neponset river
WATERSHED ASSOCIATION

December 27, 2012

Jack Wiggin, Chairman
Westwood Planning Board
c/o Nora Loughnane, Town Planner
50 Carby Street
Westwood, MA 02090

RE: Preliminary comments regarding University Station proposal

Dear Mr. Wiggin,

Thank you in advance for your consideration of these written comments regarding water, stormwater, streamflow, pedestrian connectivity and river access at the proposed University Station project.

In the past, our organization has been supportive of the redevelopment of the University Avenue area, and that support continues today. Because it involves the redevelopment of such a large area of uncontrolled pavement, the project represents a unique opportunity to enhance water quality, groundwater recharge and streamflows along the Neponset River and within the Fowl Meadow Area of Critical Environmental Concern.

<u>Regulatory Context</u>
The Neponset River and its tributaries regularly violate state water quality standards for a variety of indicators in the area surrounding and downstream of the proposed redevelopment. Because of this, Westwood is covered by an EPA/DEP approved final Total Maximum Daily Load (TMDL) for bacteria which establishes a concentration-based waste load allocation for stormwater discharges of 200 colony forming units of fecal coliform at the point of discharge for stormwater runoff. In essence, the TMDL is a cleanup plan for bacteria, which establishes a goal for the maximum allowable discharge of bacteria in stormwater runoff.

TMDL limits on bacterial discharge apply both to privately owned pavement, as well as to discharges from the town-owned drainage system by virtue of the EPA phase II municipal stormwater permit program (EPA MS4 permit). I point this out, because Westwood's existing MS4 permit prohibits the Town from causing or contributing to a violation of water quality standards. Thus, to the extent that a private development discharges excess bacteria to a stream causing a violation of water quality standards, the Town of Westwood's discharges to that same stream are held to a higher regulatory standard. Therefore, it is in Westwood's self-interest to ensure that all private developments comply with the bacteria TMDL, not only to protect the Town's water, but to limit the Town's own regulatory burden.

Another important planning consideration regarding the site is that MassDEP is in the process of writing new, significantly more strict regulations governing water

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withdrawals under the Water Management Act. Under these new rules, the Westwood section of the Neponset River is classified in the highest level of hydrologic stress due to streamflow depletion. As a result, the Dedham Westwood Water District will be required to demonstrate to MassDEP that it has adequately minimized the environmental impacts of its existing water withdrawals and that they have mitigated the impact of any increased water withdrawals. As such, new water demand at University Station could place additional regulatory burden on the District by requiring the District to take additional mitigation measures and/or by requiring the District to implement more expensive options to minimize impacts from its existing demand.

General Comments on "Complete Site Plans Revised 11-30-12"

At the outset we would observe that the presently available drainage site plans lack details that are necessary to properly evaluate their adequacy. In certain portions of the site—particularly the northeast and southeast corners of the site—drainage seems only to be drawn at a conceptual level. Also absent from the plans appear to be important details such as the location and models of Stormceptor as well as key details of the detention basins, wet pond infiltration basins and the like. We provide a number of comments below, but the drainage plans will need to be developed to a greater level of detail before we can provide complete comments.

Definition of Pre-Development Condition

Under existing conditions—conditions which have existed for five years or more years now—the vast majority of the site is pervious. In its calculations for both recharge, peak runoff rates, and water demand, the Applicant has elected to start its analysis not with the existing conditions, but rather with the former developed conditions which existed five, and in terms of water demand, as much as ten years ago. This is a significant assumption on the Applicant's part, and raises a variety of interesting legal questions.

Stormwater Checklist

In Appendix C of the 11-30-12 Stormwater Report, the Applicant provides a copy of the completed MassDEP stormwater checklist.

Under "project type" the Applicant indicates that the current effort is a redevelopment project. However, the Stormwater Report Narrative indicates that the project involves a net increase in impervious cover of 15.1 acres. As such, the current project would be properly categorized as a combination of new development and redevelopment. Areas of new impervious cover are required to fully support all the stormwater standards, while areas of existing impervious cover (i.e. redevelopment) must meet most standards to the maximum extent practicable. The stormwater report does not address the treatment of new impervious areas separately from the treatment of redeveloped impervious cover. This is a moot point if one accepts the Applicant's assertion that they are meeting the new development standards for all portions of the site. However, as explained further below, the development does not presently meet the new development standards. On the final checklist, the Applicant should check the "combination" box on the form.

The MassDEP Stormwater Standards explicitly require applicants to consider the potential to use LID techniques to minimize stormwater impacts. On page 3, the draft stormwater checklist (with minor exceptions) indicates that no LID practices were utilized. The Stormwater Report Narrative confirms the absence of LID practices at the site and provides no discussion of how LID was considered in the design of the stormwater management system, nor what LID alternatives were evaluated and found infeasible. The final version of the Stormwater Report Narrative should include a discussion of what LID measures were considered and why they were not pursued. The

redevelopment checklist in the MassDEP Stormwater Handbook provides a format that can be used to submit this required information.

In TetraTech's December 21 response to comments from BETA Engineering, TetraTech answers the question of what LID practices were considered, by stating that the system is designed in compliance with MassDEP requirements. This is not an adequate response to the question. The Stormwater Handbook REQUIRES that the Applicant consider LID measures and the final Stormwater report must discuss what LID measures were considered and why they were not pursued.

As discussed further below, there are significant pedestrian and landscaped areas distributed across the site which could host a variety of LID practices which would could increase groundwater recharge and substantially improve the quality of treated stormwater runoff especially where such runoff is being discharged to Zone II areas and/or surface waters subject to a TMDL.

On page 6 of the Stormwater Checklist, the box for proprietary BMP's should be checked and supporting documentation provided in the final stormwater report. The supporting documentation should include not only copies of the output of the manufacturer's sizing software, but information from the MaSTEP program regarding the status of third party verification of manufacturer's claims.

Also on page 6 of the Stormwater Checklist, the box for TMDL's should be checked. As discussed further above and below, the final stormwater report needs to discuss what measures have been taken address the waste load allocation in the Neponset Bacteria TMDL. Adjustments to the design of the stormwater system will likely be needed to fully address the bacteria TMDL.

<u>Stormwater Standard #2: Peak Discharge Rates</u>
We have not taken the time to examine pre and post development peak discharge rate calculations in detail for this site, however it appears that the Applicant has reduced peak discharge rates throughout the site, if one accepts the Applicant's definition of the "existing" condition.

In the Final Stormwater Report, the Applicant should expound on what problem prompted the Applicant to undertake the additional review described in the note to table 2 on page 8 of the Stormwater Report Narrative (11-30-12).

Also the final stormwater report should provide further clarification and details regarding the passing reference made in the stormwater report that flows are diverted from POA3 to POA2. It is not obvious from the drainage plans where this diversion is located or how and when it activates.

<u>Stormwater Standard #3: Groundwater Recharge</u>
MassDEP stormwater standard #3 requires that "at a minimum, the annual recharge from the post-development site shall approximate the annual recharge from pre-development conditions based on soil type" (MassDEP Stormwater Handbook). While the proposed infiltrators appear to be sized appropriately for the overall recharge requirement, the proposed infiltrators will not achieve the required level of annual recharge because of the small fraction of total impervious cover on the site which is directed to the infiltrators.

To comply with its recharge policy, MassDEP requires that the *FIRST* 0.6" of runoff from all 86.3 acres of impervious surface on the site be captured and infiltrated. Instead, the Applicant proposes

a system that under the DEP dynamic field methodology earns credit for capturing 1.09" of runoff from just 46.9 acres, or 54% of the proposed impervious cover on the site.

The problem is that the vast majority of our annual rainfall is accumulated in small rainstorms. Storms that generate 1.09" or more of rainfall a day occur only about 8 times a year, whereas storms that generate 0.6" or more occur 22 days per year on average (see attached graph). In other words, the Applicant has built a big enough bucket (i.e. infiltrator volume) but because of the way it is piped, the bucket will seldom be filled.

Recognizing this problem, the MassDEP Stormwater Handbook Volume 3, Chapter 1, page 27, lays out a procedure for capture area adjustment. The Handbook requires that, at a minimum, the infiltration system be designed to capture the initial runoff from 65% of the site impervious cover, whereas the current proposal collects runoff from only 54% of the proposed impervious cover. In addition, the Handbook requires that applicants provide additional infiltration storage capacity whenever runoff is being collected from less than 100% of the site. Applying the MassDEP required multiplier to the currently proposed design, the Applicant must increase the storage capacity of the proposed infiltrators by 84%.

An alternative solution would be either to route the runoff from the entire site to the currently proposed infiltrators, or to reduce the size of the currently proposed infiltrators and redistribute that capacity elsewhere on the site where it can service runoff from areas which are currently not being collected.

In addition, we would make the following additional comments regarding recharge:

- The Stormwater Report Narrative indicates that the dynamic field method was used to calculate recharge for all but infiltration system 3 where rawl's rates were used implying the simple dynamic method. Calculations regarding infiltration basin three in Appendix D however indicate that the field dynamic calculation was used and the infiltration rate does not correspond to any of the MassDEP rawl's rates. Clarify how basin three was sized. If rawls rates were used, recalculate using the simple dynamic method.
- The footnotes notes on Stormwater Appendix D p 12 refer to simple dynamic method and the note on Appendix D page 1 refers to rawl's rates which imply simple dynamic. Please clarify the various notes and narrative regarding the use of the simple or field dynamic methods in the Final Stormwater Report.
- The saturated hydraulic conductivity values (K2) shown for infiltration basin one and two in the table on Appendix D page 1 appear to be transposed relative to the values referenced in the calculations on pages 9 and 10. The final Stormwater Report should clarify and recalculate as needed.
- We are accustomed to seeing an assumption of 30% void space in stone surrounding infiltration systems, but an assumption of 40% void space has been used in calculations for Appendix D. In the final report, recalculate using the more typical assumption or provide a narrative justifying the more aggressive assumption.
- When using the field dynamic method, the MassDEP Stormwater Handbook calls for 80% TSS removal prior to infiltration (see Handbook Volume 3, Chapter 1, page 17, paragraph 3). Based on TSS removal tables at the end of Appendix D, this criterion has not been met for point of analysis 4. Clarify this issue in the final Stormwater Report and add additional TSS removal capacity as needed.
- The Development Summary (submitted 12-3-12) indicates on page 4 that the proposed stormwater system will recharge 2.5" of runoff from 49.5 acres of impervious cover

whereas the Stormwater Report (11-30-12) indicates (following the procedures for the field dynamic method) that 1.09" of runoff from 46.9 acres will be recharged. Are there additional calculations to support the figures referenced in the Development Summary? Was a non-DEP approved methodology used to make this calculation? If so include appropriate documentation in the final Stormwater Report or correct the Development Summary as appropriate.

- The development summary indicates that a rainwater harvesting system will be used for all outdoor irrigation needs. No information or calculations seem to be presented on the rainwater harvesting system in the Stormwater Report. Details should be provided in the final report and to the extent that the rainwater harvesting system diverts water from the infiltration system, the recharge calculations should be adjusted accordingly.

Stormwater Standard #4: TSS Removal

In general the Applicant has provided a system which should be effective at reducing TSS loading from the site. As noted above however, additional TSS removal is needed upstream of infiltration basin 3.

For POA1 and POA3, the primary mechanism for pollutant removal are the extended dry detention basins. These basins appear to lack features such as extended flowpaths and wetland features that the Handbook identifies as critical to maximizing pollutant removal efficiency for this type of BMP. In the final Stormwater Management Report, discuss what additional design features will be incorporated into the basins to maximize pollutant removal efficiency.

It appears that there may be a number or areas upstream of POA 2 and 4 where only limited TSS removal is provided, particularly in areas downstream of the infiltrators. The final drainage plans should be sure to address TSS removal for all areas of the site.

We also note that the Applicant proposes mechanical sweeping on a monthly average. We would strongly urge the Applicant to propose vacuum or regenerative air sweeping on the same schedule. This will substantially increase the effectiveness of the sweeping program at little or perhaps no incremental cost. In addition, a commitment for vacuum sweeping would allow for a higher TSS removal credit.

On page 10, the Stormwater Report narrative indicates that weekly sweeping will occur within 400' of the wellhead and in areas tributary to infiltrators. However this commitment is not discussed under protection of critical areas, nor does it appear to be mentioned under the draft O&M plan. The final Stormwater report and O&M plan should more clearly address this point.

Various documents reference a commitment to use no salt in key areas. The final report and O&M plan should provide a more thorough discussion of snow management and deicing strategies, and what if any alternate deicing chemicals will be allowed. In a similar vein, the final report should discuss practices related to fertilization and herbicide use in landscaped areas.

Stormwater Standard #5: Higher Potential Pollutant Loads

This section of the Stormwater Report describes various percentages of TSS removal prior to discharge to the infiltration systems. As mentioned above, given that the infiltration sizing is predicated on the field dynamic method, all flows routed to the infiltrators should be treated for 80% TSS removal before being discharged to the infiltrators. The final Stormwater report should clarify this point. Design adjustments will be required for at least one of the infiltrators.

Stormwater Standard #6: Critical Resource Areas

Obviously, the quality of treated stormwater being recharged in the Zone II of the Dedham Westwood Water District's wells is of critical concern to all residents of Westwood and the Westwood Planning Board.

The MassDEP Stormwater Handbook specifically provides for stormwater recharge, with appropriate treatment, in zone II areas. Encouraging recharge of highly treated runoff from roofs and paved surfaces is preferable from a drinking water quality standpoint to existing conditions wherein recharge to the Dedham Westwood Water District's wells comes from untreated runoff from route 128 and in some significant part from induced infiltration out of the Neponset River which frequently violates swimming, let alone drinking, water quality standards.

While we strongly support the notion of recharging treated runoff to the Zone II, we also believe that this situation calls for the highest possible treatment standards, particularly given that infiltrators are proposed well inside the boundaries of the zone II and in areas where exfiltration rates from the underground structures will be quite high.

As discussed above, the Applicant is required to achieve 80% TSS removal prior to discharge to the infiltrators. The proposed pretreatment BMPs are designed around a 1" treatment volume, but 1.09" of runoff is being directed to the infiltrators. We would recommend that the pretreatmet BMPs be designed to achieve 80% TSS removal from 1.09" of runoff at least.

The Stormwater Handbook identifies a specific suite of "pretreatment" BMPs that should be used prior to recharging in a Zone II, and the Applicant has utilized BMPs from the approved list. However, the Handbook also requires the use of a specific suite of "treatment" BMPs (as opposed to pretreatment BMPs). The Applicant has elected to rely in infiltration as their sole treatment BMP, an approach which is consistent with the requirements of the Handbook.

However, given the high infiltration rates observed and the proximity of the infiltrators to the wells, we would feel more comfortable if the Applicant provided the required treatment for surface parking runoff using some of the other specified critical-area treatment BMPs prior to infiltration. These critical area treatment BMPs address pollutants not removed by the pretreatment BMPs, such as dissolved hydrocarbons, nutrients, and bacteria. They accomplish this added level of pollutant removal by incorporating mechanisms such as soil filtration, soil adsorption, beneficial microorganisms, UV exposure and plant uptake. Use of these BMPs would also be consistent with the goals laid out by Town of Westwood's former "University Avenue Redevelopment Environmental Workgroup." In their summary report dated April 12, 2006, the Work Group specified that "Road and parking runoff shall be treated for dissolved contaminants as well as suspended solids."

Most of the critical area treatment BMPs specified in the Handbook are the same BMPs found at the core of the LID approach to stormwater management. As discussed above, the Handbook requires the Applicant to evaluate the use of LID techniques, something it has not yet done. With this in mind, we strongly urge the Applicant to make a serious evaluation of LID stormwater management techniques for surface parking and pedestrian areas. Specifically, bioretention practices, tree boxes, and porous pavement over sand filters are recommended.

We would observe that these LID treatment BMPs, when properly configured, serve double duty as pre-treatment and even infiltration BMPs, thus allowing for the elimination of some or all of the currently proposed pretreatment BMPs from the plan, such that the total cost of improved stormwater treatment may be similar to the currently proposed system.

TMDL Requirements

In addition to the ten basic stormwater standards, the MassDEP Stormwater Handbook requires applicants to propose BMPs that are consistent with waste load allocations for applicable TMDLs that address pollutants other than TSS. As mentioned above, Westwood is subject to the Neponset Bacteria TMDL.

The MassDEP has developed a watershed based plan for the Boston Harbor Watershed to guide efforts to achieve designated water quality standards and achieve TMDL implementation. The Technical Memorandum for the Boston Harbor-Watershed Watershed-Based Plan developed for MassDEP by the Beta Group, identifies the event mean concentration of fecal coliform bacteria in runoff from commercial and high-density residential land uses as 9,306 colony forming units (CFU) per 100 ml and 16,901 CFU/100 ml respectively. The waste load allocation for stormwater discharges established in the Neponset Bacteria TMDL is 200 CFU/100 ml. This translates into a targeted reduction in fecal coliform concentrations of 98 to 99%. As a practical planning guideline, the Watershed Association recommends that applicants and communities select BMPs with the capacity to achieve a 90% reduction in bacterial loads and that these BMPs be sized to the 1" water quality volume.

Generally speaking, the treatment (as opposed to pretreatment) BMPs required by the Stormwater Handbook for land uses with higher potential pollutant loads and for critical areas such as Zone II's are capable of removing 90% or more of bacterial loads, as are infiltration and most LID techniques. Wet ponds and wetland systems also have good bacterial removal potential when properly designed—40-90% and up to 75% respectively according to the MassDEP Handbook. Extended detention basins have very limited ability to reduce bacterial loading—less than 10% according to the Handbook. Other pretreatment BMPs such as the Stormceptors and catch basins proposed by the Applicant have no ability to reduce bacterial concentrations, and in fact are likely increase bacterial concentrations.

As currently proposed, flows from point of analysis 1 have no proposed BMPs which are effective at removing bacteria. Points of analysis 2 and 3 include infiltrators which will help reduce bacterial concentrations, but it appears from the current site plans that there are substantial portions of POA 2 and 3 that are not tributary to the infiltrators and which have no other BMPs which are effective for bacteria. Point of analysis 4 includes an extended dry detention basin which would not be effective for bacterial removal, but we understand that consideration is being given to incorporating a wet pond which may be beneficial for bacteria, but further design details are needed to assess this.

With the above in mind, the Applicant should provide a thorough discussion of compliance with TMDL requirements in the final Stormwater Report and will likely need to identify additional (or alternate) BMPs in some areas of the site in order to comply with TMDL requirements, particularly in areas where flows are not directed to underground infiltrators.

As discussed above, the Applicant is required to provide a meaningful evaluation of LID techniques, and this evaluation would present an ideal opportunity to also evaluate additional BMPs to address the bacteria TMDL.

Water Use

Only limited details regarding expected water use appear to be available in the documents posted on the planning board website. The Development Summary submitted 12-3-12 makes brief reference to water use estimates under title V and the use of more optimistic conservation assumptions. Additional documentation is needed on how these figures were derived before meaningful comment can be made.

We would also observe that during the prior development process, Westwood Station made a variety of very detailed commitments regarding water efficient fixtures and practices. The current Applicant should be prepared to make a similarly detailed set of commitments. It is also notable that in the nearly six years that have passed since that time, there has been considerable progress nationally in the availability and use of innovative high efficiency fixtures.

With this in mind, we recommend that the following performance standards be applied to the project to maximize the efficiency of water use at the site:

- All toilets be they residential tank type or commercial flushometer type should be MaP Premium certified thus assuring both optimum water use efficiency and flushing power. See http://www.map-testing.com/info/menu/map-premium.html
- All urinals should use 0.25 GPF or less, including the option of waterless urinals
- All lavatory faucets in public areas (meaning not in residences or hotel rooms) should have a maximum flow rate of 0.5 GPM. Note that this is a current code requirement, though it is routinely ignored.
- All bathroom faucets in private areas (meaning residences and hotel rooms) should have a flow rate of 1.0 GPM or less.
- All kitchen faucets in private areas should have a flow rate of 1.5 GPM or less.
- All showerheads should have a flow rate of no more than 1.5 GPM and no multiple-head shower systems should be allowed.
- All clothes washing machines should have a water factor of 4.0 or less.

Considerable landscaped area exists within the site. We are encouraged by the general commitment in the Development Summary that outdoor irrigation needs will be met with harvested rainwater. However, additional details need to be provided in regards to the anticipated total irrigated area on site, the sizing and placement of the rainwater collection systems and their relationship to the recharge systems (i.e. do they reduce flows available for recharge), how irrigation water will be distributed around the site, and what design features have been incorporated to ensure that potable water is not accidentally used for irrigation and other outdoor purposes.

In the Development Summary document, the Applicant seems to rely on claims that increased stormwater recharge will offset new water withdrawals. We would respectfully suggest that the increase in stormwater recharge has already been used to comply with the recharge requirement of the stormwater policy, and it would be “double counting” to claim that stormwater recharge also counts toward offsetting increased water withdrawal volume. We would also observe that no matter how much stormwater recharge is provided, the project as proposed, will result in a net increase in demand in the Dedham-Westwood water system. As discussed above, any increase in withdrawals in the Dedham-Westwood system will trigger the need for the District to document

additional mitigation and/or minimization activities under future Water Management Act Permits. In the 2007 development proposal, the previous developer, proposed additional water supply mitigation measures, specifically a program to help reduce the high level of unaccounted for water in the Dedham-Westwood system, such that the new development would create no net increase in water supply demand. We strongly urge the current Applicant and the District to enter into a similar agreement under the new development program. Similar commitments should also be made for sewer system inflow and infiltration reduction.

Water Balance

As with water use there is no detailed discussion of the overall site water balance contained in the documents presently available on the Planning Board website.

Future submittals should contain detailed calculations and methodologies to support any claimed pre-development and post-development water use calculations. Before such a computation is made, changes to the stormwater system need to be made so that is complies with the recharge requirements of the MassDEP Stormwater Handbook. Also, as mentioned above, we recommend that the proponent offer additional mitigation measures to ensure that there is no net increase in water demand.

We note that BETA Engineering requested additional detail on water balance calculations in a previous comment letter. In its December 21 response, TetraTech referred BETA to page 6 of the Development Summary. We would reiterate our opinion that the information presented on page 6 of the Development Summary is a grossly inadequate answer to the question at hand and further details should be provided in a subsequent submission. In this same response to comments, TetraTech reiterates a statement from the Development Summary that the project will recharge 2.5" of runoff. The Applicant needs to provide calculations to substantiate this claim and explain what method was used to reach this conclusion. Using the MassDEP dynamic field methodology, the proposed infiltration system receives credit for capturing only 1.09" of runoff from about half the site.

The question of predevelopment and post development water balance is one area which is greatly impacted the definition of "existing conditions." As mentioned above, we believe that the appropriate baseline for existing conditions is the condition which currently exists on the site, which includes a minimal amount of imperious cover and very little existing water demand.

Even if one elects to use the formerly developed condition of the site as the starting point for "existing conditions" we would observe that any recharge associated with the 15.1 acres of new pavement should not be considered a net gain from the "existing" condition.

In computing the predevelopment and post development water balance for the site, we would recommend that the Applicant select a credible method for making this calculation. Toward that end, we would recommend using the hydrologic response unit methodology that was developed by the US Geological Survey to estimate runoff and recharge values for various types of land use under contract to the Executive Office of Environmental Affairs. The USGS developed this approach for a larger, more complex model for the Ipswich River Watershed. There is no need to replicate this model for University Station, but the hydrologic response unit values provide a quick and credible way to estimate pre and post development recharge and runoff. The USGS report entitled "A Precipitation-Runoff Model for Analysis of the Effects of Water Withdrawals on Streamflow,

Ipswich River Basin, Massachusetts" (available at http://pubs.usgs.gov/wri/wri004029) lays out this approach.

Until such time as the Applicant provides a more detailed water balance calculation, we cannot offer further comments.

Pedestrian Improvements and River Access

One final consideration is pedestrian flow throughout the site and in particular, the ability of pedestrians to make connections to the Neponset River, Fowl Meadow and the Blue Hills at the northeast end of the site, the ability of the public to access the canoe launch at the southeast end of the site and the ability of pedestrians to traverse the site from north to south as they move from open space areas at either end of the site. The final development plan should address these issues and replicate the commitments made previously for pedestrian connection and river access improvements.

Conclusion

Thank you in advance for your consideration of these comments and we look forward to continuing to work with the Planning Board, the Applicant and other local and state permitting agencies as the permitting process for the site moves forward.

Sincerely,

Ian Cooke
Executive Director