Review of:

Documents associated with the Functional design of the Old Victoria SWM Facility #1 by AECOM (lead), June 2015

Located at Hamilton Road and Commissioners

Reviewers: P. Ferguson, PhD, S. Peirce (PhD Candidate), J. Stinziano (PhD Candidate), S. Levin

The documents reviewed are the Environmental Impact Study (EIS), Functional Design Report – Final (Functional Design) and Functional Design Report – Final Volume II - Supplemental Reports (Supplemental Report)

HIGHLIGHTS

A. EEPAC appreciates the efforts made to move the facility almost completely out of the ESA.

B. Recommendation 7 in the EIS (page 60) is for the development of an **Environmental Monitoring Program (EMP)**. The elements are good, however, EEPAC thought preparing the Program itself would have been included in the EIS. This begs the questions: "who will be preparing it," and "will it be prepared and reviewed prior to the awarding of the construction contract?" **EEPAC takes the position that the City's consultant should prepare the EMP, and it should be reviewed by a City Ecologist prior to its inclusion in the bid documents for this project**.

C. As noted in its previous comments on the Thames Village EIS, EEPAC recommends that the **wetlands** in the area **be evaluated** under the Ontario Wetland Evaluation System. We note the wetlands are treated as significant, but without an OWE, it is unknown if they are provincially significant themselves or complexed with the PSW already identified to the west (see air photo from the MNRF at the end of this document). This is particularly important as Figure 5 of the EIS does not show the complete wetland boundary (the purple line in the Figure does not completely encompass an area).

D. EEPAC **does not support multi-use pathways** in ecological buffers. They must be outside the buffer. The City should utilize Planning Act provisions at its disposable to acquire lands, outside of the natural heritage system, for the Thames Valley Parkway.

FUNCTIONAL DESIGN REPORT

EEPAC notes (p. 48 EIS and p. 9 Functional Design) that 1961 to 2003 data are used to model surface water inputs. The IDF curves for the city were modified after the July 2009 work of Simonovic and Peck. The report can be found on the City's web site under IDF report final at http://www.london.ca/residents/Environment/Climate-Change/Pages/Vulnerability-of-Infrastructure-to-Climate-Change.aspx

This report, "Updated Rainfall Intensity Duration Frequency Curves for the City of London under the Changing Climate" reviewed the 61-2002 (DLY03) data set. **It is unclear if this is the same data set used in the modeling for the SWM facility.** Simonovic and Peck noted that the DLY03 data set has errors in element 010 and the "hourly data set did not include some of the critical rainfall events (for example, the 2000 summer storm)!" As well, they noted 17% of data was missing for durations shorter than 24 hours. In order to deal with these deficiencies, Simonovic and Peck prepared a modified data set. It is unclear if this modified data set was used by the consultants for the SWM facility.

1) **Recommendation**: The most up to date rainfall data set be used in future functional design work required by the City.

2) **Recommendation**: The most up to date data set be used to re run the numbers for this facility.

3) **Recommendation**: The SWM unit check with the Ontario Climate Centre (Ontario.climate@ec.gc.ca) to determine if 2004 and beyond have been added to the data set. Page 33 of Simonovic and Peck notes that in late 2008, the Centre was working on 2004 data.

EEPAC notes the dewatering requirements and Golder's comment (p.6 Supplemental Reports) that a Permit to Take Water will be required. Based on the geomorphological work in Parson's report it is our understanding that bankfull discharge is 1.13 m3/s and that the critical discharge (the discharge at which sediment will begin to move) is 0.33 m3/s or 30% of the bankfull. This is the same as 330 litres/second.

For the dewatering process, the maximum rate would be 579 l/min or 9.65 l/s and a steady state of 100 l/min = 1.66 l/s. Based on these conversions, the rate of dewatering would be below the rate of critical discharge so sediment transport shouldn't be a problem.

4) **Recommendation:** Groundwater discharged as part of dewatering should be done in such a way to cause no negative impact to the Natural Heritage features and their functions. If water is discharged to Tributary 2, it must be at a rate less than the critical discharge rate and should follow the proposed outlet channel to avoid unnecessary impacts to the steep slopes as suggested in the consultant's report.

5) **Recommendation**: A dewatering plan be prepared and approved by the UTRCA or MOEE and /or the City. Water must not be discharged through the woodlands of the ESA to the river.

Significant Wildlife Habitat

EEPAC notes the anuran call surveys were done last year (2014), a much drier spring than this year. Results could have been significantly different if undertaken this year.

Gray Treefrog was noted in the anuran call surveys. This is an indication of Significant Wildlife Habitat (SWH). However, the EIS (p. 26) assumes the SWH is the FOD5-1 (outside the area of development), rather than the SWT-2 (swamp thicket). Gray treefrogs live in moist, deciduous woodlands and swamps near water. Appendix J (and pp. 26 and 34) note that this frog was heard outside the 100 m area of the survey which could be either the woods or the swamp thicket. A survey station north of the tributary closer to the river could have clarified this matter.

The swamp thicket is already considered SWH due to the presence of hisbid buttercup *Ranunculus hispidus(?)* (pp. 17, 40, 47).

6) **Recommendation**: If long term disturbance of the SWH cannot be avoided (either from ongoing operations or construction), EEPAC recommends compensatory mitigation based on the recommendations of a City Ecologist. Ideally, this should be in the Meadowlily ESA.

7) **Recommendation**: A literature search be conducted to determine if hisbid buttercup can be transplanted successfully as suggested in the EIS. If not, seed stock or plants should be obtained. There are plant experts at Western University who should be consulted as to the optimum choice and location(s).

Seeps

EEPAC notes that none of the reports seem to have studied ground water flows particularly to the seeps. We understand the barrier will prevent groundwater from entering the facility, but we are not clear what the impact will be on the seeps to the north of the facility. It is not well marked on the maps how far into the seeps construction of the outlet will go. It does not appear any of the boreholes were done near to the proposed outlet (BH-104 is the closest) in order to determine the direction of the groundwater flows near the seeps. Certainly none of the monitoring wells are nearby. The clay dam may cut off groundwater to the swamp thicket under the Hydro corridor to the east of the outlet. Again there are no data collection points nearby.

The Supplemental Report from Golder's showing the A-A' and B-B' cross sections (Figures 3 and 4) do not relieve our concerns. In fact, it increases them as each of the cross sections do not seem to include monitoring wells that would seem more appropriate. For example, BH-104 which is closest to the seepage area, is a borehole, not a monitoring well. None of the boreholes appear to be close enough to the seeps to provide enough information to forecast impacts. Hence we are puzzled by the comment on page 48 of the EIS that points to Golder's June 3, 2015 correspondence (not found in our review) that indicates "… that the SWM facility may will (sic) likely interrupt groundwater flow causing it to flow around the facility and reconverge on the downstream side of the facility. This reconvergence may or may not lead to a change in the discharge orientation such that the seepage areas are bifurcated or widened."

EEPAC anticipates that discharge changes **will** likely impact the seeps (despite the awkward "may likely" sentence on page 48 of the EIS). Page 50 of the EIS also raises concerns "… the potential bifurcation of groundwater discharge to the seepage areas may cause a widening or separation of the seepage areas. Provided that this potential impact does not result in a reduction of the volume of discharge, it is not anticipated that there will be any impacts to the wildlife habitat function of the seepage areas." This is no clear estimation of volume of discharge to the seeps and even if discharge has any connection to the seeps.

Page 7 of the Functional Design document also notes infiltration in the study area will be reduced by 72%. Page 16 notes that the 2009 EA estimated a 65% total of impervious surfaces. It is unclear how this decrease in infiltration will impact the seeps.

EEPAC assumes that there have been other interruptions of seepage at other sites, therefore, a provisional plan and budget for compensation should be prepared and be in place at the beginning of construction. The possible corrective measures noted on page 60 do not take into account the time it would take to implement, who would be responsible for developing the mitigation measures, nor who would pay costs. Nor is there an estimate of funds to reserve for such an eventuality. Given the lag between problem identification, identifying a solution, hiring a contractor to implement the recommendation, EEPAC is skeptical the features and their function could be saved.

8) **Recommendation**: Professor Chris Smart at Western University be asked to review the data and provide recommendations for additional work and/or mitigation measures.

9) **Recommendation**: In the to be prepared Environmental Monitoring Program, monitoring of the seeps must be included (as referenced on page 60 of the EIS) and funds for compensatory mitigation be included in a holdback in the project budget. This holdback will only be released after the conclusion of the monitoring period if there are no negative impacts to the seeps. Otherwise, the funds are to be applied to compensatory mitigation. We recommend that monitoring be the responsibility of the SWM unit with support from a City Ecologist from E&PP. We recommend that corrective action measures be estimated and budgeted for and not left to the point in time where corrective action is needed. Compensatory mitigation could also include work in another area of the ESA perhaps to the west of the ravine.

10) Recommendation: EEPAC supports the section (p.23) of the Functional Design document that removed two catchments from the SWM facility in order to provide potential localized groundwater recharge. EEPAC concurs that the engineer for the subdivision works be required to work within the noted site servicing requirements. These requirements must be included in the development agreement for the development.

Buffers (Appendix O, EIS and recommendation 2, p. 56, EIS)

11) **Recommendation**: Plantings in the buffer should also include "unfriendly" native species such as hawthorns to discourage people from entering the ESA away from managed trail access points.

According to the City's Environmental Management Guideline, the ESA should have a minimum 30 m buffer. EEPAC does understand that due to the location of the facility, such buffers are not possible. But under the Guidelines, Woodlands require a minimum of 15 m. Therefore we do not agree with sections of Appendix O where the buffer is reduced below 15 m where it does not interfere with the functioning and maintenance of the facility.

12) **Recommendation**: The buffers be reviewed and be at least 15 m where it would not interfere with the functioning and maintenance of the facility. The buffers also be reviewed in light of the geotechnical report. The Table in Appendix O of the EIS notes that this study may lead to greater buffers than suggested. It appears the geotechnical report was subsequent to the publication of the EIS.

Generally, EEPAC supports plantings in the buffer that mirror those in the ESA (p. 58 EIS). The emphasis should be on establishing a healthy treed edge. It will be important in the monitoring program to ensure buckthorn and other invasives do not get established in the new edge.

Habitat compensation (Figure 8, EIS, and Recommendation 6, page 60)

Three different areas are proposed. One is recommended as a cultural thicket, another as a buffer extension of shrub and herbaceous plants and a third as a meadow habitat. A clear rationale for these choices is not included in the EIS. EEPAC is of the position that the appropriate plantings should mirror the existing ESA, in particular, the area around the outlet. As well, the type of revegetation should consider the future development and any trails. For example, the proposed meadow habitat may not survive if the area is where the ESA is being accessed inappropriately. If no trail development is proposed in conjunction with the construction of the facility (hence our recommendation below that E&PP convene the Trail Advisory Group), undesirable access to the ESA may continue.

There are likely areas where access should not be promoted and "unfriendly" plantings such as native hawthorns would be more appropriate.

EEPAC also notes that this recommendation in the EIS is a "pre-recommendation." The detailed recommendations are left to the Detail Design stage (EIS - Recommendation 4 for buffer plantings also leaves the details to the detail design stage). Again, this begs the question "when will the work be done, by who, and who will approve it?"

13) **Recommendation**: A City Ecologist should provide a recommendation for the appropriate species and type of habitat for the compensation areas. This direction must be included in the bid documents. The winning bidder be required to prepare the detailed recommendations and planting specifications subject to the approval of a City Ecologist. Only after approval by a City Ecologist should construction begin.

14) **Recommendation**: The placeholder of $20,000 in the project budget for landscaping be reviewed by a City Ecologist and adjusted if necessary after the Ecologist provides recommendations for the appropriate species and type of habitat for the buffers and compensation areas.

Aquatic Health

It is unclear if the EIS has addressed impacts on the health of the aquatic system of Tributary 2. From page 29 of the Functional Design document, it appears that peak flows to the Tributary will be significantly less than pre-development. With the removal of the old coffer dam, EEPAC believes greater access for fish to the Tributary will be possible. Also a lower flow may have an impact on plants such as watercress and the temperature regime of the Tributary (AECOM and NRSI disagree if it is a cold water thermal regime). Given some sediment is good for nutrients and that the Thames is the receiving water course, a lower flow may be acceptable as it will likely mean no negative impact on the riffles at the outlet. However, further work should be done.

15) **Recommendation**: AECOM and NRSI be asked for their opinion on the impact of the lower peak flow on the aquatic health of Tributary 2 post construction.

(NB: In the EIS that NRSI did for the Thames Village development proposal, *NRSI says there are fish up and downstream of the old dam on Tributary 2 and the Tributary is a cold water thermal regime, while AECOM on page 15 of its draft EIS report says it is warm water and the dam is a barrier to fish movement, but that there were cyprinids in pools.)*

16) **Recommendation**: The non-native Common Reed (Phragmites australis) should be eliminated from the site as it will spread invasively.

Avoiding impacts during construction

EEPAC agrees with the recommendation that temporary construction access be away from Tributary 2C.

17) **Recommendation**: In addition to Golder's recommendation on page 6 of the Geotechnical Investigation in the Supplemental Report that care should be taken to direct all surface flows away from open excavations during construction, EEPAC recommends that care be taken so that the surface water flows to the tributary and ESA should mirror pre-development flows as far as is possible.

EEPAC is supportive of Sheet 4, Appendix B of the Functional Design document outlining the sediment and erosion control and other measures. If the SWM unit is unable to do a weekly inspection, the inspection must be done by a City Ecologist or a qualified ecologist retained by the contractor who reports to both the City (SWM unit) and the contractor.

18) **Recommendation**: In addition to the contractor education proposed on page 53 of the Net Effects Table, EEPAC recommends SWM unit staff inspect the site at least weekly to ensure fencing is maintained and equipment stored at least 30 m from the buffer (i.e., to the south of the construction area), and litter is being removed so that it doesn't blow into the woodland or watercourses.

EEPAC agrees with Recommendation 5 on page 59 of the EIS regarding a construction mitigation plan. However the recommendation does not specify who will develop the plan, who will review it, and who will approve it.

19) **Recommendation**: The detailed construction mitigation plan be prepared by a qualified individual retained by the contractor prior to approval being given for the start of construction. The plan must be approved by a City Ecologist.

20) **Recommendation**: A qualified ecologist be on site at all times with the ability to stop work if unanticipated disturbance to the natural heritage features or their ecological functions is noted.

21) **Recommendation**: For the severe weather contingency plan, EEPAC recommends stockpiles be removed 30 m from all watercourses and the ESA. This is to avoid a situation similar to the Amica site on Fanshawe where there was a large discharge of sediment to the Medway from a stockpile on the site.

22) **Recommendation**: While EEPAC agrees that piles inactive for 30 days or more should be revegetated, EEPAC recommends it be with native seed mix not hydro-seeded grass due to the inherent nitrate nutrient surge. If hydro-seeded with grass, it must be a form of hydro-seeding without fertilizers.

Golder on page 10 of its Hydrogeological Assessment in the Supplemental Report document suggests there may be temporary impacts to the water wells further from the site. EEPAC suspects that there will also be at least temporary impacts to the seeps and the SWT. EEPAC agrees with Golder's that groundwater levels be checked prior to commencing excavation as it appears that groundwater data was only collected on December 9, 2014 and March 17, 2015 (page 5 and Table 1, Golder Hydrogeological Assessment, Supplemental Report).

23) **Recommendation**: Excavating and dewatering be avoided during snow melt and early spring.

24) **Recommendation**: A qualified ecologist with the ability to stop work be on site during excavation and dewatering (if Recommendation 20 above is not included).

Post construction

EEPAC is not clear why a specific meadow mix is recommended on page 58. There will be little meadow left unless plantings are planned for the south side of the facility where the soils will ostensibly be drier.

EEPAC does not agree that post construction ground cover should be to urban lawn as it appears to be suggested by Golder's on page 3-4 of its report in the Supplemental Report. We hope this is only for modeling purposes.

25) **Recommendation**: The areas/buffers north of the facility should be planted with shrubs and trees consistent with the ESA. The contract should

also include a requirement that buckthorn should be removed/treated and understory plantings be undertaken.

26) **Recommendation**: If the areas south of the facility are planted with an appropriate meadow mix, there must be a warranty and annual summer inspections by a City Ecologist or a qualified ecologist retained by the contractor, for at least the three years recommended by AECOM.

EEPAC believes the monitoring program outlined in Section 6.5 page 60 is good. What is missing, however, is specifying who is responsible for the monitoring and for bearing the cost, particularly the cost of any follow up work that may be required. It also does not specify which department at the City should receive the monitoring reports for review.

27) **Recommendation**: If the contractor is responsible for monitoring as part of the construction bid documents, monitoring must be carried out by a qualified ecologist (CV required in the bid submission) and approved by a City Ecologist. Reports should be sent to the SWM unit with a copy for review by a City Ecologist. Otherwise, the contractor be given the option for the inspection to be carried out directly by a City Ecologist or a City selected ecologist and funded by the contractor.

28) **Recommendation**: The construction contract include holdbacks to ensure remediation and plantings are successful. The recommended amount be recommended by a City Ecologist. The monitoring period be for a minimum of three years and inspections be made bi-annually, once in spring and one in autumn.

Other

29) **Recommendation**: If all of EEPAC's recommendations for monitoring and restoration are included in the bid documents, a City Ecologist should serve on the evaluation team when the bids are opened.

30) **Recommendation**: The old control structure in the tributary be removed as part of the facility construction contract.

31) **Recommendation**: The non-developable lands that are not required for the SWM facility should be acquired by the City and revegetated as part of the

SWM project rather than waiting for dedication through the residential development process. The species used for revegetation should be consistent with the existing ELC (primarily FOD5-1). Native species such as hawthorn should also be added to discourage unmanaged access to the ESA. The bike jumps and litter can then be removed and managed trails established.

Without an established formal trail system in place, existing and new residents will create their own trails, as there is easy access to the ESA through the hydro right of way. The risk of this laisse fair / desire line trail planning is that residents may be entering the most sensitive parts of the ESA including seepage areas. Once informal trails are established, they are hard to remove.

32) **Recommendation**: The rest of the identified ESA should be dedicated to the City now so that trails can be identified by a Trail Advisory Group established and led by a City Ecologist. The TAG must include a representative from Friends of Meadowlily and from EEPAC.

33) **Recommendation**: Multi-use pathways must be outside the ESA and ecological buffers. EEPAC notes there is no rationale for why the buffer may include such pathways in Recommendation 2, page 56 of the EIS. Guidance for trails is presently through the Trails Standards Guideline.

34) **Recommendation**: ESA lands acquired by the City must be added to the management contract with the UTRCA.

Areas of Agreement

Vegetation removal must follow the Migratory Birds Convention Act's limitations.

Tree removal must be outside bat roosting season (April 30 to Sept 1) as per page 28. This must be included in the construction documents and reinforced once with the contractor once the contract is awarded.

35) **Recommendation**: If additional trees are required to be removed, acoustic surveys for bats must be undertaken. There are bat experts at Western University who can analyze the recordings.

EEPAC agrees with Recommendation 1 on page 55 of the EIS that the ESA boundaries and buffers determined in the EIS be added to Schedules A and B1 (and the equivalent maps in the London Plan). This should be through an Official Plan amendment initiated by the City. The wetlands in particular need to be

added as Golder notes on page 10 of its Hydrogeological Assessment in the Supplemental Report document that no wetland areas are mapped in the Official Plan in the vicinity of the facility.

EEPAC agrees that sediment and erosion control measures be installed prior to clearing and grubbing.

Misc

It appears that there wasn't a spring survey of spring ephemeral plants listed in Table 2-1 page 11. The consultant should provide a rationale for not including this work.

The Issues Summary Checklist includes nutrient retention and removal/ biochemical cycling. There is no information in the EIS – there should be a section addressing it.

The EIS could have been more succinct and better organized. If desired, EEPAC can provide examples from the document.

It would have been helpful to have at least one map with both the SMW facility and the proposed subdivision shown, particularly one showing the ELCs or Hazard Lines (Figure 2 of the EIS for example). In future, the City should require at least one such figure in all EIS and Functional Design documents.

Figure 2 of the EIS is difficult to read on line – the colours do not stand out.

The last row of the Net Effects Table, the last column should be No Net Effect to Net Positive Effect as the present rationale assumes the plantings are successful and invasive species are managed on an ongoing basis.

WETLAND COMPLEX FROM MNR