

<b>To:</b> William Clark Town of Milton 525 Canton Ave. Milton, MA	<b>From:</b> Katy M. Konary Stantec 400 Crown Colony Dr., Quincy, MA
<b>File:</b> Milton PB Review Services Wolcott Woods – Stormwater review Project No. 179410771	<b>Date:</b> October 18, 2018

**Reference: Milton PB Review Services of Stormwater Design for Wolcott Woods**

Stantec has reviewed the Stormwater Report, HydroCAD calculations and design plans prepared by Merrill Engineers and Land Surveyors for the Wolcott Woods development in Milton, MA. Below are my comments.

Report Ref. / Plan Sheet	Comment
Report	Header incorrectly states that the project is in the Town of Canton, MA.
Report	Page 2 states that “an increased infiltration rate was utilized for the existing natural depressions in the drainage analysis”. HydroCAD calculations include three depressions (20,003 cf, 2,689 cf and 57,265 cf), all with an exfiltration rate of 60 in/hr (which is significantly higher than the Rawls rates of 8.27 in/hr for HSG A sands per MA Stormwater Handbook). Provide supporting documentation for using this 60 in/hr exfiltration rate.
Report	Page 2 states that the “stormwater management systems were designed to be in compliance with the DEP Stormwater Management Regulations to the extent practicable”, but then Page 4 states that “for the purposes of stormwater design, the project was considered new development and has been designed to be in compliance with the Stormwater standards”. This discrepancy needs to be confirmed.
Report	Standard 1. Include documentation to show that no new Stormwater conveyances will cause erosion. For example, document that the proposed riprap will sufficiently attenuate discharge velocities at the pipe outlets to not cause erosion.
Report	Standard 3. A calculation of the required recharge volume for the entire site was provided, but calculations for each recharge system were not provided.
Report	Standard 3. Calculations to document compliance of the required minimum bottom area for each recharge system are not provided.

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<p>Report &amp; Appendix C</p>	<p>Standard 4. A separate TSS removal form should be completed for each storm water outlet to document that the proposed treatment trains remove 80% of the TSS load. It appears that the design includes the following BMP treatment trains:</p> <ul style="list-style-type: none"> <li>(1) catch basin, manhole, First Defense Unit FD1, chambers 9P;</li> <li>(2) catch basin, manhole, First Defense Unit FD2, infiltration basin;</li> <li>(3) stone diaphragm along driveway, bioretention basin, manhole, chambers 6P, and chambers 7P with discharge onsite;</li> <li>(4) catch basin, manhole, First Defense Unit FD3, chambers 6P, and chamber 7P with discharge onsite; and</li> <li>(5) catch basin, manhole, First Defense Unit FD4, and First Defense Unit FD5 with discharge to farm pond.</li> </ul> <p>It is unclear if each BMP treatment train meets the 80% TSS removal requirement. Also, the TSS forms that include a First Defense Unit (a propriety treatment practice) should have 50% removal rate, not 0%.</p>
<p>Report &amp; Appendix C</p>	<p>Standard 4. Per MA Stormwater Handbook, at least 44% TSS pretreatment is required prior to discharge to the infiltration BMP when the BMP is located within an area with a rapid infiltration (greater than 2.4 inches per hour). Documentation indicating the proper pretreatment is not provided for the chamber systems, infiltration basin or bioretention basin.</p>
<p>Report</p>	<p>Standard 4. A calculation of the required water quality volume for the entire site was provided, but calculations for each recharge system were not provided.</p>
<p>Report</p>	<p>Standard 10. An Illicit Discharge Compliance Statement signed by the owner has not been provided.</p>
<p>Appendix C</p>	<p>Pipe velocities within the collection system are as high as 11.3 and 12.5 fps. The typical design velocity for storm drains is between 3 and 10 fps. As flows approach/exceed 10 fps, abrasion in the pipes can occur. How is the concern for pipe abrasion and flow through the drop manholes addressed?</p>
<p>Appendix D</p>	<p>The MassDEP Stormwater Report Checklist is missing.</p>

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Appendix E	The Town of Milton Stormwater Management Bylaw requires “soil permeability data for areas where infiltration Stormwater management systems will be installed”. Were any percolation tests or hydraulic conductivity tests performed? If so, results should be included with the test pit logs in Appendix E. The very high recharge rates utilized in the design need to be verified.
Appendix E & C2.2 & C4.2	TP #1 appears to be at existing ground elevation 198±, not 196± as stated in the test pit logs. Similarly, TP #7 appears to be at existing ground elevation 200±, not 202± as stated in the logs.
WS	Document that Stormwater from the areas south of Wolcott Path is captured and conveyed away from the site. Otherwise, Subcatchment 6C may receive more runoff from the area south of Wolcott Path than defined on the WS plans.
Plans	The Town of Milton Stormwater Management Bylaw requires “topographic survey showing existing and proposed contours in one-foot intervals”. The plans show contours at two-foot intervals.
C1.2	Waiver to Regs Section 8.2 for the use of HDPE pipe and to allow 1.5’ minimum cover. The plan should indicate where there is not sufficient cover over the drain pipes (e.g., roadway, grassed area) and how the pipe will be protected. Some pipes near discharges may have less than 1.5 feet of cover.
C2.1 and HydroCAD	The existing depression (Pond 3P) appears to overflow below elevation 154 with runoff flowing toward the rear of the lot at 2 Carbarry Lane. The plan shows a break between the existing 154 contours near the existing spot grade of 152.8 at the stonewall. The HydroCAD calculations specify a 6’ long overflow weir at elevation 155.50.
C4	The required minimum number of soil borings/pits per BMP system area per MA Stormwater Handbook was not completed.
C4.1	The manhole at Station 6+78.54 is called out as DMH-6, not First Defense Unit FD3.

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Chambers	
C4.1	TP #2 and TP-C are located near chamber system Pond 6P. TP #2 was excavated from elevation 215.0± to 202.5± and no groundwater or redox was observed. TP-C was excavated from elevation 220± to 210± with redox 8' deep at elevation 212± in medium-coarse sand C1 layer with a fine-medium sand C2 layer beneath. The bottom of the proposed chamber system is at elevation 208.50. Another test pit should be considered to confirm the estimated seasonal high groundwater elevation in this area.
C4.1 & C10.4	There does not appear to be sufficient cover over chambers in Pond 6P. Top of chambers is elevation 213.00. Detail calls out 24" minimum cover and minimum finish elevation of 215.00. However, the plan shows finish spot elevations of 214.5 over the chambers and the proposed contours do not indicate a minimum elevation of 215.00 over the system.
C4.1 & HydroCAD	The plan shows a 24" outlet pipe from the chamber system, but the HydroCAD calculations include an 18" outlet pipe.
C4.1	There is insufficient cover over the 24" outlet pipe from chamber system Pond 7P. The 24" flared end invert is 196.60 and the pipe crosses a proposed 198 contour, therefore the top of pipe will be 0.6 feet above grade.
C4.1 & C10.4	The connection between the isolator row and the chambers should be detailed.
C4.1 & C10.4	The location of the chamber system inspection ports should be specified and should comply with the MA Stormwater Handbook.
C4.1	The drain manholes following the chamber systems include a 12" orifice. A detail of this should be included.
C4.3	Provide details for the proposed rain garden near Station 10+00.
Infiltration Basin	
C4.2 & HydroCAD	Infiltration Basin (Pond 8P) peaks at elevation 199.44 in the 100-year storm. The adjacent Canton Avenue roadway is at elevation 198.2 and the adjacent new road is at elevation 198±. The elevation 200 contours are not clearly defined around the basin, and it is unclear if the 100-year storm will actually be contained.

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C4.2	The infiltration basin is not designed per MA Stormwater Handbook (i.e., one foot of freeboard, overflow outlet, emergency spillway, vehicular access around the perimeter).
C4.2	The limit of clearing is incorrectly shown between the infiltration basin (Pond 8P) and Canton Avenue. Trees will be cleared to the northwest to achieve the proposed 197 contour. HydroCAD calculations show that the basin peaks at elevation 196.51, 197.52, and 199.44 in the 10-, 25- and 100-year storms, respectively. The proposed clearing, grading, overflow outlets and emergency spillway should be clearly shown.
C4.2	Calculations indicate that the infiltration basin will have a water depth of 4.44 feet during the 100-year storm event. A fence around the basin should be considered for safety purposes.
C4.2	There is insufficient cover over the 12" outlet pipe. The 12" invert is 198.82 and the pipe crosses a proposed 200 contour, therefore there will be 0.2± feet of cover behind the headwall.
C10.3	The basin section detail calls out a limit of the "detention basin". Revise the detail to note that this basin is an infiltration basin.
C10.3	ESHGW elevation of 190.0± is called out on the basin detail. How this elevation was determined should be noted (e.g., redox in test pit # - )?
C10.3	The infiltration basin detail shows a top of berm elevation of 201±. However, the plan does not show a proposed 201 contour or spot grades around the basin, and it is unclear if a 200 contour exists along the road.

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Bioretention Basin	
C4.2	TP-C, TP #3 and TP#6 are located near bioretention basin (Pond 5P). TP-C was excavated from elevation 220.0± to 210.0± with redox 8' deep at elevation 212± in a medium-coarse sand C1 layer with a fine-medium sand C2 layer beneath. TP #3 was excavated from elevation 232± to 221.5± with 40% redox 48" deep at elevation 228± in a sandy loam C2 layer with a sand C3 layer beneath. TP #6 was excavated from elevation 218± to 210.5± with 40-50% redox 42" deep at elevation 214.5± in a sandy loam C2 layer with a sandy loam C3 layer beneath. The bottom of the bioretention basin is 217.00. Another test pit should be considered to confirm the estimated seasonal high groundwater elevation in this area and to confirm the west and east extents of the basin are in sand, not sandy loam found in TP #3 and #6. If the basin is in sandy loam, then the infiltration rate of 2.41 inch/hour is too high.
C4.2	Bioretention basin Pond 5P peaks at elevation 218.49 in the 100-year storm. The adjacent roadway catch basin is at elevation 218.33, and the adjacent driveway is at 218.5. The proposed grading (spot grades and/or contour 219) around the basin perimeter should be more clearly detailed. The MA Stormwater Handbook requires 3 inches of freeboard for bioretention areas.
C10.3	What is the intent of the double grate on the overflow structure? It is assumed that the grate elevation is 220± or higher based on the overflow structure detail on Sheet C10.3 and the manhole detail on Sheet C10.2. Any overflow from the bioretention basin will first flow into the 2'x1' weir (218.00), then the roadway (218.5) and catch basin CB6 (218.33). There may never be any flow through the double grate.
C10.3	The bioretention basin detail should be revised to show the correct proposed pavement elevation (218.5±, not 198.5±).
C10.3	The bioretention basin detail should specify how the groundwater elevation of 212± was determined (e.g., redox in test pit # -).
C10.3	The bioretention basin overflow structure detail should be revised to clearly indicate the structure depth. The detail calls out a 4' dimension, but it is unclear whether this is 4 feet from the invert in or out. If the intent is to provide a 4' sump, then this dimension needs to be from the invert out to the inside bottom (not the outside, as shown on the detail).
C10.3	The overflow structure detail should include a grate elevation. Plan C4.2 should also call out the double grate elevation.

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C10.3	The bioretention basin detail should be revised to show the overflow outlet structure depth (including sump, if any) and outlet pipe (invert 214.55) below the filtration zone (bottom 215.00).
Details	
C10.1	There are two roadway cross section details, one for a 22' wide roadway and one for a 24' wide roadway, but both are labeled for Station 1+64.09 to 37+84.90.
C10.2	It is unclear whether the concrete basins and covers for the First Defense Units are designed for HS-20 loading.
C6.1, C10.2, & C10.4	Profile shows 12" HDPE at FD1 and FD2. FD detail shows 18" inlet pipe. SC-740 isolator row detail shows 24" HDPE out of FD1. Confirm and correct the discrepancy.
C6.1 & C10.2	Profile shows 24" HDPE at FD3. FD detail shows 30" inlet and outlet pipes. Confirm and correct the discrepancy.
C6.2 & C10.2	Profile shows 15" HDPE at FD5 and FD6. FD detail shows 24" inlet and outlet pipes. Confirm and correct the discrepancy.
C10.2	The Town of Milton Conservation Commission's Performance Standards require a specific oil separator within the catch basins. Confirm whether the "hood" shown on the catch basin details complies with this Standard or if the Applicant intends to submit the alternate oil separator design in writing to the Commission for approval prior to construction.
C10.3	Plan C4.2 shows a proposed "headwall with grate and riprap pad" at the 12" outlet at the infiltration basin. Confirm that the sediment trap detail is the "riprap pad". Confirm whether stainless steel bars are provided and are the "grate" referenced on the plan.
C10.3	Plan C4.1 shows a proposed "15" HDPE outlet with riprap pad" at the farm pond. Confirm that the sediment trap detail is the "riprap pad". If so, the detail should also include dimensions for a 15" outlet pipe. Does the proximity of the 15" pipe outlet and the 4'x4' culvert affect the riprap pad dimensions? Confirm if the 15" outlet includes a headwall or a flared end. Confirm whether stainless steel bars are provided at the 15" outlet.
C10.3	Plan C4.1 shows a proposed a flared end section with riprap pad at the 24" outlet from the chamber system (Pond 7P). Confirm that the sediment trap detail is the "riprap pad". Is there a detail or a reference to a MassHighway Spec for this flared end section?

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C10.3	The sediment trap detail note 1 references Massachusetts Highway Department Spec "M2.02.3, 3" loam and seed". However, Spec M2.02.3 specifies stone for pipe ends, not loam and seed. Please clarify and/or revise, as necessary.
C10.3	The precast concrete headwall detail calls out a 12" pipe. Is there also a headwall detail for the 15" outlet pipe at farm pond?
C10.4	Text is not legible for chamber fill materials.
C10.4	There are ESHGW elevations called out for the chamber details. How were these elevations determined? These elevations do not match the test pits logs.
C10.4	MassDEP Stormwater Standard 3. Mounding analysis is required when the vertical separation from the bottom of the BMP recharge system to the seasonal high groundwater is less than four (4) feet and the recharge system is proposed to attenuate the peak discharge from a 10-year or higher storm. Confirm separation to groundwater and/or provide mounding analysis documentation.
C10.7	The Town of Milton Conservation Commission's Performance Standards reference "double rows of firmly stakes haybales and/or filter fabric fence backed by a single row of haybales". The Plan shows multiple options for erosion control measures, which do not comply with the Town's requirement.

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