
MEMORANDUM

DATE: April 19, 2024 By Email

TO: **Barrhaven Conservancy Development Corporation
c/o Hugo Lalonde**

SUBJECT: **Barrhaven Conservancy East Phase 2, 3 & Jock River
City File No. D07-16-20-0021
Serviceability In Support of Draft Plan Updates**

OUR FILE: 20-1180

ATTACHMENTS: Drawing 1 – Key Plan (Proposed Draft Plan Revision)
Drawing 2 – Subdivision Plan
Drawing 3 – Overall Storm Tributary Area Plan
Drawing 4 – Storm Tributary Area Plan
Drawing 5 – Sanitary Tributary Area Plan
Drawing 6 – Watermain Servicing Plan
Drawing 7 – Conceptual Servicing Plan
Drawing 8 – Conceptual Grading Plan
Drawing 9 – Conceptual Park 1 Grading Plan
Attachment A – Prior Draft Plan
Attachment B1 – Phase 2B Draft Plan Update
Attachment B2 – New Concept Plan
Attachment C1 – Stantec Memo – Initial Review Assessment
Attachment C2 – Updated Boundary Conditions Request
Attachment D1 – Draft Approved Sanitary Design Sheet
Attachment D2 – Phase 3 & 4 Sanitary Design Sheet
Attachment E – Storm Design Sheet
Attachment F – OGS Sizing confirmation
Attachment G – JFSA HGL Review

1. INTRODUCTION

The following memo is prepared on behalf of the Barrhaven Conservancy Development Corporation (BCDC) in relation to a previously approved draft plan of subdivision (see **Attachment A**) within the Barrhaven Conservancy development area in the City of Ottawa. The development area is associated with municipal addresses 3285/3305 Borrisokane Road.

The overall Barrhaven Conservancy development area is approximately 139.7 ha (all land use components) and is located within the City of Ottawa urban boundary in the Barrhaven ward. The overall site is located north of the Jock River, east of Highway 416, west of Greenbank Road (and the Kennedy-Burnett Stormwater Facility), and south of both McKenna Casey Drive and Strandherd Drive.

The focus of this report is to provide technical support for a proposed draft plan revision for a portion of the Conservancy East (Phase 2, 3 & Jock River) land area that is located east of Borrisokane Road. The current total East area is ~46.65 ha (including right-of-ways, residential development, parklands and Borrisokane Road area). The Conservancy East area has previously had detailed design prepared and approved with initial phases of servicing/homebuilding currently under construction. The proposed new concept plan (**Attachment B2**) revision reconfigures approximately 14.34 ha of the Conservancy East (46.65 ha) development area and is outlined in **Drawing 1** for reference. The purpose of this memorandum is to identify unit changes within Phase 3 & 4 and propose a servicing strategy that is consistent with the previously approved draft plan.

2. DRAFT PLAN CHANGES

As demonstrated in **Drawing 1** the updated draft plan area is proposed to be developed with a mix of townhomes, rear lane townhomes, stacked townhomes (within site plan block), a park block, and a road network. The proposed draft plan update incorporates a new lot configurations which is different from the prior draft plan. The new lot configuration consists of typical lot frontages but proposes single family homes be replaced in favour of 19.6’ townhomes and stacked townhome units. Within the affected area the following differences are noted in terms of unit counts:

Table 1: Comparison of MPlan statistics

Draft Plan Version	Single Family Homes	Regular Townhomes	Rear-Lane Townhomes⁽¹⁾	Stacked Townhomes (Site Plan Block)	Population (persons)⁽²⁾
Approved MPlan (affected area)	211	133	87	0	1,311
Proposed MPlan (affected area)	0	314	87	204	1,634
Approved MPlan (overall East area)	696 ⁽³⁾	208	87	0	3,163 ⁽³⁾

Proposed Concept (with affected area)	527	454	87	204	3,803 ⁽³⁾
	Notes: (1) The proposed rear-lane townhome product footprints are the same but adjacent roadways will have servicing updates associated with the plan adjustment. (2) 3.4 population per Single Family Home (SFH), 2.7 population per Townhome (TH), Stacked Townhome (STH), and Rearlane Townhome. (3) A subsequent MPlan revision for Phase 2B in March 2024 reduced the number of SFH lots by 26 and added an additional 65 TH lots from the original approval. See Attachment B1 for MPlan revision.				

3. WATER DISTRIBUTION

3.1. Serviceability

Stantec Consulting Limited was previously retained to perform a hydraulic assessment for the Conservancy East Lands water distribution network in order to confirm sufficient water supply is available and within the required pressure range under the anticipated demands during average day, peak hour and fire flow conditions. The ***Barrhaven Conservancy East (Phases 2, 3, 4 & Jock River): Water Distribution Analysis (Stantec Hydraulic Analysis)*** was prepared by Stantec (June 2, 2022), but will require revisions due to the increase in unit density. The analysis was provided/approved in support of the overall Conservancy East development area.

Stantec has provided a memo, ***Attachment C1***, that includes preliminary hydraulic analysis comparing the proposed concept plan water demands to those included in the previous hydraulic analysis completed in June 2022. Stantec notes that the overall watermain network is governed by fire flow requirements and found that the increased water demand due to the proposed plan changes results in an increase of approximately 2% of total flow required when factoring in fire flow. As noted by Stantec, despite the increase in water demands for the revisions within the Phase 3 & 4 development area, it is anticipated that the entirety of the Conservancy East development will remain servicable and meet the desired pressure requirements and all design criteria with appropriate watermain sizing.

A boundary conditions request has been submitted to the City of Ottawa, and is attached for reference, see ***Attachment C2***. Stantec will complete a revised hydraulic analysis to confirm serviceability and watermain sizing once revised boundary conditions are received from the City of Ottawa. The final hydraulic analysis report will be provided once complete.

3.2. Fire Flows

Similar to prior reporting, Stantec notes that the overall watermain network will be governed by fire flow requirements. As part of the 2022 study, a required fire flow (RFF) of 217 L/s was considered for the area. As noted above, the increase in MXDY demands associated with the updated development plan represents approximately 2% of the total flow when factoring in the fire flow under MXDY+FF conditions. Therefore, it is anticipated that the network will still meet all design criteria.

- The required fire flow for the governing unit design (rear-lane townhouses) is calculated at 13,000 L/min (217 L/s) – unchanged from before;
- FUS calculations will be reevaluated for the stacked townhome (condo) units within the proposed site plan block. This assessment will confirm whether fire mitigation measures are required to align with the previously established RFF.

3.3. Reliability

In terms of system reliability, the proposed Concept Plan is comparable with the prior configuration. The previous development layout comprised of a configuration where there were two feeds across the development north of the large park block. With the new proposed concept plan there will be the same level of service across that area of the development and the same watermain feeds to Borrisokane Road. See the **Watermain Servicing Plan (Drawing 6)** for reference as well as an **Conceptual Servicing Plan (Drawing 7)**. Final layout and sizing will be reaffirmed at detailed design with confirmation modelling by Stantec.

4. WASTEWATER SERVICING

Similar to the above review for water supply servicing, the proposed population increase will result in a change in the overall sanitary system analysis. To assess the increase in sanitary peak flows from the Phase 3 & 4 FSR area, peak flows at the eastern boundary of Phase 3 (MH47A) were compared to the peak flows at the same location from the draft approved sanitary design sheet (**Attachment D1**) for the entire Conservancy East development.

From the abovementioned draft approved sanitary design sheet, the sanitary peak flow was previously estimated to be 94.42 L/s at MH47A compared to the updated peak flows, highlighted in **Attachment D2**, estimated to be 97.97 L/s at the same MH location. Therefore, the revisions made within the updated Phase 3 & 4 area result in a 3.55 L/s increase in peak flows. The ~4% increase in peak flow from the Phase 3 & 4 area can be accommodated by the existing SNC sanitary sewer which serves as the ultimate outlet for the overall development. Due to the increase in peak flows, some pipe sizes within the FSR area have been upsized to accommodate flows with changes highlighted in **Sanitary Tributary Area Plan (Drawing 5)**.

See the **Sanitary Tributary Area Plan (Drawing 5)** as well as the **Conceptual Servicing Plan (Drawing 7)** for the proposed system layout. See updated sanitary design sheet (**Attachment D1**) for details.

5. STORMWATER SERVICING

5.1. *Runoff Coefficients*

As noted in Section 2, the proposed Concept Plan update for the Phase 3 & 4 area incorporates new lot and road configurations, which includes 19.6' Townhomes and Stacked Townhomes (within the site plan block). Due to the increased density resulting from the new product/lotting proposed, an updated review of runoff coefficients for the development area (representing maximum zoning envelopes, etc.) has been prepared for the evaluation of storm drainage systems. See **Drawing 3** and **Drawing 4** for the new coefficients utilized in the storm system design. For the impacted areas the prior runoff coefficients ranged from 0.51 to 0.69 while the updated development plan would result in coefficients ranging from 0.40 to 0.86. The revised runoff coefficients have been considered with the various analyses prepared for this FSR review with incorporation into design sheets (**Attachment E**), sewer layout, HGL review by JFSA as well as reviewed OGS sizing to reflect the new information and demonstrate no negative impacts.

5.2. *Storm Quality & Quantity Controls*

As per the previously approved subdivision design the same objectives for quality and quantity controls will be adhered to.

Per the **Jock River SWS**, Enhanced quality treatment will be provided for stormwater runoff from the subject property, corresponding to a long-term average TSS removal efficiency of 80%, as described by the MECP prescribed treatment levels. The quality control will again be provided by the same treatment train approach methodology as previously approved as discussed in the next section.

As established in the prior design approval quantity control is not required for outlets to the Jock River, however, some quantity control will be provided intrinsically by the stormwater design.

5.3. *Treatment Train*

JFSA previously (June 2021 memo) prepared a review of various potential stormwater quality treatment options that were investigated for the development. These included options, and combinations of options, as summarized in the following updated table. Each of the options has an expected total suspended sediment (TSS) removal capability, varying from 5% to 88%. This review assessed how the required Enhanced Level of Protection (80% TSS removal) could be achieved when the options

are used in a treatment train approach, consistent with the expected requirements of the MECP *Consolidated Linear Infrastructure policy*.

Table 1: Quality Control Alternatives – Treatment Train to achieve 80% TSS Removal

Selection and comparison of alternatives

Method	TSS Removal	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8
Street Sweeping (Monthly)	5%								
Street Sweeping (Weekly)	10%								
Street Sweeping (Weekly with Elgin Eagle)*	88%	x							
Curb Cut with Grass Swales	75%			X					
Curb Cut with Infiltration Trenches	80%								
Catchbasin Inserts (CB Shield)*	27%		X		X	X		X	
Deep Sump Catch Basin	25%				X		X		X
Infiltration/ Filtration Trenches**	80%				X	X	X		
Infiltration at CBs, per MOE Table 3.2 (22.5m ³ /ha)	70%								X
OGS*	50%			X					X
JellyFish*	85%							X	
SWM Pond (Wet Pond)	80%		X						
	Overall Performance	88.0%	85.4%	87.5%	89.1%	85.4%	85.0%	89.1%	88.8%

Treatment Train Overall Performance = 1 - (1- TSS Removal Rate Method 1) x (1- TSS Removal Rate Method 2) x (1- TSS Removal Rate Method 3 x ...)

*) TSS Removal as documented by ETV Canada
 **) Includes the use of Etobicoke infiltration or filtration systems or other permutations of the same

The above table provides a summary of the TSS removal for the various methods that were considered. The options, and combinations of options, have been assessed and shown to meet or exceed the required 80% TSS target.

For the development area, the Alternative 8 option demonstrates an estimated TSS removal of 88.8% for that particular treatment train approach which has been previously approved for the Conservancy East area and will continue to be advanced for the adjusted draft plan area. Namely:

- Deep sump catchbasins;
- Multiple oil and grit separators (OGS) units to provide TSS treatment with outlets that are above the 2-year event summer water levels on the Jock River;
- The incorporation of infiltration-type Low Impact Development (LIDs) within the right-of-way extending out from catchbasin locations. The detailed design grading will allow for the determination of suitable locations in order to yield optimal benefit from this LID.

For the determination of the TSS removal of 70% for the infiltration LID at catchbasins, the *Table 3.2* of the MOECC (now MECP) publication entitled "*Stormwater Management Planning and Design Manual, March 2003*" sets the storage volume requirements for infiltration measures to achieve certain TSS removal rates.

Table 3.2 Water Quality Storage Requirements based on Receiving Waters^{1, 2}

Protection Level	SWMP Type	Storage Volume (m ³ /ha) for Impervious Level			
		35%	55%	70%	85%
<i>Enhanced</i> 80% long-term S.S. removal	Infiltration	25	30	35	40
	Wetlands	80	105	120	140
	Hybrid Wet Pond/Wetland	110	150	175	195
	Wet Pond	140	190	225	250
<i>Normal</i> 70% long-term S.S. removal	Infiltration	20	20	25	30
	Wetlands	60	70	80	90
	Hybrid Wet Pond/Wetland	75	90	105	120
	Wet Pond	90	110	130	150
<i>Basic</i> 60% long-term S.S. removal	Infiltration	20	20	20	20
	Wetlands	60	60	60	60
	Hybrid Wet Pond/Wetland	60	70	75	80
	Wet Pond	60	75	85	95
	Dry Pond (Continuous Flow)	90	150	200	240

¹Table 3.2 does not include every available SWMP type. Any SWMP type that can be demonstrated to the approval agencies to meet the required long-term suspended solids removal for the selected protection levels under the conditions of the site is acceptable for water quality objectives. The sizing for these SWMP types is to be determined based on performance results that have been peer-reviewed. The designer and those who review the design should be fully aware of the assumptions and sampling methodologies used in formulating performance predictions and their implications for the design.

²Hybrid Wet Pond/Wetland systems have 50-60% of their permanent pool volume in deeper portions of the facility (e.g., forebay, wet pond).

The required storage volume of 25 m³/ha (rounded up) is determined for the development area pro-rated from the above table based on an overall imperviousness of 63% for the revised area. The extent of the site area for Conservancy East being analyzed for the required LID extents for TSS removal is ~12.44ha (excludes 1.90 ha for the site plan block which will be assessed separately). With an overall imperviousness of 86% for the site plan block, the required storage volume of 30 m³/ha will be used.

For prior phases of the Conservancy East development it is noted that on average approximately 140 lineal meters of LID, per hectare of area to be treated, was required. At a functional level, with approximately 12.44ha of area to be treated, this equates to an LID trench extent requirement of ~1750 m (140x12.44) for the revised area. The development area impacted will have approximately 1,988 m lineal meters of roadway available to incorporate the LID infrastructure therefore demonstrating that sufficient roadway is available for use.

5.4. Oil Grit Separator Sizing

The updated areas of the draft plan have four distinct storm outlets from the development area (as per the prior system layout). The outlet locations have remained consistent with the prior approved subdivision design but have been

updated with revised sewer sizing and OGS unit products (where required) based on the new runoff coefficients resulting from the revised draft plan. The following table summarizes the original and updated drainage areas, runoff coefficients and OGS units.

OGS ID	Original Drainage Area (Ha)	Updated Drainage Area (Ha)	Original RC used for OGS sizing	New RC used for OGS sizing	Original CDS Model	Proposed CDS Model
1	5.52	5.52	0.65	0.58	PMSU 4040-8	Unchanged
5	8.39	8.33	0.67	0.67	PMSU 5640-10	Unchanged
6	5.46	5.31	0.51	0.51	PMSU 3035-8	Unchanged
7	5.05	5.62	0.69	0.75	PMSU 4040-8	Unchanged
8	4.52	4.47	0.79	0.80	PMSU 4040-8	Unchanged
13	1.21	1.23	0.64	0.70	PMSU 2020-5	Unchanged

Of the above listed OGS units, the only two that have been installed as part of the prior design approval is OGS1 and OGS5 and the required units (and its contributing upstream sewers) have not changed. The OGS units 6, 7, 8, and 13 to be installed in the future, remain consistent with previous analysis despite minor changes in drainage area and runoff coefficients. See **Drawing 3**, **Drawing 4**, and updated Echelon OGS sizing determinations (**Attachment F**) for the storm system design layout updated details.

5.5. Hydraulic Grade Line Review

In order to assess potential impacts to the hydraulic grade line of the proposed updated storm sewer network JFSA has prepared a memo titled "**Barrhaven Conservancy East Phase 3 & 4 FSR - Proposed Draft Plan Revisions – Preliminary HGL Review**" (provided as **Attachment G**). Based on this review of the functional storm system design it was found that the proposed change in residential density, and resulting increase in runoff coefficient and sewer updates, has no negative impact on the development area. As per the approved design all units are still proposed to be serviced by sump pumps.

Comparatively, as seen in **Drawing 4**, there are no negative impacts to the overall storm sewer network by virtue of the proposed draft plan revisions. Sewer sizes/slopes and drainage areas within the network have been adjusted where required with the proposed sewer sizes remaining in the same size range from 300mm to 1050mm as per the previously approved design.

6. GRADING

The proposed draft plan update incorporates a new lot and block configuration which is different from the prior draft plan. The new lot and block configurations consist of typical lot frontages but proposes single family homes be replaced in favour of 19.6' townhomes and a stacked townhome unit site plan block. See **Drawing 8** for a conceptual grading of the Phase 3 & 4 area. Detailed lot grading will be provided at

detailed design and will minimize requirements for underground rear yard drainage infrastructure while at the same time adhering to City guidelines for minimum lot grading standards.

With respect to grading standards, the proposed grading will:

1. Adhere to minimum and maximum sloping requirements (i.e. proposed minimum grades of 2% which is within the City's preferred range of 2-7%).
2. Provide a minimum of 2% ground slope which precludes the need for subdrains and additional infrastructure;
3. Will provide overland flow routes as required;
4. Will not require ponding areas by virtue of the proposed continuous positive front draining design therefore adhering to freeboard requirements;

In general, the proposed development area is very conducive to this type of grading arrangement given the flat nature of the lands which facilitate front draining lots and gradual overland drainage routes for the entirety of the subdivision area. A functional review of the overall grading is provided in **Drawing 8**. The grading arrangement will be the same approach as previously approved by optimizing earthworks and providing major system conveyance to the same outlet locations correlating to the various OGS outlets.

7. UTILITIES

Coordination with the various utility agencies will be continued from prior approved composite utility plans approved and updated as required based on their individual system requirements.

8. CONCLUSION

The proposed draft plan updates for the Conservancy East Phase 3 & 4 development area noted above have been reviewed from the perspective of deep servicing, grading and drainage. In comparison to the previously approved detailed design for this area there are no anticipated negative impacts being imparted internally, or downstream, of the revised development area.



Yours Truly,
David Schaeffer Engineering Ltd.

Per: Marc Pichette, P.Eng.