



Report to Council

Department: Infrastructure Services
Division: Environmental Services
Date: August 12, 2024
Prepared by: Rob Mackie, C. Tech
Manager, Environmental Services
Report Number: Environmental Services-2024-04
Subject: Harrow-Colchester Water Supply Model Results
Number of Pages: 44 (including attachments)

Recommendation(s)

That Environmental Services 2024-04 entitled, "**Harrow-Colchester South Water Supply System Model Results**" prepared by Rob Mackie, Manager, Environmental Services August 12th, 2024, 2024 be received,

Background and Discussion

At its regular meeting on September 19th, 2022, Council appointed C3 Water (now CIMA+) and Stantec Consulting Ltd for the development of a water model of the Harrow Colchester South Water Supply System.

With increasing demands on water supply within the Town of Essex, there was a need to study **and review, through the development of a hydraulic model, the Town's Water supply system.** In addition, this water model may be used to analyze the demand impacts from proposed development, system wide fire flows, water age, operations, and many other applications. With

future growth data, the model can also be used for high level servicing or Master Planning Purposes.

The project commenced October 12th, 2022. The supporting data analyzed for this model included GIS information pertaining to the water supply system, water billing records for 2021, annual water production information and various other components of the water supply system. C3 Water Inc completed the model on Oct 20th, 2023, and issued a Technical Memorandum to summarize the process and findings of the project, which has been **appended for Council's information.**

Additionally in February 2024, the high-lift pumps at the Harrow-Colchester Water treatment plant were tested and analyzed to develop pump curves to further aid in the accuracy and calibration of the model, which has also been appended.

Model Results

This newly created water model will aid The Town in analyzing current and future demands and will support the upcoming Servicing Master Plan approved by Council in the 2024 Capital Budget. Below are a few key findings from the model.

As shown in Figure 1, Table 2-11 of the Harrow-Colchester South Water Supply System Model Build shows the model future development demand breakdown for the ADD (Average Daily Demand) and the MDD (Maximum Daily Demand).

Figure 1: Future Development Demands

Table 2-11. Future Developments Demands

Development	Area (ha)	Population (capita)	Demand (L/s)	
			ADD = Population x 262.0 L/cap/day	MDD = ADD x 1.81
1. Erie Blue	10.4	364	1.10	2.00
2. Erie Shores	8.9	312	0.95	1.71
3. Colchester Heights	5.4	189	0.57	1.04
4. Wellesley Drive	3.4	119	0.36	0.65
5. Lypps Beach	29.1	1,019	3.09	5.59
6. The Grove Motel	0.35	13	0.04	0.07
7. Roseborough Area	10.6	370	1.12	2.03
8. Dalla Bona Development	29	879	2.67	4.82
9. Pollard Development	5.57	147	0.45	0.81
10. Roseborough	0.76	27	0.08	0.15
11. Sunset Gardens Phase 2	5.23	180	0.55	0.99
12. Walnut & Given	3.33	120	0.36	0.66
13. Roseborough & Clark	2.13	160	0.49	0.88
14. 3rd Concession & Queen Street	8.22	300	0.91	1.65
15. 2544 County Road 20	4.35	300	0.91	1.65
16. 44 Sinasac	0.05	1.75	0.01	0.01
17. 2562 County Road 20	0.08	2.8	0.01	0.02
18. Colchester Bay - Phase 1	15.5	1338	4.06	7.34
19. Colchester Bay - Phase 2	9	1128	3.42	6.19
20. Intensification Growth		441	1.34	2.42
Total Original Service Area	151	7411	22.47	40.67

As displayed in Figure 2, Figure 3-8 of the Harrow-Colchester South Water Supply System Model Build, the existing average day demand (ADD), MDD (Maximum Daily Demand), PHD (Peak Hourly Demand) and treatment capacity was compared to the future 2041 average day demand (ADD), MDD (Maximum Daily Demand) and PHD (Peak Hour Demand). The findings show that the future MDD is below our current water treatment capacity, however, the future PHD exceeds the treatment plant's capacity. As a result, system storage would be relied on to

meet future PHD. Additional analysis is required to determine if the existing storage capacity is sufficient to meet the future demands as a result of growth in the 20-year horizon.

Figure 2: Future Scenarios Model Results

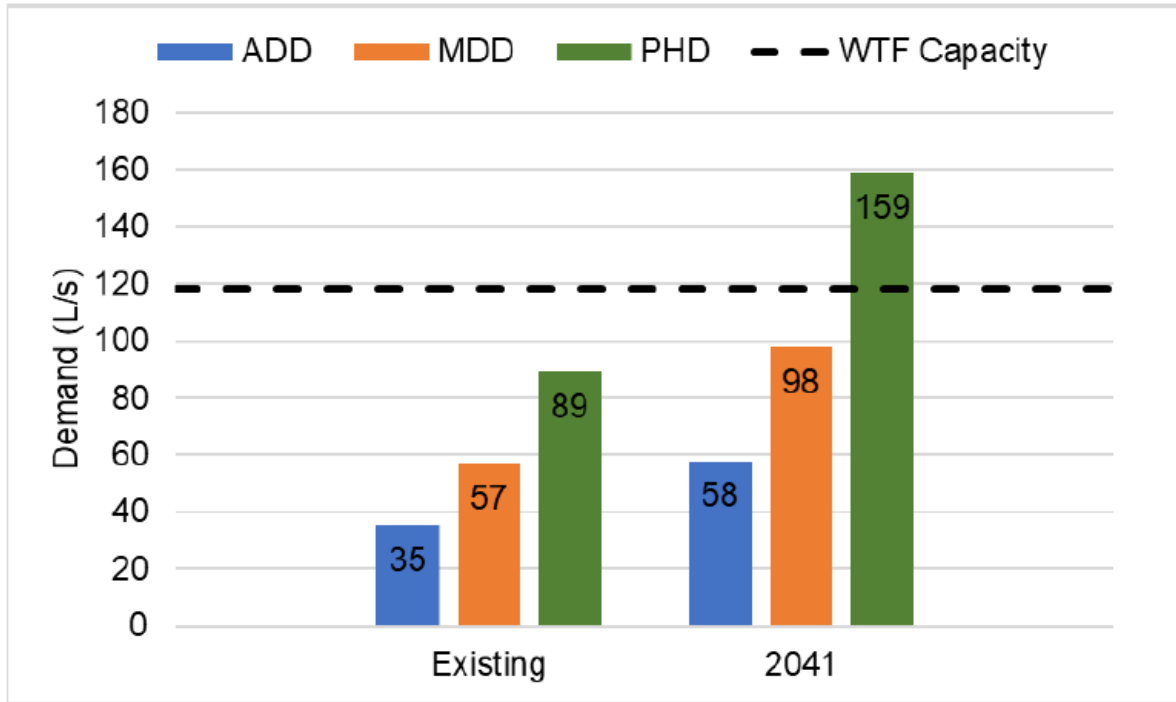


Figure 3-8: System Demand and WTF Capacity

As displayed in Figure 3, Figure 3-7 of the Harrow-Colchester South Water Supply System Model Build, hydrants near the Water Treatment Plant and the Harrow Elevated Tower exhibit the highest available fire flows in the system. Hydrants that represent lower fire flows are due to changes in elevation and/or hydraulic bottle necks created from single feed water mains, specifically north of Harrow Centre.

This fire flow information has been updated in our GIS mapping system and was provided to The Loomex Group while conducting the Fire Master Plan in 2023.

Figure 3: Fire Flow Results

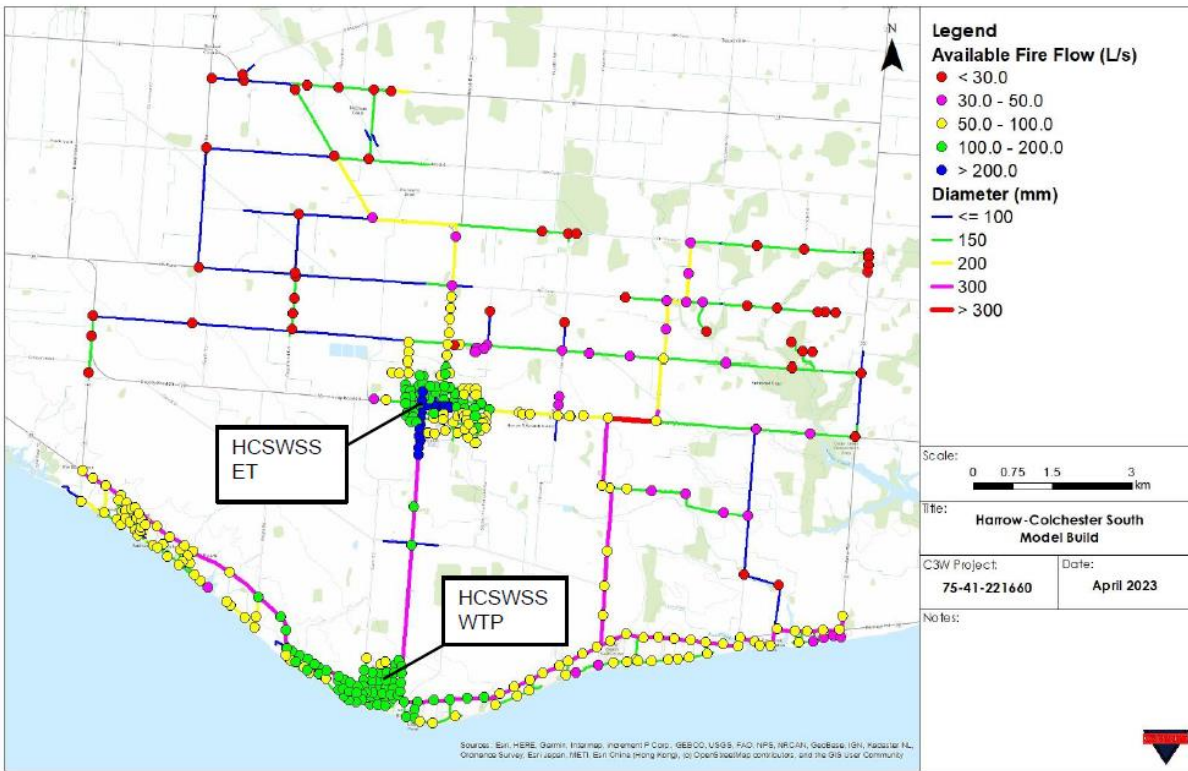


Figure 3-7. Fire Flow Results – MDD 2021

With the completion of the water model, the consultant provided various recommendations. It was recommended that the Town complete some level of model calibration. This was accomplished through the development of establishing pump curves in February of 2024. C-factor and fire flow testing in the distribution system could be used to further improve model accuracy. Additionally, CIMA+ recommended that existing and future system demands should be updated into the model every two years. Additionally, existing watermains in the model should be updated every 2 years based on the latest available GIS records. Lastly, CIMA+ recommended that the Town completes a water audit according to AWWA methodology to help identify nonrevenue water. This last recommendation will be achievable using our in-house water-billing records.

Financial Impact

There is no current financial impact as a result of this report. More information on financial impacts and timing of such will be addressed in the Servicing Masterplan.

Consultations

Cima+

Link to Strategic Priorities

- Embrace asset management best practices to build, maintain, and continuously improve our municipally owned infrastructure.
- Leverage our Town's competitive advantages to promote jobs and economic investment.**
- Take care of our natural environment and strengthen the sense of belonging to everyone **who makes Essex "home"**.
- Deliver friendly customer service in an efficient, effective, and transparent manner while providing an exceptional working environment for our employees.
- Build corporate-level and community-level climate resilience through community engagement and partnership and corporate objectives.

Report Approval Details

Document Title:	Harrow-Colchester Water Model Results - Environmental Services-2024-04.docx
Attachments:	- Final Build TM C3W-221660_27_240614_RPT_Model Build TM_e02.pdf - _Final_20240516 - HCSWSS Model - Pump Curve Testing and Model Update.pdf
Final Approval Date:	Aug 5, 2024

This report and all of its attachments were approved and signed as outlined below:



Kevin Girard, Director, Infrastructure Services - Jul 29, 2024 - 1:32 PM



Doug Sweet, Chief Administrative Officer - Aug 5, 2024 - 3:39 PM