

Electronic Delivery
December 15, 2023

Sherborn Zoning Board of Appeals
Sherborn Town Hall
19 Washington Street
Sherborn, MA 01770

**Re: Additional Comments on Farm Road Homes -
Title V Plans and Nitrate/Mounding Concerns**
Farm Road Homes Project
55-65 Farm Road
Sherborn, MA

Chair Novak and Board Members:

As mentioned in my comments at the close of last night's meeting, I am disappointed that I did not have the opportunity to share the information contained herein immediately following the presentation by the applicant and his engineer on the Title V plans filed just earlier this week with your Board. Thank you for taking time last night to hear other citizens observations and concerns about the Farm Road Homes project being proposed by Fenix Partners Farm Road, LLC (Fenix) at the 53-55-65 Farm Road property which is directly upgradient to our property and several nearby private water supply wells.

The following is a brief overview of concerns related to the Title V submission for the Farm Road Homes project:

The Applicant's plans and specifications are riddled with errors, omissions, and mistakes and should not be considered a complete application until they can pass a straight face test.

Since the filing of the Application for a Comprehensive Permit – many issues and concerns have also been raised about the litany of errors, omissions, mistakes, mis-representations, and inaccuracies contained with the engineer's drawings and plans. Prior to the Title V filing, dozens if not **hundreds** of errors, omissions, and mistakes had already been identified within the plans and specifications forwarded to your Board as part of the "Comprehensive" application process for Farm Road Homes.

These errors include the mis-characterization of soil types, inaccurate or missing information on the plans related to the test holes excavated across the study area, missing data and information on the plans (e.g., easement), and inaccurate hydraulic conductivity values (a.k.a., "K Values") which serve as one of the principal components used to determine soil permeability as derived from test hole percolation tests.

The applicant's Title V information and plans unfortunately continues this trend of filing of plans with inaccurate or misleading information, much of which is found within the bowels of the math contained with the engineering reports filed by the application. At the meeting last night, I prepared a screen share but did not have enough time to present it and walk the Board through it, so I have included it here as Attachment A. The two pages are direct reproductions from the

applicant's mounding analyses submitted earlier this week and speak to the efficacy of the work which the Town has been tasked with reviewing.

As shown in Attachment A, the percolation rates as measured by the applicant's engineer ranged from 3 to 5 minutes per inch (mpi). The range of corresponding hydraulic conductivity values are identified and highlighted in blue in Attachment A. These percolation rates seem reasonable as those "perc tests" performed in our own yard yielded a value of 5 mpi, but it does not appear that these values were used to derive the applicant's K value.

As noted in this same report in Attachment A, and without any reason or justification, the hydraulic conductivity value that was selected from the conversion chart was that which could only be obtained when percolation rates were measured at 1 mpi using the method prescribed by the engineer. This obvious and glaring **error** resulted in the 'selection' and use of a hydraulic conductivity value of 24 feet per day (fpd) when the value is actually significantly lower.

To put this into clearer perspective, a K value 24 fpd is closer to Truro beach sand than it is to the Swansea Muck and Basal Till which dominates the landscape in this portion of Sherborn. Here is how the applicants K value lines up with others:

Location or Material	Range of K-values	
	fpd	cm/sec
55-65 Farm Road Tests	24	0.008467
Well-sorted sands *	2.83 - 283	0.001 - 0.1
Clayey sands, till *	0.002 - 0.2	0.000001 - 0.0001
Clean Sand #	2.83 - 2,834	0.001 - 1.0
Silty Sand, Loess, Till #	0.0283 - 0.283	0.00001 - 0.0001

* *Applied Hydrology* (Fetter, C.W.)
Groundwater (Freeze & Cherry)

Using the 3 to 5 mpi percolation rate measured within their own test pits, the conservative approach the Board of Health employs in these matters should have yielded a K value of only 2.6 fpd from the applicant's own conversion chart. This value is an order of magnitude below that which was used in the applicant mounding analyses. Furthermore, it is also an order of magnitude below the K value the applicant previously used in their stormwater management plans.

We have also shared the hydraulic conductivity values used in the Title V Report with two (2) separate hydrogeologists who are preparing written comments/reports for your review and the review of other Boards in this matter. They have both agreed that these hydraulic conductivity values do not appear to correlate to the type of surficial deposits in this area, and we hope to have those letters to you in the next few weeks, but could not prepare written comments on such short notice.

We continue to believe that Town Boards and Commissions, largely staffed by volunteers, should not have go through the process of reviewing plans and proposals based on such erroneous and misleading data.

Discussion and Recommendation

Since the inception of this project, several neighbors have raised concerns that the Farm Road Homes development places a disproportionate burden on local resources and neighbors such as wetlands, surface water, groundwater, and existing or future private water supply wells. This issue has been studied (at no expense to the applicant) by experts who have concluded on multiple occasions that the state “Title V” standards for this project’s large combined septic system will provide inadequate protections for the neighboring private groundwater supply wells.

When one adds to this conclusion the fact that there is no municipal public water available in this portion of Sherborn, and no plans have been offered by the applicant to provide the impacted residents with clean water for potable use, the only reasonable conclusion is that the burden and impacts the Farm Road Homes 40B development places on neighborhood resources has already been adjudicated by the Massachusetts Superior Court. So in the words of Judge Salinger:

“We conclude that the plaintiff has identified an important local health issue, maintaining clean groundwater servicing local private wells, that is not adequately protected by compliance with applicable State standards”

and

“When faced with evidence that one or more adjacent private wells will have elevated nitrogen levels and there is no public water source in the area and no proposal to provide the abutter with clean water, it is unreasonable to conclude that the local need for affordable housing outweighs the health concerns of existing abutters,”

One reason why we believe that it has taken the applicant two-plus years to complete and send in a final design for the combined septic system is that it may possibly be entirely infeasible to construct a combined septic system for such a large project that would comply with Title V and not contaminate all the nearby private water supply wells. All of the errors and omissions for the Title V plans (and stormwater management plans) seem to compound to give a false impression that a project of this size may be scientifically feasible, when in fact **it is not.**

In conclusion, we believe your Board, and the other Boards and Committees of this Town, should be entitled to receiving engineered plans and specifications that factually represent site conditions, are scientifically correct, and without the type of glaring errors, omissions, and mistakes that demonstrate a lack of investment in the “Comprehensive” permitting process. No one who files false and misleading information with the Town using the 40B process should be entitled to any of its benefits, and all efforts should be put forward to limit your labors to matters where a demonstrated-interest in compliance with the 40B process is readily-apparent and has been exhibited through their action and level-of-effort.

Our expert’s review of site conditions and plans has confirmed that the applicant’s development of these parcels will result in a violation of the 10 mg/l nitrate standard at the property line. Their previous reviews have also confirmed that, with a reasonable degree of scientific certainty, our one-and-only private water supply well at 49 Farm Road will be contaminated with nitrates as the result of the past and current actions of this developer. There are several other nearby

private water supply wells, and the Department-approved Zone II Wellhead Protection for the Town's Water Supply Wells, which are also likely going to be impacted by this development.

We therefore ask the ZBA to first seek counsel and other scientific help in ensuring any engineering reports or plans are properly vetted prior to issuing any authorization. We believe it is unfair to your Board and other Town Boards should be subjugated to any condensed timeline which only exists due to the applicant's tardiness and inability to manage their 40B filings. Your Board and other Town Boards should feel entitled to a reasonable timeline to review what amounts to an extremely complicated and intricate application on a timeline that is appropriate enough to ensure public health and sensitive receptors receive the proper protections.

We believe that if these reviews confirm our assertions that the proposed septic cannot meet the 10 milligrams per liter (mg/l) nitrate thresholds at the property downgradient of the proposed septic, then no basis for approval exists. If this is the case, the matter in front of your Board appears to already have been litigated and adjudicated in the *Reynolds vs. Stow Zoning Board of Appeals* case and cannot be approved in its current form/design.

We also ask that if your Board ultimately plans any affirmative action or decisions on this application, that such action or approval be conditioned on:

- a> proper adjudication as to the existence and validity of the deed restriction;
- b> compliance with mounding and nitrate standards which are protective of human health and groundwater in both the overburden and within bedrock;
- c> compliance with mounding and nitrate standards which are protective of environmental receptors such as wetlands, Zone II, and surface water;
- d> permitting and installation of a public water supply to serve the Farm Road Homes development;
- e> placement of the solar panels on the roofs of the homes, or disclosure of the solar panel business operations and associated tax credit arrangements and how it will benefit the new owners;
- f> establishment of a performance bond or other financial assurance mechanism designed to provide assistance or recourse to those nearby owners whose private water supplies may be fouled or contaminated by the development; and
- g> (potentially) condition the approval on reducing the total number of homes to a reasonable amount that is commensurate with what the physical characteristics of the property will allow under Title V.

Since the developer and their team will undoubtedly also read this letter, we simply ask them to reconsider their plans to develop this parcel into thirty-two (32) dwellings. If they are seeking support from the neighborhood and community, they should reconsider how a smaller, but still affordable, series of homes may better serve this community – their community – as a more reasonable alternative to the plans already filed. The physical characteristics of this property can only accept so much stormwater and wastewater, and we intend to bind this project to those physical limitations using standard scientific and engineering principles to the fullest measure of our capabilities.

If the applicant were to come forward with a project plan that recognizes those limitations but still allows for development under the 40B process, we are here to listen and could even offer our support, but the project as currently imagined and designed is a far cry from a reasonable use of this land and does little, if anything, towards improving this Town's affordable housing stock while at the same time devastating the natural resources on which our neighborhood relies.

Thank you very much for your attention in these matters. We appreciate having this opportunity to table more of our concerns and look forward to further deliberations on this project.

Most respectfully,

Brian D. Moore
49 Farm Road
Sherborn, MA 01770

Attachment A

**Annotated Excerpts from
Hydrogeologic Evaluations Report
dated December 11, 2023**

Appendix E: Groundwater Mounding Analysis

This Appendix presents the calculation sheets of groundwater mounding analysis using Hantush Method.

Parameters	Leaching Field		Note
Recharge area	SAS 1+2	SAS3	All trenches are placed more than 8 ft above the estimated high groundwater and not be impacted by groundwater mounding.
Dimension, Length, ft	92	82	
Dimension, Width, ft	82	46	
Area, sq. ft	7544.00	3772.00	
Recharge Vol. Cu ft (per day or event)	745.10	372.55	
Duration, day	90	90	
Recharge rate, cu ft/day/sq. ft	0.10	0.10	
Dewater time, day	90	90	
GW Separation, ft	8.49	12.58	
Distance to wetland, ft	125	125	
Maximum mounding height, ft	0.73	0.61	
Estimated effective Max MH, ft	0.73	0.61	
Impact mounding height by other systems, ft	0	0	
Combined Mound height, ft	0.73	0.61	
Bottom of Trench, ft	192.58	192.08	
Top of stones, ft			
EHGW, ft	184.09	179.5	
	average		
Bottom aquifer, ft	170	170	
Flood routing elev, ft	291.670	291.670	
Top of grade, ft	292.5	275.5	
Aquifer depth, ft	14.09	9.5	
Hydraulic Conductivity, ft/day	24.00	24.00	

References:

Hantush, M. S. 1967. Growth and decay of Groundwater-mounds in response to uniform percolation, Water Resources Research, v. 3, no. 1, pp. 227-234.

THESE ARE INCORRECT VALUES AND SIGNIFICANTLY OVERSTATE THE TRUE PERMEABILITY OF SUBSURFACE SOILS IN THE LEACHING AREA - BY AN ORDER OF MAGNITUDE. THESE "K VALUES" SHOULD BE 2.6 FEET PER DAY.

Creative Land & Water Engineering, LLC
Environmental Science and Engineering
P.O. Box 584, Southborough, MA 01772
Tel: (508)281-1694 Fax: (508)281-1694

Subject: Permeability Estimate

Perc. by: dsw & CW
Calc.: DSW
Job No.: 269-12

Date: 1-Dec-23
Sheet: 1

Project: 40B SAS Depth to test See soil log ft
Site: 65 Farm Road Total depth: See soil log ft
Sherborn, MA H.G.W.: See soil log ft

This highlighted value is the percolation rate that would need to have been achieved to use Engineer's own calculation to derive a 24 feet per day (fpd) hydraulic conductivity value - A VALUE OF 1 MPI {24 feet per day = 0.0002777 feet per second}

THESE ARE THE HYDRAULIC CONDUCTIVITY VALUES THAT WERE USED IN THEIR DESIGN DERIVED FROM PERCOLATION RATES BETWEEN 1 AND 2 MINUTES PER INCH (MPI).

	Perc. Rate (min/in)	Water Temp. (°C)	Permeability (Ks)				Wang	Average
			Allen	Bouma	Michigan			
	0.05	20	1.39E-02	3.99E-02	1.50E-02	5.93E-03	1.89E-02	
	0.18	20	2.99E-03	5.25E-03	4.33E-03	1.62E-03	3.55E-03	
	0.233333	20	2.25E-03	3.60E-03	3.40E-03	1.27E-03	2.63E-03	
	0.5	20	1.19E-03	1.55E-03	1.98E-03	2.41E-04	1.37E-03	
	0.7	20	9.11E-04	1.10E-03	1.59E-03	5.93E-04	1.05E-03	
	1	20	6.11E-04	6.50E-04	1.13E-03	3.9E-04	7.04E-04	
	1.50	20	4.00E-04	3.72E-04	7.94E-04	2.96E-04	4.66E-04	
	2.000	20	2.48E-04	1.98E-04	5.29E-04	1.98E-04	2.93E-04	
	3	10	1.76E-04	1.26E-04	3.97E-04	1.48E-04	2.12E-04	
	4	10	1.09E-04	6.71E-05	2.65E-04	9.88E-05	1.35E-04	
	5	10	7.75E-05	4.28E-05	1.98E-04	7.41E-05	9.82E-05	
	6	10	5.95E-05	3.02E-05	1.59E-04	5.93E-05	7.69E-05	
	7	20	4.79E-05	2.28E-05	1.32E-04	4.94E-05	6.31E-05	
	8	20	3.99E-05	1.79E-05	1.13E-04	4.23E-05	5.34E-05	
	9	20	3.41E-05	1.45E-05	9.92E-05	3.70E-05	4.62E-05	
	10	20	2.96E-05	1.21E-05	8.82E-05	3.29E-05	4.07E-05	
	11	20	2.62E-05	1.03E-05	7.94E-05	2.96E-05	3.64E-05	
	12	20	2.34E-05	8.84E-06	7.22E-05	2.69E-05	3.28E-05	
	13	20	2.11E-05	7.72E-06	6.61E-05	2.47E-05	2.99E-05	
	14	20	1.62E-05	5.45E-06	5.29E-05	1.98E-05	2.36E-05	
	15	20	1.15E-05	3.48E-06	3.97E-05	1.48E-05	1.74E-05	
	16	20	8.83E-06	2.46E-06	3.17E-05	1.19E-05	1.37E-05	
	17	20	7.11E-06	1.85E-06				
	18	20	5.93E-06	1.45E-06				
	19	20	5.06E-06	1.18E-06				
	20	20	4.40E-06	9.82E-07				
	21	20	3.88E-06	8.33E-07				
	22	20	3.47E-06	7.18E-07				
	23	20	3.13E-06	6.27E-07				

THESE ARE THE ACTUAL CORRECT VALUES OF 3 TO 5 MPI AND YIELD A HYDRAULIC CONDUCTIVITY VALUE OF AT LEAST AN ORDER OF MAGNITUDE LOWER THAN THAT WHICH EXISTS IN THEIR PLANS. THESE PERCOLATION RATES YIELD A CONSERVATIVE HYDRAULIC CONDUCTIVITY VALUE ESTIMATE OF 2.6 FEET PER DAY - TEN TIMES LOWER THAN USED IN THE DESIGN DOCUMENTS.

Using 5 mpi, the conservative conversion yields a K value or 0.0000302 feet per second.

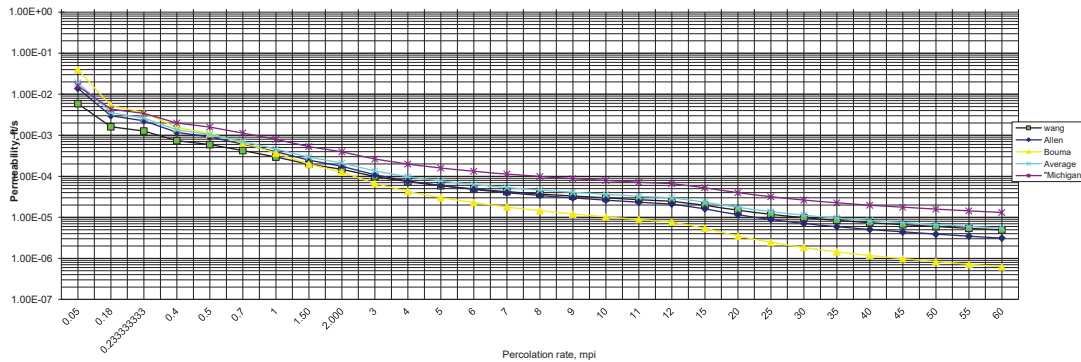


Fig. Percolation to Permeability Comparison

References:
Allen, Dan H. 1979. "Hydraulic Mounding of Groundwater under Axisymmetric Recharge," Research Report No. 24, Water Resource Research Center, University of New Hampshire, Durham, NH;
Bouma, J., et al. 1972. "Soil Absorption of Septic Tank Effluents," University of Wisconsin-Extension, Information Circular No. 20, 235pp.
Wang, Desheng 1999. "A simple mathematical model for infiltration BMP design," Hydrological Science and Technology, American Institute of Hydrology, Vol. 15, No. 1-4.
LID Manual for Michigan: Appendix E

PP Conversion V1.1, (c) 2023 by Desheng Wang