response, could be prevented.

- Emergency Response procedures:
  - ✓ 2.1 Boil Water Advisory (if bacteriological contamination);
  - ✓ 2.2 Adverse Laboratory Water Quality Results;
  - ✓ 2.4 Contamination of Water Transmission System
  - ✓ 2.10 Major Fire at any Facility
  - ✓ 2.14 Water Shortage
  - ✓ 2.16 Establishing Potable Water Filling Stations

Work Sheet No. 16: Loss of System Pressure

Activity or Process Step:
- Distribution

Description of Hazard:
- Loss of system pressure

Potential Results of Hazard:
- Physical
- Chemical
- Low pressure back-siphoning
- Biological

Comments:
- None

Available Monitoring & Control Measures:
- Consumer complaints
- Pressure gauges on boundary meters and tower monitored and alarmed by SCADA
- Backflow prevention

Emergency Procedure or Contingency Plan:
- Check pressures in effected area If necessary discuss with MOH and MECP/SAC
- If necessary, issue water advisory with consultation of MOH as per SOP *Bad Sample or Adverse Water Quality*
- Restore pressure and chlorine residuals and conduct testing and sampling in effected area
- Notify (WUCTP) of low pressure alarms

Risk Analysis Ranking		*Risk Analysis*	*Ranking*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	3
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 5** **(CCP = Yes)**

Control Procedure
Backflow prevention is considered a CCP (following CCP Decision Tree) – as contaminants can be directly introduced to distribution system and with pressure and backflow prevention program monitoring and response, could be prevented.

- Emergency Response procedures:
  - ✓ 2.1 Boil Water Advisory (if bacteriological contamination);
  - ✓ 2.2 Adverse Laboratory Water Quality Results;
  - ✓ 2.4 Contamination of Water Transmission System
  - ✓ 2.14 Water Shortage
  - ✓ 2.16 Establishing Potable Water Filling Stations

Work Sheet No. 18: Staff Shortage

Activity or Process Step:
- Distribution

Description of Hazard:
- Staff shortage
  (due to lottery, retirements, Illness /Pandemic, Strike/Lock-out)

Potential Results of Hazard:
- Physical
- Chemical
- Biological

Comments:
- No Control

Available Monitoring & Control Measures:
- Collective Agreements for both outside and inside workers
- Attendance/medical records
- MOH health advisory's
- Town's Wellness Committee

Emergency Procedure or Contingency Plan:
- Having the proper amount of Water Operators
- The ORO has a Class III Water Distribution Operators License
- The ORO has the required competencies to maintain the water distribution system.
- Town of Tecumseh Water Services Emergency Response Plan
- Will contract outside license water operators to assist the ORO if necessary

Risk Analysis Ranking		*RISK ANALYSIS*	*RANKING*
[A] LIKELIHOOD 1 to 5 [B] CONSEQUENCE 1 to 5 [C] DETECTABILITY 1 to 5 *[A] + [B] +[C] = Total*	3 to 5 = LOW 6 to 7 = MODERATE 8 to 11= HIGH 12 to 15 = VERY HIGH	**Likelihood**	1
		Consequence	4
		Detectability	1
		(High Risk Threshold = 8)	***Total*= 6** **(CCP = No)**

Control Procedure
- Adequate staffing levels assured through personnel coverage, competency requirements achieved, and other monitoring, control and contingency measures identified above.

Appendix 5 – Essential Supplies and Services

A list of supplies and services has been developed and is provided below. The list includes suppliers / service providers for each essential supply and service. A secondary source is also listed for each supply and service to ensure supplies and services are available as needed. This list is reviewed by the Manager, Water and Wastewater to ensure that it is current and up-to-date.

All supplies and services shall meet AWWA and NSF/ANSI standards; these purchases must be in accordance with the Town of Tecumseh By-Law 2017-63, a by-law to govern procurement and procedures.

Essential Supplies and Service List		
Product/Service	**Primary Source**	**Secondary Source**
Treated Drinking Water Supply	Windsor Utilities Commission P.O. Box 1625, Station A 4545 Rhodes Drive Windsor, ON N8W 5T1 Tel: 519-251-7300 Fax: 519-251-7329 www.wuc.on.ca	Refer to the Water Services Emergency Response Plan Section 2, Sub-Section 2.16 "Establishing Potable Water Filling Stations"
Accredited Laboratory Services	Caduceon Environmental Laboratories 3201 Marentette Ave. Windsor, ON N8X 4G3 Tel: 519-966-9541 Fax: 519-966-9567 contactwindsor@caduceonlabs.com	SGS Environmental Services 657 Consortium Crt. London, ON N6E 2S8 Tel: 519-672-4500 Fax: 519-672-0361 emily.crowey@sgs.com
Instrumentation Calibration	Flowmetrix Technical Services Inc. 212 Terrence Avenue Dorchester, ON N0L 1G3 Tel: 519-870-3569 Fax: 519-268-3459 service@flowmetrix.ca	ACI Instrumentation Limited 1230 Pontiac Court, Unit 18 Sarnia, ON N7S 4T9 Tel: 519-488-1753 Fax: 519-336-7989 bhadresa@aciltd.ca
Meter Supply & Service	Evans Utility and Municipal Products Supply Limited 338 Neptune Crescent London, ON N6M 1A1 Tel: 519-453-6515 Fax: 519-453-7756 www.evansupply.com	Emco Waterworks 2740 Temple Drive Windsor, ON Tel: 519-948-8131 Fax: 519-948-9362 www.emcoltd.com

Essential Supplies and Service List		
Product/Service	**Primary Source**	**Secondary Source**
AMR/ERT Supply & Service	Emco Waterworks 2740 Temple Drive Windsor, ON Tel: 519-948-8131 Fax: 519-948-9362 www.emcoltd.com	Itron Canada Inc. 2624 Dunwin Drive, Unit 4 Mississauga, ON L5L 3T6 Tel: 905-593-1707 Fax: 519-812-7929 sheila.kee@itron.com
Health & Safety Supplies	Great Lakes Safety Supply 3303 Walker Rd. Windsor, ON N8W 3R9 Tel: 519-972-6605 Fax: 519-972-6620 glspi@wincom.net	HD Supply 3350 North Talbot Rd. Tecumseh, ON Tel: 519-737-7023 Fax: 519-737-9157 Meredith.stpierre@hdsupply.com
SCADA & Instrumentation	Summa Engineering Limited 6423 Northam Drive Mississauga, ON L4V 1J2 Tel: 905-678-3388 Fax: 905-678-0444 www.summaeng.com	Onyx Engineering Ltd. 2960 Jefferson Blvd. Windsor, ON N8T 3J2 Tel: 519-948-4324 sales@onyxengineering.com
Construction Contracting Services	Coco Paving Inc. 6725 South Service Road East Windsor, ON N8N 2M1 Tel: 519-948-7133 Fax: 519-948-7469 www.cocogroup.com	Amico Contracting and Engineering 2155 Fasan Drive Tecumseh, ON N04 1L0 Tel: 519-737-1577 Fax: 519-737-1929 sdraper@triamico.com
Distribution Parts	Emco Waterworks 2740 Temple Drive Windsor, ON Tel: 519-948-8131 Fax: 519-948-9362 www.emcoltd.com	Underground Specialties 5340 Walker Road Tecumseh, ON N0R 1L0 Tel: 519737-1263 Fax: 519-737-1712 info@undergroundspecialties.ca

Essential Supplies and Service List		
Product/Service	**Primary Source**	**Secondary Source**
Disinfectant (Sodium Hypochlorite)	Emco Waterworks 2740 Temple Drive Windsor, ON Tel: 519-948-8131 Fax: 519-948-9362 www.emcoltd.com	Underground Specialties 5340 Walker Road Tecumseh, ON N0R 1L0 Tel: 519737-1263 Fax: 519-737-1712 info@undergroundspecialties.ca
Water Testing Supplies	Flowmetrix Technical Services Inc. 212 Terrence Avenue Dorchester, ON N0L 1G3 Tel: 519-870-3569 Fax: 519-268-3459 service@flowmetrix.ca	Hach Canada 400 Britannia Road East, Unit 1 Mississauga, ON L4Z 1X9 Tel: 800-665-7635 Fax: 866-259-0984 www.hach.com/canada
Locators	Ontario One Call 335 Laird Road, Unit 8 Guelph, ON N1G 4P7 Tel: 800-400-2255 solutions@accu-link.ca	G-Tel Engineering 1150 Frances Street London, ON N5W 5N5 Tel: 866-692-0208 Fax: 866-692-0809 bgowan@gtel.ca
Communications Supplies	Information Services Corporation of the Town of Tecumseh 917 Lesperance Road Tecumseh, ON N8N 1W9 Tel: 519-735-2184 sfuerth@tecumseh.ca	Kelcom 363 Eugenie St. E. Windsor, ON N8X 2Y2 Tel: 519-250-5050 www.kelcom.com
Computer Systems Supplies	Information Services Corporation of the Town of Tecumseh 917 Lesperance Road Tecumseh, ON N8N 1W9 Tel: 519-735-2184 sfuerth@tecumseh.ca	Summa Engineering Limited 6423 Northam Drive Mississauga, ON L4V 1J2 Tel: 905-678-3388 Fax: 905-678-0444 www.summaeng.com ACI 1230 Pontiac Court, Unit 18 Sarnia, ON N7S 4T9 Tel: 519-488-1753 Fax: 519-336-7989

Essential Supplies and Service List		
Product/Service	**Primary Source**	**Secondary Source**
Answering Service	Environmental Services Corporation of the Town of Tecumseh 917 Lesperance Road Tecumseh, ON N8N 1W9 Tel: 519-735-2184	After hour call Kelcom answering service Tel: 519-971-2866

Appendix 6- Public Works & Environmental Services Capital Works Plan:

The Corporation of the Town of Tecumseh

Public Works & Environmental Services

To: Mayor and Members of Council

From: John Henderson, Manager Engineering Services

Date to Council: December 11, 2018

Report Number: PWES-2018-08

Subject: 2019-2023 Public Works & Environmental Services Five Year Capital Works Plan

Recommendations

It is recommended:

THAT the following following Public Works and Environmental Services Projects for the 2019 year, and the Capital Project List 2019-2023, **be approved**:

	Previously Approved	Requested for 2019	Future Costs	Total Costs
Sidewalk Projects				
1. Sidewalk Repair Program - Various Locations	$ -	**$ 69,000**	$ -	$ 69,000
Sub-Total:	$ -	**$ 69,000**	$ -	$ 69,000
Grants:	$ -	**$ -**	$ -	$ -
Recoveries:	$ -	**$ -**	$ -	$ -
Sidewalk Lifecycle Reserve:	$ -	**$ 69,000**	$ -	$ 69,000
New Infrastructure				
1. Riverside Drive Trail	$ 850,000	**$ -**	$ -	$ 850,000
2. CR11: Hwy401 to NTR (CWATS Multi-Use Trail)	$ 141,650	**$ 292,950**	$ -	$ 434,600
Sub-Total:	$ 991,650	**$ 292,950**	$ -	$ 1,284,600
Grants:	$ -	**$ -**	$ -	$ -
Recoveries:	$ -	**$ 174,000**		$ 174,000
Infrastructure Lifecycle Reserve:	$ 991,650	**$ 118,950**	$ -	$ 1,110,600

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		Previously Approved	Requested for 2019	Future Costs	Total Costs
Road Projects					
1.	Road Paving - Tar & Chip	$ -	**$ 100,000**	$ -	$ 100,000
2.	Road Paving - Asphalting	$ -	**$ 1,100,000**	$ -	$ 1,100,000
3.	Road Paving - Crack Sealing	$ -	**$ 100,000**	$ -	$ 100,000
4.	Lesperance Road Bike Lane Pavement Markings	$ 110,000	**$ -**	$ -	$ 110,000
5.	Tecumseh Rd/Lacasse Blvd Intersection Improvements	$ 40,000	**$ -**	$ 439,000	$ 479,000
6.	Tecumseh Road CIP - Streetscape Plan & Final Design	$ 1,422,640	**$ -**	$ 27,908,927	$ 29,331,567
7.	South Talbot Road Reconstruction	$ 90,000	**$ 2,240,500**	$ -	$ 2,330,500
8.	Sylvestre Drive Sanitary Sewer Extension	$ 74,000	**$ 20,000**	$ 1,026,300	$ 1,120,300
9.	Scully & St. Mark'sStorm PS/Riverside Drive	$ -	**$ 43,600**	$ 720,400	$ 764,000
10.	Cty Rd 46/Webster/Laval Sanitary Sewer Extension	$ -	**$ 120,750**	$ 944,750	$ 1,065,500
11.	Delduca Drive Sanitary Sewer	$ -	**$ 92,450**	$ 1,142,450	$ 1,234,900
12.	Road Needs Study	$ -	**$ 63,000**	$ -	$ 63,000
13.	Traffic Signal Controller Update	$ -	**$ 150,000**	$ -	$ 150,000
14.	Brighton Road Traffic Study	$ -	**$ 32,000**	$ -	$ 32,000
15.	Road Line Painter	$ -	**$ 30,000**	$ -	$ 30,000
16.	Expansion/Improvements PW Yard (North)	$ -	**$ 30,000**	$ -	$ 30,000
17.	Traffic Calming Guideline Study	$ -	**$ 20,000**	$ -	$ 20,000
	Sub-Total:	$ 1,736,640	**$ 4,142,300**	$ 32,181,827	$ 38,060,767
	Grants *:	$ 99,000	**$ -**	$ -	$ 99,000
	Recoveries:	$ -	**$ -**	$ 885,000	$ 885,000
	Road Lifecycle Reserve:	$ 1,637,640	**$ 4,142,300**	$ 31,296,827	$ 37,076,767
	* Grant available if works completed by end of 2019				
Bridge Projects					
1.	Culvert #46 (STR Reconstruction)	$ 40,000	**$ 370,500**	$ -	$ 410,500
2.	Culvert #47 (STR Reconstruction)	$ 20,000	**$ 175,500**	$ -	$ 195,500
3.	Bridge #1004 - Sullivan Creek at 12th Concession	$ 43,000	**$ 207,300**	$ -	$ 250,300
4.	Bridge #1013 - Merrick Creek at 8th Concession	$ 43,000	**$ 207,300**		$ 250,300
5.	Bridge #1014 - Townline Road Drain at 6th Concession	$ 43,000	**$ 207,300**	$ -	$ 250,300
	Sub-Total:	$ 189,000	**$ 1,167,900**	$ -	$ 1,356,900
	Grants:	$ -	**$ -**	$ -	$ -
	Recoveries:	$ -	**$ -**	$ -	$ -
	Bridges Lifecycle Reserve:	$ 189,000	**$ 1,167,900**	$ -	$ 1,356,900
Water Projects					
1.	Water & Wastewater Master Plan Update	$ 50,000	**$ 7,500**	$ -	$ 57,500
2.	Tecumseh Road CIP - Streetscape Plan & Final Design	$ 50,250	**$ -**	$ 1,292,686	$ 1,342,936
3.	Hwy#3/County Road 11 Watermain Replacement	$ 134,600	**$ -**	$ 1,933,400	$ 2,068,000
4.	Water Audit and Water Balance	$ -	**$ 15,000**	$ -	$ 15,000
5.	Cty Rd 46/Webster Laval Sanitary Sewer Exten.	$ -	**$ 80,400**	$ 1,130,400	$ 1,210,800
6.	Delduca Drive Sanitary Sewer	$ -	**$ 5,550**	$ 68,550	$ 74,100
7.	CR42 & CR43 Advanced Engineering	$ -	**$ 25,000**	$ -	$ 25,000
	Sub-Total:	$ 234,850	**$ 133,450**	$ 4,425,036	$ 4,793,336
	Grants:	$ -	**$ -**	$ -	$ -
	Recoveries:	$ -	**$ -**	$ -	$ -
	Watermain Reserve Fund:	$ 234,850	**$ 133,450**	$ 4,425,036	$ 4,793,336

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		Previously Approved	Requested for 2019	Future Costs	Total Costs
Water Facility Projects					
1.	Water Tower Internal Lining Replacement	$ -	**$ 470,000**	$ -	$ 470,000
	Sub-Total:	$ -	**$ 470,000**	$ -	$ 470,000
	Grants:	$ -	**$ -**	$ -	$ -
	Recoveries:	$ -	**$ -**	$ -	$ -
	Water Facilities Reserve Fund:	$ -	**$ 470,000**	$ -	$ 470,000
Wastewater Projects					
1.	Water & Wastewater Master Plan Update	$ 50,000	**$ 7,500**	$ -	$ 57,500
2.	Tecumseh Road CIP - Streetscape Plan & Final Design	$ 63,500	**$ -**	$ 1,246,436	$ 1,309,936
3.	Sanitary Sewer Rehab. (I&I Removal) - Phase 3	$ -	**$ 3,000,000**	$ -	$ 3,000,000
4.	CR11 (North) Sanitary Sewer Extension	$ 200,000	**$ 952,000**	$ -	$ 1,152,000
5.	Sylvestre Drive Sanitary Sewer Extension	$ 109,200	**$ 77,600**	$ 575,200	$ 762,000
6.	Manhole Restoration Program	$ -	**$ 50,000**	$ -	$ 50,000
7.	Cty Rd 46/Webster/Laval Sanitary Sewer Exten.	$ -	**$ 166,700**	$ 838,200	$ 1,004,900
8.	Scully & St. Mark's Storm PS/Riverside Drive	$ -	**$ 20,550**	$ 339,550	$ 360,100
9.	Delduca Drive Sanitary Sewer	$ -	**$ 148,500**	$ 833,300	$ 981,800
10.	CR42 & CR43 Advanced Engineering	$ -	**$ 16,000**	$ -	$ 16,000
11.	Sanitary Sewer Model Update & Flow Monitioring	$ -	**$ 250,000**	$ -	$ 250,000
	Sub-Total:	$ 422,700	**$ 4,688,850**	$ 3,832,686	$ 8,944,236
	Grants *:		**$ 1,500,000**	$ -	$ 1,500,000
	Recoveries:	$ -	**$ 1,133,000**	$ 3,579,000	$ 4,712,000
	Wastewater Sewers Reserve Fund:	$ 422,700	**$ 2,055,850**	$ 253,686	$ 2,732,236
	* Grant is subject to NDMP funding approval				
Wastewater Facility Projects					
1.	Sanitary Pump and Meter Station Improvements	$ -	**$ 32,500**	$ 30,000	$ 62,500
	Sub-Total:	$ -	**$ 32,500**	$ 30,000	$ 62,500
	Grants:	$ -	**$ -**	$ -	$ -
	Recoveries:	$ -	**$ -**	$ -	$ -
	Wastewater Facilities Reserve Fund:	$ -	**$ 32,500**	$ 30,000	$ 62,500
Stormwater Projects					
1.	Tecumseh Road CIP - Streetscape Plan & Final Design	$ 68,310	**$ -**	$ 701,690	$ 770,000
2.	Storm Drainage Master Plan	$ 600,000	**$ -**	$ -	$ 600,000
3.	Oldcastle Storrm Drainage Master Plan	$ 120,000	**$ 330,000**	$ -	$ 450,000
4.	Storm Pump Stations - 2019 Repairs	$ 100,000	**$ 268,000**	$ -	$ 368,000
5.	Manhole Restoration Program	$ -	**$ 50,000**	$ -	$ 50,000
6.	Cty Rd 46/Webster/Laval Sanitary Sewer Exten.	$ -	**$ 2,400**	$ 33,900	$ 36,300
7.	Scully & St. Marks Storm PS/Riverside Drive	$ -	**$ 733,100**	$ 12,113,700	$ 12,846,800
8.	Delduca Drive Sanitary Sewer	$ -	**$ 50,850**	$ 628,350	$ 679,200
9.	CR42 & CR43 Advanced Engineering	$ -	**$ 9,000**	$ -	$ 9,000
	Sub-Total:	$ 888,310	**$ 1,443,350**	$ 13,477,640	$ 15,809,300
	Grants:	$ 175,000	**$ -**	$ -	$ 175,000
	Recoveries:	$ -	**$ -**	$ -	$ -
	Storm Sewer Lifecycle Reserve:	$ 713,310	**$ 1,443,350**	$ 13,477,640	$ 15,634,300

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Background

The above noted projects are intended to upgrade existing infrastructure while also providing for future development. The objective of the 2019 - 2023 Public Works & Environmental Services (PWES) Capital Works Plan is to maintain a consistently high level of service and strive to improve the Town's infrastructure components through these improvements.

The Town adopted an Asset Management Plan in December 2013, updated in May 2018, which serves as a guide as to what, and when, capital projects should be undertaken. The attached PWES Capital Project List 2019 – 2023 summarizes PWES projects proposed to be undertaken over the 2019 – 2023 period. Recommendations will be made requesting Council approve specific projects which begin in 2019 while adopting the five year capital plan; this gives authorization to proceed with the 2019 projects while 2020 to 2023 projects will come back to Council in subsequent years for approval to proceed.

Comments

This section provides detailed information for all 2019 projects i.e. both those previously approved and those newly proposed for 2019. Comments are provided by **road, sidewalks and pathways, bridge, water, wastewater, storm sewer** and **municipal drain** categories. Generally, projects will contain expenditures related to all categories; for expediency purposes we have included project discussion on the main driver requiring the project be undertaken.

We have also included a section entitled **2020 to 2023 projects** that provides a higher level discussion on projects being proposed for future years. Some of the future projects are initiatives led by the County of Essex which will require further discussion regarding cost sharing agreements with the Town. In addition, there are some potential new developments in the Town that, depending on the actual development proposals, may drive the need for improvements to existing Town infrastructure. At this time, it is premature to estimate Town costs related to these potential future projects.

The attached PWES Capital Project List 2019 – 2023 **has been prepared assuming adequate funding is available in all lifecycle categories**. Discussion on those categories that are deficient can be found in the Financial Implications Section.

Certain projects have been proposed to be phased in over a two year period. Generally this occurs because either the project scope is too large or costly to be completed in one construction season or would be too disruptive over too large of an area and too long a period of time to the adjacent properties. Projects being phased would be tendered as two separate tender calls.

ROAD PROJECTS

Public Works staff reviews roads for inclusion in the annual paving program. The Town's Road Needs Study has been used for reference in conjunction with Public Works input and suggestions from Council and residents to form the basis for the recommended annual paving projects. Public Works & Environmental Services investigates and categorizes the needs based on the condition of the roads in comparison with other roads of similar traffic volumes.

The list of roads proposed for tar and chip are based on Public Works staff review of observed conditions of the roads and maintenance needs in conjunction with Pavement Condition Index (PCI) ratings from the Road Needs Study. Based on this information, Administration recommends the installation of a new tar and chip surface and edge treatment for Snake Lane. Public Works also suggest earmarking an amount for remedial tar and chip repairs on roads other than those planned for. Every spring Public Works finds areas that require some repair from winter plowing activities, and this would be used to address those concerns.

Administration recommends that as part of the annual paving program, an amount be set aside for crack sealing of Town roads to extend the lifespan of the pavement before more substantial repairs or replacement are required. It is recommended that $100,000 be set aside for crack sealing.

RD 1. Tar & Chip, Asphalting, and Crack Sealing

Tar & Chip - $100,000	Asphalting - $1,100,000	Crack Sealing - $100,000
Snake Lane	Kimberly Court	Various Locations (TBD)
	Shawn Avenue	
	Jelso Place	
	Herbert Street (Intersection Road to Westlake Drive)	
	Malden Road (South Talbot Road to County Road No. 8)	
	Malden Road (Various repair areas)	

Inspection and project administration will be carried out by Public Works & Environmental Services staff upon award of the Contract by Council. Quality control of the materials will be carried out by a Consulting Geotechnical Engineer.

Funding to be provided from:

- Road Lifecycle Reserve $1,300,000

RD 2. Lesperance Road Bike Lane Pavement Markings

Lesperance Road Bike Lane Pavement Markings - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$110,000	**$0**	$0	$110,000

Lesperance Road, a Minor Arterial Road, is a key north-south spine in the transportation network for all modes of travel and the only continuous north-south road under the control of the Town of Tecumseh. Consideration has been given in the Transportation Master Plan (TMP) to modify the existing cross-section of Lesperance Road to remove the existing two-way left turn lane (TWLTL) between McNorton Street and Riverside Drive to permit the creation of on-road cycling lanes with a width of approximately 1.9 meters. The remaining travel laneway

portions of Lesperance Road would be 3.5 meters in width. Therefore, the removal of the TWLTL would not significantly affect intersection capacity or road safety.

At the May 22, 2018 Regular Meeting of Council, Council received Report No. PWES-2018-14 titled "Bike Lanes on Lesperance Road", and passed the following motion: *(Motion RCM-168/18) "That a Public Information Centre on Lesperance Road Bike Lane Pavement Markings be held as soon as possible to gather public input on the project".*

On September 26, 2018, a Public Information Centre was held at Tecumseh Town Hall. Plans showing the proposed configuration of the bike lanes with a potential future multi-use trail on the west side of the road within the public right-of-way were available for review and discussion.

The Town was successful in receiving funding for this project from the Ontario Municipal Commuter Cycling Program (OMCCP). If the works are completed by the end of 2019, OMCCP funding will cover 80% ($88,000) of the project cost. In addition, the remainder of the project costs would be eligible for 50% funding from the CWATS Municipal Partnership Funding Program.

Upon review of the comments from September 26, 2018 Public Information Centre, Administration will report back to Council with a project update and recommendations on next steps.

Previously approved funding from:

- Road Lifecycle Reserve $110,000

RD 3. Tecumseh Road / Lacasse Boulevard Intersection Improvements

Tecumseh Road / Lacasse Boulevard Intersection Improvements - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$40,000	**$0**	$439,000	$479,000

At the December 12, 2017 Regular Meeting of Council, Council approved the recommendations (Motion RCM-441/17) of PWES Report No. 57/17 titled "2018-2022 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2018 capital works projects which included retaining Dillon Consulting Limited to review and analyse the potential reconfiguration of the existing lanes of Tecumseh Road east of Lacasse Boulevard. There is currently one westbound lane and two eastbound lanes, but there may be an opportunity to reconfigure the lanes to two westbound (straight and right turn) lanes, and one eastbound lane, which may alleviate the queue lengths and times for westbound traffic at that intersection.

Once the traffic analysis is completed, Administration will report back to Council with a project update and recommendations on next steps.

Previously approved funding from:

- Road Lifecycle Reserve $40,000

RD 4. Tecumseh Road Community Improvement Plan (CIP) – Streetscape Plan & Design

Tecumseh Road CIP Streetscape Plan & Final Design - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$1,604,700	**$0**	$31,149,740	$32,754,440

At the May 10, 2016 Special Meeting of Council, Council approved the recommendations (Motion SCM-01/16) of Planning & Building Services Report No.10/16 titled "Tecumseh Road Main Street CIP, Streetscape Plan and Detail Design and Utility Lines" that selected the preferred streetscape design that calls for the removal of above-ground hydro poles, hydro wires and utility wires placing them underground.

At the July 12, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-257/16) of PWES Report No. 35/16 titled "Streetscape Plan and Design, Revised Scope & Budget Update, July 2016" that included a revised scope for 30% Schematic Design for the full project limits, 100% Tender Drawings and Specifications for Phase 1 and 90% Design Drawings and Specifications for Phase 2.

At the March 29, 2017 Public Meeting of Council, Council received (Motion PCM-09/17) the PWES Report No. 19/17 titled "Tecumseh Road Main Street CIP – Streetscape Plan and Design Project Update, March 2017".

The tentative phasing and associated project costs are broken up into the five following phases:

- Phase 1: $14,611,300 - Tecumseh Road (St. Anne to VIA) & Lesperance (St. Denis to Arbour)
- Phase 2: $7,716,180 - Tecumseh Road (St. Anne to Shawnee)
- Phase 3: $4,053,262 - Tecumseh Road (Shawnee to Southfield)
- Phase 4: $4,187,530 - Tecumseh/Southfield intersection
- Phase 5: $2,186,168 - Lesperance (McNorton to St. Denis)

Expected recoveries from the County of Essex are anticipated to be $885,000 for a portion of the Tecumseh Road reconstruction (under the Connecting Link Agreement). Administration is still exploring recovery opportunities with some of the Utility companies.

At the December 12, 2017 Regular Meeting of Council, Council approved the recommendations (Motion RCM-441/17) of PWES Report No. 57/17 titled "2018-2022 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2018 capital works projects which included approval of additional costs to finalize components of this project, specifically the 100% Tender Drawings and Specifications for Phase 1, and the 90% Design Drawings and Specifications for Phase 2. Preparation of the Tender Drawings and Specifications for Phase 1 and the 90% Design Drawings and Specifications for Phase 2 are on-going.

RD 5. South Talbot Road Reconstruction and Replacement of Culverts No.46 and No.47

South Talbot Road Reconstruction and Replacement of Culverts No.46 and No.47 Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$150,000	**$2,786,500**	$0	$2,936,500

The section of South Talbot Road between County Road 9 (Howard Avenue) and County Road 11 (Walker Road) consists of a paved two-lane rural cross-section road. Over the last number of years, portions of this section have been rehabilitated: (i) A 1,030m section west of County Road 11 was milled and paved approximately nine years ago, and is still in relatively good shape, (ii) A 250m section east of County Road 9 was reconstructed approximately five years ago by the MTO as part of the realignment into the Laurier Parkway. The remaining section of South Talbot Road, a 1,590m length (250m east of County Road 9 to 400m east of Holden Road) is in need of repairs.

It was Administration's intent to include the remaining section of South Talbot Road as part of the annual asphalting program in 2017. However, a geotechnical investigation of the existing road structure confirmed that there was insufficient granular base and organic material within the subbase, and a full road reconstruction was recommended over a mill/pave operation.

At the November 8, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-384/16) of PWES Report No. 39/16 titled "2016 Culvert Needs Study (Structures with Spans < 3.0m)" that authorized Administration to use the recommendations contained within the report to form the basis of the annual PWES Capital Works Plan. In the 2016 Culvert Needs Study (Structures with Spans< 3.0m), both Culvert No. 46 (South Talbot Road at South Talbot Drain) and Culvert No. 47 (South Talbot Road at Dickson Drain) were identified to be replaced within the 1-5 year timeframe.

At the December 13, 2016 Regular Meeting of Council, Council approved the recommendation (Motion RCM-442/16) of PWES Report No. 54/16 titled "2017-2021 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2017 capital works projects which included retaining Dillon Consulting Limited to complete the engineering design for the South Talbot Road Reconstruction project and for Culverts No.46 and No.47.

In order to achieve the benefit from the efficiencies of completing the engineering, tendering, and construction in one package, Administration recommends that the South Talbot Road Reconstruction project and the replacement of Culverts No.46 and No.47 be combined into a single tender.

The project cost of $2,936,500 includes $2,330,500 for road construction, $410,500 for Culvert No. 46 and $195,500 for Culvert No. 47.

As Dillon Consulting Limited is nearing completion of the engineering design, Administration recommends continuing with Dillon Consulting Limited to complete the contract administration

and inspection for the construction of the South Talbot Road Reconstruction and Replacement of Culverts No.46 and No.47 project in 2019.

Funding to be provided from:

- Road Lifecycle Reserve $2,240,500
- Bridges Lifecycle Reserve $546,000

RD 6. Road Needs Study

Road Needs Study - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$63,000**	$0	$63,000

The Town of Tecumseh maintains an extensive network of urban, semi-urban and rural roads of all classes, with the exception of Class 1 roads such as County Road 22. The roads network is approximately 180 centerline-kilometers of roadway (varying from two to four lanes), consisting of varying materials such as asphalt, concrete, and tar and chip.

In the 2014 Roads Needs Study, it was found that the overall average pavement condition index (PCI) rating for the Town roads was 74.1. The study further found that approximately 17% of the total road system had a PCI rating less than 60 and would require some manner of rehabilitation within a 5 year timeframe. The key to managing the Town of Tecumseh roads is to apply the correct rehabilitation strategy at the correct time. This includes applying preventative maintenance strategies to roads in the early stages of deterioration (e.g. crack sealing), then applying rehabilitation strategies at later dates and ultimately reconstructing the road when the useful life has expired.

Road reconstruction is closely coordinated with other infrastructure replacements such as sewer and water in order to achieve a level of cost saving. Initiatives such as these help to increase the customers level of service as well as reduce the frequency of large scale construction activities. This is a key factor to achieving improvements while achieving overall benefits to the customer through the use of sound planning.

The Town will continue to utilize Road Needs Studies going forward on a five year basis to help prioritize road projects, and gauge the Town effectiveness in the replacement/rehabilitation strategies to date.

Administration recommends that Dillon Consulting Limited be retained to provide the engineering services for this project based on their experience with Town roads and past completion of the 2003, 2008 & 2014 Roads Needs Studies. As part of this study, Dillon Consulting Limited will be engaging StreetScan, a company that utilizes new automated road scanning technology, to obtain a more detailed assessment/inventory of the Town's existing road system.

Funding to be provided from:

- Road Lifecycle Reserve $63,000

RD 7. Traffic Signal Controller Upgrade

Traffic Signal Controller Upgrades (Coordinated with the County of Essex) - Project Costs Summary			
Previously Approved	Requested for 2019	Future Costs	Total Project Costs
$0	$150,000	$0	$150,000

Administration recommends that a yearly program be created to replace traffic signal controller equipment currently in use at the Town's signalized intersections. The Town utilizes electronic equipment that is compatible with the County of Essex highways infrastructure due to the many intersections on shared roads. The equipment currently in use is dated and replacement parts are no longer available. Both the Town and County road departments are beginning a process to transition towards the next generation of traffic controller equipment. This program will take multiple years to complete and coordination between both road departments will ensure seamless operation and the potential for integration in the future between the two systems.

Funding to be provided from:

- Road Lifecycle Reserve $150,000

RD 8. Brighton Road Traffic Study

Brighton Road Traffic Study - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$32,000**	$0	$32,000

Based on comments received from Council and the public, Administration recommends that a traffic engineering assessment be undertaken for the Brighton Road corridor (including intersecting roads) in 2019. The assessment will generally include the following:

- Issue identification and review of information received to date by the Town and Police
- Public consultation to obtain community feedback regarding the existing circles
- Review of field operating conditions (i.e. User difficulty with the circles)
- Collection of updated traffic and speed data
- Determine if existing circles need to be modified or if alternatives need to be explored
- Development of concepts for consideration by the Town and community
- Community meeting regarding proposed changes

Administration recommends that Dillon Consulting Limited be retained to complete the Brighton Road Traffic Study based on their experience completing other traffic related studies for the Town, including the Transportation Master Plan, Traffic Signal Infrastructure Assessment, etc. and their experience with transportation and traffic matters throughout the Essex Region

Funding to be provided from:

- Road Lifecycle Reserve $32,000

RD 9. Road Line Painter

Road Line Painter - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$30,000**	$0	$30,000

The Town's existing road line painter has reached the end of its service life. Administration recommends that a new road line painter be purchased for the Town Public Works Department and that the new road line painter be a high performance hydraulic airless line painter capable of creating precise lines with reflective beads.

Administration further recommends that the new line painter be purchased in accordance with the Town of Tecumseh's approved purchasing policies.

Funding to be provided from:

- Road Lifecycle Reserve $30,000

RD 10. Expansion/Improvements to the Public Works Yard (North)

Expansion/Improvements to the Public Works Yard (North) - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$30,000**	$0	$30,000

Additional storage area is required for Public Works equipment and materials. Administration recommends that the Lacasse Public Works yard be expanded westerly in 2019 to include a portion of the previous Town dog park which was closed approximately 8 years ago. It is recommended that the area be stripped of topsoil and that a treed earth berm be constructed around the perimeter of the site. Site modifications will include construction of a gravel surface suitable for vehicle traffic and the construction of storage bins with concrete blocks.

Funding to be provided from:

- Road Lifecycle Reserve $30,000

RD 11. Traffic Calming Guideline Study

Traffic Calming Guideline Study - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$20,000**	$0	$20,000

Administration continues to receive complaints related to motor vehicles traveling above the post speed limit at numerous locations throughout the Town. As identified in the 2017 Tecumseh Transportation Master Plan (TTMP), one potential approach to improve this problem is the implementation of traffic calming principles (where appropriate). Traffic calming generally relates to physical devices aimed at slowing the speed of motorists to the desired speed, given the context of the street. To build on the general information provided in the

TTMP, Administration recommends that a Traffic Calming Guideline Study be completed in 2019. The scope of the study will include the following:

- Review and update (as required) the general policies on traffic calming contained in the TTMP.
- Outline the process for determining if a problem exists (beyond anecdotal statements).
- Outline the process for investigating the physical feasibility of implementing traffic calming measures.
- Outline the planning process to be followed for the consideration of traffic calming methods (i.e. how to determine study area, how to engage with the residents/stakeholders and how to determine what measure should be implemented (if any)).

Administration recommends that Dillon Consulting Limited be retained to complete the Traffic Calming Guideline Study in 2019 based on their experience completing other traffic related studies for the Town, including the Transportation Master Plan, Traffic Signal Infrastructure Assessment, etc. and their experience with transportation and traffic matters throughout the Essex Region.

Funding to be provided from:

- Road Lifecycle Reserve $20,000

SIDEWALKS & PATHWAYS PROJECTS

SW 1. Sidewalk Repair Projects

Sidewalk Repair Projects - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
----	**$69,000**	----	$69,000

The 2019 sidewalk program will be based on sidewalk conditions determined through the comprehensive sidewalk inspection conducted annually. Currently this inspection is completed by Public Works staff and, along with input from Council and residents, this information is used to develop the annual program for recommended sidewalk repair and replacements. Should this inspection generate large amounts of sidewalk replacement, a Request for Quotation (RFQ) will be issued.

Trip hazards identified throughout the Town will be addressed to keep the Town in compliance with minimum maintenance standards. Currently, a detailed list of sidewalks to be repaired/replaced has not been generated. The funding requested is for an upset limit to carry out the work. A detailed list of recommended sidewalk replacements will be circulated to Council for their information prior to issuing the RFQ. Inspection and project administration will be carried out by PWES Staff upon award of the Contract.

Funding to be provided from:

- Sidewalk Lifecycle Reserve $69,000

SW 2. Riverside Drive Trail

Riverside Drive Trail - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$850,000	**$0**	$0	$850,000

At the October 25, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-372/16) of Planning & Building Services Report No. 32/16 titled "County Wide Active Transportation Study Plan, Town of Tecumseh 2017 Project, Trail on Riverside Drive from Tecumseh/Windsor Municipal Boundary to Manning Road" that endorsed in principle the construction of a 2.4m wide trail having a length of approximately 2.4km as a 2017 CWATS Project, subject to the resolution of a suitable design.

At the December 13, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-442/16) of PWES Report No. 54/16 titled "2017-2021 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2017 capital works projects including the design of the Riverside Drive Trail.

On Wednesday, September 13, 2017, a Public Information Centre was held to share details and gather public input on the Town's above noted initiative to construct a multi-use recreational trail along Riverside Drive. Options under consideration included constructing the trail in the public right-of-way on the south side of the road or on the north side of the road. Comments received were reviewed by Administration and the Consulting Team. Following consideration of the comments, it was recommended that the preferred location for the trail was within the public right-of-way on the south side of the road.

On Wednesday, June 6, 2018, a second Public Information Centre was held to discuss the detailed analysis that had been completed since the first Public Information Centre and to convey the resulting best design solution for the new multi-use trail. Concept plans showing the multi-use trail on the south side of the road were presented for discussion and to gather public input.

Upon review of the comments from the June 6, 2018 Public Information Centre, Administration will report back to Council with a project update and recommendations on next steps.

Previously approved funding from:

- Infrastructure Lifecycle Reserve $850,000

BRIDGE PROJECTS

BR 1. Bridges (with Spans > 3.0m) – Bridges No. 1004, 1013 & 1014

Bridges (with Spans > 3.0m) – Bridges No. 1004, 1013 & 1014 Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$129,000	**$621,900**	$0	$750,900

At the November 8, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-386/16) of PWES Report No. 48/16 titled "2016 Bridge and Culvert Needs Study (Structures with Spans > 3.0m)" that authorized Administration to use the recommendations contained within the report to form the basis of the annual PWES Capital Works Plan. The 2016 Bridge and Culvert Needs Study (Structures with Spans > 3.0m) identified the following Bridges for rehabilitation within a 1-5 year time frame.

- Bridge No.1004 (Pike Creek at 12th Concession Road)
- Bridge No.1013 (Merrick Creek at 8th Concession Road)
- Bridge No.1014 (Colchester Townline Drain at 6th Concession Road)

At the December 12, 2017 Regular Meeting of Council, Council approved the recommendations (Motion RCM-441/17) of PWES Report No. 57/17 titled "2018-2022 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2018 capital works projects which included retaining Dillon Consulting Limited to complete the engineering design for Bridges No. 1004, 1013 &1014 in 2018. It was further proposed that all three Bridges should be combined into a single tender package for tendering and construction in 2019.

As Dillon Consulting Limited has completed the engineering design for Bridges No. 1004, 1013 & 1014, Administration recommends continuing with them to complete a single tender package for the three Bridges, contract administration and inspection during construction in 2019.

Funding to be provided from:

- Bridges Lifecycle Reserve $621,900

WATER & WASTEWATER PROJECTS

Water and wastewater projects are intended to upgrade existing infrastructure while also providing for future development.

The methodology used to provide Council with recommendations for yearly capital projects are:

- a review of the Town of Tecumseh Water & Wastewater Master Plan.
- a review of lifecycle dollars available and possible government funding.
- a review of the Ministry of Environment regulations/guidelines.
- a review of other planned capital projects.
- a review of possible opportunities to improve/upgrade the existing infrastructure.

WATER PROJECTS

WA 1. Water and Wastewater Master Plan Update

Water and Wastewater Master Plan Update - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$100,000	**$15,000**	$0	$115,000

Since the completion of the 2008 Water and Wastewater Master Plan Update, further planning studies and discussion papers related to the preparation of a new Official Plan have been completed. In order to ensure that the Town implements the most cost effective infrastructure servicing strategies required to support new growth and maintain a high level of service into the future, an update to the current Master Plan is being planned in accordance with the Class Environmental Assessment (EA) process for water and wastewater projects. The purpose of the Master Plan Update is to re-examine water and wastewater infrastructure timing and costing requirements for the existing settlement areas in the Town of Tecumseh.

This study was commenced in 2016 and it is expected to continue into early 2019.

Funding to be provided from:

- Watermain Reserve Fund $7,500
- Wastewater Sewers Reserve Fund $7,500

WA 2. Highway No.3 / County Road 11 Watermain Replacement

Highway No.3 / County Road 11 Watermain Replacement - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$134,600	**$0**	$1,933,400	$2,068,000

The Water Division recommended replacement of the existing 200mm diameter ductile iron watermain at the Highway No.3 / County Road 11 intersection. In recent years the 200mm diameter ductile iron watermain has been failing due to the age and material of the pipe. It was proposed to carry out the engineering in 2018 and proceed with construction in 2019.

The recommended works consist of the following:

- Replacement of approximately 410m of 200mm ductile iron watermain on Highway No.3 from County Road 11 westerly with a new 300mm diameter PVC;
- Replacement of approximately 345m of 200mm ductile iron watermain on County Road 11 from McCord Lane to just south of Highway No.3 with a new 300mm diameter PVC;
- The installation of approximately 430m of 300mm diameter PVC watermain on Highway No.3 from County Road 11 to Oldcastle Road.

At the December 12, 2017 Regular Meeting of Council, Council approved the recommendations (Motion RCM-441/17) of PWES Report No. 57/17 titled "2018-2022 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2018 capital works projects which included retaining Stantec Consulting

Limited to complete the engineering design for the Highway No.3 / County Road 11 Watermain Replacement project in 2018.

Preliminary plans have been submitted to the Ontario Ministry of Transportation (MTO) for review/comment. Due to on-going discussions with MTO, it is now proposed that the engineering design will be completed in 2019 with construction proceeding in 2020.

Previously approved funding from:

- Watermain Reserve Fund $134,600

WA 3. Water Audit and Water Balance

Water Audit and Water Balance - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$15,000**	$0	$15,000

One of the key components of a water distribution asset management program is the assessment and control of water losses. The assessment and control of real losses (i.e. leakage) can greatly impact the service life of a water distribution network and save costs associated with the production and distribution of our precious water resource.

The American Water Works Association (AWWA) Manual M36 (Water Audits and Loss Control Programs) recommends completing an International Water Association (IWA) Water Audit for water distribution systems. An IWA Water Audit identifies Revenue and Non-Revenue Water and quantifies each in terms of volumes of water and costs (both operational costs to purchase water from the Windsor Utilities Commission (WUC) and potential revenue losses from customer meters). The IWA Water Audit is considered a North American Best Management Practice for water utilities and is recommended to be completed annually in order to assess water losses and gauge the performance of ongoing water loss reduction measures.

Administration recognizes the importance of identifying and reducing Non-Revenue Water in the Town's water distribution system. This is particularly important since the Town purchases water from the WUC and any water that does not reach customers because of leakage, or is not billed, becomes a cost for the Town. As a result, a third party IWA Water Audit was previously undertaken for the Town of Tecumseh in 2013/2014 with data from the year 2012 (IWA Water Audits are performed with a full years data).

Administration recommends that a new, independent, third party IWA Water Audit be completed to establish the current levels of Non-Revenue Water and water losses within the Town of Tecumseh water distribution system. Administration recommends that Kingsley Blease Consulting/Watermark Solutions be retained in 2019 to undertake an IWA Water Audit of the Town's water distribution system based on their experience completing IWA Water Audits for numerous municipalities in Ontario and the Atlantic Provinces.

Funding to be provided from:

- Watermain Reserve Fund $15,000

WA 4. Tecumseh Water Tower – Internal Lining Replacement

Tecumseh Water Tower – Internal Lining Replacement - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$470,000**	$0	$470,000

The Town of Tecumseh water tower was built in 1991 by Landmark Municipal Services (Landmark). In order to maintain the integrity of this facility, the Town cleans and inspects the water tower every 5 years in accordance with the recommendations of the Ontario Water Works Association and the American Water Works Association.

In 2013 Landmark was retained to clean and inspect the water tower. At that time, isolated repairs were made to the interior lining of the tank and the remaining life span of the interior lining was estimated to be approximately 3 to 5 years.

In early 2018, Landmark was retained to undertake the recommended 5 year cleaning and inspection of the water tower. The recent inspection confirmed that the interior tank lining has reached the end of its service life and requires replacement. The required works generally include cleaning/removal of tank sediment, removal/replacement of interior tank ladder, sandblast/reline tank interior surfaces and disinfect/fill tank.

Administration recommends that the water tank re-lining be completed in 2019. Administration will bring forward a separate report to Council in early 2019 with further details and recommendations on who should be retained to complete the works.

Funding to be provided from:

- Water Facilities Reserve Fund $470,000

WA 5. County Road 42 and County Road 43 Improvements – Advanced Engineering

Highway No.3 / County Road 11 Watermain Replacement - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$50,000**	$0	$50,000

As part of the County of Essex 25-year capacity program, County Road 42 and County Road 43 road widening have been identified to be completed within the next couple of years. The County of Essex has engaged Dillon Consulting Limited to undertake the detailed design for the following:

- Widening of County Road 42 from the City of Windsor border with the Town of Tecumseh to the Pike Creek.
- Diversion of County Road 43 from Shields Avenue to approximately 250 metres south of County Road 42.

Administration has identified municipal services within the project limits that need to be designed and incorporated into the County's overall project. The advanced engineering work required includes the design of watermains, sanitary sewers and the design of overland flow

routing from existing development located on the north side of County Road 42 to the Pike Creek located to the south of County Road 42. The design of these services is not included in the scope of work being completed by the County of Essex.

In order to ensure the Town's servicing requirements are addressed, Administration recommends that Dillon Consulting Limited be retained in 2019 to complete the engineering design for the above noted municipal services to allow this work to be incorporated into the County of Essex contract drawings and specifications for their County Road 42 project. As construction proceeds in a phased manner, Administration will identify those applicable costs for municipal infrastructure in future capital works plans.

Funding to be provided from:

- Watermain Reserve Fund $25,000
- Wastewater Sewers Reserve Fund $16,000
- Storm Sewer Lifecycle Reserve $9,000

WASTEWATER PROJECTS

WW 1.County Road 11 (North) Sanitary Sewer Extension

County Road 11 (North) Sanitary Sewer Extension - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$341,650	**$1,250,950**	$0	$1,592,600

The next project considered under the North Talbot Road sanitary sewer service area is the extension of a sanitary sewer along County Road 11 from North Talbot Road to Highway 401.

At the December 12, 2017 Regular Meeting of Council, Council approved the recommendations (Motion RCM-441/17) of PWES Report No. 57/17 titled "2018-2022 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2018 capital works projects which included continuing with Dillon Consulting Limited to complete the coordination of the utility relocations for the County Road 11 (North) Sanitary Sewer Extension project in 2018.

As recommended under Planning & Building Services Report No. 23/13 dated July 3, 2013, Council approved (Motion: RCM-218/13) a 3.0m wide trail along the east side of County Road 11 from Highway 401 to North Talbot Road. This trail is identified as Trail Segment Tec-3 in the CWATS Master Plan. This proposed CWATS project will be included as part of the sanitary sewer extension project.

Estimated recoveries from landowners for the sanitary sewers would be approximately $1,133,000. Estimated recoveries from the County of Essex for the CWATS trail would be $174,000 (40% of trail costs including design work in 2018). The project cost of $1,592,600 includes $1,152,000 for sanitary sewers and $434,600 for the installation of the 3.0m wide asphalt trail.

As Dillon Consulting Limited has completed the engineering design and the coordination of the utility relocations, Administration recommends continuing with them to complete the tendering,

contract administration and inspection during construction for the County Road 11 (North) Sanitary Sewer Extension project in 2019.

Funding to be provided from:

- Wastewater Sewers Reserve Fund $952,000
- Infrastructure Lifecycle Reserve $292,950

WW 2.Sylvestre Drive Sanitary Sewer Extension

Sylvestre Drive Sanitary Sewer Extension - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$187,400	**$97,600**	$1,616,450	$1,901,450

This project consists of the extension of a sanitary sewer on Sylvestre Drive from Sylvestre Drive to County Road 19 (approximately 410-metres), as well as adjacent to the County Road 19 right-of-way through a future easement (approximately 215-metres). It is also proposed to reconstruct Sylvestre Drive from Jamsyl Drive to County Road 19 (approximately 760-metres).

As part of this project, a Schedule B Environmental Assessment is required to be undertaken due to the extension of a sanitary sewer through a future easement.

At the December 12, 2017 Regular Meeting of Council, Council approved the recommendations (Motion RCM-441/17) of PWES Report No. 57/17 titled "2018-2022 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2018 capital works projects which included retaining Dillon Consulting Limited to complete the engineering design work and the Environmental Assessment for the Sylvestre Drive Sanitary Sewer Extension project in 2018.

The Environmental Assessment and engineering design are expected to be completed in early 2019. It is proposed to obtain the required property easements and project approvals during the remainder of 2019, and to proceed with construction in 2020.

Estimated recoveries from landowners for the sanitary sewers would be approximately $762,000. Assessments to be calculated by Administration and invoiced back to the landowners by means of a Part XII by-law (*Municipal Act*, s.391). The project cost of $1,901,450 includes $1,120,300 for road reconstruction, $762,000 for sanitary sewers, and $19,150 for storm sewers.

Funding to be provided from:

- Road Lifecycle Reserve $20,000
- Wastewater Sewers Reserve Fund $77,600

WW 3.County Road 46, Webster and Laval Sanitary Sewer Extension

County Road 46, Webster and Laval Sanitary Sewer Extension - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$370,250**	$2,947,250	$3,317,500

The County Road 46, Webster and Laval Sanitary Sewer Extension is a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area. The project includes the extension of a sanitary sewer along County Road 46 from the 8th Concession Road to Webster Drive, as well as on Webster Drive (entire length), and the extension of a sanitary sewer through an easement just south of Highway 401. It is proposed to carry out the engineering design in 2019 and to proceed with construction in 2020. This project will be coordinated with the County's planned road rehabilitation for County Road 46.

Estimated recoveries from landowners for the sanitary sewers would be approximately $1,767,000 and will be refined once the By-Law for the 8th Concession Road sanitary service area is completed. The project cost of $3,317,500 includes $1,065,500 for road reconstruction, $36,300 for storm sewers, $1,004,900 for sanitary sewers and $1,210,800 for watermains.

Administration recommends Dillon Consulting Limited be retained to complete the engineering design for the County Road 46, Webster and Laval Sanitary Sewer Extension in 2019, based on their experience with the Town's sanitary sewer infrastructure within the 8th Concession Service Area and their previous work on the 8th Concession Road Trunk Sanitary Sewer and Watermain (Phase 1) project.

Funding to be provided from:

- Road Lifecycle Reserve $120,750
- Watermain Reserve Fund $80,400
- Wastewater Sewers Reserve Fund $166,700
- Storm Sewer Lifecycle Reserve $2,400

WW 4.Delduca Drive Sanitary Sewer Extension

Delduca Drive Sanitary Sewer Extension - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$297,350**	$2,672,650	$2,970,000

The Delduca Drive Sanitary Sewer Extension is a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area. The project includes the extension of a sanitary sewer along Delduca Drive. It is proposed to carry out the engineering in 2019, complete utility relocations and obtain the required easements in 2020, and proceed with construction in 2021.

Estimated recoveries from landowners for the sanitary sewers would be approximately $1,050,000 and will be refined once the By-Law for the 8th Concession Road sanitary service area is completed. The project cost of $2,970,000 includes $1,234,900 for road

reconstruction, $679,200 for storm sewers, $981,800 for sanitary sewers and $74,100 for watermains.

Administration recommends Stantec Consulting Limited be retained to complete the engineering design for the Delduca Drive Sanitary Sewer Extension in 2019, based on their experience with wastewater projects throughout the Town.

Funding to be provided from:

- Road Lifecycle Reserve $92,450
- Watermain Reserve Fund $5,550
- Wastewater Sewers Reserve Fund $148,500
- Storm Sewer Lifecycle Reserve $50,850

WW 5.Sanitary Sewer Rehabilitation (Inflow & Infiltration Removal) – Phase 3

Sanitary Sewer Rehabilitation (Inflow & Infiltration Removal) - Phase 3 Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$3,637,824	**$3,000,000**	$0	$6,637,824

At the December 13, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-442/16) of PWES Report No. 54/16 titled "2017-2021 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the Sanitary Sewer Rehabilitation (Inflow and Infiltration Removal) project components should the Town be successful in obtaining grant funding from upper levels of government.

This project involves the renewal and rehabilitation of approximately 30,000 linear metres of sanitary sewer pipe, 500 manholes and the rehabilitation of approximately 500 sanitary sewer service connections in Wards 1, 2 and 3. In 2017, the Town was successful in receiving two grants, the Ontario Community Infrastructure Fund (OCIF) and the Canada Water Wastewater Fund (CWWF). Based on the funding received, Phases 1 and 2 of this project were completed in 2017-2018. These phases included the following:

- Camera inspections of the sewer pipes to identify pipe condition, pipe defects and sources of inflow and infiltration using trenchless technology;
- Flushing and cleaning debris from the sanitary sewer pipes and service connections to facilitate leak testing and repair using trenchless technology; and
- Pressure testing and sealing of mainline joints, cracked or otherwise leaking pipes, tee connections, clean outs, risers and sanitary service connections using innovative trenchless technology.

The next component of the Sanitary Sewer Collection System Rehabilitation Project is Phase 3. Phase 3 includes sealing leaks in manholes, mainline sewers and laterals (private service connections). Completion of these works is subject to the Town obtaining grant funding from upper levels of government.

At the September 11, 2018 Regular Meeting of Council, Council approved the recommendations (Motion RCM-272/18) of PWES Report No. 2018-21 titled "National Disaster Mitigation Program-Intake 5" that authorized Administration to submit an application to the federal government for funding under the National Disaster Mitigation Program (NDMP) for the Phase 3 portion of this project. Subsequent to the September 11, 2018 Regular Meeting of Council, Administration submitted a funding application for this project to the NDMP. The NDMP funding application is for 50% of the project cost up to a maximum amount of $1,500,000. The funding application is currently under review. If the funding application is approved, all works for this project must be completed by March 31, 2020.

Subject to confirmation of funding approval, Administration recommends proceeding with the Phase 3 portion of the Sanitary Sewer Collection System Rehabilitation Project in 2019. Administration further recommends that Blackrock Consulting be retained to complete the contract administration for Phase 3 based on their previous contract administration for Phases 1 & 2 and their experience with inflow and infiltration removal projects for other municipalities within Essex County.

Following confirmation of funding approval and completion of a tendering process, Administration will bring forward a report to Council with recommendations for the award of a construction contract for this project.

Funding to be provided from:

- Wastewater Sewers Reserve Fund $3,000,000

WW 6.Sanitary Pump Station and Sanitary Metering Station Improvement

Sanitary Pump Station and Sanitary Metering Station Improvements - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$32,500**	$30,000	$62,500

The Town owns and operates four (4) sanitary pump stations and five (5) sanitary metering stations. The 2016 Pump & Metering Station Condition Assessment identified 'Immediate Repairs' and '10 Year Repairs' for the sanitary pump stations and metering stations. In addition, the Town of Tecumseh has a service agreement with the Ontario Clean Water Agency (OCWA) for the operation and maintenance of the Town sanitary pump stations and sanitary metering stations. In accordance with the service agreement, OCWA provides the Town with a rolling five year list of major maintenance recommendations to ensure the long term health and operation of these sanitary facilities.

In accordance with the 2016 Pump & Metering Station Condition Assessment and the OCWA recommendations, Administration recommends upgrades at the following sanitary facilities in 2019:

- Sylvestre Drive Sanitary Pump Station ($15,000)
- Lakewood Sanitary Pump Station ($7,500)
- Cedarwood Sanitary Metering Station ($5,000)
- North Talbot Road Sanitary Metering Station ($5,000)

Funding to be provided from:

- Wastewater Facilities Reserve Fund $32,500

WW 7.Sanitary Sewer Model Update and Flow Monitoring

Sanitary Sewer Model Update and Flow Monitoring - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$250,000**	$0	$250,000

In 2011 Council received the report (Motion RCM-227/11) titled "Town of Tecumseh, Sanitary Sewer Assessment Report, dated May 2011". The report included a recommendation that the Town update their existing sanitary sewer model every three to four years, as well as carryout a flow monitoring program.

In 2011, Dillon Consulting Limited was retained to update the sanitary sewer model for the sanitary sewer infrastructure located north of County Road 22 in order to assess the impacts of a proposed development. The findings of the model update and related assessment led to the preparation of the "Sanitary Sewerage Collection System Improvements Class Environmental Assessment – April 2013 (Dillon) to address the recommended improvements. Following completion of the EA, Dillon Consulting Limited was retained to update the sanitary sewer model for the sanitary infrastructure located south of County Road 22 which was completed in late 2013. Both models were then integrated into one model.

At the June 26, 2018 Regular Meeting of Council, Council approved the recommendation (Motion RCM-194/18) of PWES Report No. 2018-17 "Flood Mitigation Strategy" that the report be received. Continued flow monitoring and sanitary sewer modeling were recommended flood mitigation strategies in the report. The report further identified that updating the sanitary sewer model would be incorporated within the 5-year PWES Capital Works Plan.

Administration recommends that the Town's existing sanitary sewer model be updated in 2019 including the installation of additional flow monitors within the sewer system to be used for model calibration. The flow monitors and updated modeling will provide insight into the existing flow characteristics of the sanitary sewer system and on available sanitary sewer capacity to accommodate infill development within the Town.

Administration recommends that Dillon Consulting Limited be retained to complete the Sanitary Sewer Model Update and Flow Monitoring project in 2019, based on their previous updates to the existing sanitary sewer model and their experience with wastewater projects throughout the Town.

Funding to be provided from:

- Wastewater Sewers Reserve Fund $250,000

WW 8.Manhole Restoration Program

Manhole Restoration Program - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$100,000**	$0	$100,000

Administration recommends a program whereby manholes that have been constructed in the travelled lanes of Town roadways will be reviewed and manholes that are found to have a significant difference in elevation between the rim and the surrounding roadway will be repaired. The method of repair is a technique that has been used by PWES for the last few years. It involves a machine to core drill around the manhole lid and the manhole is rebuilt and levelled to the surrounding pavement elevation. This method results in significantly less cracking of existing roadway pavement due to the circular excavation. It also allows the area around the manhole to be compacted prior to reinstatement of any pavement. PWES has experienced good success with this restoration method and it has been used by other municipalities to reconstruct manholes in travelled lanes.

Funding to be provided from:

- Wastewater Sewers Reserve Fund $50,000
- Storm Sewer Lifecycle Reserve $50,000

STORM SEWER PROJECTS

ST 1. Storm Drainage Master Plan

Storm Drainage Master Plan - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$600,000	**$0**	$0	$600,000

At the December 13, 2016 Regular Council Meeting, Council approved the recommendations (Motion RCM-442/16) of PWES Report No. 54/16 titled "2017-2021 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the Storm Drainage Master Plan in 2017 and 2018.

The Town's stormwater infrastructure network is supported through eight (8) stormwater pumping stations which are primarily located near the shore of Lake St. Clair due to the topography of the area within Wards 1, 2, and 3. The proposed Stormwater Master Plan will focus on an analysis of the storm infrastructure within the eight (8) storm pumping station service areas.

This analysis will review how the Town's stormwater infrastructure functions during minor rainfall events (what can be contained within the storm sewer network) and major rainfall events (which would follow overland flood routes). The storm pumping stations will also be reviewed to determine if any modifications or improvements are required based on the recommended storm sewer network improvements (i.e. capacity upgrades).

The Master Plan will also look for efficiencies in the storm sewer network and whether a consolidation of storm pumping stations is feasible. The Master Plan will follow the Municipal Class Environmental Assessment (EA) process and is equivalent to the same steps that a Schedule 'B' EA would follow. This will provide the Town the necessary analysis/study under the Municipal Class EA process to complete future improvements, reconstruct and/or decommission storm pumping stations without having to complete a separate Schedule 'B' EA at a later date.

In 2017 the Town was successful in receiving approval from the Federation of Canadian Municipalities (FCM) for funding in the amount of up to $175,000 under the Municipalities for Climate Innovation Program (MCIP) for the Town's Storm Drainage Master Plan feasibility study.

On Wednesday, July 25, 2018, a Public Information Centre was held to share details and gather public input on the preliminary findings of the Master Plan stormwater modelling assessment. The meeting was attended by 38 members of the public and 13 comments were received. Comments received will be considered as the project proceeds towards development of a preferred solution.

A second Public Information Centre is tentatively scheduled for January 2019 with completion of the final report and recommended solutions expected in early 2019.

Previous approved funding from:

- Storm Sewer Lifecycle Reserve $600,000

ST 2. Storm Pump Stations - 2019 Repairs

Storm Pump Stations, 2019 Repairs - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$100,000	**$268,000**	$0	$368,000

At the December 13, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-440/16) of PWES Report No. 51/16 titled "2016 Pump & Metering Station Condition Assessment" that authorized Administration to use the recommendations contained within the "2016 Pump & Metering Station Condition Assessment" to form the basis of the annual PWES Capital Works Plan.

The Town owns and operates eight (8) storm pump stations. The 2016 Pump & Metering Station Condition Assessment identified 'Immediate Repairs' and '10 Year Repairs' for the storm pump stations. Administration recommends that the proposed 2019 works include repairs at (i) West St. Louis Storm Pump Station (Cost of $66,300), (ii) Lesperance Road Storm Pump Station (Cost of $117,200), and (iii) East St. Louis Storm Pump Station (Cost of $84,500).

Funding to be provided from:

- Storm Sewer Lifecycle Reserve $268,000

ST 3. Oldcastle Storm Drainage Master Plan

Oldcastle Storm Drainage Master Plan - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$120,000	**$330,000**	$0	$450,000

At the December 12, 2017 Regular Meeting of Council, Council approved the recommendations (Motion RCM-441/17) of PWES Report No. 57/17 titled "2018-2022 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with the 2018 capital works projects which included retaining Stantec Consulting Limited to complete the Oldcastle Storm Drainage Master Plan.

The stormwater infrastructure network located within the Oldcastle Hamlet area is comprised of a combination of roadside ditches, Municipal Drains, storm sewers, swales/sub-drains, as well as County and Provincial storm infrastructure. There are three (3) distinct watershed areas within the Oldcastle Hamlet which include Little River (8 outlets), Turkey Creek (1 outlet), and River Canard (3 outlets).

The Oldcastle Storm Drainage Master Plan will focus on an analysis of the storm infrastructure within these watersheds and will set the framework for how stormwater is addressed for new and re-developments. This analysis will review how the storm infrastructure functions during minor rainfall events (what can be contained within the ditches, drains, and sewers), and major rainfall events (which would follow overland flood routes). The Master Plan will follow the Municipal Class Environmental Assessment (EA) process and is equivalent to the same steps that a Schedule 'B' EA would follow.

At the September 11, 2018 Regular Meeting of Council, Council approved the recommendations (Motion RCM-272/18) of PWES Report No. 2018-21 titled "National Disaster Mitigation Program-Intake 5" that authorized Administration to submit an application to the federal government for funding under the National Disaster Mitigation Program (NDMP) for the Oldcastle Storm Drainage Master Plan. Subsequent to the September 11, 2018 Regular Meeting of Council, Administration submitted a funding application for this project to the NDMP. The funding application is currently under review. If the funding application is approved, all works for this project must be completed by March 31, 2020.

Stantec Consulting Limited is proceeding with the Master Plan and is in the process of building the hydrologic and hydraulic models for the study area. Flow monitors have been installed at key locations with the existing storm sewer system to collect flow data that will be used for model calibration. This study will continue through 2019 with a final report anticipated in early 2020.

Funding to be provided from:

- Storm Sewer Lifecycle Reserve $330,000

ST 4. Scully & St. Mark's Storm Pump Station & Riverside Drive Storm Sewers

Scully & St. Mark's Storm Pump Station & Riverside Drive Storm Sewers - Project Costs Summary			
Previously Approved	**Requested for 2019**	Future Costs	Total Project Costs
$0	**$797,250**	$13,173,650	$13,970,900

In 2016 a review of the St. Mark's Storm Pump Station, the Scully (Edgewater) Storm Pump Station and the existing storm sewer infrastructure within the contributing drainage area was conducted. The results indicated that the storm pump stations would be unable to accommodate additional flows from local streets that were slated to be reconstructed with storm sewers having a 1:5-year level of service. These results were discussed and included in PWES Report No. 52/16 titled "Arlington Boulevard Improvements – Project Update, December 2016", which was brought to Council at the December 13, 2016 Regular Meeting of Council. In addition, the detailed analysis of the stormwater infrastructure that has been conducted as part of the on-going Storm Drainage Master Plan, has confirmed that improvements are required to the existing Scully & St. Mark's pump stations.

The proposed project consists of decommissioning the St. Mark's storm pump station and redirecting those flows into an upgraded and expanded Scully storm pump station to provide a greater level of service. The Scully pump station upgrade is to increase pump capacity to accommodate the additional flows from the current St. Mark's service area, as well as other adjacent areas where interconnections and overland flows have been identified as part of the Town's current Storm Drainage Master Plan. This project also includes trunk storm sewer improvements along Riverside Drive to add resiliency to the system and improve the level of service to address area-wide issues of surface flooding.

At the July 24, 2018 Regular Meeting of Council, Council approved the recommendations (Motion RCM-232/18) of PWES Report No. 2018-19 titled "Disaster Mitigation and Adaptation Fund Expression of Interest" that authorized Administration to submit an Expression of Interest to the federal government for funding under the Disaster Mitigation and Adaptation Fund (DMAF). Accordingly, an Expression of Interest was submitted which included the Scully & St. Mark's Storm Pump Station & Riverside Drive Trunk Storm Sewers project. On October 12, 2018, Administration received confirmation that the Expression of Interest was deemed conditionally eligible to proceed to a full application for funding. Administration is now in the process of completing the full application which is due on Friday, January 11, 2019.

The Storm Drainage Master Plan is scheduled to be complete in early 2019. Following completion of the Storm Drainage Master Plan, Administration recommends moving forward with the engineering design for Scully & St. Mark's Storm Pump Station & Riverside Drive Storm Sewers project in 2019. The schedule for the engineering design may be modified if the Town's application for DMAF funding is approved. The future timing for construction is contingent on the availability of funding and Council approval.

The project cost of $13,970,900 includes $12,846,800 for storm sewers and pumping stations, $360,100 for sanitary sewers and $764,000 for road reconstruction.

Administration recommends that Dillon Consulting Limited be retained to complete the engineering design for the Scully & St. Mark's Storm Pump Station & Riverside Drive Storm

Sewers project in 2019, based on their on-going work on the Storm Drainage Master Plan and their experience with storm drainage projects throughout the Town.

Funding to be provided from:

- Storm Sewer Lifecycle Reserve $733,100
- Wastewater Sewers Reserve Fund $20,550
- Road Lifecycle Reserve $43,600

MUNICIPAL DRAIN PROJECTS

Town of Tecumseh is obligated to manage, repair, maintain and improve the Town's 120 Municipal Drains (totaling 221km) in accordance with the Drainage Act, including assessing costs to the benefitting upstream landowners according to the most current by-law. Municipal Drains are not municipal infrastructure and only the actual Town assessments are funded from the general tax rate.

There are currently over 119 active drainage projects that the Town is undertaking. These works include new municipal drains (1), maintenance of existing drains (58), drain improvements requiring an engineer's report (44) and apportionment agreements (16) all of which are at various stages of completion. The Drainage Superintendent receives requests for maintenance or repair and improvements for Municipal Drains, and determines which section of the Drainage Act is most suitable to proceed with the request. These drainage requests, and subsequent works, are addressed as they occur and brought before Council for their approval on a project by project basis.

Funding for the Town's assessment for Municipal Drains will generally come from the Drains Lifecycle Reserves.

2020 to 2023 Projects

This section provides a higher level discussion on projects being proposed for 2020 to 2023.

- **2020: Bridge and Culvert Needs Study (Structures with Spans > 3.0m)** (Cost of $36,000)

  There are a total of sixteen (16) existing bridges and culverts with a span greater than 3.0 metres that were inspected as part of the Bridge and Culvert Needs Study in 2018. Inspections of the sixteen structures within the Town were completed in accordance with the latest version of the Ontario Structure Inspection Manual (OSIM) published by the Ministry of Transportation of Ontario (MTO).

  Inspections of the bridges and culverts are to take place every two years as legislated by Section 2(3) of The Public Transportation and Highway Act: "The structural integrity, safety and condition of every bridge shall be determined through the performance of at least one inspection in every second calendar year under the direction of a professional engineer and in accordance with the Ontario Structure Inspection Manual". It will be necessary to carry out a new Bridge and Culvert Needs Study in 2020 to comply with the legislation.

- **2020: Shoreline Management Plan** (Cost of $210,000)

In 1973 the City of Windsor and surrounding areas (including Tecumseh and St. Clair Beach) experienced widespread flooding from Lake St. Clair and the Detroit River due to a combination of record high lake levels and strong on-shore winds. The properties along the shoreline as well as inland (lower lying) properties sustained significant flood damage during that event.

The water levels in Lake St Clair reached new record highs in 1985 (from the previous record set in 1973) which prompted the Essex Region Conservation Authority in coordination with many local municipalities to undertake Shoreline Management Plans, including:

- The City of Windsor, 1986
- Town of LaSalle (Township of Sandwich West), 1988
- Town of Amherstburg (Township of Malden), 1989
- Town of Kingsville (Township of Gosfield South), 1990

At the June 26, 2018 Regular Meeting of Council, Council approved the recommendation (Motion RCM-194/18) of PWES Report No. 2018-17 "Flood Mitigation Strategy" that the report be received. Completion of a Shoreline Management Plan was a recommended flood mitigation strategies in the report. The report further identified that completion of a Shoreline Management Plan would be incorporated within the 5-year PWES Capital Works Plan.

It is recommended that Tecumseh undertake a Shoreline Management Plan to determine the best ways to identify and manage flood and erosion risk to the developed shoreline of Lake St Clair and the Pike Creek. The plan will also determine opportunities where partners, stakeholders and landowners can work together to identify, manage and reduce the risk of flooding and erosion due to high lake levels and wave action.

- **2020: Traffic Signal Reconstruction (Lesperance/McNorton)** (Cost of $165,000)

A condition assessment was conducted for all traffic signal infrastructure owned and maintained by the Town, including 11 intersections and one mid-block cross walk. Traffic signal infrastructure includes poles, luminaires, mast arms, traffic signal heads, pedestrian signal heads, pedestrian push buttons, hand holes, loop detectors, cabinets, controllers, wiring and conduit.

The traffic signal condition assessment has been used as the basis for identifying the recommended priority, scope and cost for traffic signal infrastructure improvements, which could be utilized by the Town to develop a long-term, comprehensive maintenance and capital replacement strategy.

At the September 22, 2015 Regular Meeting of Council, Council approved the recommendations (Motion RCM-319/15) of PWES Report 51/15 titled "Traffic Signal Infrastructure Assessment (2015)" where the report was adopted and Administration

was authorized to use the recommendations contained within the report to form the basis of the annual PWES Capital Works Plan.

Based on the Traffic Signal Infrastructure Assessment (2015), it is recommended that the Lesperance/McNorton intersection traffic signals be reconstructed in 2020.

In addition to this project, it is recommended that the Traffic Signal Infrastructure Reconstruction program should include the following projects subject to the timing of the Tecumseh Road CIP project:

- Lesperance Road/Tecumseh Road East
- Lesperance Road/Arbour Street
- Tecumseh Road East/Shawnee Road

➢ **2020+: Culvert Works (Structures with Spans < 3.0m)**

The 2016 Culvert Needs Study (Structures with Spans < 3.0m) had identified two (2) structures to be replaced immediately; 10 structures to rehabilitated or replaced within a 1-5 year timeframe; and three (3) structures to be rehabilitated or replaced within a 6-10 year timeframe. The recommended culvert works are as follows:

- 2020 – Culvert No. 45, South Talbot Road (cost of $326,000)
- 2020/2021 – Culvert No.54, Snake Lane Road (cost of $490,000)
- 2020/2021 – Culvert No.53, Snake Lane Road (cost of $490,000)
- 2020/2021 – Culvert No.42, Snake Lane Road (cost of $490,000)
- 2021/2022 – Culvert No.51, 8th Concession Road (cost of $150,000)
- 2021/2022 – Culvert No.70, 12th Concession Road (cost of $160,000)
- 2024+ – Culvert No.48, Holden Road (cost of $550,000)

➢ **2020 – 2021: Manning Road Improvement Project, Phases 2&3** (Cost of $10,248,070)

The Town completed a Class Environmental Assessment (EA) in April 2010 for improvements to the East Townline Drain (Manning Road) Storm Pump Station. The proposed upgrades to the pump station and drain enclosure along Manning Road provided an opportunity to improve this portion of Manning Road by constructing an urban cross-section that accommodates pedestrians, cyclists and urban design features to create an aesthetically pleasing gateway into Lakewood Park. The limits of the Class EA included Manning Road from Riverside Drive to St. Gregory's Road.

The Town actively pursued senior government funding and on July 8, 2011, the Ontario Minister of Finance announced a grant for financial assistance to the Town in the amount of $6,183,333, which represented a one-third share of the total project cost of $18.55M. The Town was able to amend the funding agreement with the Ontario Government so that the $6.1M grant could be utilized in Phase 1, being the construction of the storm pump station and associated facilities, and the reconstruction of a section of Riverside Drive (Manning Road to Christy Lane), including the roundabout at the

Manning Road/Riverside Drive intersection. Construction of Phase 1 was completed in 2014.

At the December 13, 2016 Regular Council Meeting, Council approved the recommendations (Motion RCM-442/16) of PWES Report No. 54/16 titled "2017-2021 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with finalizing the engineering design for Manning Road Improvement Project, Phases 2 & 3 in 2017, and to proceed with construction in 2019 and 2020 respectively.

At the July 24, 2018 Regular Meeting of Council, Council approved the recommendations (Motion RCM-232/18) of PWES Report No. 2018-19 titled "Disaster Mitigation and Adaptation Fund Expression of Interest" that authorized Administration to submit an Expression of Interest to the federal government for funding under the Disaster Mitigation and Adaptation Fund (DMAF). Accordingly, an Expression of Interest was submitted which included the Manning Road Improvements Phases 2 & 3 projects. On October 12, 2018, Administration received confirmation that the Expression of Interest was deemed conditionally eligible to proceed to a full application for funding. Administration is now in the process of completing the full application which is due on Friday, January 11, 2019.

As noted above, it was originally planned to proceed with construction for Phases 2 & 3 in 2019 and 2020 respectively. Subject to the results of the DMAF funding application, these projects are now tentatively scheduled to proceed with construction in 2020 and 2021.

The total project cost of $10,248,070 includes $5,143,110 for Phase 2 and $5,104,960 for Phase 3. Expected recoveries from the County of Essex are anticipated to be $120,000 for a portion of the Bike Lanes (under CWATS), and $450,000 for a portion of Manning Road reconstruction (under the Connecting Link Agreement).

- **2020-2021: Traffic Signal Upgrades/Maintenance** (Cost of $92,500)

A condition assessment was conducted for all traffic signal infrastructure owned and maintained by the Town, including 11 intersections and one mid-block cross walk. Traffic signal infrastructure includes poles, luminaires, mast arms, traffic signal heads, pedestrian signal heads, pedestrian push buttons, hand holes, loop detectors, cabinets, controllers, wiring and conduit.

The traffic signal condition assessment has been used as the basis for identifying the recommended priority, scope and cost for traffic signal infrastructure improvements, which could be utilized by the Town to develop a long-term, comprehensive maintenance and capital replacement strategy.

At the September 22, 2015 Regular Meeting of Council, Council approved the recommendations (Motion RCM-319/15) of PWES Report 51/15 titled "Traffic Signal Infrastructure Assessment (2015) where the report was adopted, and authorized Administration to use the recommendations contained within the report to form the basis of the annual PWES Capital Works Plan.

Based on the Traffic Signal Infrastructure Assessment (2015), it is recommended that traffic signal upgrades/maintenance will be required at the following intersections.

- 2020 - Manning Road at Green Valley Plaza Intersection ($20,625)
- 2020 - Tecumseh Road East and Manning Road Intersection ($20,625)
- 2020 - Tecumseh Road East and Southfield Drive Intersection ($21,250)
- 2021 - Manning Road and St. Gregory's Road Intersection ($16,500)
- 2021 - Tecumseh Road East and Green Valley Plaza Intersection ($13,500)

➢ **2020 - 2021: Riverside Drive In-line Storage Trunk Sanitary** (Cost of $2,123,750)

In 2013, a Municipal Class Environmental Assessment titled "Class Environmental Assessment (Class EA) Environmental Screening Report for the Town of Tecumseh Sanitary Collection System Improvements, April 2013" was completed. As part of this 2013 Class EA, various alternative solutions were identified and evaluated to address the problem of basement flooding and the lack of capacity in the sanitary sewage system to accommodate future growth. Based on a comparative evaluation, an expansion and upgrading of the existing sanitary sewage collection system was identified as the preferred solution.

The functional design for the preferred solution identified a reduction in the risk of basement flooding and could accommodate new development. The recommended improvements included:

- Stage 1 (completed in 2014)
  - Lakewood Pump Station Improvements
  - Increased storage capacity – Lakewood Park Trunk Sewer
- Stage 2 (future considerations)
  - Increase storage capacity – Riverside Drive Trunk Sewer
- Stage 3 (future considerations)
  - Additional investigations and sanitary sewer modelling required on Dillon and Green Valley Drive

The Riverside Drive Trunk Sanitary Sewer project consists of replacing the existing sanitary sewer along Riverside Drive between Kensington Boulevard and Pentilly Road with an in-line storage facility. Approximately 395 metres of the existing 400mm diameter sanitary sewer will be replaced with 1500mm diameter sanitary sewer to provide remedial flooding measures to reduce sanitary sewer surcharging and reduce the risk of basement flooding due to current sanitary inflow and infiltration.

The project cost of $2,123,750 includes $1,375,000 for sanitary sewers and $748,750 for road reconstruction.

Engineering design for this project is proposed to be completed in 2020 with construction proceeding in 2021.

The Government of Canada recently developed the Disaster Mitigation and Adaptation Fund (DMAF) to invest in the public infrastructure needed to mitigate the potential economic, environmental and social impacts of climate change, and strengthen resiliency to disasters triggered by natural hazards and extreme weather events. The Town submit an Expression of Interest to the federal government for funding under the DMAF that included the Riverside Drive Trunk Sanitary Sewer project. The Town's Expression of Interest was accepted and we were deemed conditionally eligible to proceed to the full application process. The Town will be proceeding with the full application process. Results of this funding application may change the proposed timelines for this project.

- **2020+: Zone 2 Booster Station (W-9) and Water Storage Facility (W-10)** (Cost of $7,863,000)

At the December 8, 2015 Regular Council Meeting, Council approved the recommendations (Motion RCM-419/15) of PWES Report No. 63/15 titled "2016-2020 Public Works & Environmental Services Capital Works Plan" that authorized Administration to proceed with a Water and Wastewater Master Plan Update. The purpose of the Master Plan Update was to re-examine water and wastewater infrastructure timing and costing requirements for the existing settlement areas in the Town of Tecumseh to ensure that the most cost effective infrastructure servicing strategies required to support new growth and maintain a high level of service into the future is implemented.

Through the Master Plan Update it is recommended that a second pressure zone is required for the South Service Area. Creation of a second pressure zone requires construction of the following facilities:

- W-9 - A new booster pumping station to provide adequate system pressure during peak demand conditions for existing and new growth including pressure reducing valves and/or check valves at all boundary connection points with the City of Windsor water system and zone isolation valves between the two Tecumseh pressure zones.

- W-10 - A new water storage facility to meet the long-term water storage requirements for fire protection.

Total project cost estimate is $7,863,000 with $2,675,000 for W-9 and $5,188,000 for W-10. It is proposed to complete the engineering in 2020 with construction of W-9 and W-10 to follow in subsequent years as funding becomes available.

- **2020+: County of Essex (Initiated) Projects**

The County of Essex has a number of planned projects in the upcoming years, where the Town is obligated to meet financial contributions through cost sharing arrangements. The Town is also planning on a number of infrastructure improvements as part of these projects. As the projects are more clearly defined in the years to come, Administration will continue to communicate and negotiate with the County as to the Town's exact contribution. These projects consist of the following:

- **County Road 11/South Talbot Road (2020,Town's cost share to be negotiated)**

  The County is currently completing the design of a roundabout at the County Road 11/South Talbot Road intersection. Town's cost share to be negotiated.

- **County Road 42 & County Road 43 (2020-2024+, Town cost of $1,670,500)**

  As part of the County's 25-year capacity program, County Road 42 and County Road 43 road widenings have been identified to be completed within the next couple of years. The Town's costs may consist of a cost share of traffic signal infrastructure and bike lanes, and the installation of sidewalks, multi-use trails, watermains, and sanitary sewers. Advanced engineering is recommended to be completed in 2019 for municipal services related to these County projects.

- **Westlake Drive Extension (2020, cost of $438,500)**

  The extension of Westlake Drive is a component of the County's planned advance construction works at the County Road 22/Lesperance Road intersection, the design details which continue to be the subject of discussion with the County. The Town has provided the County of Essex with a traffic study prepared by Dillon Consulting Limited which details the anticipated urban-cross section required for this road extension. The Town will be seeking to install full municipal services (storm, sanitary, watermain), for which those costs will be full recovery from the adjacent development lands.

- **County Road 19 (2021+, Town cost of $214,500)**
  The County is proposing advance construction works at the intersections of County Road 19/County Road 46 intersection and the County Road 19/County Road 34 intersection. The Town's costs are attributed to the replacement of the existing watermains.

➢ **2021+: Peter Cecile (Kensington) Storm Pump Station** (Cost of $6,218,000)

In 2016 a review of the Peter Cecile (Kensington) Storm Pump Station and existing storm sewer infrastructure within the contributing drainage area was conducted. The results indicated that the pump station cannot accommodate the future projected flows from the drainage area once some of the existing streets are reconstructed to an urban (or semi-urban) cross section.

As part of the Storm Drainage Master Plan (currently underway), a further detailed analysis will be conducted on the stormwater infrastructure (including pump stations) to determine if any modifications or improvements are required. The Master Plan will also identify prioritization of recommended works based on various factors, such as their location within the system and their existing condition.

The project cost of $6,218,000 includes $ 5,938,000 for storm sewers and pump stations and $280,000 for road reconstruction.

Although the Storm Drainage Master Plan has not yet been completed, Administration felt it was important to identify this project within the 5-year capital works plan as it will have an effect on the annual allocation to the storm sewer reserve fund. There is also benefit in having projects in a 'shovel ready' state in the event grant funding becomes available from upper levels of government. The timing of design and construction is contingent on the final recommendations and prioritization in the Storm Drainage Master Plan, the availability of funding, and Council approval.

- **2021 – 2022: Ure Street Sanitary Sewer Extension** (Cost of $1,587,000, landowner recoveries approximately $905,500)

  The Ure Street Sanitary Sewer Extension is a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area. This project includes the extension of a sanitary sewer along Ure Street from Delduca Drive to North Talbot Road. It is proposed to carry out the engineering in 2021 and to proceed with construction in 2022.

  Estimated recoveries from landowners for the sanitary sewers would be approximately $905,500 and will be refined once the By-Law for the 8th Concession Road sanitary service area is completed. The project cost of $1,587,000 includes $509,000 for sanitary sewers, $667,000 for road reconstruction and $411,000 for storm sewers.

- **2021 – 2022: Lesperance Road Trail** (Cost of $864,500)

  As part of the Tecumseh Transportation Master Plan (TMP), a network of key Active Transportation facilities was developed to ensure connectivity in the larger network. This network has been coordinated with plans and recommendations from the County Wide Active Transportation Study (CWATS) and the City of Windsor Bicycle Use Master Plan (BUMP). The expansion of the Active Transportation Network is a municipal focus for several reasons, including: it promotes Environmental Sustainability, it promotes personal Health, and it promotes Equity in transportation service.

  The Lesperance Road segment from County Road 22 to County Road 42 has been identified to have both On-Road and Off-Road facilities. The Off-Road facility will consist of a 2.4-metre wide asphalt trail with an approximate length of 3,075-metres.

- **2022: Bridge and Culvert Conditions Assessment (Structures with Spans < 3.0m)** (Cost of $75,000)

  At the November 8, 2016 Regular Meeting of Council, Council approved the recommendations (Motion RCM-384/16) of PWES Report No. 39/16 titled "2016 Culvert Needs Study (Structures with Spans < 3.0m)" that authorized Administration to use the recommendations contained within the report to form the basis of the annual PWES Capital Works Plan.

  The "2016 Culvert Needs Study (Structures with Spans < 3.0m)" is being used by Administration to prioritize culvert works. It is recommended that a Bridge and Culvert Conditions Assessment be completed approximately every 5 to 6 years for structures with Spans < 3.0m. The recommended 2022 update will include the following:

- Condition assessment of the existing culvert;
- Signage and roadside safety review;
- Review site conditions and possible extensions of the culverts for roadside safety;
- Coordination with the Town's Drainage Superintendent as to active drainage reports;
- Recommend a schedule for repairs and replacements;
- Prepare detailed costs estimates for the recommended works

➢ **2022: Sanitary Pump Station Improvements** (Cost of $30,000)

The Town owns and operates four (4) sanitary pump stations. The 2016 Pump & Metering Station Condition Assessment had identified 'Immediate Repairs' and '10 Year Repairs' for the sanitary pump stations. The proposed 2022 works consist of improvements at the Sylvestre Sanitary Pump Station, where the pump and structural supports will be replaced.

➢ **2022 – 2023: O'Neil Street Sanitary Sewer Extension** (Cost of $1,794,000, landowner recoveries $740,000)

The O'Neil Street Sanitary Sewer Extension is a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area. This project includes the extension of a sanitary sewer along O'Neil Street from Delduca Drive to North Talbot Road. It is proposed to carry out the engineering in 2022 and to proceed with construction in 2023.

➢ Estimated recoveries from landowners for the sanitary sewers would be approximately $740,000, and will be refined once the By-Law for the 8th Concession Road sanitary service area is completed. The project cost of $1,794,000 includes $566,000 for sanitary sewers, $772,000 for road reconstruction and $456,000 for storm sewers.**2022+: West Tecumseh Trunk Sewer & Watermain from County Road 22 to CP Railway (WW-1A & W-1A) & Diversion Sewer South of CP Railway (WW-2)** (Cost of $5,436,000)

The West Tecumseh Trunk Sewer (WW-1A) is proposed to provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area (north of the CP Railway), and will provide an outlet for existing and new growth south of CP Railway. Based on preliminary design, a 1200mm diameter sewer is required. In order to comply with the Wastewater Agreement between the City of Windsor and the Town of Tecumseh, a flow measurement facility will be required on this trunk sewer prior to discharging to the outlet sewer on County Road 22.

In order to alleviate system surcharges in the Lesperance Road trunk sewer between CP Railway and County Road 22, a new diversion sewer (WW-2) will be constructed through the Hydro corridor south of CP Railway from the West Tecumseh Trunk Sewer to the trunk sewer on St. Alphonse Avenue. All flows from the St. Alphonse sewer will be diverted to the new outlet.

Total project cost estimate is $5,436,000 with $2,970,000 for WW-1A, $1,553,000 for W-1A and $913,000 for WW-2. It is proposed to complete the engineering in 2020, construction of WW-1A, W-1A and WW-2 to follow in subsequent years as funding becomes available.

Note: This information is based on the 2008 Water and Wastewater Master Plan Update and will be refined upon completion of the on-going update of the Water and Wastewater Master Plan that is schedule to be finalized in early 2019.

- **2022 – 2023: Riverside Drive Pathway** – Arlington to Kensington (Cost of $156,000)

  As part of the Tecumseh Transportation Master Plan (TMP), a network of key Active Transportation facilities was developed to ensure connectivity in the larger network. This network has been coordinated with plans and recommendations from the County Wide Active Transportation Study (CWATS) and the City of Windsor Bicycle Use Master Plan (BUMP). The expansion of the Active Transportation Network is a municipal focus for several reasons, including: it promotes Environmental Sustainability, it promotes personal Health, and it promotes Equity in transportation service.

  The Riverside Drive Pathway from Arlington to Kensington will consist of a 2.4-metre wide asphalt trail with an approximate length of 400-metres.

- **2023+: Moynahan Street, Henin Drive and Regal Drive Sanitary Sewer Extension** (Cost of $2,194,000, landowner recoveries $990,000)

  The Moynahan Street, Henin Drive and Regal Drive Sanitary Sewer Extensions are a continuation of the sanitary sewer servicing within the 8th Concession Road sanitary service area. It is proposed to carry out the engineering in 2023 and to proceed with construction in 2024.

  Estimated recoveries from landowners for the sanitary sewers would be approximately $990,000 and will be refined once the By-Law for the 8th Concession Road sanitary service area is completed. The project cost of $2,194,000 includes $692,000 for sanitary sewers, $944,000 for road reconstruction and $558,000 for storm sewers.

Consultations

Financial Services
Planning & Building Services

Financial Implications

The capital expenditures proposed for 2019 totals just over $13.9M with an additional $49.9M projected over the remaining four years of the five-year capital works plan. Details of expenditures by project and year are included in the tables.

Generally speaking funding for most projects is covered through lifecycle, grants and rates however the following categories are projected to be in deficit positions:

Bridges Lifecycle Reserve

This reserve estimates a small deficit for 2019 and 2020 in the $50,000 to $150,000 range. However, in 2021 three (3) culverts are planned to be replaced at a cost of $1,344,000 which causes the deficit to exceed $1,100,000. The annual $390,000 allocation will likely be sufficient on a longer-term basis but it is not enough to fund the existing backlog of work that was required over the previous number of years.

Prior to 2021, Administration will consider options to offset the deficit including reallocating funds from the Road LC, borrowing, grants, increasing the annual allocation and stretching out the works over a longer period.

Storm Sewer Lifecycle Reserve

The reserve is expected to be in a $1,700,000 deficit position by the end of 2020 largely as a result of the $1,668,000 required for Manning Road/ETLD Drain Relocation – Phase 2 project.

A major contributor to the deficit is that the Town has significantly enhanced storm infrastructure with funding coming from Storm Sewer LC whereas a portion of the funds should come from new infrastructure funds. Examples include Brighton and Manning Roads pump stations being enhanced, over what was previously in place, along with certain road projects in the St. Clair Beach and Oldcastle areas where the storm system is being enhanced. Deficits have been manageable using grants and additional funding provided by the Roads LC.

The Stormwater Master Plan is nearing completion. Preliminary results indicate that millions of dollars will be required over the next 20 years. The Scully & St. Mark's Storm Pump Station has been identified in the five-year capital works plan at an estimated project cost of almost $13,000,000 of which $700,000 has been allocated in 2019 for engineering to have the project in a "shovel ready" state in the event grants become available. The timing of design and construction is contingent on the final recommendations of the Master Plan, the availability of funding, and Council approval.

Discussions are on-going with regard to functional servicing for various developments that are being considered within the Town that may require advancement of Capital infrastructure. As proposals are brought forward, Administration will report back to Council with project details and potential financial implications.

Based on the current annual allocation of just over $900,000, implementation of the Master Plan projects will require significant funding enhancements. Administration continues to look at a range of funding sources including debt, grants, increased lifecycle allocations etc. In the near term OCIF grant allocations have been preliminarily earmarked for storm sewer purposes and will be banked until an implementation plan is developed coming out of the master planning process.

Wastewater Sewers Reserve Fund

This reserve fund continues to be in a deficit position, 2018 estimated to be $4,688,000. Lack of sustained growth has meant the Town has had to fund infrastructure for longer

than originally anticipated. In addition, the Town expended $11.9 million funding between 2011 and 2017 for trunk sanitary sewer construction for the 8th Concession Road sanitary service area. Local sewers are scheduled to be constructed over the next few years, which should result in significant recoveries to help reduce the deficit.

Administration is investigating at debt funding and other options in order to address the cash flow issues facing the wastewater infrastructure system.

The Town is updating its development charges study which includes dealing with a deficit in the reserve fund which will be combined with the above matter to develop a strategy to deal with this issue.

For purposes of putting together this PWES Capital Plan, Administration has assumed that new sidewalk and CWATS projects would be funded by the Infrastructure Reserve. Neither the Sidewalk LC nor the Trail LC annual allocations of $74,000 and $50,000 respectively allow for any significant new infrastructure. Administration continues to work at refining estimates for new infrastructure requirements to be funded from the Infrastructure LC as well as other methods of financing. Additional analysis will be brought before Council as these works continue.

Projected Lifecycle Reserve and Reserve Fund balances are provided in attached schedules.

Link to Strategic Priorities

Applicable	2017-18 Strategic Priorities
☒	Make the Town of Tecumseh an even better place to live, work and invest through a shared vision for our residents and newcomers.
☒	Ensure that the Town of Tecumseh's current and future growth is built upon the principles of sustainability and strategic decision-making.
☐	Integrate the principles of health and wellness into all of the Town of Tecumseh's plans and priorities.
☒	Steward the Town's "continuous improvement" approach to municipal service delivery to residents and businesses.
☐	Demonstrate the Town's leadership role in the community by promoting good governance and community engagement, by bringing together organizations serving the Town and the region to pursue common goals.

Communications

Not applicable ☒

Website ☐ Social Media ☐ News Release ☐ Local Newspaper ☐

This report has been reviewed by Senior Administration as indicated below and recommended for submission by the Chief Administrative Officer.

Prepared by:

John Henderson, P.Eng.
Manager Engineering Services

Reviewed by:

Phil Bartnik, P.Eng.
Director Public Works & Environmental Services

Reviewed by:

Luc Gagnon, CPA, CA, BMath
Director Financial Services & Treasurer

Reviewed by:

Brian Hillman, MA, MCIP, RPP
Director Planning & Building Services

Recommended by:

Tony Haddad, MSA, CMO, CPFA
Chief Administrative Officer

Attachment Number	**Attachment Name**
1	Capital Project Estimates 2019 – November 29, 2018
2	LCRoads2019 CC2 1500
3	LCBridges2019 CC2 1660
4	LCSidewalks2019 CC2 1550

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Attachment Number	Attachment Name
5	LCStorm2019 CC2 1650
6	RFSanitary2019 CC2 2550
7	RFSanitary2019 CC2 2560
8	RFWater2019 CC2 2520
9	RFWater2019 CC2 2530
10	RInfrastructure2019

TOWN OF TECUMSEH
Public Works and Environmental Services
2019 - 2023 Public Works & Environmental Services Capital Works Plan

	Construction	Engineering	Contingency	Total	2018	2019	2020	2021	2022	2023	2024
Roads											
Paving	$ 7,775,000	$ -	$ -	$ 7,775,000	$ 1,775,000	$ 1,300,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000	$ 1,000,000
Traffic Signal Controller Upgrade (w/ County)	$ 150,000	$ -	$ -	$ 150,000		$ 150,000					
PW Yard (North) Expansion/Improvements	$ 30,000			$ 30,000		$ 30,000					
Road Line Painter	$ 30,000	$ -	$ -	$ 30,000		$ 30,000					
Traffic Calming Guideline Study	$ -	$ 20,000	$ -	$ 20,000		$ 20,000					
Traffic Signal Upgrades/Maintenance	$ 83,000	$ 12,450	$ 8,300	$ 103,750			$ 62,500	$ 30,000			
Traffic Signal Reconstruction (Riverside/Lesperance)	$ 105,000	$ 30,000	$ 5,300	$ 140,300	$ 140,300						
Traffic Signal Reconstruction (Lesperance/McNorton)	$ 140,250	$ 24,750	$ -	$ 165,000			$ 165,000				
Tecumseh Road CIP - Phase 1	$ 10,131,900	$ 1,665,360	$ 946,000	$ 12,743,260	$ 71,492	$ 450,000					
Tecumseh Road CIP - Phase 2	$ 5,579,980	$ 846,540	$ 538,020	$ 6,964,540	$ 10,298	$ 78,000					
Tecumseh Road CIP - Phase 3	$ 2,930,130	$ 445,078	$ 282,870	$ 3,658,078							
Tecumseh Road CIP - Phase 4	$ 3,027,950	$ 459,522	$ 292,050	$ 3,779,522							
Tecumseh Road CIP - Phase 5	$ 1,742,250	$ 271,418	$ 172,500	$ 2,186,168							
Manning Road/ETLD Drain Relocation - Phase 2	$ 617,500	$ 96,555	$ 18,525	$ 732,580	$ 50,000		$ 682,580				
Manning Road Reconstruction - Phase 3	$ 4,047,500	$ 600,235	$ 121,425	$ 4,769,160	$ 180,000			$ 4,589,160			
South Talbot Road Reconstruction	$ 2,039,500	$ 189,000	$ 102,000	$ 2,330,500		$ 2,240,500					
Rossi Drive Sanitary Sewer	$ 950,000	$ 155,000	$ 47,500	$ 1,152,500	$ 1,075,000						
Sylvestre Drive Sanitary Sewer Extension	$ 880,000	$ 196,300	$ 44,000	$ 1,120,300	$ 74,000	$ 20,000	$ 1,026,300				
Lesperance Road Bike Lanes	$ 100,000	$ 10,000	$ -	$ 110,000		$ 110,000					
Tecumseh/Lacasse Intersection Improvements	$ 365,000	$ 77,000	$ 36,500	$ 479,000	$ 15,000						
Brighton Road Traffic Circle Review	$ -	$ 32,000	$ -	$ 32,000		$ 32,000					
Roads Needs Study	$ -	$ 63,000	$ -	$ 63,000		$ 63,000					$ 65,000
Scully & St Mark's Storm PS/Riverside Drive	$ 615,000	$ 87,200	$ 61,500	$ 764,000		$ 43,600			$ 720,400		
CR46/Webster/Laval Sanitary Sewer Exten. (LRPCP)	$ 880,000	$ 141,500	$ 44,000	$ 1,065,500		$ 120,750	$ 944,750				
Delduca Drive Sanitary Sewer (LRPCP)	$ 1,000,000	$ 184,900	$ 50,000	$ 1,234,900		$ 92,450		$ 1,142,450			
Riverside Drive In-line Storage Trunk Sanitary	$ 575,000	$ 116,250	$ 57,500	$ 748,750			$ 58,125	$ 690,625			
Kensington Storm PS *	$ 200,000	$ 60,000	$ 20,000	$ 280,000					$ 30,000		$ 250,000
Ure Street Sanitary Sewer (LRPCP)	$ 533,900	$ 80,100	$ 53,400	$ 667,000				$ 40,000	$ 627,000		
O'Neil Street Sanitary Sewer (LRPCP)	$ 617,500	$ 92,600	$ 61,800	$ 772,000					$ 46,300	$ 725,700	
Moynahan-Henin-Regal Sanitary Sewer (LRPCP)	$ 755,300	$ 113,300	$ 75,500	$ 944,000						$ 56,650	$ 887,350
Oldcastle Road Sanitary Sewer (LRPCP)	$ 1,150,000	$ 172,500	$ 115,000	$ 1,438,000							$ 5,000
	$ 48,201,660	$ 6,415,058	$ 3,268,690	$ 57,886,308	$ 3,391,090	$ 4,780,300	$ 3,939,255	$ 7,492,235	$ 2,423,700	$ 1,782,350	$ 2,207,350

TOWN OF TECUMSEH
Public Works and Environmental Services
2019 - 2023 Public Works & Environmental Services Capital Works Plan

	Construction	Engineering	Contingency	Total	2018	2019	2020	2021	2022	2023	2024
Sidewalks/Pathways											
Sidewalk Repair Program	$ 483,000	$ -	$ -	$ 483,000	$ 69,000	$ 69,000	$ 69,000	$ 69,000	$ 69,000	$ 69,000	$ 69,000
Riverside Drive Trail (Lesperance to Manning)	$ 680,000	$ 102,000	$ 68,000	$ 850,000		$ 782,000					
Lesperance Road Trail (CR22 to CR42)	$ 665,000	$ 99,750	$ 99,750	$ 864,500				$ 49,900	$ 814,600		
Riverside Drive Pathway (Arlington to Kensington)	$ 120,000	$ 18,000	$ 18,000	$ 156,000					$ 9,000	$ 147,000	
Lesperance Road Trail (Riverside to McNorton)	$ 350,000	$ 52,500	$ 52,500	$ 455,000							$ 26,250
CR42 / CR19 Roundabout (Sidewalks)	$ 16,500	$ -	$ 2,500	$ 19,000			$ 19,000				
CR42: CR43 to Lesperance (Sidewalks)	$ 352,000	$ -	$ 10,000	$ 362,000					$ 362,000		
CR42: Lesperance to CR19 (Sidewalks)	$ 50,000	$ -	$ 7,500	$ 57,500						$ 57,500	
CR42: City Limits to CR43 (Sidewalks)	$ 91,000	$ -	$ 13,700	$ 104,700							$ 104,700
	$ 2,807,500	$ 272,250	$ 271,950	$ 3,351,700	$ 69,000	$ 851,000	$ 88,000	$ 118,900	$ 1,254,600	$ 273,500	$ 199,950
CWATS Projects											
CR11: Hwy 401 to NTR (Multi-Use Trail)	$ 348,000	$ 52,000	$ 34,600	$ 434,600	$ 136,000	$ 292,950					
CR42 / CR19 Roundabout (Bike Lanes)	$ 1,000	$ -	$ -	$ 1,000			$ 1,000				
CR43: Banwell Diversion (Multi-Use Trail)	$ 285,000	$ -	$ 57,000	$ 342,000				$ 342,000			
CR42: CR43 to Lesperance (Bike Lanes)	$ 13,300	$ -	$ -	$ 13,300					$ 13,300		
CR42: Lesperance to CR19 (Bike Lanes)	$ 4,200	$ -	$ -	$ 4,200						$ 4,200	
CR42: City Limits to CR43 (Bike Lanes)	$ 2,000	$ -	$ 1,000	$ 3,000							$ 3,000
	$ 653,500	$ 52,000	$ 92,600	$ 798,100	$ 136,000	$ 292,950	$ 1,000	$ 342,000	$ 13,300	$ 4,200	$ 3,000
Bridges											
Bridge & Culvert Condition Assessment (<3m Span)	$ -	$ 75,000	$ -	$ 75,000					$ 75,000		
Bridge & Culvert Needs Study (>3m Span)	$ -	$ 108,000	$ -	$ 108,000	$ 32,000		$ 36,000		$ 36,000		$ 36,000
Culvert #46: South Talbot Road	$ 290,500	$ 90,000	$ 30,000	$ 410,500		$ 370,500					
Culvert #47: South Talbot Road	$ 131,500	$ 50,000	$ 14,000	$ 195,500		$ 175,500					
Culvert #35: Rossi Drive	$ 10,000	$ -	$ -	$ 10,000	$ 10,000						
Sullivan Creek at 12th Concession (1004)	$ 155,000	$ 87,500	$ 7,800	$ 250,300	$ 43,000	$ 207,300					
Townline Road Drain at 6th Concession Road (1014)	$ 155,000	$ 87,500	$ 7,800	$ 250,300	$ 43,000	$ 207,300					
Merrick Creek at 8th Concession Road (1013)	$ 155,000	$ 87,500	$ 7,800	$ 250,300	$ 43,000	$ 207,300					
Culvert #45: South Talbot Road (CR11/STR Works)	$ 250,000	$ 38,000	$ 38,000	$ 326,000			$ 326,000				
Culvert #42: Snake Lane Road	$ 400,000	$ 70,000	$ 20,000	$ 490,000			$ 42,000	$ 448,000			
Culvert #53: Snake Lane Road	$ 400,000	$ 70,000	$ 20,000	$ 490,000			$ 42,000	$ 448,000			
Culvert #54: Snake Lane Road	$ 400,000	$ 70,000	$ 20,000	$ 490,000			$ 42,000	$ 448,000			
Culvert #51: 8th Concession Road	$ 80,000	$ 60,000	$ 10,000	$ 150,000				$ 30,000	$ 120,000		
Culvert #70: 12th Concession Road	$ 85,000	$ 60,000	$ 15,000	$ 160,000				$ 30,000	$ 130,000		
Culvert #48: Holden Road	$ 422,000	$ 64,000	$ 64,000	$ 550,000							$ 32,000
	$ 3,214,000	$ 1,073,500	$ 297,400	$ 4,584,900	$ 171,000	$ 1,167,900	$ 488,000	$ 1,404,000	$ 361,000	$ -	$ 68,000

TOWN OF TECUMSEH
Public Works and Environmental Services
2019 - 2023 Public Works & Environmental Services Capital Works Plan

	Construction	Engineering	Contingency	Total	2018	2019	2020	2021	2022	2023	2024
Watermains											
Water & Wastewater Master Plan Update (2016)	$ -	$ 57,500	$ -	$ 57,500	$ 50,000	7500					
Tecumseh Road CIP - Phase 1	$ 430,000	$ 92,520	$ 43,000	$ 565,520							
Tecumseh Road CIP - Phase 2	$ 298,900	$ 47,030	$ 29,890	$ 375,820							
Tecumseh Road CIP - Phase 3	$ 157,150	$ 24,727	$ 15,715	$ 197,592							
Tecumseh Road CIP - Phase 4	$ 162,250	$ 25,529	$ 16,225	$ 204,004							
Tecumseh Road CIP - Phase 5	$ -	$ -	$ -	$ -							
Water Metering Facilities Repairs	$ 85,000	$ -	$ -	$ 85,000	$ 85,000						
Mack Court Watermain Replacement	$ 200,645	$ 44,105	$ 10,035	$ 254,790	$ 239,790						
Lacasse Park Watermain Replacement	$ 290,820	$ 59,830	$ 14,540	$ 365,190	$ 350,190						
Tecumseh Road Watermain Abandonment	$ 183,520	$ 44,665	$ 9,175	$ 237,360	$ 222,360						
Alden Crescent Watermain Replacement	$ 130,835	$ 31,735	$ 6,545	$ 169,120	$ 154,120						
Hwy#3/Roscon Watermain Interconnection	$ 131,100	$ 32,775	$ 6,555	$ 170,430	$ 155,430						
Rossi Drive Sanitary Sewer	$ 35,000	$ 25,000	$ -	$ 60,000	$ 35,000						
Manning Road/ETLD Drain Relocation - Phase 2	$ 373,000	$ 58,325	$ 11,190	$ 442,520			$ 417,520				
County Road 11 (North) Sanitary Sewer	$ -	$ -	$ -	$ -							
Hwy#3/Walker Rd Watermain Replacement	$ 1,700,000	$ 300,000	$ 68,000	$ 2,068,000	$ 60,000	$ 74,600	$ 1,933,400				
Anode Protection Program	$ 375,000	$ -	$ -	$ 375,000	$ 375,000						
SCADA Software/Server/Nodes Update	$ 73,500	$ -	$ -	$ 73,500	$ 73,500						
Water Meter Reader System Update	$ 15,000			$ 15,000	$ 15,000						
Westlake Drive - San, Strm, Water	$ 85,000	$ 12,750	$ 12,750	$ 110,500			$ 110,500				
Water Tower Internal Lining Replacement	$ 470,000			$ 470,000		$ 470,000					
Water Loss Audit	$ -	$ 15,000	$ -	$ 15,000		$ 15,000					
CR46/Webster/Laval Sanitary Sewer Exten. (LRPCP)	$ 1,000,000	$ 160,800	$ 50,000	$ 1,210,800		$ 80,400	$ 1,130,400				
Delduca Drive Sanitary Sewer (LRPCP)	$ 60,000	$ 11,100	$ 3,000	$ 74,100		$ 5,550		$ 68,550			
CR42 & CR43 Advanced Engineering	$ -	$ 25,000	$ -	$ 25,000		$ 25,000					
CR42 / CR19 Roundabout - Water & Sanitary	$ 225,000	$ 33,750	$ 22,500	$ 281,000			$ 281,000				
Zone 2 Booster Station (W-9)	$ 2,140,000	$ 321,000	$ 214,000	$ 2,675,000			$ 360,500				$ 2,314,500
Zone 2 Water Storage Facility (W-10)	$ 4,150,000	$ 622,500	$ 415,000	$ 5,188,000			$ 611,250				$ 4,576,750
CR19 @ CR46 Advanced Construction	$ 125,000	$ 18,750	$ 18,750	$ 162,500				$ 162,500			
West Tecumseh Trunk Watermain (W-1A)	$ 1,150,000	$ 230,000	$ 172,500	$ 1,553,000					$ 115,000		$ 1,438,000
CR19 @ CR34 Advanced Construction	$ 40,000	$ 6,000	$ 6,000	$ 52,000					$ 52,000		
CR42: Lesperance to CR19 - Watermain	$ 320,000	$ 48,000	$ 32,000	$ 400,000						$ 400,000	
	$ 14,406,720	$ 2,348,391	$ 1,177,370	$ 17,933,246	$ 1,815,390	$ 678,050	$ 4,844,570	$ 231,050	$ 167,000	$ 400,000	$ 8,329,250

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TOWN OF TECUMSEH
Public Works and Environmental Services
2019 - 2023 Public Works & Environmental Services Capital Works Plan

	Construction	Engineering	Contingency	Total	2018	2019	2020	2021	2022	2023	2024
Wastewater Projects											
Water & Wastewater Master Plan Update (2016)	$ -	$ 57,500	$ -	$ 57,500	$ 50,000	$ 7,500					
Tecumseh Road CIP - Phase 1	$ 400,000	$ 92,520	$ 40,000	$ 532,520							
Tecumseh Road CIP - Phase 2	$ 298,900	$ 47,030	$ 29,890	$ 375,820							
Tecumseh Road CIP - Phase 3	$ 157,150	$ 24,727	$ 15,715	$ 197,592							
Tecumseh Road CIP - Phase 4	$ 162,250	$ 25,529	$ 16,225	$ 204,004							
Tecumseh Road CIP - Phase 5	$ -	$ -	$ -	$ -							
Sanitary Sewer Rehabilitation (I&I Removal) - Ph1&2	$ 3,637,824	$ -	$ -	$ 3,637,824	$ 2,827,324						
Sanitary Sewer Rehabilitation (I&I Removal) - Ph3	$ 3,000,000	$ -	$ -	$ 3,000,000		$ 3,000,000					
Manning Road/ETLD Drain Relocation - Phase 2	$ 94,300	$ 14,750	$ 2,830	$ 111,880			$ 91,880				
Rossi Drive Sanitary Sewer	$ 450,000	$ 85,000	$ 22,500	$ 557,500	$ 515,000						
County Road 11 (North) Sanitary Sewer	$ 875,000	$ 172,000	$ 105,000	$ 1,152,000	$ 75,000	$ 952,000					
Sylvestre Drive Sanitary Sewer Extension	$ 600,000	$ 132,000	$ 30,000	$ 762,000	$ 109,200	$ 77,600	$ 575,200				
Pump Station Emergency Response Plan	$ -	$ 35,000	$ -	$ 35,000	$ 35,000						
SCADA Software/Server/Nodes Update	$ 26,250	$ -	$ -	$ 26,250	$ 26,250						
Manhole Restoration Program	$ 50,000	$ -	$ -	$ 50,000		$ 50,000					
Sylvestre Drive Sanitary PS Improvements	$ 45,000	$ -	$ -	$ 45,000		$ 15,000			$ 30,000		
Lakewood Sanitary PS Improvements	$ 7,500	$ -	$ -	$ 7,500		$ 7,500					
Sanitary Metering Station Repairs	$ 10,000	$ -	$ -	$ 10,000		$ 10,000					
Westlake Drive - San, Strm, Water	$ 132,000	$ 20,000	$ 20,000	$ 172,000			$ 172,000				
CR46/Webster/Laval Sanitary Sewer Exten. (LRPCP)	$ 830,000	$ 133,400	$ 41,500	$ 1,004,900		$ 166,700	$ 838,200				
Scully & St Mark's Storm PS/Riverside Drive	$ 290,000	$ 41,100	$ 29,000	$ 360,100		$ 20,550			$ 339,550		
Delduca Drive Sanitary Sewer (LRPCP)	$ 795,000	$ 147,000	$ 39,750	$ 981,800		$ 148,500		$ 833,300			
CR42 / CR19 Roundabout - Water & Sanitary	$ 15,000	$ 2,300	$ 1,500	$ 18,800			$ 18,800				
Sanitary Sewer Model Update	$ -	$ 250,000	$ -	$ 250,000		$ 250,000					
Riverside Drive In-line Storage Trunk Sanitary	$ 1,100,000	$ 165,000	$ 110,000	$ 1,375,000			$ 82,500	$ 1,292,500			
CR42 & CR43 Advanced Engineering	$ -	$ 16,000	$ -	$ 16,000		$ 16,000					
Ure Street Sanitary Sewer (LRPCP)	$ 407,500	$ 61,100	$ 40,800	$ 509,000				$ 31,000	$ 478,000		
West Tecumseh Trunk Sanitary (WW-1A)	$ 2,200,000	$ 440,000	$ 330,000	$ 2,970,000					$ 220,000		$ 2,750,000
Diversion San Sewers (Intersection Rd) (WW-2)	$ 676,000	$ 135,200	$ 101,400	$ 913,000					$ 67,600		$ 845,400
O'Neil Street Sanitary Sewer (LRPCP)	$ 471,300	$ 70,700	$ 23,600	$ 566,000					$ 35,350	$ 530,650	
CR42: Lesperance to CR19 - Sanitary	$ 40,000	$ 6,000	$ 4,000	$ 50,000						$ 50,000	
Moynahan-Henin-Regal Sanitary Sewer (LRPCP)	$ 576,400	$ 86,500	$ 28,800	$ 692,000						$ 43,250	$ 648,750
Oldcastle Road Sanitary Sewer (LRPCP)	$ 1,630,000	$ 244,500	$ 163,000	$ 2,037,500							$ 5,000
	$ 18,977,374	$ 2,504,856	$ 1,195,510	$ 22,678,490	$ 3,637,774	$ 4,721,350	$ 1,778,580	$ 2,156,800	$ 1,170,500	$ 623,900	$ 4,249,150

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TOWN OF TECUMSEH
Public Works and Environmental Services
2019 - 2023 Public Works & Environmental Services Capital Works Plan

	Construction	Engineering	Contingency	Total	2018	2019	2020	2021	2022	2023	2024
Storm Sewers											
Tecumseh Road CIP - Phase 1	$ 700,000	$ -	$ 70,000	$ 770,000	$ 27,410						
Tecumseh Road CIP - Phase 2	$ -	$ -	$ -	$ -							
Tecumseh Road CIP - Phase 3	$ -	$ -	$ -	$ -							
Tecumseh Road CIP - Phase 4	$ -	$ -	$ -	$ -							
Tecumseh Road CIP - Phase 5	$ -	$ -	$ -	$ -							
Storm Drainage Master Plan	$ -	$ 600,000	$ -	$ 600,000	$ 300,000						
Rossi Drive Sanitary Sewer	$ 386,500	$ 70,000	$ 19,300	$ 475,800	$ 440,800						
Manning Road/ETLD Drain Relocation - Phase 2	$ 1,428,600	$ 257,383	$ 42,850	$ 1,728,830			$ 1,668,830				
Manning Road Reconstruction - Phase 3	$ 285,000	$ 42,300	$ 8,500	$ 335,800				$ 335,800			
Sylvestre Drive Sanitary Sewer Extension	$ 15,000	$ 3,400	$ 750	$ 19,150	$ 4,200		$ 14,950				
Pump Station Emergency Response Plan	$ -	$ 35,000	$ -	$ 35,000	$ 35,000						
SCADA Software/Server/Nodes Update	$ 5,250	$ -	$ -	$ 5,250	$ 5,250						
West St. Louis Storm PS - Repairs	$ 51,000	$ 7,650	$ 7,650	$ 66,300		$ 66,300					
Lesperance Road Storm PS - Repairs	$ 181,000	$ 18,100	$ 18,100	$ 217,200	$ 100,000	$ 117,200					
(East) St. Louis Storm PS - Repairs	$ 65,000	$ 9,750	$ 9,750	$ 84,500		$ 84,500					
Manhole Restoration Program	$ 50,000	$ -	$ -	$ 50,000		$ 50,000					
Westlake Drive - San, Stm, Water	$ 120,000	$ 18,000	$ 18,000	$ 156,000			$ 156,000				
Oldcastle Storm Drainage Master Plan	$ -	$ 450,000	$ -	$ 450,000	$ 120,000	$ 330,000					
CR46/Webster/Laval Sanitary Sewer Extension	$ 30,000	$ 4,800	$ 1,500	$ 36,300		$ 2,400	$ 33,900				
Scully & St Mark's Storm PS/Riverside Drive	$ 10,346,000	$ 1,466,200	$ 1,034,600	$ 12,846,800		$ 733,100			$ 12,113,700		
Delduca Drive Sanitary Sewer (LRPCP)	$ 550,000	$ 101,700	$ 27,500	$ 679,200		$ 50,850		$ 628,350			
Shoreline Management Plan	$ -	$ 210,000	$ -	$ 210,000			$ 210,000				
Kensington Storm PS *	$ 4,750,000	$ 712,500	$ 475,000	$ 5,938,000				$ 356,250			$ 5,581,750
Ure Street Sanitary Sewer (LRPCP)	$ 328,800	$ 49,300	$ 32,900	$ 411,000				$ 25,000	$ 386,000		
O'Neil Street Sanitary Sewer (LRPCP)	$ 380,300	$ 57,000	$ 19,000	$ 456,000					$ 28,500	$ 427,500	
CR42 & CR43 Advanced Engineering	$ -	$ 9,000	$ -	$ 9,000		$ 9,000					
CR42: Lesperance to CR19 - Storm	$ 50,000	$ 9,000	$ 5,000	$ 64,000						$ 64,000	
Moynahan-Henin-Regal Sanitary Sewer (LRPCP)	$ 465,100	$ 69,800	$ 23,300	$ 558,000						$ 34,900	$ 523,100
	$ 20,852,550	$ 4,293,383	$ 1,847,000	$ 26,993,130	$ 1,032,660	$ 1,443,350	$ 2,083,680	$ 1,345,400	$ 12,528,200	$ 526,400	$ 6,104,850
Municipal Drains											
Manning Road/ETLD Drain Relocation - Phase 2	$ 1,735,000	$ 340,300	$ 52,000	$ 2,127,300			$ 2,022,300				
	$ 1,735,000	$ 340,300	$ 52,000	$ 2,127,300	$ -	$ -	$ 2,022,300	$ -	$ -	$ -	
TOTAL	**$ 110,848,304**	**$ 17,299,738**	**$ 8,202,520**	**$ 136,353,174**	$ 10,252,914	$ 13,934,900	$ 15,245,385	$ 13,090,385	$ 17,918,300	$ 3,610,350	$ 21,161,550

** Subject to final recommendations and prioritization in the Storm Drainage Master Plan, available funding, and council approval*

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TOWN OF TECUMSEH
Public Works and Environmental Services
2019 - 2023 Public Works & Environmental Services Capital Works Plan

	Construction	Engineering	Contingency	Total	2018	2019	2020	2021	2022	2023	2024
MAJOR PROJECTS SUMMARY											
Oldcastle - North Talbot - Sanitary Area											
Rossi Drive Sanitary Sewer	$ 1,831,500	$ 335,000	$ 89,300	$ 2,255,800	$ 2,075,800	$ -	$ -	$ -	$ -	$ -	$ -
County Road 11 (North) Sanitary Sewer	$ 1,223,000	$ 224,000	$ 139,600	$ 1,586,600	$ 211,000	$ 1,244,950	$ -	$ -	$ -	$ -	$ -
Olympia-Astor-Solar Sanitary Sewer	$ 649,500	$ 97,400	$ 65,000	$ 812,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
County Road 11 (South) Sanitary Sewer	$ 300,000	$ 45,000	$ 30,000	$ 375,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Oldcastle - 8th Concession - Sanitary Area											
CR46/Webster/Laval Sanitary Sewer Extension	$ 2,740,000	$ 440,500	$ 137,000	$ 3,317,500	$ -	$ 370,250	$ 2,947,250	$ -	$ -	$ -	$ -
Delduca Drive Sanitary Sewer (LRPCP)	$ 2,405,000	$ 444,700	$ 120,250	$ 2,970,000	$ -	$ 297,350	$ -	$ 2,672,650	$ -	$ -	$ -
Ure Street Sanitary Sewer (LRPCP)	$ 1,270,200	$ 190,500	$ 127,100	$ 1,587,000	$ -	$ -	$ -	$ 96,000	$ 1,491,000	$ -	$ -
O'Neil Street Sanitary Sewer (LRPCP)	$ 1,469,100	$ 220,300	$ 104,400	$ 1,794,000	$ -	$ -	$ -	$ -	$ 110,150	$ 1,683,850	$ -
Moynahan-Henin-Regal Sanitary Sewer (LRPCP)	$ 1,796,800	$ 269,600	$ 127,600	$ 2,194,000	$ -	$ -	$ -	$ -	$ -	$ 134,800	$ 2,059,200
Oldcastle Road Sanitary Sewer (LRPCP)	$ 2,780,000	$ 417,000	$ 278,000	$ 3,475,500	$ -	$ -	$ -	$ -	$ -	$ -	$ 10,000
County of Essex (Initiated) Projects											
CR11: Hwy 401 to NTR (Multi-Use Trail)	$ 348,000	$ 52,000	$ 34,600	$ 434,600	$ 136,000	$ 292,950	$ -	$ -	$ -	$ -	$ -
Culvert #45: South Talbot Road (CR11/STR Works)	$ 250,000	$ 38,000	$ 38,000	$ 326,000	$ -	$ -	$ 326,000	$ -	$ -	$ -	$ -
Westlake Drive - San, Storm, Water	$ 337,000	$ 50,750	$ 50,750	$ 438,500	$ -	$ -	$ 438,500	$ -	$ -	$ -	
CR42 / CR19 Roundabout	$ 257,500	$ 36,050	$ 26,500	$ 319,800	$ 120,000	$ -	$ 319,800	$ -	$ -	$ -	$ -
CR19 @ CR46 Advanced Construction	$ 125,000	$ 18,750	$ 18,750	$ 162,500	$ -	$ -	$ -	$ 162,500	$ -	$ -	$ -
CR43: Banwell Diversion (Multi-Use Trail)	$ 285,000	$ -	$ 57,000	$ 342,000	$ -	$ -	$ -	$ 342,000	$ -	$ -	$ -
CR42: CR43 to Lesperance	$ 365,300	$ -	$ 10,000	$ 375,300	$ -	$ -	$ -	$ -	$ 375,300	$ -	$ -
CR19 @ CR34 Advanced Construction	$ 40,000	$ 6,000	$ 6,000	$ 52,000	$ -	$ -	$ -	$ -	$ 52,000	$ -	$ -
CR42: Lesperance to CR19	$ 464,200	$ 63,000	$ 48,500	$ 575,700	$ -	$ -	$ -	$ -	$ -	$ 575,700	$ -
CR42: City Limits to CR43	$ 93,000	$ -	$ 14,700	$ 107,700	$ -	$ -	$ -	$ -	$ -	$ -	$ 104,700

TOWN OF TECUMSEH
Public Works and Environmental Services
2019 - 2023 Public Works & Environmental Services Capital Works Plan

	Construction	Engineering	Contingency	Total	2018	2019	2020	2021	2022	2023	2024
Other											
Water & Wastewater Master Plan Update (2016)	$ -	$ 115,000	$ -	$ 115,000	$ 100,000	$ 15,000	$ -	$ -	$ -	$ -	$ -
Manning Road/ETLD Drain Relocation - Phase 2	$ 4,248,400	$ 767,313	$ 127,395	$ 5,143,110	$ 50,000	$ -	$ 4,883,110	$ -	$ -	$ -	$ -
Manning Road - Road Reconstruction - Phase 3	$ 4,332,500	$ 642,535	$ 129,925	$ 5,104,960	$ 180,000	$ -	$ -	$ 4,924,960	$ -	$ -	$ -
Tecumseh Road CIP - Phase 1	$ 11,661,900	$ 1,850,400	$ 1,099,000	$ 14,611,300	$ 98,902	$ 450,000	$ -	$ -	$ -	$ -	$ -
Tecumseh Road CIP - Phase 2	$ 6,177,780	$ 940,600	$ 597,800	$ 7,716,180	$ 10,298	$ 78,000	$ -	$ -	$ -	$ -	$ -
Tecumseh Road CIP - Phase 3	$ 3,244,430	$ 494,532	$ 314,300	$ 4,053,262	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Tecumseh Road CIP - Phase 4	$ 3,352,450	$ 510,580	$ 324,500	$ 4,187,530	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Tecumseh Road CIP - Phase 5	$ 1,742,250	$ 271,418	$ 172,500	$ 2,186,168	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Riverside Drive Trail	$ 680,000	$ 102,000	$ 68,000	$ 850,000	$ -	$ 782,000	$ -	$ -	$ -	$ -	$ -
Lesperance Road Trail (CR22 to CR42)	$ 665,000	$ 99,750	$ 99,750	$ 864,500	$ -	$ -	$ -	$ 49,900	$ 814,600	$ -	$ -
Riverside Drive Pathway (Arlington to Kensington)	$ 120,000	$ 18,000	$ 18,000	$ 156,000	$ -	$ -	$ -	$ -	$ 9,000	$ 147,000	$ -
Lesperance Road Trail (Riverside to McNorton)	$ 350,000	$ 52,500	$ 52,500	$ 455,000	$ -	$ -	$ -	$ -	$ -	$ -	$ 26,250
Sanitary Sewer Rehabilitation (I&I Removal) - Ph1&2	$ 3,637,824	$ -	$ -	$ 3,637,824	$ 2,827,324	$ -	$ -	$ -	$ -	$ -	$ -
Sanitary Sewer Rehabilitation (I&I Removal) - Ph3	$ 3,000,000	$ -	$ -	$ 3,000,000	$ -	$ 3,000,000	$ -	$ -	$ -	$ -	$ -
Storm Drainage Master Plan	$ -	$ 600,000	$ -	$ 600,000	$ 300,000	$ -	$ -	$ -	$ -	$ -	$ -
South Talbot Road Reconstruction & Culverts	$ 2,461,500	$ 329,000	$ 146,000	$ 2,936,500	$ -	$ 2,786,500	$ -	$ -	$ -	$ -	$ -
Manhole Restoration Program	$ 100,000	$ -	$ -	$ 100,000	$ -	$ 100,000	$ -	$ -	$ -	$ -	$ -
Tecumseh/Lacasse Intersection Improvements	$ 365,000	$ 77,000	$ 36,500	$ 479,000	$ 15,000	$ -	$ -	$ -	$ -	$ -	$ -
Mack Court Watermain Replacement	$ 200,645	$ 44,105	$ 10,035	$ 254,790	$ 239,790	$ -	$ -	$ -	$ -	$ -	$ -
Lacasse Park Watermain Replacement	$ 290,820	$ 59,830	$ 14,540	$ 365,190	$ 350,190	$ -	$ -	$ -	$ -	$ -	$ -
Tecumseh Road Watermain Abandonment	$ 183,520	$ 44,665	$ 9,175	$ 237,360	$ 222,360	$ -	$ -	$ -	$ -	$ -	$ -
Alden Crescent Watermain Replacement	$ 130,835	$ 31,735	$ 6,545	$ 169,120	$ 154,120	$ -	$ -	$ -	$ -	$ -	$ -
Hwy#3/Roscon Watermain Interconnection	$ 131,100	$ 32,775	$ 6,555	$ 170,430	$ 155,430	$ -	$ -	$ -	$ -	$ -	$ -
Hwy#3/Walker Rd Watermain Replacement	$ 1,700,000	$ 300,000	$ 68,000	$ 2,068,000	$ 60,000	$ 74,600	$ 1,933,400	$ -	$ -	$ -	$ -
Anode Protection Program	$ 375,000	$ -	$ -	$ 375,000	$ 375,000	$ -	$ -	$ -	$ -	$ -	$ -
SCADA Software/Server/Nodes Update	$ 105,000	$ -	$ -	$ 105,000	$ 105,000	$ -	$ -	$ -	$ -	$ -	$ -
Water Tower Internal Lining Replacement	$ 470,000	$ -	$ -	$ 470,000	$ -	$ 470,000	$ -	$ -	$ -	$ -	$ -
Water Loss Audit	$ -	$ 15,000	$ -	$ 15,000	$ -	$ 15,000	$ -	$ -	$ -	$ -	$ -
Zone 2 Booster Station (W-9)	$ 2,140,000	$ 321,000	$ 214,000	$ 2,675,000	$ -	$ -	$ 360,500	$ -	$ -	$ -	$ 2,314,500
Zone 2 Water Storage Facility (W-10)	$ 4,150,000	$ 622,500	$ 415,000	$ 5,188,000	$ -	$ -	$ 611,250	$ -	$ -	$ -	$ 4,576,750
Sylvestre Drive Sanitary Sewer Extension	$ 1,495,000	$ 331,700	$ 74,750	$ 1,901,450	$ 187,400	$ 97,600	$ 1,616,450	$ -	$ -	$ -	$ -
Sanitary Sewer Model Update	$ -	$ 250,000	$ -	$ 250,000	$ -	$ 250,000	$ -	$ -	$ -	$ -	$ -
Riverside Drive In-line Storage Trunk Sanitary	$ 1,675,000	$ 281,250	$ 167,500	$ 2,123,750	$ -	$ -	$ 140,625	$ 1,983,125	$ -	$ -	$ -
West St. Louis Storm PS - Repairs	$ 51,000	$ 7,650	$ 7,650	$ 66,300	$ -	$ 66,300	$ -	$ -	$ -	$ -	$ -
Lesperance Road Storm PS - Repairs	$ 181,000	$ 18,100	$ 18,100	$ 217,200	$ 100,000	$ 117,200	$ -	$ -	$ -	$ -	$ -
(East) St. Louis Storm PS - Repairs	$ 65,000	$ 9,750	$ 9,750	$ 84,500	$ -	$ 84,500	$ -	$ -	$ -	$ -	$ -
Oldcastle Storm Drainage Master Plan	$ -	$ 450,000	$ -	$ 450,000	$ 120,000	$ 330,000	$ -	$ -	$ -	$ -	$ -
Shoreline Management Plan	$ -	$ 210,000	$ -	$ 210,000	$ -	$ -	$ 210,000	$ -	$ -	$ -	$ -
Scully & St Mark's Storm PS/Riverside Drive	$ 11,251,000	$ 1,594,500	$ 1,125,100	$ 13,970,900	$ -	$ 797,250	$ -	$ -	$ 13,173,650	$ -	$ -
West Tecumseh Trunk Watermain (W-1A)	$ 1,150,000	$ 230,000	$ 172,500	$ 1,553,000	$ -	$ -	$ -	$ -	$ 115,000	$ -	$ 1,438,000
West Tecumseh Trunk Sanitary (WW-1A)	$ 2,200,000	$ 440,000	$ 330,000	$ 2,970,000	$ -	$ -	$ -	$ -	$ 220,000	$ -	$ 2,750,000
Diversion San Sewers (Intersection Rd) (WW-2)	$ 676,000	$ 135,200	$ 101,400	$ 913,000	$ -	$ -	$ -	$ -	$ 67,600	$ -	$ 845,400
Kensington Storm PS *	$ 4,750,000	$ 712,500	$ 475,000	$ 6,218,000	$ -	$ -	$ -	$ 356,250	$ -	$ -	$ 5,581,750

Attachment 2 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

LC Road (1500)

		2019	2020	2021	2022	2023
Reserve Balance Start of Year		$8,981,000	$8,533,330	$6,713,875	$3,933,140	$5,650,940
Budget Allocation		$4,160,000	$4,160,000	$4,160,000	$4,160,000	$4,160,000
OMCC Grant re Lesperance Road Bike Lanes		$80,000				
Surplus						
Sale of Electricity to Grid		$10,000	$10,000	$10,000	$10,000	$10,000
Grants		$80,000				
CWATS		$30,000		$120,000		
County Connecting Link Agreement				$450,000		
DC re unfinanced amounts						
Funds Available		**$13,341,000**	**$12,703,330**	**$11,453,875**	**$8,103,140**	**$9,820,940**
Committed						
Lesperance Road Bike Lanes		$110,000				
IT GIS Tech % share		$27,370	$27,900	$28,500	$28,500	$29,100
Balance Committed		**$137,370**	**$27,900**	**$28,500**	**$28,500**	**$29,100**
Balance Uncommitted		**$13,203,630**	**$12,675,430**	**$11,425,375**	**$8,074,640**	**$9,791,840**
Proposed						
Road Paving - Asphalting	1)	$1,300,000	$1,000,000	$1,000,000	$1,000,000	$1,000,000
Traffic Signal Controller Upgrade (with County)		$150,000				
PW Yard (North) Expansion/Improvements		$30,000				
Road Line Painter		$30,000				
Brighton Road Traffic Study		$32,000				
Traffic Calming Guideline Study		$20,000				
Traffic Signal Upgrades/Maintenance			$62,500	$30,000		
Traffic Signal Reconstruct (Lesperance/McNorton)			$165,000			
Tecumseh Road CIP Phase 1		$450,000				
Tecumseh Road CIP Phase 2		$78,000				
Manning Road - Phase 2 - Road Work			$682,580			
Manning Road - Phase 2 - Drain Relocation			$2,022,300			
Manning Road - Phase 3 - Road Reconstruction				$4,589,160		
South Talbot Road Reconstruction		$2,240,500				
Roads Needs Study		$63,000				
Sylvestre Drive (Sanitary Sewer)		$20,000	$1,026,300			
Scully & St. Mark's Storm PS/Riverside Drive		$43,600			$720,400	
CR#46/Webster/Laval Sanitary Ext. (LRPCP)		$120,750	$944,750			
Delduca Drive (Sanitary Sewer LRPCP)		$92,450		$1,142,450		
Riverside Drive In-Line Storage Trunk Sanitary			$58,125	$690,625		
Kensington Storm PS/Riverside Drive Sanitary					$30,000	
Ure Street (Sanitary Sewer LRPCP)				$40,000	$627,000	
O'Neil Street Sanitary Sewer (LRPCP)					$46,300	$725,700
Moynahan-Henin-Regal Sanitary Sewer (LRPCP)						$56,650
CR#11/South Talbot Roundabout $ unknown						
Balance Proposed		**$4,670,300**	**$5,961,555**	**$7,492,235**	**$2,423,700**	**$1,782,350**
Balance Available		**$8,533,330**	**$6,713,875**	**$3,933,140**	**$5,650,940**	**$8,009,490**

Notes:

1) General allowance for asphalting

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Attachment 3 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

LC Bridges (1660)

	2019	2020	2021	2022	2023
Reserve Balance Start of Year	$ 731,100	$ (46,800)	$ (144,800)	$ (1,158,800)	$ (1,129,800)
Budget Allocation	$ 390,000	$ 390,000	$ 390,000	$ 390,000	$ 390,000
Grant					
Funds Available	**$ 1,121,100**	**$ 343,200**	**$ 245,200**	**$ (768,800)**	**$ (739,800)**
Committed					
Balance Committed	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
Balance Uncommitted	**$ 1,121,100**	**$ 343,200**	**$ 245,200**	**$ (768,800)**	**$ (739,800)**
Proposed					
Culvert Condition Assessment (<3m Span)				$ 75,000	
Bridge/Culvert Needs Study (>3m)		$ 36,000		$ 36,000	
Culvert #46: South Talbot Road	$ 370,500				
Culvert #47: South Talbot Road	$ 175,500				
Sullivan Creek at 12th Concession (1004)	$ 207,300				
Townline Road Drain at 6th Conc Rd (1014)	$ 207,300				
Merrick Creek at 8th Concession (1013)	$ 207,300				
Culvert #45: South Talbot (CR11/STR Works)		$ 326,000			
Culvert #42: Snake Lane Road		$ 42,000	$ 448,000		
Culvert #53: Snake Lane Road		$ 42,000	$ 448,000		
Culvert #54: Snake Lane Road		$ 42,000	$ 448,000		
Culvert #51: 8th Concession			$ 30,000	$ 120,000	
Culvert #70: 12th Concession			$ 30,000	$ 130,000	
Balance Proposed	**$ 1,167,900**	**$ 488,000**	**$ 1,404,000**	**$ 361,000**	**$ -**
Balance Available	**$ (46,800)**	**$ (144,800)**	**$ (1,158,800)**	**$ (1,129,800)**	**$ (739,800)**

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Attachment 4 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

LC Sidewalk (1550)

		2019	2020	2021	2022	2023
Reserve Balance Start of Year		$233,800	$238,800	$243,800	$248,800	$253,800
Budget Allocation		$74,000	$74,000	$74,000	$74,000	$74,000
Funds Available		**$307,800**	**$312,800**	**$317,800**	**$322,800**	**$327,800**
Committed						
Balance Committed		**$0**	**$0**	**$0**	**$0**	**$0**
Balance Uncommitted		**$307,800**	**$312,800**	**$317,800**	**$322,800**	**$327,800**
Proposed						
Sidewalk repair program	1)	$69,000	$69,000	$69,000	$69,000	$69,000
Balance Proposed		**$69,000**	**$69,000**	**$69,000**	**$69,000**	**$69,000**
Balance Available		**$238,800**	**$243,800**	**$248,800**	**$253,800**	**$258,800**

Notes:
1) General allowance

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Attachment 5 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

LC Storm Sewer (1650)

	2019	2020	2021	2022	2023
Reserve Balance Start of Year	$148,600	($547,050)	($1,728,030)	($2,170,730)	($13,796,230)
Budget Allocation	$902,700	$902,700	$902,700	$902,700	$902,700
Funds Available	**$1,051,300**	**$355,650**	**($825,330)**	**($1,268,030)**	**($12,893,530)**
Committed					
Pump Station Emergency Response Plan	$35,000				
Oldcastle Storm Drainage Master Plan	$120,000				
Balance Committed	**$155,000**	**$0**	**$0**	**$0**	**$0**
Balance Uncommitted	**$896,300**	**$355,650**	**($825,330)**	**($1,268,030)**	**($12,893,530)**
Proposed					
West St. Louis Storm PS Repairs	$66,300				
Lesperance Road Storm PS Repairs	$117,200				
East St. Louis Storm PS Repairs	$84,500				
Manhole Restoration Program	$50,000				
Manning Road/ETLD Drain Relocation - Phase 2		$1,668,830			
Manning Road Reconstruction - Phase 3			$335,800		
Sylvestre Drive Sanitary Sewer Extension		$14,950			
Westlake Drive - Sanitary/Storm/Water		$156,000			
CR#46/Webster/Laval Sanitary Ext. (LRPCP)	$2,400	$33,900			
Oldcastle Storm Drainage Master Plan	$330,000				
Scully & St. Mark's Storm PS/Riverside Drive	$733,100			$12,113,700	
Delduca Drive (LRPCP)	$50,850		$628,350		
Shoreline Management Plan		$210,000			
Kensington Storm PS/Riverside Drive Sanitary			$356,250		
Ure Street (Sanitary LRPCP)			$25,000	$386,000	
O'Neil Street Sanitary Sewer (LRPCP)				$28,500	$427,500
CR42:CR43 Advance Engineering	$9,000				
CR42: Lesperance to CR19 - Sanitary					$64,000
Moynahan-Henin-Regal Sanitary Sewer (LRPCP)					$34,900
Balance Proposed	**$1,443,350**	**$2,083,680**	**$1,345,400**	**$12,528,200**	**$526,400**
Balance Available	**($547,050)**	**($1,728,030)**	**($2,170,730)**	**($13,796,230)**	**($13,419,930)**

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Attachment 6 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

RF Wastewater Sewers (2550)

	2019	2020	2021	2022	2023
Reserve Balance Start of Year	($3,047,500)	($4,012,705)	($1,828,540)	($969,641)	($1,010,541)
Estimated Allocation	$1,841,499	$1,847,599	$1,956,599	$1,970,000	$1,990,000
Estimated Interest	($91,000)	($120,000)	($55,000)	($29,000)	($30,000)
Development Charges	$163,300	$150,000	$150,000	$150,000	$150,000
Capital Sewer Charges	$1,133,000	$2,529,000	$1,050,000	($905,500)	$740,000
National Disaster Mitigation Program	$1,500,000				
Funds Available	**$1,499,299**	**$393,894**	**$1,273,059**	**$215,859**	**$1,839,459**
Committed					
Debt payments - Lakewood Pump Station	$200,000	$100,000			
Debt payments - 2012 Non-DC debt	$57,400	$57,400	$57,400	$57,400	$57,400
Debt payments - DC Debt	$538,384	$258,554			
IT GIS Tech % share	$27,370	$27,900	$28,500	$28,500	$29,100
Balance Committed	**$823,154**	**$443,854**	**$85,900**	**$85,900**	**$86,500**
Balance Uncommitted	**$676,145**	**($49,960)**	**$1,187,159**	**$129,959**	**$1,752,959**
Proposed					
Water/Wastewater Master Plan Update	$7,500				
Sewer Model Update & Flow Monitoring	$250,000				
Manhole Restoration Program	$50,000				
Scully & St. Mark's Storm PS/Riverside Drive	$20,550			$ 339,550	
Manning Rd/ETLD Relocation - Phase 2		$91,880			
West Tecumseh Trunk (WW-1A)				$ 220,000	
Diversion Sewers Intersection Road (WW-2)				$ 67,600	
County Road 11 (Walker Road)	$952,000				
Sylvestre Drive Sanitary Extension	$77,600	$575,200			
Westlake Drive - Sanitary, Storm, Water		$172,000			
County Road #46/Webster/Laval Sanitary Extension	$166,700	$838,200			
CR42:CR43 Advance Engineering	$16,000				
CR42 / CR 19 Roundabout - Water & Sanitary		$18,800			
CR42: Lesperance to CR19 - Sanitary					$50,000
Delduca Drive (Sanitary Sewer LRPCP)	$148,500		$833,300		
Sanitary Sewer Rehabilitation (I&I Removal - Phase	$3,000,000				
Riverside Drive In-Line Storage Trunk Sanitary		$82,500	$1,292,500		
Ure Street (LRPCP)			$31,000	$478,000	
O'Neil Street Sanitary Sewer (LRPCP)				$35,350	$530,650
Moynahan-Henin-Regal Sanitary Sewer (LRPCP)					$43,250
Total Proposed	**$4,688,850**	**$1,778,580**	**$2,156,800**	**$1,140,500**	**$623,900**
Balance Available	**($4,012,705)**	**($1,828,540)**	**($969,641)**	**($1,010,541)**	**$1,129,059**

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Attachment 7 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

RF Wastewater Facilities (2560)

	2019	2020	2021	2022	2023
Reserve Balance Start of Year	$1,417,200	$1,827,200	$2,282,000	$2,750,500	$3,253,000
Estimated Allocation	$400,000	$400,000	$400,000	$450,000	$450,000
Estimated Interest	$42,500	$54,800	$68,500	$82,500	$97,600
Funds Available	**$1,859,700**	**$2,282,000**	**$2,750,500**	**$3,283,000**	**$3,800,600**
Committed					
Pump Station Emergency Response Plan	$35,000				
Balance Committed	**$0**	**$0**	**$0**	**$0**	**$0**
Balance Uncommitted	**$1,859,700**	**$2,282,000**	**$2,750,500**	**$3,283,000**	**$3,800,600**
Proposed					
Pump & Metering Station - Sylvestre	$15,000			$ 30,000	
Pump & Metering Station - Lakewood	$7,500				
Pump & Metering Station - Cedarwood/NTR	$10,000				
Total Proposed	**$32,500**	**$0**	**$0**	**$30,000**	**$0**
Balance Available	**$1,827,200**	**$2,282,000**	**$2,750,500**	**$3,253,000**	**$3,800,600**

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Attachment 8 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

RF Watermain (2520)

	2019	2020	2021	2022	2023
Reserve Balance Start of Year	$3,019,600	$4,453,680	$2,458,560	$4,109,310	$5,987,110
Estimated Allocation	$1,621,000	$1,822,000	$1,886,500	$2,000,000	$2,040,000
Estimated Interest	$90,600	$133,600	$73,800	$123,300	$179,600
Development Charges	$57,900	$50,000	$50,000	$50,000	$50,000
Funds Available	**$4,789,100**	**$6,459,280**	**$4,468,860**	**$6,282,610**	**$8,256,710**
Committed					
Tools	$10,000	$10,000	$10,000	$10,000	$10,000
Meters	$90,000	$90,000	$90,000	$90,000	$90,000
IT GIS Tech % share	$27,370	$27,900	$28,500	$28,500	$29,100
Balance Committed	**$127,370**	**$127,900**	**$128,500**	**$128,500**	**$129,100**
Balance Uncommitted	**$4,661,730**	**$6,331,380**	**$4,340,360**	**$6,154,110**	**$8,127,610**
Rossi Drive					
Water & Wastewater Master Plan Update (2016)	$7,500				
Manning Road/ETLD Drain Relocation - 2		$417,520			
Hwy # 3 Watermain Replacement	$74,600	$1,933,400			
Westlake Drive - San, Storm, Water		$110,500			
Water Loss Audit	$15,000				
CR46/Webster/Laval Sanitary Sewer Ext	$80,400	$1,130,400			
Delduca Drive (Sanitary Sewer LRPCP)	$5,550		$68,550		
CR42 & CR43 Advanced Engineering	$25,000				
CR42 / CR 19 Roundabout - Water & Sanitary		$281,000			
CR42: Lesperance to CR19 - Watermain					$400,000
West Tecumseh Trunk Watermain (W-1A)				$115,000	
CR19@CR46 Advanced Construction			$162,500		
CR19@CR34 Advanced Construction				$52,000	
Total Proposed	**$208,050**	**$3,872,820**	**$231,050**	**$167,000**	**$400,000**
Balance Available	**$4,453,680**	**$2,458,560**	**$4,109,310**	**$5,987,110**	**$7,727,610**

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Attachment 9 - 2019 - 2023 PWES Five (5) Year Capital Works Plan

RF Water Facilities (2530)

	2019	2020	2021	2022	2023
Reserve Balance Start of Year	$7,324,600	$7,230,670	$6,655,720	$7,058,920	$7,498,220
Estimated Allocation	$129,000	$152,000	$175,000	$199,000	$220,000
Estimated Interest	$247,070	$244,800	$228,200	$240,300	$254,000
Funds Available	**$7,700,670**	**$7,627,470**	**$7,058,920**	**$7,498,220**	**$7,972,220**
Committed					
Balance Committed	**$0**	**$0**	**$0**	**$0**	**$0**
Balance Uncommitted	**$7,700,670**	**$7,627,470**	**$7,058,920**	**$7,498,220**	**$7,972,220**
Proposed					
Water Tower Internal Lining	$470,000				
Zone 2 Booster Station (W-9)		$360,500			
Zone 2 Water Storage Facility (W-10)		$611,250			
Total Proposed	**$470,000**	**$971,750**	**$0**	**$0**	**$0**
Balance Available	**$7,230,670**	**$6,655,720**	**$7,058,920**	**$7,498,220**	**$7,972,220**

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Attachment 10 - 2019 - 2023 Infrastructure Five (5) Year Projections

LC Infrastructure (1085)

		2019	2020	2021	2022	2023
Reserve Balance Start of Year		$4,294,600	$4,850,250	$6,651,150	$7,766,550	$7,793,450
Budget Allocation - New Infrastructure Levy		$1,300,000	$1,300,000	$1,300,000	$1,300,000	$1,300,000
Budget Allocation - NIL Sportsplex		$50,000	$250,000	$350,000	$450,000	$450,000
DC - repayments		$91,100	$90,000	$90,000	$90,000	$90,000
Investment income above base budget		$457,000	$457,000	$457,000	$457,000	$457,000
Tecumseh Baseball re scoreboard		$8,500	$8,500	$8,500	$8,500	$8,500
GenSet Revenues		$15,000	$15,000	$15,000	$15,000	$15,000
CWATS		$174,000	$400	$136,800	$5,300	$1,700
Funds Available		**$6,390,200**	**$6,971,150**	**$9,008,450**	**$10,092,350**	**$10,115,650**
Committed						
Official Plan		$22,500				
Development Charge Study		$2,000				
Tecumseh Hamlet Secondary Plan		$37,000				
Sportsplex - Capital Funding allocation		$50,000	$300,000	$650,000	$1,100,000	$1,550,000
CWATS: CR11 - Hwy 401 to NTR (Multi-Use Trail)		$136,000				
Riverside Dr. Trail		$782,000				
Balance Committed		**$1,029,500**	**$300,000**	**$650,000**	**$1,100,000**	**$1,550,000**
Balance Uncommitted		**$5,360,700**	**$6,671,150**	**$8,358,450**	**$8,992,350**	**$8,565,650**
Proposed						
CWATS: CR11 - Hwy 401 to NTR (Multi-Use Trail)		$292,950				
Lesperance Road Trail (CR22 to CR42)				$49,900	$814,600	
Riverside Dr Pathway (Arlington to Kensington)					$9,000	$147,000
CR42/CR19 Roundabout (Sidewalks)			$19,000			
CR42: CR43 to Lesperance (Sidewalks)					$362,000	
CR42: Lesperance to CR19 (Sidwalks)						$57,500
CWATS: CR42/CR19 Roundabout (Bike Lanes)			$1,000			
CWATS: CR43 Banwell Diversion (Multi-Use Lanes)				$342,000		
CWATS: CR42: CR43 to Lesperance (Bike Lanes)					$13,300	
CWATS: Lesperance to CR19 (Bike Lanes)						$4,200
McAuliffe Park - New Washroom Building	*	$217,500				
Pickleball Complex Lacasse Park	*			$200,000		
Town Hall $1,900,000						
Balance Proposed		**$510,450**	**$20,000**	**$591,900**	**$1,198,900**	**$208,700**
Balance Available		**$4,850,250**	**$6,651,150**	**$7,766,550**	**$7,793,450**	**$8,356,950**

* See 2019 - 2023 Parks Five (5) Year Capital Works Plan

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Q:\shared\Capital Projects\2. Capital Work Plans\NIL & Infrastructure Reserve\RInfrastructure2019 11/29/2018

Appendix 7- Continual Improvement Report:

TOWN OF Tecumseh ONTARIO · CANADA

WATER DIVISION
REQUEST FOR NEW OR CHANGED DWQMS DOCUMENT

PLEASE PRINT ALL INFORMATON

Document Verified by (Initials Only)	

When completed, submit this form to the DWQMS Representative or alternate. Please attach a printed hardcopy with all revisions when requesting changes to an existing DWQMS document.

DWQMS Document Title: _____

DWQMS ID: _____

Operator Name (print): _____

Date of Submission: _____

Reason for Request:

- ☐ Enhances process control
- ☐ Supports regulatory requirements
- ☐ Required by the DWQMS
- ☐ Reduce risk
- ☐ Improve operational efficiency

Summary of Reason for Change / Addition:

_____

Operator's Name (print)			
Operator's Signature		Date:	

Page **1** of **1**
Version 2

Appendix 8 – Schedule C – Director's Directions for Operational Plans

Ontario

Ministry of the Environment and Climate Change

Schedule C – Director's Directions for Operational Plans (Subject System Description Form)
Municipal Residential Drinking Water System

Fields marked with an asterisk (*) are mandatory.

Owner of Municipal Residential Drinking Water System *
The Corporation of the Town of Tecumseh

Name of Municipal Residential Drinking Water System *
Tecumseh Distribution System

Subject Systems

☐ Check here if the Municipal Residential Drinking Water System is operated by one operating authority. Enter the name of the operating authority in the below table.

	Name of Operational Subsystems(if Applicable)	Name of Operating Authority *	DWS Number(s) *
1		The Corporation of the Town of Tecumseh	260004969

Provide the information outlined in the 'Contact Information' section for **each** Operational Subsystem.

Contact Information

Last Name *	First Name *	Middle Initial
Dupuis	Brad	
Title *	Phone Number *	
DWQMS Representative	519 791-6509	
Email Address *		
bdupuis@tecumseh.ca		

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