Town of Tecumseh

Water and Wastewater Master Plan Update

Class EA Report

July 31, 2008

UMA | AECOM

Town of Tecumseh

Water and Wastewater Master Plan Update

Class Environmental Assessment Report

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Revision Log

REVISION	DATE	ISSUE / REVISION DESCRIPTION
REV0	June 2008	DRAFT
REV1	July 31, 2008	Issued for 30 Day Public Review

Signature Page

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Executive Summary

Background

Municipalities can recognize the benefit of comprehensive long-range planning exercises that examine problems and solutions for an overall system of municipal services. Master Plans are not intended to address specific local problems or to plan for projects on a project-by-project basis. The Class EA defines Master Plans as:

> *"Long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure system(s) or group of related projects in order to outline a framework for planning for subsequent projects and/or developments."*

The Town of Tecumseh completed a Water and Wastewater Master Plan in June of 2002 and a Water Plan amendment in 2005. It is recommended practice to review a Master Plan at least every five years to determine the need for a formal review and update to the Master Plan. Since the Plan was completed in 2002, several changes have occurred which have had significant impacts to the assumptions used in preparing the Plan and, as a result, it has been identified that the Plan needs to be updated. Significant issues impacting the Plan include:

- Updated Provincial Regulations, including the Safe Drinking Water Act, the Sustainable Water and Sewage Systems Act and the Provincial Policy Statement
- Water Agreement among the Windsor Utilities Commission (WUC), City of Windsor and the Town of Tecumseh (November 2004) and Amending Agreement (January 2006)
- Wastewater Agreement between the City of Windsor and the Town of Tecumseh (November 2004)
- The Town of Tecumseh Official Plan Review (ongoing) and Secondary Plans for Manning Road (1996), Maidstone Hamlet (September 2003) and Tecumseh Hamlet (ongoing)
- Class EA for Sanitary Servicing of Lands Annexed from the Town of Tecumseh, City of Windsor (2005)
- Development Charge Background Study, Town of Tecumseh (July 2004)
- Water and Wastewater Rate Study, Town of Tecumseh (October 2007)
- Class EA Study for the Banwell Water Storage Reservoir, Windsor Utilities Commission (deferred in December 2007).

The purpose of Water and Wastewater Plan Update is to use revised best planning population estimates for the Town of Tecumseh within the 2028 planning horizon to provide a technical review of the 2002 and 2005 water and wastewater servicing strategies. The review recommends necessary strategy changes, updates to project phasing and updates to capital cost estimates which in turn will fed into the Development Chagres process. This update is a critical component in the integrated planning process and is intended to consolidate and harmonize the Town's water and wastewater servicing strategies and capital program for the North and South Service Areas based on updated planning information, new water and wastewater service agreements with the City of Windsor, updated design criteria and updated project information.

Master Planning Process

The Municipal Class Environmental Assessment (EA) process clearly defines approaches for completion of Master Plans within the Class EA context. The Town of Tecumseh has prepared this Master Plan based generally on Approach 2, which involves preparing a Master Plan document at the conclusion of Phases 1 and 2 in order to fulfill the requirements for Schedule B projects. The Town of Tecumseh has identified select Schedule B projects that will follow on with separate studies in order to provide greater detail and finalize property and/or easement requirements.

Study Area

The Town of Tecumseh is situated in the northwest portion of Essex County and covers 9,413 hectares. The Town is bordered by the City of Windsor and the Town of LaSalle to the west, Lake St. Clair to the north, Town of Lakeshore to the east and Towns of Essex and Amherstburg to the south. The study area for the Water and Wastewater Master Plan Update covers the urban settlement areas of Tecumseh, St. Clair Beach and Tecumseh Hamlet in the North service area, Maidstone Hamlet and the Highway Service Centre Area in the Southeast (SE) service area and Oldcastle Hamlet in the Southwest (SW) service area.

Planning Projections

Best Planning Estimates (BPE 2008) for residential growth were prepared in consultation with the Town's Planning, Public Works and Water departments and include intensification of the urban settlement areas of Tecumseh, St. Clair Beach, Tecumseh Hamlet, Maidstone Hamlet and Oldcastle Hamlet. The BPEs are based on the available planning information including local growth analysis in the Town's Official Plans, planning documents and Secondary Plans for Tecumseh Hamlet, Maidstone Hamlet and the Manning Road Development Area.

The distribution of population growth in the urban settlement areas is summarized in Table ES-1.

Table ES- 1 Projected Population Statistics – 2008 through 2028+

SERVICE AREA		2008	2018	2028	URBAN BUILD-OUT (2028+)
North	Tecumseh	13,773	14,029	14,029	14,029
	St. Clair Beach	3,957	4,138	4,138	4,138
	Tecumseh Hamlet	3,838	10,529	15,720	21,085
Southeast	Maidstone Hamlet	449	449	2,000	3,000
	Rural	1,300	1,490	1,680	2,300
Southwest	Oldcastle Hamlet	466	1,066	2,052	2,437
	Rural	531	581	631	767
Total		24,314	32,282	40,250	47,756

Master Plan Objectives

The Master Plan Update objectives and work plan were defined as follows:

- Review and update all planning data and inputs to the servicing analysis based on best planning estimates developed for the Town
- Undertake a comprehensive review and analysis for both water and wastewater servicing requirements
- Ensure infrastructure capacities address operational flexibility
- Utilize updated industry trends and more accurate information from relevant studies and projects to provide better capital cost estimates
- Utilize recently completed and on-going projects to update infrastructure status, capacity and cost estimates
- Consolidate the Town's servicing strategies for the North and South Service Area to make best use of the available capacities provided in the Windsor-Tecumseh Servicing Agreements.

Servicing Requirements

The servicing requirements established for the Town of Tecumseh in the 2002 Master Plan and 2005 Water Servicing Plan Addendum have been updated to reflect the terms and conditions of the 2004 Windsor-Tecumseh Servicing Agreements and the 2006 Amending Agreement.

Water

- The Windsor Utilities Commission (WUC) is responsible for supplying water to the Town on a continuous basis up to a maximum daily flow of 87 MLD
- The Town is responsible for its own distribution system within the boundaries of Tecumseh and any new storage works that may be required to supply its fire flow of water
- Storage for equalization and peak hour flow of water for the Town will be the responsibility of WUC
- WUC will deliver peak hourly flow to the Town
- The Tecumseh Water Treatment Plant (WTP) will be decommissioned and ownership will be transferred to the City of Windsor
- WUC will proceed with a Class EA for the proposed Banwell Road Reservoir and Booster Pumping Station (BPS) and employ its best efforts to complete construction prior to future needs being required.

Wastewater

- The ultimate servicing of the Tecumseh Urban Areas will be from a combination of capacities at the 64 MLD Little River Pollution Control Plant (PCP) and/or the 159 MLD Lou Romano Water Reclamation Plant (WRP) in Windsor
- Tecumseh will not construct a centralized Wastewater Treatment Plant (WWTP) as identified in the 2002 Master Plan; however, can provide interim treatment plants until conveyance is provided

- The Town has a current treatment capacity allocation of 17 MLD at the Little River PCP and 2.7 MLD capacity at the Lou Romano WRP
- The Town can purchase additional capacity at the Little River PCP for future growth up to a maximum 38.0 MLD
- Maximum discharge rate limitations at Town boundary:
    - 935 L/s at the Cedarwood Outlet to Little River PCP
    - 1,308 L/s at the Banwell Road Outlet to Little River PCP
    - 85 L/s at the North Talbot Road Outlet to Lou Romano WRP

Recommended Servicing Strategies

The general servicing concepts from the 2002 Master plan and 2005 Water Servicing Plan Addendum have been revised to incorporate updated information on servicing requirements, capacity allocations, scheduling, alignments and costing. Wherever possible, the alignments of new trunk facilities have been planned based on the location of existing road allowances and/or servicing corridors in order to ensure that servicing can proceed without undue delays resulting from the need to acquire property. However, the Town has the option to construct trunk facilities through new development lands if it can be shown to be cost effective to do so. In this event, the alignment of the trunk facilities may be altered based on approved Secondary Plans and/or Approved Draft Plans of Subdivision. Should the trunk facilities be implemented through new development lands, additional notification to the Public would be provided through the Planning Act notifications.

The timing of the various projects has been established based on anticipated growth rates in Tecumseh and on a fiscally responsible capital works program. The Town will have the option to advance or defer specific projects depending upon the rate of growth experienced in Tecumseh, or upon the petition by a developer (or group of developers) provided that the financial impacts of advancing certain projects are reviewed and mitigated through collection of Development Charges or through Front-End Financing arrangements.

Water

Based on the recent Notice given by WUC that the proposed Banwell Road Reservoir Class EA has been deferred on the basis that the Windsor Water System has sufficient treatment and storage capacity to meet the projected 10 year demands for the amalgamated system, the time frame to implement full integration of the north and south water systems in Tecumseh has been reviewed to ensure that an adequate level of service can be provided to meet projected demands within the Town.

Significant water servicing strategy updates include:

- Revised alignments, diameters and scheduling of watermains in-line with BPEs and related studies
- Provision of additional trunk watermain capacity in North service area between CR 22 and CR 42 to service new growth to 2018
- Revised routing of trunk watermain between County Road 42 and County Road 46 to avoid a number of watercourse crossings and potential conflicts with the County's plans for widening/improving County Road 19 (Manning Road)
- Provision of Zone 2 pumping capacity for the SE service area to address existing system limitations and to service growth in Maidstone Hamlet

- Provision of additional storage capacity in Zone 2 for pump control in the SE service area and additional fire flow storage
- Provision of additional trunk watermains in the South service area to allow east west transfer from Maidstone Hamlet (Zone 2) to Oldcastle Hamlet due to capacity limitations in the existing Windsor Water System.

The Town of Tecumseh is finalizing negotiations to assume operational control of the South Tecumseh Water System from the Windsor Utilities Commission (WUC) in August 2008. As part of this operational change-over, the Town has recently implemented new bulk water metering facilities at all connection points between the Windsor and Tecumseh Water Systems in the SW service area.

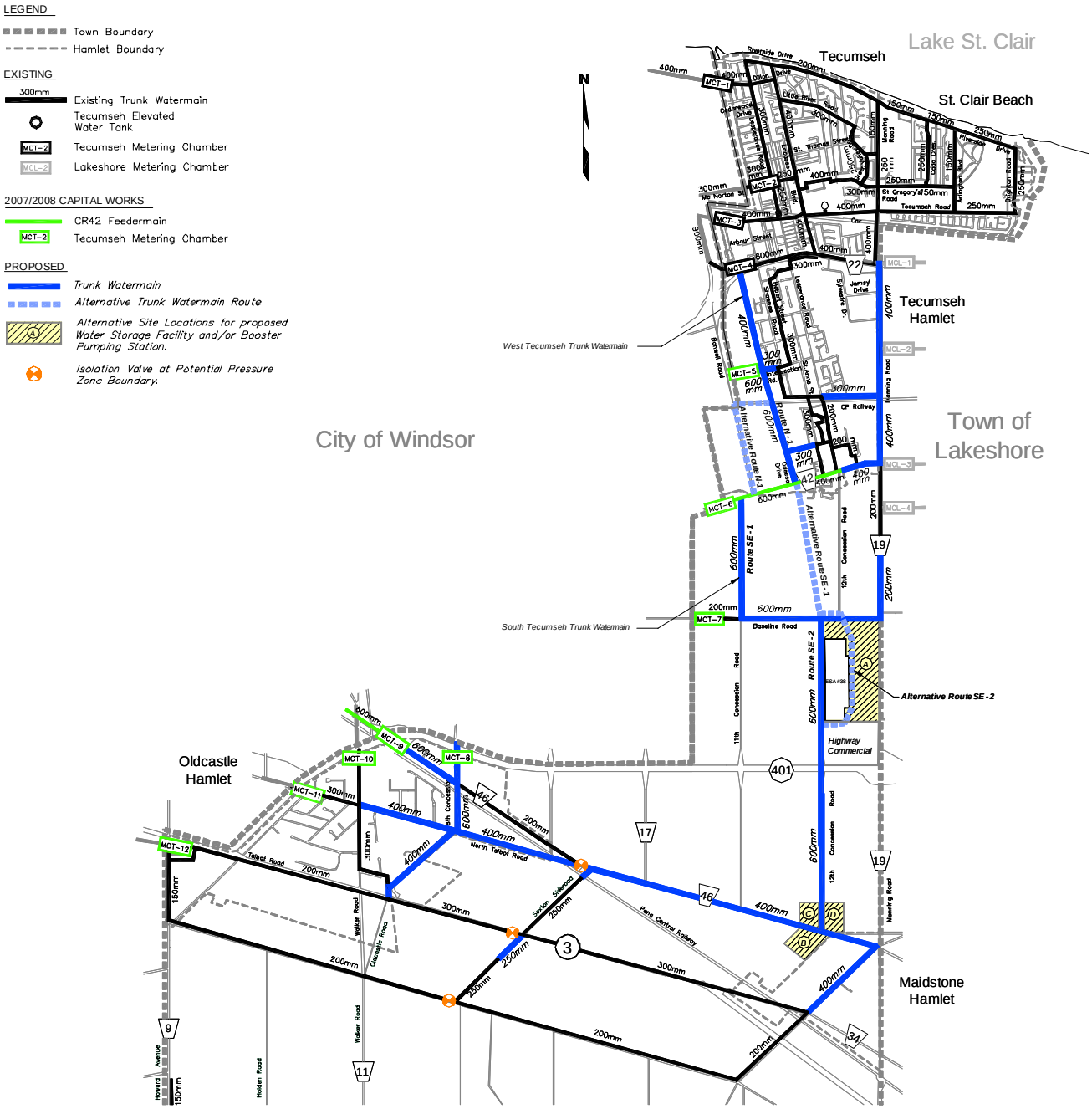
The updated Water Capital Program, Class EA Schedules and Costs are detailed in Table ES-2. The 2008 preferred Water Servicing Strategy is depicted in Figure ES-1.

Table ES- 2 Water Capital Program and EA Schedules

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST ($MILION)
West Tecumseh Trunk Watermain from CR 22 to CP Railway	W-1	Tecumseh Hamlet	B [1]	$1.85
East Tecumseh Hamlet Watermain Connection	W-2A	Tecumseh Hamlet	A+	$0.31
Trunk Watermain on Manning Road from CR 22 to CP Railway	W-2B	Tecumseh Hamlet	A+	$1.33
North Talbot Road Trunk Watermain	W-3	Oldcastle Hamlet	A+	$1.23
West Tecumseh Trunk Watermain from CP Railway to CR 42	W-4	Tecumseh Hamlet	B [1]	$0.88
Trunk Watermain on Manning Road south of CP Railway	W-5	Tecumseh Hamlet	A+	$0.66
South Tecumseh Trunk Watermain from CR 42 to Highway 401	W-6	Southeast Tecumseh	A+	$4.16
South Tecumseh Trunk Watermain from Highway 401 to Maidstone	W-7	Southeast Tecumseh	A+	$1.53
Maidstone Hamlet Trunk Watermain	W-8	Maidstone Hamlet	A+	$0.69
Zone 2 Booster Pumping Station	W-9	Southeast Tecumseh	B	$1.50
Zone 2 Water Storage Facility	W-10	Southeast Tecumseh	B	$3.70
County Road 46 Trunk Watermain	W-11	Southeast Tecumseh	A+	$1.83
Southwest Tecumseh Trunk Watermain	W-12	Oldcastle Hamlet	A+	$3.33
Total Estimated Capital Cost				$23.0

Note: 1. Project may be Approved (Schedule A) if implemented under a Plan of Subdivision

Figure ES- 1 2008 Preferred Water Servicing Strategy



Notes:

The routing shown for proposed trunk watermains may be subject to change based on approved development plans.

Property requirements for proposed Water Storage Facility and/or Booster Pumping Station are to be finalized after a site selection process and may be different than shown.

Wastewater

Given that the Town has been able to secure additional treatment capacity at both the Little River PCP and the Lou Romano WRP in Windsor, the basis and assumptions on which the preferred wastewater servicing strategies were developed for the 2002 Master Plan have been reviewed. Specifically, the 2002 Master Plan was based upon the provision of Wastewater Treatment in a new wastewater treatment facility within the Town of Tecumseh. However, in light of the new wastewater service agreement with the City of Windsor, a new servicing strategy has been developed that fully utilizes the available capacities allocated at the existing wastewater treatment plants in Windsor.

Significant wastewater servicing strategy updates include:

- Revised alignments, diameters and scheduling of sewers to direct all wastewater generated in Tecumseh to approved outlets in the City of Windsor in-line with BPEs and related studies
- Provision of new trunk sewers for new growth in North and SE service areas with discharge to the Little River PCP through the new Banwell Road Outlet
    - West Tecumseh trunk sewer between CR 22 and CR 42 with capacity for the lands designated in the Tecumseh Hamlet Secondary Plan & south portion of the Manning Road Secondary Plan, and the SE service area
    - East Tecumseh trunk sewer within the existing utility corridor south of CP Railway for lands on the east side of Tecumseh Hamlet
    - South Tecumseh trunk sewer between CR 42 and Highway 3 with capacity for the lands designated in the Maidstone Hamlet Secondary Plan, Highway Service Centre lands, and existing developments in the SE service area
- Provision of continuous flow monitoring at Town boundary (SCADA)
- Utilization of diversion sewers for east to west diversion in Tecumseh Hamlet to address existing system limitations and meet discharge limit at the existing Cedarwood Outlet
    - Diversion of flow at St. Alphonse Avenue and South Pacific Avenue through diversion sewer south of CP Railway to the west Tecumseh trunk sewer
    - Diversion of flow at St. Alphonse Avenue and CR 42 through diversion sewer on CR 42 to the west Tecumseh trunk sewer and decommission St. Alphonse Avenue PS
- Provision of standby power facilities at the Sylvestre Pumping Station in a new building
- Purchase additional conveyance capacity in the Windsor NE trunk sewer and treatment capacity at the Little River PCP when required for new growth in the SE and SW service areas as provided for in the 2004 Wastewater Agreement
- Provision of new trunk sewers for existing developments and new growth in the SW service area with discharge to the Lou Romano WRP and the Little River PCP
    - North Talbot Road trunk sewer with discharge to the Lou Romano WRP through the existing North Talbot Road Outlet up to 85 L/s
    - SW Tecumseh trunk sewer with interim discharge to the Lou Romano WRP through the North Talbot Road trunk sewer and ultimate discharge to the Little River PCP through the future 8th Concession Road Outlet
- Decommissioning of the Skyway Plaza WWTP in Oldcastle Hamlet and flow diversion from the Skyway Plaza WWTP to the North Talbot Road trunk sewer.

The new servicing strategy incorporates flexibility for the Town to divert all or part of peak wet weather flows from existing trunk sewers south of County Road 22 to the new Northeast Windsor Trunk Sanitary Sewer, which outlets to the Little River PCP. This flexibility will permit Tecumseh to comply with their servicing agreement with Windsor to limit peak flow discharge to the Cedarwood Outlet to the maximum approved rate, while maximizing the potential development areas to be serviced through the Banwell Road Outlet.

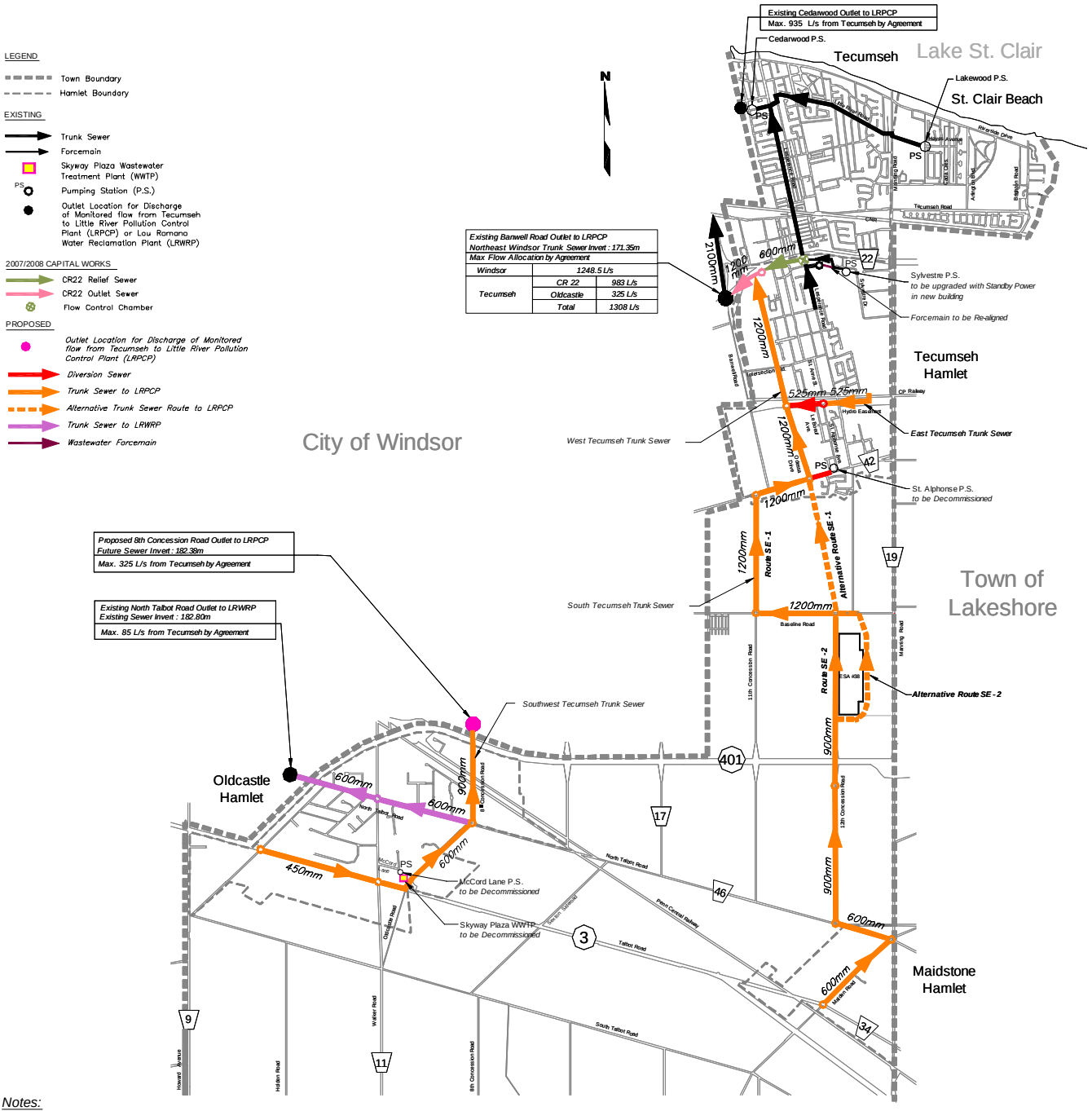
The updated Wastewater Capital Program, Class EA Schedules and Costs are detailed in Table ES-3. The 2008 preferred Wastewater Servicing Strategy is depicted in Figure ES-2.

Table ES- 3 Wastewater System Servicing Strategy

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST ($MILION)
SCADA system for Cedarwood and Lakewood Pumping Stations	WW-0	Tecumseh, St. Clair Beach	A	$0.20
West Tecumseh Trunk Sewer from CR 22 to CP Railway	WW-1	Tecumseh Hamlet	B [1]	$3.78
Diversion Sewer south of CP Railway	WW-2	Tecumseh Hamlet	B [1]	$0.36
East Tecumseh Trunk Sewer	WW-3	Tecumseh Hamlet	A+	$0.84
Sylvestre Pumping Station Upgrade	WW-4	Tecumseh Hamlet	B	$0.90
North Talbot Road Trunk Sewer	WW-5	Oldcastle Hamlet	A+	$4.38
Northeast Windsor Trunk Sanitary Sewer, Forest Glade to Little River PCP	Windsor-1[2]	Windsor	-	$ 2.87
West Tecumseh Trunk Sewer from CP Railway to CR 42	WW-6	Tecumseh Hamlet	B [1]	$1.76
CR 42 Diversion Sewer	WW-7	Tecumseh Hamlet	A+	$0.55
Purchase additional treatment capacity at Little River PCP	Windsor-2[2]	Windsor	-	$ 8.00
South Tecumseh Trunk Sewer from CR 42 to Highway 401	WW-8	Southeast Tecumseh	A+	$10.42
South Tecumseh Trunk Sewer from Highway 401 to Maidstone Hamlet	WW-9	Southeast Tecumseh	A+	$3.59
Maidstone Hamlet Trunk Sewer	WW-10	Maidstone Hamlet	A+	$1.38
Northeast Windsor Trunk Sanitary Sewer, Banwell Road to 8th Concession Road	Windsor-3[2]	Windsor	-	$ 5.20
Southwest Tecumseh Trunk Sewer	WW-11	Oldcastle Hamlet	A+	$5.37
Purchase additional treatment capacity at Little River PCP	Windsor-4[2]	Windsor	-	$ 5.00
Total Estimated Capital Cost				$54.60

Notes: 1. Project may be Approved (Schedule A) if implemented under a Plan of Subdivision
2. Projects to be implemented by the City of Windsor in accordance with Wastewater Agreement, Nov. 2004

Figure ES- 2 2008 Preferred Wastewater Servicing Strategy



Notes:

The routing shown for proposed trunk sewers may be subject to change based on approved development plans.

Implementation Plan

Ready and accessible public infrastructure is essential to the viability of existing and growing urban settlement areas in the Town of Tecumseh. Infrastructure planning, land use planning and infrastructure investment require close integration to ensure efficient, safe and economically achievable solutions to providing the required water and wastewater infrastructure.

Based on the projections for water demand or wastewater flow requirements of the service areas developed from the 2008 BPE, the project timing requirements were determined. This process took into consideration a logical extension of growth from the existing development. The evaluation of timing also took into consideration the availability of and need to maximize the use of existing infrastructure (within both the Town of Tecumseh and City of Windsor) and best judgement on reasonable timing of subsequent expansions.

Project timing was also integrated with the results of recent studies, Class Environmental Assessments and reports, and where possible other road upgrade projects being planned by the County of Essex and/or the Ministry of Transportation (MTO), to ensure that underground infrastructure was not scheduled after completion of road improvements. This did result in several projects being accelerated. Some project components have been initiated by the Town based on the updated servicing strategies and have been incorporated into recent budgets. Working within an affordability envelope, the Town has prioritized a list of essential 2009 projects.

The updated Implementation Plans and Capital Costs for the North service area (TN), Southeast service area (TSE) and Southwest service area (TSW) are summarized in Tables ES-4, ES-5 and ES-6, respectively. Table ES-7 summarizes the anticipated timing and preliminary costs for purchasing additional wastewater conveyance and treatment capacity from the City of Windsor in accordance with the terms and conditions established in the Windsor –Tecumseh Wastewater Agreement.

Table ES- 4 North Service Area Implementation Plan

TOWN REFERENCE ID	PROJECT IDs	DESCRIPTION	CLASS EA SCHEDULE	START YEAR OF CONSTRUCTION	COST ($MILLION)
TN-1	WW-0	SCADA System for Cedarwood and Lakewood Pumping Stations	A	2008	$0.20
TN-2	W-1, WW-1 & WW-2	West Tecumseh Trunk Facilities – North Section	B	2009	$5.99
TN-3	W-2A, WW-3	East Tecumseh Trunk Facilities	A+	2010	$1.15
TN-4	WW-4	Sylvestre Pumping Station Upgrade	B	2010	$0.90
TN-5	W-2B	Trunk Watermain on Manning Road – North Section	A+	2010	$1.33
TN-6	W-4 & WW-6	West Tecumseh Trunk Facilities – South Section	B	2013	$2.64
TN-7	WW-7	Diversion Sewer on CR 42	A+	2014	$0.55
TN-8	W-5	Trunk Watermain on Manning Road – South Section	A+	2014	$0.66
Total Estimated Cost for North Service Area					$13.42

Table ES- 5 SE Service Area Implementation Plan

TOWN REFERENCE ID	PROJECT IDs	DESCRIPTION	CLASS EA SCHEDULE	START YEAR OF CONSTRUCTION	COST ($MILLION)
TSE-1	W-6 & WW-8	South Tecumseh Trunk Facilities – North Section	A+	2018	$14.58
TSE-2	W-7 & WW-9	South Tecumseh Trunk Facilities – South Section	A+	2019	$5.12
TSE-3	W-8 & WW-10	Maidstone Hamlet Trunk Facilities	A+	2020	$2.07
TSE-4	W-9	Zone 2 Booster Pumping Station	B	2020	$1.50
TSE-5	W-10	Zone 2 Water Storage Facility	B	2021	$3.70
TSE-6	W-11	Trunk Watermain on CR 46	A+	2023	$1.83
Total Estimated Cost for Southeast Service Area					$28.80

Table ES- 6 SW Service Area Implementation Plan

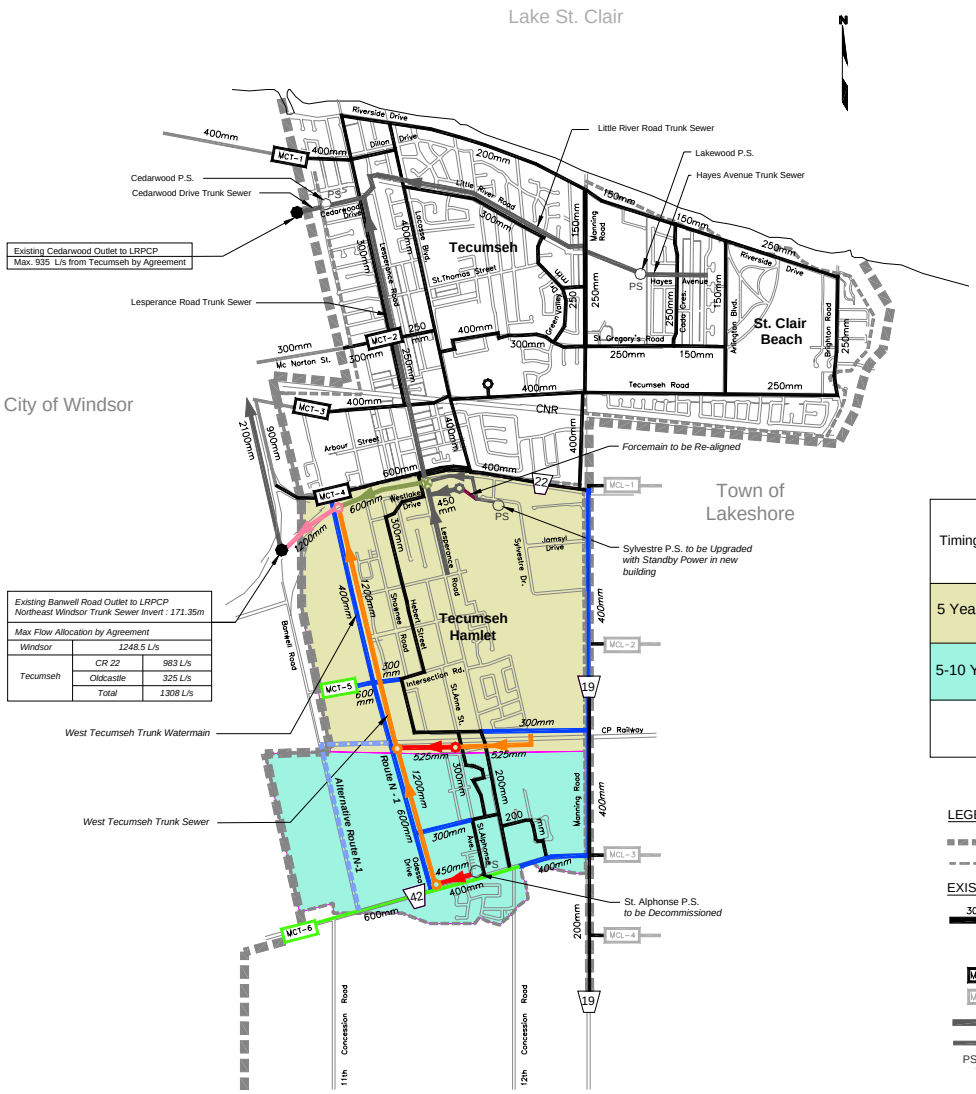
TOWN REFERENCE ID	PROJECT IDs	DESCRIPTION	CLASS EA SCHEDULE	START YEAR OF CONSTRUCTION	COST ($MILLION)
TSW-1	W-3 & WW-5	North Talbot Road Trunk Facilities	A+	2009	$5.61
TSW-2	W-12 & WW-11	Southwest Tecumseh Trunk Facilities	A+	2024	$8.70
Total Estimated Cost for Southwest Service Area					$14.31

Table ES- 7 Timing and Costs for Purchasing Additional Wastewater Capacity from Windsor

PROJECT ID	DESCRIPTION	ANTICIPATED TIMING	COST ($MILLION)
Windsor -1	Purchase additional capacity in Northeast Windsor Trunk Sanitary Sewer, Forest Glade to Little River PCP	2011-2012	$2.87
Windsor-2	Purchase additional treatment capacity at Little River PCP	2016-2017	$8.00
Windsor-3	Purchase additional capacity in Northeast Windsor Trunk Sanitary Sewer, Banwell Road to 8th Concession Road	2023-2024	$5.20
Windsor-4	Purchase additional treatment capacity at Little River PCP	2025-2026	$5.00
Total Estimated Cost for Purchasing Additional Capacity from Windsor			$21.07

The preferred Water and Wastewater Servicing Strategies for the North, Southeast and Southwest service areas are depicted in Figures ES-3, ES-4 and ES-5, respectively.

Figure ES- 3 North Service Area Implementation Strategy



Timing	Location	Estimated Capital Cost ($ Million)		
		Existing Developments	New Developments	Total
5 Year	CR 22 to CP Railway	$1.39	$8.18	$9.57
5-10 Year	CP Railway to CR 42	$0.90	$2.95	$3.85
Total		$2.29	$11.13	$13.42

LEGEND

- Town Boundary
- Hamlet Boundary

EXISTING

- Trunk Watermain
- Tecumseh Elevated Water Tank
- Tecumseh Metering Chamber
- Lakeshore Metering Chamber
- Trunk Sewer
- Forcemain
- Wastewater Pumping Station (P.S.)
- Outlet Location for Discharge of Monitored flow from Tecumseh to Little River Pollution Control Plant (LRPCP)

2007/2008 CAPITAL WORKS

- CR42 Feedermain
- Tecumseh Metering Chamber
- CR22 Relief Sewer
- CR22 Outlet Sewer
- Flow Control Chamber

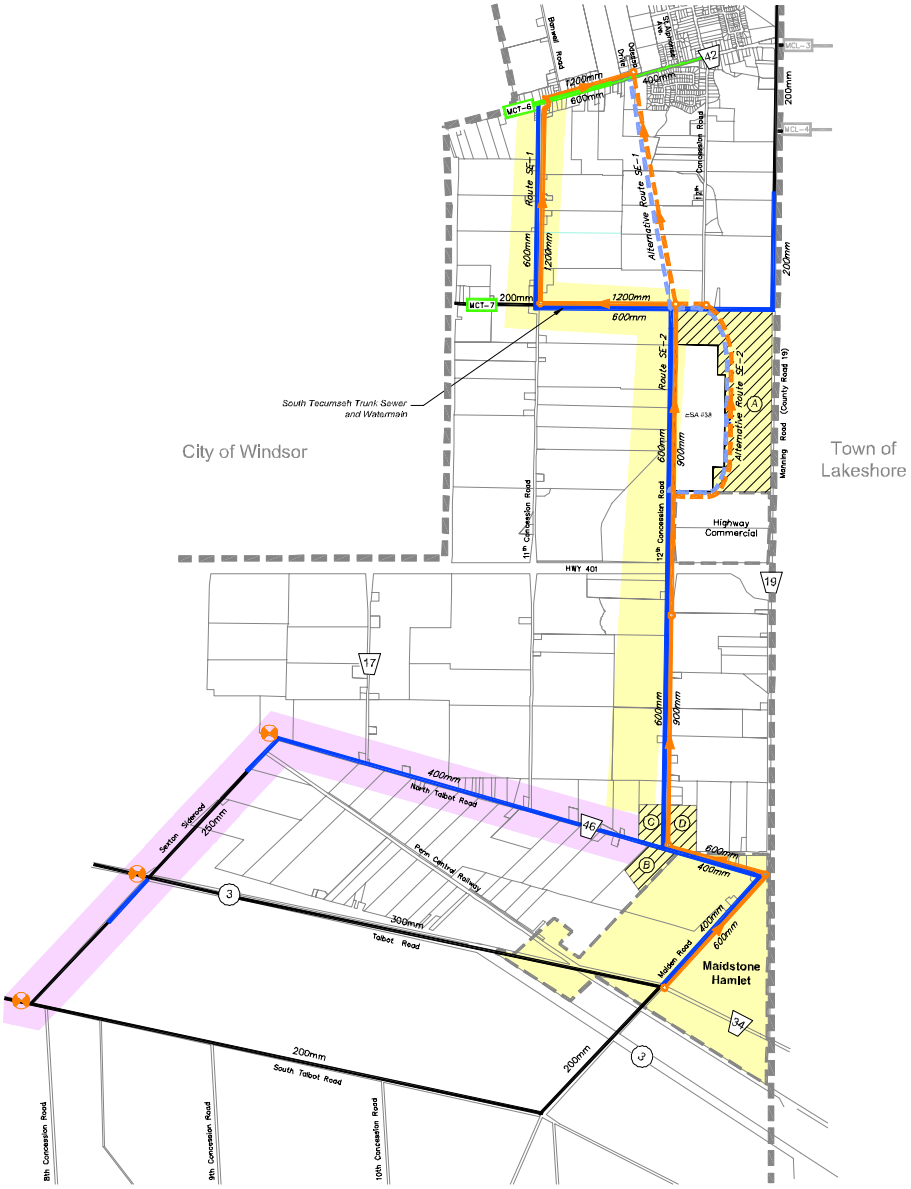
PROPOSED

- *Trunk Watermain*
- *Alternative Trunk Watermain Route*
- *Diversion Sewer*
- *Trunk Sewer to LRPCP*
- *Wastewater Forcemain*
- *5 Year Implementation Plan*
- *5-10 Year Implementation Plan*

Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

Figure ES- 4 SE Service Area Implementation Strategy



Timing	Location	Estimated Capital Cost ($ Million)		
		Existing Developments	New Developments	Total
10-15 Year	CR 42 to HWY 401	$1.37	$13.21	$14.58
	HWY 401 to CR 34	$2.20	$10.19	$12.39
15-20 Year	CR 46	$0.63	$1.20	$1.83
Total		$4.20	$24.60	$28.80

LEGEND

- Town Boundary
- Hamlet Boundary

EXISTING

- 300mm Trunk Watermain
- MCL-3 Lakeshore Metering Chamber

2007/2008 CAPITAL WORKS

- CR42 Feedermain
- MCT-7 Tecumseh Metering Chamber

PROPOSED

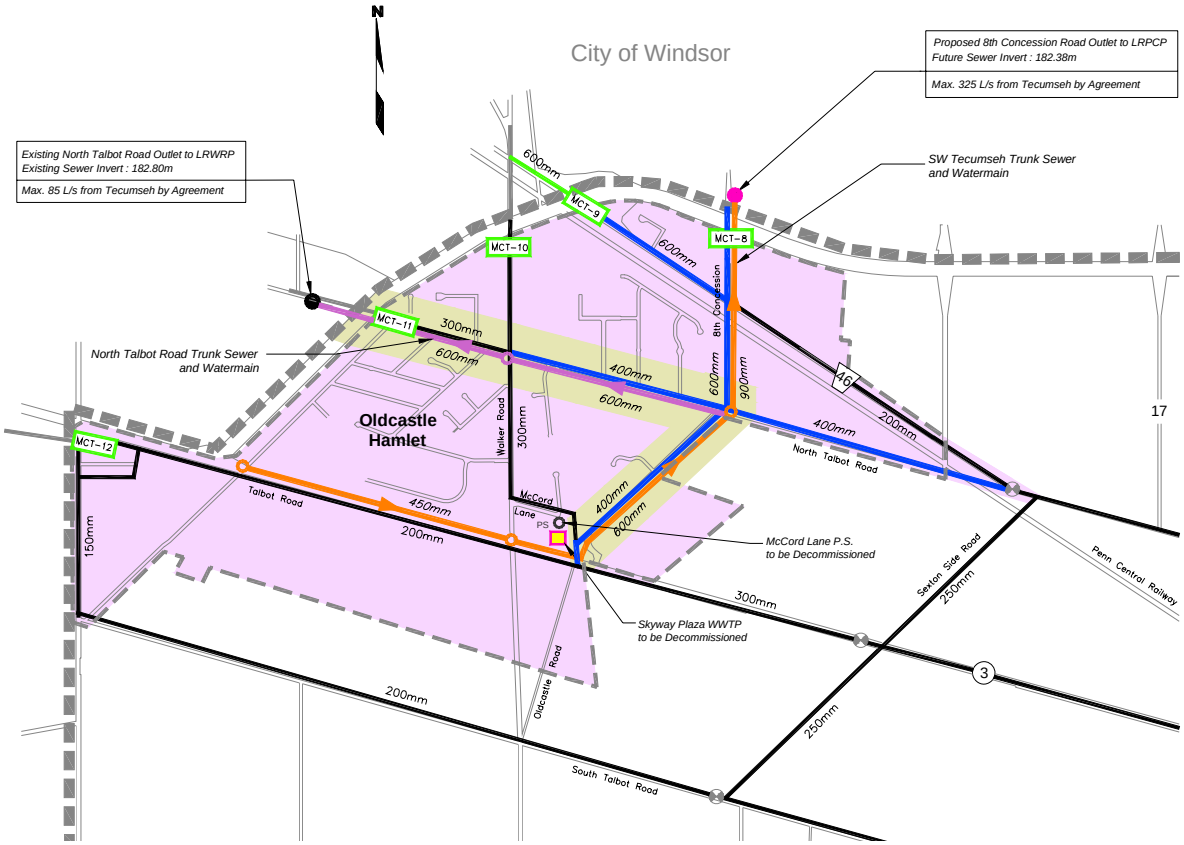
- *Trunk Watermain*
- *Alternative Trunk Watermain Route*
- *Trunk Sewer to LRPCP*
- *Alternative Trunk Sewer Route to LRPCP*
- *Isolation Valve at Potential Pressure Zone Boundary.*
- *Alternative Site Locations for proposed Water Storage Facility and/or Booster Pumping Station.*
- *10-15 Year Implementation Plan*
- *15-20 Year Implementation Plan*

Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

Property requirements for proposed Water Storage Facility and/or Booster Pumping Station are to be finalized after a site selection process and may be different than shown.

Figure ES- 5 SW Service Area Implementation Strategy



Timing	Location	Estimated Capital Cost ($ Million)		
		Existing Developments	New Developments	Total
5 Year	North Talbot Road	$1.75	$3.86	$5.61
15-20 Year	Oldcastle Hamlet	$2.40	$6.30	$8.70
Total		$4.15	$10.16	$14.31

LEGEND

- Town Boundary
- Hamlet Boundary

EXISTING

- 300mm Trunk Watermain
- Skyway Plaza Wastewater Treatment Plant (WWTP)
- PS Wastewater Pumping Station (P.S.)
- Outlet Location for Discharge of Monitored flow from Tecumseh to Lou Romano Water Reclamation Plant (LRWRP)

2007/2008 CAPITAL WORKS

- Feedermain
- MCT-8 Tecumseh Metering Chamber

PROPOSED

- *Trunk Watermain*
- *Outlet Location for Discharge of Monitored flow from Tecumseh to Little River Pollution Control Plant (LRPCP)*
- *Trunk Sewer to LRPCP*
- *Trunk Sewer to LRWRP*
- *5 Year Implementation Plan*
- *15-20 Year Implementation Plan*

Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

Property Requirements

Schedule B Projects that will require property acquisition by the Town are summarized in Table ES-8. Property requirements for routing alternatives are summarized in Table ES-9 and will be reviewed during the design phase for each respective project.

Table ES- 8 Property Requirements

PROJECT ID	PROJECT NAME	PROPERTY REQUIREMENTS	COMMENTS
WW-1, W-1, WW-6 & W-4	West Tecumseh Trunk Sewer and Watermain	Route N-1: min. 20.0 m wide easement between CR 22 and CR42 in Tecumseh Hamlet.	Alignment of trunk sewer and watermain along Route N-1 to be coordinated through Secondary Plan / Plan of Subdivision approvals. Town will secure/purchase permanent easement(s) prior to commencing detail design.
WW-4	Sylvestre Pumping Station Upgrade	A min. 25m wide by 30 m deep (.075 ha) parcel of land is required for the building site on or adjacent to Sylvestre Drive in Tecumseh Hamlet.	An evaluation of alternatives sites for the proposed building in close proximity to the existing pumping station will be undertaken prior to commencing detail design. The Town will purchase any required property prior to construction.
W-9	Zone 2 Booster Pumping Station	A min. 50m wide by 50 m deep (0.25 ha) parcel of land is required for the booster pumping station site between Baseline Road and Maidstone Hamlet.	Four alternative sites (A, B, C and D) have been selected for the proposed booster pumping station. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.
W-10	Zone 2 Water Storage Facility	A 5.0 ha parcel of land is required for the water storage facility site between Baseline Road and Maidstone Hamlet.	Four alternative sites (A, B, C and D) have been selected for the proposed water storage facility. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.

Table ES- 9 Potential Property Requirements for Routing Alternatives

PROJECT ID	PROJECT NAME	POTENTAIL PROPERTY REQUIREMENTS	COMMENTS
WW-8 & W-6	South Tecumseh Trunk Sewer and Watermain	Alternative Route SE-1: min. 20.0 m wide easement through vacant agricultural lands between CR 42 and Baseline Road.	Alternative routing of trunk sewer and/or trunk watermain to be evaluated prior to commencing detail design. If alternative routing is selected as the preferred solution, Town will secure/purchase permanent easement(s).
		Alternative Route SE-2: min. 20.0 m wide easement around ESPA #38 through vacant lands between Baseline Road and Hwy 401.	

Summary

The preferred water and wastewater servicing strategies will support the short and long-term servicing needs of the approved growth areas and provide flexibility for servicing potential growth areas in the future. The strategies will also support meeting operational requirements, water quality and level of service objectives.

Upon completion of the Master Plan Update or Phase 2 of the EA process, Schedule A, A+ and B projects may proceed to Phase 5, Implementation, subject to finalization of the 30-day review period and assuming no Part II Orders are received. However, during implementation of some of these projects, additional study and analysis may be undertaken such as during the area servicing stages of development. While this work may address refinement to alignments, siting and minimizing environmental impacts, these projects will not require further planning under the Class EA process. The preferred water and wastewater strategies do not include any Schedule C projects requiring further planning under the Class EA process.

The following implementation requirements will be addressed during the subsequent steps (primarily during detailed design) of the projects:

- Finalization of property requirements
- Final refinement of infrastructure alignment and facility siting to ensure infrastructure is located outside regulated areas except for instances when it is unavoidable (watercourse crossings)
- Final refinement of construction methodologies including determination of crossing approaches including open-cut, tunnelling and structural supporting requirements
- Completion of additional supporting investigations including but not limited to:
    - Geotechnical investigations to support determination of construction requirements for the infrastructure
    - Hydrogeological investigations to evaluate potential impacts, to support mitigative requirements during construction and determine any dewatering requirements
- Mitigation of potential construction related impacts including but not limited to:
    - Traffic control
    - Noise, vibration and dust
    - Air pollution
    - Service interruption
    - Environmental and water disturbance or contamination
    - Siltation and erosion control
- Approval Requirements as required but not limited to:
    - Certificates of Approval from Ministry of Environment
    - Encroachment Permit from the Ministry of Transportation
    - Approvals from the County of Essex
    - Permit approvals from the Essex Region Conservation Authority (ERCA)
    - Associated Planning Act Approvals
    - Temporary Permit to Take Water for construction dewatering from the Ontario Ministry of the Environment.

1.0 Introduction and Background

1.1 Background

Planned population growth in the Town of Tecumseh is anticipated to be significant within the 2028 planning horizon. By 2028, the population of the Town is forecasted to grow by an additional 16,000 people (from 2006) to over 40,000 people.

Ready and accessible public infrastructure is essential to the viability of existing and growing urban areas. Infrastructure planning, land use planning and infrastructure investment require close integration to ensure efficient, safe and economically achievable solutions to providing the required water and wastewater infrastructure.

The Town of Tecumseh has developed goals to blend the economic and social activities of a growing Town with the preservation and protection of natural areas and resources through a sustainable approach to land management. The Official Plan provides a long-term strategic policy framework to guide growth and development while protecting and preserving natural areas and resources through a sustainable approach to land management.

In 2002, the Town of Tecumseh approved a comprehensive Master Plan for water and wastewater servicing. This Master Plan, which was subsequently updated with water master plan addendum in 2005, has provided the framework and vision for the water and wastewater servicing needs for the Town of Tecumseh into the future.

In light of new water and wastewater service agreements with the City of Windsor in 2004 and recent legislation, the Town of Tecumseh has initiated an update to the Water and Wastewater Master Plan to confirm and update the preferred water and wastewater servicing strategy to support growth in the Town and continue to provide a high level of service.

This update is being undertaken in accordance with the Municipal Engineers Association (MEA) Class Environmental Assessment (EA) process for Master Plans with extensive public and agency participation. The update is a critical component in the committed approach to providing sustainable services and will form the new framework and vision for the water and wastewater servicing needs for the Town into the future.

1.2 Master Plan Update Goals and Objectives

The Master Plan Update objectives and workplan were defined as follows:

- Complete a baseline review of existing water and wastewater systems
- Develop water and wastewater policies to provide guidelines to the process and to the development/evaluation of servicing strategies
- Integrate previous and concurrent related studies including:
  - Water Agreement among the Windsor Utilities Commission (WUC), City of Windsor and the Town of Tecumseh (November 2004) and Amending Agreement (January 2006)
  - Wastewater Agreement between the City of Windsor and the Town of Tecumseh (November 2004)
  - The Town of Tecumseh Official Plan Review and Secondary Plans for Manning Road (1996), Maidstone Hamlet (September 2003) and Tecumseh Hamlet (ongoing)

  - Class EA for Sanitary Servicing of Lands Annexed from the Town of Tecumseh, City of Windsor (2005)
  - Development Charges Study, Town of Tecumseh (July 2004)
  - Water and Wastewater Rate Study (October 2007)
  - Class EA Study for the Banwell Water Storage Reservoir, Windsor Utilities Commission (Deferred in December 2007)
- Complete and document the Master Planning process in accordance with the Class Environmental Assessment process with extensive public and agency participation
- Update the water and wastewater servicing strategies in consideration of:
  - meeting technical service requirements
  - optimizing existing infrastructure
  - minimizing impact to or enhance the natural, social and economic environments, and
  - providing cost effective solutions
- Establish a preferred long term servicing strategy and implementation plan to meet the existing and future servicing needs of the Town

In general, the overall goals for the water and wastewater servicing strategies are:

- Provide high level of service to existing users and approved growth
- Provide security of supply
- Mitigate impacts to natural, social and economic environments
- Best meet policy statements
- Ensure servicing meets the technical criteria
- Endeavour to optimize existing infrastructure
- Ensure the strategies are cost-effective.

1.3 Master Plan Update Study Components

The focus of the Water and Wastewater Master Plan Update consists of the evaluation of the water distribution and wastewater collection systems for the Town of Tecumseh. The analysis undertaken as part of this study deals primarily with the trunk infrastructure for the water and wastewater systems ultimately serviced by the water and wastewater treatment plants located within the City of Windsor. This infrastructure consists of the trunk watermains and sewers, major pumping stations and water storage facilities.

This Master Plan Update details the updated capital and implementation program for the trunk infrastructure as part of the Town of Tecumseh water and wastewater systems and provides all supporting reference data and deliverables.

1.4 Relevant Historical Reports

1.4.1 2002 Town of Tecumseh Water and Wastewater Master Plan

The Town of Tecumseh Water and Wastewater Servicing Master Plan was approved in 2002. The Master Plan has established preferred servicing strategies for the Town's water and wastewater systems to meet projected approved growth up to 2022.

The Master Plan followed the Class EA process for Master Plans and, as such, provided an approved public document which details the required capital and implementation program for the water and wastewater systems through 2022.

The Master Plan identified location, capacity, timing and costing for the required infrastructure as well as the steps required to implement the projects. The Town of Tecumseh has been proceeding with completing the study, design and construction requirements based on the servicing strategies identified in the Master Plan.

1.4.2 2005 Town of Tecumseh Water Master Plan Addendum

In 2005, the Town of Tecumseh completed an Addendum to the 2002 Water and Wastewater Servicing Master Plan based on the Windsor-Tecumseh Water Servicing Agreement.

The Addendum specifically analyzed the impact on the approved water servicing strategies from servicing the existing and projected water demands in the Town of Tecumseh from the City of Windsor system. The Addendum identified an updated capital and implementation program for the Town of Tecumseh works primarily related to changes in capacity, routing and timing for trunk watermain projects, and elimination of the Tecumseh Treatment Plant Upgrade project.

This Addendum also followed the Class EA process, including public consultation and filing of the final documentation.

1.4.3 2005 Class EA for Sanitary Servicing of Lands Annexed from the Town of Tecumseh, City of Windsor

The Class EA for Sanitary Servicing of Lands Annexed from the Town of Tecumseh was undertaken by the City of Windsor to confirm the wastewater infrastructure program necessary to service the affected lands based on developments and planning information and servicing requirements at that time. The Town of Tecumseh secured two new outlets for sanitary wastewater with the Wastewater Agreement with the City of Windsor, and established the location and capacity requirements for the new outlets to the Windsor System as part of the EA Study.

The Town of Tecumseh Wastewater Master Plan Update reviews the impact of the two new outlets on the approved wastewater servicing strategies for servicing new and existing developments within the Town boundaries. The Update includes a review of the impact of the updated servicing strategies on the Town's short-term capital budgets, and ensuring components of the near term projects were properly scheduled.

1.5 Master Plan Update Class EA Report Outline

This Master Plan Update Class EA Report documents the planning and design process followed and conclusions reached for the Town of Tecumseh Water and Wastewater Master Plan Update.

This Master Plan Update Class EA Report forms part of the overall deliverables for the Master Plan project. Based on the approach followed, the documentation has been prepared as described below:

Master Plan Update Class EA Report

The Water and Wastewater Master Plan Update Class EA Report, including all Appendices, is the documentation placed on public record for the Class EA review period.

This report contains and describes all required phases of the planning process and incorporates the procedure considered essential for compliance with the Environmental Assessment Act.

This Report contains the following sections:

1. Introduction and Background – provision of relevant information and reports as basis to the Master Plan Update
2. Master Planning Process – description of the Class EA Master Planning process and approach taken under this Master Plan Update
3. Problem/Opportunity Statement – definition of the problem/opportunity needing to be addressed under this study and presentation of baseline planning information
4. Master Plan Methodologies – description of the approach, specific tasks and relevant background information unique to the completion of the Town of Tecumseh Master Plan Update
5. Existing Conditions – description of the natural and social environments within the Town of Tecumseh.

Water

6. Existing Water System – description of the existing water system operating philosophy and trunk infrastructure
7. Water Design Criteria – definition of the design criteria used for the water system
8. Water Servicing Strategy Review – description of the rationale for the servicing strategy and confirmation of changes to the approved program for the lake-based infrastructure

Wastewater

9. Existing Wastewater System – description of the existing wastewater system operating philosophy and trunk infrastructure
10. Wastewater Design Criteria – definition of the design criteria used for the wastewater system, including plants, conveyance and analysis approaches
11. Wastewater Servicing Strategy Review – description of the rationale for the servicing strategy and confirmation of changes to the approved program for the lake-based infrastructure

Preferred Solution

12. Preferred Servicing Strategies – description of the preferred water and wastewater servicing strategies
13. Implementation Plan – updated implementation plans and capital costs for the north, southeast and southwest service areas

Appendix Part 1 – Project and Implementation Data

This Appendix contains relevant project, implementation and technical analysis information.

Key information includes:

- Planning data
- Background system data including historical water and wastewater flow conditions
- Water demand and wastewater flow calculations
- System capacity calculations

- Information on the Development Charges program.

Appendix Part 2 – Public Consultation Program

This Appendix contains all relevant documentation of the public consultation process including notices, comments and responses, and distributed information. All presentation material from the Public Information Centre (PIC) held during the process is included.

2.0 Master Planning Process

The Municipal Class Environmental Assessment (EA) process clearly defines approaches for completion of Master Plans within the Class EA context. The Town of Tecumseh has prepared this Master Plan based generally on Approach 2, which involves preparing a Master Plan document at the conclusion of Phases 1 and 2 in order to fulfill the requirements for Schedule B projects. The Town of Tecumseh has identified select Schedule B projects that will follow on with separate studies in order to provide greater detail and to finalize property and/or easement requirements. Any Schedule C projects identified would continue to fulfill Phases 3 and 4.

2.1 Class Environmental Assessment Process

This section describes the environmental assessment process and the specific requirements for the preparation of master plans.

2.1.1 Environmental Assessment Act

Ontario's *Environmental Assessment Act (EA Act)* was passed in 1975 and proclaimed in 1976. The EA Act requires proponents to examine and document the environmental effects that might result from major projects or activities and their alternatives. Municipal undertakings became subject to the *Act* in 1981.

The *Act* defines the environment broadly as:

1. Air, land or water
2. Plant and animal life, including man
3. The social, economic and cultural conditions that influence the life of man or a community
4. Any building, structure, machine or other device or thing made by man
5. Any solid, liquid, gas odour, heat, sound, vibration or radiation resulting directly or indirect from activities of man
6. Any part or combination of the foregoing and the interrelationships between any two or more of them.

The purpose of the EA Act is the betterment of the people of the whole or any part of Ontario by providing for the protection, conservation and wise management of the environment in Ontario (RSO1990, c. 18, s.2).

As set out in Section 5(3) of the *EA Act*, an EA document must include the following:

1. A description of the purpose of the undertaking

- The undertaking
- The alternative methods of carrying out the undertaking
- Alternatives to the undertaking.

2. A description of:

   - The environment that will be affected or that might reasonably be expected to be affected, directly or indirectly, by the undertaking or alternatives to the undertaking.
   - The effects that will be caused or that might reasonably be expected to be caused to the environment by the undertaking or alternatives to the undertaking.
   - The actions necessary or that may reasonably be expected to be necessary to prevent, change, mitigate or remedy the effects upon or the effects that might reasonably be expected upon the environment by the undertaking or alternatives to the undertaking.

3. An evaluation of the advantages and disadvantages to the environment of the undertaking, the alternative methods of carrying out the undertaking and the alternatives to the undertaking (RSO 1990, c. 18, s.2).

2.1.2 Principles of Environmental Planning

The Act sets a framework for a systematic, rationale and replicable environmental planning process that is based on five key principles, as follows:

1. *Consultation with affected parties.* Consultation with the public and government review agencies is an integral part of the planning process. Consultation allows the proponent to identify and address concerns cooperatively before final decisions are made. Consultation should begin as early as possible in the planning process.

2. *Consideration of a reasonable range of alternatives.* Alternatives include functionally different solutions, "alternatives to" the proposed undertaking and "alternative methods" of implementing the preferred solution. The do nothing alternative must also be considered.

3. *Identification and consideration of the effects of each alternative on all aspects of the environment.* This includes the natural, social, cultural, technical, and economic environments.

4. *Systematic evaluation of alternatives in terms of their advantages and disadvantages, to determine their net environmental effects.* The evaluation shall increase in the level of detail as the study moves from the evaluation of "alternatives to" to the evaluation of "alternative methods".

5. *Provision of clean and complete documentation of the planning process followed, to allow "traceability" of decision-making with respect to the project.* The planning process must be documented in such a way that it may be repeated with similar results.

2.1.3 Class Environmental Assessment

"Class" Environmental Assessments (Class EAs) were approved by the Minister of the Environment in 1987 for municipal projects having predictable and mitigatable impacts. The municipal Class EAs were revised and updated in 1993, 2000 and again in 2007. The Class EA approach streamlines the planning and approvals process for municipal projects, which have the following characteristics:

- They generally address similar types of problems and opportunities
- A common set of "alternatives to" and "alternative methods" apply
- They follow the same EA planning process with similar phases
- The types of impacts and approaches to environmental protection and mitigation are recurrent

The Municipal Class Environmental Assessment, prepared by the Municipal Engineers Association (October 2000, as amended in 2007), outlines the procedures to be followed to satisfy EA requirements for water, wastewater and road projects. The process includes five phases:

- Phase 1: Problem Definition
- Phase 2: Identification and Evaluation of Alternative Solutions to Determine a Preferred Solution
- Phase 3: Examination of Alternative Methods of Implementation of the Preferred Solution
- Phase 4: Documentation of the Planning, Design and Consultation Process
- Phase 5: Implementation and Monitoring.

Public and agency consultation are integral to the Class EA planning process.

Projects subject to the Class EA process are classified into one of four possible "schedules", depending on the degree of expected impacts. Schedule A projects are limited in scale, have minimal adverse environmental effects and include a number of municipal operational and maintenance activities and are approved without the need for further assessment. Schedule A+ projects are also pre-approved, but public notification is required prior to implementation of the Project to allow an opportunity for the public to review the project with the local municipal Council. Schedule B projects require a screening of alternatives for their environmental impacts and Phases 1 and 2 of the planning process must be completed.

Schedule C projects must satisfy all five phases of the Class EA planning process. These projects have the potential for greater environmental impacts. Phase 3 involves the assessment of alternative methods of carrying out the project, as well as public consultation on the preferred conceptual design. Phase 4 normally includes the preparation of an Environmental Study Report (ESR), which is filed for public review.

If there are no outstanding issues remaining after the public review period for Schedule B or Schedule C projects, then the project is approved and may proceed to construction. However, should there be any unresolved issues remaining during the public review period, any party may request that the Minister of the Environment consider a Part II Order. The Minister would then decide to deny the request for a Part II Order; refer the matter to mediation; or require the proponent to comply with Part II of the EA Act.

The Class EA process flowchart is provided in Figure 2.1.

2.1.4 Master Planning Process

Municipalities recognize the benefits of comprehensive, long-range planning exercises that examine problems and solutions for an overall system of municipal services. The Municipal Class EA for Water and Wastewater Projects recognizes the importance of master plans as the basis for sound environmental planning. The Class EA defines master plans as:

"*Long range plans which integrate infrastructure requirements for existing and future land use with environmental assessment planning principles. These plans examine an infrastructure system(s) or group of related projects in order to outline a framework for planning for subsequent projects and/or developments.*"

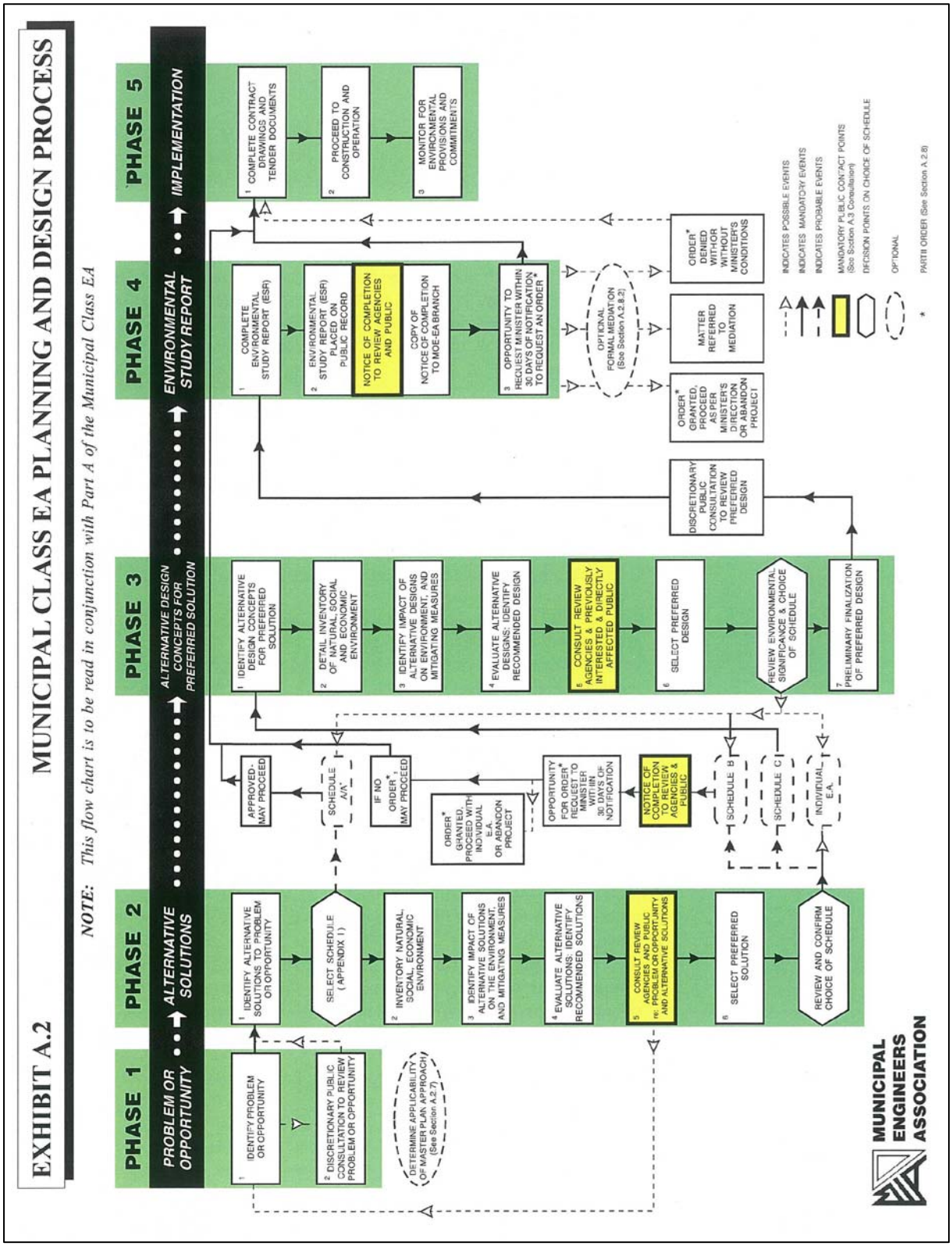
Master plans have distinguishing features that set them apart from project specific studies. These features include the following:

- Master plans are broad in scope and focus on the analysis of a system for the purpose of outlining a framework for the provision of future works and developments.
- Specific projects recommended in a master plan are part of a larger management system and are distributed geographically throughout the study area. The implementation of specific projects may occur over an extended time frame.

According to the Class EA document, a master plan must at least satisfy the requirements of Phases 1 and 2 of the Class EA process and incorporate the five key principles of environmental planning, as identified in Section 2.1.2. The master plan must document public and agency consultation at each phase of the process and a reasonable range of alternative solutions must be identified and systematically evaluated.

The Town of Tecumseh Water and Wastewater Master Plan (2002) fulfills these requirements. This Master Plan Update is designed to build on the decision making completed in the previous Master Plan exercises and present a refined strategy. The approach for the Master Plan Update is to confirm the existing projects and where applicable, evaluate and develop any new components. This approach would also be scrutinized through a public and agency consultation process and be fully documented.

Figure 2.1 Municipal Class EA Planning and Design Process



2.2 Consultation and Communication

At the outset of the Master Plan Update process, a Public Consultation Plan was developed. The activities that were undertaken as part of the process are described in the following sections and are considered critical and required under the Class EA Master Planning process.

Full documentation of the consultation and communication program is contained in the appendices to this report.

2.2.1 Public Access to Information

At the onset of the project, the Town developed and maintained a Contact List, and sent relevant project materials to all Agencies and members of the public who had expressed interest in the process. Notices of upcoming Public Information Centres (PICs) were published in the local papers.

2.2.2 Public Information Centres

Through Phases 1 and 2 of a Municipal Class EA, the study proponent (in this case, the Town of Tecumseh) is required to consult the public only once the alternative solutions to the problem being addressed have been evaluated, and a preferred option selected. The Town of Tecumseh notified the public of the Master Plan Update and of the upcoming PIC on February 29, 2008. All of the materials presented at the PIC are included in the Appendix 2-3, and copies of all comments received following the PIC are included in Appendix 2-4. Notice of the PIC was also mailed directly to each agency contact included on the Town's Contact List such that any concerned parties would be aware of the opportunities to become involved in the Master Planning process. A PIC was held on two separate nights to allow the public from the north and south areas of the Town easier access to the PIC. The PIC was held on the following dates:

- Water/Wastewater PIC: Wednesday, March 26, 2008
- Water/Wastewater PIC: Thursday, March 27, 2008

The PIC held at the Town of Tecumseh Fire Hall in Oldcastle Hamlet on Wednesday March 26, 2008, while the PIC was held in the Council Chambers at the Town of Tecumseh offices on Lesperance Road on Thursday, March 27, 2008.

2.2.3 Agency Meetings

In addition to the project information disseminated through the mandatory contact distribution and public information centres, stakeholder workshops were held to provide opportunity for detailed discussion on the development and evaluation of the servicing strategies and for detailed discussion on specific technical topics related to Tecumseh's systems.

The Agency consultation included meetings with:

- City of Windsor
- Windsor Utilities Commission

3.0 Problem/Opportunity Statement

3.1 Study Area

The Town of Tecumseh is situated in the northwest portion of the Essex County and covers approximately 9,413 hectares. The Town is bordered by the City of Windsor and the Town of LaSalle to the west, Lake St Clair to the north, the Town of Lakeshore to the east and the Towns of Essex and Amherstburg to the south. The study area for the Water and Wastewater Master Plan Update covers the urban settlement areas of Tecumseh, St Clair Beach and Tecumseh Hamlet in the North Service area, Maidstone Hamlet and the Highway Service Centre area in the Southeast (SE) Service area, and Oldcastle Hamlet in the Southwest (SW) Service area.

The Study Area for this Master Plan consists of the existing designated urban areas of the Town of Tecumseh, and includes the anticipated growth between the present date and 2028. A map of the Study Area is included in Figure 3.1.

3.2 Planning Projections

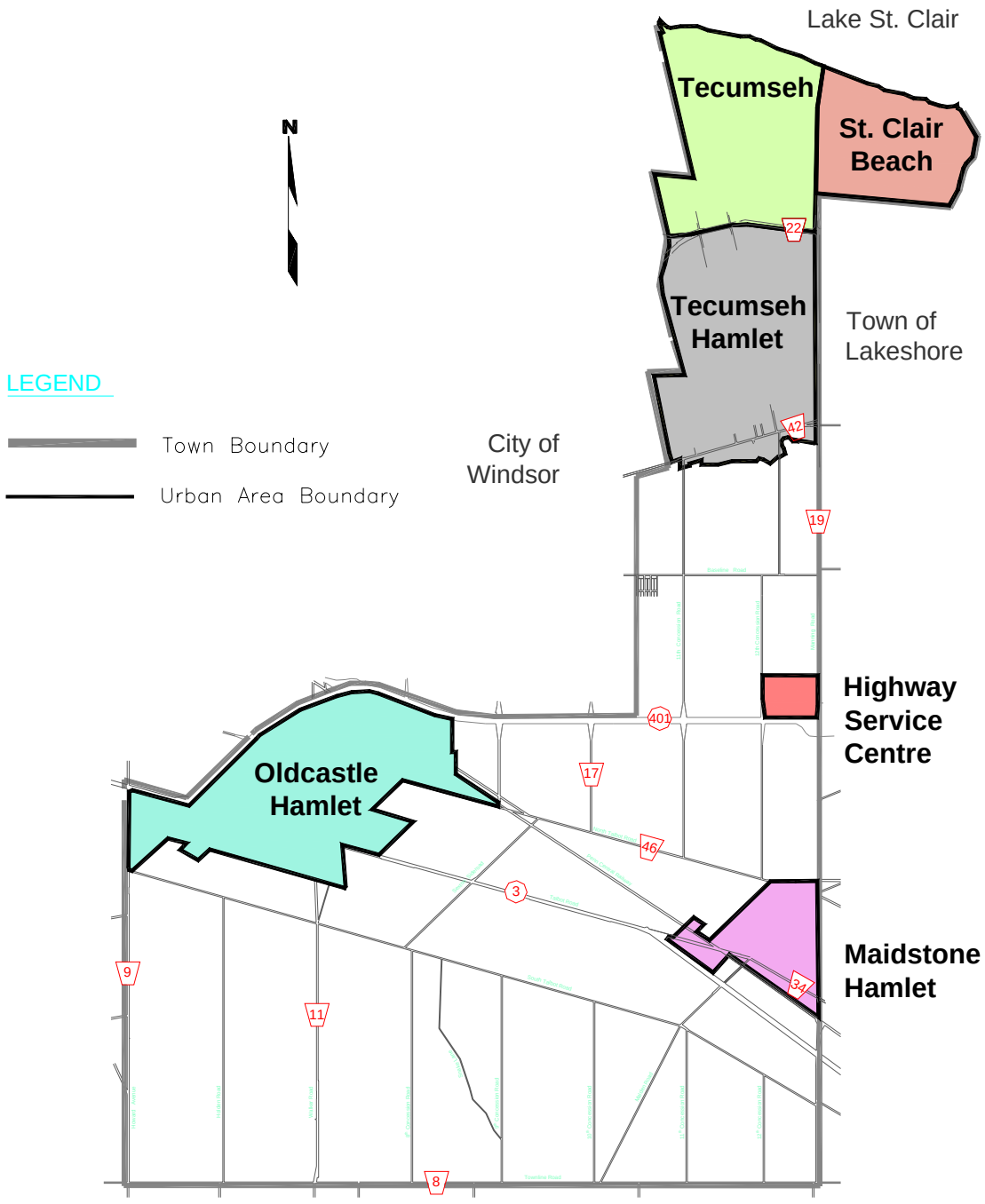
Best Planning Estimates (BPE 2008) for residential growth were prepared in consultation with the Town's Planning, Public Works and Water departments and include intensification of the urban settlement areas of Tecumseh, St. Clair Beach, Tecumseh Hamlet, Maidstone Hamlet and Oldcastle Hamlet. The BPEs are based on the available planning information including local growth analysis in the Town's Official Plans, planning documents and Secondary Plans for Tecumseh Hamlet, Maidstone Hamlet and the Manning Road Development Area.

The distribution of population growth in the urban settlement areas is summarized in Table 3.1.

Table 3.1 Projected Population Statistics – 2008 through 2028+

SERVICE AREA		2008	2018	2028	URBAN BUILD-OUT (2028+)
North	Tecumseh	13,773	14,029	14,029	14,029
	St. Clair Beach	3,957	4,138	4,138	4,138
	Tecumseh Hamlet	3,838	10,529	15,720	21,085
Southeast	Maidstone Hamlet	449	449	2,000	3,000
	Rural	1,300	1,490	1,680	2,300
Southwest	Oldcastle Hamlet	466	1,066	2,052	2,437
	Rural	531	581	631	767
Total		24,314	32,282	40,250	47,756

Figure 3.1 Study Area



3.3 Problem/Opportunity Statement

The purpose of the Problem/Opportunity Statement is to define the principal starting point in the undertaking of the Master Plan Class EA and assist in defining the scope of the project.

As such, the Problem/Opportunity Statement has been defined as:

- By 2028, the Town of Tecumseh could experience population growth to over 40,000 people – an increase of about 16,000 residents
- Water and Wastewater infrastructure upgrades will be required to service future residential and non-residential lands
- A comprehensive Water and Wastewater Master Plan will ensure implementation of a sustainable growth strategy
- The Town of Tecumseh had completed a Water and Wastewater Master Plan in 2002 and a Water Master Plan amendment in 2005
- In light of new water and wastewater service agreements with the City of Windsor, an update to the Approved Water and Wastewater Master Plan is required to confirm and update the preferred water and wastewater servicing strategies to support growth in the Town and to continue to provide a high level of service.

4.0 Master Plan Methodologies

4.1 Overview

A number of tasks and evaluation requirements were undertaken as part of the Master Plan process unique to the Town of Tecumseh.

Under any Master Plan, the methodology for analyzing planning information, developing water demands and wastewater flows and modelling the systems needs to be developed to best serve the proponent.

4.2 Population Data

This Master Plan makes use of the planning information derived through the Best Planning Estimates process in order to assess growth areas and allocate future water demands and wastewater flows.

4.3 Evaluation Criteria

The Master Plan evaluation approach followed typical evaluation of impacts under Class EA evaluation criteria including:

- Physical and Natural Environment:
  - Impact on vegetation, fish and wildlife; surface drainage and groundwater; soil and geology
  - Impact on areas of natural and scientific interest, and environmentally-sensitive areas
  - Disruption of topographical features.
- Social, Economic, and Cultural Environment:
  - Impact on existing and proposed development
  - Impact on archaeological and historic sites
  - Impact on agricultural resources
  - Impact on recreational areas
  - Impact on other utilities
  - Coordination with proposed roadway development.
- Financial Factors:
  - Construction, operation and maintenance (life-cycle) costs
  - Best use of existing infrastructure
  - Flexibility for scheduling works.
- Technical Factors:
  - Level of service
  - Security and reliability
  - Impact on existing infrastructure
  - Constructability
  - Impact on operations and maintenance
  - Meeting legislated criteria and regulations.

4.4 Implementation and Scheduling

Typically, scheduling of infrastructure upgrades should be planned to ensure that actual flows do not exceed approximately 85 - 90% of full design capacity. This approach should ensure that future upgrades are undertaken approximately 2 years before flow projections meet available capacity.

This concept is more easily achieved for the projects further out in the planning horizon. Given that many upgrades are required in the short term (i.e., before 10 years), some projects have been identified with accelerated schedules and in-service dates as soon as feasible.

Total project scheduling has been based on total project delivery requirements including identifying all project components such as additional studies, Class EA studies, design, and construction requirements.

5.0 Existing Conditions

5.1 Natural, Social and Cultural Environment

A detailed review of the biophysical, socio-economic and cultural environments was undertaken as part of the Approved 2002 Water and Wastewater Master Plan. Detailed description of the environment within the Study area can be found in the 2002 Master Plan document.

There are no significant changes to the Biophysical Environment or natural features of interest as described in 2002 Master Plan, with the exception of the Airport Woodlot. As a result of the City of Windsor's annexation of the "Airport Lands" from the Town of Tecumseh, the Airport Woodlot is no longer within the Town's boundary.

The Province provides guidance for the identification of areas to be protected from urban uses/growth through the Provincial Policy Statement (PPS, 2005). With the PPS guidelines in mind, the following areas were confirmed as constraint areas for development. These areas were reviewed and considered in the Master Plan Update Process.

Constraint Areas for Development

- Fairplay Woods, ESA Site #38
- McAuliffe Woods

In addition to the two constraint areas identified, consideration was given to potential impacts to watercourses at crossings with the alignments of trunk sewers and watermain facilities.

5.2 Approved Servicing Strategies

The Servicing Strategies approved under the 2002 Wastewater Master Plan and the 2005 Water Master Plan Addendum are outlined on Figures 5.1 and 5.2 respectively.

The Capital Works Projects developed under the Approved 2002 Wastewater Master Plan and the 2005 Water Master Plan Addendum are summarized in Tables 5.1 and 5.2 respectively.

Figure 5.1 2002 Wastewater Master Plan Servicing Plan

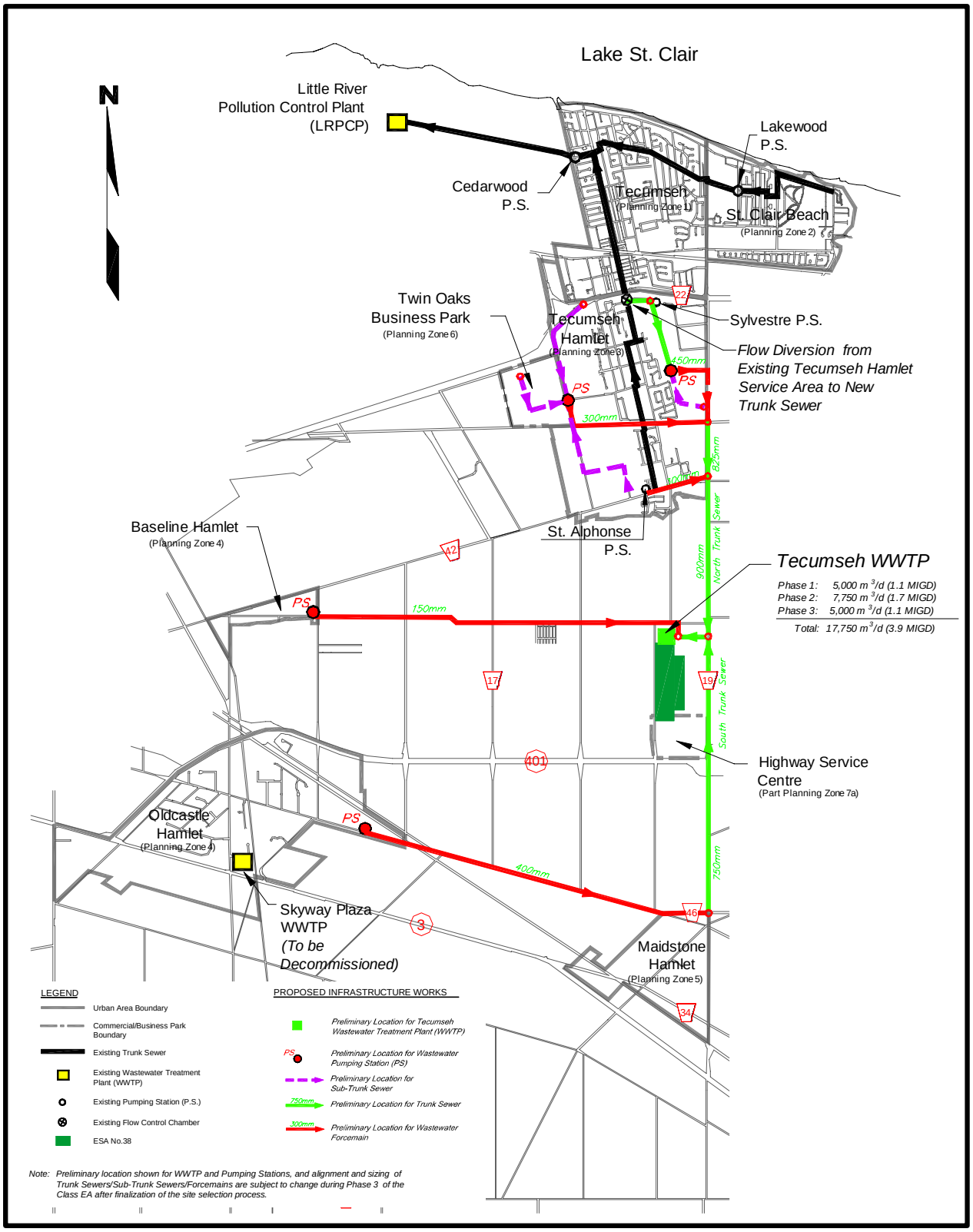
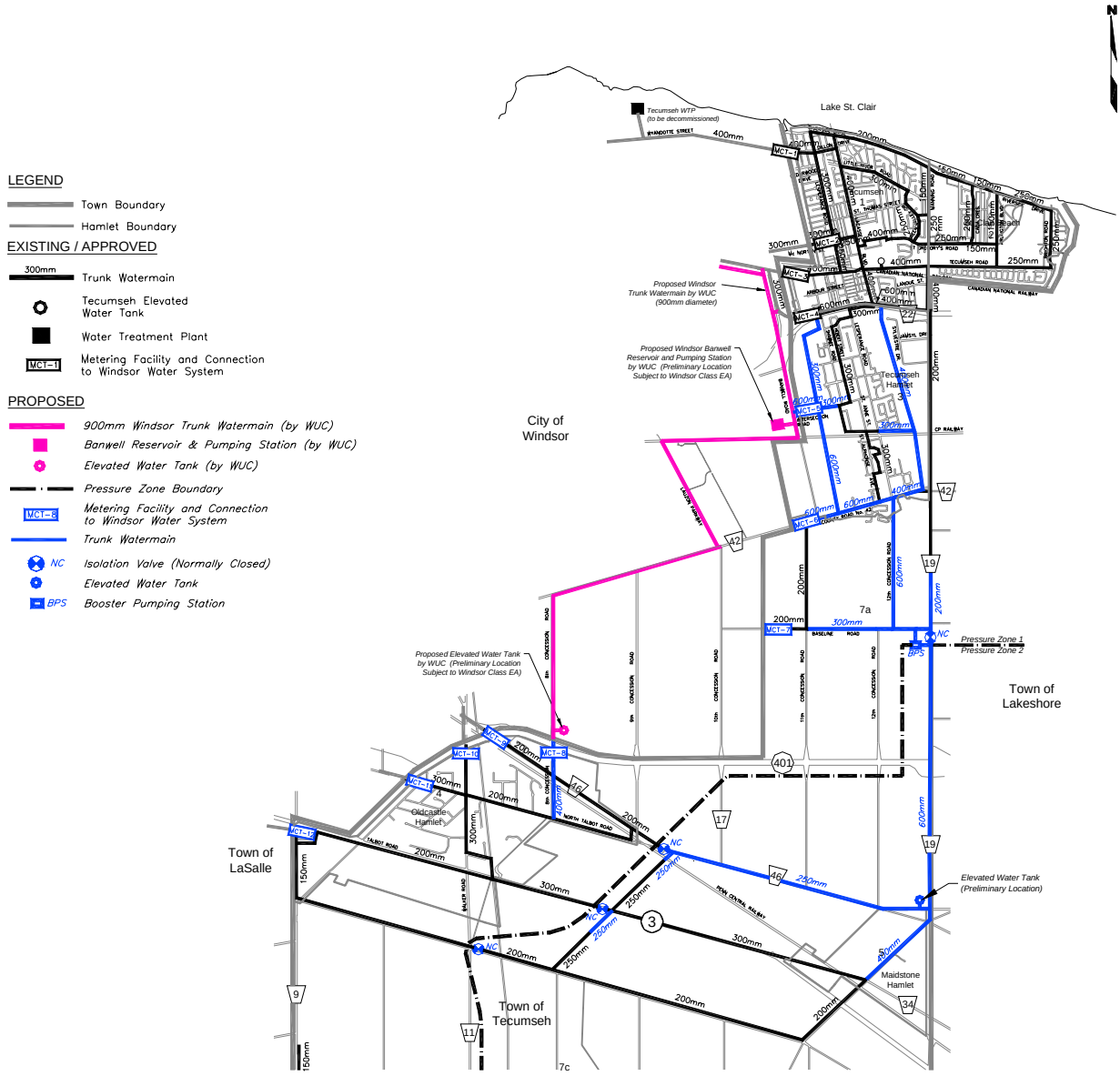


Table 5.1 2002 Wastewater Master Plan – Approved Servicing Strategy

SERVICE AREA	PROJECT ID	DESCRIPTION OF PROJECT	ESTIMATED CAPITAL COST ($ MILLION)
North Tecumseh Wastewater Service Area	TN-WWTP1	New 5,000 m3/d (1.1 MIGD) Tecumseh WWTP on Town Property north of Highway 401	$11.38
	TN-WWTP2	Tecumseh WWTP expansion from 5,000 m3/d (1.1 MIGD) to 12,750 m3/d (2.8 MIGD)	$15.62
	TN-WWTP3	Tecumseh WWTP expansion from 12,750 m3/d (2.8 MIGD) to 17,750 m3/d (3.9 MIGD)	$10.08
	TN-TS1	North trunk sewer on Manning Road from Tecumseh Hamlet to WWTP	$3.65
	TN-WWPS1	New pumping station and forcemain for servicing Tecumseh Hamlet east development and service area south of County Road 22	$2.21
	TN-STS1	Sub-trunk sewers for Tecumseh Hamlet east development and diversion of existing service area south of County Road 22	$1.29
	TN-WWPS2	New pumping station and forcemain for servicing Tecumseh Hamlet west development and Twin Oaks Business Park	$1.44
	TN-STS2	Sub-trunk sewers for Tecumseh Hamlet west development and Twin Oaks Business Park	$2.05
	TN-WWPS3	New pumping station and forcemain for servicing Baseline Hamlet	$1.38
South Tecumseh Wastewater Service Area	TS-TS1	South trunk sewer on Manning Road from Maidstone Hamlet to WWTP	$4.09
	TS-WWPS1	New pumping station and forcemain for servicing Oldcastle Hamlet	$2.90
TOTAL CAPITAL COST			$56.09

Note: Estimated in 2002 dollars

Figure 5.2 2005 Water Master Plan Addendum Servicing Plan



Notes:

The alignments shown for proposed trunk watermains are not finalized at this time and will be subject to change based on approved development plans.

Table 5.2 2005 Water Master Plan Addendum - Approved Servicing Strategy

PHASE	PROJECT ID	DESCRIPTION OF PROJECT	TIMING	ESTIMATED CAPITAL COST ($ MILLION)
Phase 1 (0-5 yrs)	TN-WTP1	Engineering design and WTP interim upgrades	Completed	$1.33
	Contract # 2	Water supply feedermain and metering facilities on Dillon Drive, McNorton Street, Tecumseh Road and Lesperance Road – Contract # 2	2005	$1.61
	Contract # 3	County Road No. 22 feedermain and connections - Contract # 3	2005-2006	$2.11
	TN-WM1	Feedermain on Tecumseh Road from County Road 19 (Manning Road) to existing elevated tank	2005-2006	$0.25
	TS-MF1	Provision of five (5) metering facilities and interconnections at the Town Boundary in Oldcastle Hamlet on the 8th Concession Road, County Road 46, Walker Road, North Talbot Road and Talbot Road (Highway 3)	2006-2007	$0.66
	TN-WM2	400mm trunk watermain and appurtenances for east Tecumseh Hamlet north of CPR tracks from County Road 22 to CPR tracks	2008-2009	$0.95
	TN-WM3	300mm trunk watermain and appurtenances along CPR tracks from Lesperance Road to new 400 mm watermain in east Tecumseh Hamlet	2008-2009	$0.17
	TN-WM4	300mm trunk watermain and appurtenances for west Tecumseh Hamlet from County Road 22 to Intersection Road	2008-2009	$0.55
	TN-WM5	600mm and 300mm trunk watermains and appurtenances including metering facilities on Intersection Road from Banwell Road to existing 300 mm watermain	2008-2009	$0.77
	TS-WM1	250mm watermain and appurtenances on Sexton Side Road from North Talbot Road to existing 250 mm watermain and from Highway 3 to existing 250 mm watermain	2008-2009	$0.26
Less OSTAR Approved Grant for WTP upgrades				($3.92)
Sub Total for PHASE 1 (0-5 years)				$4.74
Phase 2 (5-10 yrs)	TN-WM6	600mm trunk watermain and appurtenances for west Tecumseh Hamlet from Intersection Road to County Road 42	2010 - 2011	$1.17
	TN-WM7	600mm trunk watermain and appurtenances on County Road 42 from Tecumseh-Windsor Boundary to 12th Concession Road and metering facilities	2010 -2011	$1.96
	TN-WM8	400mm trunk watermain and appurtenances for east Tecumseh Hamlet south of CPR Tracks from CPR tracks to County Road 42	2012-2013	$0.39
	TN-WM9	400mm trunk watermain and appurtenances on County Road 42 from 12th Concession Road to 150 m west of Manning Road	2012 - 2013	$0.20
Sub Total for PHASE 2 (5-10 years)				$3.72

PHASE	PROJECT ID	DESCRIPTION OF PROJECT	TIMING	ESTIMATED CAPITAL COST ($ MILLION)
Phase 3 (10-20 yrs)	TN-WM10	600mm trunk watermain and appurtenances on 12th Concession Road from County Road 42 to Booster Pumping Station (BPS) on Baseline Road	2015-2016	$1.66
	TN-WM11	300mm watermain and appurtenances on Baseline Road from 11th Concession Road to 12th Concession Road and metering facilities	2016-2017	$0.51
	TN-WM12	200mm watermain and appurtenances on County Road 19 (Manning Road) and Baseline Road from proposed 600mm trunk watermain to existing 200 mm watermain	2015-2016	$0.35
	TN-WM13	600mm trunk watermain and appurtenances on County Road 19 (Manning Road) from booster pumping station to Highway 401	2015-2016	$1.71
	TS-WM2	600mm trunk watermain and appurtenances on County Road 19 (Manning Road) from Highway 401 to Elevated Tank on County Road 46	2015-2016	$2.62
	TS-WM3	400mm trunk watermain and appurtenances on Malden Road from County Road 46 to County Road 34	2017-2018	$0.77
	TS-WM4	250mm watermain and appurtenances on County Road 46 from Elevated Tank near County Road 19 (Manning Road) to Sexton Side Road	2016-2017	$1.41
	TS-WM5	400mm trunk watermain and appurtenances on 8th Concession Road from Highway 401 to North Talbot Road	2017-2018	$1.31
	TS-BPS1	Booster Pumping Station (BPS) near intersection of Baseline Road and Manning Road	2015-2016	$1.50
	TS-ET1	Construction of elevated water tank near intersection of North Talbot Road and Manning Road	2016-2017	$3.70
Sub Total for PHASE 3 (10-20 years)				$15.54
ESTIMATED TOTAL CAPITAL COST (FROM 2005 TO 2025)				$24.00

6.0 Existing Water System

6.1 General

The Town of Tecumseh is supplied with water from the City of Windsor. The A.H. Weeks water treatment plant (WTP), the trunk transmission mains, the pumping stations and reservoirs in the City of Windsor are owned and operated by the Windsor Utilities Commission (WUC). The Town of Tecumseh owns and operates the distribution system within the Town of Tecumseh, including metering facilities at the Town boundary. The Town also owns and operates one elevated storage facility with a capacity of 4,540 m^3 (1.0 MIG). The WUC currently utilizes approximately 50% of the available storage within the Tecumseh elevated water tank for pump control.

6.2 Windsor Water Treatment Plant

The Windsor (A. H. Weeks) Water Treatment Plant is owned and operated by the Windsor Utilities Commission (WUC). It has been confirmed by the WUC that the plant currently has a rated capacity of 349,000 m^3/day (76.8 MIGD). Raw water to the WTP is drawn from the Detroit River. The main treatment processes at the Windsor WTP consist of coagulation, flocculation, sedimentation, filtration, fluoridation and disinfection with ozone as the primary disinfectant.

The Water Agreement between the Windsor Utilities Commission and the Town of Tecumseh includes the following conditions:

- WUC is responsible for supplying water to the Town on a continuous basis up to a maximum daily flow of 87 MLD
- The Town will remain responsible for its own distribution system within the boundaries of Tecumseh and any new storage works that may be required to supply its fire flow of water
- WUC will deliver peak hourly flow and maintain sufficient storage in the existing elevated water tank for fire flows in Tecumseh
- Storage for equalization and peak hour flow of water for the Town will be the responsibility of WUC
- The Tecumseh Water Treatment Plant will be shut-down and deactivated, and ownership would be transferred to the City of Windsor
- The existing 4.5 ML reservoir on Riverside Drive will be maintained in service by WUC until the capacity is replaced by an alternative facility.

In accordance with Article 3 of the 2004 Water Agreement, the Town recently completed or commenced construction of the following works in order to meet current and future servicing needs in Tecumseh:

- 12 new metering facilities and connections to the Windsor Water System along the Town boundary at Dillon Drive, McNorton Street, Tecumseh Road, County Road 22, Intersection Road, County Road 42, Baseline Road, 8th Concession Road, Provincial Road (County Road 46), Walker Road, North Talbot Road and Howard Avenue (Talbot Road)
- New water supply feedermains on McNorton Street, Lesperance Road, Tecumseh Road, Manning Road, County Road 22, County Road 42 and Provincial Road.

6.3 Local Water Distribution System

6.3.1 North Service Area

The north service area comprises the urban settlement areas of Tecumseh, St. Clair Beach and Tecumseh Hamlet and accounts for approximately 90% of the Town's current population. The change over in the source of supply from the Tecumseh WTP to the Windsor Water System took effect on March 31, 2006.

The existing distribution system in the north service area is supplied water through metering facilities and connections to the Windsor water system at the Town boundary at Dillon Drive, McNorton Street, Tecumseh Road, County Road 22 and County Road 42. The watermains in the north service area range in size from 100mm to 600mm in diameter and consist of various pipe material including cast iron, ductile iron and PVC.

The Town of Tecumseh owns and operates an elevated water storage facility with a storage capacity of 4.5 ML (1.0 MIG). This storage capacity is used for fire flows for the Town of Tecumseh, and is currently utilized by the WUC for pump control at the AJ Brian and George Avenue pumping stations.

The Town of Lakeshore is also supplied water from the WUC through the Tecumseh system via the north service area through four bulk water meters located east of Manning Road.

6.3.2 Southeast and Southwest Service Areas

The southeast and southwest service areas include the urban settlement areas of Maidstone Hamlet and Oldcastle Hamlet and the rural area south of County Road 42.

The existing distribution systems in the southeast and southwest service areas are supplied water through metering facilities and connection to the Windsor water system along the Town boundary at Baseline Road, 8th Concession Road, Provincial Road, Walker Road, North Talbot Road and Howard Avenue (Talbot Road). The watermains range in size from 100mm to 600mm in diameter and consist of various pipe material including cast iron, ductile iron and PVC.

7.0 Water Design Criteria

The design criteria utilized for the Tecumseh Water and Wastewater Master Plan Update is based on previous data used in the approved Master Plan, historical records and updated information developed through the water and wastewater servicing review process with Town staff.

The design criteria establishes the parameters utilized to develop projected flows, evaluate system capacities, determine future needs, and determine the scheduling and implementation plan.

7.1 Unit Water Demand Criteria

The Tecumseh water distribution system is being analyzed and designed based on MOE Design Guidelines and historical monitored flow rates, as presented in Table 7.1. In addition, large water users with known demands have been accounted for in the system analysis.

Table 7.1 Water Demand Criteria

PARAMETER	CRITERIA
Existing Residential Consumption	373 L/cap/day
Proposed Residential Consumption	347 L/cap/day
ICI Consumption	21,430 L/ha/day
Highway Service Centre Consumption	28,000 L/ha/day
Maximum Day Factor	2.0
Peak Hour Factor	3.0

7.2 Design Criteria for System Components and Operation

7.2.1 System Operation

The WUC currently operates their transmission and distribution system within a single pressure zone. Within the Town of Tecumseh, the system is also operated on a single pressure zone, with the maximum system pressure limited by the High Water Level in the Tecumseh Elevated Tank.

Under peak demand conditions, system pressures in the Southeast and Southwest service areas are low due to higher ground elevations and limitations in transmission capacity.

7.2.2 Pumping Capacity

As per the terms and conditions outlined in the 2004 Windsor-Tecumseh Water Agreement and 2006 Amending Water Agreement, the Windsor Utilities Commission (WUC) is responsible for supplying water to the Town on a continuous basis up to a maximum daily flow of 87 ML/D (19.1 MIGD) and is also responsible to deliver peak hourly flow to the Town. In addition, WUC agreed to proceed with a Class EA for the proposed Banwell Road Reservoir and Booster Pumping Station (BPS) and to employ its best efforts to complete construction prior to future needs being required.

Pumping stations are rated on their “firm” capacity to supply water. Based on the MOE Design Guidelines, it is recommended that the pumping station firm capacity with the largest pump out of service for each pumping station be utilized.

7.2.3 Storage Capacity

As per the terms and conditions outlined in the 2004 Windsor-Tecumseh Water Agreement and 2006 Amending Water Agreement, the Town is responsible for its own distribution system within the boundaries of Tecumseh and any new storage works that may be required to supply its fire flow of water. Storage for equalization and peak hour flow of water for the Town is the responsibility of WUC.

The fire flow criteria for the Town of Tecumseh are summarized in Table 7.2.

Table 7.2 Fire Flow Criteria

YEAR	CRITERIA	GUIDELINE
2008	227 L/s for 3.0 hours	IAO [1]
2013	280 L/s for 4.5 hours	MOE [1]
2018	280 L/s for 4.5 hours	MOE [1]
2023	378 L/s for 6.0 hours	MOE [2]
20-Year (2028)	378 L/s for 6.0 hours	MOE [2]
Urban Build-out	378 L/s for 6.0 hours	MOE [2]
Notes: 1. Based on a single fire in the largest urban centre 2. Based on the serviced population in an integrated north and south service areas		

7.2.4 Distribution Capacity

The distribution system is sized to convey the greater of peak hour flows or maximum day plus fire flows. Within each pressure zone in the distribution system, the range of acceptable pressures under normal operating conditions is between 40 psi (275 kPa) and 100 psi (690 kPa). Under fire flow conditions, it is acceptable for system pressures to drop to 20 psi (140 kPa).

8.0 Tecumseh Water Servicing Strategy Review

The Tecumseh water servicing strategy was reviewed in light of several changes that have occurred which have had significant impacts on the assumptions used in preparing the 2002 Master Plan. Significant issues impacting the 2002 Water Master Plan include:

- Updated Provincial Regulations, including the Safe Drinking Water Act, the Sustainable Water and Sewage Systems Act, and the Provincial Policy Statement
- On January 1, 2003, the City of Windsor annexed approximately 2,600 ha of land from the Town of Tecumseh, including the Twin Oaks Business Park and Baseline Hamlet
- On November 10, 2004, the Windsor Utilities Commission (WUC) entered into a Water Servicing Agreement with the Town of Tecumseh, and have agreed to provide potable water supplies up to a Maximum Daily Flow of 87,000 m^3/day (87 MLD), which will be sufficient for Tecumseh's needs for the foreseeable future
- The Town of Tecumseh completed the Master Water Servicing Addendum in 2005 to address the implications of the 2004 Water Servicing Agreement
- The recent Notice given by WUC that the proposed Banwell Road Reservoir Class EA is being deferred on the basis that the Windsor Water System has sufficient treatment and storage capacity to meet the projected 10 year demands for the amalgamated system.

The service area for the Tecumseh water system has changed from the approved 2002 Master Plan due to the Annexation of lands known as the "Airport Lands" by the City of Windsor. The current Study Area is depicted on Fig. 3.1.

Based on the recent Notice given by WUC that the proposed Banwell Road Reservoir Class EA is being deferred on the basis that the Windsor Water System has sufficient treatment and storage capacity to meet the projected 10 year demands for the amalgamated system, the time frame to implement full integration of the north and south water systems in Tecumseh has been reviewed to ensure that an adequate level of service can be provided to meet projected demands within the Town.

The servicing strategies and capital programs were updated to integrate previous and concurrent related studies including:

- Water and Wastewater Rate Study, Town of Tecumseh, October 2007
- Class EA Study for the Banwell Water Storage Reservoir, Windsor Utilities Commission (Deferred in December 2007).

8.1 Water Demand Projections

Utilizing the Town of Tecumseh planning projections and water design criteria, the water demand projections for the Town of Tecumseh are summarized in the following Table 8.1.

Table 8.1 Town of Tecumseh Water Demand Projections

SERVICE AREA		MAXIMUM DAY WATER DEMAND (ML/D)			
		2008	2013	2018	2028
North Tecumseh	Tecumseh	16.7	16.9	17.2	17.2
	St. Clair Beach	3.5	3.6	3.7	3.7
	Tecumseh Hamlet	3.6	6.6	9.1	13.1
	Supply to Town of Lakeshore	1.7	1.7	1.7	1.7
	Sub-Total	25.5	28.9	31.7	35.7
Southeast Tecumseh	Highway Service Centre	0.0	0.0	0.0	2.8
	Maidstone Hamlet	0.4	0.5	0.6	1.9
	Rural Area north of Highway 401	0.2	0.2	0.2	0.3
	Rural Area south of Highway 401	0.8	0.8	0.8	0.9
	Sub-Total	1.4	1.5	1.6	6.0
Southwest Tecumseh	Oldcastle Hamlet	4.5	5.3	6.5	8.9
	Rural Area	0.4	0.4	0.4	0.5
	Sub-Total	4.9	5.7	6.9	9.4
Total		31.7	36.1	40.3	51.0

8.2 Water Storage Requirements

Utilizing the Town of Tecumseh planning projections and water design criteria, the water storage requirements for the Town of Tecumseh are summarized in the following Table 8.2.

Table 8.2 Town of Tecumseh Water Storage Requirements

YEAR	REQUIRED STORAGE VOLUME
2008	2.5 ML
2013	4.5 ML
2018	4.5 ML
2023	9.1 ML
20-Year (2028)	9.1 ML
Urban Build-out	9.1 ML

The Town of Tecumseh currently has 4.5 ML of storage capacity within the Tecumseh Elevated Tank; however, approximately 50% of the available storage is currently utilized by the WUC for pump control, on an interim basis.

Based on the projected growth, additional fire storage will be required in Tecumseh by the year 2023.

8.3 Opportunities and Constraints

8.3.1 Pumping Stations and Reservoirs

The Town of Tecumseh has identified the need for a booster pumping station to provide adequate system pressures during peak demand conditions in the Southeast Service area, and an additional water storage facility to meet their long-term water storage requirements for fire protection. WUC will also require additional storage and pumping capacity, and had originally identified a new water storage reservoir and pumping station near Banwell Road and the EC ROW Expressway. The WUC has now identified that they have sufficient storage and pumping capacity within their system to meet projected demands until 2018, and has therefore deferred further Study on this facility pending completion of their Master Plan.

There may be a possibility to combine the storage and pumping requirements for both the Town and WUC into a single facility, in order to save on capital and ongoing maintenance and operations costs. Further review of this possibility will be considered through the Town and City's Permanent Joint Staff Liaison Committee.

8.3.2 Transmission Mains

The alignment of the trunk watermains within the Town of Tecumseh has, as much as possible, followed the alignment of existing road allowances to ensure that there are no delays in extending services. However, there may be opportunities to select alternative routes, which may be preferred. Potential alternative trunk facility alignments are depicted on the recommended Master Plan Update.

The Alternative routing of the trunk facilities will be further evaluated prior to commencing detail design for the affected project. Should the alternative route be selected for implementation, permanent easements will be secured and/or purchased by the Town prior to construction.

8.4 Water Servicing Strategy Overview

The Town of Tecumseh Water and Wastewater Master Plan Update consolidates the Town's servicing strategies for the north and south service areas to make best use of available capacities provided in the Servicing Agreements with Windsor. It should be recognized that the water and wastewater projects should be implemented concurrently wherever possible.

Wherever possible, the alignments of new trunk facilities have been planned based on the location of existing road allowances and/or servicing corridors in order to ensure that servicing can proceed without undue delays resulting from the need to acquire property. However, the Town has the option to construct the trunk facilities through new development lands if it can be shown to be cost effective to do so. In this event, the alignment of the trunk facilities may be altered based on approved Secondary Plans and/or Approved Draft Plans of Subdivision. Should the trunk facilities be implemented through new development lands, additional notification to the Public would be provided through the Planning Act notifications.

It should also be noted that the timing of the various projects has been established based on anticipated growth rates in Tecumseh and on a fiscally responsible capital works program. The Town will have the option to advance or defer specific projects depending upon the rate of growth experienced in Tecumseh, or upon the petition by a developer (or group of developers) provided that the financial impacts of advancing certain projects are reviewed and mitigated through collection of Development Charges or through Front-End Financing arrangements.

The Town of Tecumseh has initiated negotiations to assume operational control of the South Tecumseh Water System from the Windsor Utilities Commission (WUC) in 2008. As part of this operational change-over, the Town is implementing metering facilities at all connection points between the Windsor and Tecumseh Water Systems at the Town boundary. This work is scheduled for completion in 2008.

The servicing strategies and capital programs were also updated based on projects currently underway, whether in study, design or construction stage. This led to more detailed project information, schedules and capital cost estimates.

In general, the water servicing strategy remains valid from the 2005 Master Water Servicing Plan Addendum. The primary changes to the water servicing strategy are as follows:

- Revised alignments, diameters and scheduling of watermains in-line with BPEs and related studies
- Provision of additional trunk watermain capacity in North service area between CR 22 and CR 42 to service new growth to 2018
- Revised routing of trunk watermain between County Road 42 and County Road 46 to avoid a number of watercourse crossings and potential conflicts with the County's plans for widening/improving County Road 19 (Manning Road)
- Provision of Zone 2 pumping capacity for the SE service area to address existing system limitations and to service growth in Maidstone Hamlet
- Provision of additional storage capacity in Zone 2 for pump control in the SE service area and additional fire flow storage
- Provision of additional trunk watermains in the South service area to allow east west transfer from Maidstone Hamlet (Zone 2) to Oldcastle Hamlet due to capacity limitations in the existing Windsor Water System.

8.5 Recommended Strategy

The Updated Water Servicing Strategy includes a number of separate and distinct projects that will provide an ultimate consolidated servicing scheme to maximize the use of existing infrastructure and provide capacity for new growth in designated growth areas of the Town. The Servicing Strategy is depicted on Figure 8.1, and a brief description of each of the Projects is provided below:

8.5.1 W-1 – West Tecumseh Trunk Watermain from CR 22 to CP Railway

This trunk watermain will provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area, and will improve fire flows in existing developments south of CR 22. The alignment of this trunk watermain should be established through approved Secondary Plans and co-ordinated through proposed Plans of Subdivision.

Based on a Preliminary Design, a 400 mm trunk watermain from CR 22 to Intersection Road and 600 mm trunk watermain from Intersection Road to CP Railway is required within the Tecumseh Hamlet West Planning Area. In addition, 600 mm and 300 mm watermains are required on Intersection Road from Banwell Road to Shawnee Road.

8.5.2 W-2A – East Tecumseh Hamlet Watermain Connection

This trunk watermain will provide servicing for new development lands within the Tecumseh Hamlet East Planning Area, and will improve fire flows in existing developments south of CR 22. Based on a Preliminary Design, a 300 mm trunk watermain along CP Railway line from Lesperance Road to Manning Road is required.

8.5.3 W-2B- Trunk Watermain on Manning Road from CR 22 to CP Railway

This trunk watermain will provide servicing for new development lands within the Tecumseh Hamlet East Planning Area south of CR 22. Construction of this watermain could be coordinated with future Manning Road upgrades. Based on a Preliminary Design, a 400 mm trunk watermain on Manning Road from CR 22 to CP Railway is required.

8.5.4 W-3 – North Talbot Road Trunk Watermain

This project includes construction of a new trunk watermain on North Talbot Road from Walker Road to 8th Concession Road and on Oldcastle Road from North Talbot Road to Talbot Road. This trunk watermain will provide a major feed from the Windsor system into the southwest service area of Tecumseh, and combined with the future connections on provincial Road and 8th Concession Road, will ensure that adequate system pressures and fire flows will be available throughout the southwest service area. Based on a Preliminary Design, a 400 mm trunk watermain on North Talbot Road and Oldcastle Road is required.

8.5.5 W-4 - West Tecumseh Trunk Watermain from CP Railway to CR 42

Similar to W-1, this trunk watermain will provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area, and will improve fire flows in existing developments south of CP Railway. It will also connect the feedremain on County Road 22 to the recently installed feedremain on County Road 42, to provide looping for the main potable water feed lines from the Windsor system into the Town of Tecumseh. The alignment of this trunk watermain should be established through approved Secondary Plans and co-ordinated through proposed Plans of Subdivision.

Based on a Preliminary Design, a 600 mm trunk watermain from CP Railway to CR 42 is required within the Tecumseh Hamlet West Planning Area. In addition, a 300 mm watermain connection to the existing watermain on St. Alphonse Avenue is proposed.

8.5.6 W-5 - Trunk Watermain on Manning Road south of CP Railway

Similar to W-4, this trunk watermain will provide servicing for new development lands within the Tecumseh Hamlet East Planning Area, and will improve fire flows in existing developments south of CP Railway. Construction of this watermain could be coordinated with future Manning Road upgrades.

Based on a Preliminary Design, a 400 mm trunk watermain on Manning Road from CP Railway to CR 42 is required. In addition, a 400 mm watermain on CR 42 from 12th Concession Road to Manning Road is proposed.

8.5.7 W-6 – South Tecumseh Trunk Watermain from CR 42 to Highway 401

Construction of the South Tecumseh trunk watermain from County Road 42 to Highway 401 will provide water supply for new growth south of CR 42 including the designated Highway Commercial lands located adjacent to Manning Road just north of Highway 401. The alignment of this watermain is proposed to extend along 11th Concession Road south of County Road 42 to Baseline Road, then easterly along Baseline Road from 11th Concession to 12th Concession Road, then south on 12th Concession Road from Baseline Road to Highway 401. Consideration may be given to an Alternative Route for this trunk watermain during preparation of Secondary Plans for the future development areas south of County Road 42, should these lands be designated for growth in future Official Plan Updates.

Based on a Preliminary Design, a 600 mm trunk watermain from CR 42 to Highway 401 is proposed for the areas south of CR 42.

8.5.8 W-7 - South Tecumseh Trunk Watermain from Highway 401 to Maidstone

Construction of the South Tecumseh trunk watermain from Highway 401 to Maidstone Hamlet will provide water supply for new growth south of Highway 401 including Maidstone Hamlet. The alignment of this watermain will be along 12th Concession Road from Highway 401 to North Talbot Road, then easterly along Middle Road to Malden Road.

On a Preliminary basis, a 600 mm diameter trunk watermain has been selected for the portion on 12th Concession Road and a 400 mm watermain on Middle Road.

8.5.9 W-8 – Maidstone Hamlet Trunk Watermain

Construction of the Maidstone Hamlet trunk watermain will provide servicing for existing development and new growth within Maidstone Hamlet. The preliminary alignment of the watermain is along Malden Road from Middle Road to Talbot Road (CR 34). On a preliminary basis, a 400 mm diameter trunk watermain has been selected for this watermain.

8.5.10 W-9 – Zone 2 Booster Pumping Station

Construction of the Zone 2 Booster Pumping Station will permit the Town to operate the water system in the southeast area of Tecumseh at a higher pressure zone, in order to provide adequate pressures throughout the full range of demand scenarios. Four (4) alternative sites including the Town owned lands near the Manning Road/ Baseline Road have been identified for the location of the proposed booster pumping station. The rated capacity of the booster pumping station is estimated at 100 L/s.

8.5.11 W-10 – Zone 2 Water Storage Facility

Construction of the Zone 2 Water Storage Facility will supplement the existing fire storage already provided within the Tecumseh Elevated Tank, will provide Tecumseh with minimum fire storage required for an integrated Tecumseh system, and will provide storage for pump control for the booster pumping station. Four (4) alternative sites including the Town owned lands near the Manning Road/ Baseline Road have been identified for the location of the proposed water storage facility. The storage capacity requirement is estimated at 4.55 ML (1.0 MIG).

8.5.12 W-11 – County Road 46 Trunk Watermain

This project includes construction of a trunk watermain on County Road 46 (North Talbot Road) from 12th concession Road to Sexton Sideroad and local distribution watermains on Sexton Sideroad. Construction of the trunk watermain will provide water supply for the southeast service area and will provide an emergency back-up to the southwest service area in the event supply through the Windsor system is disrupted. The trunk watermain will also permit Tecumseh to provide fire storage for the southwest service area in the event that the Windsor sytem cannot provide fire flows to the area.

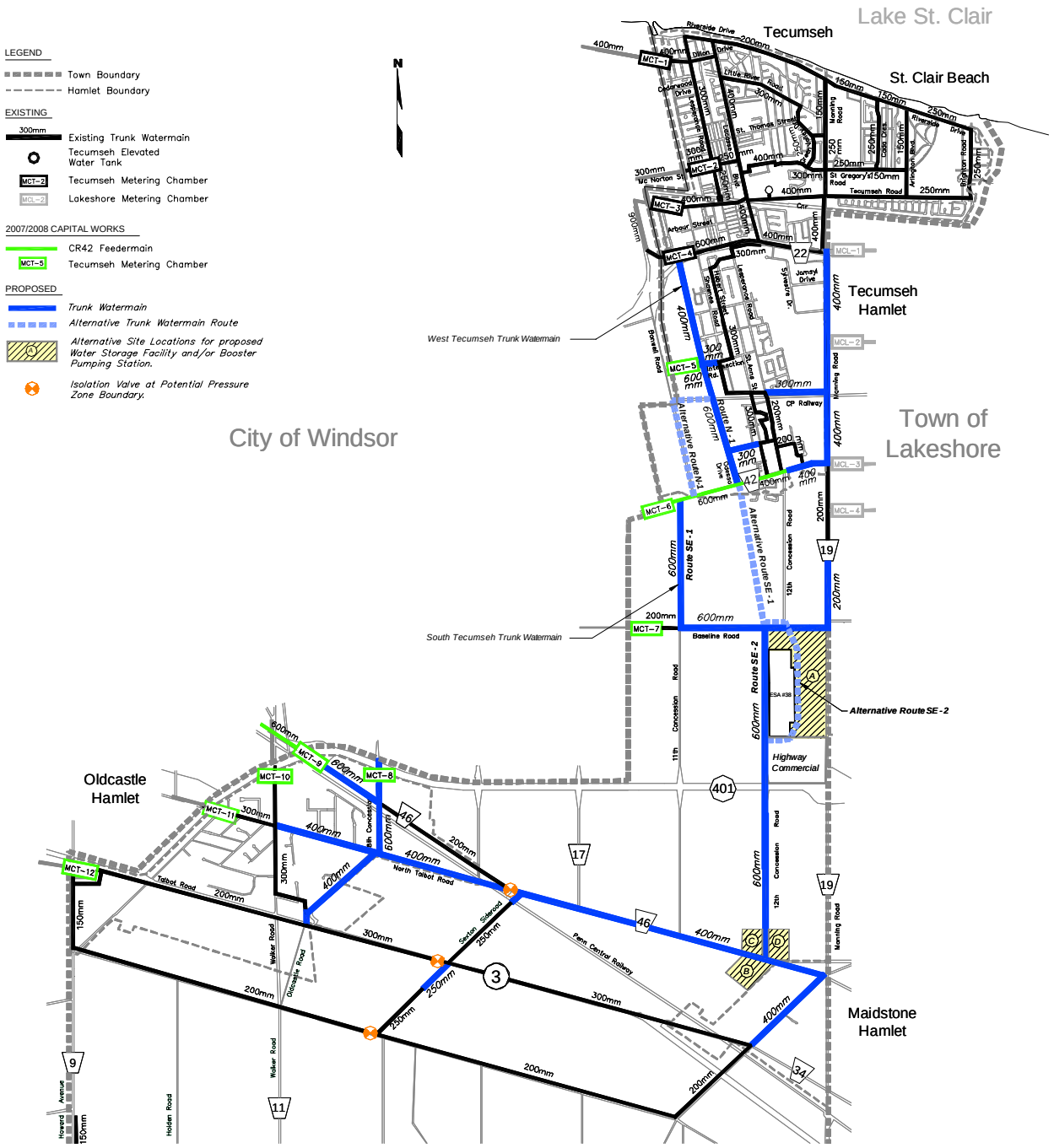
Based on a Preliminary Design, a 400 mm trunk watermain on County Road 46 is required. In addition, 250 mm watermains on Sexton Sideroad are required to complete the watermain looping.

8.5.13 W-12 - Southwest Tecumseh Trunk Watermain

This project involves construction of trunk watermain on 8th Concession Road from Highway 401 to North Talbot Road, on North Talbot Road form 8th Concession Road to Sexton Sideroad and on Provincial Road (CR 46) from Highway 401 to 8th Concession Road. This project will strengthen the overall distribution network for the southwest service area. The actual timing of the watermain works on 8th Concession Road and on provincial Road will be dependent upon Windsor completing the watermain extensions to the Tecumseh boundary.

Based on a Preliminary Design, 600 mm trunk watermain 8th Concession Road and Provincial Road, and 400 mm trunk watermain on North Talbot Road are required.

Figure 8.1 2008 Preferred Water Servicing Strategy



Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

Property requirements for proposed Water Storage Facility and/or Booster Pumping Station are to be finalized after a site selection process and may be different than shown.

9.0 Existing Wastewater System

Two (2) wastewater treatment plants currently service the Town of Tecumseh. The Little River Pollution Control Plant services the existing urban areas in the former Village of St Clair Beach, Town of Tecumseh and Tecumseh Hamlet. The Skyway Plaza and the Piccadilly Circus Subdivisions within Oldcastle Hamlet are serviced by a local temporary treatment facility.

9.1 Wastewater Treatment Plants

9.1.1 Little River Pollution Control Plant (PCP)

The Little River PCP is owned and operated by the City of Windsor, and is located in the northeast corner of the City adjacent to Lake St Clair. The Plant has a reported nominal capacity of 72,800 m^3/day (16 MIGD). A detailed description of the plant was provided in the 2002 Master Plan Study.

In accordance with the 2004 Wastewater Agreement between the City of Windsor and the Town of Tecumseh, the Town has been allocated 19.9 ML/D (4.37 MIGD) capacity in the Little River PCP. Provisions were included within the 2004 Agreement to allow Tecumseh to increase their capacity allocation by paying the Town's share for future plant expansions, up to a maximum of 38.0 ML/D (8.37 MIGD).

9.1.2 Skyway Plaza Wastewater Treatment Plant (WWTP)

The Skyway Plaza Wastewater Treatment Plant was constructed in 1998 as a temporary facility to service a commercial plaza and a 22 lot residential subdivision. The plant has a rated capacity of 87 m^3/d (0.02 MIGD). A detailed description of the plant was provided in the 2002 Master Plan Study.

9.1.3 Lou Romano Water Reclamation Plant (WRP)

In accordance with the 2004 Wastewater Agreement between the City of Windsor and the Town of Tecumseh, the Town's capacity allocation at the Lou Romano WRP has been limited to 2.72 ML/d (0.6 MIGD) due to limitations in the City's conveyance system. There are no firm provisions included within the 2004 Agreement to allow Tecumseh to increase their capacity allocation at the Lou Romano WRP; however, the Agreement permits both parties to negotiate the sale of additional treatment capacity should additional conveyance capacity become available.

9.2 Wastewater Collection System

9.2.1 North Trunk System

The collection system in the North Service Area was originally constructed as three separate systems in the 1970's under a Provincial Sewage Works Program administered by the Ministry of the Environment. Each system was designed to ultimately discharge wastewater flows to a pumping station in the urban settlement of Tecumseh.

Two primary trunk sewers were originally constructed to service the North Service Area. The Lesperance Road Trunk Sewer extended from Cedarwood Drive southerly along Lesperance Road, Gouin Street, St Anne Street and St Alphonse Street to County Road 42. The Little River Road Trunk Sewer extended from the Cedarwood Pumping Station on Gauthier Street easterly along Cedarwood Drive, Wood Street, Little River Road and through the Lakewood Golf Course to Hayes Avenue at the Lakewood Pumping Station. By Agreement with the City, the outlet at the Cedarwood Pumping Station is limited to a maximum peak flow rate of 935 L/s.

In accordance with Article 11 of the 2004 Wastewater Agreement between the City of Windsor and the Town of Tecumseh, the North-East Windsor Trunk Sanitary Sewer has been constructed up to the south side of the intersection of Banwell Road and County Road 22 (EC Row Expressway). This new trunk facility provides a new outlet for the Town of Tecumseh with discharge to the Little River PCP. By Agreement with the City, the outlet at Banwell Road is limited to a maximum peak flow rate of 1,308 L/s, including an allowance of 325 L/s from Oldcastle Hamlet.

As identified in the 2002 Master Plan, the two (2) trunk sewers within the former Town of Tecumseh are operating at or above capacity under peak wet-weather events. In the 2002 Master Plan, recommendations related to the capacity limitations in the two (2) trunk sewers included:

- Actively reducing inflow and infiltration into the existing sewer system, thereby reducing the peak flow capacity requirements
- Limiting growth within the existing service areas unless it can be demonstrated that there is no negative impact or increased surcharge in the existing trunk sewer system resulting from the new development
- Flow relief in the Lesperance Road Trunk sewer by diverting flow easterly through a new sewer outlet on Westlake Road to a new East Tecumseh Hamlet Trunk Sewer.

Following execution of the Wastewater Servicing Agreement between the Town of Tecumseh and the City of Windsor, the plan to address the existing sewer capacity limitations was reconsidered. As a result of the re-evaluation, the same approach to addressing the capacity limitations was adopted, with the exception of the routing of the Relief Sewer. With completion of construction of the North East Windsor Trunk Sanitary Sewer on Banwell Road by the City of Windsor, a new outlet has been provided on Banwell Road at County Road 22 (E.C. ROW Expressway). The routing of the Relief Sewer has been amended to provide system relief for the Lesperance Road Trunk Sewer to the North East Windsor Trunk Sewer. This option also provides the Town with flexibility to control the volume of flow diverted from the Lesperance Road Trunk Sewer in order to ensure that the peak flow rate at the Cedarwood Outlet does not exceed the maximum rate permitted under agreement with the City of Windsor

The Town of Tecumseh retained CH2M Hill Ltd to confirm that the proposed diversion flows through the relief sewer and the diversion sewers are adequate and appropriate to address capacity limitations north of CR 22, and to ensure that the maximum discharge rate established at the Cedarwood pumping station will not be exceeded in the future. The sewer model developed as part of the Sanitary Sewer Infiltration Study (2005) was updated by CH2M Hill to incorporate the proposed CR 22 relief sewer and the Tecumseh Hamlet diversion sewers. The results of the updated analysis were summarized in the Technical Memorandum by CH2M Hill, a copy of which is included in Appendix 1-8. A brief summary of the updated analysis is presented below:

- Scenario 1 – Short-Term Plan with CR 22 Relief Sewer

  Under this scenario, the impact of diverting peak flow ranging from 71 L/s under existing conditions (Scenario 1a) to 194 L/s (maximum relief sewer pipe capacity-Scenario 1b) was evaluated. The purpose was to identify and quantify improvements, if any, in the Lesperance Road trunk sewer north of CR 22 and confirm that the maximum allowable discharge rate of 935 L/s at the Cedarwood pumping station would not be exceeded.

  Overall, the updated modeling results with CR 22 relief sewer showed improvements in terms of available hydraulic capacity in Lesperance Road trunk sewer north of CR 22. However, the results did not show any significant impacts or improvements to the sewers in St. Clair Beach area or the Little River Road trunk sewer in Tecumseh.

  The modeling of Scenario 1a and 1b resulted in a peak flow of 922 L/s, and 828 L/s respectively at the Cedarwood pumping station, lower than the maximum allowable discharge rate of 935 L/s.

- Scenario 2 – Long-Term Plan with CR 22 Relief Sewer and Tecumseh Hamlet Diversion Sewers

  Under this scenario, the impact of diverting peak flows from Tecumseh Hamlet through CR 22 relief sewer and Tecumseh Hamlet diversion sewers under 20-Year (Scenario 2a) and Ultimate (Scenario 2b) conditions was evaluated. The purpose was to identify and quantify improvements, if any, in the Lesperance Road trunk sewer north of CR 22 and confirm that the maximum allowable discharge rate of 935 L/s at the Cedarwood pumping station was not exceeded.

  Overall, the updated modeling results with CR 22 relief sewer and Tecumseh Hamlet diversion sewers showed improvements in terms of available hydraulic capacity in Lesperance Road trunk sewer north of CR 22. However, the results did not show any significant impacts or improvements to the sewers in St. Clair Beach area or the Little River Road trunk sewer in Tecumseh.

  The modeling of Scenario 2a and 2b resulted in a peak flow of 925 L/s, and 927 L/s respectively at the Cedarwood pumping station, lower than the maximum allowable discharge rate of 935 L/s.

In May of 2008, the Town initiated construction of the Relief Sewer on County Road 22. The Relief Sewer will divert flows from the Lesperance Road Trunk Sewer to the new Banwell Road outlet, thereby alleviating surcharge conditions within the Lesperance Road Trunk Sewer. The County Road 22 Relief Sewer is scheduled to be completed and commissioned by September 2008.

9.2.2 Southwest Trunk System

The Skyway Plaza and the Piccadilly Circus Subdivisions within Oldcastle Hamlet are serviced by local sewers draining to the Skyway Plaza WWTP. There are no trunk sewer facilities currently in existence in the Southwest Service Area.

The 2004 Wastewater Agreement between the City of Windsor and the Town of Tecumseh identifies two Outlets for the Southwest Service Area on North Talbot Road with discharge to Little River PCP and 8th Concession Road with discharge to Lou Romano WRP. By Agreement, flow to the North Talbot Road Outlet will be limited to 85 L/s, and to the 8th Concession Road Outlet will be limited to 325 L/s.

9.2.3 Local Wastewater Collection System

The trunk systems provide direct conveyance for the local wastewater collection system which consists of the sewers extending down to the water service level for each user. Within the local wastewater collection system, there also exists local sewage pumping stations required to overcome grade limitations.

10.0 Wastewater Design Criteria

The design criteria utilized for the Tecumseh Water and Wastewater Master Plan Update is based on previous data used in the approved Master Plan, historical records and updated information developed through the wastewater servicing review process with Town staff.

The design criteria establishes the parameters utilized to develop projected flows, evaluate system capacities, determine future needs, and determine the scheduling and implementation plan.

10.1 Unit Wastewater Flow Criteria

Based on the available information, the Master Plan recommends that the criteria presented in Table 10.1 be used for design and analysis of sewer systems in Tecumseh.

Table 10.1 Wastewater System Design and Analysis Criteria

PARAMETER	AREA	CRITERIA
Sewage Generation Rate	Existing Developed areas [1]	229 l/cap/day
	New Development	300 L/cap/day
Infiltration Allowance	Existing Developed areas [1]	
	St Clair Beach	33,000 L/ha/day
	Tecumseh	34,000 L/ha/day
	Tecumseh Hamlet	29,000 L/ha/day
	New Development	16,415 L/ha/day

Note: 1. Taken from monitoring results reported in I&I Control Study, CH2M Hill, January 2005

10.2 Design Criteria for System Components and Operation

10.2.1 Pumping Capacity

The Tecumseh wastewater system is primarily gravity serviced from the south to the north. There are currently four major wastewater pumping stations, Cedarwood, Lakewood, St Alphonse and Sylvestre, which are considered part of the trunk wastewater system.

Pumping stations are rated on their firm capacity to pump flows. The Firm Rated Capacity is calculated based on the largest pump out of service at each station.

Each pumping station must have sufficient firm capacity to meet peak wet weather flows for its respective catchment.

10.2.2 Trunk Sewer Capacity

Trunk sewer capacity is determined based on the pipe volume (function of diameter) and slope. Design of sewer pipes is typically based on maintaining a minimum cleansing velocity in the pipe through a combination of diameter and slope.

The minimum required trunk sewer capacity is based on the upstream cumulative peak wet weather flows draining through a particular reach.

For the existing infrastructure, the capacity to service future flows was also assessed. In cases where existing sewers experienced peak flows in excess of their capacity, the resulting hydraulic grade was also examined. Moderate surcharging of sewers was deemed acceptable as long as the peak hydraulic grade line remained at least 3 m below grade.

10.2.3 Treatment Capacity

While wastewater conveyance systems are designed and rated to deliver peak wastewater flow to the treatment facilities, the treatment plants themselves are rated for average day flows based on traditional plant rating.

Similar to water, plant expansions have been traditionally scheduled on a “just in time” basis. Additional capacity has been scheduled and installed in “steps” based on growth projections and in order to stagger capital expenditures.

With potential fluctuations in flow requirements and the potential fluctuations in plant capacities due to operating conditions, loadings, equipment performance and emergency conditions, plant capacity may be reached sooner than anticipated.

As noted in Section 9, the Town of Tecumseh has been allocated capacity within the Little River PCP and the Lou Romano WRP. Provisions have been included within the Wastewater Agreement between the City of Windsor and the Town of Tecumseh to allow Tecumseh to secure additional capacity allocation within the Little River PCP. A copy of the Wastewater Agreement is included in Appendix 1-3.

Planning for future expansions to the Little River PCP will be undertaken by the City of Windsor. Planning for these plant expansions will be undertaken in order to ensure that there are no unnecessary limitations placed on development in either Windsor or Tecumseh due to capacity or process limitations in the Little River PCP.

11.0 Tecumseh Wastewater Servicing Strategy Review

The Tecumseh wastewater servicing strategy was reviewed in light of several changes that have occurred which have had significant impacts on the assumptions used in preparing the 2002 Master Plan. Significant issues impacting the 2002 Wastewater Master Plan include:

- Updated Provincial Regulations, including the Safe Drinking Water Act, the Sustainable Water and Sewage Systems Act, and the Provincial Policy Statement
- On January 1, 2003, the City of Windsor annexed approximately 2,600 ha of land from the Town of Tecumseh, including the Twin Oaks Business Park and Baseline Hamlet
- On November 1, 2004, the City of Windsor entered into a Wastewater Servicing Agreement with the Town of Tecumseh, and have agreed to provide the Town with additional treatment capacity at the Little River PCP. The Agreement also provides Tecumseh with conveyance capacity to, and treatment capacity at the Lou Romano Water Reclamation Plant (WRP)
- In 2005, the City of Windsor completed the Class EA Study for Servicing of the Annexed Lands, which identified the need and alignment for a trunk sewer extension from the Little River PCP to Oldcastle Hamlet
- The City of Windsor has completed construction of the North East Windsor Trunk Sanitary Sewer from the existing Trunk Sewer Outlet at Forest Glade Drive to County Road 22 at Banwell Road, which provides the Town of Tecumseh with a long-term wastewater outlet to the Little River PCP.

The service area for the Tecumseh wastewater system has been changed from the approved 2002 Master Plan as a result of the Annexation of lands known as the “Airport Lands” by the City of Windsor. The current Study Area is depicted on Fig. 3.1.

Given that the Town has secured additional treatment capacity at both the Little River PCP and the Lou Romano WRP in the City of Windsor, the basis and assumptions on which the preferred wastewater servicing strategies were developed for the 2002 Master Plan have been reviewed. Specifically, the 2002 Master Plan was based upon the provision of Wastewater Treatment in a new wastewater treatment facility within the Town of Tecumseh. However, in light of the new wastewater service agreement with the City of Windsor, a new servicing strategy has been developed that fully utilizes the available capacities allocated at the existing wastewater treatment plants in Windsor.

The servicing strategy and capital program were also updated to integrate previous and concurrent related studies including:

- Development Charges Study, Town of Tecumseh, October 2007
- 2005 Class EA for Sanitary Servicing of Lands Annexed from the Town of Tecumseh, City of Windsor.

11.1 Peak Wastewater Flow Projections

Utilizing the Town of Tecumseh planning projections and wastewater flow criteria, the peak wastewater flow projections for the Town of Tecumseh are summarized in the following Table 11.1.

Table 11.1 Town of Tecumseh Peak Wastewater Flow Projections

SERVICE AREA		PEAK FLOW (L/S)			
		2008	2013	2018	2028
North Tecumseh	Tecumseh	551	555	560	560
	St. Clair Beach	205	208	211	211
	Tecumseh Hamlet	259	333	393	472
	Sub-Total	1,015	1,096	1,164	1,243
Southeast Tecumseh	Highway Service Centre	-	-	-	54
	Maidstone Hamlet	-	-	-	60
	Sub-Total	-	-	-	114
Southwest Tecumseh	Oldcastle Hamlet to Little River PCP	-	-	-	132
	Oldcastle Hamlet to Lou Romano WRP	-	30	59	85
	Sub-Total	-	30	59	217
Total		1,015	1,126	1,223	1,574

11.2 Wastewater Treatment Capacity Requirements

Utilizing the Town of Tecumseh planning projections and wastewater flow criteria, the wastewater treatment capacity requirements for the Town of Tecumseh are summarized in the following Table 11.2.

Table 11.2 Town of Tecumseh Wastewater Treatment Capacity Requirements

SERVICE AREA		AVERAGE DAY FLOW (ML/D)			
		2008	2013	2018	2028
North Tecumseh	Tecumseh	9.5	9.6	9.7	9.7
	St. Clair Beach	2.8	2.9	2.9	2.9
	Tecumseh Hamlet	3.4	4.9	6.2	8.3
	Sub-Total	15.7	17.4	18.8	20.9
Southeast Tecumseh	Highway Service Centre	-	-	-	1.5
	Maidstone Hamlet	-	-	-	1.0
	Sub-Total	-	-	-	2.5
Southwest Tecumseh	Oldcastle Hamlet to Little River PCP	-	-	-	2.5
	Oldcastle Hamlet to Lou Romano WRP	-	0.6	1.5	2.7
	Sub-Total	-	0.6	1.5	5.2
Total		15.7	18.0	20.3	28.6

11.3 Opportunities and Constraints

11.3.1 Infiltration and Inflow Reduction

In the 2002 Master Plan, it was identified that system limitations were resulting from excessive Inflow and Infiltration (I&I) in older sections of the sewer collection system. As a result, the Master Plan recommended that the Town initiate a program to reduce I&I in order to maximize the utility of the existing infrastructure.

In 2005, the Town completed the Infiltration and Inflow Control Study (CH2M Hill, January 2005) which identified significant sources of extraneous flows within the existing collection system, primarily in the Tecumseh Hamlet and St Clair Beach areas. Recommendation from the I&I Study included:

- The Town should undertake a comprehensive program to control I&I, initially in the Tecumseh Hamlet and St Clair Beach areas. The program should include flow monitoring during wet and dry weather events and then systematically removing the sources of I&I
- Obvious sources of inflow, such as roof leaders and back yard drains should be examined and removed from discharging to the sanitary sewer system
- Foundation drains connected to the sanitary sewer system within St Clair Beach be disconnected as the opportunity arises
- Sump pump discharges within the Tecumseh Hamlet area be investigated and confirmed that they are not directly or indirectly connected to the sanitary sewer system.

The Town of Tecumseh has initiated monitoring the sanitary sewer system in St Clair Beach and Tecumseh Hamlet, and have completed storm sewer upgrades on Pentilly Lane, which was identified as one of the major sources of I&I in the St Clair Beach area. The Town has also recently awarded a Contract for the reconstruction of Brighton Road. The Projects included provisions for dedicated storm sewer service connections to each lot to permit connection of foundation drains and roof leaders to the storm sewer system. The Town of Tecumseh will continue monitoring flows within the existing collection system to establish the effectiveness of the strategy.

11.3.2 Trunk Sewers

The alignment of the trunk sewers within the Town of Tecumseh has, as much as possible, followed the alignment of existing road allowances to ensure that there are no delays in extending services. However, there may be opportunities to select alternative routes, which may be preferred. Potential alternative trunk facility alignments are depicted on the recommended Master Plan Update.

The Alternative routing of the trunk facilities will be further evaluated prior to commencing detail design for the affected project. Should the alternative route be selected for implementation, permanent easements will be secured and/or purchased by the Town prior to construction.

11.3.3 Wastewater Treatment Plant Expansions

The Little River PCP provides wastewater treatment for the North Service Area, the Southeast Service Area, and the majority of the Southwest Service Area of the Town of Tecumseh.

Based on the projected total flow contributions from Tecumseh, it is anticipated that upgrades to the Little River PCP will be required by 2013 up to a rated capacity of 16 MIGD (72.6 MLD). A further expansion will be required by 2018 up to a rated capacity of 20 MIGD (90.8 MLD), and a further expansion will be required by 2028 to 24 MIGD (109 MLD).

Notwithstanding the above projected schedule, the City of Windsor will need to test and rate the actual capacity of the Little River PCP after each expansion to further refine scheduling and expansion requirements. The Town of Tecumseh will monitor the City's progress through ongoing Permanent Joint Staff Liaison Committee meetings.

11.4 Wastewater Servicing Strategy Overview

The Town of Tecumseh Water and Wastewater Master Plan Update consolidates the Town's servicing strategies for the north and south service areas to make best use of available capacities provided in the Servicing Agreements with Windsor. It should be recognized that the water and wastewater projects should be implemented concurrently wherever possible.

Wherever possible, the alignments of new trunk facilities have been planned based on the location of existing road allowances and/or servicing corridors in order to ensure that servicing can proceed without undue delays resulting from the need to acquire property. However, the Town has the option to construct the trunk facilities through new development lands if it can be shown to be cost effective to do so. In this event, the alignment of the trunk facilities may be altered based on approved Secondary Plans and/or Approved Draft Plans of Subdivision. Should the trunk facilities be implemented through new development lands, additional notification to the Public would be provided through the Planning Act notifications.

It should also be noted that the timing of the various projects has been established based on anticipated growth rates in Tecumseh and on a fiscally responsible capital works program. The Town will have the option to advance or defer specific projects depending upon the rate of growth experienced in Tecumseh, or upon the petition by a developer (or group of developers) provided that the financial impacts of advancing certain projects are reviewed and mitigated through collection of Development Charges or through Front-End Financing arrangements.

The servicing strategies and capital programs were also updated based on projects currently underway, whether in study, design or construction stage. This led to more detailed project information, schedules and capital cost estimates.

The primary updates to the wastewater servicing strategy are as follows:

- Elimination of the need to construct a new Tecumseh WWTP on Town owned lands north of Highway 401 at Manning Road
- Elimination of the need to construct four (4) new wastewater pumping stations, and the associated ongoing operations and maintenance costs
- Revised alignments, diameters and scheduling of sewers to direct all wastewater generated in Tecumseh to approved outlets in the City of Windsor in-line with BPEs and related studies
- Provision of new trunk sewers for new growth in North and SE service areas with discharge to the Little River PCP through the new Banwell Road Outlet
    - West Tecumseh trunk sewer between CR 22 and CR 42 with capacity for the lands designated in the Tecumseh Hamlet Secondary Plan & south portion of the Manning Road Secondary Plan, and the SE service area
    - East Tecumseh trunk sewer within the existing utility corridor south of CP Railway for lands on the east side of Tecumseh Hamlet
    - South Tecumseh trunk sewer between CR 42 and Highway 3 with capacity for the lands designated in the Maidstone Hamlet Secondary Plan, Highway Service Centre lands, and existing developments in the SE service area

- Provision of continuous flow monitoring at Town boundary (SCADA)
- Utilization of diversion sewers for east to west diversion in Tecumseh Hamlet to address existing system limitations and meet discharge limit at the existing Cedarwood Outlet
    - Diversion of flow at St. Alphonse Avenue and South Pacific Avenue through diversion sewer south of CP Railway to the west Tecumseh trunk sewer
    - Diversion of flow at St. Alphonse Avenue and CR 42 through diversion sewer on CR 42 to the west Tecumseh trunk sewer and decommission St. Alphonse Avenue PS
- Provision of standby power facilities at the Sylvestre Pumping Station in a new building
- Purchase additional conveyance capacity in the Windsor NE trunk sewer and treatment capacity at the Little River PCP when required for new growth in the SE and SW service areas as provided for in the 2004 Wastewater Agreement
- Provision of new trunk sewers for existing developments and new growth in the SW service area with discharge to the Lou Romano WRP and the Little River PCP
    - North Talbot Road trunk sewer with discharge to the Lou Romano WRP through the existing North Talbot Road Outlet up to 85 L/s
    - SW Tecumseh trunk sewer with interim discharge to the Lou Romano WRP through the North Talbot Road trunk sewer and ultimate discharge to the Little River PCP through the future 8th Concession Road Outlet
- Decommissioning of the Skyway Plaza WWTP in Oldcastle Hamlet and flow diversion from the Skyway Plaza WWTP to the North Talbot Road trunk sewer.

The new strategy incorporates flexibility for the Town to divert all or part of peak wet weather flows from existing trunk sewers south of County Road 22 to the new Northeast Windsor Trunk Sanitary Sewer, which outlets to the Little River PCP. This flexibility will permit Tecumseh to comply with their servicing agreement with Windsor to limit peak flow discharge to the Cedarwood Outlet to the maximum approved rate, while maximizing the potential development areas to be serviced through the new outlet sewer.

11.5 Recommended Strategy

The Updated Wastewater Servicing Strategy includes a number of separate and distinct projects that will provide an ultimate consolidated servicing scheme to maximize the use of existing infrastructure and provide capacity for new growth in designated growth areas of the Town. The Servicing Strategy is depicted on Figure 11.1, and a brief description of each of the Projects is provided below:

11.5.1 Project WW-0 – SCADA System for Cedarwood and Lakewood Pumping Stations

Under this Project, SCADA monitoring will be installed at both pumping stations to monitor peak instantaneous flows and monitor total flows to the respective outlets. These facilities will permit the Town to monitor the effectiveness of the Inflow and Infiltration Control strategies for the respective service areas, and will allow the Town to verify the flow measurements to the Windsor system.

11.5.2 WW-1 – West Tecumseh Trunk Sewer from County Road 22 to CP Railway

The West Tecumseh Trunk Sewer is proposed to provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area, and will provide an outlet for existing and new growth south of CP Railway. The alignment of this sewer should be established through Approved Secondary Plans and co-ordinated though proposed Plans of Subdivision.

This facility should be designed to accommodate a projected ultimate peak flow rate of 935 (1,260) L/s. The alignment of the sewer should be kept as low and deep as possible to maximize the gravity service area of the pipeline. Based on Preliminary Design, a 1200 mm sewer is required at a design gradient of 0.07%.

In order to comply with the Wastewater Agreement between Windsor and Tecumseh, a flow measurement facility will be required on this trunk sewer prior to discharging to the outlet sewer on County Road 22. The design of the flow measurement facility will be subject to the approval of the City of Windsor.

11.5.3 WW-2 –Diversion Sewer South of CP Railway

In order to alleviate system surcharges in the Lesperance Road trunk sewer between CP Railway and County Road 22, a new diversion sewer 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.

This facility should be designed to accommodate a projected interim peak flow rate of 173 L/s, and an ultimate projected peak flow rate of 85 L/s. The ultimate projected peak flow rate is lower than the interim projected peak flow rate due to the planned diversion of flows at County Road 42 (Project WW-7). On a preliminary basis, a new 525 mm diameter sewer will be required.

11.5.4 WW-3 - East Tecumseh Trunk Sewer

In order to provide an outlet for new development lands south of the Baillargeon Drain and north of County Road 42, a new trunk sewer will be extended easterly from St Alphonse Avenue though existing road allowances or through the hydro corridor to the new development lands.

The East Tecumseh Trunk Sewer should be designed to accommodate a projected ultimate peak flow of 58 L/s. On a Preliminary basis, a 525 mm trunk sewer has been selected.

11.5.5 WW-4 - Sylvestre Pumping Station Upgrade

New development lands located east of the existing developed areas in Tecumseh Hamlet, west of Manning Road and north of the Baillargeon Drain will be serviced through local sewers to outlet to the trunk sewer on Westlake Drive. As part of the development of this area, the existing forcemain from the Sylvestre Pumping Station should be re-aligned to discharge to the Westlake Drive trunk sewer.

In order to ensure continuity of service during emergency situations or power outages, the existing Sylvestre Pumping Station should be upgraded with the provision of Stand-by power. A new building enclosing a generator set and system controls will be required. On a Preliminary basis, it is anticipated that a block of land approximately 25 m wide by 30 m deep will be required for construction of the generator building; however, the specific land requirements and stand-by power facility requirements will be subject to further review prior to implementation. Property for the Pumping Station Upgrade should be acquired through the Development Approvals process.

In the southern portion of this drainage area, the alignment of the local sewers may preclude provision of sanitary sewer service to full depth basements. Should development proponents in the southern portion of this drainage area propose to utilize the Sylvestre Pumping Station to lower the local sewers in order to allow for basement servicing, re-alignment of the existing sewers on Sylvestre Drive may be required. The local developers will be responsible to confirm the available capacity of the existing sewers on Sylvestre Drive and upgrade the sewers, if necessary, and will be responsible to upgrade the pumping station, as necessary, beyond the existing rated capacity for the Sylvestre Station.

11.5.6 WW-5 - North Talbot Road Trunk Sewer

The North Talbot Road Trunk Sewer is planned to be extended from the City of Windsor's trunk sewer on North Talbot Road at Old West Avenue to 8th Concession Road in Oldcastle Hamlet, and south-westerly on Oldcastle Road to Piccadilly Avenue. A monitoring facility will be required to measure instantaneous peak flow rates into the City of Windsor's collection system.

This trunk sewer has been planned to address the significant pollution problem and health risks caused by inadequate and/or malfunctioning septic systems in older industrial areas of Oldcastle, and to reduce contaminant loadings to the open drains and area watercourses. Also included in the project is a sewer tunnel under Highway 401, a flow monitoring station at the Town boundary, and installation of service/sewer connections. This sewer will provide direct servicing for properties fronting onto the new sewer, as well as an outlet for new growth in Oldcastle Hamlet.

At a minimum, the North Talbot Road Trunk Sewer should be designed to accommodate a projected ultimate peak flow of 85 L/s, which is the agreed maximum discharge rate from Tecumseh to the Lou Romano WRP. Since the maximum discharge rate to the Lou Romano WRP was based on conveyance capacity limitations within the existing Windsor system, the Town may wish to oversize the sewer in anticipation of negotiating additional conveyance capacity from Windsor at some time in the future. On a preliminary basis, a 600 mm trunk sewer is proposed.

11.5.7 WW-6 - West Tecumseh Trunk Sewer from CP Railway to CR 42

Similar to WW-1, this trunk sewer will provide direct servicing for new development lands within the Tecumseh Hamlet West Planning Area south of CP Railway, and will provide an outlet for existing and new growth south of CP Railway. The alignment of this sewer should be established through Approved Secondary Plans and co-ordinated though proposed Plans of Subdivision.

This portion of the West Tecumseh Trunk Sewer should be designed to accommodate a projected ultimate peak flow rate of 773 (1,098) L/s. The alignment of the sewer should be kept as low and deep as possible to maximize the gravity service area of the pipeline. Based on Preliminary Design, a 1200 mm sewer is required at a design gradient of 0.07%.

11.5.8 WW-7 - CR 42 Diversion Sewer

This project involves the construction of a new diversion sewer on County Road 42 from St Alphonse Avenue to Odessa Drive to outlet to the new West Tecumseh Trunk Sewer in the same alignment as the existing sewer on County Road 42. All flows generated by existing development south of County Road 42 will be diverted through this sewer to the new outlet. Provision of this Diversion Sewer will permit the Town to decommission the St Alphonse pumping station, and thereby eliminate the ongoing operation and maintenance costs for this station.

The CR42 Diversion sewer should be designed for a projected peak ultimate flow rate of 90 L/s. A 450 mm sewer has been selected on a preliminary basis.

11.5.9 WW-8 - South Tecumseh Trunk Sewer from CR 42 to Highway 401

Construction of the South Tecumseh Trunk Sewer from County Road 42 to Highway 401 will provide a wastewater outlet for the designated Highway Commercial lands located adjacent to Manning Road just north of Highway 401, and will provide an outlet for wastewater generated in existing and new developments in Maidstone Hamlet. The alignment of this sewer is proposed to extend along 11th Concession Road south of County Road 42 to Baseline Road, then easterly along Baseline Road from 11th Concession to 12th Concession Road, then south on 12th Concession Road from Baseline Road to Highway 401. Consideration may be given to an Alternative Route for this trunk sewer during preparation of Secondary Plans for the future development areas south of County Road 42, should these lands be designated for growth in future Official Plan Updates.

The portion of the South Tecumseh Trunk Sanitary sewer north of Baseline Road should be designed to accommodate a projected ultimate peak flow rate of 591 (916) L/s., and should be designed to be installed deep as possible in order to facilitate extension of gravity drainage to Maidstone Hamlet. Projected ultimate peak flows on Baseline Road will be 525 L/s, and on 12th Concession Road will be 450 L/s. On a Preliminary basis, a 1200 mm diameter tank sewer has been selected for the portions on 11th Concession Road and Baseline Road, and a 900 mm on 12th Concession Road.

11.5.10 WW-9 - South Tecumseh Trunk Sewer from Highway 401 to Maidstone Hamlet

Construction of the South Tecumseh Trunk Sewer from Highway 401 to Maidstone Hamlet will provide an outlet for existing and new growth within Maidstone Hamlet. The alignment of this sewer will be along 12th Concession Road from Highway 401 to North Talbot Road, then easterly along Middle Road to Malden Road.

The South Tecumseh Trunk sewer should be designed to accommodate a projected peak ultimate flow rate of 400 L/s for the portion on 12th Concession Road, and a projected peak flow rate of 125 L/s for the portion on Middle Road. On a Preliminary basis, a 900 mm diameter trunk sewer has been selected for the portion on 12th Concession Road and a 600 mm sewer on Middle Road.

11.5.11 WW-10 - Maidstone Hamlet Trunk Sewer

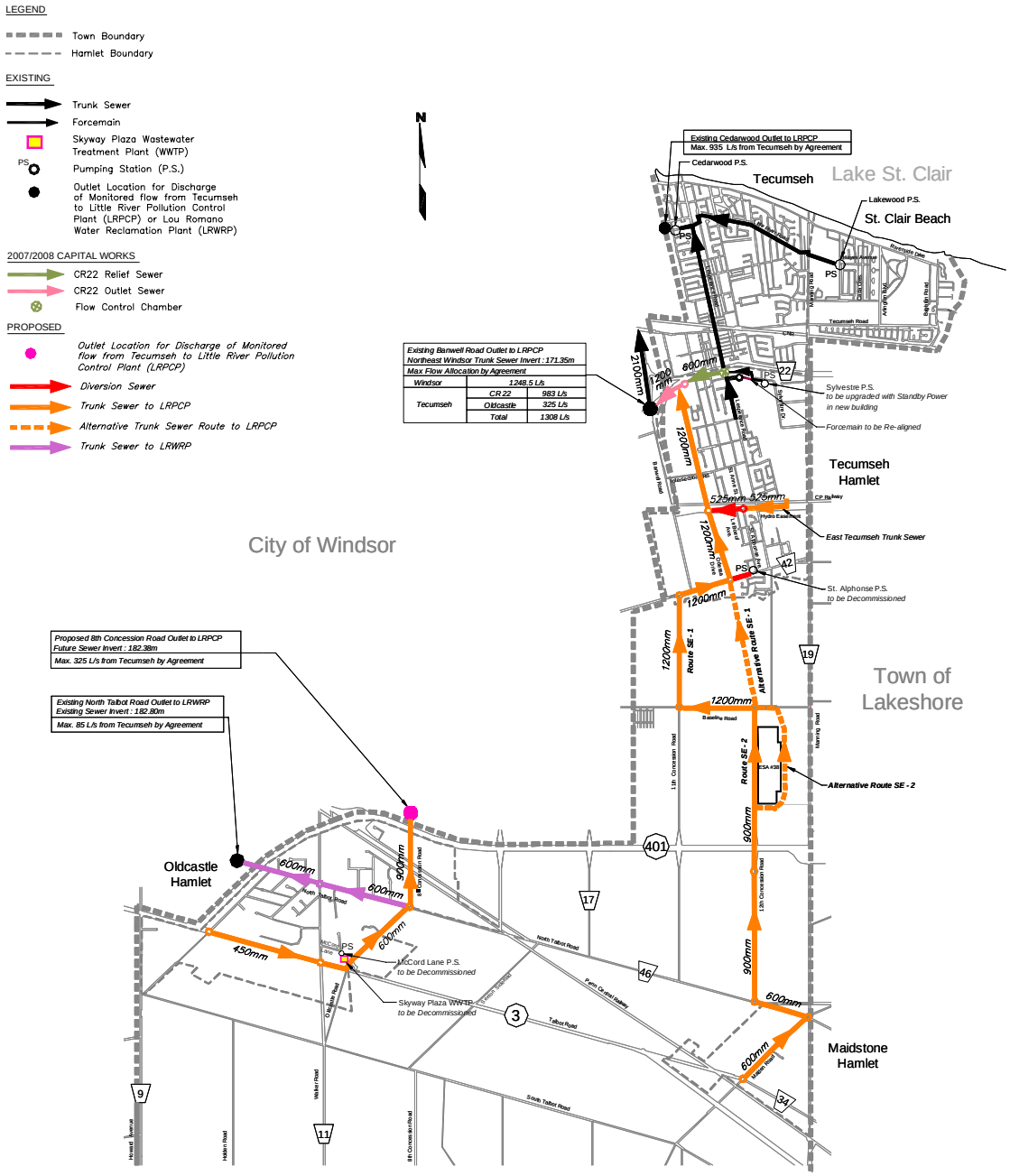
Construction of the Maidstone Trunk Sanitary sewer will provide servicing for existing development and new growth within Maidstone Hamlet. The preliminary alignment of the sewer is along Malden Road from Middle Road to Talbot Road (CR 34).

This sewer should be designed to accommodate the projected ultimate peak flows from Maidstone Hamlet of 90 L/s, plus an allowance for future growth beyond the current Maidstone Hamlet urban area. On a preliminary basis, an ultimate peak design flow of 125 L/s has been considered for this sewer, and a 600 mm sewer has been selected.

11.5.12 WW-11 - Southwest Tecumseh Trunk Sewer

This Project involves the construction of a trunk sewer on 8th Concession Road from Highway 401 to Talbot Road, and on Talbot Road from 8th Concession Road to Highway 401. This project will provide an outlet for wastewater generated by existing and new development in the Oldcastle Hamlet Planning area. In addition, this sewer will permit the Town of Tecumseh to decommission the Skyway Plaza WWTP, thereby eliminating the ongoing operation and maintenance costs for this facility.

Figure 11.1 2008 Preferred Wastewater Servicing Strategy



Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

12.0 Preferred Servicing Strategies

The preferred servicing strategies for the Town of Tecumseh water and wastewater systems are detailed in the following sections.

The capital cost estimated for the programs are based on the following criteria:

- Review of unit costs identified in the Master Plan and Technical Servicing Review
- Updated project requirements identified through the Master Plan Update
- Updated project requirements and project costs identified through available Class EA studies, conceptual designs, or pre-design reports for any projects currently underway
- Updated costs based on recent industry trends and construction costs
- 2008 dollars.

12.1 Water Capital Program

The complete water capital program for the servicing strategies developed under the Town of Tecumseh's Master Plan Update is provided in Table 12.1 and depicted in Figure 12.1.

Table 12.1 provides the Town's Project ID number, project descriptions, project schedule and estimated total project costs.

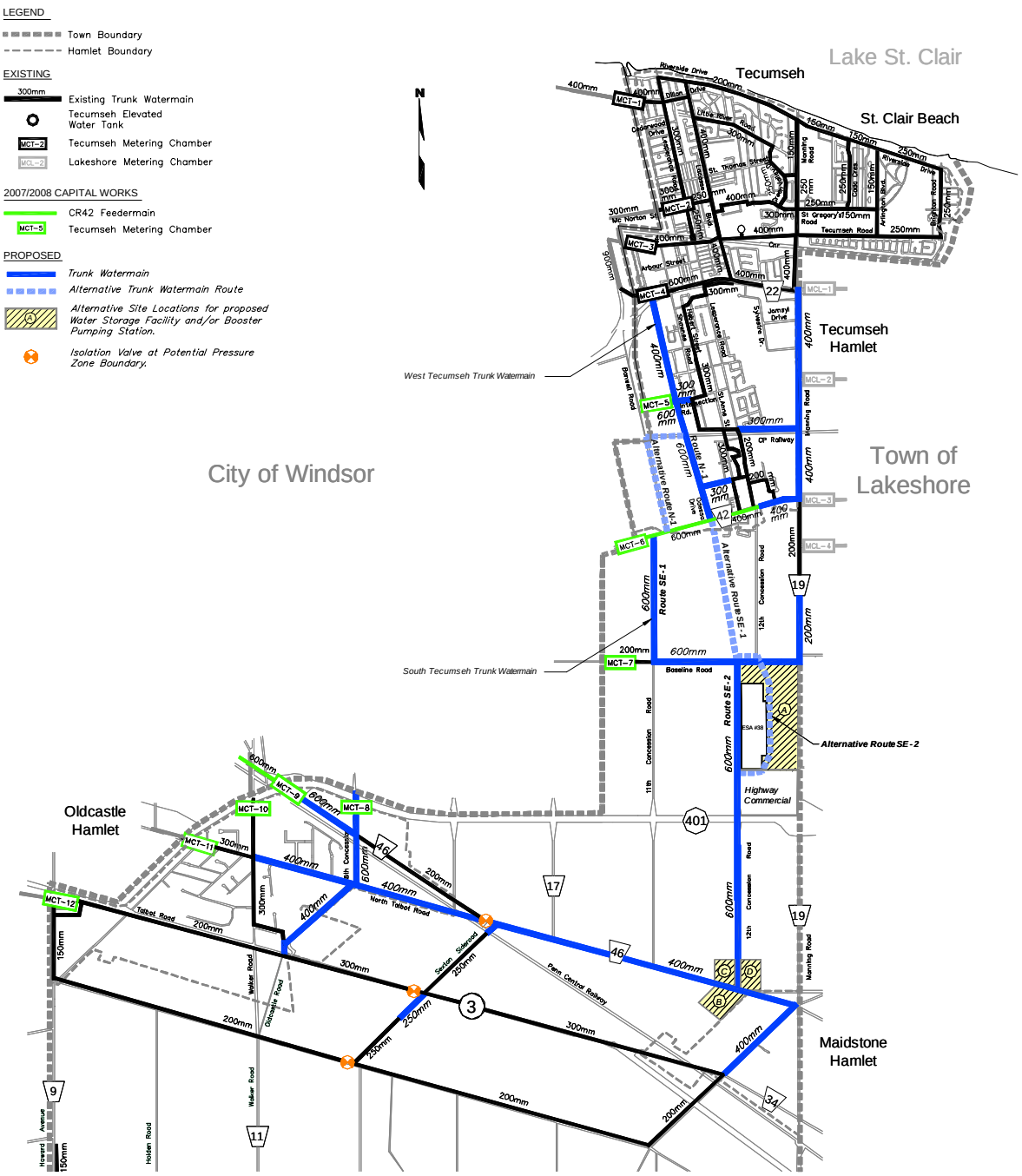
The Water Master Plan Update succeeds the Development Charges By-Law Update and is based on more recent findings and decisions due to further completion of related studies, further technical analysis and financial considerations. In general, the water servicing strategy has remained the same; however, budget and timing has been further refined and therefore could be marginally different to those prepared for the 2004 DC process.

Table 12.1 Updated Water System Servicing Strategy

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST ($MILION)
West Tecumseh Trunk Watermain from CR 22 to CP Railway	W-1	Tecumseh Hamlet	B [1]	$1.85
East Tecumseh Hamlet Watermain Connection	W-2A	Tecumseh Hamlet	A+	$0.31
Trunk Watermain on Manning Road from CR 22 to CP Railway	W-2B	Tecumseh Hamlet	A+	$1.33
North Talbot Road Trunk Watermain	W-3	Oldcastle Hamlet	A+	$1.23
West Tecumseh Trunk Watermain from CP Railway to CR 42	W-4	Tecumseh Hamlet	B [1]	$0.88
Trunk Watermain on Manning Road south of CP Railway	W-5	Tecumseh Hamlet	A+	$0.66
South Tecumseh Trunk Watermain from CR 42 to Highway 401	W-6	Southeast Tecumseh	A+	$4.16
South Tecumseh Trunk Watermain from Highway 401 to Maidstone	W-7	Southeast Tecumseh	A+	$1.53
Maidstone Hamlet Trunk Watermain	W-8	Maidstone Hamlet	A+	$0.69
Zone 2 Booster Pumping Station	W-9	Southeast Tecumseh	B	$1.50
Zone 2 Water Storage Facility	W-10	Southeast Tecumseh	B	$3.70
County Road 46 Trunk Watermain	W-11	Southeast Tecumseh	A+	$1.83
Southwest Tecumseh Trunk Watermain	W-12	Oldcastle Hamlet	A+	$3.33
Total Estimated Capital Cost				$23.0

Notes: *1. Project may be Approved (Schedule A) if implemented under a Plan of Subdivision*

Figure 12.1 2008 Preferred Water Servicing Strategy



12.2 Wastewater Capital Program

The complete wastewater capital program for the servicing strategies developed under the Town of Tecumseh's Master Plan Update is provided in Table 12.2 and depicted in Figure 12.2.

Table 12.2 provides the Town's Project ID number, project descriptions, project schedule and estimated total project costs.

The Wastewater Master Plan Update succeeds the Development Charges By-Law Update and is based on more recent findings and decisions due to the Wastewater Agreement with the City of Windsor, further completion of related studies, further technical analysis and financial considerations. The wastewater servicing strategy has been substantially revised as a result of the Wastewater Agreement and the provision of treatment capacity at the Little River PCP and the Lou Romano WRP, as well as the provision of a additional outlets at Banwell Road and 8th Concession Road. As a result, the impact of the Updated Wastewater Master Plan on the Town's Development Charge bylaw will need to be reviewed.

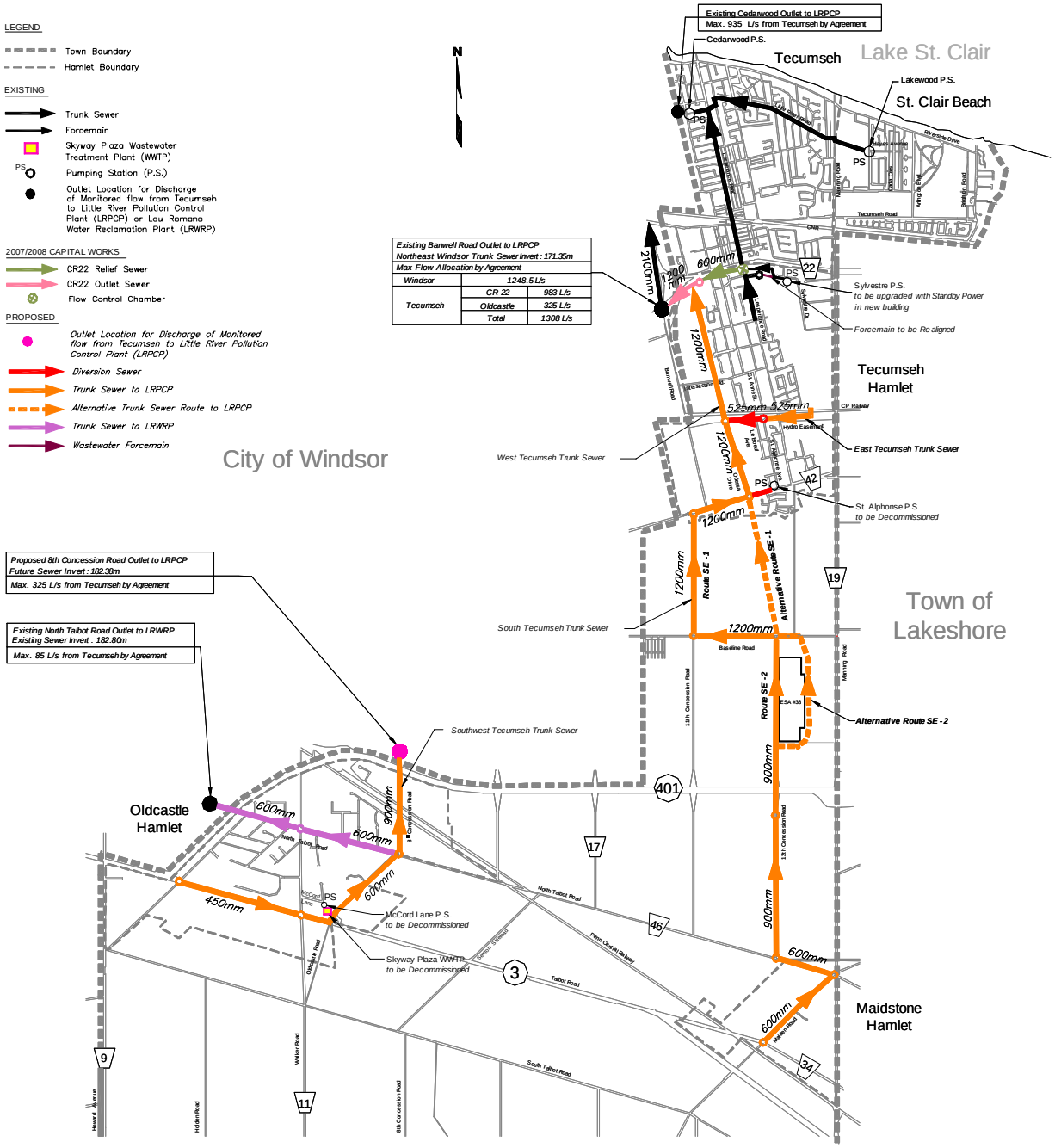
Table 12.2 Updated Wastewater System Servicing Strategy

PROJECT NAME	PROJECT ID	LOCATION	CLASS EA SCHEDULE	COST ($MILION)
SCADA system for Cedarwood and Lakewood Pumping Stations	WW-0	Tecumseh, St. Clair Beach	A	$0.20
West Tecumseh Trunk Sewer from CR 22 to CP Railway	WW-1	Tecumseh Hamlet	B [1]	$3.78
Diversion Sewer south of CP Railway	WW-2	Tecumseh Hamlet	B [1]	$0.36
East Tecumseh Trunk Sewer	WW-3	Tecumseh Hamlet	A+	$0.84
Sylvestre Pumping Station Upgrade	WW-4	Tecumseh Hamlet	B	$0.90
North Talbot Road Trunk Sewer	WW-5	Oldcastle Hamlet	A+	$4.38
Northeast Windsor Trunk Sanitary Sewer, Forest Glade to Little River PCP	Windsor-1	Windsor[2]	-	$ 2.87
West Tecumseh Trunk Sewer from CP Railway to CR 42	WW-6	Tecumseh Hamlet	B [1]	$1.76
CR 42 Diversion Sewer	WW-7	Tecumseh Hamlet	A+	$0.55
Purchase additional treatment capacity at Little River PCP	Windsor-2	Windsor[2]	-	$ 8.00
South Tecumseh Trunk Sewer from CR 42 to Highway 401	WW-8	Southeast Tecumseh	A+	$10.42
South Tecumseh Trunk Sewer from Highway 401 to Maidstone Hamlet	WW-9	Southeast Tecumseh	A+	$3.59
Maidstone Hamlet Trunk Sewer	WW-10	Maidstone Hamlet	A+	$1.38
Northeast Windsor Trunk Sanitary Sewer, Banwell Road to 8th Concession Road	Windsor-3	Windsor[2]	-	$ 5.20
Southwest Tecumseh Trunk Sewer	WW-11	Oldcastle Hamlet	A+	$5.37
Purchase additional treatment capacity at Little River PCP	Windsor-4	Windsor[2]	-	$ 5.00
Total Estimated Capital Cost				$54.60

Notes: *1. Project may be Approved (Schedule A) if implemented under a Plan of Subdivision*

2. Projects to be implemented by the City of Windsor in accordance with the Wastewater Agreement, Nov 2004

Figure 12.2 2008 Preferred Wastewater Servicing Strategy



13.0 Implementation Plan

The preferred water and wastewater servicing strategies will support the short and long term servicing needs of the approved growth areas and provide flexibility for servicing potential growth areas in the future. The strategies will also support meeting operational requirements, water quality and level of service objectives.

Upon completion of the Master Plan Update or Phase 2 of the EA process, Schedule A, A+ and B projects may proceed to Phase 5, Implementation, subject to finalization of the 30-day review period and assuming no Part II Orders are received. However, during implementation of some of these projects, additional study and analysis may be undertaken such as during the area servicing stages of development. While this work may address refinement to alignments, siting and minimizing environmental impacts, these projects will not require further planning under the Class EA process. The preferred water and wastewater strategies do not include any Schedule C projects requiring further planning under the Class EA process.

The following implementation requirements will be addressed during the subsequent steps (primarily during detailed design) of the projects:

- Finalization of property requirements
- Final refinement of infrastructure alignment and facility siting to ensure infrastructure is located outside regulated areas except for instances when it is unavoidable (watercourse crossings).
- Final refinement of construction methodologies including determination of crossing approaches including open-cut, tunnelling and structural supporting requirements
- Completion of additional supporting investigations including but not limited to:
    - Geotechnical investigations to support determination of construction requirements for the infrastructure
    - Hydrogeological investigations to evaluate potential impacts, to support mitigative requirements during construction and determine any dewatering requirements
- Mitigation of potential construction related impacts including but not limited to:
    - Traffic control
    - Noise, vibration and dust
    - Air pollution
    - Service interruption
    - Environmental and water disturbance or contamination
    - Siltation and erosion control
- Approval Requirements as required but not limited to:
    - Certificates of Approval from Ministry of Environment
    - Encroachment Permit from the Ministry of Transportation
    - Approvals from the County of Essex
    - Permit approvals from the Essex Region Conservation Authority (ERCA)
    - Associated Planning Act Approvals

- Temporary Permit to Take Water for construction dewatering from the Ontario Ministry of the Environment.

Based on the projections for water demand or wastewater flow requirements of the service areas developed from the 2008 BPE, the project timing requirements were determined. This process took into consideration a logical extension of growth from the existing development. The evaluation of timing also took into consideration the availability of and need to maximize the use of existing infrastructure (in both the Town of Tecumseh and the City of Windsor) and best judgement on reasonable timing of subsequent expansions.

Project timing was also integrated with the results of recent studies, Class Environmental Assessments and reports, and where possible other road upgrade projects being planned by the County of Essex and/or the Ministry of Transportation (MTO), to ensure that underground infrastructure was not scheduled after completion of road improvements. This review resulted in several projects being accelerated.

Total project scheduling has been determined for each service area. Some project components have been initiated based on the updated servicing strategies and have been incorporated into recent budgets. Working within an affordability envelope, the Town has prioritized a list of essential projects that will commence detail design in 2008/09.

In order to provide for a reasonable range of development opportunity within the Town, the following sections outline the proposed Implementation Plan.

13.1 North Service Area

In order to accommodate growth within the West Tecumseh Hamlet and the Manning Road Secondary Plan areas, the proposed Implementation Plan for the projects in the North Service Area (TN) was developed as depicted on Fig. 13.1, and as summarized in Table 13.1.

Table 13.1 North Service Area Implementation Strategy

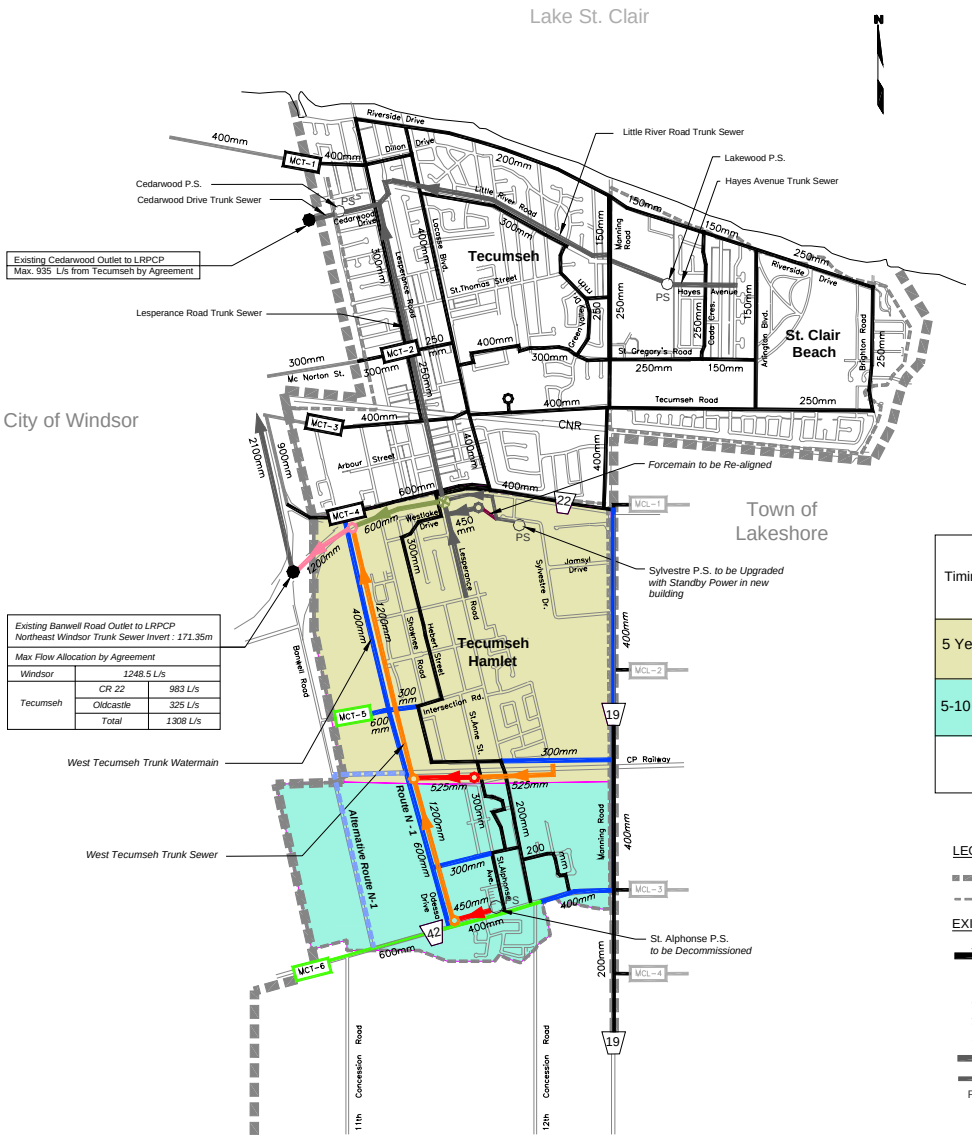
TOWN REFERENCE ID	PROJECT IDs	DESCRIPTION	CLASS EA SCHEDULE	START YEAR OF CONSTRUCTION	COST ($MILLION)
TN-1	WW-0	SCADA System for Cedarwood and Lakewood Pumping Stations	A	2008	$0.20
TN-2	W-1, WW-1 & WW-2	West Tecumseh Trunk Facilities – North Section	B	2009	$5.99
TN-3	W-2A & WW-3	East Tecumseh Trunk Facilities	A+	2010	$1.15
TN-4	WW-4	Sylvestre Pumping Station Upgrade	B	2010	$0.90
TN-5	W-2B	Trunk Watermain on Manning Road – North Section	A+	2010	$1.33
TN-6	W-4 & WW-6	West Tecumseh Trunk Facilities – South Section	B	2013	$2.64
TN-7	WW-7	Diversion Sewer on CR 42	A+	2014	$0.55
TN-8	W-5	Trunk Watermain on Manning Road – South Section	A+	2014	$0.66
Total Estimated Cost for North Service Area					$13.42

A description of the key components and justification of the North Service Area Implementation Strategy is provided below.

- Implementation of the SCADA system for the Cedarwood and Lakewood Pumping Stations (TN-1) will allow the Town to monitor flows to the Windsor system as required under the Windsor/Tecumseh Wastewater Agreement
- Construction of the West Tecumseh Trunk Facilities – North Section (TN-2) will facilitate development within the designated urban area of west Tecumseh Hamlet between County Road 22 and CP Railway, and will provide a wastewater outlet and water distribution capacity for the Southeast Service area. Construction of the West Tecumseh Trunk Facilities will also provide the Town with an opportunity to divert wastewater generated from the lands south of CP Railway to the new West Tecumseh Trunk Sewer; thereby reducing flow in the Lesperance Road Trunk Sewer north of CP Railway and alleviating surcharge in the system under wet-weather conditions
- Construction of the East Tecumseh Trunk Facilities (TN-3) within existing utility corridor south of CP Railway for lands on east side of Tecumseh Hamlet will provide an outlet for new development lands located east of the existing development in Tecumseh Hamlet, south of the Baillargeon Drain, and north of County Road 42
- Sylvestre Pumping Station Upgrade (TN-4) with a standby power in a new building will ensure continuity of service during power outages. The station will need to be further upgraded after the twenty-year planning period to its rated design capacity to accommodate full build-out of the industrial subdivision
- Construction of Trunk Watermain along Manning Road – North Section (TN-5) will strengthen the distribution system and provide capacity for Fire Flows to the Manning Road Secondary Plan area
- Construction of the West Tecumseh Trunk Facilities – South Section (TN-6) will facilitate development within the designated urban area of west Tecumseh Hamlet between the CP Railway and County Road 42, and will extend the wastewater outlet and water distribution capacity for the Southeast Service area. Connecting the trunk watermain to the recently completed County Road 42 Feedermain will also complete the primary feedermain loop in Tecumseh for supply from the Windsor system
- Construction of the County Road 42 Diversion Sewer (TN-7) will direct all wastewater flows from South of County Road 42 to the new West Tecumseh trunk sewer, and will allow the Town to decommission the St. Alphonse Pumping Station
- Construction of the Trunk Watermain on Manning Road – South Section and County Road 42 (TN-8) will strengthen the distribution system on the east side of the Town to ensure that there is adequate capacity to distribute fire flows to the North Service area of the Town

The existing Trunk Sewer on Westlake Drive will provide an outlet for wastewater generated by new and existing developments located in the Manning Road Secondary Plan area, north of the Baillargeon Drain. This outlet sewer will also provide the Town with an opportunity to re-direct the discharge from the Sylvestre Pumping Station, thereby removing the forcemain from the County's Road Allowance.

Figure 13.1 North Service Area Implementation Plan



Timing	Location	Estimated Capital Cost ($ Million)		
		Existing Developments	New Developments	Total
5 Year	CR 22 to CP Railway	$1.39	$8.18	$9.57
5-10 Year	CP Railway to CR 42	$0.90	$2.95	$3.85
Total		$2.29	$11.13	$13.42

LEGEND

- Town Boundary
- Hamlet Boundary

EXISTING

- Trunk Watermain
- Tecumseh Elevated Water Tank
- MCT-2 Tecumseh Metering Chamber
- MCL-2 Lakeshore Metering Chamber
- Trunk Sewer
- Forcemain
- PS Wastewater Pumping Station (P.S.)
- Outlet Location for Discharge of Monitored flow from Tecumseh to Little River Pollution Control Plant (LRPCP)

2007/2008 CAPITAL WORKS

- CR42 Feedermain
- MCT-5 Tecumseh Metering Chamber
- CR22 Relief Sewer
- CR22 Outlet Sewer
- Flow Control Chamber

PROPOSED

- *Trunk Watermain*
- *Alternative Trunk Watermain Route*
- *Diversion Sewer*
- *Trunk Sewer to LRPCP*
- *Wastewater Forcemain*
- *5 Year Implementation Plan*
- *5-10 Year Implementation Plan*

Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

13.2 Southeast Service Area

In order to accommodate development of the Highway Commercial Lands, and to accommodate existing and new developments within Maidstone Hamlet, the Implementation Plan was developed for projects in Southeast Service Area (TSE) as depicted on Figure 13.2, and as summarized in Table 13.2.

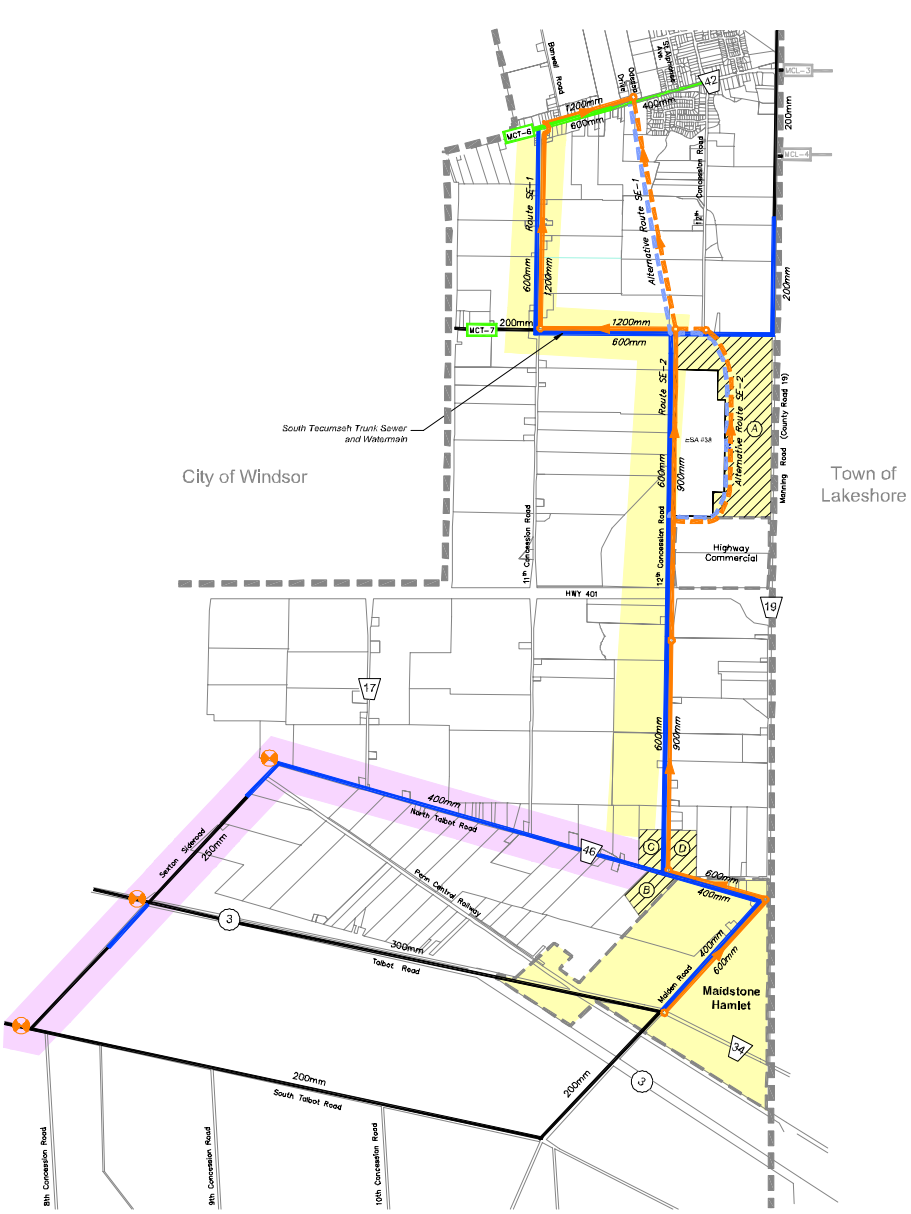
Table 13.2 Southeast Service Area Implementation Strategy

TOWN REFERENCE ID	PROJECT IDs	DESCRIPTION	CLASS EA SCHEDULE	START YEAR OF CONSTRUCTION	COST ($MILLION)
TSE-1	W-6 & WW-8	South Tecumseh Trunk Facilities – North Section	A+	2018	$14.58
TSE-2	W-7 & WW-9	South Tecumseh Trunk Facilities – South Section	A+	2019	$5.12
TSE-3	W-8 & WW-10	Maidstone Hamlet Trunk Facilities	A+	2020	$2.07
TSE-4	W-9	Zone 2 Booster Pumping Station	B	2020	$1.50
TSE-5	W-10	Zone 2 Water Storage Facility	B	2021	$3.70
TSE-6	W-11	Trunk Watermain on CR 46	A+	2023	$1.83
Total Estimated Cost for Southeast Service Area					$28.80

A description of the key components and justification of the Southeast Service Area Implementation Strategy is provided below.

- Construction of the South Tecumseh Trunk Facilities – North Section (TSE-1) from County Road 42 to Highway 401 will provide a wastewater outlet and water supply capacity for the designated Highway Commercial Lands, and will extend the wastewater outlet and water supply for Maidstone Hamlet to the south side of Highway 401
- Construction of the South Tecumseh Trunk Facilities – South Section (TSE-2) from Highway 401 to Malden Road will provide a wastewater outlet and water supply capacity for existing development in Maidstone Hamlet and for new growth south of Highway 401
- Construction of the Maidstone Hamlet Trunk Facilities (TSE-3) along Malden Road from County Road 46 to County Road 34 will extend the wastewater outlet and water supply capacity for existing developments and new growth in Maidstone Hamlet
- Construction of a Booster Pumping Station (TSE-4) and isolation valves will allow the Town to operate the water distribution system in the southeast area of the Town at a higher pressure, in order to alleviate low pressure concerns and address fire flow limitations in the area
- Construction of a 4.5 ML Water Storage Facility (TSE-5) will supplement the existing fire storage already provided within the Tecumseh Elevated Tank, will provide Tecumseh with the minimum fire storage required for an integrated Tecumseh system, and will provide storage for pump control for the Booster Pumping Station.
- Construction of the Trunk Watermain on County Road 46 (TSE-6) will provide local distribution and an emergency back-up to the Southwest service area in the event supply through the Windsor system is disrupted. This connection will also permit Tecumseh to provide fire storage for the Southwest service area in the event that the Windsor system cannot provide fire flows to the area.

Figure 13.2 Southeast Service Area Implementation Plan



Timing	Location	Estimated Capital Cost ($ Million)		
		Existing Developments	New Developments	Total
10-15 Year	CR 42 to HWY 401	$1.37	$13.21	$14.58
	HWY 401 to CR 34	$2.20	$10.19	$12.39
15-20 Year	CR 46	$0.63	$1.20	$1.83
Total		$4.20	$24.60	$28.80

LEGEND

Town Boundary

Hamlet Boundary

EXISTING

300mm Trunk Watermain

MCL-3 Lakeshore Metering Chamber

2007/2008 CAPITAL WORKS

CR42 Feedermain

MCT-7 Tecumseh Metering Chamber

PROPOSED

Trunk Watermain

Alternative Trunk Watermain Route

Trunk Sewer to LRPCP

Alternative Trunk Sewer Route to LRPCP

Isolation Valve at Potential Pressure Zone Boundary.

Alternative Site Locations for proposed Water Storage Facility and/or Booster Pumping Station.

10-15 Year Implementation Plan

15-20 Year Implementation Plan

Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

Property requirements for proposed Water Storage Facility and/or Booster Pumping Station are to be finalized after a site selection process and may be different than shown.

13.3 Southwest Service Area

In order to accommodate existing and new developments within Oldcastle Hamlet, the Implementation Plan was developed for projects in Southwest service area (TSW) as depicted on Figure 13.3, and as summarized in Table 13.3.

Table 13.3 Southwest Service Area Implementation Strategy

TOWN REFERENCE ID	PROJECT IDs	DESCRIPTION	CLASS EA SCHEDULE	START YEAR OF CONSTRUCTION	COST ($MILLION)
TSW-1	W-3 & WW-5	North Talbot Road Trunk Facilities	A+	2009	$5.61
TSW-2	W-12 & WW-11	Southwest Tecumseh Trunk Facilities	A+	2024	$8.70
Total Estimated Cost for Southwest Service Area					$14.31

A description of the key components and justification of the Southwest Service Area Implementation Strategy is provided below.

- Construction of the North Talbot Road Trunk Facilities (TSW-1) will address existing pollution problems associated with malfunctioning and/or inadequate private wastewater disposal systems, will provide for limited industrial growth within Oldcastle Hamlet, and will improve water distribution within Oldcastle Hamlet and the Southwest Service area. The wastewater component of this Project will enable the Town to utilize capacity in the Lou Romano WRP secured by the Town as part of the 2004 Wastewater Servicing Agreement
- Construction of the Southwest Tecumseh Trunk Facilities (TSW-2) will provide a long term outlet for wastewater generated in Oldcastle Hamlet to the Little River PCP through the Northeast Windsor Trunk Sanitary Sewer. Construction of the Southwest Tecumseh Trunk watermain will provide a major feed from the Windsor system into the southwest service area of Tecumseh with connections on Provincial Road and 8th Concession Road, and will ensure that adequate system pressures and fire flows will be available throughout the Southwest Service Area

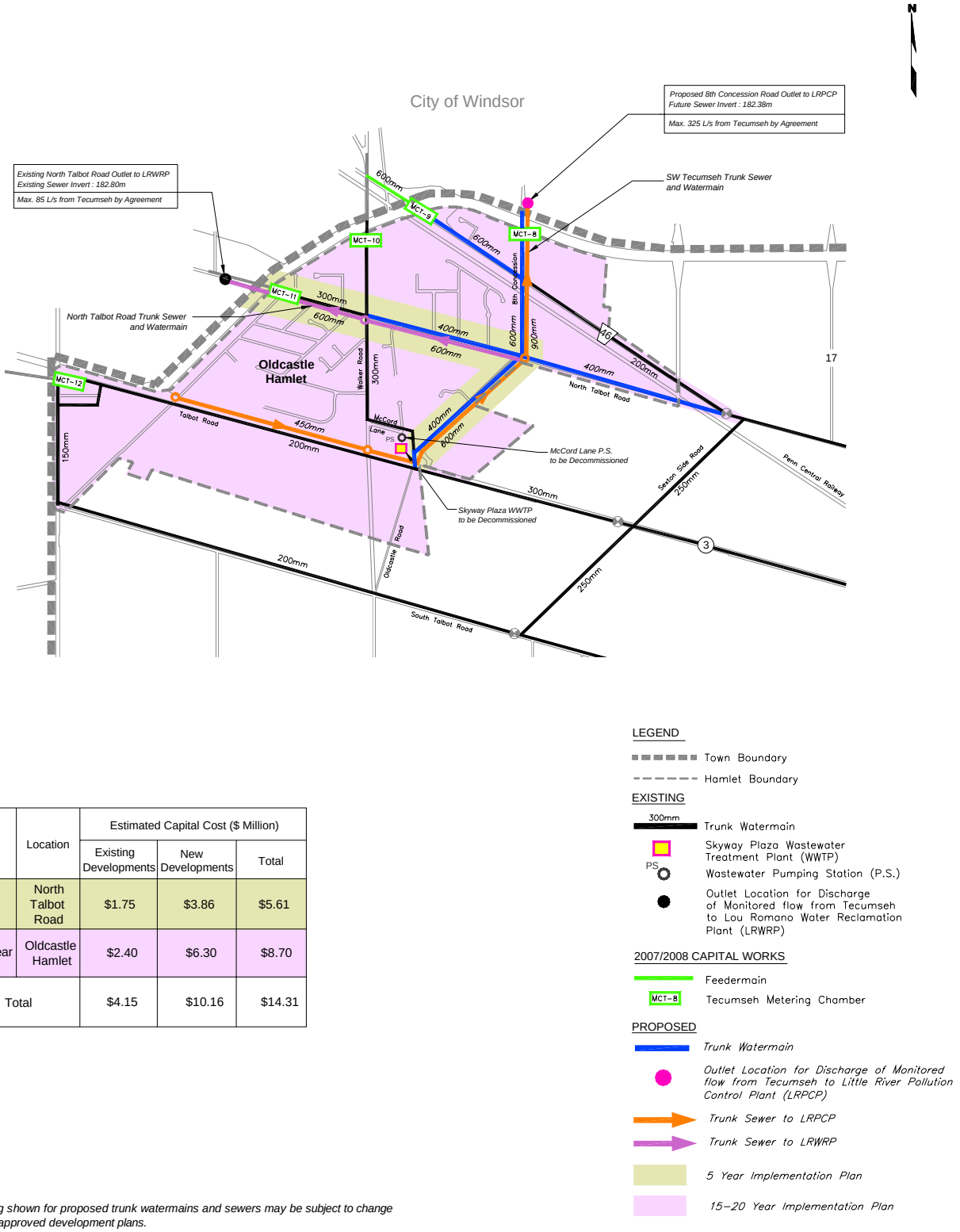
13.4 Additional Wastewater Treatment Capacity

Based on the growth projections and design criteria, the Town of Tecumseh will exceed the current capacity allocation at the Little River PCP at some point in the future. Table 13.4 summarizes the anticipated timing and preliminary costs for purchasing additional wastewater conveyance and treatment capacity from the City of Windsor in accordance with the terms and conditions established in the Windsor –Tecumseh Wastewater Agreement.

Table 13.4 Timing and Costs for Purchasing Additional Wastewater Capacity from Windsor

PROJECT ID	DESCRIPTION	ANTICIPATED TIMING	COST ($MILLION)
Windsor -1	Purchase additional capacity in Northeast Windsor Trunk Sanitary Sewer, Forest Glade to Little River PCP	2011-2012	$2.87
Windsor-2	Purchase additional treatment capacity at Little River PCP	2016-2017	$8.00
Windsor-3	Purchase additional capacity in Northeast Windsor Trunk Sanitary Sewer, Banwell Road to 8th Concession Road	2023-2024	$5.20
Windsor-4	Purchase additional treatment capacity at Little River PCP	2025-2026	$5.00
Total Estimated Cost for Purchasing Additional Capacity from Windsor			$21.07

Figure 13.3 Southwest Service Area Implementation Plan



Timing	Location	Estimated Capital Cost ($ Million)		
		Existing Developments	New Developments	Total
5 Year	North Talbot Road	$1.75	$3.86	$5.61
15-20 Year	Oldcastle Hamlet	$2.40	$6.30	$8.70
Total		$4.15	$10.16	$14.31

LEGEND

- Town Boundary
- Hamlet Boundary

EXISTING

- 300mm Trunk Watermain
- Skyway Plaza Wastewater Treatment Plant (WWTP)
- PS Wastewater Pumping Station (P.S.)
- Outlet Location for Discharge of Monitored flow from Tecumseh to Lou Romano Water Reclamation Plant (LRWRP)

2007/2008 CAPITAL WORKS

- Feedermain
- MCT-8 Tecumseh Metering Chamber

PROPOSED

- *Trunk Watermain*
- *Outlet Location for Discharge of Monitored flow from Tecumseh to Little River Pollution Control Plant (LRPCP)*
- *Trunk Sewer to LRPCP*
- *Trunk Sewer to LRWRP*
- *5 Year Implementation Plan*
- *15-20 Year Implementation Plan*

Notes:

The routing shown for proposed trunk watermains and sewers may be subject to change based on approved development plans.

13.5 Property Requirements

As much as possible, all recommended Projects are planned within existing road allowances and/or utility corridors. However, for certain projects property acquisition will be required. A summary of the anticipated property requirements is provided below.

Table 13.5 Property Requirements

PROJECT ID	PROJECT NAME	PROPERTY REQUIREMENTS	COMMENTS
WW-1, W-1, WW-6 and W-4	West Tecumseh Trunk Sewer and Watermain	Route N-1: min. 20.0 m wide easement between CR 22 and CR 42 in Tecumseh Hamlet	Alignment of trunk sewer and watermain along Route N-1 to be coordinated through Secondary Plan / Plan of Subdivision approvals. Town will secure / purchase permanent easement(s) prior to commencing detail design
WW-4	Sylvestre Pumping Station Upgrade	A minimum 25m wide by 30 m deep (.075 ha) is required for the building site on or adjacent to Sylvestre Drive in Tecumseh Hamlet	An evaluation of alternative sites for the proposed building in close proximity to the existing pumping station will be undertaken prior to commencing detail design. The Town will purchase any required property prior to construction.
W-9	Zone 2 Booster Pumping Station	A min. 50m wide by 50m deep (0.25 ha) parcel of land is required for the booster pumping station site between Baseline Road and Maidstone Hamlet.	Four alternative sites (A,B, C and D) have been selected for the proposed booster pumping station. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.
W-10	Zone 2 Water Storage Facility	A 5.0 ha parcel of land is required for the water storage facility site between Baseline Road and Maidstone Hamlet.	Four alternative sites (A,B, C and D) have been selected for the proposed water storage facility. A detailed evaluation of the alternative sites will be undertaken to identify the preferred site prior to commencing detail design. The Town will purchase any required property prior to construction.

In addition, the Town may wish to consider alternative routing of trunk facilities south of County Road 42 to minimize impacts on watercourse crossings and to reduce the capital cost of the projects. The alternative routes that may be considered are shown on the Updated Water and Wastewater Master Plans – Figure Nos. 12.1 and 12.2. In the event that the alternative routes are considered, the following additional property requirements will apply.

Table 13.6 Potential Property Requirements for Routing Alternatives

PROJECT ID	PROJECT NAME	PROPERTY REQUIREMENTS	COMMENTS
WW-8 & W-6	South Tecumseh Trunk Sewer and Watermain	Alternative Route SE-1: min. 20.0 m wide easement through vacant agricultural lands between CR 42 and Baseline Road Alternative Route SE-2: min. 20.0 m wide easement around ESPA #38 through vacant lands between Baseline Road and Hwy 401	Alternative routing of trunk sewer and/or trunk watermain to be evaluated prior to commencing detail design. If alternative routing is selected as the preferred design, Town will secure /purchase permanent easement(s).

Appendix 1-1

Planning Information

Appendix 1-2

Development Charge Background Study (July 2004)

Appendix 1-3

Servicing Agreements

Appendix 1-4

Inflow and Infiltration Control Study (January 2005)

Appendix 1-5

Class EA for Sanitary Servicing of Lands Annexed from the Town of Tecumseh, City of Windsor (June 2006)

Appendix 1-6

Water and Wastewater Rate Study (October 2007)

Appendix 1-7

Water and Wastewater System Data

Appendix 1-8

Capacity Requirement Calculations

Appendix 1-9

Project Data Sheets

Appendix 1-10

Capital Cost Estimates

Appendix 2-1

Notice of Public Information Centre

Appendix 2-2

Mandatory Contact Letters and Contact List

Appendix 2-3

Public Information Centre (PIC)

Appendix 2-4

Public and Agency Comments and Responses