Creative
LAND & WATER
Engineering, LLC

www.claweng.com
P.O Box 584
Southborough, MA 01722

clawe@claweng.com
(774) 454-0266 (cell)
(508) 281-1694 (office)

Date: May 8, 2024

To: Peter Dillon, PG, Peter.Dillon@tetratech.com, Tetra Tech
Mark Oram, Board Health Agent, SBOH

Cc: Bob Murchison
Jerme Marsette, Town Administrator

From: Desheng Wang, Clawe

Re: Working Meeting for 65 Farm Road, Sherborn, MA

On April 29, 2024, a working meeting was held at the Sherborn Board of Health Office to discuss and clarify the remaining stormwater and septic design issues in the peer review correspondences.

1. The major number of comments are resolved in the CLAWE's April 17 2024 response letter.
2. The outstanding issues are described and addressed with further data and clarifications in the following:
    a. The concern about stormwater basin B2 (Comment 22) whether enough (2 ft) groundwater separation was provided was discussed briefly as relayed message from Steven Bouley of Tetra Tech: CLAWE explained that the groundwater table used in the basin was based on the test pit 65-10D not test pit 65-10c as test pit 65-10C is located outside of the basin in the upper slope area, which was found dry during our field investigation and monitoring. We also conveyed this information to Mr. Steve Bouley by phone and he is satisfied.
    b. Mr. Peter Dillon was contacted by Ms. Daryl Beardsley prior to the meeting for him to confirm the soil texture in the SAS area. We spent a good amount of time discussing the laboratory data.
        i. It is Mr. Dillon's standing that this issue is resolved, i.e. the laboratory testing data confirmed the soil texture.
        ii. Mr. Dilion also examined sieve analysis results and stated that the soil could not be from the upper B soil due to the soil particle size distribution.
        iii. Mr. Dilion will be satisfied with the soil texture issue if Clawe can certify the depth where the soil samples were taken from. Therefore, Desheng Wang, PhD, PE, is here to certify that he took the two soil samples from depth of 6 ft that meets the Title 5 requirement for the 4 ft permeable soil requirement per 310 CMR 15.104 (2). Soil sample S1 is from the lower gradient edge of SAS between DHTP 5-1 and DHTP 55-11AN and S2 was from the upper gradient edge of the SAS area near DHTP-11.

c. We reviewed and discussed the data CLAWE presented in their April 17, 2024 response letter, for the hydraulic conductivity analyzed using the widely accepted University Kansas HydrogeosieveXL excel sheet. We presented in our response letter dated April 17, 2024:

   i. The hydraulic conductivity analyzed using HydrogeosieveXL confirmed that the hydraulic conductivity values obtained from other source and methods for silty sand as we quoted from *Jay Ameratung, etc al. (2016) Correlations for soil and rock properties in Geotechnical Engineering, 28 ft/day*. The value of hydraulic conductivity used for early analysis was 24 ft/day, which is about 23% larger than the HydrogeosieveXL value of 19.46 ft/day, and about 86% of Ameratung's value 28 ft/day. It is well in between the range.

   ii. With all said above and detailed in our response to Comment 58, we took the conservative approach and reanalyzed the groundwater mounding using Hdrogeosieve XL value and saturated aquifer depth to be discussed in the following. The new groundwater mounding analysis in April 17, 2024 letter confirmed that the SAS and stormwater basins are designed in full compliance with applied Title 5 groundwater separation of 4 ft for SAS area and meet the dewatering requirement of 72 hours for stormwater basins.

d. We reviewed and discussed the aquifer depth in over 40 drinking water wells' drilling log from DEP and Sherborn BOH to address how we applied the nearby drilled well data to obtain the saturated aquifer depth:

   i. The most relevant well is located at 53 Farm Road in the adjacent upgradient based on groundwater mapping and in the same geological setting with ground surface elevation of 193 ft and overburden soil depth of 18 ft and saturated thickness of 14.5 ft (water depth to water 5.5 ft on November 15, 2021 and adjusted with 2 ft). See groundwater contour map for location of the well.

   ii. The groundwater depth in the nearby overburden monitoring well at 55-10B showed EHGW at 3.41 ft below ground surface, which is consistent with the drilled well at 3.5 ft. See groundwater contour map for the test pit location.

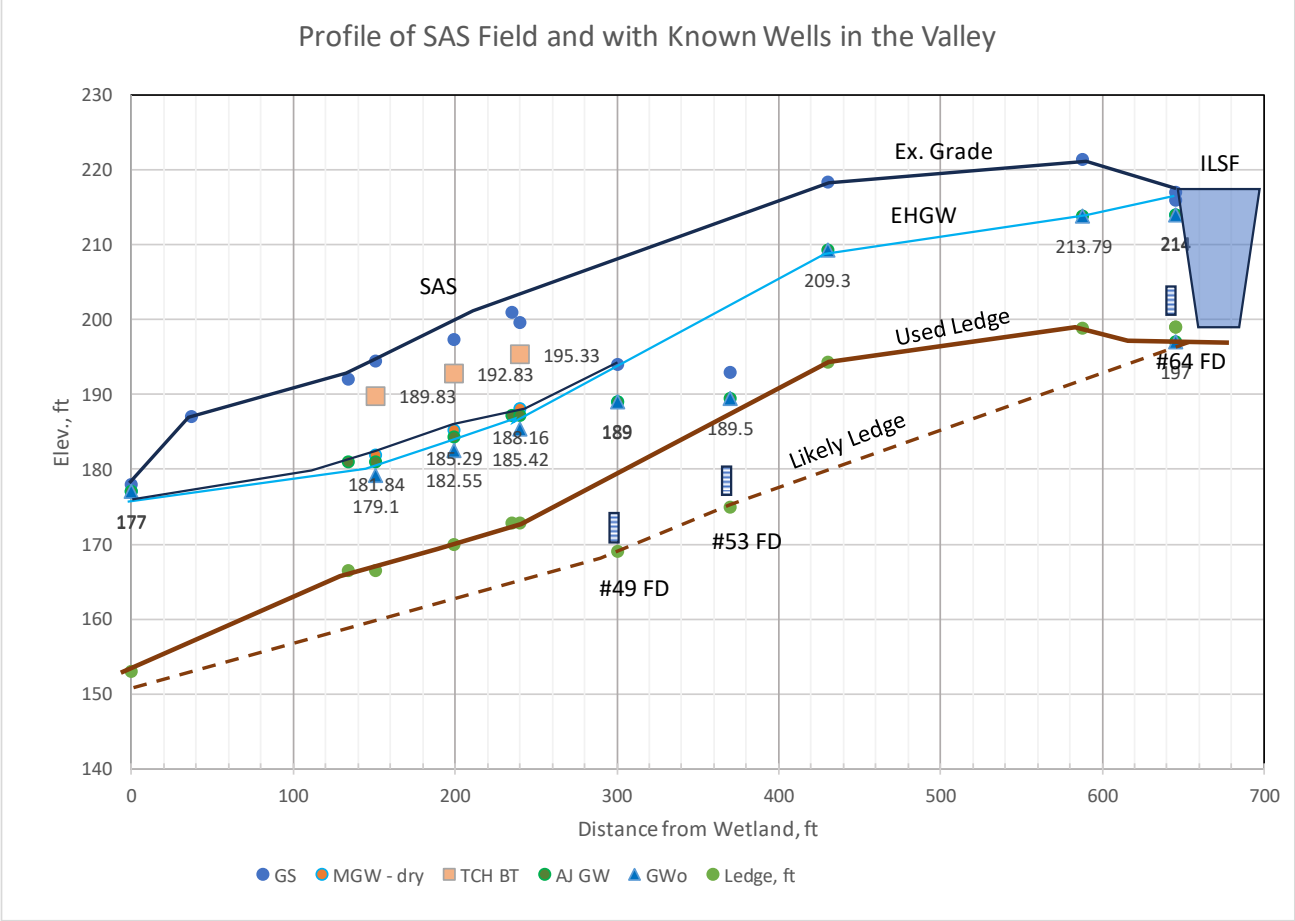
   iii. The well drilling log at 49 Farm Road of similar geological setting showed a 25 ft of overburden depth and groundwater within 2-4 ft of the ground surface based on nearby SAS soil evaluation data. See soil testing plan for the well location.

   iv. The well drilled at 64 Farm Road is also analyzed. It appears that this well water is not connected to the overburden aquifer as the well has 18 ft overburden soil and with ground surface elevation at about 217 ft and the bedrock at 199 ft. The static water in the well was recorded at 20 ft deep (elevation of 197 ft) below the top of ledge while the ILSF/IVW normal water level is at about 210 ft. The well is located in the same valley of the ILSF, which is observed recharge ground water and rest at a higher groundwater level towards the proposed SAS area. See soil testing plan for location of the well.

   v. The averaged overburden soil depth around the downgradient glacial kettle hole swamp is 28.13 ft and average static water depth of 10.54 ft, with 2 ft groundwater adjustment, the average aquifer depth is 19.59 ft and average depth to EHGW is

8.54 ft. The average depth to EHGW is remarkably like the SAS area based on our soil evaluation, which has 8.5 ft to 10.5 ft average depth to groundwater with or without 2 ft groundwater adjustment, respectively.

vi. Based on the available data in the nearby area and the soil evaluation test pits in the leaching field (grade, and EHGW), we constructed a soil profile from the edge of the western wetland through the valley where SAS is located and to the upper ILSF area with reference to three drilled deep bedrock wells at 49, 53, and 64 Farm Road. See the following diagram for details.



As we can see from the diagram analysis, the overburden aquifer in the valley where SAS is located is likely in the range of 15 ft to 17 ft as they are located in the downgradient area of the reference wells and the ILSF which have a saturated depth ranging from 14.5 ft to 21 ft. Again, to be conservative, we used 14.5 ft for the saturated aquifer depth for the estimated high groundwater condition for the groundwater mounding analysis for the SAS area. It should be noted that this value is not just for the SAS area but would be expanded hundreds feet beyond into the downgradient area, which shows an average aquifer depth of over 19.59 ft based on 41 DEP wells drilling data analysis.

e. The groundwater mounding analysis used non constant head boundary condition along the wetland, which is found to be a groundwater breaking out discharge wetland and should be allowed to treat as constant head boundary according to groundwater hydraulic principle. Again, to be conservative and as requested by the peer reviewer, we used non constant head boundary for our updated groundwater mounding analysis.
f. Nitrogen loading analysis. It is our professional opinion that our nitrogen loading analysis is based on solid groundwater hydraulics and mass balance analysis which presented a realistic water quality at our downgradient property line with Nitrogen level less than 5 mg/l. However, this analysis is not required as it is addressed in Mr. Bob Murchison's email to ZBA and BOH dated May 7, 2024 regarding the applicability of 310 CMR 15.216 and its DEP Guidelines. See attachment 2 for an easier reference.

In summary, it is our professional opinion that the groundwater parameters used in the April 17, 2024 response letter is conservative for groundwater mounding calculation to site a Title 5 septic soil absorption system (SAS) which showed plenty of ground water separation from the bottom of the disposal trenches to the estimated high groundwater with mounding height adjustment. All stormwater basins will be dewatered within 72 hours.

If you have any questions, please feel free to contact us.

Feel free to contact us if you have any questions.

Sincerely,

Creative Land & Water Engineering, LLC

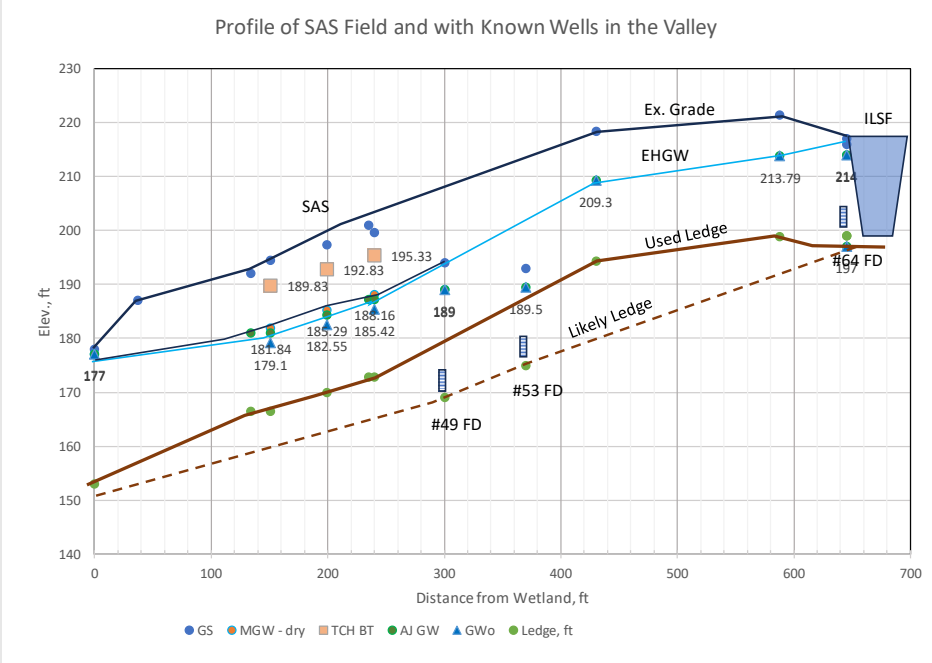
By

Desheng Wang, Ph.D., P.E., CWS, CSE
Project Manager and Engineer

Cc: Bob Murchison
Paul Haverty, esq.

Attachment 1. Soil, water and ledge profile data for Groundwater Mounding Analysis

Location	Distance	GS. El., ft	M.GW el. ft	Depth to water, ft	Slope (H:v)	Trench BTM, ft	AJ GW, ft	GWo, ft	BTM TP, ft	Ledge, ft	Note
Wetland	0	178	177	1	4.11		177	177		153	
49 Farm Rd Well	300	194	189	5			189	189		169	Downgradient well
Buffer	37	187			19.40						
Buffer, 55-10AN	134	192			6.80		180.93			166.43	Lower edge of SAS
53 Farm rd well	370	193		3.5			189.5	189.5		175	Well in line with upper edge of SAS
55-11	235	201					187.25			172.75	Upper edge of SAS
ILSF	645	216	214				214	214		199	BTM of Pond
64 Farm Rd	645	217					197	197		199	bedrock well isolated
Tanks	430	218.3					209.3	209.3		194.3	
Ridge-SL-TP4	588	221.41					213.79	213.79		198.79	
Edge SAS, L2-6	151	194.5	181.84	7.99	17.14	189.83	180.93	179.1		166.43	
Ceter SAS, L1-6	199	197.3	185.29	7.54	17.52	192.83	184.38	182.55		169.88	Leaching Field SAS
up edge, L 1-1	240	199.64	188.16	7.17		195.33	187.25	185.42		172.75	



Attachment 2. Bob Murchison's email to ZBA and BOH for clarification of 310CMR15.216 requirement

Tue, May 7 at 4:03 PM

Sherborn ZBA,
Sherborn BOH,

Farm Road Homes (Project) is separately responding to item #58 of the TetraTech review letter dated October 27, 2023, and updated March 15, 2024, as it relates to the assertion that the project is subject to 310 CMR 15.216 and the associated document "*Guidelines for Title 5 Aggregation of Flows and Nitrogen Loading*".

The Project is <u>not</u> subject to the provisions of 310 CMR 15.216 or the associated Guidelines.

The Project is a "Nitrogen Sensitive Area" under 310 CMR 15.214 (1)(a)(2).

The Project is required to meet a maximum of 440 gallons per Title V acre (40,000 square feet) under 310 CMR 15.215 except as set forth in 310 CMR 15.217 which requires a use of a system for "Enhanced Nitrogen Removal". Project flows modestly exceed the 440 gallons per Title V acre as allowed under provisions of 310 CMR 15.217.

310 CMR 15.216 is **<u>only</u>** applicable to projects which choose to make an "Aggregate Determination" by using "Nitrogen Credit Land". The Project is not using "Nitrogen Credit Land" or making any "Aggregate Determination".

The analysis of applicability above was confirmed by the Land Court in 2017 in the decision STEVENS vs. SHERBORN BOARD OF HEALTH, MISC 16-000214 (masscases.com).

"The Board's subsidiary findings that the Project requires the issuance of a groundwater discharge permit pursuant to 310 C.M.R. § 15.006, and that the Board may impose the more stringent nitrogen loading requirements of 10 mg/L found in the "Guidelines for Title 5 Aggregation" referenced by 310 C.M.R. § 15.216, fail as well when the bedroom count is correctly limited to 76. A groundwater discharge permit is only required when the design flow of the system exceeds 10,000 GPD (310 C.M.R. § 15.006). The more stringent nitrogen loading requirements of the "Guidelines" may only be imposed when an applicant seeks to aggregate flows pursuant to § 15.216 using other credit land, and such aggregation is only necessary when the design flow of the system exceeds 440 gallons per day per acre. 310 C.M.R. §§ 15.214-15.216. The 10 mg/L limit provided by the Guidelines, and applied by the Board, is thus not applicable to projects that meet the 440 GPD per acre standard without aggregation. Here, the flow does not exceed 440 GPD per acre, and the Developer neither did nor was required to

aggregate the nitrogen load with credit land as provided in § 15.216; accordingly, the Project is not subject to the more stringent requirements of the "Guidelines" applicable to that section."

Finally, the Board here emphasized that because of the unusual characteristics of the town, such as the large proportion of its land covered in wetlands, the court should give great latitude to the Board to impose more stringent requirements in light of local particularities. The Board relies on 310 C.M.R § 15.003(1), which provides that "specific site or design conditions, however, may require that additional criteria be met in order to achieve the purpose or intent of 310 C.M.R 15.000." The town-wide conditions alleged by the Board in support of its argument (which are not apparent in the record in any case) are not "specific site or design conditions." Even if there were such specific site or design conditions applicable to the Property, local authorities may not make up more stringent regulations on the fly, but instead they must properly enact such regulations in accordance with G. L. c. 111, § 31, so that there can be uniformity of standards and enforcement. See 310 C.M.R. § 15.003(3). See also Fieldstone Meadows Corp. v. Conservation Com'n of Andover, supra, 62 Mass. App. Ct. at 267. In the present case, the Board is asking the court to give deference to the imposition of "additional criteria" not found in statute, regulation, or local bylaw, but which are instead essentially "devised for the occasion." Fafard v. Conservation Comm'n. of Reading, supra, 41 Mass. App. Ct. at 568. Therefore, the Board's imposition of additional nitrogen loading requirements is not authorized by 310 C.M.R § 15.003(1).

Please let us know if you have any questions.

Bob Murchison
Fenix Partners Farm Road Development, LLC

Attachment 3: Soil testing location plan and Groundwater Contour map