**KRCA 2nd Comments FSR/SWM Report D.G. Biddle & Associates   
168 County Road 49, Part Lot 19, Concession 19**

**Job Number: 122169**

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Resources Planner – Kawartha Conservation

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|  | Comment | 1st Submission Response | 2nd Submission Response |
|  | Section 4 – Soil Data |  |  |
| 1. | We recommend referencing the results from the geotechnical investigation by Terraspec Engineering Inc, as the test pit data completed as part of the geotechnical investigation would be more accurate than a desktop review. | Comment noted. The previous submission included a Preliminary SWM Report completed by another consultant. The SWM report included in this submission has been completed by this office, DG Biddle & Associates, therefore the material presented for SWM management in this submission are new | Comment addressed. |
|  | Stormwater Management Report |  |  |
| 2 | Section 5 – Approval Requirements  Stormwater Quantity Controls, Runoff Volume Control, Stream Erosion and Water Balance apply to the proposed development and must be addressed and discussed in the report. Comment partially addressed. Expect to see details and discussions of Runoff Volume Control, Stream Erosion, and Water Balance with next submission | The proposed stormwater Quantity Controls are clearly addressed and discussed within the SWM report. Runoff Volume Control and Stream Erosion will be discussed in the next submission. It should be noted that the proposed infiltration galleries will likely fulfill their respective requirements as substantial runoff is directed to the galleries for infiltration. The Water Balance will also be discussed in the next submission | A feature-based water balance is to be completed through the detailed design process. The hydraulic capacity of the wetland will be evaluated and the stormwater management pond that outlets to the wetland will be revised through detailed design as required.  For Hydraulic Point A, the infiltration gallery has been sized to infiltrate 100% of the 5-year storm. This is larger than the volume required to store the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point B, an infiltration gallery has been sized in the base of Stormwater Management Pond B in Lot 33 of Phase 2 to infiltrate the runoff from the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point C, an infiltration gallery has been sized in the base of Stormwater Management Pond A in BLK 30 to infiltrate the runoff from the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point D, the infiltration gallery has been sized to infiltrate 100% of the 2-year storm. This is larger than the volume required to store the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point E, there is a reduction in area draining to the outlet point from 2.43ha in pre-development conditions to 1.88ha in post-development conditions. As such, there will be a reduction in flows at the outlet. |
| 3 | Section 6 – Pre-Development Drainage Conditions  Please address all external drainage conveyed towards the subject property. Based on Figure 2, there appears to be some external drainage areas to the northwest. Delineate all external drainage areas and present them on Figure 2. Comment partially addressed. Please provide the relevant engineering drawings. | Refer to response to comment 1. All predevelopment areas are shown in the Engineering Drawings Set: 1) 122169 20240315 Pre-Development Storm Drainage Plan (East Parcel) -SD-2 2) 122169 20240315 Pre-Development Storm Drainage Plan (West Parcel) -SD-1. | Relevant engineering drawings have been appended at the end of the report. |
| 4 | Please confirm the correct runoff coefficients and areas, as there are discrepancies as indicated in the redlined figures. Comment partially addressed. Please provide the relevant engineering drawings. | All runoff coefficients are assumed to be below 0.20, therefore Nashyd nodes were used to simulate flow volumes in the Visual Otthymo program. The Curve Number (CN) for each area was calculated to simulate the flow volumes. Calculations are shown in Appendix 1. The corresponding CN number for each drainage area in pre, and post development conditions are shown on Drawing SD-1, SD-2, SD-3 and SD-4 | Relevant engineering drawings have been appended at the end of the stormwater management report as a part of this submission. |
| 5 | Section 7 – Post-Development Drainage Conditions  Please describe how runoff from each area is going to be services. For example, swales, storm sewers… etc. | A majority of runoff will drain towards rural side ditches. No storm sewers are proposed except at the headwalls. | Comment addressed. |
| 6 | Please describe minor and major flows and how they are being conveyed. | All flows will be conveyed to rural side ditches to low points in the road where flows will first be infiltrated via infiltration galleries then attenuated above the galleries in the roadside ditches in conjunction with orifices(s) to meet predevelopment targets. All remaining flows throughout the subdivision will continue to flow to the rear of the proposed lots as in pre-development conditions | Comment addressed. |
| 7 | Please provide a storm sewer design sheet if storm sewers are proposed | No storm sewers are proposed for conveyance | Comment addressed |
| 8 | Please provide swale capacity calculations if swales are proposed Expect to see all updates at detailed design stage | This can be shown at detailed design. | Noted. |
| 9 | Please provide overland flow capacity calculations | Not required as a new SWM strategy is proposed. All flows are being attenuated within the roadside ditch and being directed through orifices | Comment addressed. |
| 10 | Please address all external drainage conveyed towards the subject property and how it is going to be accounted for under post-development conditions Comment partially addressed. Please include more details in the report to address all external drainage areas through the subject property under pre- and postdevelopment conditions. | All external drainage areas conveyed towards subject property will drain through the subdivision via swales at the property lines which discharge to the rural side ditches. | In speaking with the developer, there are concerns about the extents of the external drainage area draining through the development. Reviewing the aerial mapping of the property to the north of the development, it appears that the homeowner at 214 Kawartha Lakes County Road 49 has dug multiple on-site ponds. There appears to be additional modifications to the grading of property to the north. Further analysis would be required to understand the extent of the external drainage entering the subject site. |
| 11 | Section 8 – Hydrologic Modelling  Please provide a reference for the assigned runoff coefficients Comment partially addressed. Please provide the rationale for all assumed runoff coefficients | No runoff coefficient will exceed 0.20 for each drainage area. Nashyd nodes only were used in the Visual Otthymo Program | When calculating weighted runoff coefficients, as appended in Schedule 1 of the Functional Servicing and Stormwater Management Report, it is noted that the runoff coefficients were less than 20% impervious. As such, they were modelled as NasHyds in Visual Otthymo. |
| 12 | The pre-development drainage areas reported in Figure 8-1 does not correspond with the areas reported in Figure 2 | Refer to response to comment 1. | Comment addressed |
| 13 | Please provide the rationale for why the SCS 60hour storm was the governing rainfall distribution. Evaluate other rainfall distributions such as the 4-hour Chicago, 12-hour SCS, and 24-hour SCS. The most conservative rainfall distribution should be utilized for water quantity control design Comment partially addressed. Expect to see further assessment of other rainfall distributions including 6-hour SCS,12-hour SCS, 24-hour SCS, and Timmins Storm. | The 4-hour Chicago Distribution rainfall was used. Additional rainfall distributions will be assessed next submission, and the most conservative distribution will be used | Peak flows were computed using the 4-hour Chicago rainfall distribution, 6-hour SCS rainfall distribution, 12-hour SCS rainfall distribution, 24-hour SCS rainfall distribution for the 2-year to 100-year return frequency events. The 2-year to 100-year IDF parameters used are as per the “City of Peterborough 2022 Engineering Design Standards”. Additional storm rainfalls that were evaluated include the Timmins regional storm and the 12-hour and 24-hour modified Chicago storms. The 12-hour and 24-hour Chicago storms were modified to ensure total rainfall depths of 98.4mm and 108.7mm respectively as required within the City of Peterborough Engineering Design Standards. |
| 14 | The post-development drainage areas reported in Figures 8-2 and 8-3 do not correspond with those reported in Figure 3. | Refer to response to comment 1. | Comment addressed |
| 15 | The post-development VO schematic provided in Figures 8-2 and 8-3 features culverts. Please provide a description and design details of the proposed culverts in the main body of the report. Please provide culvert sizing calculations to emsure that the culvert has sufficient capacity to convey the 100-year flows | Refer to response to comment 1. A new SWM strategy is proposed. | Comment addressed |
| 16 | Please report the impervious Manning’s roughness and the previous depression storage applied to the VO modelling in Tables 8-4 and 8-5. | Refer to response to comment 1. | Comment addressed |
| 17 | Table 8-5 incorrectly reports a pervious Manning’s roughness of 0.6. The VO modelling inputs apply a pervious manning’s roughness of 0.25. Please Revise | Refer to response to comment 1. | Comment addressed |
| 18 | The Table 8-5 header for the XIMP and TIMP columns appear to be swapped. Please revise | Refer to response to comment 1 | Comment addressed. |
| 19 | Stand HYDs should only be proposed for catchments with impervious ratios larger than 20%. East Basin B, West Basin C, D, and E would be more appropriately modelled with a NasHYD. Please revise | Comment noted and agreed. Refer to response to comment 1 | Comment addressed. |
| 20 | Section 9 – Stormwater Management  The report references VO2 throughout the report. This implies that version 2.0 was used, however, version 6.2 was used as per the modelling output. Please revise to just VO to avoid confusion | Refer to response to comments 1. Visual Otthymo version 6.0 was used. | Comment addressed. |
| 21 | The proposed West Pond outlets to the roadside ditches servicing County Road 49, and the proposed East Pond outlets to the roadside ditches servicing Moon Line North. Please evaluate how much flow drains towards these ditches under pre-development conditions and demonstrate that flows directed to the roadside ditches does not increase under post-development conditions | Refer to response to comment 1. | Comment addressed. |
| 22 | Please describe the proposed quantity control measures: SWM pond active storage, orifice, weir, etc. | Refer to response to comment 6. | Comment addressed. |
| 23 | Please include discussions on groundwater and if the East and West Pond need to be wrapped with an impermeable liner | Refer to response to comment 1. A new SWM strategy is proposed. The infiltration galleries must be 1.0m above the seasonally high groundwater. Based on the Borehole data and the additional fill where the proposed infiltration galleries are proposed, this requirement is achieved. This is also discussed in infiltration gallery sizing calculations in Appendix 1 of the SWM Report | Comment addressed. |
| 24 | Please summarize the water quantity volume requirement in comparison to the active storage provided | Refer to response to comment 1. A new SWM strategy is proposed | Comment addressed. |
| 25 | The peak storage volumes reported in Table 9-1, reports a peak storage of 3747m3. Please ensure that the numbers reported in the tables correspond to the VO outputs. The Vo outputs indicate that the east active storage provided needs to be significantly increased. Please clarify or revise | Refer to response to comment 1. A new SWM strategy is proposed. | Comment addressed. |
| 26 | The peak storage volumes reported in Table 9-2 does not correspond with the VO outputs appended. For example, during the 100-year event, the VO outputs report a maximum west pond storage used of 5491m3. However, Table 9-2, reports a peak storage of 5145m3. Please ensure that the numbers reported in the tables correspond to the VO outputs. The VO outputs indicate that the west active storage provided needs to be increased. Please clarify or revise | Refer to response to comment 1. A new SWM strategy is proposed | Comment addressed. |
| 27 | Please ensure the first line of the Route Reservoirs is set to zero. Review all warnings/errors in VO output and revise as needed. | Refer to response to comment 1. A new SWM strategy is proposed. | Comment addressed. |
| 28 | Please adjust pervious and impervious depression storage for all StandHYDs appropriately (Impervious = 2.0mm, pervious = 5.0mm – representative of asphalt and lawns, respectively), rather than 1.0mm and 1.5mm | Refer to response to comment 1. A new SWM strategy is proposed | Comment addressed. |
| 29 | Please provide an emergency outlet sized for the 100-year uncontrolled flow for the proposed SMW ponds | Refer to response to comment 1. A new SWM strategy is proposed | Comment addressed. |
| 30 | Please provide the controlled release rates from the SWM ponds from the 2-years to 100-year storm events | Refer to response to comment 1. A new SWM strategy is proposed | Comment addressed. |
| 31 | Please provide detailed descriptions on how Runoff Volume Control, Stream Erosion and Water Balance are addressed for the proposed development and provide detailed calculations Comment partially addressed. Expect to see details and discussions of Runoff Volume Control, Stream Erosion, and Water Balance with next submission | Refer to response to comment 2. | A feature-based water balance is to be completed through the detailed design process. The hydraulic capacity of the wetland will be evaluated and the stormwater management pond that outlets to the wetland will be revised through detailed design as required.  For Hydraulic Point A, the infiltration gallery has been sized to infiltrate 100% of the 5-year storm. This is larger than the volume required to store the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point B, an infiltration gallery has been sized in the base of Stormwater Management Pond B in Lot 33 of Phase 2 to infiltrate the runoff from the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point C, an infiltration gallery has been sized in the base of Stormwater Management Pond A in BLK 30 to infiltrate the runoff from the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point D, the infiltration gallery has been sized to infiltrate 100% of the 2-year storm. This is larger than the volume required to store the 25mm rainfall event. As such, runoff volume and stream erosion control have been provided.  For Hydraulic Point E, there is a reduction in area draining to the outlet point from 2.43ha in pre-development conditions to 1.88ha in post-development conditions. As such, there will be a reduction in flows at the outlet. |
| 32 | Please see redlined drawings and calculations attached. We understand that this is a preliminary design submission. As such please provide more detailed engineering drawings (servicing, grading, erosion and sediment control, stormwater management plans., etc) in the next submission. Upon review of the detailed submission, additional SWM comments will be issued as necessary | Refer to response to comment 1. A new SWM strategy is proposed. | Comment addressed. |
| 33 | The proposed development appears to reduce flows going towards Wetlands 1. A feature-based water balance assessment for Wetlands 1 should be conducted by a qualified professional to ensure that the proposed development will have no negative impacts to Wetlands 1 Comment partially addressed. Since all post development flows will be attenuated to below pre-development levels, how can the water balance of Wetland be maintained? A feature-based water balance assessment for Wetland is to be submitted | All post development flows have been attenuated to below pre-development levels. Therefore, no adverse impact to the wetlands is anticipated. | As outlined in the revised stormwater management report, post-development flows have been attenuated to the allowable pre-development levels. Infiltration galleries have been sized in the base of the proposed ponds to promote groundwater recharge. A feature-based water balance will be completed through the detailed design process. Revisions will be made to the stormwater pond and infiltration gallery sizing based on the findings of the water balance. |
| 34 | Please provide a description on the proposed erosion and sediment control measure on site | Refer to section 8.0 of the SWM report. | Comment addressed. |
| 35 | Please provide a description on the operation and maintenance of the proposed stormwater management pond Expect to see all updates at detailed design stage | Refer to response to comment 1. A new SWM strategy is proposed. Any Operations and Maintenances manuals should not be requested at the preliminary stage of approvals. This can be completed at detailed design | Noted. |