

Approved

Building Committee Minutes

July 12, 2013

O Meeting was called to order at 8:00 AM.

Members present: Halsey Platt, Val Prest, Don Black, Susan Daly, Mike Bouchard

Advisor: Mark Haddad

Others: Don Walter (D&W)), Alan Brown (D&W), Steve Boucher (ACG), Mike Josefek (ACG), Anna Eliot, Josh Degen, Peter Cunningham and Michelle Collette.

O Mark Haddad identified the issue of site drainage. Part of the issue has been peer reviewed (Letters from D&W (July 8, 2013), Nitsch Engineering (June 28) and Gale Associates (July 2)). Since these reviews and the proposal of a solution, there are additional concerns about drainage in the southwest corner of the property.

The purpose of the meeting is to understand how the drainage issue can be resolved, and to also identify what went wrong in the previous testing such that the water/drainage issue was not identified.

O Don Walter reviewed the chronology of the testing which had occurred. In March 2012, 6 test pits were dug at the original station location on the north side of the site (near the wetlands). The intention was to also dig test pits in the center and southern portions of the property. Due to concerns of interference with haying operations, the Lawrence Homestead Trust requested that test pits not be dug beyond the wetlands area.

In March, 2012 test pits were dug at the northern end of the property, near the wetlands. Water was found at 14". Because the wetlands were more extensive than originally determined, the station's location was moved to the opposite (southern) end of the property. In August, 2012, 11 borings were drilled (southern area) at depths of 10 to 17'. Water was found at 15' depth in the area where the bays would be built. No other water was found at the finish grade. "Refusal" was hit at 10' at the left rear of the property. Ms. Eliot asked if the Town owned the property in August 2012. At that time it was an active haying field under agreement to the town.

O The boring technique was used to accommodate haying operations. It is not as good a technique as test pits. The mottling analysis used with test pits is more difficult with borings. Water was not found and subsurface mottling was not detected with the borings. Mr. Prest explained that boring samples are 18" long and typically taken every 5'. They are intended to analyze bearing load capacity. Typically they will not pick up on spring perched water or high water in dry seasons. Test pits produce better results.

Mr. Walter stated that if test pits had been used, and mottling or water had been detected, the initially proposed drainage system would have been more expensive than the one that was proposed. Mr. Haddad agreed but stated that the work would not be done under a change order, which carries additional cost.

Mr. Platt disagreed with Mr. Walter, and suggested that the building could have been moved. Mr. Brown input that more fill would have been needed and would have increased costs.

A suggestion was made to repeat the borings in August 2013 and review the results against what is known. Mr. Prest thought the recent wet weather would make the boring tests unable to be duplicated.

Ms. Collette offered that testing was not known to have been done to Title V specifications. The Planning Board and Earth Removal Stormwater Advisory Committee were unaware that test pits had not been dug.

O Mr. Haddad asked how this problem could get fixed. Mr. Black questioned whether the current drainage change order work would be enough to fix the problem. Mr. Walter suggested that the water infiltrating "at grade" was a new issue which the change order work was not designed to accommodate. Mr. Walter expressed that a potential solution being examined is to extend the drain pipe further to the back and rear of the site.

Mr. Haddad stated that the right rear corner of the site is very saturated, and asked what the solution could be and its cost. Steve Boucher stated that this groundwater affects the parking lot, and not the building. His thought was that an extension of the cut off drain, run deeper in the ground on the building's side of the retaining wall, would be needed to pull water from the parking lot. Mr. Haddad said we needed a solution which doesn't slow down the contractor (TLT).

O Mr. Black asked if the current site was big enough to handle the drainage issues. Ms. Collette reiterated that stormwater regulations require that there be no net increase in runoff.

O Mr. Black asked if the proposed cutoff drain extension required rework. Mr. Boucher stated "no", that this was an extension and did not disrupt completed work.

ACTIONS

- Wait for the response from Gale Associates to act on next steps
- No action at this time to determine responsibility for payment of the solution

MOTION: Postpone review of previous committee minutes. Passed by Unanimous Vote

MOTION to adjourn. Passed by Unanimous Vote. Meeting adjourned at 8:50 am

Respectfully,

Michael Bouchard



8 July 2013

Mr. Mark W. Haddad
Town Manager
Town of Groton
173 Main Street
Groton, MA. 01450

**RE: New Center Fire Station
Groundwater Letter**

Dear Mr. Haddad:

We are writing in response to the 28 June 2013 letter issued by Nitsch Engineering whereby they questioned the lack of determination by Gale Associates of the Estimated Seasonal High Groundwater Table (ESHGWT) for the selected location of the new Center Fire Station in Groton. Gale Associates has responded to the Nitsch Engineering letter and both are attached to this letter as a matter of record. Based upon the information presented, it is Dore & Whittier's opinion that the uncovering of higher than anticipated groundwater levels is truly an unforeseen condition. In fact, of the (11) borings that were advanced only one location at the northwest corner of the proposed apparatus bays encountered groundwater and that was found at 15 feet below the existing finished grade.

The following is a brief chronology of the events that led to the current site design:

- Before the final building location was determined, six test pits were excavated under the direction of Gale Associates at the northern edge of the Lawrence Homestead Trust (LHT) land in March 2012 which is the lowest elevation of the site.
- Gale Associates attempted to conduct further test pits in the central and southern ends of the site but were instructed to stop by the LHT due to the ongoing seasonal income generating haying operation.
- Due to the disruption of the test pits it was determined that less invasive core borings would be utilized to determine the remaining below surface soils conditions. Terracon subcontracted through Gale Associates and completed the borings analysis on or about 1 August 2012.
- The Geotechnical Engineering Report dated 21 August 2012 was issued by Terracon. In the report it notes that they were issuing "recommendations" regarding "Groundwater conditions" among others, that "Groundwater was encountered in one boring at 15 feet deep", and that "Based upon the depth of groundwater observed during drilling and the proposed site work, construction dewatering is not anticipated".

Based upon Terracon's findings there was no reason to believe that high seasonal groundwater may fluctuate upwards of 15 feet thus alerting all to the situation uncovered when excavation commenced in March of 2013. This project was thoroughly vetted by local boards, commissions and departments. The town's

ARCHITECTS
PROJECT MANAGERS

VERMONT
1795 Williston Rd. Ste. 200
S. Burlington, VT 05403
(P) 802.863.1428
(F) 802.863.6955

MASSACHUSETTS
260 Merrimac St. Bldg. 7
Newburyport, MA 01950
(P) 978.499.2999
(F) 978.499.2944

independent engineer spent countless hours reviewing the project privately and publicly with Gale Associates and the design team. We also attended regular building committee meetings where we all discussed all aspects of the project. This clearly is an unforeseen condition concealed below ground, during one of the driest months annually, in a location where the landholder wanted to minimize surface damage so not to impact the ongoing haying operation. If test pits were allowed to be taken the ESHGWT may have been discovered. Whether the ESHGWT was discovered in August 2013 or during construction, the owner would incur the additional storm water system enhancements as an added benefit to the project.

We hope this provides a better understanding of the groundwater situation. We look forward to discussing this further as you may wish.

Sincerely,

DORE & WHITTIER ARCHITECTS, INC.

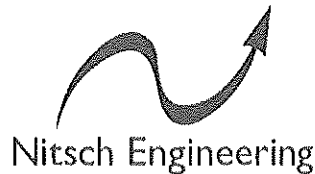
Architects · Project Managers

Donald M. Walter, AIA
Principal

Enclosures:

Nitsch letter dated 28 June 2013

Gale letter dated 2 July 2013



2 Center Plaza, Suite 430
Boston, MA 02108-1928
T: 617-338-0063
F: 617-338-6472
www.nitscheng.com

June 28, 2013

Groton Planning Board
c/o Mr. Mark Haddad
Town Manager
173 Main Street
Groton, MA 01450

RE: Nitsch Project #9767
Groton Fire Station
Farmers Row
Site Plan Review
Groton, MA

Dear Planning Board Members:

Nitsch Engineering was asked to explain the difference between two (2) methods of groundwater table determination typically required in Title V soil evaluations, and in the Massachusetts Stormwater Standards. The two (2) methods of determination discussed in this letter are observed groundwater table and estimated seasonal high groundwater table (ESHGWT).

Observed groundwater table may be determined by monitoring well or by observation of saturated conditions during a test pit exploration or boring. When observed by monitoring well, multiple observations may be made and plotted for evaluation. Observed groundwater tables represent seasonal high groundwater only when the observation is made during a period of high groundwater during a typical year. Throughout the year the groundwater table fluctuates in elevation. In a typical New England year, the groundwater table is at its highest in the spring; therefore, observed groundwater tables in the spring time in New England are usually closer to ESHGWT than observed groundwater tables in the summer.

Determination of an ESHGWT uses a combination of soil geology, landform geology, topography, landform geology, and other methods to estimate where the seasonal high groundwater table is in a particular location. The most common way to make this determination is the evaluation of the presence of redoximorphic features in the soil profile. Redoximorphic features are more commonly referred to as mottles or redox. If redox features are present in the soil horizon, it is commonly confirmed through evaluation of the landform, soil composition, and offset from observed groundwater table. This evaluation takes place in an open test pit as opposed to a boring or groundwater monitoring well.

If redox features are not present in the soil, there are other methods available for ESHGWT determination; however, proper identification of redox features is the most accurate method and should be attempted first.

Massachusetts requires that individuals performing soil evaluations under Title V be an Approved Soil Evaluator. Becoming an Approved Soil Evaluator includes training in determining ESHGWT.

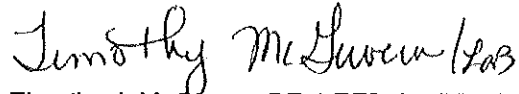
The soil analysis provided in the report entitled, "Stormwater Management Report and Permit Application" for the "Groton Center Fire Station Design, Groton, MA", dated August 29, 2012 and revised October 5, 2012, prepared for Town of Groton (the Town) by Gale Associates, Inc., did not appear to include a determination of ESHGWT.

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We hope the Planning Board finds this information helpful. If the Planning Board has any questions, please call.

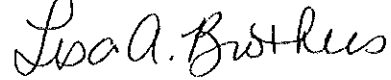
Very truly yours,

Nitsch Engineering, Inc.

Handwritten signature of Timothy J. McGivern in black ink.

Timothy J. McGivern, PE, LEED AP BD+C
Senior Project Engineer

Approved By:

Handwritten signature of Lisa A. Brothers in black ink.

Lisa A. Brothers, PE, LEED AP BD+C
President & CEO

cc: Michelle Collette, Town Planner

TJM/lab/fmk

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Gale Associates, Inc.

163 Libbey Parkway | P.O. Box 890189 | Weymouth, MA 02189-0004

P 781.335.6465 F 781.335.6467 www.galeassociates.com

July 2, 2013

Mr. Donald M. Walter, AIA
Principal
Dore & Whittier Associates, Inc.
260 Merrimac Street, Building 7
Newburyport, MA 01950

Dear Mr. Walter:

Gale Associates, Inc. (Gale) is providing this letter in response to the correspondence prepared by Nitsch Engineering, Inc. dated June 28, 2013 in reference to groundwater at the proposed Central Fire Station on Farmers Row in Groton, MA.

Nitsch's letter explains methods for determining estimated seasonal high groundwater (ESHGW) and that test pits or monitoring wells during a period of high groundwater are the preferred methods to be used. Gale agrees with this assessment, however due to certain limitations, not all preferred methods were available at the time of the site evaluation. This letter details our effort and restrictions to evaluate soil conditions and ESHGW at the Groton Center Fire Station site.

In March of 2012 Gale performed six (6) test pits with the assistance of the Groton Department of Public Works (DPW). These test pits were conducted in the northern (low lying) portion of the 11± acre Lawrence Homestead Trust (LHT) parcel on Farmers Row as part of the initial site feasibility study for the new Fire Station. While on site Gale attempted to conduct test pits in the center and the southern portion of the parcel to confirm soil conditions. However, immediately after initiating the first such test pit a representative of the LHT ordered digging to stop. We were informed that test pits were only to occur in the northern portion of the site and that maintaining the field for hay operations was paramount. For this reason, it was determined that drilled borings only would be used for the soil evaluation in the southern portion of the site (current project location).

Gale engaged Terracon, a licensed firm specializing in Geotechnical Engineering and Geology, to perform soil testing for the proposed building, pavement and stormwater systems. Due to the project schedule test borings were drilled on July 31 and August 1, 2012. As Nitsch's letter states, when determining groundwater by monitoring wells, observations of groundwater represents seasonal high groundwater only when observed during a period of high groundwater in a typical year. Since the window of site investigation through

Boston
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San Francisco



Mr. Donald M. Walter, AIA
Principal
July 2, 2013
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project bid was July through October it is not reasonable to assume that ESHGW could have been observed through monitoring wells.

Often times, soil borings will reveal moist soil or lenses of redoximorphic features that can denote ESHGW. As noted in Terracon's report dated August 21, 2012 and stamped by a registered professional engineer licensed in MA, soil samples were taken in eleven (11) boring locations. Redoximorphic features were not observed in any samples. Groundwater was observed in only one (1) at a depth of 15-feet and moist/damp soil was observed in only one (1) at a depth of 15-17-feet. Also, permeability testing was performed in three (3) borings and each resulted in a water level drop; hence it is reasonable to conclude that the soil was not saturated with standing ESHGW.

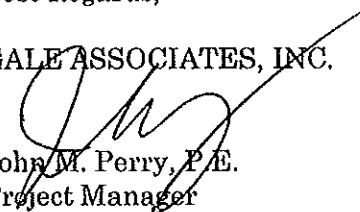
Also, no member of the Building Committee, the Conservation Commission, DPW, Planning Board or property owner made mention of historical high groundwater during the site evaluation or design process.

In conclusion, Gale provided a reasonable effort to evaluate soil and groundwater conditions within the limitations described above.

If you have any questions, regarding the above comments, please contact me at (781)335-6465 or JMP@gainc.com.

Best Regards,

GALE ASSOCIATES, INC.



John M. Perry, P.E.
Project Manager

JMP/lad

cc: Alan Brown (Dore and Whittier)
Larry Dwyer (Terracon)

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