# APPENDIX I: WATER

UPDATED WATER DEMAND

# LEGGETTE, BRASHEARS & GRAHAM, INC.

**PROFESSIONAL GROUNDWATER AND**
**ENVIRONMENTAL ENGINEERING SERVICES**

---

4 RESEARCH DRIVE, SUITE 301
SHELTON, CT 06484
(203) 929-8555
FAX (203) 926-9140
www.lbgweb.com


January 29, 2014

Mr. Peter Marlow, P.E.
Senior Public Health Engineer
Dutchess County Department of Health
85 Civic Center Plaza, Suite 106
Poughkeepsie, NY 12601

RE: Application for Well Site Approval
Proposed Silo Ridge Development
4651 Route 22
Amenia, New York

Dear Mr. Marlow:

Leggette, Brashears & Graham, Inc. (LBG) and VHB Engineering, Surveying and Landscape Architecture, P.C. (VHB) on behalf of Silo Ridge Ventures, LLC have prepared this request for approval to drill and construct up to 10 bedrock test wells on the Silo Ridge property in the Town of Amenia, New York. If sufficient yields are obtained, the wells will be used to supply water to the proposed new development on the Silo Ridge property. The locations of the proposed bedrock test wells are shown on the attached drawing "Silo Ridge Resort Community, Proposed Well Locations", January 28, 2014.

Modifications to the existing Silo Ridge Golf Course are also being conducted and are shown on the attached drawing. The changes in the golf course layout have been considered in the selection of the proposed well site locations in regard to public water-supply well offset distance requirements from sources of potential pollution. Irrigation water for the golf course will be supplied by the onsite ponds which will collect surface-water runoff from the golf course and proposed development areas on the property. No irrigation wells for the golf course are currently proposed.

## Well Site Approval

The proposed test well locations were chosen by LBG based on the results of a fracture-trace analysis conducted and an assessment of the locations and yields of existing onsite wells (figure 1). Based on the layout of the proposed development, none of the existing onsite wells meet the New York State Department of Health (NYSDOH) 100-foot radius of ownership/200-foot radius of sanitary control well siting requirements or the wells do not have sufficient yield for consideration for use as public water-supply wells for this project.

Each proposed test well location was selected to target water-bearing fractures in the bedrock identified in the fracture-trace analysis and meet regulatory well offset distance requirements from sources of pollution. The actual number of wells that will be constructed on the property is dependent on the yields obtained from the proposed wells as they are drilled. The total target yield of water to be developed is approximately 177 gpm (gallons per minute) with the most productive well (i.e., best well) out of service to meet twice the estimated average water demand for the proposed project. It may not be necessary to construct a well in each of the proposed locations if the desired amount of water can be obtained from the first several well locations drilled.

The table below is a summary of the water demand estimated for the proposed Silo Ridge development based on New York State Department of Environmental Conservation, Draft 2012 "Design Standards for Wastewater Treatment Works":

| Usage Type | Subcategory | Number | Water Usage Rate | Water Demand (gpd) | Water Demand with 20% Reduction (gpd) | Twice the Average Water Demand (gpd) |
|---|---|---|---|---|---|---|
| Residential | Total Bedroom Count | 996 bedrooms | 110 gpd/bedroom | 109,560 | 109,560* | 219,120 |
| Lodge Clubhouse | Restaurant | 167 seats | 35/seat | 5,845 | 4,676 | 9,352 |
| | Store/Pro Shop | 4 employees | 15/employee | 60 | 48 | 96 |
| Clubhouse/Fitness | Pool | 50 swimmers | 10/swimmer | 500 | 400 | 800 |
| | Health Club | 20 patrons | 20/patron | 400 | 320 | 640 |
| Sales House - General Store | | 5,000 sq.ft. | 0.1/sq. ft. | 500 | 400 | 800 |
| Activity Barn | Pool | 50 swimmers | 10/swimmer | 500 | 400 | 800 |
| | Bowling | 2 lanes | 10/lane | 20 | 16 | 32 |
| | Theater | 32 seats | 75/seat | 2,400 | 1,920 | 3,840 |
| Winery Building | Restaurant | 80 seats | 35/seat | 2,800 | 2,240 | 4,480 |
| | Winery | allowance | 2,000 | 2,000 | 1,600 | 3,200 |
| Golf Academy | | 40 students | 10/student | 400 | 320 | 640 |
| | | 5 teachers | 10/teacher | 50 | 40 | 80 |
| Vineyard Villas Club | | 13 seats | 35/seat | 455 | 364 | 728 |
| Equestrian Center | Wash Stalls | 2 stalls | 35/stall | 70 | 56 | 112 |
| | Boarded Horses | 20 horses | 12/horse | 240 | 192 | 384 |
| | Employees | 5 employees | 15/employee | 75 | 60 | 120 |
| Field House | Pool | 50 swimmers | 10/swimmer | 500 | 400 | 800 |
| Golf Maintenance Building | Building Size | 11,500 sq. ft. | 0.1/ sq. ft. | 1,150 | 920 | 1,840 |
| Employees | | 200 employees | 15/employee | 3,000 | 2,400 | 4,800 |
| Comfort Stations | Snack Seating | 16 seats | 25/seat | 400 | 320 | 640 |
| Golf Course | Rounds of Golf | 60 rounds | 20/round | 1,200 | 960 | 1,920 |
| | | | | **Total Water Demand (gpd)** | 127,612 | 255,224 |
| | | | | **Total Water Demand (gpm)** | 88.6 | 177.2 |

sq. ft. square feet
gpd gallons per day
gpm gallons per minute
* 20% reduction not applied to residential water demand component per NYSDEC Draft 2012 "Design Standards for Wastewater Treatment Works"

There are no known sources of potential pollution listed in the NYSDOH Sanitary Code Part 5 Subpart 5-1 Appendix 5-D within 200 feet of the proposed test well locations based on the proposed layout of the project site shown on the attached drawing. The 100-foot radius of ownership for all proposed well locations is contained within the property boundaries of the Silo Ridge Golf Course. The 200-foot radius of sanitary control is also contained within the property boundaries of the Silo Ridge Golf Course for all the proposed well locations with the exception of Well 19 which is discussed below.

Two former landfill areas are shown on the attached drawing. The former landfill area located south of the golf course, known as the Luther Segalle Landfill, is no longer in use and has been capped. Annual monitoring of the former landfill area is conducted and results of the monitoring are report to the NYSDEC. This former landfill area is owned by Harlem Valley Property, LLC which is an entity controlled by the applicant. The former landfill area to the east of the golf course shown on the attached drawing is owned by the Town of Amenia. This landfill area was recently capped and is no longer in use. The proposed onsite test well locations for Silo Ridge are located 900 feet or more from these former landfill areas and none of the test well locations are located in a downgradient direction from the former landfills.

The design and layout of the sewer lines for the proposed development are still in the conceptual phase and have not been included on the attached drawing. However, the sanitary sewer lines will be designed to afford the required minimum of 50-foot separation distance from public water-supply wells. Additionally, the discharge location for the onsite Wastewater Treatment Facility has not been finalized. However, the location selected will be placed a minimum of 200 feet from any onsite well proposed for use as a public water-supply well. Below is a description of each proposed well location shown on the attached drawing.

Well 17 – Located to the west of the large central pond. The 200-foot sanitary control radius for Well 17 is located completely within the Silo Ridge Golf Course property boundary and encompasses the central pond and proposed wet and dry swales which will not receive direct runoff from any onsite paved or parking areas (automotive-related waste) in the development. The well site was selected to target the bedrock contact between the marble and schist bedrock units underlying the property and a perceived fracture-trace lineation that passes through this region of the site.

Well 18 – Located south of the large central pond. The 200-foot sanitary control radius for Well 18 is located completely within the Silo Ridge Golf Course property boundary and encompasses the central pond and proposed dry swales which will not receive direct runoff from any onsite paved or parking areas (automotive-related waste) in the development. The well site was selected to target the bedrock contact between the marble and schist bedrock units underlying the property and a perceived fracture-trace lineation that passes through this region of the site.

Well 19 – Located east of the large central pond. The 200-foot sanitary control radius for Well 19 encompasses a portion of two proposed residential lots as shown on the attached drawing. If Well 19 is pursued as a public water-supply source, an easement will be obtained for those properties that impact the 200-foot radius of this well location. A stream channel and proposed dry swales which will not receive direct runoff from any onsite paved or parking areas (automotive-related waste) in the development are also located within the 200-foot radius of this

well. The well site was selected to target a fracture-trace lineation that passes through this region of the site.

Well 20 – Located to the southeast of the central pond. The 200-foot sanitary control radius for Well 20 is located completely within the Silo Ridge Golf Course property boundary and encompasses the central pond and proposed dry swales which will not receive direct runoff from any onsite paved or parking areas (automotive-related waste) in the development. The well site was selected to target a fracture-trace lineation that passes through this region of the site.

Well 21 – Located on the north side of the golf course. The 200-foot sanitary control radius for Well 21 is located completely within the Silo Ridge Golf Course property boundary and encompasses a portion of a stream channel. The well site was selected to target fracture-trace lineations that passes through this region of the site.

Well 22 – Located on the northwest side of the golf course. The 200-foot sanitary control radius for Well 22 is located completely within the Silo Ridge Golf Course property boundary and encompasses a portion of a stream channel. The well site was selected to target a fracture-trace lineation that passes through this region of the site.

Well 23 – Located on the southeast side of the golf course. The 200-foot sanitary control radius for Well 23 is located completely within the Silo Ridge Golf Course property boundary and encompasses a portion of NYSDEC wetland AM-15. The well site was selected to target a fracture-trace lineation that passes through this region of the site.

Well 24 – Located on the central area of the golf course. The 200-foot sanitary control radius for Well 24 is located completely within the Silo Ridge Golf Course property boundary. No surface-water features are proposed within the 200-foot radius of the well. The well site was selected to target a fracture-trace lineation that passes through this region of the site.

Well 25 – Located to the west of the onsite NSYDEC wetland. The 200-foot sanitary control radius for Well 25 is located completely within the Silo Ridge Golf Course property boundary and encompasses a portion of NYSDEC wetland AM-15 and proposed dry swales which will not receive direct runoff from any onsite paved or parking areas (automotive-related waste) in the development. The well site was selected to target a fracture-trace lineation that passes through this region of the site.

Well 26 – Located on the northwest side of the golf course. The 200-foot sanitary control radius for Well 26 is located completely within the Silo Ridge Golf Course property boundary. No surface-water features are proposed within the 200-foot radius of the well. The well site was selected to target a fracture-trace lineation that pass through this region of the site.

New York State Department of Environmental Conservation (NYSDEC) and Army Corp of Engineer (ACOE) regulated wetlands are located on the project site. None of the well locations selected are located within an NYSDEC wetland, NYSDEC 100-foot adjacent area wetland buffer or within an ACOE wetland. Therefore, no wetland permits will need to be obtained from these agencies prior to drilling the proposed well locations.

The test wells will be drilled in accordance the NYSDOH, Dutchess County Health Department (DCDOH) regulations and the American Water Works Association (AWWA) Standards for public water-supply wells. A minimum of 50 feet of casing will be installed in each well drilled. The total depth of the wells will be determined based on the conditions encountered during drilling, particularly the depth and yield of the water-bearing fractures encountered in the bedrock. A water-tight cap will be placed on each well following the completion of drilling.

Any wells that are drilled and determined to have insufficient yield, will either be maintained as water-level monitor wells equipped with water-tight caps or be abandoned in accordance with NYSDOH and DCDOH protocols in the future.

Once a sufficient number of test wells have been drilled to meet the twice the average water demand of project with the best well out of service, LBG will coordinate a 72-hour pumping test program to document the stabilized yield of the wells. Because the project's water demand exceeds 100,000 gpd (gallons per day), a water-supply permit from the NYSDEC will be required for the project, in addition to obtaining approvals from the DCDOH and NYSDOH. Therefore, the pumping test program will be designed in accordance with the NYSDEC "Pumping Test Procedures for Water Withdrawal Applications", March 2013. The pumping test plan will be discussed with the DCDOH prior to completion of testing.

As part of the pumping test program, water samples will be collected from the test wells and analyzed for parameters listed in the NYSDOH Sanitary Code Part 5, Subpart 5-1 for public water-supply wells. In addition, if a test well is located within 200 feet of a surface-water body, the well will also be sampled for microscopic particulate analysis.

Enclosed herewith please find the following documents for your review:

1. Figure 1, Leggette, Brashears & Graham, Inc. "Bedrock Geology with Fracture-Trace Analysis and Existing Well Locations", January 24, 2014

2. Drawing, VHB Engineering Surveying and Landscape Architecture, P.C., "Silo Ridge Resort Community, Proposed Well Locations", January 28, 2014

3. Short Environmental Assessment Form for Test Well Drilling Program, January 28, 2014

4. VHB Engineering Surveying and Landscape Architecture, P.C. "Engineer's Report, Silo Ridge Resort Community, 4651 Route 22, Amenia, New York 12501", January 2014

If you have any question concerning this application or require additional information please contact LBG at (203) 929-8555.

Very truly yours,

LEGGETTE, BRASHEARS & GRAHAM, INC.

Stacy Stieber
Senior Hydrogeologist

Reviewed by:

Thomas P. Cusack, CPG
Senior Vice President

TPC:cmm
Enclosures
cc: Michael Montysko – NYSDOH
Michael Dignacco – Stoneleaf Partners LLC
Michael Pelczar – Stoneleaf Partners LLC
Amanda DeCesare – VHB Engineering, Surveying and Landscape Architecture, P.C.
H:\Silo Ridge Property\Well Site Approval Application\Cover Letter Well Site Approval.docx

# LEGGETTE, BRASHEARS & GRAHAM, INC.

4 RESEARCH DRIVE, SUITE 301
SHELTON, CT 06484
PHONE (203) 929-8555 / FAX (203) 926-9140
www.lbgweb.com


## *MEMORANDUM*

**TO:** Pedro Torres, Silo Ridge Ventures, LLC

**FROM:** Stacy Stieber, CPG

**DATE:** July 2, 2014

**SUBJECT:** Production Well Stabilized Yields at Silo Ridge Resort Community

***Via Electronic Transmission***

---

The following is a summary of the stabilized yields of the proposed Production Wells (potable and irrigation) at the Silo Ridge Resort Community Property based on 72-hour pumping tests conducted by the The Chazen Companies (Chazen) in 2006 and 2007 and Leggette, Brashears & Graham, Inc. (LBG) in June 2014.

In 2006, Chazen conducted a 72-hour pumping test program which included the simultaneous pumping of Wells 1, 2, 4, 5, 9 and 11. Wells 9 and 11 were retested in 2007 by Chazen to assess whether the wells could be pumped at higher rates. The yields of the pumping wells from the 72-hour pumping test which were provided in Chazen's report "Silo Ridge Resort Community, Aquifer Development and Pumping Test Report", May 2007 are summarized in the table below.

| Well ID | 2006 Pumping Rate (gallons per minute) | 2007 Pumping Rate (gallons per minute) |
|---|---|---|
| Well 1 | 80 | Not Tested |
| Well 2 | 100 | Not Tested |
| Well 4 | 15 | Not Tested |
| Well 5 | 23 | Not Tested |
| Well 9 | 75 | 105 |
| Well 11 | 65 | 65 |
| **Total** | 358 | 170 |

LBG recently conducted a 72-hour pumping test event on several wells located on the Silo Ridge property. The 72-hour pumping test was completed in accordance the New York State Department of Environmental Conservation's "Pumping Test Procedures for Water Withdrawal Application", March 2013. The test included the pumping of existing Wells 1, 2, 9 and 11 which had been previously tested by Chazen, and newly drilled Wells 25 and 31.

A simultaneous pumping test was conducted on Wells 1, 2, 9, 11, and 25 to demonstrate the combined yield of the wells. An individual pumping test was conducted on Well 31 to demonstrate the yield of this well as "the best well" in accordance with New York State Department of Health requirements. The stabilized yields of the pumping wells demonstrated during the 72-hour pumping tests completed by LBG are summarized on the table below.

| **Well ID** | **2014 Pumping Rate (gallon per minute)** |
|---|---|
| Well 1 | 87 |
| Well 2 | 150 |
| Well 9 | 85 |
| Well 11 | 65 |
| Well 25 | 33 |
| Well 31* | 158 |
| **Combined Yield with the Best Well (Well 31) Out of Service** | 420 |

Water-level drawdown and pumping rate stabilization were documented in all of the pumping wells during the June 2014 tests. The stabilized yields demonstrated during the 2014 pumping test from Wells 1, 9 and 11 were similar to the yields documented during the 2006 and 2007 Chazen pumping tests. A higher yield was demonstrated in Well 2 in 2014 compared to the 2006 pumping test; however, 180 day water-level drawdown projection for Well 2 completed in 2006 by Chazen showed available drawdown in the well which indicated that a higher yield from the well was attainable.

Water-quality samples were collected during the June 2014 test program from Wells 2, 11, 25 and 31, which are the wells being considered for use as potable water-supply wells. Water samples were previously collected by Chazen from Wells 1, 2, 9 and 11 in 2006 and 2007. The laboratory results from the water samples collected by LBG should be available in early August 2014.

H:\Silo Ridge Property\Well Yield Memo.doc