

July 24, 2024

615 Waterfront Drive | Suite 201  
Allentown, PA 18102

AUG 02 2024

RE: Stormwater Review  
Easton Commerce Park – Land Use of Regional Significance  
Wilson Borough, City of Easton and Palmer Township  
Northampton County

Comments from LVPC regarding stormwater received in Attachment 1 (Act 167 Drainage Plan Review) on June 7, 2024 are in *Italic* and responses by Bogia Engineering are in **Bold**.

- ❖ *A separate map showing the pre- and post- development drainage boundaries and times of concentration should be provided. The boundaries are too difficult to see on the existing condition and grading plans and could not be verified.*

**The existing and proposed site plans are revised to more clearly depict the pre- and post-development drainage areas as well as their associated time of concentration paths.**

- ❖ *Areas draining to on-site closed depressions need to be evaluated for runoff impact in the pre development condition.*

**The pre-development drainage areas and their associated time of concentration path take into account the existing topography and land cover in time of concentration calculations, where appropriate Manning's Coefficient and land slope for sheet flow and concentrated flow are estimated. The drainage areas and their time of concentration path were initially generated by tools provided by Civil 3D (watershed delineation and water drop path finder) that uses topography to do the corresponding tasks, and then the generated areas and paths were checked and revised (if needed) by the project engineer.**

- ❖ *A portion of drainage area 1 will flow across a neighboring property before reaching the Bushkill Creek. This area should be delineated and pre- and post- development flows should be provided to demonstrate that there will not be an increase in peak runoff.*

**The pre-development drainage passing through the adjacent property is part of the northern side of the EX-DA that can be separated from the rest of EX-DA 1 based on the ridgeline created by the existing topography. It will be an area of around 4.7 acres. However, in the post-development condition, this drainage area is substantially reduced to around 2.5 acres that is delineated as PR-Bypass 3 on the plans. Since the underlying soil and the drainage slopes would not be altered, the reduction in the drainage area that discharges as sheet flow through the adjacent property would result in reduction of the corresponding post-development peak rates. Below illustrates the delineated drainage area that sheet flows through the adjacent property in the existing condition:**



- ❖ *The outfall pipes from basins A and B are creating concentrated discharge points. Conveyance should be provided downstream to basin C.*

**The outfall pipes from basins A and B would discharge over riprap aprons installed upslope of the basin C. The riprap aprons are designed for 100-yr storm and the calculations and details are presented in the PCSM and E&SC reports and drawings.**

- ❖ *There appears to be disturbed areas that are outside of the defined drainage areas. This may be clarified once revised drainage area maps are provided.*

**The design and report are revised to ensure consistency between limit of disturbance and pre- and post-drainage areas.**

- ❖ *The plans should clearly show how runoff from drainage areas 2, 5, 6, and 7 reaches the creek or tributary.*

**Due to change in limit of disturbance existing drainage areas 5 and 7 are removed from the plans and existing drainage area 6 is labeled 5 in the revised plans. The stormwater from existing drainage area 5 (previously labeled as 6) would most likely drain as sheet flow across Hackett Avenue and from there into the Bushkill tributary. No existing storm utility**

or culvert was identified during the site survey. Below is a google picture that shows approximate location of drainage area 5 time of concentration downgradient point. As can be seen, there is no specific roadside swale and the runoff from the upland on the right (i.e., drainage area 5) would sheet flow to the other side of the road and from there to the tributary.



Similar to drainage area 5, there is no specific stormwater conveyance structure to pass the runoff generated on drainage area 2, and it sheet flows to Bushkill Creek. The drainage area 2 time of concentration discharge point is located near the remaining of an old dam and is located in meadow area between two wooded areas, as displayed below:



❖ *There are wooded areas shown on the plans that do not appear in the calculations.*  
**Addressed through revising the curve numbers to include wooded areas. Generally, the site is a combination of meadow and trees, and both are considered in good condition to model the pre-development hydrographs. Also, 20% of existing impervious areas were considered to be meadow in good condition for pre-development modeling to create a more conservative scenario per local and State requirements.**

❖ *The pre-development calculations use a runoff curve number of 36 for open space for A soils that should be 39.*  
**Addressed through revising the curve number associated with HSG to use 39 instead of 36.**

❖ *It appears that drainage areas EXT B and EXT C were included in the tributary areas to the respective basins. These areas do not flow to the basins and should be included in the bypass areas.*  
**These areas are part of PR-BYPASS 2 in the revised design and drawings.**

❖ *The post-development inflow to basin C does not include the 0.91 acres of open space and should be revised.*  
**Drainage areas are revised to accurately reflect the areas drained into basins and bypass areas.**



- ❖ *The routing for each basin should start with the basin full to the elevation of the first orifice.*

**The first orifices in all basins are below the BMP fill media as they are underdrain pipes. Please see appendix B of the PCSM report for the full report of the BMPs and how they have been modeled.**

- ❖ *The spillway capacity calculation should be revised to show capacity to pass the 100-year inflow to the basins. Freeboard calculations from the maximum pool elevation to the invert of the spillway have not been provided.*

**Spillway calculations, including the free board calculations, are provided at the end of Appendix D of the PCSM report.**

**The proposed BMPs A and E are fully excavated and no berm or embankment is needed, therefore, no emergency spillway is proposed for them because emergency spillways are applicable as a dam safety measure for BMPs at which creating a berm or embankment, in form of placement of fill, is needed to finish the side slope. The freeboard for these two BMPs are calculated from the top of the BMP side slope, while the freeboard for BMPs B and C, at which berm is proposed and as a result emergency spillway is needed, are calculated from the invert of the emergency spillways. The following tables report the elevations and provided freeboards associated with all storms within the proposed BMPs. Please see the Appendix A of the PCSM report for details of the storm and BMP elevations.**

**Elevations (ft)**

BMP ID	Top of Side Slope	Spillway Invert	1-year	2-year	5-year	10-year	25-year	50-year	100-year
A	296.00	N/A *	290.36	290.62	290.88	291.31	291.74	292.17	292.57
B	292.00	290.50	286.49	286.79	287.09	287.57	288.06	288.51	288.91
C	224.00	222.00	216.47	216.91	217.37	218.10	218.51	218.95	219.48
E	262.00	N/A *	256.29	256.92	257.63	258.30	259.09	259.64	260.00

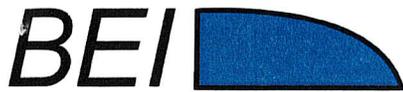
\* BMP is fully excavated and there is no berm or embankment to construct the BMP, therefore, no emergency spillway needed.

**Freeboard (ft)**

BMP ID	1-year	2-year	5-year	10-year	25-year	50-year	100-year
A	5.64	5.38	5.12	4.69	4.26	3.83	3.43
B	4.01	3.71	3.41	2.93	2.44	1.99	1.59
C	5.53	5.09	4.63	3.90	3.49	3.05	2.52
E	5.71	5.08	4.37	3.70	2.91	2.36	2.00

- ❖ *The basin C storm sewer calculations show zero flow and should be checked and revised.*

**Storm sewer design is revised and results are reported at the end of Appendix A of PCSM report. The drainage areas are assigned to inlets and using Rational Method the inflow to each inlet and from there to connected pipes are calculated.**



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❖ *Calculations for the sizing of the channel for the realigned stream should be provided along with a drainage easement as required by the ordinance.*

**Hydraulic and hydrologic modeling and report are submitted to PADEP to obtain a Joint Permit for this project. This report, which discusses the design of the channel and culvert, is presented as a component of this resubmission package. The drainage easement is added to the proposed site plans.**

If you have any questions, please do not hesitate to call me at 484-872-8886.

Sincerely,

A handwritten signature in red ink that reads 'Donald Haas'.

Donald Haas, RLA, ASLA, CBLP  
Branch Manager