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851 Chemung Street  
Horseheads, New York 14845

January 5, 2017

Mr. Brad Lytle, Village Manager  
Village of Horseheads  
202 South Main Street  
Horseheads, New York 14845

**Re: Villas at Gardner Road  
Gardner Road, Village of Horseheads  
Review of Stormwater Pollution Prevention Plan**

Mr. Lytle:

I have completed a review of the following submitted items for the above-referenced project regarding the proposed stormwater management system for that project.

- Stormwater Pollution Prevention Plan (SWPPP) for Villas at Gardner Road - Horseheads, NY, Stamped by a NYS Licensed Professional Engineer, Prepared by Fagan Engineers, Prepared for Barrington Associates, Revision dated December 2016, Received December 7, 2016
- Site Plan Drawings for Villas at Gardner Road, Village of Horseheads, Chemung County, NY, Stamped by a NYS Licensed Professional Engineer, Prepared by Fagan Engineers, Revision dated December 2, 2016, Received December 7, 2016
- Response letter to the Stormwater Coalition's November 22, 2016 drainage review letter, Prepared by Fagan Engineers, Dated December 7, 2016

My review comments and questions regarding the SWPPP and stormwater management system for the above-referenced project, based upon the submitted information, are as follows.

**I. STORMWATER MANAGEMENT**

1. As per Test Pit # Probe 1 (Site 1), well graded sand and gravel is located at an approximate depth of 3 feet, with a silt/clay layer above. Furthermore, as per the Infiltration Test Data Log for Site 1, the test hole depth for the infiltration tests was 54 inches. As per the grading plan, the bottom of the proposed infiltration basin shall be roughly 3 to 4 feet below the existing grade.

In regards to modeling the performance of the proposed infiltration basin, a design infiltration rate of 10 inches per hour is used which is applied over the plan area of the basin to calculate the infiltration (flow) capacity of the basin (expressed as cubic feet per second). Accordingly, to be consistent with the intent of the design, it would be important to expose the well graded sand and gravel layer over the entire bottom of the infiltration basin. It is recommended that the plans clearly note that the sand/gravel layer shall be exposed along the entire bottom of the proposed infiltration basin.

Alternately, additional soil testing should be completed for the silty/clay soil layer, if that silty/clay layer is to remain at the bottom of the basin, and that data utilized in the modeling of the performance of the basin. In regards to the proposed low flow channel, I believe that it would act to improve the performance of the basin, but would also be prone to clogging over time.

2. In regards to the modeling of the proposed infiltration basin, the following items are noted.
  - It appears that the forebay was modeled such that it would infiltrate at a rate of 10 inches per hour. This is contrary to the SWPPP narrative, which indicates that the forebay was assumed not to infiltrate.
  - In regards to the Stage versus Storage characteristics for the proposed infiltration basin, it appears that the volume of the forebay was inadvertently included with the volume of the infiltration basin at elevations above 920 feet. From the submitted calculations, it appears that the forebay was modeled with its own specific Stage versus Storage characteristics. Hence, the storage offered by the forebay may have been mistakenly considered twice in the calculations.

### **III. STORMWATER COLLECTION & CONVEYANCE**

#### General

1. Upon a recent discussion with the Village Street Superintendent, it was indicated that the developer's engineer has not reviewed the details of their proposed street and drainage design with him to date. Furthermore, it was noted the question of ownership/maintenance of the streets and drainage system is an important consideration, as it would impact the drainage design. For example, if the Village is to own the streets, a drainage system for the proposed cul-de-sacs would be required to address potential icing issues. Also, potential concerns regarding the long-term maintenance of the proposed stone-lined swales was also noted, as well as the depth of the proposed storm sewer.

#### Hydraulic Sizing

1. In regards to the proposed CB-1 and CB-2, will the inlet grates for these be situated within topographic depressions, improving the respective hydraulic capture efficiencies. The plans should clearly detail this associated grading. The ability of these inlets to collect peak stormwater flow rates should be evaluated.
2. As per the submitted calculations, the hydraulic capacity of CB-3 and CB-3A is noted as being 12.7 CFS/each. Given the potential for debris accumulation on these grates, the ability of these to reliably accommodate peak flows from certain significant storm events may be questionable and should be reviewed.

#### Storm Sewer & Culvert System

1. The proposed 24-inch diameter storm sewer between CB-1 and End Section-1 is shown to be approximately 4 feet (horizontally) from the proposed building on Lot #3. Furthermore, depending upon the elevation of the foundation for the proposed home, the elevation of this proposed storm sewer could be near or possibly below this foundation elevation. Given these items, the location of this proposed storm sewer in relation to the adjacent proposed building could be problematic for both the homeowner and the entity responsible for the maintenance of this storm sewer. As one example, if a repair to this storm sewer is needed and excavation of it is required, the excavation would be difficult (owing to the close proximity of the adjacent building) and could negatively impact the structural integrity of this building's foundation. Given these considerations, it is recommended that alternatives be explored to address this issue.

2. The Top of Grate elevation for CB-1 does not match between the Utility Plan (Sheet C6) and the storm sewer profile on Sheet C8.
3. In regards to the Rip-Rap Outlet Apron Detail on Sheet C10, does the "Medium Fill" and "Light Fill" intend to refer to Stone Filling per Section 620 of the NYSDOT Standard Specifications? If so, this should be clearly noted on this detail.

#### Drainage Swales

1. Will the proposed drainage swale on and near Lot #18 that would receive runoff from the adjacent cul-de-sac be prone to erosion? As per Sheet C9, this proposed swale is not shown to receive a stone lining (or other means to control erosion).
2. As noted previously, a proposed drainage swale is shown passing through the proposed building on Lot #20. As noted in Fagan Engineer's December 7, 2016 letter, "*The standard layout home will not fit Lot #20. An alternate layout will be required for the homeowner of this lot. This will be approved by the Village of Horseheads Stormwater Management Officer during the building plan approval process*".  
  
It is recommended that the plans be corrected to show a proposed footprint for the proposed building on Lot #20 that does not conflict with the proposed swale and is located outside of the associated easement for this swale.
3. As per the submitted hydraulic sizing calculations for the proposed stone-lined and grassed ditches, a maximum side slope of 3 horizontal:1 vertical is utilized. On the contrary, the "Typical Drainage Swale Section" on Sheet C5 and the "Typical Roadway Section" on Sheet C7 indicate a side slope of 2 horizontal:1 vertical. It is recommended that these details be modified to show the side slope used in the calculations.
4. In regards to the "Phase II Circle Swale", the sizing/design of this swale was based on a slope of 11 percent, although it appears that a portion of this swale is at a steeper slope. Similarly, where the proposed swales discharge to the proposed forebay, steeper slopes appear to exist.

#### Easements

1. Appropriate easements for the proposed stormwater collection and management system should be shown on the plans.

#### **IV. OPERATION & MAINTENANCE PLAN**

1. The Operation & Maintenance Plan should indicate that appropriate maintenance of the infiltration basin shall be implemented to restore the infiltration capacity of this basin, when the effective infiltration rate of the basin drops below the design infiltration rate of 10 inches per hour.
2. Maintenance and inspection requirements for the proposed stormwater collection system (including the proposed stone-lined swales) should be included in the Operation & Maintenance Plan.

**V. UNRESOLVED ITEMS**

1. As per Fagan Engineer's December 7, 2016 letter, the following items have not been resolved at this time. These items pertain to the operation and maintenance of the proposed stormwater facilities and are important considerations that would impact the long-term performance of the proposed stormwater management system.

- a. The entity who shall own and be responsible for the long-term maintenance of the stormwater collection and management system has not been established to date. As noted previously, this would impact the design of the stormwater collection system.
- b. If the proposed stormwater facilities are to be in private ownership, in accordance with the Village's Stormwater Management and Erosion and Sediment Ordinance, a formal, signed enforceable operation and maintenance agreement for the stormwater collection and management system shall be provided by the Applicant. Furthermore, this agreement must reference and include an approved Operation & Maintenance Plan that are specific to the proposed stormwater management practices. It is recommended that the O & M Plan outline steps and measures to be implemented if operational/performance issues are encountered with the proposed stormwater infiltration system.

This agreement shall be binding on all subsequent landowners and recorded in the office of the County Clerk as a deed restriction on the property. Also, the Applicant shall convey to the Village easements and/or rights-of-way to assure access for periodic inspections by the Village or their representatives (and for maintenance if required). These agreements, as well as the Operation & Maintenance Plan, shall be subject to the review and approval of the Village of Horseheads, their attorney, and Chemung County Stormwater Coalition.

- c. Appropriate easements provided over the various proposed stormwater drainage system (including swales, storm sewers, and the infiltration basin)
- d. A means for vehicular access such to allow for the maintenance of the proposed stormwater forebay and infiltration basin

If you have any questions or comments regarding this letter, please do not hesitate to contact me. Furthermore, I would be happy to meet to discuss this project in greater detail.

Sincerely,



Jimmie Joe Carl, P.E.

Cc: Matt Mustico, Village Street Superintendent  
Attorney John Groff  
Fagan Engineers