



November 1, 2019

Will Ethridge, Director of Planning and Zoning
Westtown Township
1039 Wilmington Pike
West Chester, PA 19382

RE: Crebilly Farm Family Associates, L.P.
Conditional Use Application Review
Pottstown Borough
WTT-19-239

Dear Mr. Ethridge,

Per the Township's request, CEDARVILLE Engineering Group, LLC (CEG) has completed a review of the Conditional Use Application for Crebilly Farm Family Associates, L.P. as it relates to stormwater management and surface water quality. The site (Parcels 64-4-29, 67-4-29.1, 67-4-29.2, 67-4-29.3, 67-4-29.4, 67-4-30, 67-4-31, 67-4-32, 67-4-33, 67-4-33.1, 67-4-134) is bounded by Wilmington Pike (S.R. 202/322) to the east, West Pleasant Grove Road to the north, South New Street to the west, and West Street Road (S.R. 926) to the south. The parcel contains 322.36 acres and is located A/C Agricultural/Cluster Residential District and the R-1 Residential District. The property is currently used for residential and agricultural purposes. The current application proposes a 319-unit residential development consisting of 2 existing homes, 182 single family homes, and 135 townhomes.

The following information was submitted and was received by our office on September 18, 2019:

- A. Conditional Use Application Narrative prepared by Toll PA XVIII, L.P., no date.
- B. Full size plan set titled "Conditional Use Subdivision Plan for The Robinson Tract", prepared by ESE Consultants, dated August 9, 2019, Sheet 1-71 of 71.
- C. Report titled "Conditional Use Stormwater Management Narrative for the Robinson Tract," dated August 2019.

Surface Water Quality

Westtown Township has a National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit that requires the implementation of Best Management Practices (BMPs) to address surface water quality goals, beginning in 2003. The basis of the permitting requirements administered by the Pennsylvania Department of Environmental Protection (PA DEP) is authorized by the Federal Clean Water Act of 1972 and supported further by the Pennsylvania Clean Streams Law.

The permit requires the Township to reduce siltation (i.e. sediment) to the streams listed below by ten (10) percent over a five (5) year period through the implementation of a Pollutant Reduction Plan (PRP) as required by the NPDES MS4 permit program upon issuance of their final Individual NPDES MS4 Permit, in addition to addressing the Goose Creek Total Maximum Daily Load (TMDL) for phosphorous. The Township has received draft Individual NPDES MS4 permit approval in a letter from the Pennsylvania Department of Environmental Protection (PA DEP) dated September 16, 2019; final approval is anticipated by the end of 2019.



- Radley Run
- Chester Creek
- Plum Run
- East Branch Chester Creek
- Hunters Run
- Ridley Creek

The Township Stormwater Management Ordinance allows the Township to require additional stormwater control measures for discharges to impaired streams as per the excerpt below.

§ 144-301.P(1) & (2) – Additional water quality requirements. The municipality may require additional stormwater control measure for stormwater discharges to special management areas, including but not limited to: Water bodies listed as “impaired” by PADEP., and any water body or watershed with an approved total maximum dial load (TMDL), specifically Goose Creek Watershed. Total phosphorus is the assigned TMDL pollutant to Westtown Township within the Goose Creek Watershed. As such the Township may require additional phosphorus-reducing measures for regulated activities within the Goose Creek Watershed, including but not limited to: rain gardens/bioretention., constructed wetlands, permeant compost filter sock, and/or water quality inlet filter.

The vast majority of the site is located within the Radley Run watershed, with a very small portion of the western side of the site located within the Chester Creek watershed. A portion of Radley Run and several unnamed tributaries to Radley Run flow through the site. Radley Run and its tributaries are listed on the 2014 Section 303(d) List as impaired due to siltation and water/flow variability from urban runoff/storm sewers and agriculture.

Table 1. Radley Run Impairments

Cause of Impairment	Source of Impairment
Siltation	Urban Runoff/Storm Sewers
Siltation	Agriculture
Water/Flow Variability	Urban Runoff/Storm Sewers

Stormwater management is proposed to meet the minimum Ordinance requirements primarily through the installation of infiltration basins, intended to attenuate the volume of the 2-year storm and, for storm frequencies greater than the 2-year, only rate control is considered. Any proposed development will contribute to the further impairment of the Radley Run and Chester Creek watersheds.

There are several BMPs that can reduce sediment, both improving surface water quality and aiding the Township to meet its regulatory requirements in the Pollutant Reduction Plan (PRP). BMPs that would be most applicable to this development include stream restoration and forested riparian buffer, both of which are described in more detail below.

- **Stream Restoration** – The PA DEP BMP Effectiveness Values Table (Rev. 6/2018) describes this BMP as “an annual mass nutrient and sediment reduction credit for qualifying stream restoration practices that prevent channel or bank erosion that otherwise would be delivered downstream from an actively enlarging or incising urban stream. Applies to 0 to 3rd order streams that are not tidally influenced. If one of the protocols is cited and pounds are reported, then the mass reduction is received for the protocol.”

According to the PA DEP BMP Effectiveness Values Table, the net reduction of pollutants for this BMP are: 44.88 lb./ft. of streambank/year of sediment.

There is approximately 17,000 linear feet (LF) of stream on the site (appx. 4,000 LF of Radley Run and 13,000 LF of tributary stream sections). While some reaches are stable, there are many reaches that exhibit severe bank erosion and scour. These streams should be assessed for appropriate restoration opportunities. Any



stream restoration activities would have significant positive impacts on water quality and meet the goals of its PRP.

- **Forested Riparian Buffer** - An area of trees at least 35 feet wide on one side of a stream, usually accompanied by trees, shrubs and other vegetation that is adjacent to a body of water. The riparian area is managed to maintain the integrity of stream channels and shorelines, to reduce the impacts of upland sources of pollution by trapping, filtering, and converting sediments, nutrients, and other chemicals. Effectiveness credit for TN is for 4 upslope acres for each acre of buffer (4:1), and 2 upslope acres for TP and sediment (2:1). Additional credit is gained by converting land use from current use to forest. (Note – the values represent pollutant load reductions from stormwater draining through buffers). Per the PA DEP BMP Effectiveness Values Table, a forest buffer will provide a 50% reduction in sediment for these areas.

Per the Overall Open Space Plan dated August 9, 2019, it appears that a buffer is proposed to be maintained as “Natural Areas” around the existing streams and wetlands. The applicant should explore ways in which to enhance the proposed buffer with trees and shrub plantings for creating a minimum 35-foot forested riparian buffer around the streams.

However, this option is less favorable as it will not achieve the same level of sediment reduction per linear foot of stream as stream restoration. Proposed riparian buffer enhancement may also reduce/prevent the opportunity or incentive for future stream restoration projects in this location.

We request the Township consider requiring the applicant to implement stream restoration for this proposed development by Conditional Use. Stream restoration will prevent the further impairment of Radley Run, provide surface water quality benefit, and address the Pollutant Reduction Plan (PRP) requirements. The applicant would be required to conduct a stream assessment and complete a restoration design, including applying for and obtaining the necessary PA DEP permits, and construct the project.

The increase in density, change in land cover, and impact of urban/suburban and human activity on the landscape will continue to increase the Township’s burden for water quality and quantity mitigation unless projects are designed specifically to address those concerns and obligations. This project offers an opportunity for the partnering with the development community that has historically impacted water resources to be part of the solution and the Township MS4 Program moving forward.

Stormwater Management

The submitted application has been reviewed in accordance with the criteria set forth in the Westtown Township Zoning Ordinance, Chapter 170-2009, Conditional Uses, in accordance with the following section:

§ 170-2009.B.(3)(d) – The application shall include sufficient information, e.g., preliminary site grading and road profiles, preliminary stormwater management analysis, etc. to preliminarily determine compliance with the Township natural feature, site analysis, conservation district design process (if applicable) and density requirements.

This letter addresses the preliminary stormwater management design to ensure that sufficient supporting information has been provided to substantiate that the proposed stormwater management facilities are of sufficient size and configuration to not adversely affect features currently shown in proximity to the basins, including the riparian buffers (Stormwater Management Ordinance 144-301.U) and the proposed sewage effluent disposal areas shown on the plans.



The referenced information has been reviewed in accordance with the applicable provisions set forth in Chapter 170, Zoning Ordinance (Section 170-900 applicable to the Flexible Development Procedure) and Chapter 144, Stormwater Management, and Chapter 149, Subdivision and Land Development (as required by Section 170-905.(A), Zoning Ordinance), Township of Westtown Ordinances.

The following comments are offered for your consideration:

Chapter 170 - Zoning:

1. *§ 170-905.A.(2) – Finished Topography: The finished topography of the site shall adequately facilitate the proposed development without excessing earthmoving tree clearing, or destruction of natural amenities. Natural features such as lakes, streams, and wooded slopes shall be preserved and incorporated into the final landscaping of the development where possible and desirable. The applicant shall demonstrate the means whereby trees and other natural features shall be protected during construction.*

The grading as currently shown is incomplete and is only shown within the proposed roadway rights-of-way and at each stormwater management facility. Proposed grading shall be shown throughout the entire site, including the areas of the proposed dwellings, to demonstrate compliance with this section of the Ordinance and to confirm that no disturbance shall be required within the riparian buffers or sewage effluent disposal areas.

2. *§ 170-905.A.(5) – Erosion and sedimentation control: An erosion and sedimentation control plan shall be filed and implemented in accordance with the regulation of the Pennsylvania Department of Environmental Protection and the requires of Chapter 149, Subdivision and Land Development.*

An Erosion and Sedimentation Control Plan shall be provided to ensure proposed erosion and sedimentation control facilities will not require encroachment into the riparian buffer and sewage effluent disposal areas.

Chapter 149 - Subdivision and Land Development:

3. *§ 149-803.B(1)) – General requirements. For all subdivision and land development proposal, a stormwater management plan and report shall be submitted containing, but not limited to the following*
 - *(e) A plan of the grading of the subject subdivision or land development*
 - *(f). A plan of the erosion and sedimentation procedures to be utilized.*

The referenced information shall be provided as referenced above.

4. *§ 149-803.B(3) – The stormwater management plan shall consist of written material, calculations, and topographic plan drawn to the same scale and the preliminary and or/ final plan. The stormwater management plan shall include, but not be limited to: Storm Sewer System.*
 - *(a) Storm sewer design shall meet the requirements of PennDOT 408 Standards.*
 - *(f). Calculations shall be provided to show the flow in the system, pipe size, allowable flow, and velocity*

Storm sewer and inlet locations along with supporting calculations must be provided to confirm the post development drainage areas as shown on the Post Developed Drainage Area Plan, Sheet 2 of 2. Invert



elevations shall be provided to confirm that runoff can be adequately conveyed to the facility in which it was intended.

5. § 149-803.B(4) – *The stormwater management plan shall consist of written material, calculations, and topographic plan drawn to the same scale and the preliminary and or/ final plan. The stormwater management plan shall include, but not be limited to: Detention/retention basins. All basins shall be constructed to include, but not be limited to, the following standards:*
- (a) *Berm construct of earth of a clay base with no topsoil and a cutoff trench key continuous along the berm base.*
 - (b) *The top of the berm shall be a minimum of 10 feet. The sides shall have a maximum slope of three horizontal to one vertical (3:1)*
 - (d) *The riser shall be precast concrete, box inlet or equivalent with grate top and shall be built into the berm wherever possible.*
 - (e) *The barrel shall be concrete pipe with anti-seep collars with a minimum projection of two feet beyond the pipe.*
 - (f) *Emergency spillway shall be constructed of concrete/grass pavers. Pavers shall extend down the basin slopes at the spillway location.*
 - (g) *Basin barrel outfall shall have an end wall or flared end section with properly design riprap or energy dissipaters.*

The referenced information shall be shown on the plan as applicable, to confirm that encroachment into the riparian buffer and sewage effluent disposal areas is not required.

Chapter 144 - Stormwater Management:

6. § 144-301.G - *For regulated activities with one acre or more of proposed earth disturbance, existing drainage peak rate discharges up to and including the one-hundred year storm onto or through adjacent properties or down-gradient properties, including diffuse drainage discharge, shall not be altered in any manner without written permission from, and where applicable as determined by the municipality and easement agreement with , the affected landowner(s) for conveyance of discharges onto or though their property(ies). Such discharge shall be subject to any applicable discharge criteria specified in this chapter.*

Basin C-1 proposes discharge overland and through properties located on the east side of Wilmington Pike, prior to being conveyed to Walton's Run. Executed easements or other written documentation as deemed acceptable by the Township Solicitor will need to be provided from the affected landowners.

7. § 144-301.J - *For all regulated activities, erosion and sediment control BMPs shall be designed, implemented, operated, and maintained during the regulated activity (i.e. during construction) as required to meet the purposes and requirements of this chapter, to meet the erosion and sediment control requirements of the municipality, if applicable, and to meet all requirement under Title 25 of the Pa. Code and the Clean Streams law.*

Erosion and Sedimentation Control facilities shall be shown on the plan to confirm that encroachment into the riparian buffers and sewage effluent disposal areas is not required.

8. § 144-301.K - *For all regulated activities, permanent BMPs and conveyances shall be designed, implemented, operated, and maintained to meet the purposes and requirement of this chapter and to*



meet all requirements under Title 25 of the Pennsylvania Code, the Clean Streams law, and the Stormwater Management Act.

Post Construction Stormwater Management Plans must be provided along with supporting calculations which confirm that the water quality / runoff volume requirements, infiltration requirements, and stream channel protection requirements referenced in Sections 144-305 through 307 can be met for watersheds A-D. Additional BMPs will be required if the referenced criteria cannot be met, which has the potential to increase disturbed area and possibly affect the riparian buffer and sewage effluent disposal areas.

9. *§ 144-301.Q - Applicants shall utilize the Pennsylvania Stormwater Best Management Practices Manual (PA BMP Manual), as amended, or other sources acceptable to the Municipal Engineer, for testing and design standards for BMPs, and , where there is a conflict with the provision of this chapter , the most restrictive applies.*

Infiltration testing and BMP design shall comply with the Pennsylvania Best Management Practices Manual, Appendix C. Upon review of the test pit location reference on the plans and the depth of testing referenced in Section 7 of the report, there are numerous discrepancies between the elevation of the infiltration test and the bottom of the corresponding basin. Examples of these discrepancies include:

- Basin A5 vs. Test Pit #3 – The bottom of the basin (elev. 314) is approximately 8.5 feet lower than the elevation tested (elev. 322.5), per the testing locations shown on the Drainage Area Plan.
- Basin A6 vs. Test Pit #1 – The bottom of the basin (elev. 296) is approximately 10 feet lower than the elevation tested (elev. 306), per the testing locations shown on the Drainage Area Plan.
- Basin A7 vs. Test Pit #12 – The bottom of the basin (elev. 262) is approximately 9 feet lower than the elevation of the infiltration test (elev. 271.5), per the testing locations shown on the Drainage Area Plan.

In addition, all testing shall occur within immediate vicinity of each proposed basin. Additional testing shall be required for Basins A-4, A-5, A-9, and A-10, as the plans currently do not show test pit locations in these areas.

The above will require redesign of the BMP facilities as shown and will potentially require enlarging and reconfiguration of these facilities, which may result in encroachment within the riparian buffers and sewage effluent disposal areas.

10. *§ 144-301.U - Riparian Buffer:*
- (1) *Where a development site is traversed by perennial or intermittent watercourse, riparian buffers shall be provided conforming to the line of such watercourses. The riparian buffer shall be created to extend a minimum of 75 feet to either side of the top of the bank of the channel, unless a wider riparian buffer is required by the provisions of the Pennsylvania Code Chapter 102, as amended, in which case the greater of the two shall apply.*
 - (2) *If the applicable rear or side yard setback is less than 75 feet, the buffer wide may be reduced to 25 feet of the setback to a minimum of 10 feet. If an existing buffer is legally prescribed (e.g., deed covenant, easement, etc.) and it exceeds the requirement of this chapter, the existing buffer shall be maintained.*
 - (3) *The buffer shall be maintained with appropriate native vegetation as defined I the appendices of the Pennsylvania Stormwater Best Management Manual, dated December 30, 2006. Excavating, placing fill, building structures, or making any alteration s that may adversely affect the flow of*



stormwater within any portion of the riparian buffer shall be prohibited unless the proposed work is associated with a regulated wetlands mitigation program.

- (4) *The buffer must be defined through a deed restriction.*
- (5) *The riparian buffer shall be built in accordance with Section 170-407 of the Westtown Township Zoning Ordinance.*

The following information shall be provided on the plan:

- Riparian buffers as referenced above shall be included within a defined easement where the buffer encroaches within the area of a building lot.
- Site grading shall be completed to include all areas surrounding the proposed buildings to demonstrate that disturbance to the riparian buffers will not be required.

11. *§ 144-305.A - The post-construction total runoff volume shall not exceed the predevelopment total runoff volume for all storms equal to or less than the two-year, twenty-four-hour duration precipitation (design storm). The water quality and runoff volume to be managed shall consist of any runoff volume generated by the proposed regulated activity over and above the predevelopment total runoff volume and shall be captured and permanently retained or infiltrated on the site. Permanent retention options may include, but are not limited to, reuse, evaporation, transpiration, and infiltration.*

The report currently is lacking information to support compliance with the referenced section. Along with any redesign that may be required based upon the above referenced comments pertaining to infiltration testing, information must be provided to support compliance with the above, to include at a minimum NOI Appendix D Worksheets 4 and 5, complete for all watersheds. Without this information, it cannot be determined whether the facilities as shown are of proper size and volume, and whether these facilities may need to be enlarged and reconfigured.

12. *§ 144-305.E - Water quality improvement shall be achieved in conjunction with achieving the infiltration requirements of § 144-306. The infiltration volume required under § 144-306 may be included as a component of the water quality volume. If the calculated water quality and runoff volume is greater than the volume infiltrated, then the difference between the two volumes shall be managed for water quality and runoff volume control through other techniques or practices but shall not be discharged from the site.*

Additional BMPs will be required for all excess water quality runoff not adequately infiltrated, as may be required for Watersheds A-D. NOI Appendix D Worksheets 4 and 5 shall be provided for Watersheds A-D to confirm compliance.

13. *§ 144-305.H - When the regulated activity contains or is divided by multiple drainage areas, the water quality and runoff volume shall be separately addressed for each drainage area.*

§ 144-306.G - When a project contains or is divided by multiple watersheds, the infiltration volume shall be separately addressed for each watershed.

Applicable NOI Appendix D Worksheets shall be provided for Watersheds A-D.

14. *§ 144-306.J - Infiltration BMPs shall be selected based on suitability of soils and site conditions and shall be constructed on soils that have the following characteristics:*



- (1) A minimum depth of 24 inches between the bottom of the BMP and the top of limiting zone. Additional depth may be required in areas underlain by karst or carbonate geology (See 144-306N).
- (3) The infiltration facility shall completely drain the retention (infiltration) volume within three days (72 hours) from the end of the design storm.

The stormwater report shall include supporting information demonstrating compliance with the above criteria.

15. § 144-306.K(4) - *All infiltration practices shall be consistent with the protocol written in the Pennsylvania Stormwater Best Management Practices Manual, December 2006 or latest version thereof.*

The proposed design shall reflect the following criteria to ensure proper sizing and configuration of the proposed stormwater management facilities: CEG recommends utilizing BMP Stormwater Chart 5.B for clarity:

- Infiltration rates for each facility, with safety factor of 2 applied.
 - Facility dewatering time, demonstrating that the BMP will dewater between 24 and 72 hours.
 - Elevation of limiting zone and corresponding elevation of infiltration facility, verifying that a minimum distance of two feet is maintained between the respective elevations.
 - Impervious and Total Drainage Area Loading ratios, indicating that respective 5:1 and 8:1 ratios are maintained.
16. § 144-307.B - *To the maximum extent practicable, and unless otherwise approved the Municipal Engineer, the post-construction one-year twenty-four hour storm flow shall be detained for a minimum of 24 hours and a maximum not to exceed 72 hours from a point in time when the maximum volume of water from the one-year twenty-four hour storm is stored in a proposed BMP (i.e., when the maximum water surface elevation is achieved in the facility). Release of water can begin at the start of the storm (i.e. the invert of the orifice at the invert of the proposed BMP).*

Supporting calculations shall be provided for each BMP demonstrating that the facilities will dewater within the referenced timeframe. If sufficient dewatering cannot be achieved, additional BMPs may be warranted which potentially may require expansion of the site disturbed area and encroachment within the riparian buffer and sewage effluent disposal areas.

17. § 144-309.A - *Post-construction peak flow rates from any regulated activity shall not exceed the predevelopment peak flow rates as shown for each of the design storms specified in Table 308.1:*

Per the referenced Table 308.A, post-development flow shall be reduced to equal or less than pre-development flows for storms of 5-100-year frequency, with the post development 2-year frequency storm reduced to equal or less than a 1-year post development frequency storm. The following revisions and/or clarifications shall be provided to support the size and configuration of the stormwater facilities as shown, and to confirm that expansion into the riparian buffer and sewage effluent disposal areas is not required:

- Hydrographs must be included for all pre and post development storms to support the flow values referenced in Section 2 of the Report.
- Allowable post development flow for the 2-year frequency storm, for each drainage area point of interest, shall be determined by adding the peak flows of each subarea within the watershed. As a result, the 2-year post development flows exceed the respective 1-year frequency



predevelopment flows for watersheds A-D and therefore do not comply with the referenced section of the Ordinance. Stormwater management design shall be revised accordingly.

- The time of concentration flow path associated with predevelopment Drainage Area A will need to be extended to encompass the entire watershed, with the flow path beginning at the eastern end of the watershed. This will result in a decrease of pre-development flow values for the storm.
- Time of concentration worksheets must be provided for all post development flow and shall be incorporated into the hydrographs to be provided with the report. Only pre-development worksheets are currently included.
- A Manning's n-value of 0.24 (dense grass) shall be used to compute Sheet Flow travel time, rather than the 0.17 (cultivated soil) value used, to be consistent with pre-development meadow condition as required by Ordinance.

18. § 144-309.D(3) - *The following additional ground cover assumption shall apply to regulated activities within the Chester Creek Watershed*

- (b) *For the purposes of predevelopment flow rate determination, undeveloped land shall be considered as "meadow" good condition, type "B" soils (RCN=58, Rational "C"=0.12) unless the natural ground cover generates a lower curve number or Rational "C" value (i.e. forest). If a proposed development meets the definition of redevelopment as defined in this chapter, the, applicant may adjust the predevelopment RCN of "C" value based on the curves presented in Figure B-3.*

The runoff curve number calculation for Pre-Developed C1 shall be revised to include all Meadow area as Type B with a CN value of 58. Proposed Basin C may need to be enlarged and reconfigured to meet this requirement; updated grading of the basin shall be required to ensure it will not encroach within the upslope sewage effluent disposal area.

In summary, the submission as provided does not provide sufficient stormwater management analysis to preliminarily determine compliance with the Township natural feature, site analysis, Conservation District design process and density requirements.

Additional comments shall be forthcoming upon receipt of the requested information listed above. If you have any questions, please do not hesitate to contact me.

Best Regards,
CEDARVILLE Engineering Group, LLC

Robert E. Flinchbaugh, P.E.
Senior Municipal Engineer

cc: Kristen Camp, Esq. – Buckley Brion McGuire & Morris LLP (kcamp@buckleyllp.com)