June 3, 2024

Ms. Noelle Gray
The Gray
3015 Louisa Road
Keswick, Virginia 22947

ECS Project No. 47-18991

Re: Water Consumption and Use Document
The Gray Site, 3015 Louisa Road, Keswick, VA

Dear Noelle:

We are pleased to submit this Water Consumption and Use Document in relation to the Special Use Permit Application being submitted for The Gray Site (i.e., site or subject site) located at 3015 Louisa Road, Keswick, Virginia (Figure 1). The site currently contains two buildings, the larger of which is operated as an American Legion and the smaller of which is operated as a wine shop (formerly In Vino Veritas) that has held regular wine tasting events under the former ownership. Both the American Legion and wine shop are provided potable water by a single onsite public well that is permitted through the Virginia Department of Health (VDH) via Waterworks Operation Permit 2003060. Conditions of the Waterworks Operation Permit require regular water quality sampling and water volume use information reporting to VDH. The well's reported water use volume for calendar year 2023, as reported to VDH, averaged 3,908 gallons per month (i.e., 128.5 gallons per day).

The Special Use Permit applicant, Ms. Noelle Gray, leases the wine shop and plans to maintain the site's general function as a wine shop while also including premade food service. The kitchen will not contain a stove, grease trap, or other appliances associated with typical full-service restaurant kitchens. The addition of premade food service to the business' operations has required Ms. Gray to submit a Special Use Permit Application to Albemarle County. The wine shop will have the capacity to seat up to 32 people at a time and it is estimated that up to 100 people will visit the shop each day. As such, it is estimated that up to 700 people may visit the shop each week.

Existing Supply Well Construction and Water Quality

ECS reviewed documents related to the existing onsite public supply well. The documents included well construction records provided by VDH and water quality sampling results for the site well. Additionally, based on a lack of municipal water service in the immediate vicinity of the site, aerial photographs were reviewed to estimate the site well's proximity to offsite properties that appear likely to use supply wells.

The Water Well Completion Report for the existing site well states that the well was constructed in November 1999 and was completed to a total depth of 255 feet below ground surface (bgs). The well's construction includes 6-inch diameter steel casing extending from above the ground surface to a depth of 53 feet bgs with a neat cement grout annular seal extending from ground surface to 50 feet bgs. The section of the well

from 53–255 feet bgs was completed as a 6-inch diameter open borehole. Water-bearing zones were identified at depths of 70 feet bgs, 100 feet bgs, and 210 feet bgs. The combined air-lift yield of the zones at 70 feet bgs and 100 feet bgs was 15 gallons per minute (gpm) and the air-lift yield of the zone at 210 feet bgs was more than 15 gpm. The well's final air-lift yield was more than 30 gpm. An inspection of the water system performed by Foster Well and Pump Company in December 2007 revealed that the well's 1.5-hp submersible pump was set at 240 feet bgs and that the system was operating properly. A brief pumping test was performed by Foster Well where the well was pumped at 15 gpm for 45 minutes, which resulted in 20 feet of water level drawdown. Foster Well concluded that the well's production capacity was at least 20 gpm or more. Copies of the site well's Water Well Completion Report and the Foster Well inspection report are included in Attachment A.

Water quality sampling of the well is routinely performed to satisfy VDH public well permit requirements and the well has reportedly received no violations from VDH over the past four years. Annual water quality sampling includes the analysis of total coliform, E-coli, and Nitrate/Nitrite. The bacterial analysis for the most current water quality sampling event in October 2023 is included within Attachment A.

Water Use and Consumption

As discussed above, the existing American Legion and wine shop used an average of 3,908 gallons per month during calendar year 2023, which equates to an average of only 128.5 gallons per day. The only expected additional water use will be related to the proposed addition of premade food service. According to VDH guidelines for calculating water use when designing water treatment systems (VDH, 1993), the typical water usage in a restaurant is approximately 19 gallons per seat per day. Based on the planned number of seats (i.e., 32) and an estimated water use of 19 gallons per seat per day, it is estimated that daily water use will be approximately 608 gallons per day. This water use estimate is likely a significant overestimation of actual water use, since the site's planned restaurant will be limited and will only serve premade food, thus limiting the volume of water used each day. Adding this daily water use to the existing daily water use by the American Legion and the former wine shop that did not include food service (i.e., 128.5 gallons per day), it is estimated that the average daily water use of the site well will be up to 737 gallons per day, although the actual daily water use is expected to be lower. It is ECS's opinion that this amount of groundwater extraction will have little to no impact on supply wells on adjoining properties. Additionally, the subject well's yield capacity (i.e., more than 20 gpm) appears more than capable of meeting the site's small water demand.

The subject site uses an on-lot septic system. As a result, the vast majority of water used at the site is returned to the subsurface through infiltration via the site's drainfield. It is commonly estimated, including as part of past Tier 3 Groundwater Assessments performed for Albemarle County, that approximately 95% of well water is returned to the subsurface when septic systems are used. The remaining 5% may be consumed from water carried offsite in containers and/or evapotranspiration. Based on the site's maximum daily water use of 737 gallons per day and a consumption rate of 5%, it is estimated that daily water consumption (i.e., water extracted from the site's well that is not returned to the subsurface) is 37 gallons per day.

Recharge Evaluation

ECS performed recharge estimate calculations to compare the site's expected water consumption (i.e., 37 gallons per day) with the site's estimated rate of recharge to the groundwater system. Calculations are shown in Attachment B. Based on the site's pervious area of 0.92 acres and the typical groundwater system recharge rate in Albemarle County, as estimated by Sanford et al. (2012), the onsite recharge to the groundwater system is approximately 1,049 gallons per day. This value exceeds the estimated rate of daily water consumption by 1,012 gallons per day. As such, it is expected that onsite water consumption will be only a fraction of the onsite recharge to the groundwater system.

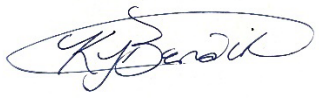
Closing

ECS has reviewed documents related to the subject site's existing public supply well and has estimated water use and consumption associated with the site's proposed service of premade food. Available information indicates that the site well's yield capacity greatly exceeds the planned water use at the subject site. Water consumption is estimated to be only 37 gallons per day, which is significantly less than the average recharge at the site (i.e., 1,049 gallons per day). Available information also indicates that the well's water quality is acceptable and meets VDH requirements. It is ECS's opinion that the subject site well has the ability to meet the water demands of the subject site without adversely impacting proximal offsite properties.

Please feel free to contact me at (540) 785-6624 if you have any comments or questions regarding this report.

Sincerely,

ECS Mid-Atlantic, LLC



Kirsten J. Bendik, G.I.T.
Staff Hydrogeologist



Thomas P. Nelson, C.P.G.
Principal Hydrogeologist

References

Sanford, W.E., Nelms, D.L., Pope, J.P., and Selnick, D.L. 2012. Quantifying components of the hydrologic cycle in Virginia using chemical hydrograph separation and multiple regression analysis. U.S. Geological Survey Scientific Investigations Report 2011-5198, 152 p.

[VDH] Virginia Department of Health. 1993. Memorandum of estimated vs. real water use as it relates to soil absorption field design. VDH Onsite Guidance – Water Use Memo GMP #35.

Figures



Figure 1: Site Location Map

The Gray
3015 Louisa Rd,
Keswick, VA

Legend

Site Property Boundary

Site Well

N

0 65 130 260 Feet

ECS Project No. 47: 18991

Attachment A

Site Well Documents

Commonwealth of Virginia
Uniform Water Well Completion Report

Owner Shadwell Outquarters
Address C/o WWW Construction
Phone
Location

Tax Map ID 79-19
VDH Permit 101-99-0093
VWCB Permit
VWCB ID
County Albemarle

* Well Data *

General Information
Drilling Method AR
Depth to Bedrock 17'
Static Water Level
Well Disinfected (Y or N)

Date Completed 11-4-99
Yield 30 (GPM)
Stabilized Water Level
Disinfectant Used

Total Depth of Well 255
Length of Test
Natural Flow (Rate) 30+
Amount Used

Casing
From +2' To 53'
Size 6" Material Steel
Weight/Schedule 280 wall

From To
Size Material
Weight/Schedule

From To
Size Material
Weight/Schedule

Gravel Pack
From To

From To

From To

Grout
From 0 To 50'
Bore Hole Size 10¼
Type Portland I Cement
Method Pump

From To
Bore Hole Size
Type
Method

From To
Bore Hole Size
Type
Method

Water Zones or Screened Intervals
From 70 To 71 — 15
Mesh Size Diam
From 100 To 101 — 15
Mesh Size Diam

From 210 To 212 — 15+
Mesh Size Diam
From To
Mesh Size Diam

From To
Mesh Size Diam
From To
Mesh Size Diam

* Use Data *

Private Well: Domestic ____ Agricultural ____ Industrial ____ Monitoring ____
Public Well: Community ____ Non Community ✓

* Abandonment Information *

Bored or Dug Wells
Casing Removed, Y or N?:
If Y, Depth to which casing was removed:
Depth and Type of Fill:
Source of Fill
Bentonite Plugs: From ____ to ____ From ____ to ____

Wells other than Bored Wells
Casing removed, Y or N? ____
Depth to which casing was removed:
Applicable, depth(s), and type of gravel/sand fill:
Source of gravel or sand:
Cement: From ____ to ____ From ____ to ____

Method of permanently marking location:

V

* Drillers Log *

Depth	Description of Formation or Sediment	Remarks
0. 14.0	Red Brown silty clay Greenstone rocktg.	
14. 17.0 ..	Greenish tan Brown silt weathered greenstone	
17, 53.0	Greenstone	
53	Set casing	
53 210	Greenstone	
210 255	Dark Gry Black schist	

702 15-
1005
[redacted]
210

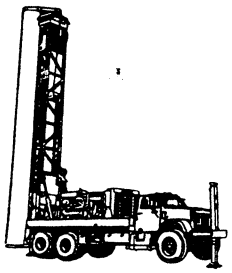
(User additional Sheets if necessary)

I certify that the information contained here is true and that this well was installed and constructed in accordance with the permit and further that the well complies with all applicable state and local regulations, ordinances and laws.

Name FOSTER WELL & PUMP CO INC
Address 3705 DOBLEANN DRIVE
CHARLOTTESVILLE VA 22911
Phone (804) 973-9079

Drillers Signature
Date _____ Representing FOSTER WELL & PUMP CO INC

Virginia Contractors License Number 2705 015945A



OSTER WELL & PUMP COMPANY, I
P.O. Box 260
Earlysville, Virginia 22936
(434) 973-9079
1-800-827-9079
Fax (434) 973-8838

December 17 2007

Ken Bergerson
American Legion
P O Box 6566
Charlottesville VA 22906-6566

RE: 3025 Louisa Road
Albemarle County

Dear Mr. Bergerson:

Pursuant to your request, on December 14, 2007 our company performed an inspection of the well system on property located at 3025 Louisa Road in Albemarle County. The results of our examination were as follows:

- Original drilling records indicate that the well is 255' deep with a recovery rate of 30 gallons per minute when drilled. Enclosed you will please find a copy of the original drilling report for your records;
- The pump installed in the well is a 1.5HP 18GPM hung 240' of 1.25" PVC pipe;
- Mechanically the pump and pressure tank are functioning properly. The pressure tank is low on air pressure but that is something that can be adjusted and at this level is not detrimental to the performance;
- An open discharge flow rate could not be performed. However, we were able to pump the system under pressure for approximately 45 minutes. The flow rate maintained at 15 gallons per minute and the static water level only dropped 20'. Accordingly, at this rate we can determine that the well is still maintaining a recovery rate of at least 20 gallons per minute or more.
- An accurate test for water quality (i.e. iron, ph level, hardness, etc) could not be performed at this time. After the well has been used for a more significant time period than it has in the last year we should be able to obtain a sample for more accurate testing.

We appreciate the opportunity of working with you and offering this information. If you have any questions, or need further assistance, please do not hesitate to contact us.

Thank you --

Sincerely,

Shane Foster
DSC

Shane Foster

Enclosure

Commonwealth of Virginia
Division of Consolidated Laboratory Services
600 North 5th St.
Richmond, Virginia 23219
804-648-4480

DCLS

REPORT OF ANALYSIS

Report Date: 11/08/2023
DCLS LIMS #: E230902700

Mail To

AMERICAN LEGION POST 74
99 ELIZABETH DR
BARBOURSVILLE, VA 22923

ATTN: GEORGE SHADMAN

PWSID 2003060
REGION 2

Sample Information

DATE RECEIVED	11/01/2023 08:52	**LOCATION**	AMERICAN LEGION POST 74 020
SAMPLING DATE	10/31/2023 11:29	**FACILITY**	DS001
COLLECTED BY	GEORGE A SHADMAN	**FACILITY DESC**	AMERICAN LEGION POST 74 DISTRIBUTION
SAMPLE MATRIX	DRINKING WATER	**TYPE**	RT
ORDERED TEST	206-062 MW COLIPA	**CATEGORY**	TC
PROJECT NAME	DW2023-Q4	**ORDER NUMBER**	92783

Test Results

APPROVED BY: JFONVILLE, Scientist Senior **DATE APPROVED:** 11/08/2023

METHOD	PARAMETER	RESULT	ANALYSIS DATE
SM 9223 B			
	Total Coliforms by Colisure	Absent	11/03/2023 08:15
	E. Coli by Colisure	Absent	11/03/2023 08:15

Explanation of Terms and Disclaimers

PMCL is defined as the "Primary Maximum Contaminant Level." SMCL is defined as the "Secondary Maximum Contaminant Level". If blank, level not defined by EPA. Results denoted with an asterisk (*) indicate that the PMCL is exceeded. Test Results meet requirements of NELAP. Non-NELAP accredited analyses noted by ^^. The results included on this report relate only to this specific sample and not to other samples tested from this sampling location.

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Attachment B

Groundwater Recharge and Consumption Calculations

Groundwater Recharge and Consumption Calculations

Annual precipitation, Albemarle County:	46.8 inches (from Sanford et al., 2012)
Annual regional groundwater recharge:	15.4 inches (from Sanford et al., 2012)
Average daily groundwater recharge:	15.4 inches/year ÷ 365 days = 0.042 inches/day (0.0035 feet/day)
Daily recharge per acre:	0.0035 feet/day x 43,560 $feet^2$/acre = 152.46 $feet^3$/acre
Gallons recharge per day, per acre:	152.46 $feet^3$/acre x 7.48 gallons/$feet^3$ = 1,140.4 gallons/day/acre
Recharge available on site:	
Total Site Area:	2.04 acre
Impervious Area:	1.12 acre
Area available for recharge:	2.04 – 1.12 = 0.92 acre
Gallons per day of recharge to site:	1,140.4 gallons/day/acre* 0.92 acre = 1,049 gallons/day
Estimated water consumption at entire site:	37 gallons/day

Surplus recharge (i.e., groundwater recharge minus groundwater consumption):

1,049 gallons/day recharge – 37 gallons/day groundwater use = 1,012 gal/day