Ebert Engineering, Inc.

Water and Wastewater Engineering

November 13, 2025

Mr. Maximilano Bustos
Toll Brothers, Inc.
1140 Virginia Drive
Fort Washington, PA 19034

Subject: Bennett Property Sewer Feasibility Study
Re: Individual On-lot Systems and Public Water
EE, Inc. No.: 085-005

Dear Mr Bustos:

Ebert Engineering, Inc. (EE, Inc.) has prepared this Sewer Feasibility Study for the Bennett Property development that is being proposed by Toll Brothers, Inc. The Bennett Property development is a proposed residential development consisting of forty nine (49) single family houses in West Vincent Township, Chester County, Pennsylvania. It is proposed to construct forty seven (47) new single family houses and retain two (2) existing single family houses.

The proposed Bennett Property development will be serviced by public water and individual on-lot wastewater disposal systems. This report focuses on the feasibility of meeting the long term wastewater needs of the proposed development through the use of individual on-lot wastewater disposal systems located on each proposed lot. This feasibility study was completed based upon the soil works that was completed by Willow Run Consulting, Inc. and summarized in their March 10, 2025 letter which is contained in Exhibit One to this study. The soil log and test pit plan completed by Willow Run Consulting are also included in Exhibit One. As part of the overall evaluation of the individual on-lot disposal system, Geo-Technology Associates, Inc. performed a Nitrogen Mass Balance Evaluation of the property and summarized their calculations and findings in a report dated October 31, 2025 that is contained in Exhibit Two. It is noted that the Geo-Technology Associates, Inc. report was based upon a total of fifty lots and the proposed development will only contain forty-nine lots.

The West Vincent Township Act 537 Plan identifies this property as being in an area that is to be serviced by individual on-lot wastewater disposal systems. While there is public sanitary sewer system nearby it is located in another municipality (Upper Uwchlan Township), the option to connect to that public sanitary sewer system would not be consistent with the West Vincent Township Act 537 Plan. There are two public sanitary sewer systems in West Vincent Township that are owned and maintained by the Bucks County Water and Sewer Authority. The Bennett property is not located in either of the two existing West Vincent Township public sanitary sewer service areas. There is also no available excess sanitary sewer capacity in either of those service areas.

In order to be consistent with the existing West Vincent Township Act 537 Plan, the use of individual on-lot wastewater disposal systems was evaluated. This involves first confirming if there are soils on the property are suitable for individual on-lot wastewater disposal systems. The first step in this process was the review of the existing soils mapping available for the

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property. The results of this analysis showed that the mapped soils were suitable for individual on-lot wastewater disposal systems. The next step was to have a certified soil scientist perform test holes to verify the soils mapping in the field. This work was completed by Willow Run Consultants, Inc. with the results of their field verification work contained in Exhibit One. The field verification work was compromised of twenty four (24) test pits. The test pits were located across the site at key points of interest to confirm that the soils on the site could be utilized for individual on-lot wastewater disposal systems. It is noted that some areas of the site were not able to be tested as they were in established crop fields that were not harvested. Generally existing agricultural fields that are actively being farmed have the better soils on the property.

The test pits and the summary report prepared by Willow Run Consultants, Inc. concluded that the test pits identified soils that were suitable for individual on-lot wastewater disposal systems. There were some areas that did contain rock and mottling but they were at a depth deep enough to be considered suitable for individual on-lot wastewater disposal systems. The results of the soil testing identified that a combination of inground system and elevated systems (i.e. sand mounds) will be required.

The next step was to have a Nitrogen Mass Balance evaluation performed to confirm that the installation of forty nine individual wastewater disposal system would not increase the off-site groundwater nitrate-nitrogen concentration above the safe drinking water level of 10 mg/l. This work was completed by Geo-Technology Associates, Inc. and the results are contained in Exhibit Two. The first step in this process was to identify the background nitrogen levels. This was done by testing six existing wells that were located on the site in the vicinity of Lots 5, 24, 25, 33, 34 and 36. The results of the background sampling identified a background nitrate level of 1.73 mg/l.

The Nitrogen Mass Balance calculations were performed assuming an average number of four bedrooms per house and a flow of 500 gpd per house. The calculations were based upon fifty lots and a total flow of 25,000 gpd. The average wastewater flow for all lots was estimated to be 16,667 gpd by dividing the peak daily flows by 1.5 to calculate the average daily wastewater flow that will be generated. The calculations were then performed utilizing a recharge value of 13 inches per year and nitrate concentration of 45 mg/l per the PA DEP requirements. The background nitrate concentration was 1.73 mg/l based upon the background sampling results. The result of the calculation was a nitrate concentration of 5.5 mg/l. The calculated result is less than the maximum concentration of 10 mg/l. This demonstrates that the installation of the individual on-lot wastewater disposal systems will not adversely impact the groundwater quality and comply with the requirements to not impact off-site water usage.

During the land development process additional soil testing and deep hole percolation testing will be required for the PA DEP Sewage Facilities Planning process. The applicant will need to identify both a primary and a secondary disposal area on each lot. This will need to be witnessed and approved by the Chester County Health Department. This is done in the normal course of the overall land development approval process.

It is currently proposed to extend public water to the development to provide safe drinking water for the proposed development. This will assist in the design of the individual on-lot wastewater disposal system as each lot will not be constrained by the isolation distance from an existing or proposed drinking water well. The location of both the primary and secondary disposal areas will need to be identified on each lot on the land development plans after the testing has been completed on each lot.

The result of this study is that individual on-lot wastewater systems are a feasible alternative to meet the long wastewater treatment and disposal needs of the proposed residential development. This alternative is consistent with the West Vincent Township Act 537 Plan and will not impact the offsite water usage. The extension of the existing public water system to service the proposed development will meet the long term potable water demands. The utilization of individual on-lot wastewater disposal system and the extension of the public water supply will not have a negative impact on the local aquifer that is utilized by the surrounding properties as a source of safe drinking water.

The above conclusions are based upon the initial soil and water testing results that were performed by others and provided to Ebert Engineering, Inc. There will be additional soil and groundwater testing required during the land development approval process to design and permit the individual on-lot wastewater disposal systems on each lot.

Should you have any questions concerning this matter or require any additional information, please feel free to contact me.

Very truly yours,

Frederick E. Ebert, P.E.
President

Enclosures

COMMONWEALTH OF PENNSYLVANIA
REGISTERED PROFESSIONAL
FREDERICK ERICK EBERT
ENGINEER
PE063096

EXHIBIT ONE

Willow Run Consulting, Inc.
166 Hemlock Drive Cochranville, PA 19330
610-345-1400 ed@willowrunconsulting.com

March 10, 2025

Toll Brothers, Inc.
Mr. Max Bustos
1140 Virginia Drive
Fort Washington, PA 19034

RE: Bennett Property
West Vincent Township, Chester County, PA

Dear Max,

Willow Run Consulting, Inc. (WRCI) completed soils evaluations throughout the Bennett property to determine soil suitability and potential limiting zones on the property related to utilizing on-lot septic disposal systems for the project. Soil suitability for on-lot septic disposal systems is determined by several factors, including 1. Rock and high coarse fragment content 2. Redoximorphic features (commonly called mottling) 3. High water table 4. Slopes / topography and 5. Percolation rates.

Overall, the test pits we evaluated were generally suitable for on-lot septic disposal. We did find rock and high coarse fragments in many test pits and some mottling was encountered in test pits at the lower elevations on the property. Suitable soil for on-lot septic systems can include in-ground absorption areas such septic beds or trenches, or elevated septic systems such as sand mounds or at-grade systems.

There are some areas of concern which we have listed below.

1. The existing conditions of the ground in the areas of lots 1-9 and 43-49 contain very irregular topography. This topography appears to have been previously graded to likely control/divert stormwater runoff. These features can create difficulties in placement of septic systems in order to meet all of the requirements for on-lot septic disposal.
2. In addition to the irregular topography mentioned above, there is a pronounced swale cutting down though that area. Depending on where the actual lot lines and corners are, there could be some issues with suitability if we need to test in the swale because portions of the swale could contain unsuitable soil.
3. For on-lot septic systems, the regulations require absorption areas to be at least 10 feet away from 25% or greater slopes, at least 10 feet from all property lines and 100 feet from all wells. Absorption areas may not be in areas of disturbed soil. All of the area of grading around the proposed houses would not be suitable for placement of absorption areas.
4. One of the requirements for subdivisions proposing to use on-lot septic disposal is an initial submission of information to PADEP. They will then provide a response directing what their requirements will be for our work. PADEP will almost certainly require a preliminary hydrogeologic study for this project. That study will determine the minimum lot size needed.

We witnessed several wells on the property that appear to be monitoring wells to be used for a preliminary hydro study. We don't know if this is something being worked on or already completed, or if it will still need to be done. We should have a discussion on this topic to determine how this will impact this project.

<u>Summary of Findings and Expectations:</u>

The rock and mottling limiting zones we encountered were deep enough that they would be considered suitable for on-lot disposal. Some of these systems could be in-ground systems and some of these systems would be elevated systems. While some lots will be very tight fitting these systems, it appears that if suitable soil is found, it will be possible for these systems to fit.

We did review the existing lot layout related to the utilization of individual wells on the properties instead of public water. With the current layout, it appears that individual wells will not create any isolation distance problems. Septic system placement would be prioritized.

Per township ordinance, we are required to test for suitable primary and replacement area septic systems.

Thank you for allowing WRCI to complete this work on your project! We welcome the opportunity to review this information with you and look forward to continuing assisting with the successful completion of the project.

Sincerely,
WILLOW RUN CONSULTING, INC.

Edward Beideman
President

Bennett Property

Preliminary test pit summary

West Vincent Township

Test Pit #	Summary of Findings (each of these test pits would be suitable for septic system)
1	Rock limiting zone of 20". Unable to dig past 60" due to rock content.
2	Rock limiting zone of 20". Unable to dig past 36" due to rock content.
3	Soil was good with no limiting zone. Test pit was gravelly from 60" to 84".
4	Soil was good to 36". Pockets of rock below. Rock limiting zone of around 60".
5	No limiting zone found. No rock. Some silt loam and some clay loam. Would likely be deeper system.
6	Rock limiting zone of 36". Some mottling above 32". Heavy clay loam and rocky.
7	No limiting zone found. No rock. Mostly silt loam. Would likely be deeper system.
8	Rock limiting zone of 30". Unable to dig past 50" due to rock content.
9	No limiting zone found. Very little rock. Heavy silt loam down to 48". Would likely be deeper system.
10	Soil was good to 58". Pockets of rock below. Rock limiting zone of around 74".
11	No limiting zone found. Very little rock. Heavy silt loam down to 48". Would likely be deeper system.
12	Mottling limiting zone at 22". Some rock (approx. 30%) rock. Heavy silt loam and moist.
13	Mottling limiting zone at 24". Some rock (approx. 30%) rock. Heavy silt clay loam.
14	No limiting zone found. Very little rock.
15	No limiting zone found. Very little rock.
16	Rock limiting zone of 36". Clay loam.
17	Mottling limiting zone at 36". Pretty Rocky (approx. 50%) rock. Silt clay loam and moist.
18	Rock limiting zone of 48". Rest of pit rocky (approx. 30%).
19	No limiting zone found. Very little rock.
20	Rock limiting zone of 60". Rest of pit rocky (approx. 40%).
21	No limiting zone found. Heavy Lo to 36". Would likely be deeper system. 30% rock.
22	Rock limiting zone of 65". Rest of pit rocky (approx. 40%).
23	Rock limiting zone of 48". Rest of pit rocky (approx. 30%).
24	Rock limiting zone of 60". Heavy Loam to 40".

EXHIBIT TWO

GEO-TECHNOLOGY ASSOCIATES, INC.

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GTA 40 years Established 1985

October 31, 2025

Toll Brothers
1140 Virginia Drive
Fort Washington, PA 19034

Attn: Mr. Max Bustos

Re: Report of Mass Balance Evaluation
Bennett Property
Chester County, Pennsylvania

Dear Mr. Bustos:

In accordance with our Agreement dated October 23, 2025, Geo-Technology Associates, Inc. (GTA) has performed a mass balance evaluation for the above-referenced site in Chester County, Pennsylvania. GTA's services included the review of site plans, existing site information, published hydrogeologic literature and topographic maps - and groundwater quality sampling and a mass balance analysis. The purpose of the work summarized herein was to evaluate potential groundwater quality impact due to proposed on-lot wastewater disposal. The results of the evaluation are summarized herein.

1.0 Site Description and Proposed Development

The site is composed of approximately 181 acres and is situated immediately east of the junction of St. Matthews Road with Chester Springs Road in Chester County, Pennsylvania. Test well locations are indicated on the *Overall Proposed Site Plan*, prepared by ESE Consultants, Inc. and dated July 3, 2025 (Plan). The Plan indicates undulating topography at the site, with ground surface elevations ranging from about EL. 390 in the southeastern portion of the site to about EL. 580 at the western portion of the site. At the time of this evaluation, the site consisted primarily of agricultural lands with existing residences and outbuildings situated at the central and eastern portions of the site.

GTA understands, based on review of the Plan and discussion with Client, the site is proposed for development with 50 single-family residential lots, including 48 new and 2 existing single family home lots. GTA understands that the residential lots are proposed be serviced by on-lot wastewater disposal systems. For the purposes of this evaluation, it is assumed that the average number of bedrooms per single family dwelling is 4, translating to a wastewater design flow of about 500 gallons per day (gpd) per lot, or a combined 50-lot design flow of 25,000 gpd dispersed throughout the site. The average wastewater flow for all lots combined is estimated at about 16,667 gpd total, obtained by dividing the design flow by 1.5.

2.0 Geology and Recharge

According to the *Geologic Map of Chester County*, included in *Water-Resources Investigations Report 77-67* (WRI 77-67) prepared by the United States Geological Survey (USGS) and dated 1977, the site is underlain primarily by the graphitic gneiss, with an area of metadiabase mapped near the east-central portion of the site. WRI 77-67 describes graphitic gneiss as medium-grained gneiss and schist characterized by the presence of graphite, which is part of a metamorphosed sedimentary sequence that includes the Franklin Limestone. It is noted that the graphitic gneiss identified in WRI 77-67 has also been called "Pickering Gneiss" by other publications. The metadiabase is described as dikes of altered diabase, which are mostly blueish green and some green in color.

According to *Geologic Map of the Honeybrook and Phoenixville Quadrangles, Pennsylvania*, published by USGS in 1938 (USGS, 1938), the "Pickering Gneiss" formation, identified as "graphitic gneiss" by WRI 77-67, is described as graphite-bearing paragneiss intimately intruded by igneous rocks with granodiorite inclusions. The USGS (1938) also indicates that a diabase dike is situated near to the western margin of the site. According to the *Summary of Ground-Water Recharge Estimates for Pennsylvania*, published by the Pennsylvania Geological Survey (PGS) in 2010, the mean annual recharge for the area in which the site is situated ranges from 12 to 14 inches per year (in/yr); for the purpose of the mass balance analysis the mid-point of this range was used, i.e., 13 in/yr.

3.0 On-Site Background Nitrate Concentrations; Nitrogen Mass Balance Evaluation

GTA personnel collected groundwater samples from test wells (intended as future domestic water supply wells) in the vicinity of Lots 5, 24, 25, 33, 34 and 36. The samples were collected in general accordance with standard industry practice. The samples were decanted directly into laboratory-cleaned sampling containers, immediately placed on ice to maintain a temperature of 4ºC, and transported to Eurofins to be laboratory analyzed for nitrate. Concentrations of nitrate ranged from non-detect (less than 0.1 milligrams per liter [mg/L]) to 8.4 mg/L, with an average nitrate concentration of 1.73 mg/L. It is noted that the laboratory analysis of 5 of the 6 collected groundwater samples resulted in nitrate concentrations ranging from non-detect to 0.83 mg/L.

The *Statewide Mass-Balance Equation,* provided to GTA by the PADEP, was used to evaluate whether off-site groundwater nitrate-nitrogen levels would exceed the USEPA drinking water standard of 10 mg/l. A mass balance evaluation was performed for the overall site, incorporating the nitrate concentrations obtained through laboratory analysis of samples from the six aforementioned wells.

Inputs to the mass balance equation included the combined average flow of about 16,667 gpd – i.e., the combined total estimated 50-lot flow which is dispersed throughout the site (see Section 1.0 of this Report), a recharge value of 13 inches per year (See Section 2.0 of this Report), an assumed wastewater nitrate concentration of 45 mg/L (per PADEP) and a background nitrate concentration of 1.73 mg/L. The result of the mass balance evaluation indicates that the nitrate concentration in groundwater beneath the site, after assimilation of proposed wastewater flows, would be less than 10 mg/L, i.e., the calculated overall nitrate concentration after mixing of wastewater and background waters was approximately 5.5 mg/L. A *Mass Balance Calculation Sheet* is attached to this Letter.

Based on the results of the mass balance evaluation it appears that nitrate concentrations in off-site groundwater/receiving waters will not exceed the USEPA MCL of 10 mg/L due to the proposed wastewater disposal at the site. Thus, it appears, with respect to nitrate concentrations, that the proposed on-lot wastewater disposal will not adversely impact groundwater quality or existing off-site water usage.

4.0 Limitations

This Report has been prepared for Toll Brothers, in accordance with generally accepted hydrologic practice. No warranty, express or implied, is made.

The analyses and conclusions contained in this Report are based on the data obtained from existing site information. Sampling and the results of our evaluation indicate groundwater conditions only at specific locations at specific times. They do not necessarily reflect variations in water quality conditions that may exist between locations, or that may occur over time.

In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions contained in this Report should not be considered valid unless the changes are reviewed and conclusions of this Report are verified in writing. GTA is not responsible for any claims, damages, or liability associated with interpretation of hydrologic data or reuse of the hydrologic data or analysis without the expressed written authorization of GTA.

This Report and the attachments are instruments of service. If certain conditions or items are noted during our evaluation, GTA may be required by prevailing statutes to notify and provide information to regulatory or enforcement agencies. GTA will notify our Client should a required disclosure condition exist.

GTA appreciates the opportunity to have been of assistance to you on this project. Please contact our office at (410) 515-9446 if you have any questions or require additional information.

Sincerely,
GEO-TECHNOLOGY ASSOCIATES, INC.

Paul S. Scott, P.G.
Vice President

PSS/gmm
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Attachment: *Mass Balance Calculation Sheet*

GEO-TECHNOLOGY ASSOCIATES, INC.

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Bennett Property Mass Balance Calculation

PADEP Statewide Mass-Balance Equation:

$$Nr = \frac{(L)(Nw) + (R)(Nb)(A - AI)}{L + R(A - I)}$$

Nr = Average overall nitrate-nitrogen concentration (mg/l)
L = Volume of wastewater being discharged (gpd)
Nw = Nitrate-nitrogen concentration of wastewater (mg/l)
R = Average base flow volume of aquifer (gpd/sq ft)
Nb = Background nitrate-nitrogen concentration (mg/l)
A = Area of site under control of applicant or appropriate recharge basin (ft^2)
AI = Area of site covered by impervious surface (ft^2; zero value if design includes on-site stormwater recharge)

Input Parameter Values

L = 25,000 gpd ÷ 1.5 = 16,667 gpd

Nw = 45 mg/l

R = 13 in/yr. = 0.022 gpd/ft^2

Nb = 1.73 mg/l

A = 181 acres x 43560 ft^2/acre = 7,884,360 ft^2

AI = 0 (Design includes on-site stormwater recharge)

Calculation and Result

$$Nr = \frac{(16{,}667 \times 45) + (0.022 \times 1.73 \times 7{,}884{,}360)}{16{,}667 + (0.022 \times 7{,}884{,}360)}$$

Nr = 5.52 mg/l