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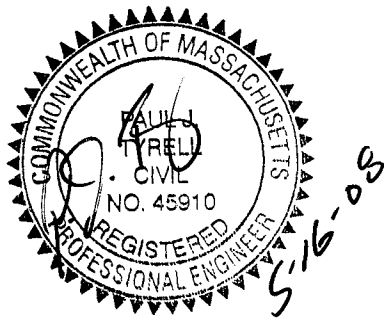
MEMORANDUM

TO: Lou Taverna, P.E. – Newton City Engineer

FROM: Paul J. Tyrell, P.E. – Gale Associates, Inc.

RE: South Meadow Brook and the
Newton South High School Athletic Fields
Gale JN 712690

DATE: May 16, 2008



As requested, Gale Associates, Inc. (Gale) has prepared this memorandum to supplement our Drainage Report and Master Plan and to address the questions raised by Alderman Paul Coletti. This memorandum has been structured to address those items specifically requested by Alderman Coletti during our May 13th, 2008 meeting.

1. Preliminary Research – The Consultant shall review flooding complaints received by the City to compile a preliminary list of problem areas that may impact or be impacted by the proposed project. Conduct interviews with appropriate City Officials and employees to determine areas of concern that are not publicly known.

As part of the preparation of our drainage study, we met with the City of Newton engineering staff to review the records of flooding complaints from the Newton South High School (NSHS) fields. During this interview, your staff confirmed that during excessive rain events, the NSHS Athletic Fields flood and stormwater run-off sheet flows to the abutting properties along Winston Road. As detailed in our Drainage Report, Gale has determined that this flooding is a result of poor field grading, poor field drainage, heavy soil compaction, and the high clay content of the topsoil. There were no other reports of flooding beyond that resulting from sheet flow run-off from the fields.

On Monday, May 5, 2008, we met with Mr. Ted Jerdee, Superintendent of Utilities, to determine whether there has been any flooding complaints from residents along Brandeis Road. During this meeting, Mr. Jerdee confirmed that he has not received any complaints from the Brandeis Road residents.

Mr. Jerdee did confirm that he was aware of a persistent problem with catch basins along the West side of the NSHS parking lot. He believed this problem was a result of debris clogging the catch basins. To confirm this assumption, we visited the parking lot to inspect the structures in question and found 1"-2" of leaves covering each structure. It is apparent from our site visit that the leaves and debris are in fact causing the problem and that it is not a result of a deficient drainage system.

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2. Review Drainage Mapping – The Consultant shall review all existing maps and plans available.

Gale has reviewed all existing maps and plans made available to them by the City of Newton Engineering Division. Of note in our review of this mapping is that there is no drainage connection to the existing wetland (between Brandeis Road and the NSHS). Accordingly, since the fields do not contribute flow to the wetlands, it is not expected that the proposed improvements would have any negative effect on the wetlands.

3. Provide a drainage and geotechnical report describing the existing conditions and feasibility of constructing a drainage system to serve turf and/or grass fields.

Gale's Drainage Report and Master Plan were submitted in April 2008 addressing these issues. The Drainage Report described the existing conditions and feasibility of constructing a drainage system to serve synthetic and/or natural turf fields. This report contained a description of the stormwater management plan for the proposed athletic fields, and the Master Plan included schematic drainage designs for each of the proposed athletic field improvements.

As outlined in these reports, the existing site consists of heavily compacted, poorly draining soils over approximately 9 feet of miscellaneous fill, which was placed over the original streambed and wetland. As part of the NSHS improvements, the top layer of existing soils will be removed (the depth of removal will vary with the proposed surface), a series of underdrains will be laid under the fields, and the area will be filled to the proposed grade with free-draining soils. The underdrains will be connected to a series of collector pipes **which will ultimately be connected to the 84" RCP culvert under the field**. These improvements will improve drainage on the fields and result in a reduction in stormwater run-off from the site through increased infiltration, retention, and an extended time of concentration through the drainage system.

4. Compile a comprehensive list of problem areas that may impact or be impacted by the proposed project.

Our interviews with you, the City of Newton engineering staff, and the Superintendent of Utilities did not identify any problem areas that may impact or be impacted by the proposed project.

5. Determine if the addition of the synthetic turf at Newton South High School will impact (positively or negatively) current flooding issues.

A properly designed and maintained field (either synthetic or natural turf) will eliminate the current flooding issues during the storm event for which it is designed to handle.

6. Determine the off-site impact of the proposed project including on abutting properties and down stream drainage areas.

The proposed project will result in a decrease in stormwater run-off from the NSHS. Accordingly the project will have no negative effect to drainage on the abutting properties or the downstream areas.

7. Prepare a hydraulic analysis of the closed sections of South Meadow Brook to identify any possible areas of constraint within the system related to the proposed project.

As part of the Drainage Report prepared by Gale, a hydrologic and hydraulic analysis of the South Meadow Brook Watershed was completed, as well as an internal investigation of the closed section of South Meadow Brook within the limits of the NSHS. This analysis confirmed that the existing conduit has the capacity to handle the 25-year storm event and that there was no constraint to flow within limits of the pipe investigated.

8. Develop recommendations for improvements including a set of structural and/or non-structural recommendations for the potential improvement of drainage problems related to the proposed Newton South project and abutting residential properties, such as cleaning of ditches and culverts, redirection of surface flow, resizing of culverts, and other potential solutions applicable to various site specific drainage problems. As part of the study of various drainage alternatives, study the feasibility of the installation of a drainage retention cistern under football field for collection and usage of storm water for irrigation.

The proposed field drainage improvements will be completed generally as follows:

- The top layer of existing soils will be removed (the depth of removal will vary with the proposed surface).
- A series of underdrains will be laid under the fields and the area will be filled to the proposed grade with free draining soils.
- The underdrains will be connected to a series of collector pipes which will ultimately be connected to the 84" RCP culvert under the field.

This proposed system will improve drainage on the fields and result in a reduction in storm water run-off from the site through increased infiltration, retention, and an extended time of concentration through the drainage system.

The 84" RCP culvert under the field was televised and found to be relatively free of debris and does not appear to require cleaning. The open channels, downstream of the culvert, are susceptible to clogging with debris from natural causes such as vegetation and downed trees, as well as the dumping of foreign matter. These open channels should be inspected regularly and any debris should be removed regularly to minimize its impact on the drainage system.

The hydraulic analysis indicated that the South Meadow Brook will convey a 25-year storm event without surface flooding. Since most municipalities size the public storm drain systems for the 10 year storm event, it appears that there is adequate capacity within the 84" culvert.

Finally, while technically feasible, the volume of water required to properly irrigate a natural turf field(s) is significantly more than a drainage retention cistern beneath the fields could economically be constructed. The irrigation system would quickly empty the system, leaving a dangerous void under the field. Since the existing irrigation system uses a well and the proposed drainage system would improve groundwater recharge, we believe the proposed plan meets the intent (reuse of water) where the drainage system recharges the groundwater for reuse as irrigation.

9. The consultant shall investigate and determine the feasibility of methods used to control water collection and to control removal of storm water runoff in the wetland area adjacent to the fields and the parking lot, in a manner acceptable to the Department of Environmental Protection and the Newton Conservation Commission. This shall include investigating the feasibility of an acceptable draw down system to handle the removal of excessive storm water accumulation.

As noted above there are no existing drainage connections to (or from) the subject wetlands. Wetlands are important environmental resources, improving water quality through filtration and providing wildlife habitat, and are protected under the Wetlands Protection Act. The Wetlands Protection Act restricts proposed projects that would impact existing wetlands, either through increasing or decreasing storm water flows to them. Accordingly, it does not seem feasible to control stormwater flow to the wetlands (since there are no drainage connections), nor is it feasible to remove flows since this would have a negative effect on the wetlands.

10. Evaluate current methods of stormwater removal during major storm events in the Newton South High School complex, and recommend methods for potential improvement.

During our meeting on May 5, 2008 with the Superintendent of Utilities, Gale reviewed the City mapping for the NSHS parking lot. As noted above, the lack of parking lot sweeping has resulted in debris building up at the catch basins, limiting their ability to properly drain the parking lot. This debris causes stormwater to puddle at each catch basin, which increases the deterioration of the pavement and reduces its effective life, and could result in stormwater flowing onto the NSHS field. To remedy this situation, Gale recommends that each structure be cleaned and a regular maintenance program be executed to clear the leaves. Additionally, Gale recommends that the curbs adjacent to each of these catch basins be replaced with a "gutter mouth" which would not be impacted by the leaf cover.

11. Study existing storm drain sizes and design of back up drainage at Brandeis Road.

The Brandeis Road drainage system consists of various diameter reinforced concrete pipes that flow southwest from the start of Brandeis Road westerly to its connection into the existing 84" culvert downstream of the NSHS athletic fields. This system is independent of the NSHS as well as the adjacent wetlands.

During our meeting of May 5, 2008 with the Superintendent of Utilities, it was confirmed that these existing drains are functioning properly with no reports of surcharging or back up. Since there are no reports of failure and with proper maintenance of the drain pipes (keeping them free of roots and intrusions), as well as cleaning out the catch basins on a semiannual basis, the storm drain system along Brandeis Road appears adequate.

We hope this adequately addresses Alderman Coletti's questions and we remain available to meet with him personally to further review our memorandum and his areas of concerns.

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