MEMO

To:	Cam Elsby, P.Eng. (City of Ottawa)	From:	Stantec Consulting Ltd.
Stantec Project:	163402031 – City of Ottawa Urban Expansion Area Hydraulic Assessments	Date:	May 30, 2025

O'Keefe (Mattamy) Urban Expansion Area Assessment

1. Introduction

The City of Ottawa (City)'s New Official Plan (OP) was adopted by City Council in 2021. To identify infrastructure needs required to support growth to the 2046 horizon of the OP, the City updated its Infrastructure Master Plan (IMP) in 2024.

The Province of Ontario issued a Provincial Planning Statement[1] (PPS) in October 2024, enabling private landowners to request an expansion of the urban boundary at any time, including outside of a comprehensive review or OP update. If a proponent wishes to include land within the Urban Boundary, they may make an application for an Urban and Village Boundary Expansion Official Plan Amendment (OPA), which are generally site-specific, and consist of the following five (5) steps:

- Step 1 - Assess existing servicing capacity
- Step 2 - Identify new servicing capacity
- Application submission
- Step 3 - Assess land need
- Step 4 - Settlement area parcel analysis
- Step 5 - Council decision

Steps 1 and 2 are to be performed before the planning process. Steps 3 through 5 are part of the planning process. Before applicants begin the planning process, applicants must consult with the City to obtain Servicing Capacity information as part of steps 1 and 2. To provide the Servicing

[1] https://www.ontario.ca/page/provincial-planning-statement-2024

Capacity information, the following assessments were completed for the proposed areas to be included within the urban boundary area:

1. an assessment of existing and planned servicing (water and sanitary) capacity, and
2. where system capacities will not be available to support the OPA application based on planned system upgrades, an assessment identifying off-site works and the associated costs required to accommodate the expansion.

The following technical memorandum (TM) presents the findings of the Step 1 and Step 2 assessments for the proposed O'Keefe urban boundary expansion OPA application, as they pertain to potable water distribution infrastructure needs.

2. Background

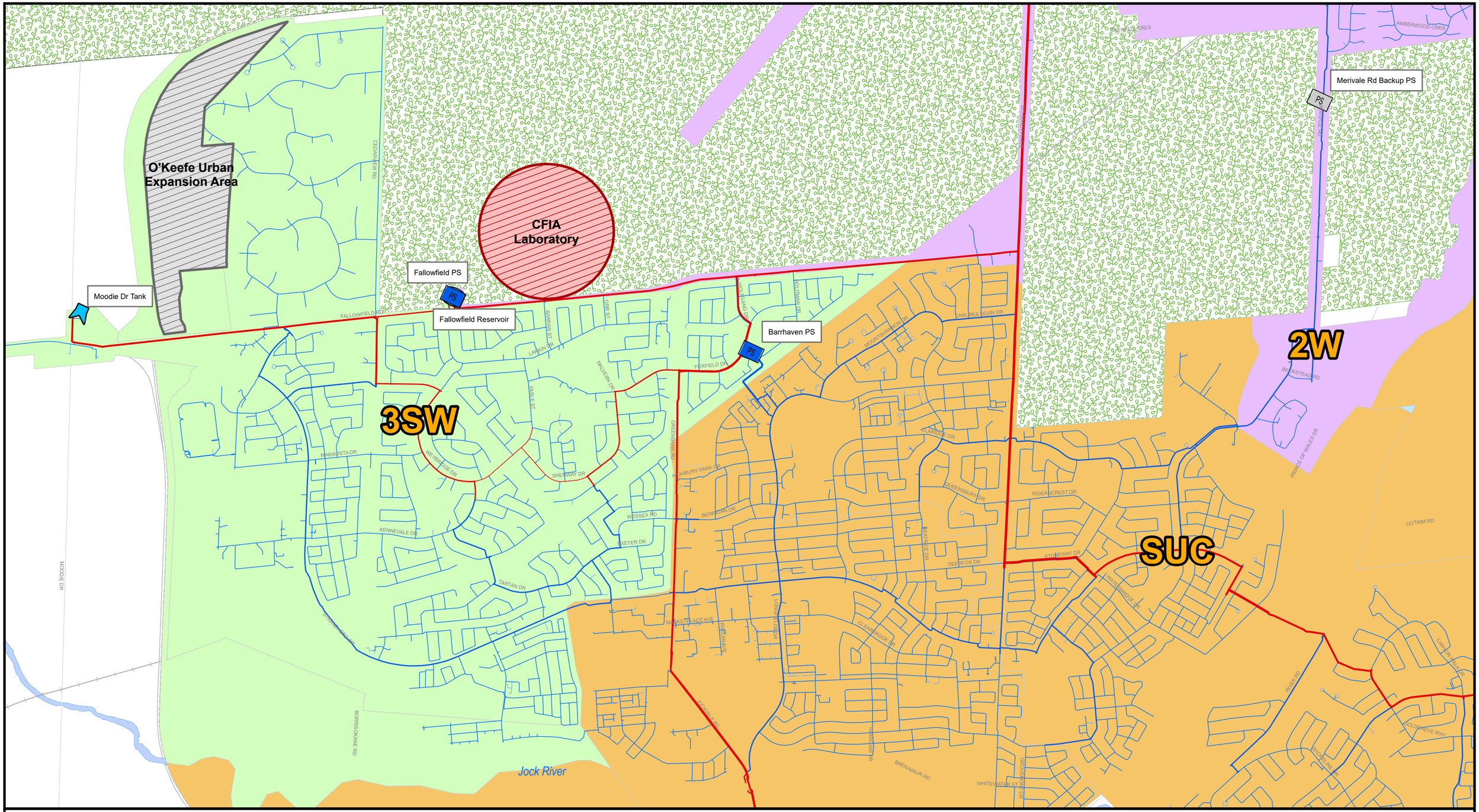
2.1 Study Area

The O'Keefe Urban Expansion Area (UEA) is adjacent to the 3SW pressure zone. The O'Keefe UEA is generally located within the following boundaries:

- To the north by Lytle Ave and Highway 416;
- To the west by Highway 416;
- To the south by Fallowfield Rd and O'Keefe Ct; and,
- To the east by the Cedarhill Estates.

For this assessment, the impact of a known development on servicing the O'Keefe UEA was also considered. The federal Canadian Food Inspection Agency (CFIA) currently operates its Ottawa Laboratory on its Fallowfield Campus, located at 3851 Fallowfield Rd, between Cedarview Rd and Greenbank Rd. The CFIA laboratory's existing facilities are currently serviced from 3SW, and will be expanded in the future, which will also have an impact on available water supply capacity.

Figure 1 shows the location of the O'Keefe UEA and the CFIA laboratory site within the overall water distribution system. **Figure 2** provides a closer view of the O'Keefe UEA and adjacent infrastructure. The O'Keefe UEA is directly adjacent to the existing pressure zone 3SW. The potential to service the O'Keefe UEA from this pressure zone is assessed in **Section 3.1.**



O'Keefe Urban Expansion Area Assessment

Figure 1: Existing Water Distribution System, Proposed O'Keefe UEA & CFIA Laboratory Site

Legend

- PS — Pump Station (Active)
- PS — Pump Station (Backup)
- Elevated Tank
- Reservoir

Backbone Watermain
- 152 mm - 305 mm
- 406 mm - 508 mm
- 610 mm - 914 mm
- 1067 mm - 1372 mm
- 1524 mm - 1981 mm
- 2550 mm

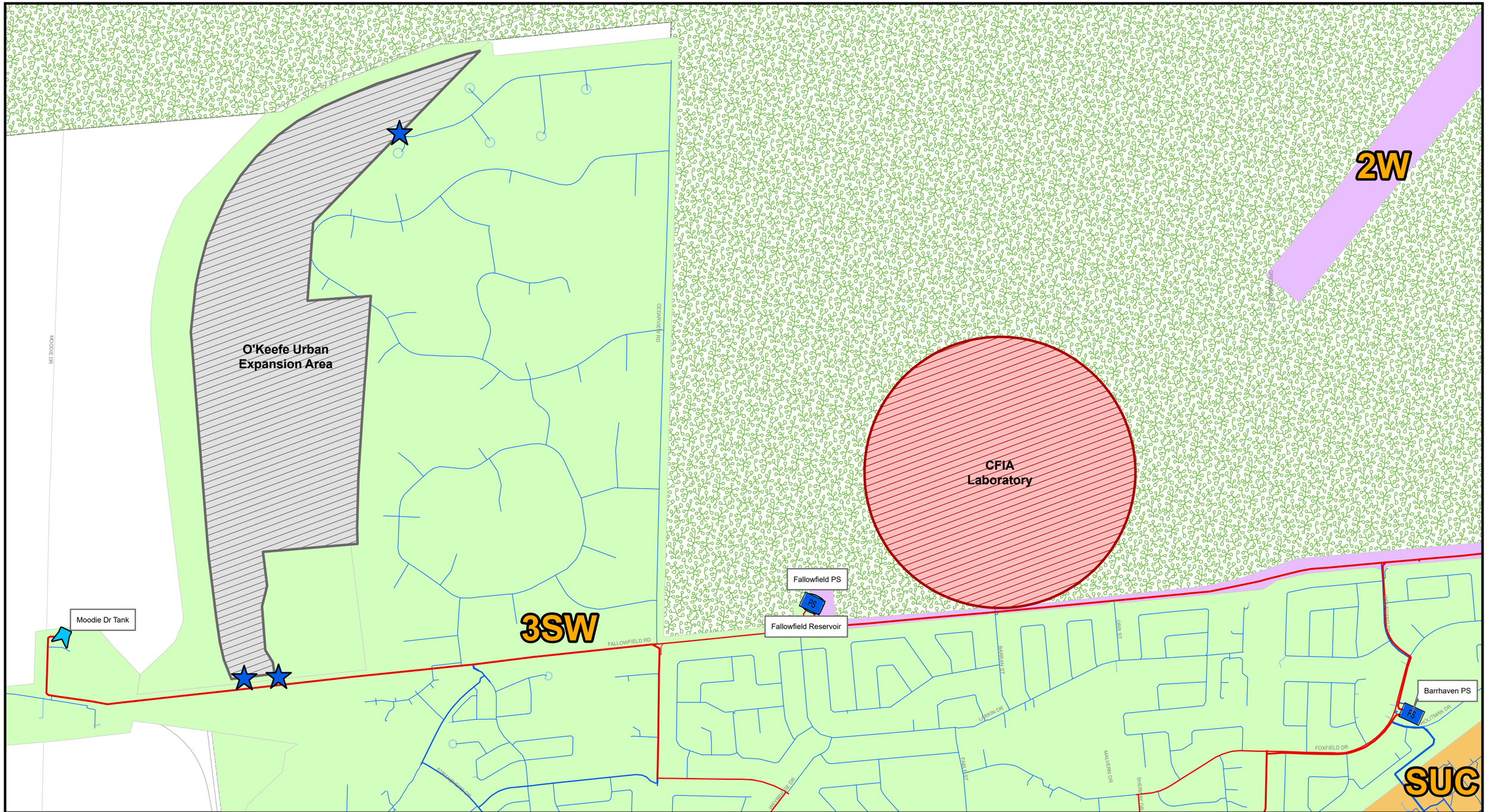
Distribution Watermain
- ≤ 102 mm
- 152 mm - 305 mm
- 356 mm - 508 mm
- 610 mm - 914 mm
- 1372 mm

Existing Pressure Zones
- 1E
- 1W
- 2C
- 2E
- 2W
- 3SW
- 3W
- EMR
- LEIT
- ME
- MG
- MONT
- SHADOW RIDGE
- SUC
- YOW

- Official Plan Urban Expansion Area
- Villages
- Greenbelt
- Major Rivers
- O'Keefe Urban Expansion Area
- Canadian Food Inspection Agency (CFIA) Laboratory

Ottawa

0 0.33 0.65 1.3 Km



O'Keefe Urban Expansion Area Assessment

Figure 2: Proposed O'Keefe UEA & Adjacent Infrastructure

Legend

- Pump Station (Active)
- Elevated Tank
- Reservoir

Backbone Watermain
- 152 mm - 305 mm
- 406 mm - 508 mm
- 610 mm - 914 mm
- 1067 mm - 1372 mm
- 1524 mm - 1981 mm
- 2550 mm

Distribution Watermain
- ≤ 102 mm
- 152 mm - 305 mm
- 356 mm - 508 mm
- 610 mm - 914 mm
- 1372 mm

- O'Keefe Urban Expansion Area
- Proposed Connection Points
- Canadian Food Inspection Agency (CFIA) Laboratory

Ottawa

0 0.15 0.3 0.6 Km

The land use within the O'Keefe UEA will include a mix of residential areas with varying densities, mixed-use blocks, parks and conservation areas. **Table 1** presents the projected growth unit counts within the O'Keefe UEA. The unit types assumed for water demand calculations (based on the unit types defined in the 2024 Water Master Plan (WMP)) are also presented in the table.

Table 1: Projected O'Keefe UEA Growth Unit Counts

Unit Type	Unit Type for Water Demand Calculations	Count
Single Detached	Single Family House (SFH)	327
Town Homes	SFH	184
Rear Lane Towns	Multi-Level Townhouse (MLT)	348
Back-to-Back Towns	MLT	266
Stacked Units	MLT	128
Mixed Use Units	Apartment (APT)	624
Total	**N/A**	**1,877**

The potable water demand calculations are based on the dwelling counts and 2024 WMP level of service criteria, which include population calculations based on population density by unit type. A concept plan and phasing plan are presented in the FSR, however, the focus of this assessment is on the backbone infrastructure requirements. Therefore, the demands within the O'Keefe UEA were applied as one lumped total demand for the area. Potential phasing of recommended infrastructure is assessed based on assumed phasing of demands as a percentage of calculated build-out.

For the CFIA laboratory, existing and future water demands were directly provided by the City. The on-site infrastructure (e.g., existing service line or on-site booster pumps) were not modelled or assessed.

Projected potable water demands for the O'Keefe UEA and the CFIA laboratory are presented in **Section 2.5**.

2.2 Background Information

The following background studies were reviewed for this analysis:

- Infrastructure Master Plan (City of Ottawa, 2024) *[2024 IMP]*, including supporting studies such as:
  - City of Ottawa 2024 Water Master Plan (Stantec Consulting Ltd., 2024) *[2024 WMP]*
  - Appendix H – Benefit to Existing Calculations *[2024 IMP Appendix H]*
- Assessment of Adequacy of Public Services Report for 4497 O'Keefe Court (David Schaeffer Engineering Ltd., 2024) *[Functional Servicing Report, FSR]*

- Cedarview Community Masterplan Concept - Version 6, August 17th, 2023, Urban Typology *[Concept Plan]*
- Barrhaven Reservoir Pump Station Upgrade As-Built Drawings (Parsons & Stantec Consulting Ltd., 2018) *[Fallowfield Reservoir PS (FRPS) As-Built Drawings]*
- Fallowfield Watermain Upgrade (Larkin to Cedarview) As-Built Drawings (Stantec Consulting Ltd., 2015) *[Fallowfield Watermain Downstream of FRPS As-Built Drawings]*

2.3 Discussions with Stakeholders

Technical advisory committee (TAC) meetings were held with City staff to gather input on infrastructure planning, asset management and operations considerations for this assessment. The following considerations were discussed:

- The FRPS, the Barrhaven PS and the Fallowfield Rd watermain downstream of the FRPS were upgraded recently (within the last 10 years).
- The CFIA would prefer maintaining its existing laboratory building serviced at a higher pressure, from pressure zone 3SW, than at a lower pressure from pressure zone 2W.
- The current pressure zone boundary between 2W and SUC results in a dead-end on Leikin Dr.

2.4 Level of Service and Design Criteria

The potable water servicing analysis is based on the level of service (LOS) and design criteria established in the 2024 WMP *Table 3-1* and supporting technical memoranda (TMs). The proposed servicing alternatives and recommended alternative were developed based on an assessment of peak domestic demand conditions, fire flow (FF) conditions, reliability scenarios, and water quality.

Table 2 summarizes the main LOS targets used to develop proposed servicing alternatives, and identify a recommended alternative. The required fire flow (RFF) target is 13,000 L/min (217 L/s; 18.7 MLD) for 3 hours.

Table 2: Summary of Pressure LOS Targets

Condition	Pressure	
	(kPa)	(psi)
Maximum Pressures		
Basic Day (BSDY) Demands (Occupied Areas)	552	80
BSDY (Unoccupied Areas)	689	100
Minimum Pressures		
Maximum Day (MXDY) Demands	345	50
Peak Hour (PKHR) Demands	276	40
BSDY+FF (Reliability) ***Maximum duration below target pressure should not exceed 24 hrs***		
MXDY+FF & BSDY+FF (Reliability)	140	20

2.5 Potable Water Demands

Potable water demands were calculated for the O'Keefe UEA projected developments and existing lots, using the unit counts presented in **Section 2.1** and the 2024 WMP design criteria. Demands for the CFIA laboratory were provided by the City. The demands are summarized in **Table 3**.

The City's hydraulic model's existing demands are representative of 2018 demands. While no demands were allocated to the nodes representing the existing CFIA laboratory servicing connection, it is understood that existing conveyance and pumping capacity is already being allocated to this existing building. Therefore, the CFIA's existing demands were not further considered as additional demands.

Table 3: Water Demand Projections

Area	Pressure Zone Servicing for Water Demand Calculations	BSDY (MLD)	5-Year MXDY(1) (MLD)	1-Year MXDY(2) (MLD)
O'Keefe UEA	3SW	1.4	1.9	1.7
CFIA Existing	N/A (Demands provided by City)	0.2	0.3	0.3
CFIA Expansion		1.5	2.9	2.9
CFIA Existing + Expansion		**1.7**	**3.2**	**3.2**
O'Keefe UEA + CFIA Expansion	-	**2.9**	**4.8**	**4.6**

Notes:

(1) MXDY demand based on an outdoor water demand (OWD) with a design frequency of 5 years, used for assessing and planning the pressure zones' high-lift pumping and storage capacities.

(2) MXDY demand based on an OWD with a design frequency of 1 year, used for assessing and planning the WPPs' treatment capacity. The impact of the additional demands on WPP treatment capacity, however, is not assessed in this site-specific study, and is to be reviewed at a Master Plan level.

3. OPA Step 1 – Assessment of Existing and Planned Infrastructure Capacity

3.1 Pressure Zone Boundary Analysis

The serviceability of the O'Keefe UEA is first assessed conceptually using an analysis of existing pressure zone boundaries. This analysis can help identify constraints within the existing pressure zones, which are confirmed using the hydraulic model. This analysis is also used as a preliminary evaluation of the serviceability of urban expansion areas, which are then further evaluated in the capacity analysis spreadsheet tool and hydraulic model. Feasible conceptual pressure zone servicing strategies can be identified from the onset of the analysis, and alternatives and permutations for the capacity and hydraulic assessments can be reduced.

The pressure zone boundary analysis incorporates head losses generated by flows through the system. A typical industry best practice target head loss rate of 1 m/km within the upstream water distribution network is used to derive the theoretical pressure zone boundaries. However, actual head loss rates within the network can vary due to distribution system characteristics including watermain looping, varying pipe roughness, and distribution of demands, and thus the pressure distributions are further assessed using the hydraulic model. Pressure distributions based on hydraulic model hydraulic gradelines (HGLs) and calculated O'Keefe UEA and CFIA demands are presented in the assessment of servicing alternatives in **Section 4.3**.

Figure 3 shows the pressure zone boundary analysis results for the pressure zones 3SW, 2W and SUC, as they pertain to servicing the O'Keefe UEA and the CFIA laboratory. While the O'Keefe UEA can only be serviced from 3SW, there could be minimum pressure constraints under high head loss conditions. The CFIA laboratory expansion can be serviced directly from 3SW without any on-site pressure boosting, however, if serviced from 2W, may experience minimum pressure constraints.

Finally, should the City choose to undertake a pressure zone reconfiguration, some areas within 3SW could be serviced at lower pressures from SUC, while meeting the minimum pressure targets. Likewise, some areas within SUC could be serviced at lower pressures from 2W. This assessment demonstrates the feasibility of a pressure zone reconfiguration, which should be further assessed at a Master Plan level.

3SW Maximum HGL
Head Loss Rate = 1 m/km

2W Maximum HGL
Head Loss Rate = 1 m/km

SUC Maximum HGL
Head Loss Rate = 1 m/km (w/ RSET)

3SW Minimum HGL
Head Loss Rate = 1 m/km

2W Minimum HGL
Head Loss Rate = 1 m/km

SUC Minimum HGL
Head Loss Rate = 1 m/km (w/ RSET)

O'Keefe Urban Expansion Area

CFIA Laboratory

416

PS

Jock River

O'Keefe Urban Expansion Area Assessment

Figure 3: Pressure Zone Boundary Analysis - O'Keefe UEA Servicing

O'Keefe UEA demands are not considered in this theoretical analysis. Instead, head losses due to additional demands and resulting flows are generated using a theoretical rate of 1 m/km.

Legend

Pressures (psi)

- Not Serviceable
- 0 psi < Pressure ≤ 20 psi
- 20 psi < Pressure ≤ 25 psi
- 25 psi < Pressure ≤ 30 psi
- 30 psi < Pressure ≤ 35 psi
- 35 psi < Pressure ≤ 40 psi
- 40 psi < Pressure ≤ 45 psi
- 45 psi < Pressure ≤ 50 psi
- 50 psi < Pressure ≤ 60 psi
- 60 psi < Pressure ≤ 70 psi
- 70 psi < Pressure ≤ 80 psi
- 80 psi < Pressure ≤ 85 psi
- 85 psi < Pressure ≤ 90 psi
- 90 psi < Pressure ≤ 95 psi
- 95 psi < Pressure ≤ 100 psi
- Pressure > 100 psi

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0 0.75 1.5 3 Km

3.2 Capacity Analysis

The capacity of the existing water distribution's pumping stations (PS), storage and treatment facilities, was assessed using the City's capacity analysis spreadsheet tool. Capacity constraints requiring upgrades were assessed based on a trigger year of 2046, which is the 2024 IMP's growth horizon. Planned upgrades in the 2024 IMP were considered, however, while they impact the overall system's treatment and pumping capacity, they do not directly impact the servicing of the O'Keefe UEA and the CFIA laboratory expansion. The following demand scenarios were assessed:

- Baseline scenario: Servicing of the O'Keefe UEA only (from 3SW), without a CFIA laboratory expansion;
- Impact of CFIA laboratory expansion into 3SW; and,
- Impact of CFIA laboratory expansion into 2W.

Capacity upgrade trigger years are presented in **Table 4**. From a capacity perspective, the existing 3SW pressure zone pumping capacity can accommodate the O'Keefe UEA demands. However, should the CFIA laboratory also proceed with expansion into 3SW as currently planned, pumping capacity constraints would arise. The projected MXDY demand would be 16.8 MLD, which exceeds the zone's firm pumping capacity of 14 MLD, hence pumping upgrades will be needed to service the O'Keefe UEA, if the CFIA laboratory expands into 3SW. Alternatively, 3SW pumping capacity could be made available by undertaking a pressure zone reconfiguration, whereby some demands could be re-allocated to SUC, where hydraulically feasible. However, this would require a comprehensive review in terms of master planning as well as operational considerations outside the scope of this study, which would account for assessing SUC capacity and addressing existing dead-ends at the 2W/SUC boundary on Leikin Dr. For the purposes of assessing the serviceability of the O'Keefe UEA, this study focuses on the off-site infrastructure requirements to address pumping capacity constraints.

Should the CFIA laboratory instead proceed with expansion into 2W, there is enough firm pumping capacity within 3SW to supply the O'Keefe UEA and no pumping upgrades are needed.

Under all scenarios, no 2W capacity upgrades are needed to service the O'Keefe UEA and the CFIA laboratory expansion.

Table 4: Impact of O'Keefe UEA and CFIA Peak Demands on Existing Facility Upgrade Growth Triggers

Servicing Scenario	Facility	Upgrade Needed by 2046?			
		w/o O'Keefe UEA, w/o CFIA Expansion	Baseline Scenario	Impact of Other Known Developments	
			O'Keefe UEA Servicing	Impact of CFIA Expansion into 3SW	Impact of CFIA Expansion into 2W
Servicing from 2W+	2W+ Pumping from Britannia HLP and Carlington Heights PS (with 2024 IMP's Proposed Storage Upgrades(1))	2099	2098	2096	
Servicing from 3SW	3SW 2046 MXDY Demands(2)	12 MLD	13.9 MLD	16.8 MLD	13.9 MLD
	3SW Pumping from Fallowfield Reservoir PS & Barrhaven PS-3SW (with Existing Storage)	2057	2046(3)	2032	2046(3)

Legend: Upgrades required by 2046

Notes:

(1) The following 2024 IMP's proposed storage upgrades offset peak 2W+ pumping requirements from the Britannia HLP-2W pumps and the Carlington Heights PS-2W pumps: new Riverside South ET.

(2) Total 5-year MXDY demand, including 2024 WMP demand projections for the 2046 horizon.

(3) Total 3SW 2046 MXDY demands are less than the 3SW zone's firm pumping capacity (14 MLD), therefore no upgrades are required.

3.3 Hydraulic Assessment

The need for potential off-site watermain upgrades (new watermains and/or existing watermain replacement) was assessed using the City's hydraulic model, under future growth (2046 growth from the OP) and infrastructure conditions (i.e., with planned infrastructure).

Table 5 presents a summary of direct servicing opportunities and infrastructure gaps. The infrastructure gaps were identified as needed, in addition to planned infrastructure recommended in the 2024 IMP.

Under all servicing scenarios, constraints in the Fallowfield WM upstream of the FRPS (existing 762 mm diam. WM) were identified. This watermain was already identified as experiencing high head losses in the 2024 WMP, and was flagged for capacity constraints at the time. With the addition of the O'Keefe UEA demands alone, the Fallowfield WM constraints result in PKHR minimum pressures below 40 psi within the O'Keefe UEA. The CFIA expansion into 2W does not

trigger additional constraints within the O'Keefe UEA, however the CFIA expansion into 3SW will trigger the following additional constraints:

- Fallowfield Reservoir PS pumping constraints (as identified in the capacity analysis in **Section 3.2**), resulting in lower pumping head gain; and,
- Fallowfield WM, downstream of the FRPS (existing 406 mm diam. WM), which experiences high head losses.

Combined, these constraints result in expanded PKHR minimum pressure constraints within the O'Keefe UEA, and impacts on existing service areas' pressures in 3SW, as illustrated in **Appendix A**.

Table 5: Direct Servicing Opportunities and Infrastructure Gaps for O'Keefe UEA

Scenario		Infrastructure Gaps
Baseline O'Keefe UEA Servicing		• Head loss reduction measures to address Fallowfield WM (upstream of FRPS) capacity constraints (existing 762 mm diam. WM, between Woodroffe Ave and Wolfgang Dr)
Impact of Other Known Developments	**Impact of CFIA Expansion into 3SW**	• Head loss reduction measures to address Fallowfield WM (upstream of FRPS) capacity constraints (existing 762 mm diam. WM, between Woodroffe Ave and Wolfgang Dr) • 3SW pumping capacity increase • Head loss reduction measures to address Fallowfield WM (downstream of FRPS) capacity constraints (existing 406 mm diam. WM, between FRPS and Cedarview Rd)
	Impact of CFIA Expansion into 2W	• Head loss reduction measures to address Fallowfield WM (upstream of FRPS) capacity constraints (existing 762 mm diam. WM, between Woodroffe Ave and Wolfgang Dr)

3.4 Step 1 Conclusions & Recommendations

The capacity of the existing water distribution system to directly service the O'Keefe UEA was assessed. **The existing water distribution system cannot directly supply the O'Keefe UEA to fulfil the 2024 IMP's target LOS criteria. Therefore, the OPA Step 2 assessment is needed to identify off-site infrastructure needs** and address the following infrastructure gaps:

- Head loss reduction measures to address Fallowfield WM (upstream of FRPS) capacity constraints (existing 762 mm diam. WM, between Woodroffe Ave and Wolfgang Dr);

Should the CFIA laboratory expand into 3SW, the following additional infrastructure gaps will need to be addressed:

- 3SW pumping capacity increase ; and,

- Head loss reduction measures to address Fallowfield WM (downstream of FRPS) capacity constraints (existing 406 mm diam. WM, between FRPS and Cedarview Rd).

Off-site infrastructure needs to address these constraints, along with Class D opinions of probable costs (OPCs) and cost allocation are addressed in Step 2 of the OPA, presented in **Section 4**.

4. OPA Step 2 – Identification & Assessment of Off-Site Infrastructure Needs

4.1 Capacity Analysis

As identified in the Step 1 capacity analysis (**Section 3.1**), the existing 3SW pressure zone can supply the O'Keefe UEA alone. However, the CFIA laboratory expansion, if it proceeds within 3SW, will trigger off-site PS capacity upgrades to service the O'Keefe UEA. Required upgrades under each potential scenario are presented in **Section 4.3**.

4.2 Hydraulic Assessment

As identified in the Step 1 hydraulic analysis (**Section 3.3**), infrastructure gaps need to be addressed off-site. Potential off-site infrastructure solutions for each infrastructure gap are presented in **Table 6**. These potential solutions are further assessed as part of the servicing alternatives assessment in **Section 4.3**.

As discussed in the Step 1 hydraulic analysis, these off-site infrastructure solutions would be needed in addition to already planned infrastructure from the 2024 IMP.

Table 6: Infrastructure Gaps and Potential Off-Site Solutions and Additional Internal Needs to Support Off-Site Solutions

Scenario		Infrastructure Gaps	Potential Off-Site Solutions
Baseline O'Keefe UEA Servicing		• Head loss reduction measures to address Fallowfield WM (upstream of FRPS) capacity constraints (existing 762 mm diam. WM, between Woodroffe Ave and Wolfgang Dr)	• WM upgrade (replace and upsize existing watermain, twin existing watermain or provide looping along additional alignment [e.g., Cedarview Rd, Greenbank Rd])
Impact of Other Known Developments	**Impact of CFIA Expansion into 3SW**	• Head loss reduction measures to address Fallowfield WM (upstream of FRPS) capacity constraints (existing 762 mm diam. WM, between Woodroffe Ave and Wolfgang Dr)	• WM upgrade (replace and upsize existing watermain, twin existing watermain or provide looping along additional alignment [e.g., Cedarview Rd, Greenbank Rd])
		• 3SW pumping capacity increase	• Upgrade FRPS or Barrhaven PS, or undertake pressure zone reconfiguration to reduce 3SW demands
		• Head loss reduction measures to address Fallowfield WM (downstream of FRPS) capacity constraints (existing 406 mm diam. WM, between FRPS and Cedarview Rd)	• WM upgrade (replace and upsize existing watermain, twin existing watermain or provide looping along additional alignment [e.g., Cedarview Rd, Greenbank Rd])
	Impact of CFIA Expansion into 2W	• Head loss reduction measures to address Fallowfield WM (upstream of FRPS) capacity constraints (existing 762 mm diam. WM, between Woodroffe Ave and Wolfgang Dr)	• WM upgrade (replace and upsize existing watermain, twin existing watermain or provide looping along additional alignment [e.g., Cedarview Rd, Greenbank Rd])

4.3 Servicing Scenarios & Alternatives

Table 7 summarizes the off-site infrastructure needs to address the infrastructure gaps identified in Step 1 in each potential servicing scenario. Each scenario is further described and illustrated in the following sub-sections, including discussions of LOS achieved and potential phasing opportunities. For feasible options, OPCs are presented, which were developed using the Class D costing templates from the 2024 IMP. Details on the OPCs are provided in **Section 4.4**.

Table 7: O'Keefe UEA Servicing Alternatives and Off-Site Infrastructure Needs

Scenario Description	Baseline Scenario	Impact of Other Known Developments on O'Keefe Servicing	
	O'Keefe UEA Servicing	Impact of CFIA Expansion into 3SW	Impact of CFIA Expansion into 2W
Pressure Zone Servicing	• O'Keefe: 3SW	• O'Keefe: 3SW • CFIA Existing: 3SW • CFIA Expansion: 3SW	• O'Keefe: 3SW • CFIA Existing: 3SW • CFIA Expansion: 2W
Existing Infrastructure Assessment			
Resulting 2046 MXDY in 3SW	13.9 MLD	16.8 MLD	13.9 MLD
Target LOS (PKHR Minimum Pressures) Achieved within O'Keefe UEA?	No - see **Figure 4**	No – see **Figure 6**	No – see **Figure 8**
Impact on Existing Servicing Areas Compared to Baseline[(1)] (Existing Servicing Areas Outside O'Keefe UEA)	Pressure reduction in existing servicing areas within 3SW (areas outside of O'Keefe UEA); minimum PKHR pressures remain above 40 psi	Pressure reduction in existing servicing areas within 3SW (areas outside of O'Keefe UEA); minimum PKHR pressures drop below 40 psi	Pressure reduction in existing servicing areas within 3SW (areas outside of O'Keefe UEA); minimum PKHR pressures remain above 40 psi
Proposed Off-Site Servicing Upgrades			
Off-Site Pumping Upgrade Needs	None	Add +2.8 MLD of pumping capacity to FRPS	None
Off-Site WM Upgrade Needs	• Upsize 1,925 m of WM to 1050 mm diam., along Fallowfield Rd, from Woodroffe Ave to Wolfgang Dr	• Upsize 1,925 m of WM to 1050 mm diam., along Fallowfield Rd, from Woodroffe Ave to Wolfgang Dr • Upsize 600 m of WM to 600 mm diam., along Fallowfield Rd, from FRPS to Cedarview Rd	• Upsize 1,925 m of WM to 1050 mm diam., along Fallowfield Rd, from Woodroffe Ave to Wolfgang Dr
Target LOS (PKHR Minimum Pressures) Achieved within O'Keefe UEA?	Yes – see **Figure 4**	Yes – see **Figure 6**	Yes – see **Figure 8**
Impact on Existing Servicing Areas Compared to Baseline[(1)] (Existing Servicing Areas Outside O'Keefe UEA)	Minimum PKHR pressures in existing servicing areas within 3SW (areas outside of O'Keefe UEA) back to baseline (or minor improvement)	Minimum PKHR pressures in existing servicing areas within 3SW (areas outside of O'Keefe UEA) back to baseline (or minor improvement)	Minimum PKHR pressures in existing servicing areas within 3SW (areas outside of O'Keefe UEA) back to baseline (or minor improvement)
Potential Phasing Opportunities	• **Phase A1**: Upgrade Fallowfield WM (upstream of FRPS)	• **Phase B1**: Upgrade Fallowfield WM (upstream of FRPS) • **Phase B2**: Upgrade FRPS • **Phase B3**: Upgrade Fallowfield WM (downstream of FRPS)	• **Phase C1**: Upgrade Fallowfield WM (upstream of FRPS)
Opinion of Probable Cost (2025$)[(2)]	**$31.5 M**	**$38.1 M**	**$31.5 M**

Notes:

(1) Baseline 2046 (growth & infrastructure) conditions; refer to **Appendix A** for results.

(2) Class D OPCs based on 2024 IMP templates.

4.3.1. Baseline Scenario: O'Keefe Servicing

The baseline scenario consists of only servicing the O'Keefe UEA, without considering the impact of other developments. Existing watermain upgrades along Fallowfield Rd (upstream of the FRPS) are needed to reduce head losses and increase resulting pressures in 3SW and in the O'Keefe UEA, to meet the minimum pressure LOS. The infrastructure needs under this scenario are listed in **Table 8**.

Table 8: Baseline Scenario: O'Keefe Servicing – Off-Site & Additional Internal Infrastructure Needs

Phase (ID)	Description	Diameter (mm)	Length (m)	Along	From	To
A1	Existing Watermain Upgrade	1050	1,925	Fallowfield Rd	Woodroffe Ave	Wolfgang Dr

Figure 5 illustrates potential phases for the proposed infrastructure under this scenario. Each phase is assessed in terms of LOS achieved (percentage of areas experiencing PKHR minimum pressures below 40 psi) as a function of demand supplied. While under this scenario, there is capacity to supply up to ~1.4 MLD in MXDY demands within the O'Keefe UEA without any additional off-site infrastructure upgrades, these will be needed to fully service the O'Keefe UEA build out demands. As shown in **Figure 4** however, the pressure constraints under the O'Keefe UEA build out scenarios are localized to a block that is currently planned for condo developments (per the Concept Plan). Until the Fallowfield WM upstream upgrades are undertaken, mitigation measures could be implemented to supply build-out conditions. These mitigation measures could include one or a combination of the following on-site solutions:

- Adjusting grading;
- Building height restrictions;
- Servicing of higher flows using jet pumps; and,
- Oversizing services.

Without considering other new developments in 3SW, the O'Keefe UEA, when fully built-out, does not meet LOS requirements with the existing water distribution infrastructure. There is available capacity to supply up to ~1.4 MLD in MXDY demands within the O'Keefe UEA without any additional off-site infrastructure upgrades, however, beyond this flow rate/demand an upgrade to the existing watermain along Fallowfield Rd (upstream of the FRPS) is recommended to meet the target LOS within the O'Keefe UEA. The OPC for off-site infrastructure upgrades is $31.5 M (see details in Section 4.4). The required off-site watermain upgrades would require additional Master Plan-level considerations to confirm the required sizing and cost recovery mechanisms. Alternatively, interim on-site measures could be implemented to mitigate the impact of low pressures.

PKHR Minimum Pressure Distribution
Baseline Scenario (O'Keefe UEA Servicing)
w/o Off-Site Infrastructure Upgrades

Planned condo block (per Concept Plan v23)

O'Keefe Urban Expansion Area

3SW

Moodie Dr Tank

MOODIE DR

CEDARVIEW RD

FALLOWFIELD RD

PKHR Minimum Pressure Distribution
Baseline Scenario (O'Keefe UEA Servicing)
w/ Off-Site Infrastructure Upgrades

Planned condo block (per Concept Plan v23)

O'Keefe Urban Expansion Area

3SW

Moodie Dr Tank

MOODIE DR

CEDARVIEW RD

FALLOWFIELD RD

O'Keefe Urban Expansion Area Assessment

Figure 4: Baseline Scenario (O'Keefe UEA Servicing) - PKHR Minimum Pressure Distribution with & without Off-Site Infrastructure Upgrades

Legend

- PS — Pump Station (Active)
- Elevated Tank
- Planned Non-Residential, Non-ICI Land Uses
- Planned Residential & ICI Land Uses

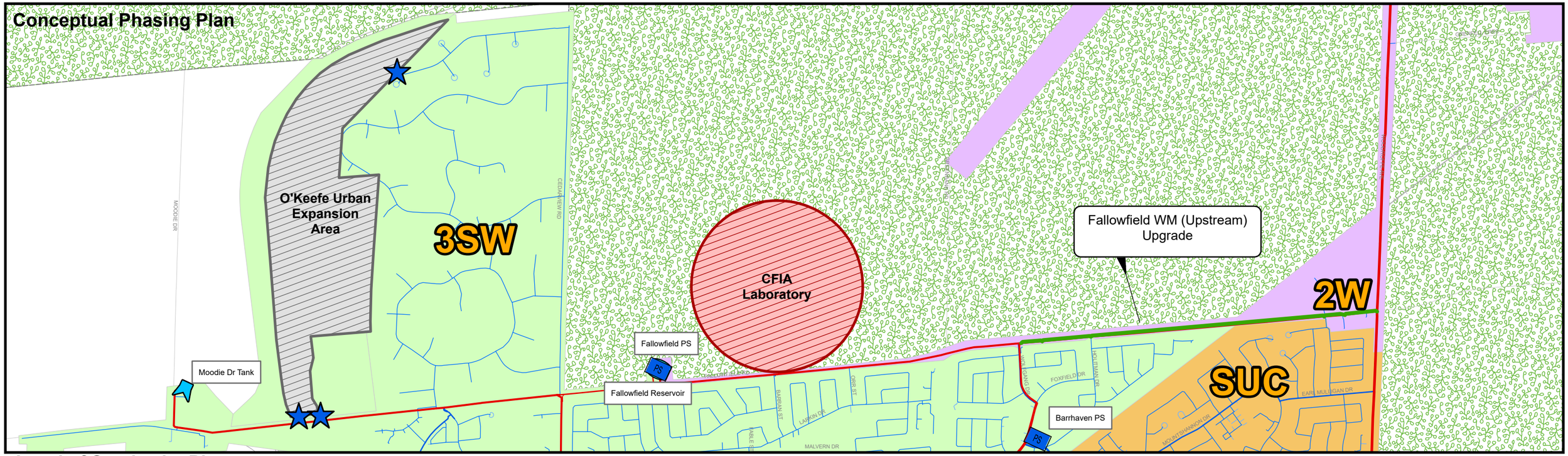
Pressures (psi)

- Not Serviceable
- 0 psi < Pressure ≤ 20 psi
- 20 psi < Pressure ≤ 25 psi
- 25 psi < Pressure ≤ 30 psi
- 30 psi < Pressure ≤ 35 psi
- 35 psi < Pressure ≤ 40 psi
- 40 psi < Pressure ≤ 45 psi
- 45 psi < Pressure ≤ 50 psi
- 50 psi < Pressure ≤ 60 psi
- 60 psi < Pressure ≤ 70 psi
- 70 psi < Pressure ≤ 80 psi
- 80 psi < Pressure ≤ 85 psi
- 85 psi < Pressure ≤ 90 psi
- 90 psi < Pressure ≤ 95 psi
- 95 psi < Pressure ≤ 100 psi
- Pressure > 100 psi

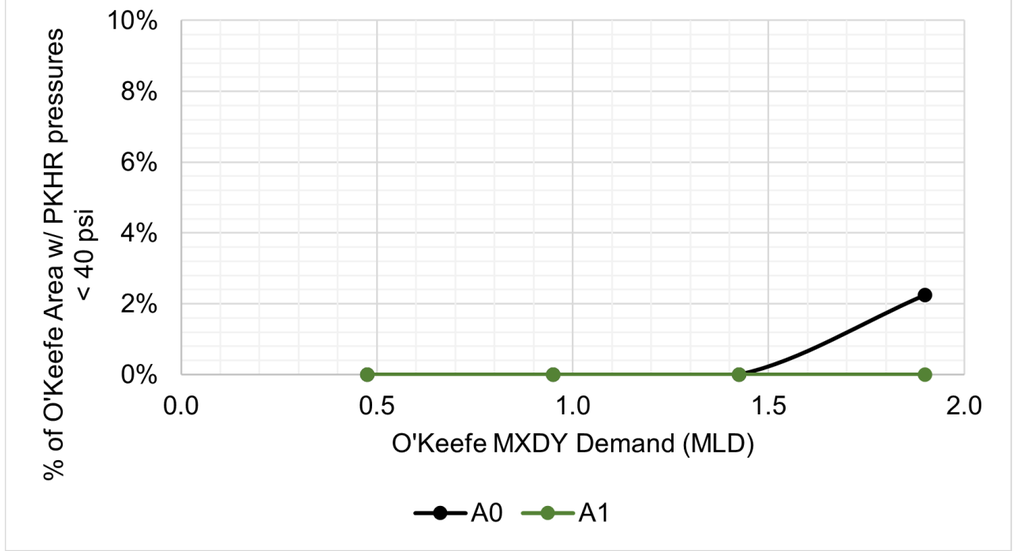
Ottawa

0 0.15 0.3 0.6 Km

Conceptual Phasing Plan



Level of Service by Phase, Based on O'Keefe UEA MXDY Demand (MLD)



O'Keefe Urban Expansion Area Assessment

Figure 5: Baseline Scenario (O'Keefe UEA Servicing)
Potential Phasing of Infrastructure & Level of Service

Legend

- PS — Pump Station (Active)
- Elevated Tank
- Reservoir
- O'Keefe Urban Expansion Area
- Proposed Connection Points
- Canadian Food Inspection Agency (CFIA) Laboratory

Proposed Off-Site Watermains

- Phase 1

Ottawa

0 0.25 0.5 1 Km

4.3.2 Impact of Other Known Developments on O'Keefe UEA Servicing

4.3.2.1 Impact of CFIA Expansion into 3SW

Should the CFIA laboratory expand into 3SW, the following off-site upgrades are needed to meet the minimum pressure LOS requirements in 3SW and in the O'Keefe UEA:

- Existing watermain upgrades along Fallowfield Rd (upstream of the FRPS);
- FRPS upgrade; and,
- Existing watermain upgrades along Fallowfield Rd (downstream of the FRPS).

The infrastructure needs under this scenario are listed in **Table 9**.

For the purpose of providing conceptual OPCs to inform off-site infrastructure needs, the following was assumed:

- Watermain upgrades consist of upsizing the existing watermains.
  - Alternatively, the existing watermains could be maintained, and an equivalent capacity achieved through twinning or looping along an additional alignment (e.g., Cedarview Rd, Greenbank Rd).
- PS upgrades consist of replacing existing pumps, which can provide the required additional capacity.

These options would need to be assessed in separate functional design studies, should this scenario become the primary supply scenario.

Table 9: Impact of CFIA Expansion into 3SW – Off-Site & Additional Internal Infrastructure Needs

Phase (ID)	Description	Diameter (mm)	Length (m)	Along	From	To
B1	Add +2.8 MLD of pumping capacity to FRPS	N/A				
B2	Existing Watermain Upgrade	1050	1,925	Fallowfield Rd	Woodroffe Ave	Wolfgang Dr
B3	Existing Watermain Upgrade	600	600	Fallowfield Rd	FRPS	Cedarview Rd

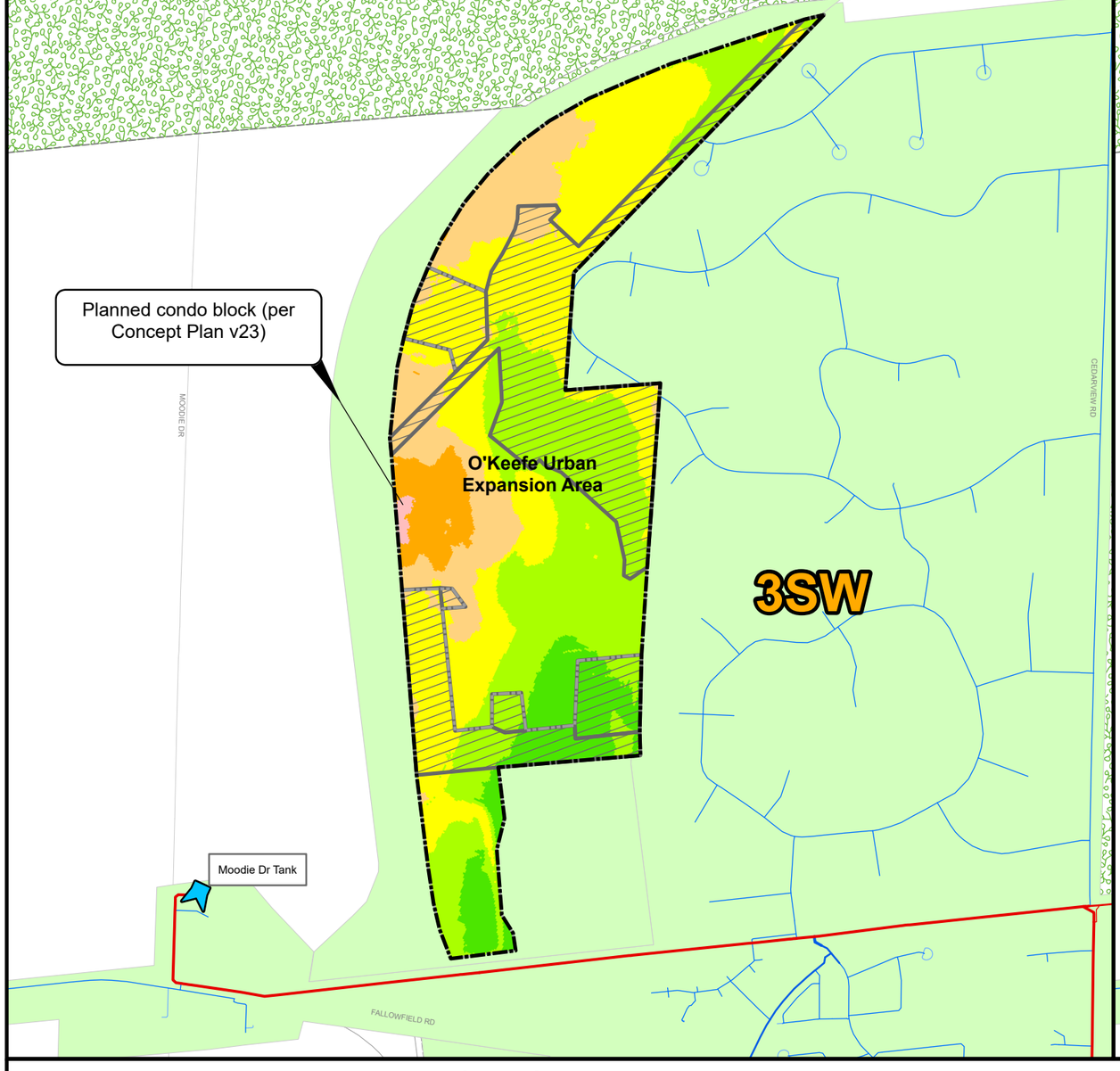
Figure 7 illustrates potential phases for the proposed infrastructure under this scenario. Each phase is assessed in terms of LOS achieved (percentage of areas experiencing PKHR minimum pressures below 40 psi) as a function of demand supplied. Under this scenario, additional off-site infrastructure upgrades are required immediately to service the O'Keefe UEA demands. In the

interim, mitigation measures could be implemented. These mitigation measures could include one or a combination of the following on-site solutions:

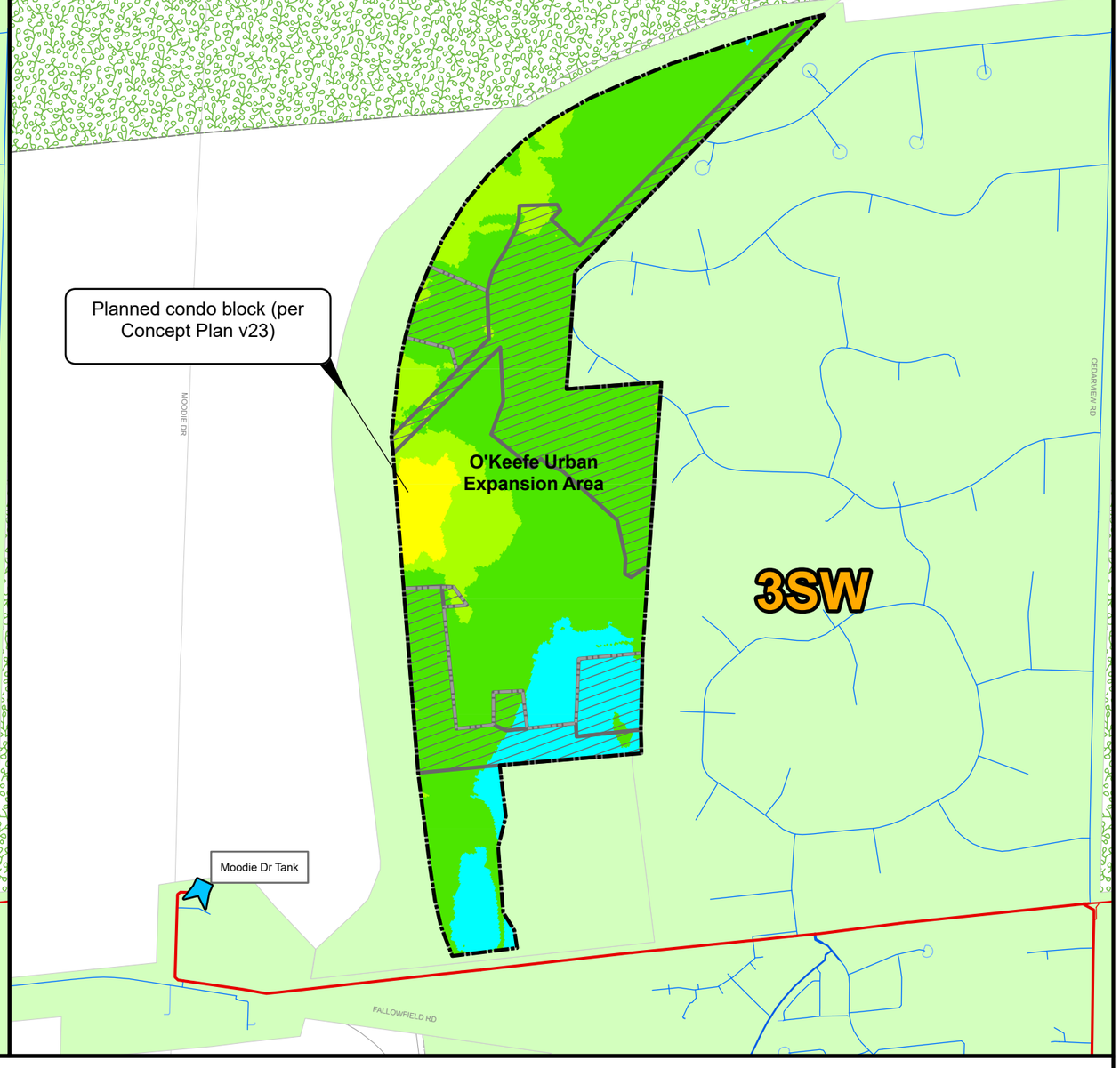
- Adjusting grading;
- Building height restrictions;
- Servicing of higher flows using jet pumps; and,
- Oversizing services.

Should the CFIA expand into 3SW, the O'Keefe UEA does not meet LOS requirements with the existing water distribution infrastructure. Off-site PS and watermain upgrades (upstream and downstream of the FRPS) would be needed for the O'Keefe UEA to proceed with development and for the target LOS to be met within the O'Keefe UEA. The OPC for off-site infrastructure is $38.1 M (see details in Section 4.4). The required off-site watermain upgrades would require additional Master Plan-level considerations to confirm the required sizing and cost recovery mechanisms. Alternatively, on-site interim measures could be implemented to mitigate the impact of low pressures.

PKHR Minimum Pressure Distribution
Impact of CFIA Expansion into 3SW
w/o Off-Site Infrastructure Upgrades



PKHR Minimum Pressure Distribution
Impact of CFIA Expansion into 3SW
w/ Off-Site Infrastructure Upgrades



O'Keefe Urban Expansion Area Assessment

Figure 6: Impact of CFIA Expansion into 3SW - PKHR
Minimum Pressure Distribution
with & without Off-Site Infrastructure Upgrades

Legend

- PS Pump Station (Active)
- Elevated Tank
- Planned Non-Residential, Non-ICI Land Uses
- Planned Residential & ICI Land Uses

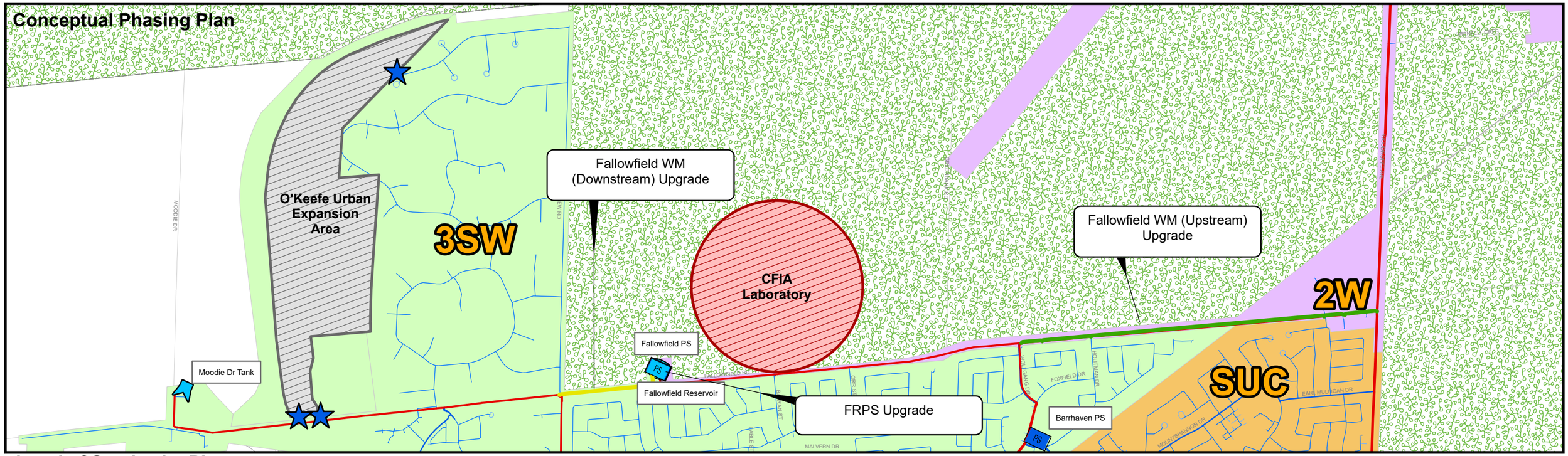
Pressures (psi)

- Not Serviceable
- 0 psi < Pressure ≤ 20 psi
- 20 psi < Pressure ≤ 25 psi
- 25 psi < Pressure ≤ 30 psi
- 30 psi < Pressure ≤ 35 psi
- 35 psi < Pressure ≤ 40 psi
- 40 psi < Pressure ≤ 45 psi
- 45 psi < Pressure ≤ 50 psi
- 50 psi < Pressure ≤ 60 psi
- 60 psi < Pressure ≤ 70 psi
- 70 psi < Pressure ≤ 80 psi
- 80 psi < Pressure ≤ 85 psi
- 85 psi < Pressure ≤ 90 psi
- 90 psi < Pressure ≤ 95 psi
- 95 psi < Pressure ≤ 100 psi
- Pressure > 100 psi

Ottawa

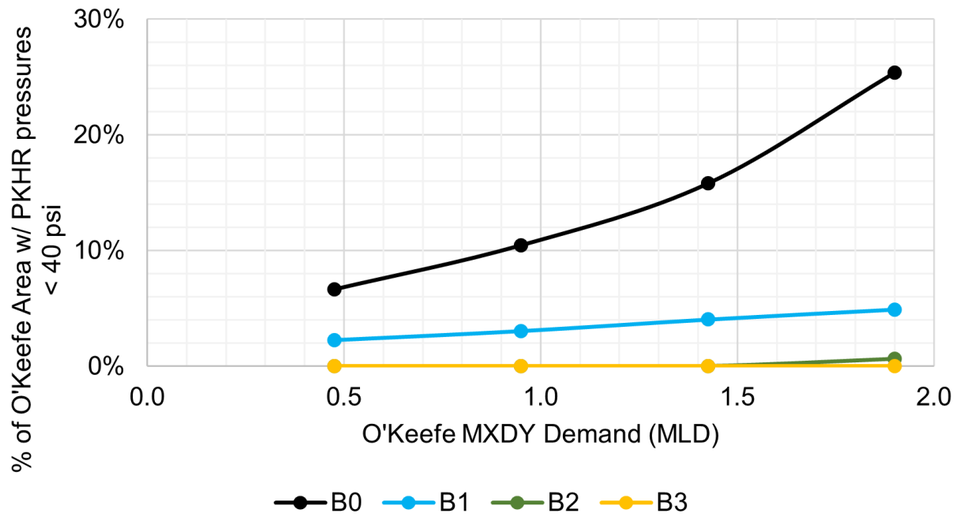
0 0.15 0.3 0.6 Km

Conceptual Phasing Plan



Level of Service by Phase, Based on O'Keefe UEA MXDY Demand (MLD)

Impact of CFIA Expansion into 3SW



O'Keefe Urban Expansion Area Assessment

Figure 7: Impact of CFIA Expansion into 3SW- Potential Phasing of Infrastructure & Level of Service

Legend

- Pump Station (Active)
- Elevated Tank
- Reservoir
- Proposed Connection Points
- Canadian Food Inspection Agency (CFIA) Laboratory
- PS Upgrades (Phase 1)

Proposed Off-Site Watermains

- Phase 2
- Phase 3

Ottawa

0 0.25 0.5 1 Km

4.3.2.2 *Impact of CFIA Expansion into 2W*

Should the CFIA laboratory expand into 2W, off-site upgrades are needed to meet the minimum pressure LOS requirements in 3SW and in the O'Keefe UEA. Existing watermain upgrades along Fallowfield Rd (upstream of the FRPS) are needed to reduce head losses and increase resulting pressures in 3SW and in the O'Keefe UEA, to meet the minimum pressure LOS. The infrastructure needs under this scenario are listed in **Table 10**.

Table 10: Impact of CFIA Expansion into 2W – Off-Site & Additional Internal Infrastructure Needs

Phase (ID)	Description	Diameter (mm)	Length (m)	Along	From	To
C1	Existing Watermain Upgrade	1050	1,925	Fallowfield Rd	Woodroffe Ave	Wolfgang Dr

Figure 9 illustrates potential phases for the proposed infrastructure under this scenario. Each phase is assessed in terms of LOS achieved (percentage of areas experiencing PKHR minimum pressures below 40 psi) as a function of demand supplied. While under this scenario, there is capacity to supply up to ~0.5 MLD in MXDY demands within the O'Keefe UEA without any additional off-site infrastructure upgrades, these will be needed to fully service the O'Keefe UEA build out demands. As shown in **Figure 8** however, the pressure constraints under the O'Keefe UEA build out scenarios are localized to a block that is currently planned for condo developments (per the Concept Plan). Until the Fallowfield WM upstream upgrades are undertaken, mitigation measures could be implemented to supply build-out conditions. These mitigation measures could include one or a combination of the following on-site solutions:

- Adjusting grading;
- Building height restrictions;
- Servicing of higher flows using jet pumps; and,
- Oversizing services.

Should the CFIA expand into 2W, the O'Keefe UEA, when fully built-out, does not meet LOS requirements with the existing water distribution infrastructure. There is capacity to supply up to ~0.5 MLD in MXDY demands within the O'Keefe UEA without any additional off-site infrastructure upgrades, beyond which an upgrade to the existing watermain along Fallowfield Rd (upstream of the FRPS) is recommended to meet the target LOS within the O'Keefe UEA. The OPC for off-site infrastructure upgrades under this scenario is $31.5 M (see details in Section 4.4). The required off-site watermain upgrades would require additional Master Plan-level considerations to confirm the required sizing and cost recovery mechanisms. Alternatively, on-site interim measures could be implemented to mitigate the impact of low pressures.

PKHR Minimum Pressure Distribution
Impact of CFIA Expansion into 2W
w/o Off-Site Infrastructure Upgrades

Planned condo block (per Concept Plan v23)

O'Keefe Urban Expansion Area

3SW

Moodie Dr Tank

MOODIE DR

CEDARVIEW RD

FALLOWFIELD RD

PKHR Minimum Pressure Distribution
Impact of CFIA Expansion into 2W
w/ Off-Site Infrastructure Upgrades

Planned condo block (per Concept Plan v23)

O'Keefe Urban Expansion Area

3SW

Moodie Dr Tank

MOODIE DR

CEDARVIEW RD

FALLOWFIELD RD

O'Keefe Urban Expansion Area Assessment

Figure 8: Impact of CFIA Expansion into 2W - PKHR
Minimum Pressure Distribution
with & without Off-Site Infrastructure Upgrades

Legend

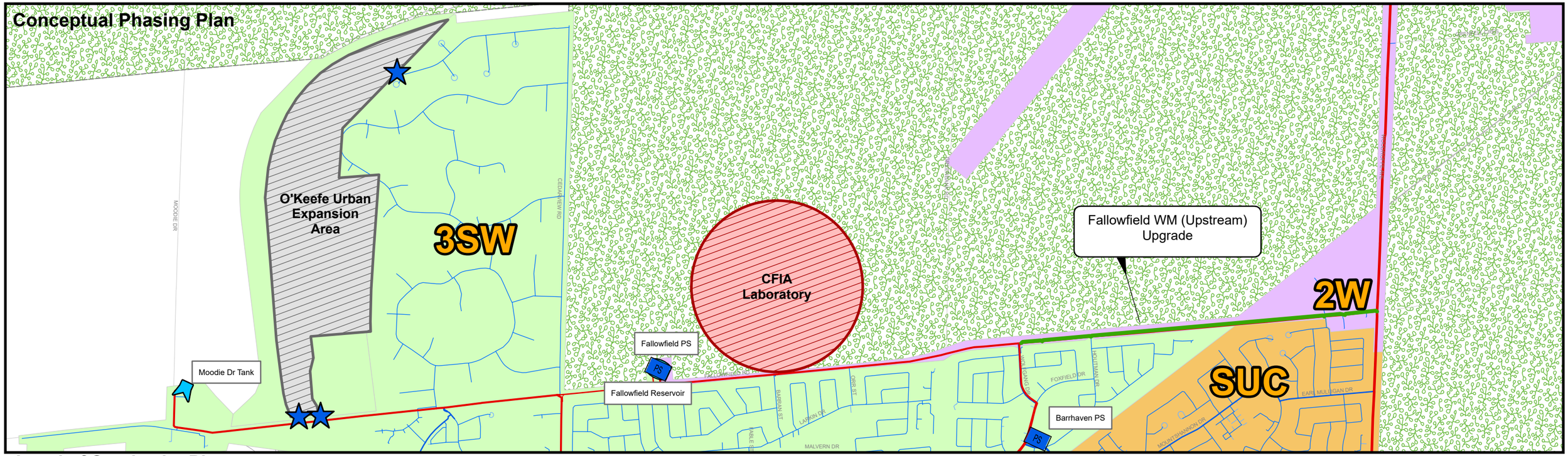
- PS — Pump Station (Active)
- Elevated Tank
- O'Keefe Urban Expansion Area
- Planned Non-Residential, Non-ICI Land Uses
- Planned Residential & ICI Land Uses

Pressures (psi)

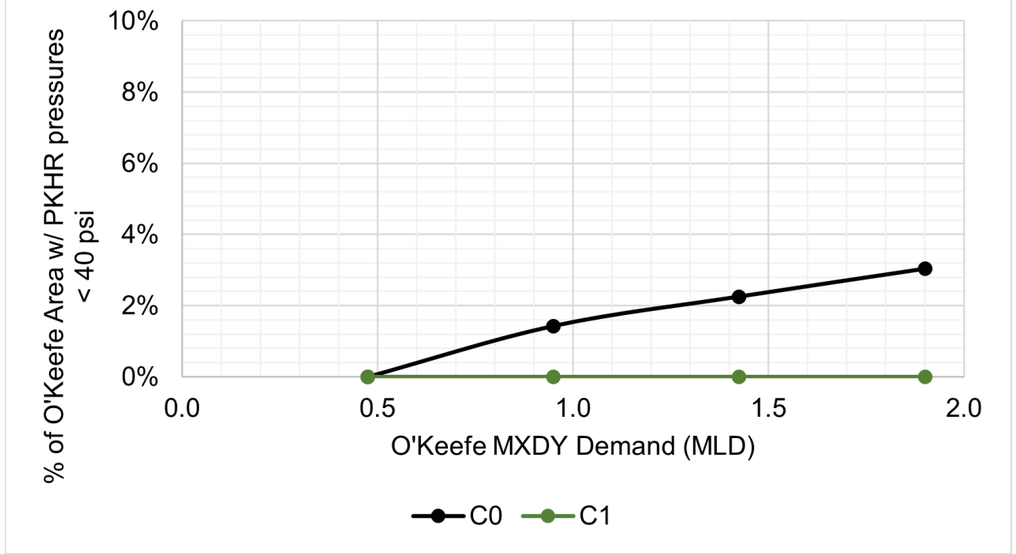
- Not Serviceable
- 0 psi < Pressure ≤ 20 psi
- 20 psi < Pressure ≤ 25 psi
- 25 psi < Pressure ≤ 30 psi
- 30 psi < Pressure ≤ 35 psi
- 35 psi < Pressure ≤ 40 psi
- 40 psi < Pressure ≤ 45 psi
- 45 psi < Pressure ≤ 50 psi
- 50 psi < Pressure ≤ 60 psi
- 60 psi < Pressure ≤ 70 psi
- 70 psi < Pressure ≤ 80 psi
- 80 psi < Pressure ≤ 85 psi
- 85 psi < Pressure ≤ 90 psi
- 90 psi < Pressure ≤ 95 psi
- 95 psi < Pressure ≤ 100 psi
- Pressure > 100 psi

Ottawa

0 0.15 0.3 0.6 Km



Level of Service by Phase, Based on O'Keefe UEA MXDY Demand (MLD)



O'Keefe Urban Expansion Area Assessment

Figure 9: Impact of CFIA Expansion into 2W - Potential Phasing of Infrastructure & Level of Service

Legend

- PS Pump Station (Active)
- Elevated Tank
- Reservoir
- Proposed Connection Points
- Canadian Food Inspection Agency (CFIA) Laboratory
- **Proposed Off-Site Watermains**
  - Phase 1

Ottawa

0 0.25 0.5 1 Km

4.4 Opinion of Probable Cost & Cost Allocation

Using the Class D costing templates developed by Ainley Graham & Associates Limited – Ainley Group for use in the 2024 IMP, OPCs were developed for each servicing scenario. The OPCs are presented in 2025$, using the 2020-2024 inflation rates established in the 2024 IMP and an assumed rate of 3% from 2024 to 2025.

Cost allocations between growth stakeholders and benefit-to-existing (BTE) were developed based on the framework outlined in the *2024 IMP Appendix H*. At the time of this assessment, the details of the mechanisms to recuperate fees for the costs allocated to growth were unknown, as this assessment does not directly support an update to the Development Charges By-Law. The BTE components were determined as follows:

- For existing watermain upgrades (replacement with upsizing) which are growth-driven and where there are no existing conditions or performance concerns, a BTE = 5% was applied;
- For existing facility upgrades which are growth-driven, the OPC for the incremental need arising from development does not have any BTE applied to it (BTE = 0%).

Table 11 presents the OPCs (in 2025$) and allocation by phase and between growth and BTE for each servicing scenario. Detailed OPC calculation sheets are provided in **Appendix B**.

The required off-site watermain upgrades would require additional Master Plan-level considerations to confirm the required sizing and cost recovery mechanisms. In the interim, on-site measures could be implemented to mitigate the impact of low pressures. Should the CFIA laboratory expand into 3SW, the City could choose to re-allocate the OPC to a pressure zone reconfiguration, which would be assessed under separate, Master Plan-level studies.

Table 11: OPCs (2025$), Potential Phasing and Preliminary Cost Allocation

Servicing Scenario	Phase (ID)	Growth (M$)	BTE (M$)	Total (M$)	Growth %	BTE %
Baseline Scenario O'Keefe UEA Servicing	**A1**	$29.9	$1.6	**$31.5**	95%	5%
	Total	**$29.9**	**$1.6**	**$31.5**	**95%**	**5%**
Impact of CFIA Laboratory Expansion into 3SW	**B1**	$1.2	-	**$1.2**	100%	-
	B2	$29.9	$1.6	**$31.5**	95%	5%
	B3	$5.1	$0.3	**$5.4**	95%	5%
	Total	**$36.2**	**$1.9**	**$38.1**	**95%**	**5%**
Impact of CFIA Laboratory Expansion into 2W	**C1**	$29.9	$1.6	**$31.5**	95%	5%
	Total	**$29.9**	**$1.6**	**$31.5**	**95%**	**5%**

4.5 Servicing Recommendations

Based on the comparison of servicing scenarios presented in **Section 4.3** and of the OPCs presented in **Section 4.4**, the O'Keefe UEA, when fully built-out, does not meet LOS requirements with the existing water distribution infrastructure. Without considering other developments, there is capacity to supply up to ~1.4 MLD in MXDY demands within the O'Keefe UEA without any additional off-site infrastructure upgrades. Should the existing CFIA laboratory site expand into 2W (to be serviced at a lower pressure than existing buildings), there is capacity to supply up to ~0.5 MLD in MXDY demands within the O'Keefe UEA. Beyond these flow rates/demands, an upgrade to the existing watermain along Fallowfield Rd (upstream of the FRPS) is recommended to meet the target LOS within the O'Keefe UEA. The OPC for these watermain upgrades is $31.5 M (see details in **Section 4.4**). The required off-site watermain upgrades would require additional Master Plan-level considerations to confirm the required sizing and cost recovery mechanisms. Alternatively, on-site interim measures could be implemented to mitigate the impact of low pressures.

4.6 Step 2 Conclusions & Recommendations

Off-site water distribution infrastructure will be needed to service the O'Keefe UEA to meet the target LOS when fully built-out. An upgrade to the existing Fallowfield Rd watermain (upstream of the FRPS) is recommended when the O'Keefe UEA MXDY demands exceed ~1.4 MLD (without any other developments in 3SW) or ~0.5 MLD (should the existing CFIA laboratory site expand into 2W).

Alternatively, depending on the planned phasing of development compared to the infrastructure implementation phases, on-site interim measures could be implemented to mitigate the impact of low pressures (e.g., adjusting grading, on-site pressure boosting, building height limitations, oversizing services). The off-site infrastructure listed in **Table 12** is needed to support these servicing scenarios:

Table 12: O'Keefe UEA Off-Site Infrastructure Needs

Phase (ID)	Description	Diameter (mm)	Length (m)	Along	From	To
A1/C1	Existing Watermain Upgrade	1050	1,925	Fallowfield Rd	Woodroffe Ave	Wolfgang Dr

With these recommended upgrades, the target LOS requirements are fulfilled. The Class D OPC for this option is $31.5 M, with 95% being allocated to growth and 5% to BTE. This OPC and the proposed allocation should be reviewed in future studies. Future assessments (functional design studies, Master Plan studies) should include considerations for the following:

- Assessment of alternative for WM upgrades (e.g., upsizing existing watermains, twinning, looping);
- Review of cost allocation and mechanisms to recuperate costs associated with growth;
- Assessing potential pressure zone reconfiguration between 3SW, SUC and 2W to re-allocate demands and increase available pumping capacity.

Stantec Consulting Ltd.

Prepared by:

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Date: 2025.05.30 12:02:14 -04'00'

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Water Resources Engineer

Phone: 343 996 7086
Christene.Razafimaharo@stantec.com

Reviewed by:

Digitally signed by Jasmin Sidhu, P.Eng.
Date: 2025.05.30 12:05:35 -04'00'

Jasmin Sidhu P.Eng.
Senior Water Resources Engineer

Phone: 613 725 5553
Jasmin.Sidhu@stantec.com

Approved by:

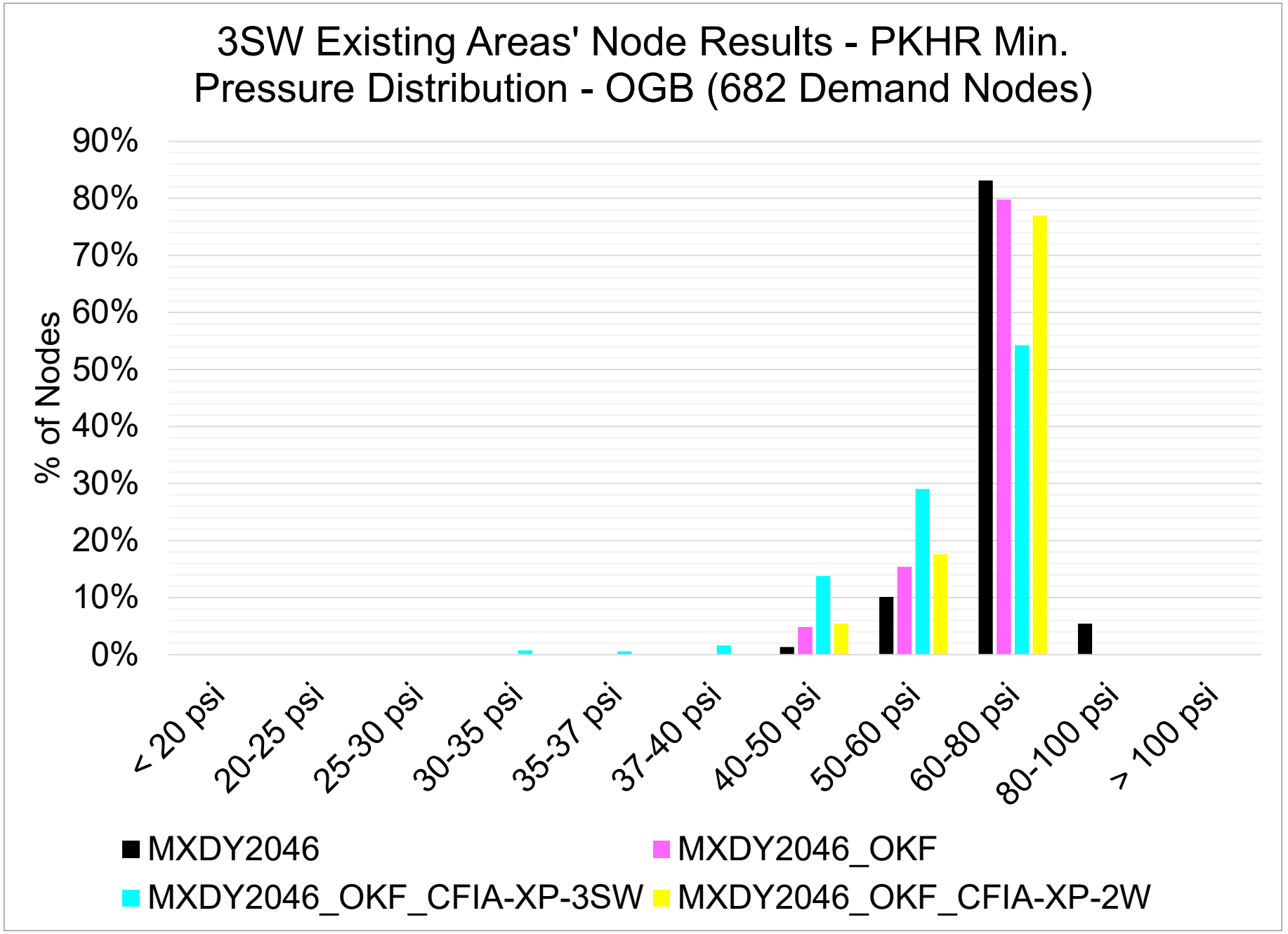
Digitally signed by Kevin Alemany
Date: 2025.05.30 12:08:02 -04'00'

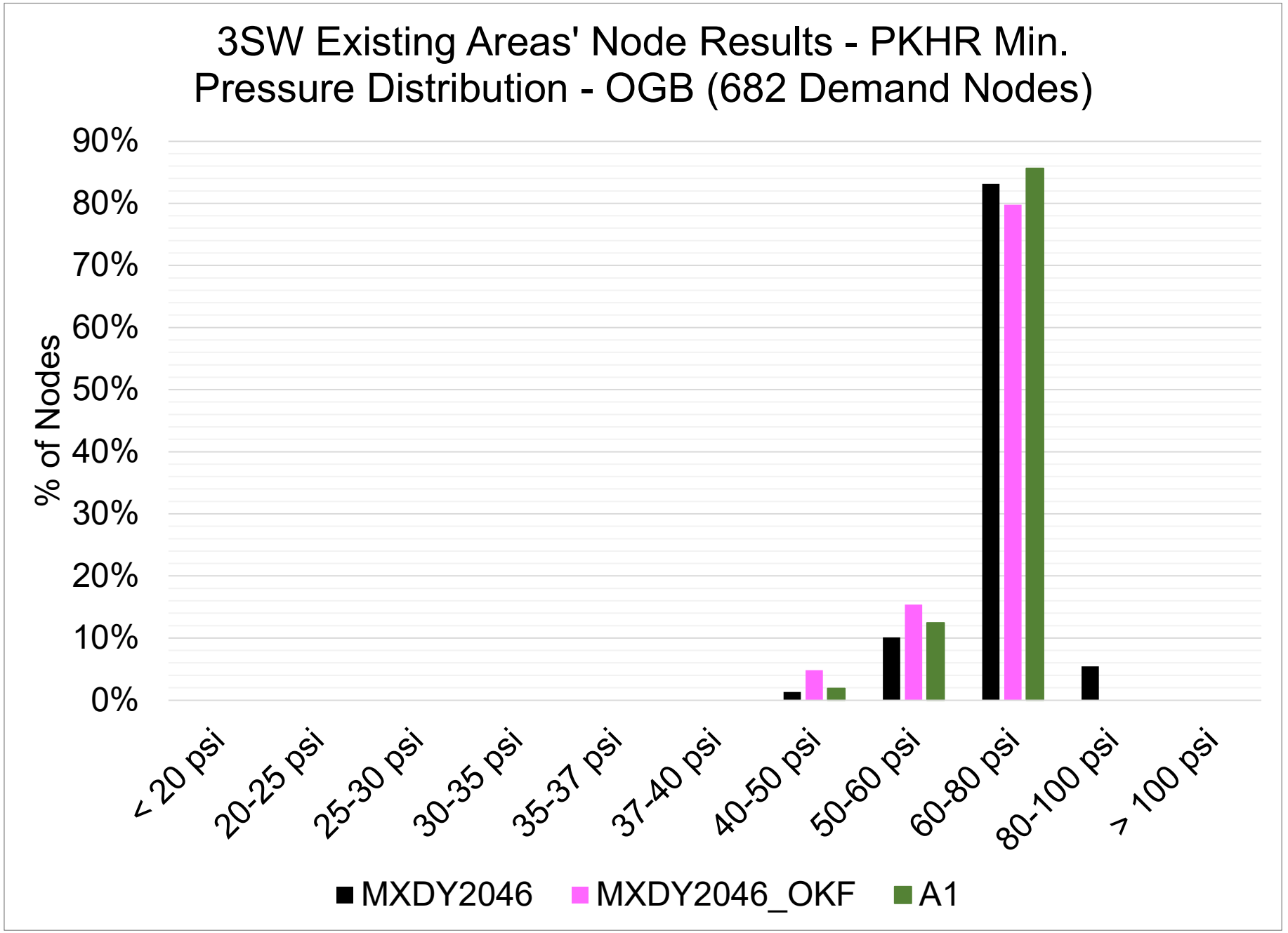
Kevin Alemany M.A.Sc., P. Eng.
Senior Principal, Potable Water Systems Lead, Urban Water Resources

Phone: 613 724 4091
Kevin.Alemany@stantec.com

Attachments: Appendix A: Hydraulic Modelling Results: PKHR Minimum Pressure Distribution (Existing Service Areas)
Appendix B: Opinions of Probable Costs

Appendix A Hydraulic Modelling Results: PKHR Minimum Pressure Distribution (Existing Service Areas)


3SW Existing Areas' Node Results - PKHR Min. Pressure Distribution - OGB (682 Demand Nodes)
% of Nodes
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
< 20 psi
20-25 psi
25-30 psi
30-35 psi
35-37 psi
37-40 psi
40-50 psi
50-60 psi
60-80 psi
80-100 psi
> 100 psi
MXDY2046
MXDY2046_OKF
MXDY2046_OKF_CFIA-XP-3SW
MXDY2046_OKF_CFIA-XP-2W


3SW Existing Areas' Node Results - PKHR Min. Pressure Distribution - OGB (682 Demand Nodes)
% of Nodes
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
< 20 psi
20-25 psi
25-30 psi
30-35 psi
35-37 psi
37-40 psi
40-50 psi
50-60 psi
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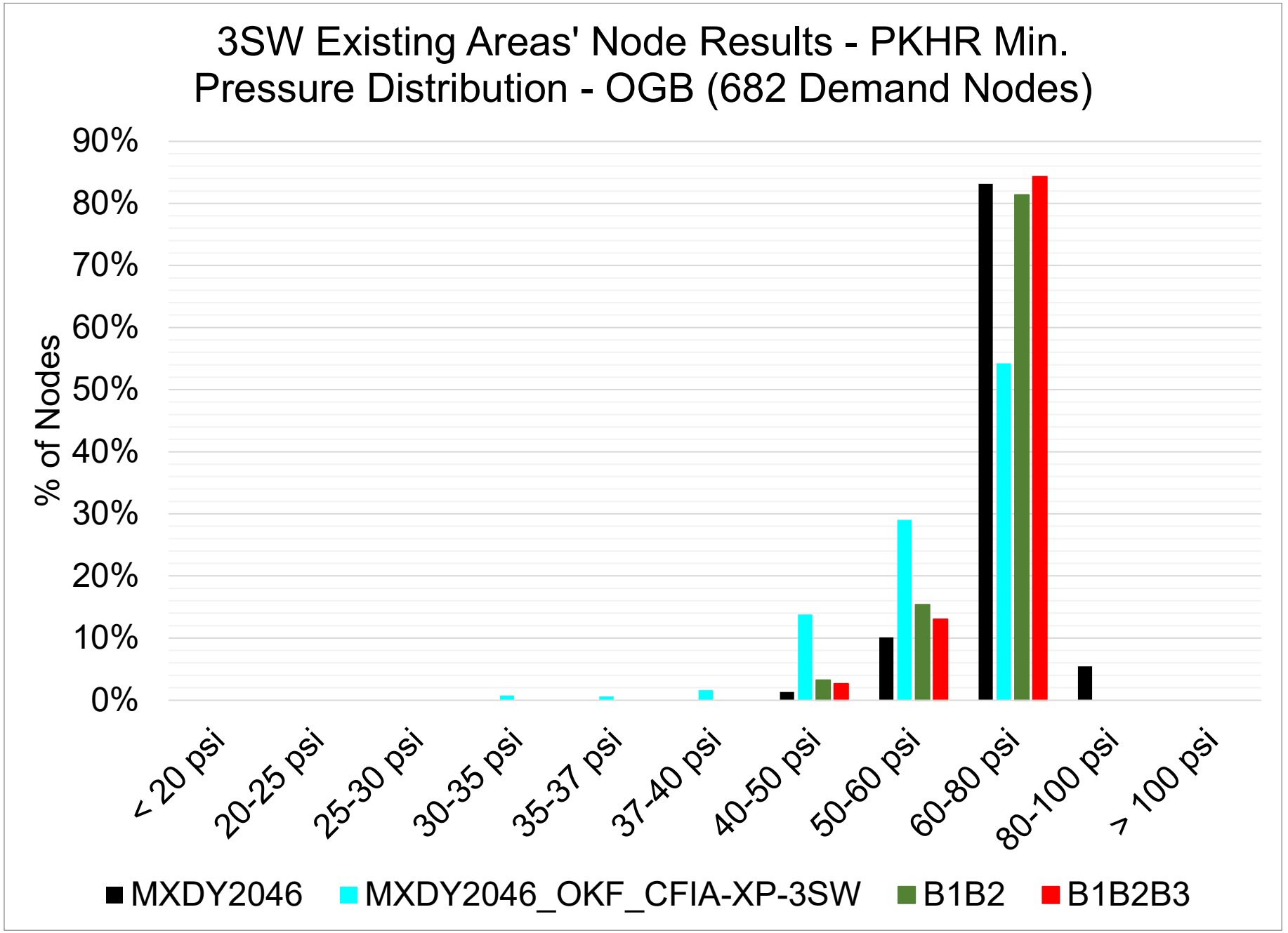
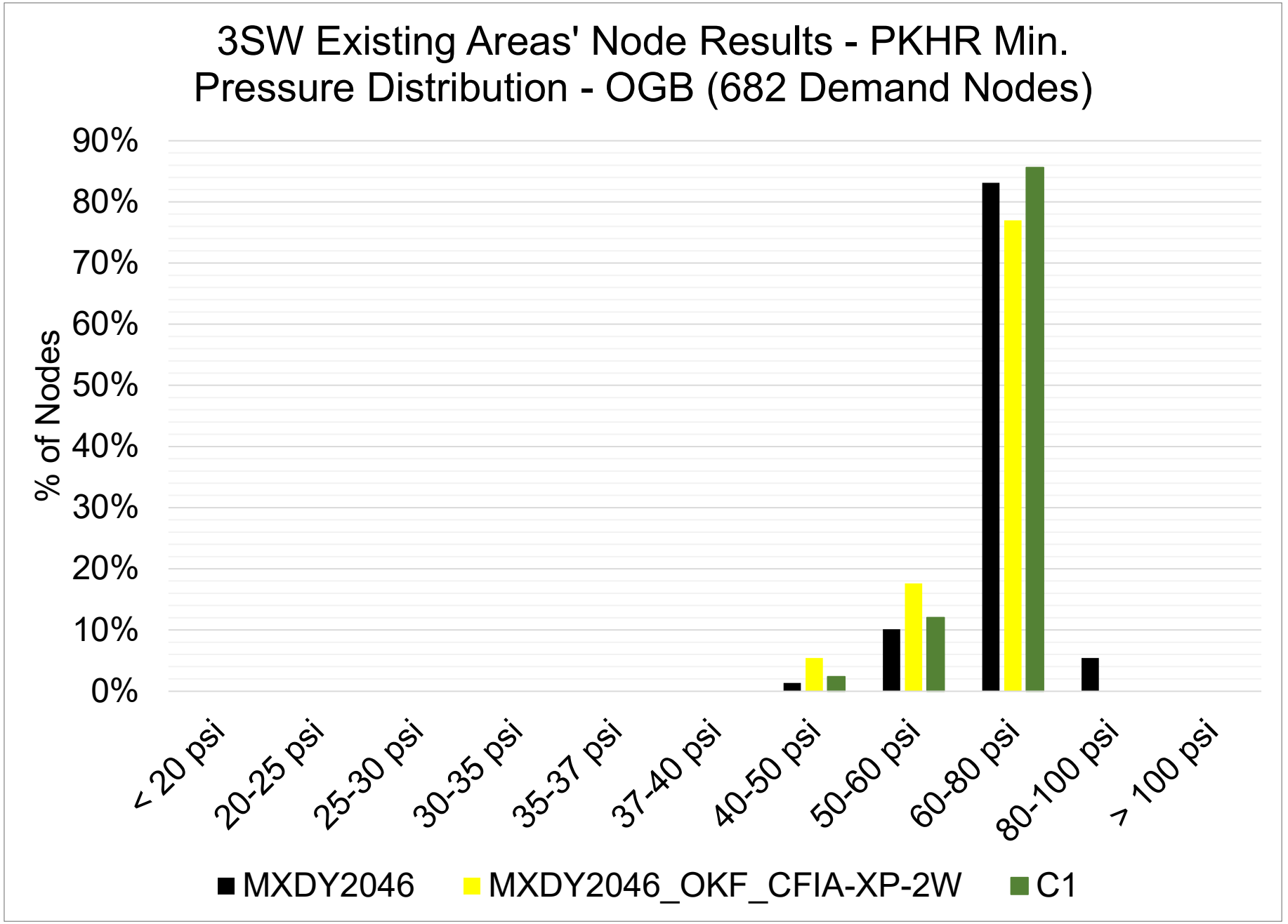
> 100 psi
MXDY2046
MXDY2046_OKF
A1


3SW Existing Areas' Node Results - PKHR Min. Pressure Distribution - OGB (682 Demand Nodes)
% of Nodes
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
< 20 psi
20-25 psi
25-30 psi
30-35 psi
35-37 psi
37-40 psi
40-50 psi
50-60 psi
60-80 psi
80-100 psi
> 100 psi
MXDY2046
MXDY2046_OKF_CFIA-XP-3SW
B1B2
B1B2B3


3SW Existing Areas' Node Results - PKHR Min. Pressure Distribution - OGB (682 Demand Nodes)
% of Nodes
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
< 20 psi
20-25 psi
25-30 psi
30-35 psi
35-37 psi
37-40 psi
40-50 psi
50-60 psi
60-80 psi
80-100 psi
> 100 psi
MXDY2046
MXDY2046_OKF_CFIA-XP-2W
C1

Appendix B Opinions of Probable Costs

Date: 5/30/2025

Asset Management
Infrastructure Planning Unit

Infrastructure Category:	**Pump Station**
Project Type:	**Pump Station**
Project Title:	Fallowfield Reservoir PS Upgrade for 3SW
Project Phase:	**Conceptual Design**
SAP Project Number:	TBD
Project Location:	Refer to report figures

Project Location Map:
Refer to report figures for project location

Project Description
Add +2.8 MLD (+32.4 L/s) of pumping capacity (replace existing pumps)

FINAL - 2020 - CLASS D - ESTIMATED - CONSTRUCTION COSTS (No HST):	**$379,454**

Class D Capital Cost Components and Risk Factors

Item	Percentage	Yes/No = 1/0	Estimated Cost
Capital Cost Components*			
Engineering - Design, Contract Adm. (15% - 25%)	20.0%	1	$75,891
Utilities (5% - 20%)	5.0%	1	$18,973
Property - REPDO Estimate (1% - 10%)	1.0%	1	$3,795
City Internal Costs (7% - 10%)	8.5%	1	$32,254
Misc. Soft Costs - Permit, Public Art, etc. (5%)	5.0%	1	$18,973
Risk Factors**			
Geo-Tech Issues - Soil (1% - 5%)	1.0%	1	$3,795
Geo-Tech issues - Bedrock (1% - 5%)	1.0%	1	$3,795
Geo-Tech Issues - Grey Silty Clay (1% - 10%)	0.0%	0	$0
Special Hydro-Geo Conditions (1% - 5%)	1.0%	1	$3,795
Change in Design Standards (1% - 5%)	1.0%	1	$3,795
Construction Contract Duration (2% per year)	2.0%	1	$7,589
Species at Risk and Project Mitigation (1% - 5%)	1.0%	1	$3,795
Planning, Design and Land use Approvals (5% - 10%)	5.0%	1	$18,973
Provincial and Federal Environmental Assessments (5% - 10%)	0.0%	0	$0
CONSTRUCTION COST AND CAPITAL COST COMPONENTS SUBTOTAL:			**$529,338**
RISK FACTORS SUBTOTAL:			**$45,534**
OVERALL CLASS D CONTINGENCY (40%-50%) * **	**40%**	**1**	**$211,735**
FINAL - 2020 - CLASS D - ESTIMATED TOTAL CAPITAL COST (No HST):			**$786,608**

*** Capital Cost Components Percentage Allowance Range as per City 2013 PDR**
**** Risk Factors Percentage Allowance to be Applied Based on the Project Complexity**
***** Overall Contingency is Applied to Estimated Construction and Capital Cost Components**

Project Related Comments:

COST INFLATION CHART

Year	Inflation % per Year	Yearly Total Cost Projection
2021	17%	$921,905
2022	10%	$1,013,173
2023	7.8%	$1,092,201
2024	5.79%	$1,155,439
2025	3%	$1,190,102
2026	3%	$1,225,806
2027	3%	$1,262,580
2028	3%	$1,300,457
2029	3%	$1,339,471
2030	3%	$1,379,655
2031	3%	$1,421,045
2032	3%	$1,463,676
2033	3%	$1,507,586
2034	3%	$1,552,814
2035	3%	$1,599,398
2036	3%	$1,647,380
2037	3%	$1,696,802
2038	3%	$1,747,706
2039	3%	$1,800,137
2040	3%	$1,854,141
2041	3%	$1,909,765
2042	3%	$1,967,058
2043	3%	$2,026,070
2044	3%	$2,086,852
2045	3%	$2,149,457
2046	3%	$2,213,941

City of Ottawa	Water Booster Station 500 L/s - Greenfield FINAL - Class D - Construction Cost Estimating Template
	Fallowfield Reservoir PS Upgrade for 3SW

A. Division Description	Costs
Division 1 - General Requirements	$15,600
Division 2 - Site Work	$0
Division 3 - Concrete	$0
Division 4 - Masonry	$0
Division 5 - Metals	$0
Division 6 - Wood and Plastics	$0
Division 7 - Thermal and Moisture Protection	$0
Division 8 - Doors and Windows	$0
Division 9 - Finishes	$0
Division 10 - Specialties	$0
Division 11 - Equipment	$91,104
Division 12 - Furnishings	$0
Division 14 - Conveying Systems	$0
Division 15 - Mechanical	$52,500
Division 16 - Electrical & Communication	$220,250
2020 - Class D - Estimated Construction Costs (No HST):	**$379,454**

Estimate Note:

The Construction Cost Estimating Template for 500 L/s Water Booster Station has been prepared for guidance in project evaluation and implementation from the information available at the time of the 2020 unit prices.

NOTE:	ADJUST QUANTITIES/UNIT COSTS AS REQUIRED

Division 1, General Requirements

Item No:	Description	Qty	Unit	Unit Cost	Costs
D1.1	Field office for Contract Administrator 35m2 to 70m2	6	wk	$1,000	$6,000
D1.2	Mobilization and Demobilization	1	LS	$5,000	$5,000
D1.3	Commissioning & Training and O & M Manuals & Record Drawings	1	LS	$1,700	$1,700
D1.4	Erosion and Sediment Control Measures	1	LS	$800	$800
D1.5	Traffic Control Plan	1	LS	$400	$400
D1.6	Pre-Construction Inspection	1	LS	$200	$200
D1.7	Construction Site Safety Management and Control	1	LS	$400	$400
D1.8	1.8m High Construction Interlock Safety Fencing	1	LS	$1,100	$1,100
	Subtotal Construction Costs Division 1:				**$15,600**

Division 2 - Site Work

Item No:	Description	Qty	Unit	Unit Cost	Cost
D2.1	Clearing and Grubbing	0	LS	$0	$0
D2.2	Removal & Disposal of Clearing and Grubbing Materials	0	LS	$0	$0
D2.3	Sheeting and Shoring of Excavations	0	LS	$0	$0
D2.4	Excavating, Backfilling, and Compacting	0	LS	$0	$0
D2.5	Earthworks & Site Grading, Including Imported Backfill Material	0	LS	$0	$0
D2.6	Unshrinkable Backfill	0	m^3	$0	$0
D2.7	Hydro Underground Service	0	LS	$0	$0
D2.8	Telephone Underground Service	0	LS	$0	$0
D2.9	Sub-Drain	0	LS	$0	$0
D2.10	Underground Yard Piping for Washroom Potable Water Service and Sanitary Service	0	LS	$8,000	$0
D2.11	Supply and Install 300 mm diameter Concrete Pressure ClassCL C303 Watermain c/w all Appurtenances and Mechanical Restraints and Connections on the Site	0	m	$4,500	$0
D2.12	Connections to Existing Watermains	0	ea	$25,000	$0
D2.13	Access, Air Release and Drain-Out Valve Chamber	0	LS	$80,000	$0
D2.14	Water Pressure Reducing Valve Chamber	0	LS	$80,000	$0
D2.15	Underground Yard Piping - Storm Drainage	0	LS	$0	$0
D2.16	Supply and Install Watermain Insulation	0	LS	$0	$0
D2.17	Natural Gas Service and Coordination	0	LS	$0	$0
D2.18	Pump House & Reservoir Asphalt Access Driveway & Parking Area	0	LS	$0	$0
D2.19	1.82 Chain-link Security Fencing with Top Rail as per OPSD 972.102 and 3m wide Swing Gate OPSD 972.102 with locking hardware	0	LS	$0	$0
D2.20	Topsoil & Sod and Landscaping & Plantings	0	LS	$0	$0
	Subtotal Construction Costs Division 2:				**$0**

Division 3 - Concrete Work					
Item No:	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
D3.1	Cast-in-place Concrete, including Forming & Reinforcing of Structural Concrete Foundation, including Slabs on Grade, Footings, Floor Slabs, Beams, Columns, Walls, Working Slabs, Pipe and Equipment Supports, Cutting and Coring for Water Booster Station Building	0	LS	$0	$0
D3.2	Miscellaneous 30MPa Concrete, Formed, where not otherwise Provided	0	m3	$0	$0
D3.3	Miscellaneous Reinforced 30MPa Concrete, Formed, where not otherwise Provided	0	m3	$0	$0
D3.4	Reinforced Concrete100% Containment Curb for Standby Generator & Reinforced Concrete100% Containment Crib Box for Fuel Tank at Water Booster Station Building	0	LS	$0	$0
D3.5	Concrete Foundations for Communications /Alarms Tower	0	LS	$0	$0
D3.6	Concrete Footings for Chain-link Fence Posts	0	LS	$0	$0
	Subtotal Construction Costs Division 3:				**$0**
Division 4 - Masonry					
Item No:	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
D4.1	Masonry & Bricks, including supply and placing all Masonry & Bricks Units for Water Booster Station Building	0	LS	$0	$0
	Subtotal Construction Costs Division 4:				**$0**
Division 5 - Metals					
Item No:	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
D5.1	Metal Roofing, Metal Flashings and Metal Fascia Water Booster Station Building	0	LS	$0	$0
D5.2	Structural Steel including Fabrication, Supply and Installation of Beams, Columns, Open Web Steel Joists, Crane Beams and Rails, Steel Stairs & Landings with Handrailing, Metal Grating, Ladders, Ladders with Fall Arrest System, Equipment Frames, Access Hatches, Vents, and all other Miscellaneous Metals, including but not limited to Bolts, Brackets, etc. and the supply of Window and Door Lintels. Water Booster Station Building	0	LS	$0	$0
	Subtotal Construction Costs Division 5:				**$0**
Division 6 - Wood & Plastics					
Item No:	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
D6.1	Wood and Plastics, including Roof Trusses and all Carpentry	0	LS	$0	$0
	Subtotal Construction Costs Division 6:				**$0**
Division 7 - Thermal and Moisture Protection					
Item No:	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
D7.1	Waterproofing Membrane for Exterior Below Grade Surfaces Thermal and Moisture Protection including Corrosion Protection, Rigid Board Insulation, Vapour Barriers, Trim Sealants, Construction Joint Watertight Sealer, etc.Water Booster Station Building	0	LS	$0	$0
D7.2	Waterproofing and Sealing of Concrete Containment Slab & Curb around the Diesel Generator and Waterproofing and Sealing of Concrete Containment Slab & Crib around Fuel Tank	0	LS	$0	$0
	Subtotal Construction Costs Division 7:				**$0**
Division 8 - Doors and Windows					
Item No:	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
D8.1	Doors, and Windows including Framing, Hollow Metal Doors, Roll-Up Door, Metal Flashing and Hardware for Water Booster Station Building	0	LS	$0	$0
	Subtotal Construction Costs Division 8:				**$0**

Division 9 - Finishes					
Item No:	Description	Qty	Unit	Unit Cost	Cost
D9.1	Finishes, including Wall Finishes, Floor Finishes, Ceiling, Painting	0	LS	$0	$0
				Subtotal Construction Costs Division 9:	**$0**
Division 10 - Specialities					
Item No:	Description	Qty	Unit	Unit Cost	Cost
D10.1	Washroom Hot Water Tank, Sink, Toilet, Mirror, Fan and all Piping and Accessories	0	LS	$0	$0
D10.2	Seismic Restraints	0	LS	$0	$0
D10.3	Fire Proofing	0	LS	$0	$0
				Subtotal Construction Costs Division 10:	**$0**
Division 11 - Equipment					
Item No:	Description	Qty	Unit	Unit Cost	Cost
D11.01	Equipment General Requirements	0	LS	$0	$0
D11.02	Five (5) Centrifugal Pumps - , Four Duty and One Standby Sized to meet the maximum flow of **300 L/s**. The Pumps will operate on an alternating duty basis.	5	ea	$7,130	$35,650
D11.03	Pressure under no-flow or minimum-flow conditions controlled by a Low Flow Protection Pressure Tank	1	LS	$454	$454
D11.04	Air Release and Drain Valves	0	ea	$0	$0
D11.05	Backflow Preventer Valve	0	ea	$0	$0
D11.06	Water Pressure Reducing Valve	0	ea	$0	$0
D11.07	Chemical Feed Equipment c/w Pumps, Chemical Storage Tank, Miscellaneous Pipe/Tube/Fittings	1	LS	$40,000	$40,000
D11.08	Chemical Analyzer	1	LS	$15,000	$15,000
				Subtotal Construction Costs Division 11:	**$91,104**
Division 12 - Furnishings					
D12.1	Storage Shelves for Drawings in Water Booster Station Building	0	LS	$0	$0
D12.2	Desk & Chair, Cabinet in Water Booster Station Building	0	LS	$0	$0
				Subtotal Construction Costs Division 12:	**$0**
Division 14 - Conveying Systems					
Item No:	Description	Qty	Unit	Unit Cost	Cost
D14.1	Lifting Equipment including all Gantry and Davit Cranes, Lifting Davits and other Specified Lifting Equipment	0	LS	$0	$0
				Subtotal Construction Costs Division 14:	**$0**
Division 15 Mechanical					
Item No:	Description	Qty	Unit	Unit Cost	Cost
D15.01	304L SS Process Piping and Valves including Supply an Installation of all Process Piping, Valves, Fittings, Couplings, Restraints, Adjusting, Testing, Disinfection	0.15	LS	$350,000	$52,500
D15.02	Flowmeters and Transmitters	0	LS	$0	$0
D15.03	Building Mechanical including Drainage, Heating, Ventilation, Air Conditioning, Equipment, and Controls.	0	LS	$0	$0
				Subtotal Construction Costs Division 15:	**$52,500**

Division 16 - Electrical & Communications					
Item No:	Description	Qty	Unit	Unit Cost	Cost
D16.01	Electrical General Requirements	0	LS	$0	$25,000
D16.02	Electrical Supply for Five (5) Centrifugal Pumps with VFD Drive with Electric Valve Actuators and Related Equipment	0.15	LS	$300,000	$45,000
D16.03	Electrical Power Supply Feeds and Conduit, MCCs, Soft Starters, Distribution for the Works, Interior Lighting, Receptacles, Security Systems, Base Board Heater, and Complete Wiring of all Instruments and Equipment	0.15	LS	$400,000	$60,000
D16.04	Supply and Install Communication Tower, Antenna/Dish, Supply, Install, Terminate & Test Coax w/ Cable & Conduit and Cisco AirNet 1200 System	0	LS	$0	$0
D16.05	Instrumentation and Control including PLCS, HMI, SCADA Programming and Control Panel, Radio Equipment, all level and Pressure Sensors and Transmitters, Chlorination System Alarms, Smoke and CO Detectors and Alarms, MCC Power Metering Instrumentation.	0.15	LS	$185,000	$27,750
D16.06	Supply and Install Stand-By Emergency Diesel Generator, including Transfer Switch, DG Exhaust Code Requirements and Fuel Tank (See Division 3 for Containment Crib and Curb)	0.15	LS	$250,000	$37,500
D16.07	Lighting Pole (3.3m ht), 2 x Brackets and 2 x 70 Watt HPS Specialty Flat Glass Luminaire with Photo - Controller for Security and Maintenance	0	ea	$0	$0
D16.08	Arc Flash Study, Coordination Study and Harmonic Analysis	0	LS	$0	$0
D16.09	Auto dialer with Panel, System Controller, Power Supply Module, Programming Keypad, Telephone Line Surge Protector, Supply, Install, Terminate & Test DI/O w/Cable & Conduit	1	LS	$25,000	$25,000
				Subtotal Construction Costs Division 16:	**$220,250**
				FINAL 2020 - CLASS D - ESTIMATED CONSTRCTION COSTS (No HST):	**$379,454**

Date: 5/30/2025

Asset Management

Infrastructure Planning Unit

Infrastructure Category:	**Watermain**
Project Type:	**Trunk Watermain and Appurtenances**
Project Title:	**Fallowfield WM Upgrade**
Project Phase:	**Conceptual Design**
SAP Project Number:	TBD
Project Location:	Refer to report figures for project location

Project Location Map:
Refer to report figures for project location

Project Description
1067mm diam. WM along Fallowfield Rd from Woodroffe Ave to Wolfgang Dr

FINAL - 2020 - CLASS D - ESTIMATED CONSTRUCTION COSTS (NO HST):	**$9,024,547**

CAPITAL COST COMPONENTS AND RISK FACTORS

Item	Percentage**	Yes/No = 1/0	Estimated Cost
Capital Cost Components*		**Change as Required**	
Engineering - Design, Contract Adm. (15% - 25%)	20.0%	1	$1,804,909
Utilities (5% - 20%)	15.0%	1	$1,353,682
Property - REPDO Estimate (1% - 10%)	1.0%	1	$90,245
City Internal Costs (7% - 10%)	8.5%	1	$767,086
Misc. Soft Costs - Permit, Public Art, etc. (5%)	5.0%	1	$451,227
Risk Factors**			
Geo-Tech Issues - Soil (1% - 10%)	10.0%	1	$902,455
Geo-Tech issues - Bedrock (1% - 5%)	5.0%	1	$451,227
Geo-Tech Issues - Grey Silty Clay (1% - 10%)	0.0%	0	$0
Special Hydro-Geo Conditions (1% - 10%)	5.0%	1	$451,227
Change in Design Standards (1% - 5%)	0.0%	0	$0
Construction Contract Duration (2% per year)	0.0%	0	$0
Species at Risk and Project Mitigation (1% - 5%)	1.0%	1	$90,245
Planning, Design and Land use Approvals (5% - 10%)	0.0%	0	$0
Provincial and Federal Environmental Assessments (5% - 10%)	0.0%	0	$0
CONSTRUCTION COST AND CAPITAL COST COMPONENTS SUBTOTAL:			**$13,491,697**
RISK FACTORS SUBTOTAL:			**$1,895,155**
OVERALL CLASS D CONTINGENCY (40%-50%) * **	**40%**	**1**	**$5,396,679**
FINAL - 2020 - CLASS D - ESTIMATED TOTAL CAPITAL COST (No HST):			**$20,783,531**

*** Capital Cost Components Percentage Allowance Range as per City 2013 PDR**

**** Risk Factors Percentage Allowance to be Applied Based on the Project Complexity**

***** Overall Contingency is Applied to Estimated Construction and Capital Cost Components**

Project Related Comments:

COST INFLATION CHART

Year	Inflation % per Year	Yearly Total Cost Projection
2021	17.2%	$24,358,298
2022	9.9%	$26,769,770
2023	7.8%	$28,857,812
2024	5.79%	$30,528,679
2025	3%	$31,444,540
2026	3%	$32,387,876
2027	3%	$33,359,512
2028	3%	$34,360,297
2029	3%	$35,391,106
2030	3%	$36,452,839
2031	3%	$37,546,425
2032	3%	$38,672,817
2033	3%	$39,833,002
2034	3%	$41,027,992
2035	3%	$42,258,832
2036	3%	$43,526,597
2037	3%	$44,832,395
2038	3%	$46,177,366
2039	3%	$47,562,687
2040	3%	$48,989,568
2041	3%	$50,459,255
2042	3%	$51,973,033
2043	3%	$53,532,224
2044	3%	$55,138,190
2045	3%	$56,792,336
2046	3%	$58,496,106

CITY OF OTTAWA	Trunk Watermains (300mm, 400mm, 600mm, 750mm & 900mm) FINAL - 2020 - Class D - Construction Cost Estimating Template Fallowfield WM Upgrade

Estimate Note:
This Construction Cost Estimate Template for Trunk Watermains has been prepared for guidance in project evaluation and implementation from the information available at 2020 unit cost prices.

NOTE	ADJUST QUANTITIES/UNIT PRICES AS REQUIRED

Section A - General						
Code	**Spec**	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
A010		**Field Office**				
A010.01	F-1001	Field office for Contract Administrator 35-70m2	132	wk	$1,000	$132,333
A020		**TRAFFIC CONTROL PLAN**				
A020.01	F-1010	Traffic Control Plan	132	wk	$1,000	$132,333
A020.02	F-1012	Police Assistance at Intersection	96	hr	$280	$26,880
A030		**PEDESTRIAN CONTROL**				
A030.01	F-1013	Construction Site Pedestrian Control Implementation	1	LS	$113,100	$113,100
A040		**EROSION & SEDIMENT CONTROL**				
A040.01	805, F-1004	Erosion and Sediment Control Plan and Monitoring	1	LS	$14,700	$14,700
A040.03	805, F-1004	Erosion and Sediment Control Measures	1	LS	$37,300	$37,300
A060		**PRE-CONSTRUCTION INSPECTION**				
A060.01	F-1011	Pre-Construction Inspection	1	LS	$37,300	$37,300
A999		**Non-Standard Items**				
A999.01	GC 6.04	Construction Site Health and Safety Management and Control	1	LS	$113,100	$113,100
					Sub-Total Section A:	**$607,047**

Section G - Watermains						
G010		**EXCAVATION AND BACKFILL**				
G010.02	401, 441,F-4411, F-7010	Additional excavation & backfill with 50mm clear stone	0	m^3	$75	$0
G020		**SELECT SUBGRADE MATERIAL**				
G020.01	212, 314, F-2120, F-3147	Select subgrade material for Trench Backfill	0	m^3	$50	$0
G030		**WATERMAIN - PVC PIPE**	**1,925**			
G030.05	441, F-4411, F-4412, F-4491, F-4492, F-4493, F-4494	300mm watermain, PVC, CL 150, DR-18 including all appurtenances	0	m	$800	$0
G030.06	441, F-4411, F-4412, F-4491, F-4492, F-4493, F-4494	400mm watermain, PVC, CL 150, DR-18 including all appurtenances	0	m	$1,000	$0
G050		**WATERMAIN - CONCRETE PRESSURE PIPE**				
G050.01	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	400mm watermain, concrete pressure pipe, CL C303 including all appurtenances	0	m	$1,200	$0
G050.02	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	600mm watermain, concrete pressure pipe, CL C301 including all appurtenances	0	m	$1,500	$0
G050.03	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	750mm watermain, concrete pressure pipe, CL C301 including all appurtenances	0	m	$2,000	$0
G050.04	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	1050mm watermain, concrete pressure pipe, CL C301 including all appurtenances	1875	m	$3,200	$6,000,000
G070		**VALVE AND VALVE CHAMBER**	**5**			
G070.04	F-4411 ,F-4413, F-4491, F-4492, F-4493, F-4494	300mm Gate valve,valve chamber, W3	0	ea	$9,500	$0

G080		**BUTTERFLY VALVE AND VALVE CHAMBER**				
G080.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	400mm Butterfly valve,W5 & valve chamber, W2	0	ea	$20,000	$0
G080.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	600mm Butterfly valve,W5 & valve chamber, W2	0	ea	$35,000	$0
G080.03	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	750mm Butterfly valve,W5 & valve chamber, W2	0	ea	$50,000	$0
G080.04	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	1050mm Butterfly valve,W5 & valve chamber, W2	5	ea	$80,000	$400,000
G090		**VALVE CHAMBER ONLY FOR TVS**				
G090.05	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	1500mm Valve Chamber (Only) FOR 300mm TVS per W4	0	ea	$10,000	$0
G090.05	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	R-1 valve chamber (only) for TVS(any size) off 400mm watermain, W10	0	ea	$12,000	$0
G100		**MISCELLANEOUS VALVE CHAMBER**				
G100.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	610mm access, air relief and drain out valve chamber type R-1 per W10	0	ea	$20,000	$0
G100.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	Automatic Flushing Chamber per W3.2	0	ea	$10,000	$0
G110		**BRANCH VALVE CHAMBER**				
G110.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	Branch Valve chamber type R-3 off 600mm watermain per W11	0	ea	$35,000	$0
G110.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	Branch Valve chamber type R-3 off 900mm watermain per W11	0	ea	$65,000	$0
G120		**LINE VALVE CHAMBER**				
G120.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	600mm Line valve chamber Type R-3 per W12	0	ea	$80,000	$0
G120.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	900mm Line valve chamber Type R-3 per W12	0	ea	$120,000	$0
G130		**BRANCH AND LINE VALVE CHAMBER**				
G130.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	600mm Line & (150mm - 400mm) Branch Valve Chamber Type R-4 per W13	0	ea	$120,000	$0
G130.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	900mm Line & (150mm - 400mm) Branch Valve Chamber Type R-4 per W13	0	ea	$150,000	$0
G140		**HYDRANTS**				
G140.01.	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	Hydrant W19	0	ea	$7,000	$0
G140.02	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	Hydrant W20 Complete with Ditch Culvert	0	ea	$6,500	$0
G140.03	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	150 mm Hydrant lateral DI CL52 or PVC CL150, DR-18	0	m	$350	$0
G140.04	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	150 mm Hydrant lateral DI, CL52 or PVC CL 150 DR18, including reinstatement	0	m	$500	$0
G170		**TEMPORARY OVERLAND SERVICES**				
G170.999.01	F-4411, F4416, F-4491, F-4492 F-4493, F-4494	Temporary Service Connections - Supply, Installation & Protection	0	ea	$700	$0
G180		**TRENCH REINSTATEMENT (ALL INCLUSIVE PRICE METHOD)**				
G180.02	F-4411, F-4419, F4491, F-4492. F-4493, F4494	Trench Reinstatement - Existing Road(All Inclusive Method)	1,875	m	$500	$937,500
G180.03	F-4411, F-4419, F4491, F-4492, F-4493, F4494	Trench Reinstatement - Green Field (All Inclusive Method)	0	m^2	$100	$0

G999		TRENCHLESS CONSTRUCTION				
G999.01	450, F-4491, F-4492, F-4493, F-4494	Entry and Exist Pits for Trenchless Comstrction (All Inclusive)	2	ea	$15,000	$30,000
G999.02	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 750mm Steel Casing Pipe by Boring & Jacking	0	m	$8,000	$0
G999.03	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 400mm Concrete Pressure Pipe Watermain Class C303 inside the 750mm Steel Casing, including Spacers and Flowable Grout	0	m	$2,000	$0
G999.04	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 1000mm Steel Casing Pipe by Boring & Jacking	0	m	$10,000	$0
G999.05	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 600mm Concrete Pressure Pipe Watermain Class C301 inside the 1000mm Steel Casing, including Spacers and Flowable Grout	0	m	$3,000	$0
G999.06	450, F-4491, F-4492, F-4493, F-4494	Supply and Install >1500mm Steel Casing Pipe by Boring & Jacking	50	m	$15,500	$775,000
G999.07	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 1050mm Concrete Pressure Pipe Watermain Class C301 inside the >1500 mm Steel Casing, including Spacers and Flowable Grout	50	m	$5,500	$275,000
					Sub-Total Section G:	**$8,417,500.00**
Section U - Labour and Equipment						
UO10		**Labour**				
U010.01	127, F-8025	Unskilled labour (including supervision where not otherwise provided)	0	hr	$70	$0
U010.02	127, F-8025	Skilled labour (including supervision where not otherwise provided)	0	hr	$75	$0
U020		**Equipment**				
U020.01	127, F-8026	Bulldozer, 45 kW min (D3) (operated)	0	hr	$135	$0
U020.02	127, F-8026	Crawler mounted hydraulic backhoe, 24,500 kg minimum operating weight (Operated)	0	hr	$175	$0
U020.03	127, F-8026	Dump truck - rear axle, tandem drive, 22,000kg GVW min (operated)	0	hr	$110	$0
U020.04	F-8026	Front end loader backhoe, rubber tired 45 kW min (operated)	0	hr	$110	$0
U020.05	127, F-8026	Hydraulic rock breaker, boom mounted - 1400 Joules (operated)	0	hr	$500	$0
U020.06	127, F-8026	Portable air compressor 9m3/min including air hammer and all attachments (operated)	0	hr	$100	$0
U020.07	127, F-8028	Sweeper (Operated)	0	hr	$150	$0
U020.08	F-8026	Water truck - 7,500l min (operated)	0	hr	$125	$0
U020.09	F-4109	Flusher (Operated)	0	hr	$150	$0
U020.11	127, F-8028	CCTV Video Unit (with pan tilt camera)	0	hr	$180	$0
U020.12	F-4110	Combo Cleaning Unit	0	hr	$200	$0
U020.13	127, F-8026	Hydro Excavating/Vacuum Truck (Operated)	0	hr	$325	$0
					Sub-Total Section U:	**$0**
					FINAL - 2020 - Class D - Estimated Construction Costs (No HST):	**$9,024,547**

Date: 5/30/2025

Asset Management

Infrastructure Planning Unit

Infrastructure Category:	**Watermain**
Project Type:	**Trunk Watermain and Appurtenances**
Project Title:	**Fallowfield Reservoir PS Discharge Upgrade**
Project Phase:	**Conceptual Design**
SAP Project Number:	TBD
Project Location:	Refer to report figures for project location

Project Location Map:
Refer to report figures for project location

Project Description
610mm diam. WM along Fallowfield Rd & Larkin Dr from Fallowfield Reservoir PS to Cedarview Rd

FINAL - 2020 - CLASS D - ESTIMATED CONSTRUCTION COSTS (NO HST):	**$1,549,260**

CAPITAL COST COMPONENTS AND RISK FACTORS

Item	Percentage**	Yes/No = 1/0	Estimated Cost
Capital Cost Components*		**Change as Required**	
Engineering - Design, Contract Adm. (15% - 25%)	20.0%	1	$309,852
Utilities (5% - 20%)	15.0%	1	$232,389
Property - REPDO Estimate (1% - 10%)	1.0%	1	$15,493
City Internal Costs (7% - 10%)	8.5%	1	$131,687
Misc. Soft Costs - Permit, Public Art, etc. (5%)	5.0%	1	$77,463
Risk Factors**			
Geo-Tech Issues - Soil (1% - 10%)	10.0%	1	$154,926
Geo-Tech issues - Bedrock (1% - 5%)	5.0%	1	$77,463
Geo-Tech Issues - Grey Silty Clay (1% - 10%)	0.0%	0	$0
Special Hydro-Geo Conditions (1% - 10%)	5.0%	1	$77,463
Change in Design Standards (1% - 5%)	0.0%	0	$0
Construction Contract Duration (2% per year)	0.0%	0	$0
Species at Risk and Project Mitigation (1% - 5%)	1.0%	1	$15,493
Planning, Design and Land use Approvals (5% - 10%)	0.0%	0	$0
Provincial and Federal Environmental Assessments (5% - 10%)	0.0%	0	$0
CONSTRUCTION COST AND CAPITAL COST COMPONENTS SUBTOTAL:			**$2,316,144**
RISK FACTORS SUBTOTAL:			**$325,345**
OVERALL CLASS D CONTINGENCY (40%-50%) * **	**40%**	**1**	**$926,457**
FINAL - 2020 - CLASS D - ESTIMATED TOTAL CAPITAL COST (No HST):			**$3,567,946**

*** Capital Cost Components Percentage Allowance Range as per City 2013 PDR**

**** Risk Factors Percentage Allowance to be Applied Based on the Project Complexity**

***** Overall Contingency is Applied to Estimated Construction and Capital Cost Components**

Project Related Comments:

COST INFLATION CHART

Year	Inflation % per Year	Yearly Total Cost Projection
2021	17.2%	$4,181,632
2022	9.9%	$4,595,614
2023	7.8%	$4,954,072
2024	5.79%	$5,240,913
2025	3%	$5,398,140
2026	3%	$5,560,084
2027	3%	$5,726,887
2028	3%	$5,898,693
2029	3%	$6,075,654
2030	3%	$6,257,924
2031	3%	$6,445,662
2032	3%	$6,639,031
2033	3%	$6,838,202
2034	3%	$7,043,348
2035	3%	$7,254,649
2036	3%	$7,472,288
2037	3%	$7,696,457
2038	3%	$7,927,351
2039	3%	$8,165,171
2040	3%	$8,410,126
2041	3%	$8,662,430
2042	3%	$8,922,303
2043	3%	$9,189,972
2044	3%	$9,465,671
2045	3%	$9,749,642
2046	3%	$10,042,131

CITY OF OTTAWA	Trunk Watermains (300mm, 400mm, 600mm, 750mm & 900mm) FINAL - 2020 - Class D - Construction Cost Estimating Template Fallowfield Reservoir PS Discharge Upgrade

Estimate Note:
This Construction Cost Estimate Template for Trunk Watermains has been prepared for guidance in project evaluation and implementation from the information available at 2020 unit cost prices.

NOTE	ADJUST QUANTITIES/UNIT PRICES AS REQUIRED

Section A - General						
Code	**Spec**	**Description**	**Qty**	**Unit**	**Unit Cost**	**Cost**
A010		**Field Office**				
A010.01	F-1001	Field office for Contract Administrator 35-70m2	44	wk	$1,000	$44,000
A020		**TRAFFIC CONTROL PLAN**				
A020.01	F-1010	Traffic Control Plan	44	wk	$1,000	$44,000
A020.02	F-1012	Police Assistance at Intersection	32	hr	$280	$8,960
A030		**PEDESTRIAN CONTROL**				
A030.01	F-1013	Construction Site Pedestrian Control Implementation	1	LS	$19,200	$19,200
A040		**EROSION & SEDIMENT CONTROL**				
A040.01	805, F-1004	Erosion and Sediment Control Plan and Monitoring	1	LS	$2,500	$2,500
A040.03	805, F-1004	Erosion and Sediment Control Measures	1	LS	$6,200	$6,200
A060		**PRE-CONSTRUCTION INSPECTION**				
A060.01	F-1011	Pre-Construction Inspection	1	LS	$6,200	$6,200
A999		**Non-Standard Items**				
A999.01	GC 6.04	Construction Site Health and Safety Management and Control	1	LS	$19,200	$19,200
					Sub-Total Section A:	**$150,260**

Section G - Watermains						
G010		**EXCAVATION AND BACKFILL**				
G010.02	401, 441,F-4411, F-7010	Additional excavation & backfill with 50mm clear stone	0	m^3	$75	$0
G020		**SELECT SUBGRADE MATERIAL**				
G020.01	212, 314, F-2120, F-3147	Select subgrade material for Trench Backfill	0	m^3	$50	$0
G030		**WATERMAIN - PVC PIPE**	**600**			
G030.05	441, F-4411, F-4412, F-4491, F-4492, F-4493, F-4494	300mm watermain, PVC, CL 150, DR-18 including all appurtenances	0	m	$800	$0
G030.06	441, F-4411, F-4412, F-4491, F-4492, F-4493, F-4494	400mm watermain, PVC, CL 150, DR-18 including all appurtenances	0	m	$1,000	$0
G050		**WATERMAIN - CONCRETE PRESSURE PIPE**				
G050.01	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	400mm watermain, concrete pressure pipe, CL C303 including all appurtenances	0	m	$1,200	$0
G050.02	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	600mm watermain, concrete pressure pipe, CL C301 including all appurtenances	600	m	$1,500	$900,000
G050.03	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	750mm watermain, concrete pressure pipe, CL C301 including all appurtenances	0	m	$2,000	$0
G050.04	F-4411 ,F-4412, F-4491, F-4492, F-4493, F-4494	1050mm watermain, concrete pressure pipe, CL C301 including all appurtenances	0	m	$3,200	$0
G070		**VALVE AND VALVE CHAMBER**	**5**			
G070.04	F-4411 ,F-4413, F-4491, F-4492, F-4493, F-4494	300mm Gate valve,valve chamber, W3	0	ea	$9,500	$0

G080		**BUTTERFLY VALVE AND VALVE CHAMBER**				
G080.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	400mm Butterfly valve,W5 & valve chamber, W2	0	ea	$20,000	$0
G080.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	600mm Butterfly valve,W5 & valve chamber, W2	5	ea	$35,000	$175,000
G080.03	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	750mm Butterfly valve,W5 & valve chamber, W2	0	ea	$50,000	$0
G080.04	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	1050mm Butterfly valve,W5 & valve chamber, W2	0	ea	$80,000	$0
G090		**VALVE CHAMBER ONLY FOR TVS**				
G090.05	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	1500mm Valve Chamber (Only) FOR 300mm TVS per W4	0	ea	$10,000	$0
G090.05	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	R-1 valve chamber (only) for TVS(any size) off 400mm watermain, W10	0	ea	$12,000	$0
G100		**MISCELLANEOUS VALVE CHAMBER**				
G100.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	610mm access, air relief and drain out valve chamber type R-1 per W10	0	ea	$20,000	$0
G100.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	Automatic Flushing Chamber per W3.2	0	ea	$10,000	$0
G110		**BRANCH VALVE CHAMBER**				
G110.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	Branch Valve chamber type R-3 off 600mm watermain per W11	0	ea	$35,000	$0
G110.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	Branch Valve chamber type R-3 off 900mm watermain per W11	0	ea	$65,000	$0
G120		**LINE VALVE CHAMBER**				
G120.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	600mm Line valve chamber Type R-3 per W12	0	ea	$80,000	$0
G120.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	900mm Line valve chamber Type R-3 per W12	0	ea	$120,000	$0
G130		**BRANCH AND LINE VALVE CHAMBER**				
G130.01	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	600mm Line & (150mm - 400mm) Branch Valve Chamber Type R-4 per W13	0	ea	$120,000	$0
G130.02	F-4411, F-4413, F-4491, F-4492, F-4493, F-4494	900mm Line & (150mm - 400mm) Branch Valve Chamber Type R-4 per W13	0	ea	$150,000	$0
G140		**HYDRANTS**				
G140.01.	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	Hydrant W19	2	ea	$7,000	$14,000
G140.02	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	Hydrant W20 Complete with Ditch Culvert	0	ea	$6,500	$0
G140.03	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	150 mm Hydrant lateral DI CL52 or PVC CL150, DR-18	0	m	$350	$0
G140.04	F-4411, F4414, F-4419, F4491, F-4492. F-4493, F-4494	150 mm Hydrant lateral DI, CL52 or PVC CL 150 DR18, including reinstatement	20	m	$500	$10,000
G170		**TEMPORARY OVERLAND SERVICES**				
G170.999.01	F-4411, F4416, F-4491, F-4492 F-4493, F-4494	Temporary Service Connections - Supply, Installation & Protection	0	ea	$700	$0
G180		**TRENCH REINSTATEMENT (ALL INCLUSIVE PRICE METHOD)**				
G180.02	F-4411, F-4419, F4491, F-4492. F-4493, F4494	Trench Reinstatement - Existing Road(All Inclusive Method)	600	m	$500	$300,000
G180.03	F-4411, F-4419, F4491, F-4492, F-4493, F4494	Trench Reinstatement - Green Field (All Inclusive Method)	0	m^2	$100	$0

G999		TRENCHLESS CONSTRUCTION				
G999.01	450, F-4491, F-4492, F-4493, F-4494	Entry and Exist Pits for Trenchless Comstrction (All Inclusive)	0	ea	$15,000	$0
G999.02	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 750mm Steel Casing Pipe by Boring & Jacking	0	m	$8,000	$0
G999.03	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 400mm Concrete Pressure Pipe Watermain Class C303 inside the 750mm Steel Casing, including Spacers and Flowable Grout	0	m	$2,000	$0
G999.04	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 1000mm Steel Casing Pipe by Boring & Jacking	0	m	$10,000	$0
G999.05	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 600mm Concrete Pressure Pipe Watermain Class C301 inside the 1000mm Steel Casing, including Spacers and Flowable Grout	0	m	$3,000	$0
G999.06	450, F-4491, F-4492, F-4493, F-4494	Supply and Install >1500mm Steel Casing Pipe by Boring & Jacking	0	m	$15,500	$0
G999.07	450, F-4491, F-4492, F-4493, F-4494	Supply and Install 1050mm Concrete Pressure Pipe Watermain Class C301 inside the >1500 mm Steel Casing, including Spacers and Flowable Grout	0	m	$5,500	$0
					Sub-Total Section G:	**$1,399,000.00**
Section U - Labour and Equipment						
UO10		**Labour**				
U010.01	127, F-8025	Unskilled labour (including supervision where not otherwise provided)	0	hr	$70	$0
U010.02	127, F-8025	Skilled labour (including supervision where not otherwise provided)	0	hr	$75	$0
U020		**Equipment**				
U020.01	127, F-8026	Bulldozer, 45 kW min (D3) (operated)	0	hr	$135	$0
U020.02	127, F-8026	Crawler mounted hydraulic backhoe, 24,500 kg minimum operating weight (Operated)	0	hr	$175	$0
U020.03	127, F-8026	Dump truck - rear axle, tandem drive, 22,000kg GVW min (operated)	0	hr	$110	$0
U020.04	F-8026	Front end loader backhoe, rubber tired 45 kW min (operated)	0	hr	$110	$0
U020.05	127, F-8026	Hydraulic rock breaker, boom mounted - 1400 Joules (operated)	0	hr	$500	$0
U020.06	127, F-8026	Portable air compressor 9m3/min including air hammer and all attachments (operated)	0	hr	$100	$0
U020.07	127, F-8028	Sweeper (Operated)	0	hr	$150	$0
U020.08	F-8026	Water truck - 7,500l min (operated)	0	hr	$125	$0
U020.09	F-4109	Flusher (Operated)	0	hr	$150	$0
U020.11	127, F-8028	CCTV Video Unit (with pan tilt camera)	0	hr	$180	$0
U020.12	F-4110	Combo Cleaning Unit	0	hr	$200	$0
U020.13	127, F-8026	Hydro Excavating/Vacuum Truck (Operated)	0	hr	$325	$0
					Sub-Total Section U:	**$0**
					FINAL - 2020 - Class D - Estimated Construction Costs (No HST):	**$1,549,260**