To: Sherborn Zoning Board of Appeals, ZBA **Date: September 18, 2023**

From: Sherborn Groundwater Protection Committee (GPC)

Subject: Revised GPC Comments for ZBA on the proposed 40B Farm Road Homes (approved by vote at GPC 9-13-23 meeting).

Please know that the GPC is quite concerned with the acute lack of more affordable housing within our community. We encourage the Select Board, Town Administrator, and all Town residents to redouble efforts to find ways of adding, in a safe and compatible manner, more diverse and affordable housing stock. But the town's lack of a modern public water supply along with no public modern wastewater disposal system, to serve any parts of Sherborn, brings major public health challenges in constructing dense housing developments.

Please see our revised comments provided here and in the included set of figures/maps, for your consideration in conducting the continuing series of ZBA public hearings that started August 1, 2023, on this proposed 32-unit 40B project. This document includes key edits and additions from our initial draft comments to the ZBA sent on July 31, 2023. An added section summarizing the requests to the ZBA by the GPC contained in the body of the comments may be found at the end of this document.

Four major topic areas of concern to the GPC are briefly covered. More details and/or additional GPC concerns may be raised throughout the series of ZBA hearings as more information becomes publicly available. Comments here are limited to the current set of project files now posted on the Town's website, as of September 13, 2023.

1. **General Concerns:**

    a. The yet to be provided detailed plans for the i) one large private septic system, ii) seven private drinking water wells, and iii) site stormwater management plan and storm water structures, will each require significant review by the ZBA-designated engineering and scientific professional peer reviewers along with the appropriate Town boards and committees, including the GPC.

    b. The applicant is asking for very broad waivers that would essentially negate all existing Town bylaws that were adopted years ago to protect public health and the environment in this semi-rural town (no public water or wastewater services). We respectfully request that the ZBA not waive any of the Sherborn bylaws protective of groundwater, surface water, and stormwater, so that the ZBA can ensure the new residents of the proposed 32-unit development and all current and future Sherborn residents may continue to enjoy safe and contaminant-free groundwater.

    We believe multiple important local health risks are inherent in the proposed development plan, including foremost maintaining clean water standards that serve both the development and surrounding local private and public water supply wells, that are not adequately protected by compliance solely with applicable state standards. Understand that MA Chapter 40B does not override local protection of water resources. (Please see: **Reynolds v. Stow Zoning Bd. of Appeals**, MA Appeals Court No. 14-P-663, Sept. 15, 2015).

It is important to note here that both private wells (regulated by the Sherborn BOH) and public water supply wells (PWS, regulated by MassDEP) in Sherborn have been found within the past two years to contain unhealthy levels of PFAS (summary Sherborn PFAS data available from the GPC, and has been previously provided by the GPC to the Select Board and Town Administrator), suggesting that both our current Board of Health by-laws and MA Title V regulations may not be protective enough of groundwater against current and past contamination from "forever chemicals" like PFAS (PFAS and many other synthetic organic compounds are not degraded/destroyed when released in the environment, and pass through intact after "treatment" by simple Title V septic systems and more advanced treatment technologies like large multi-stage municipal wastewater treatment plants). Hence the GPC requests that no waivers of current Sherborn Board of Health and State regulations on septic and/or drinking water well designs should be granted by the ZBA for the proposed project.

c. Tree removal: Removal of trees for the development, roadways and the proposed Solar Panels will result in warmer temperatures of the ground, more evaporation and loss of groundwater, less surface water infiltration, and more potential for soil erosion. Please condition the project to limit the amount of mature tree removal in undisturbed areas.

2. **Wastewater/Septic Concerns:**

a. Project as proposed would generate a significant amount of septic effluent from the 32 new housing units (particularly as compared to the septic flow expected from the 4 homes as shown in the original by-right plan for this site and adjoining parcel), raising major concerns about septic leach field capacity (soils, mounding and distance to groundwater table, nitrogen (nitrate) loading, protection from storm water runoff/flooding, etc.) and long-term wastewater treatment system performance. Based on the total bedroom count (76) and the per bedroom design flows of 110/gal/bedroom, an estimated wastewater flow for the project is **8,360 gal/day**, as listed in the proposed plans.

The ZBA and the developer must always keep in mind that Sherborn is about 95% reliant on private drinking water wells and private septic systems, with existing 1-to-3-acre residential zoning allowing the wells and septics to be co-located on each 1 to 3-acre residential parcel for public health protection and for providing enough distance between on-site and abutter's wells/septics. A dense development with onsite wastewater generation requires a specific and conservative design plan that accounts for reliance on private well and septic and is protective of neighboring properties, given the plan of concentrating **8,360 gal/day** septage within a single large leaching field area.

Current state regulations require MassDEP permitting of septic systems with flows of greater than **10,000 gal/day**, with annual sampling/monitoring covered in the permits to head off any future issues, the most concerning of which being groundwater contamination (see MA 310 CMR 15.000, current 7-7-23 published version available at: https://www.mass.gov/regulations/310-CMR-15000-septic-systems-title-5 . THE STATE ENVIRONMENTAL CODE, TITLE 5: STANDARD REQUIREMENTS FOR THE SITING, CONSTRUCTION,

INSPECTION, UPGRADE AND EXPANSION OF ON-SITE SEWAGE TREATMENT AND DISPOSAL SYSTEMS AND FOR THE TRANSPORT AND DISPOSAL OF SEPTAGE). Could the ZBA condition the project and proposed septic system to seek MassDEP design review and annual monitoring? It would seem obvious that a 32-unit 8,360 gal/day wastewater system should not be seen as comparable to a single-family 4-bedroom home's 440 gal/day Title V septic system in terms of a threat to groundwater contamination and risks to public health. The safeguards afforded to systems with flows greater than 10,000 gal/day septage by MassDEP permitting and oversight would be most protective of public health for this large development.

Please be aware also that recent studies on the presence of "emerging contaminants of concern", like PFAS (per- and polyfluoroalkyl substances) are showing up now in concentrations above the most current US EPA health advisory levels (see: https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas) in Massachusetts private wells state-wide (ref: **MassDEP Private Well PFAS Study 2021-22**; see: https://www.mass.gov/info-details/pfas-in-private-well-drinking-water-supplies-faq . In Sherborn 34 homeowners participated in this study, and 5 wells were found to exceed the current MA PFAS6 MCL of 20 ppt, which the US EPA has now proposed to lower further to 4 ppt for each of two individual PFAS, PFOA and PFOS (see earlier EPA reference). The Sherborn private well exceedances above 20 ppt MA PFAS6, equaling about 15% of the small data set of Sherborn wells sampled, is running about 3 times the State average of 5% for the approximately 1,800 private wells tested state-wide.

Also, there are currently 14 public water supply (PWS) wells regulated by the MassDEP in Sherborn, and over the past two years, 4 of the 14 PWS wells have reported sampling events with MA PFAS6 levels above 20 ppt, and another 7 Sherborn PWS wells were at > 10 ppt PFAS6. (PWS data available at: https://eeaonline.eea.state.ma.us/portal#!/search/drinking-water). These concerning PFAS occurrences in the Sherborn private and public wells may be in part attributable to influences of nearby septic leachate, largely from single-family homes and small businesses/Churches/municipal buildings septic systems, discharging PFAS into their septic systems as the source of the groundwater contamination **("PFAS in the Commonwealth of Massachusetts"**, MA Legislature PFAS Interagency Task Force, final report: file:///C:/GIS%20data_Pace%202023%20Course/Massachusetts/Census%20Data/Downloads/HD5054%20(1).pdf).

b. USGS Surficial Materials maps of this site area indicate a significant amount of bedrock outcrops, and shallow depth of overburden soils, including areas not far from the general location of the set of proposed two large septic leach fields located west of proposed house units # 11 – 18 (**Figure 1**, general area of proposed site, mapping source: MassGIS).

Given the amount of bedrock known to be present at this site, sufficiency of the overburden soil absorption areas and depth/volume of soils to treat adequately this large amount of septic effluent must be evaluated by an independent professional hired on behalf of the Town.

Infiltration of this large daily volume of wastewater onto the bedrock-controlled land could result in untreated water reaching nearby properties. Groundwater tends to flow preferentially along the soil overburden-bedrock interface. Untreated wastewater would also flow along this

interface in the direction of the slope of bedrock. Untreated septic waste could also enter bedrock fractures and flow to neighboring properties and wells. The topography of the land at the septic system shows a steep downward slope downward to the west/southwest, so properties to the west/southwest are downgradient of the septic system and could be impacted by it. Since the impacts of mounding and the direction of bedrock fractures is not known, locations in other directions may also be downgradient and impacted by the septic waste.

c. The depth to the groundwater table needs to be well defined and monitored over the seasons and after rain events in the areas of proposed septic and stormwater infiltration areas. Depth to groundwater can vary dramatically on a day-to-day basis, especially for land where bedrock is shallow, and groundwater can be perched on the bedrock. Increased storms and precipitation events could result in shallower groundwater table depths than those observed at the site during the test pit program. This needs to be carefully defined to ensure proper infiltration capacity is available.

d. We respectfully request the ZBA now have a professional analysis undertaken of subsurface conditions by the applicant, to include bedrock geology, with a profile of the depth to top of bedrock at key areas within the property including proposed leach field areas and stormwater management infiltration locations, plus determinations of soil absorptive capacity, leaching capacity, and hydrologic modeling to identify potential fate and transport of leachate both on- and off-site. This detailed study should include a rigorous nitrate loading analysis taking into consideration the existing abutters wells, the multiple public water supply wells (PWS) west of the site, and the new proposed development's seven private wells. Please be aware that prior to this 40B proposal submission this same site was under local review for a development by this 40B applicant involving just a few new homes. At that time an abutter's hired expert water resources consultant calculated from the associated proposed septic plans a modeled groundwater nitrate concentration above the MassDEP nitrate MCL (max contaminant level) that could negatively impact abutters existing properties and drinking water wells (see Scott Horsley BOH testimony of Feb 16, 2022, meeting minutes at: https://www.sherbornma.org/sites/g/files/vyhlif1201/f/minutes/m22-0216.pdf , video recording available). With this significantly larger 40B proposed project a more extensive nitrate study needs to be performed and new attention be paid to protect both the new 40B dwelling drinking water wells, the existing abutters wells, and the several PWS wells located west of the site, (Rt 16/27 area, **Figure 2**), and downgradient wetlands.

Please also note that MA Title V regulations address nitrate concerns, and recommend for septic systems larger than 2,000 gal/day flows:

"For design flows of 2000 gpd or greater, the local approving authority or DEP may require a site-specific mass balance analysis for the area of impact. The mass balance analysis must demonstrate that the groundwater quality standard of 10 mg/l total nitrogen and 10 mg/l nitrate nitrogen will be met at the downgradient credit land property boundary, or at the nearest downgradient sensitive receptor." (Ref: MassDEP GUIDELINES FOR TITLE 5 AGGREGATION OF FLOWS AND NITROGEN LOADING, 310 CMR 15.216).

Areas of potential impact down gradient of the proposed large septic leach field include private wells and nearby wetlands.

3. **Drinking Water/Groundwater Concerns:**

a. Seven private wells, located largely along the northeast border of the site, are planned to provide potable water for the 32-unit development, presumably to preclude the alternative installation of a fewer number of wells that would trigger regulation as public water supply wells by MassDEP (service of 25 or more residents per a single PWS well). This 7-well design is not particularly protective of the health of the new residents, as the Sherborn current BOH regulations only require "private" well water quality sampling/testing at the time of initial well installation, and nothing more in the way of water quality testing **at any time in the future**. MassDEP regulation of PWS wells often requires (dependent on total expected flows and population served) annual testing for certain common contaminants and would alert residents of any future public health risks. We suggest that the proximity of these seven wells to each other function as one or more public water supply well(s) and should be managed as such.

We are aware of the August 14, 2023, letter from MassDEP to the developer regarding a preliminary determination and approval by the agency that the 7 wells be not regulated as PWS wells.

The ZBA should also request extended well pump quantity (flow) testing with additional concurrent monitoring at existing abutter wells, given the number of occupants (76 bedrooms as proposed) and associated water production requirements for the seven wells. Pump tests should reflect conditions when all seven wells are pumping at the same time as they will work independently to provide water to specific and distinct housing units. Even with projected increased storms and rainfall, future drought conditions are also expected to be worse as we have seen in Sherborn just recently with the record 2022 drought (storm events do not necessarily contribute appreciably to available groundwater volumes due to fast surface runoff).

b. We have concerns that untreated or inadequately treated wastewater could infiltrate bedrock fractures, and rapidly travel to any new or existing bedrock drinking water wells on- or off-property, thus compromising drinking water quality (see **Figure 2**). Moreover, it can take years for problems to develop in deep bedrock wells, given the unknown flow patterns underground.

c. Bedrock blasting, hammering, or drilling related to construction activities near bedrock outcrops in other parts of Sherborn in recent years have mobilized pollutants (e.g. manganese) and impacted nearby drinking water wells. If this development requires any blasting to address observed bedrock outcroppings around the site, please request a condition to preserve the integrity of the existing wells in the vicinity

4. **Stormwater Concerns:**

a. The entire project, with 32 new homes and associated paved sidewalks, driveways, parking areas, and the access road represents a significant amount of new impervious surfaces all concentrated in the center of the 14-acre property. The stormwater plans will require rigorous peer review by a professional hired by the Town. One large stormwater basin is proposed to be located adjacent to and upgradient from the development's large pair of septic leach fields.

Stormwater that infiltrates or overflows and reaches the septic system leach field area could compromise the capacity and treatment capability of the septic system.

b. Another proposed stormwater basin is located downhill to the existing pond at the southeast end of the property. The pond already varies constantly in total size and depth based on average seasonal precipitation and groundwater levels (see **Figure 3**, with two examples of the change in pond size/area over the years). The new main entry road and potentially some housing units, as currently shown in the plan, may experience flooding, even with the proposed berm addition, if the pond expands significantly following a future storm event, and adding additional storm water to this area from the development's stormwater basin would worsen flood conditions. Future climate change trends will only exacerbate the extent of this flooding. A stormwater plan evaluation would need to account for the full drainage area tributary to the overall site and especially the existing pond.

c. As discussed during earlier Town board/committee reviews of previous development applications for other projects at this site and an adjacent parcel the last few years, residents along this area of Farm Road have complained to Town officials about general current flooding issues on this section of Farm Road, and, on a nearby property (see minutes from Select Board 4-6-23 meeting at: https://www.sherbornma.org/sites/g/files/vyhlif1201/f/minutes/04-06-2023.pdf , corresponding video recording also available).

Moreover, the current USGS surface water resources map for this area (USGS StreamStats, https://streamstats.usgs.gov/ss/) depicts a water course feature on the site running along the southern edge, parallel to Farm Road, flowing west into a wetlands just downhill of this property, and eventually connecting to the larger Sewall Brook stream west of this site (see **Figure 4**). We request the stormwater plan review consultant hired by the ZBA take these known facts into consideration when determining the adequacy of the final stormwater management plan, and future stormwater flows that may impact neighboring properties and Farm Road itself; currently the Town of Sherborn is dealing with flooding issues on Farm Road adjacent to this site.

d. The critical topic of future climate change impacts needs to be taken into serious consideration in the design of this project and the required stormwater mitigations, given the future projected much larger storm events with expected larger rain/snow amounts, and higher annual precipitation levels.

The future higher than past historical annual and per storm event precipitation levels now predicted as compared to current design standards need to be considered for all the concerns raised by the GPC here on groundwater/septic/stormwater including the existing pond on the property that varies in size and depth based on annual precipitation amounts. ZBA should request consideration of climate change in the selection of "design storms" that are used to size and capacity of stormwater management features. The expected storm sizes predicted for the next half century are quite large for eastern Massachusetts, illustrated by the table shown here (taken from "Charles River Climate Adaptation Flood Mitigation Implementation Plan", MA MVP grant, Charles River Watershed Association, 2022; table 2.2 on page 6, pdf document available at: https://www.crwa.org/watershed-model)

Table 2.2 Proposed 24-hour design storm rainfall depths for future scenarios used in the Charles River Flood Model

Recurrence Interval	Present Day Baseline (in) (NOAA Atlas 14)	2030 Cornell IDF Projections (in) (2 °C Average Annual Temperature Change)	2050 Cornell IDF Projections (in) (3 °C Average Annual Temperature Change)	2070 Cornell IDF Projections (in) (4.5 °C Average Annual Temperature Change)
2-yr	3.34	3.82	4.09	4.53
10-yr	5.22	5.97	6.39	7.07
25-yr	6.39	7.31	7.83	8.66
100-yr	8.19	9.38	10.04	11.11
500-yr	11.18	12.80	13.69	15.16

Summary of GPC requests of the ZBA and peer reviewers on the proposed development:

1. ZBA to not waive any Sherborn by-laws protective of groundwater, surface water, and stormwater.
2. ZBA to ensure thorough study of all septic plans (including nitrate/nitrite loading), drinking water well plans, and stormwater management plans by experienced peer reviewers.
3. ZBA to keep to a minimum the disruption of undeveloped lands and mature trees on the property.
4. ZBA to consider, if proposed development is to be approved, to condition the project to add protective measures and oversight on design of 8,360 gpd septic as per MA Title V 10,000 gpd regulations.
5. ZBA to require a comprehensive nitrate loading/mass balance study be performed by the developer on the larger than 2,000 gpd septic system.
6. ZBA to require a professional analysis be undertaken of subsurface conditions by the applicant, to include bedrock geology, with a profile of the depth to top of bedrock at key areas within the property including proposed leach field areas and stormwater management infiltration locations, plus determinations of soil absorptive capacity, leaching capacity, and hydrologic modeling to identify potential fate and transport of septic and stormwater leachate both on- and off-site.
7. ZBA to require extended well pump quantity (flow) testing on the seven new private wells servicing the proposed development, with additional concurrent monitoring at existing abutter wells, by the applicant and overseen by peer reviewers and BOH.
8. ZBA to direct peer reviewer studying site stormwater plans to pay particular attention to current and future abutter and Farm Road flooding issues and impacts.
9. The impacts of increasing severity of future larger storms, higher temperatures, and more frequent droughts (climate change impacts) needs to be fully evaluated by a knowledgeable peer reviewer to evaluate impacts to groundwater supply (quantity and quality) and stormwater mitigation.

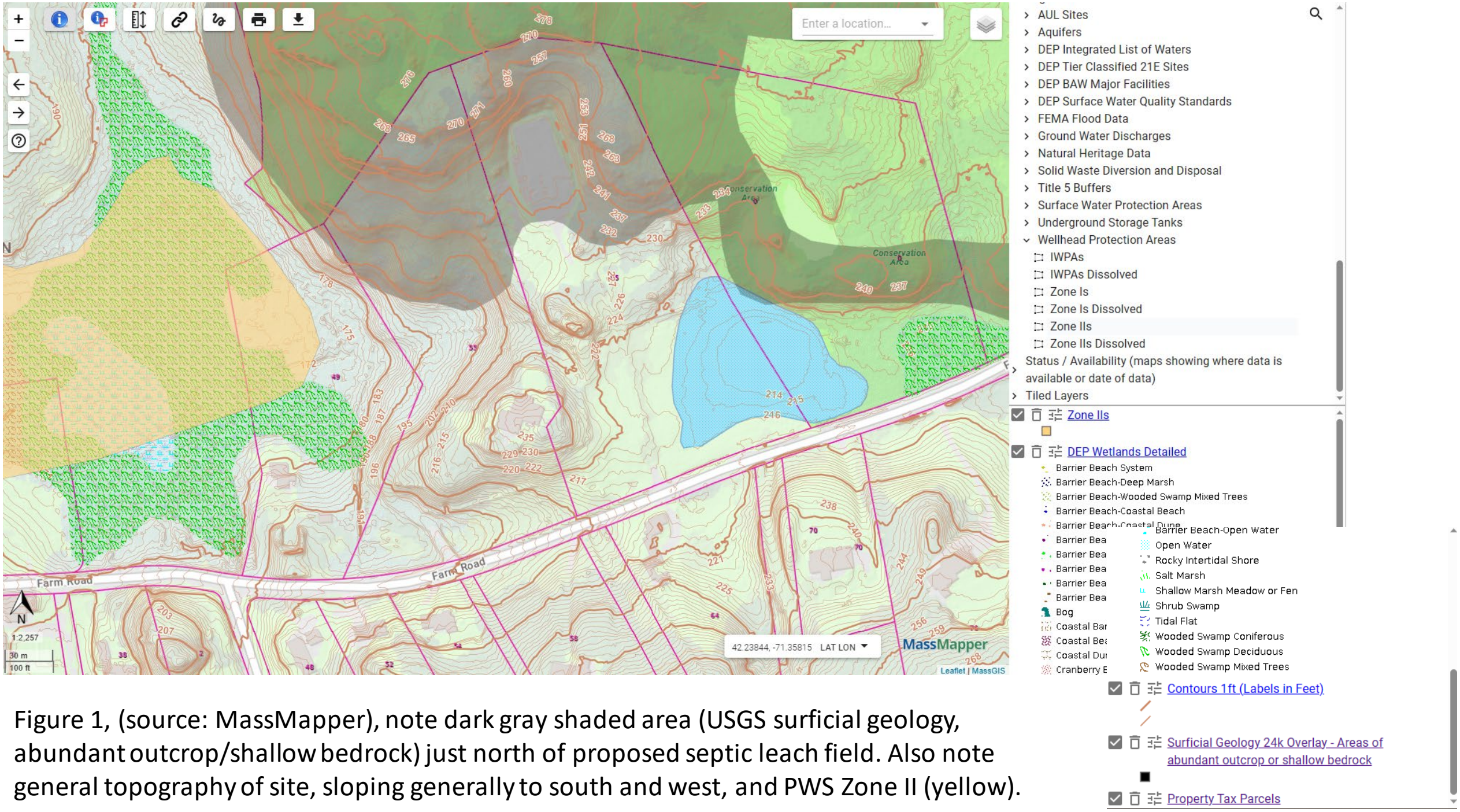


Figure 1, (source: MassMapper), note dark gray shaded area (USGS surficial geology, abundant outcrop/shallow bedrock) just north of proposed septic leach field. Also note general topography of site, sloping generally to south and west, and PWS Zone II (yellow).

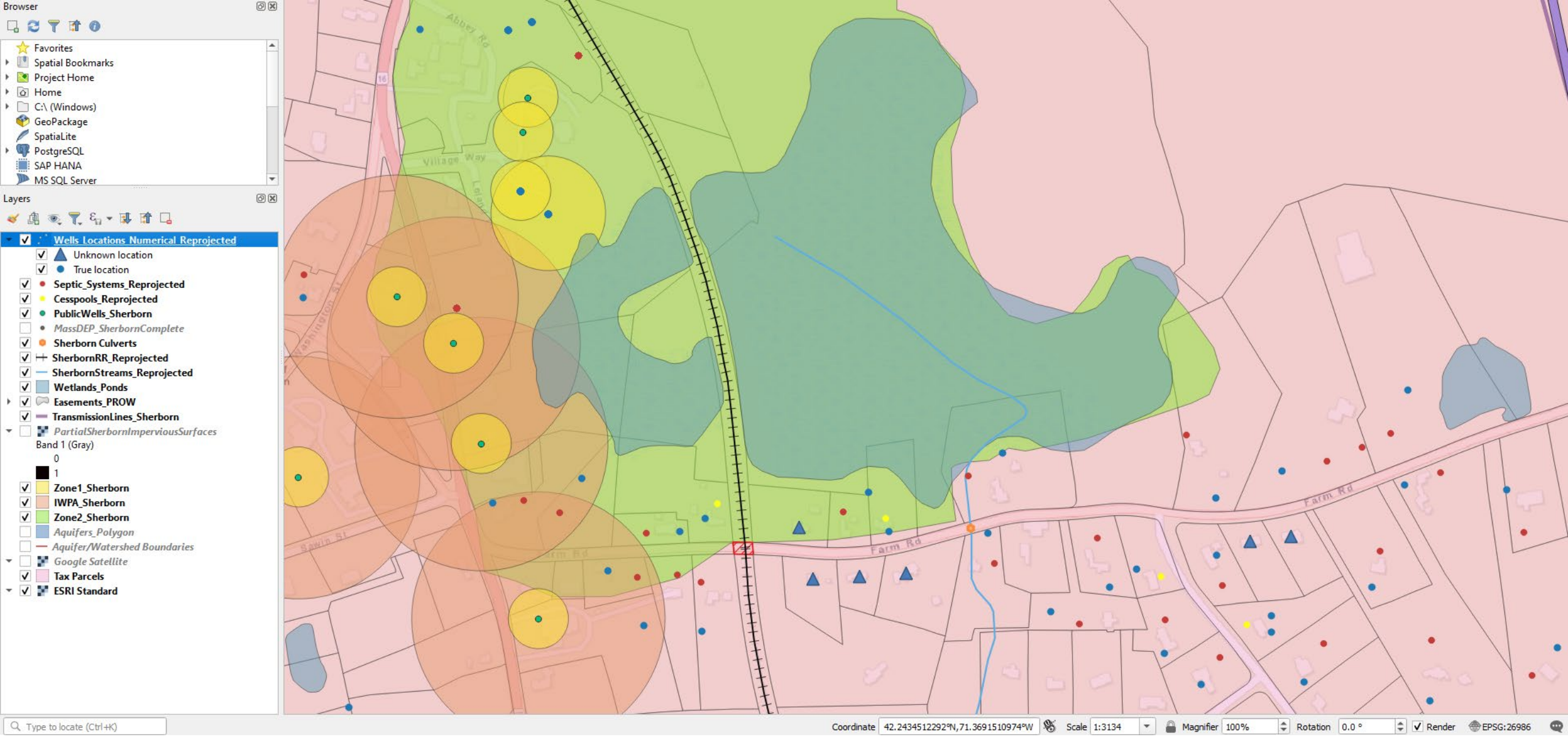
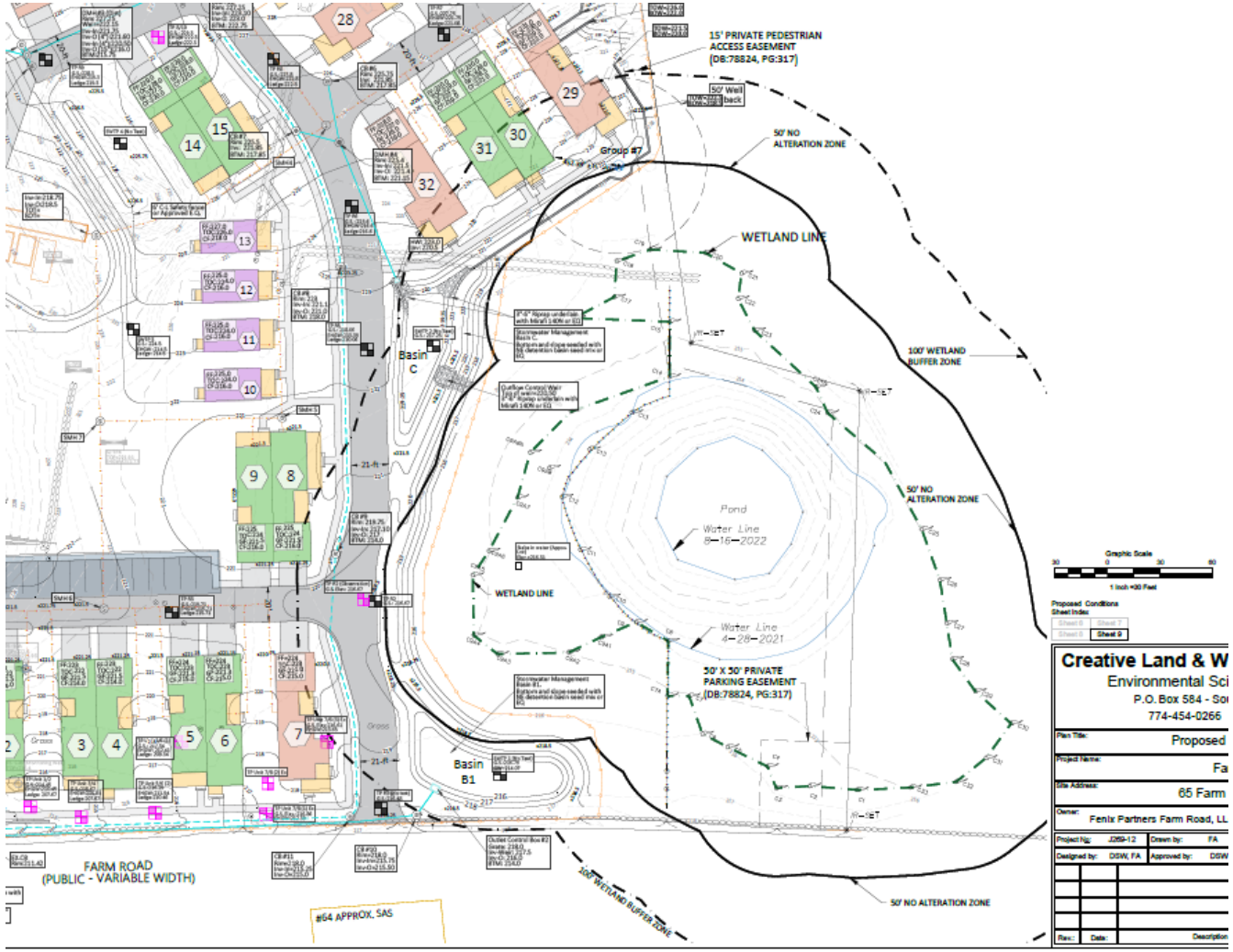


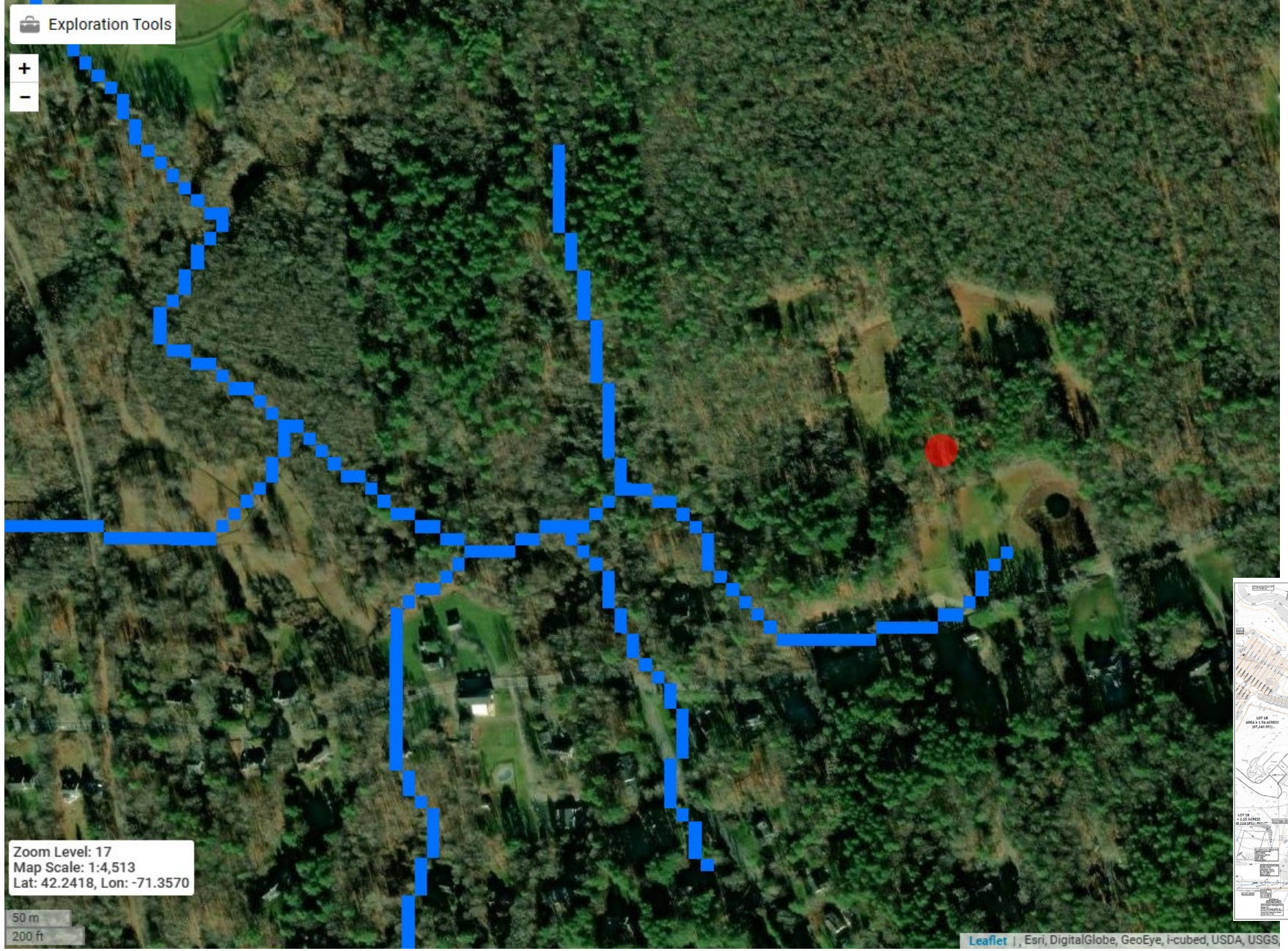
Figure 2. Protective zones of several Public Water Supply (PWS) wells – Zone 1 (yellow), IWPA (pink), and Zone 2 (light green) just west of proposed site. Map source: current GPC ARPA-funded Sherborn well/septic mapping project (MassGIS PWS layers). Blue dots represent known private well locations (BOH records), blue triangles indicate private well location unknown.

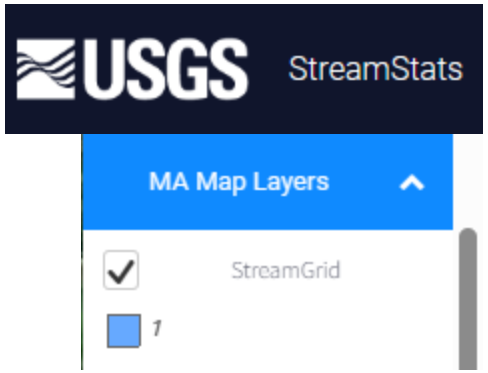


2005:

2021:

Figure 3. Proposed site plan (southeast section), above. Areal photo views, by year, from MassMapper, showing range in pond surface area along Farm Road.





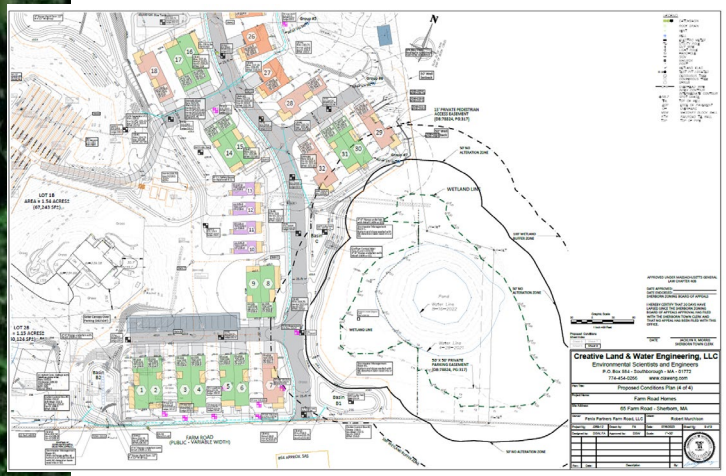


Figure 4, USGS StreamStats surface water features. Water course with known flows west to Sewall Brook.