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To: Members of the Hollis Planning board
Hollis Planning Department

Re:

**Aquifer Boundary at 82 Runnells Bridge
Rd has not been determined.**

Contents

Parcel is not located near the boundary of the APO	3
No Site Specific Soil Survey was conducted	4
Hydrogeologist was hired by the developer, not the planning board as is required	7
The developer's hydrogeological study did not accurately determine the boundary of the APO	7
Aquifer boundary not properly determined	7
The report conclusion is incongruent with the requirement to accurately locate the aquifer boundary ...	9
Correct role for the Independent Geologist.	9
Concerns raised by the independent geologist's review of the developer's report	9

The developer for the proposed development of a gas station, apartment, Dunkin Donuts and potential liquor store has claimed that the property at Tax Map 5, Lot 28 is not in the Aquifer Protection Overlay Zone per the town of Hollis regulations. The relevant ordinance is referenced below for clarity. Rectangles have been added for emphasis.

1. LOCATION

The extent of the Aquifer Protection Overlay Zone shall be the outermost edge of the surficial extent of all aquifer deposits presently designated as stratified drift in the USGS study, Hydrogeology of Stratified-Drift Aquifers and Water Quality in the Nashua Regional Planning Commission Area, South-Central New Hampshire, 1987.

- a. When the actual **boundary** of the Aquifer Protection Overlay Zone is in dispute by any owner or abutter actually affected by said boundary, **the Planning Board** (or the Board of Adjustment or other Town authority, as appropriate), at the owner's or abutter's expense and request, **may engage a certified soil scientist to conduct a Site Specific Soil Map of the area in dispute. Areas determined by the USGS as containing stratified drift aquifer and which also have excessively drained soils will be presumed to lie within the APO Zone.**
- b. If the results of the Site Specific Soil Mapping are inconclusive or are unsatisfactory to the Planning Board, the owner, or the abutter, **the Planning Board, at the owner's or abutter's expense, may engage a professional geologist or hydrologist to conduct a hydrogeological study of the area to determine more accurately the precise boundary of the APO Zone.**

The ordinance is specific on the following points which have not been followed in this case

The process allows for the precise **boundary** of the APOZ to be determined, it does not allow specific parcels to be excluded from the protections of the APOZ.

If the **boundary** of the APOZ is in dispute the following process is to be followed.

1. **Planning board** is to hire an expert to **conduct a Site Specific Soil Survey** on the parcel.
2. Acreage containing **excessively drained soils are to be presumed to be in the APO** and subject to its restrictions.
3. If the developer is not satisfied with this determination, the **Planning Board may engage** a hydro geologist to determine the precise boundary of the APOZ.

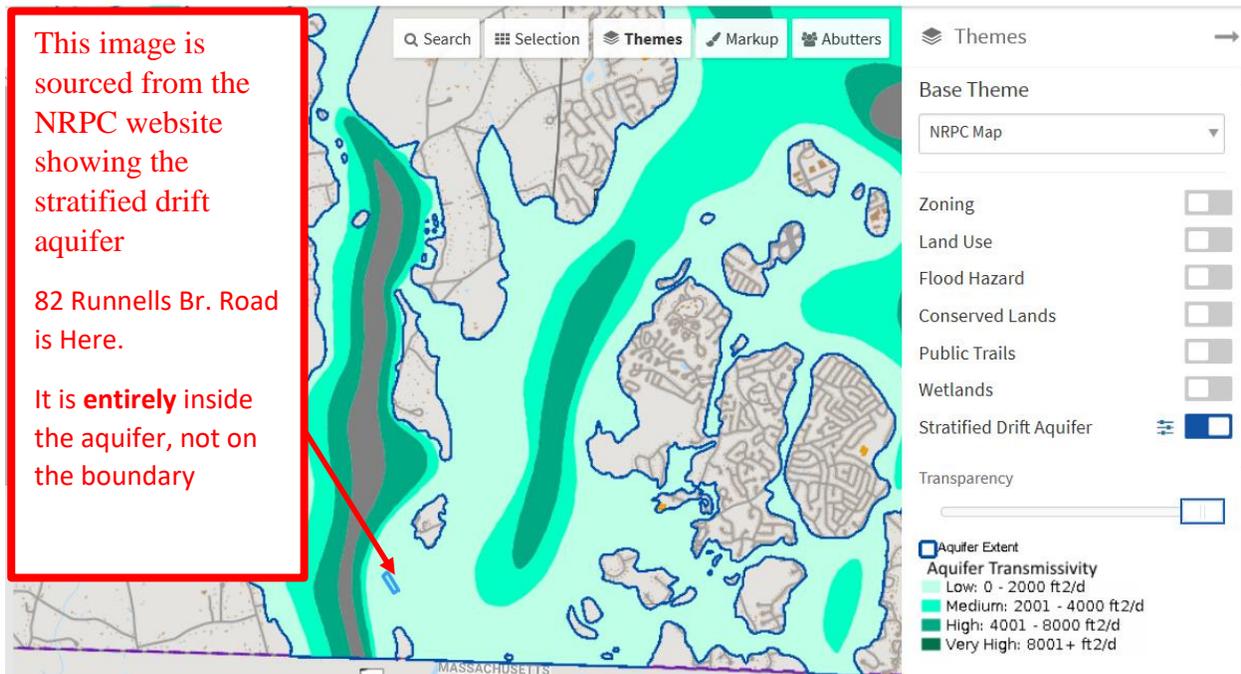
The following report will document three specific deviations from the ordinance which have led to a faulty conclusion.

Parcel is not located near the boundary of the APO

First, the subject property is not located near the APO boundary at all. A review of the aquifer map shows that the subject property is well within the Aquifer Protection Zone. It is not near a boundary at all. The Hollis zoning ordinance provides for a means of disputing the boundary only as referenced above. For parcels where the boundary of the zone is not in dispute as is the case for the project at 82 Runnels Bridge Rd, there is no provision to exempt them from the

Aquifer protection zone. Considering that only the boundary may be disputed, the planning board must not allow the property to be relieved of the restrictions of the APO.

The image below is taken from the NRPC website showing the stratified drift aquifer this map. This data is sourced from the USGS study conducted in 1987 and referenced in the Hollis Zoning Ordinance.



From the map above it can be seen that the subject property is not close to the aquifer boundary. As such there it is clear that the applicants are not disputing the boundary of the aquifer. The subject property is within the APO and is surrounded by it on all sides. Considering this, the planning board should deny the applicant's request to exclude this property from the restrictions of the Aquifer Protection zone which were enacted by Hollis voters to protect our town's water supply.

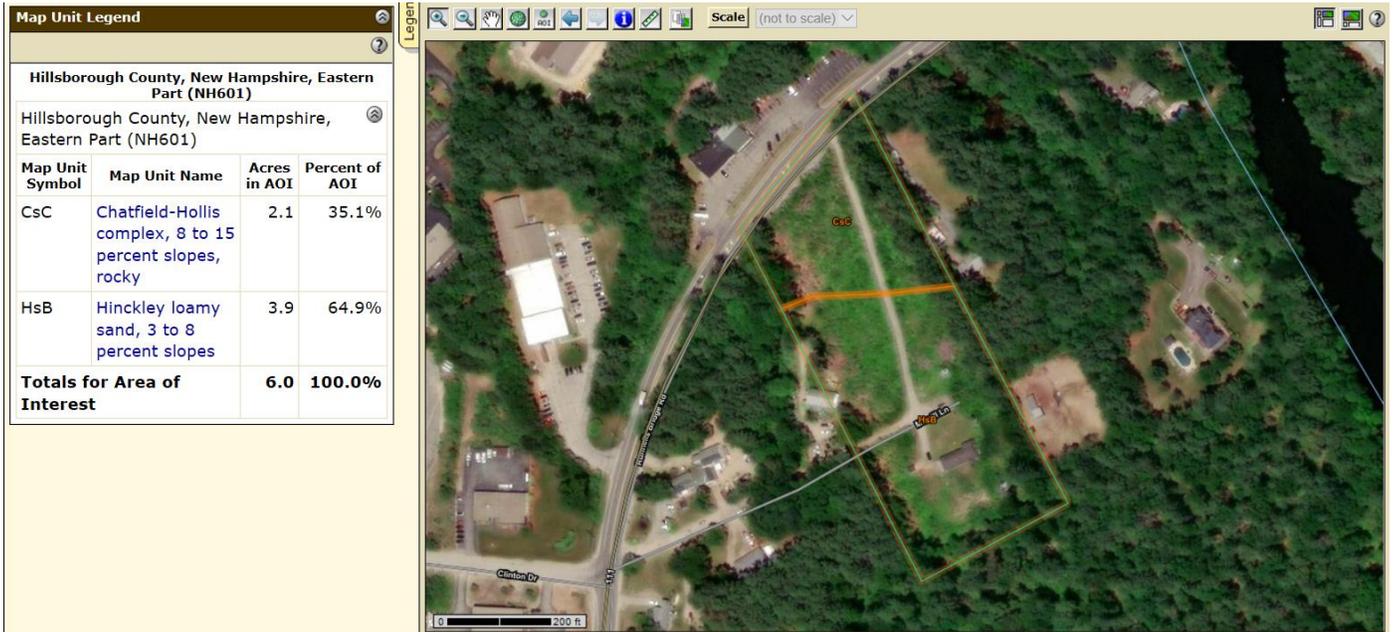
No Site Specific Soil Survey was conducted

A review of the material submitted on the website and on file at the planning department does not indicate that a Site Specific Soil Survey was conducted. The Zoning ordinance does define a process for resolving a dispute of the APO boundary which is referenced above. If a property is on the boundary of the APO (this property is not) the process requires all soils which are excessively drained to be "presumed to lie within the APO" The results of an NRCS Web soil survey are included below. The information is available at the NRCS website as cited.

<https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx> It can be seen that the property

contains approx. 60% Hinckley Loamy Sand which is identified as an **excessively drained soil**. The Hollis zoning ordinance is clear that this section of the property is to be presumed to lie within the APO. Why hasn't the developer submitted a SSS?

Web Soil Survey of the proposed property



NRCS Description of Hinckley Loamy Sand

Hillsborough County, New Hampshire, Eastern Part

HsB—Hinckley loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 2svm8

Elevation: 0 to 1,430 feet

Mean annual precipitation: 36 to 53 inches

Mean annual air temperature: 39 to 55 degrees F

Frost-free period: 140 to 250 days

Farmland classification: Not prime farmland

Map Unit Composition

Hinckley and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Hinckley

Setting

Landform: Moraines, kame terraces, outwash deltas, kames, eskers, outwash terraces, outwash plains

Landform position (two-dimensional): Summit, backslope, footslope, shoulder

Landform position (three-dimensional): Nose slope, side slope, base slope, crest, tread, riser

Down-slope shape: Linear, convex, concave

Across-slope shape: Convex, linear, concave

Parent material: Sandy and gravelly glaciofluvial deposits derived from gneiss and/or granite and/or schist

Typical profile

Oe - 0 to 1 inches: moderately decomposed plant material

A - 1 to 8 inches: loamy sand

Bw1 - 8 to 11 inches: gravelly loamy sand

Bw2 - 11 to 16 inches: gravelly loamy sand

BC - 16 to 19 inches: very gravelly loamy sand

C - 19 to 65 inches: very gravelly sand

Properties and qualities

Slope: 3 to 8 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Excessively drained

Runoff class: very low

Capacity of the most limiting layer to transmit water (Ksat):

Moderately high to very high (1.42 to 99.90 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline (0.0 to 1.9 mmhos/cm)

Available water storage in profile: Very low (about 3.0 inches)

Considering the specific language of the Hollis Zoning ordinance I request that the planning board deny the applicant's request to relieve this proposal of the APO restrictions. At the least, the board should require a Site Specific Soil Survey of the proposal. If the board chooses to do this, the ordinance requires that the planning board independently select the soil scientist so as to reduce the chance of bias in the results. Again the ordinance here is specific in that the soil scientist is to be engaged by the planning board, not the developer.

Hydrogeologist was hired by the developer, not the planning board as is required

The developer hired a Hydro geologist to conduct a study in support of their claim. Here again, the town ordinance is specific that the planning board is to select and engage the expert who will conduct the Hydrogeological study. The outcome of the study could be very different if the proper process was followed and the hydrogeologist was hired by the town to identify the boundary of the APO instead of being hired by a developer to support a claim of relief from the ordinance regulations.

The developer's hydrogeological study did not accurately determine the boundary of the APO

The report submitted by the developer failed to delineate a new boundary for the APO as is required by our ordinance. The output from an acceptable study would have been a map showing a more accurate boundary for the Aquifer. Terrecon's report however does not provide any such map or any indication of a more accurate location for the boundary of the APO. Considering that report submitted by Terrecon does not satisfy the requirements set forth in the zoning ordinance, the planning board must withhold approval until and unless the criteria set forth in the ordinance is met.

Aquifer boundary not determined by criteria of 1978 USGS study

The report submitted by the developer does not evaluate the aquifer boundary in the manner prescribed by the USGS survey referenced in our ordinance. The USGS criteria for delineation in the 1987 study was "contact between stratified drift and till and (or) bedrock." This can be seen from the legend on plate 3 of the study below. Red rectangle added for emphasis.

Legend from the 1987 USGS study which defines the Aquifer Protection Overlay Zone in Hollis

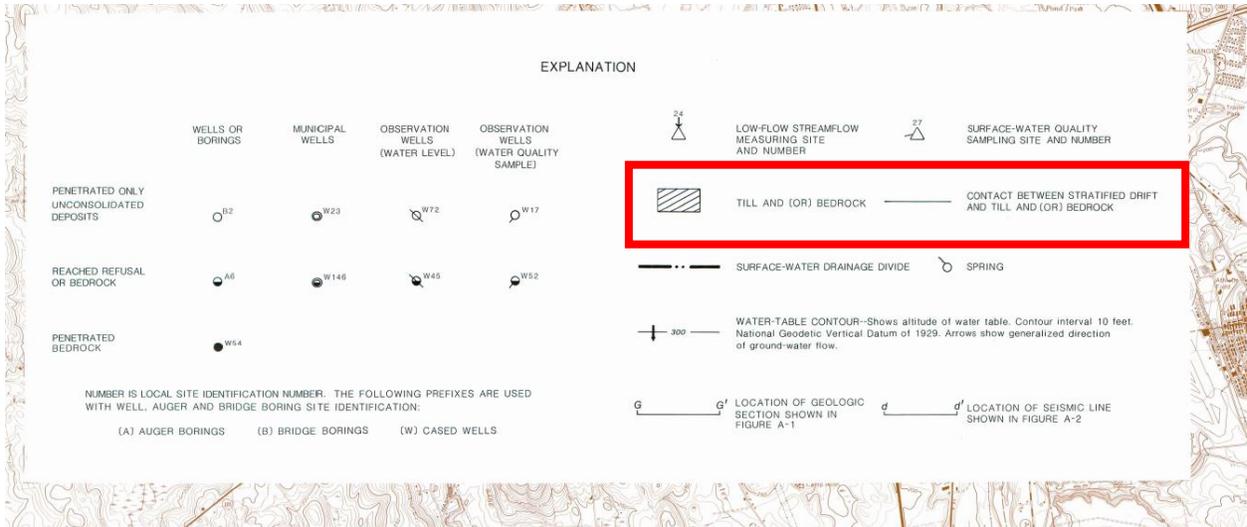
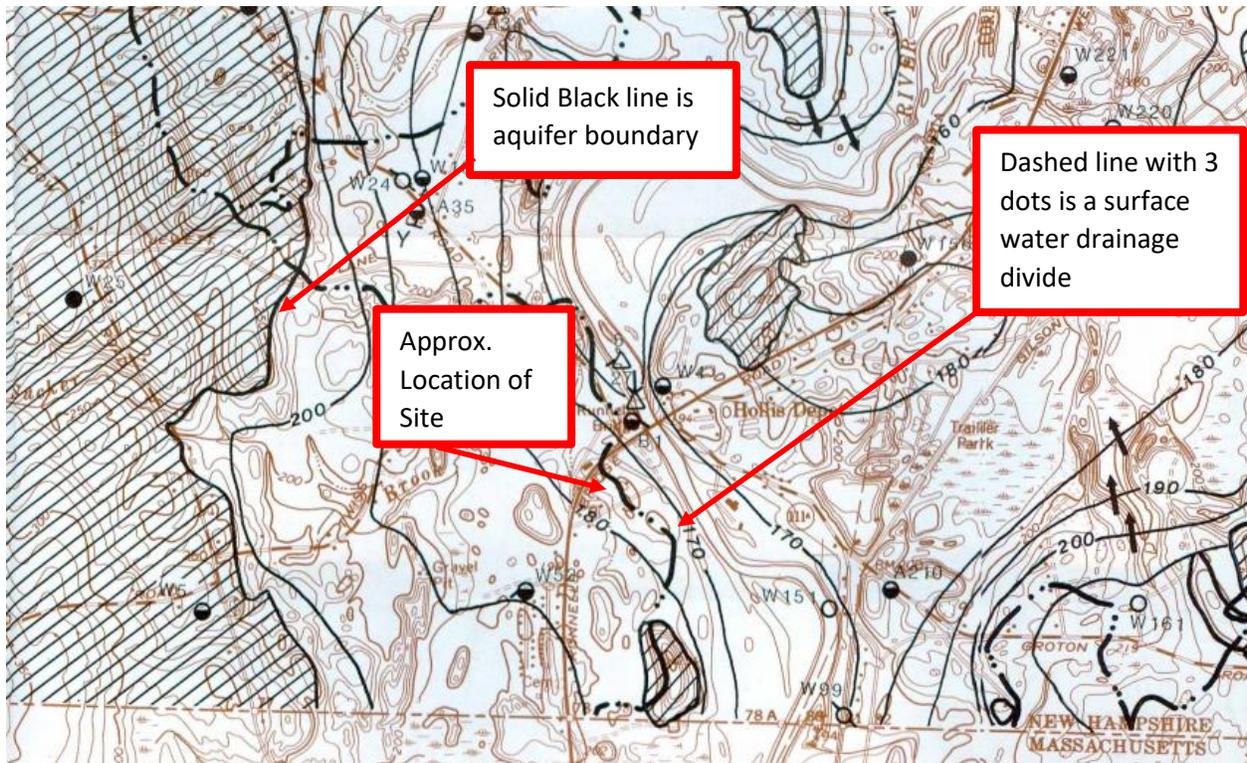


Image of plate 3 showing the boundary of the APOZ and the approximate location of the subject property



. The developer's report evaluates the specific production of the aquifer instead of the geologic boundary and even indicates a moderately high saturation rate of 18 cuft/ day. This meets the criteria for inclusion in the aquifer by the USGS. The developer's report makes no effort to find the boundary of the aquifer which is characterized by the geologic boundary described above.

The report conclusion is incongruent with the requirement to accurately locate the aquifer boundary

Instead of providing a map showing a revised aquifer boundary, the developer's report makes no attempt to locate the boundary of the aquifer and simply recommends that the entire site be excluded from the APO. The ordinance is clear that an acceptable report must more accurately determine the boundary of the aquifer but the developer's report fails to do this. The planning board should withhold approval unless the developer satisfies the requirement to accurately determine the boundary of the APO.

Correct role for the Independent Geologist.

The town hired an independent hydrogeologist to review the study. Unfortunately, the proper role for the independent geologist as identified in the Hollis Zoning Ordinance is to determine the boundary of the APO. Giving Mr. Emory direction to review the work of the developer's hydro geologist is inappropriate. The proper question to ask of Mr Emory is does the developer's report accurately determine the location of the APO boundary. If his answer is no, then the planning board must withhold approval.

Concerns raised by the independent geologist's review of the developer's report

Mr Emory's review of the developer's hydro geologic study indicates that there is a thin aquifer layer under the site. Mr Emory's review provides evidence that supports the conclusion that this the aquifer does indeed exist beneath this parcel.

- 4 of 7 test wells intercepted the water table
- There is a thin layer of sandy loose saturated sediments
- The measured hydraulic conductivity was 18.45 feet / day which is moderately high.

In addition, Mr. Emory points out that the applicant's report did not include a groundwater flow map which is needed to evaluate their claim. He anticipates that the thin aquifer on this property serves to recharge the larger aquifer to the west. Mr. Emory did not conclude that the site is not in the aquifer protection overlay zone. He merely stated that the applicant's report "makes a good case" that it is not. Mr. Emory's expertise is in Hydro geology, not the intricacies of the Hollis Zoning Ordinance. The question that Hollis residents need Mr. Emory must answer is does the Terrecon report locate the boundary of the APOZ?

Conclusion

The planning board should withhold relief from the requirements of the APOZ until and unless the language of the ordinance is satisfied with a report that accurately locates the aquifer boundary in the manner prescribed by the study referenced in our ordinance. The reports provided to date certainly indicate that the subject property contains stratified drift aquifer and should be subject to the restrictions of the APOZ.

Regards,

Joseph Garruba