



MYSTIC RIVER WATERSHED ASSOCIATION
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BY FAX: 9 PAGES

30 June 2004

Anthony E. Fracasso
Senior Vice-President, Investment Banking
MassDevelopment
75 Federal Street, 10th Flood
Boston MA 02110

RE: Comments on Belmont Uplands 40B Eligibility Application

Dear Mr. Fracasso,

The Mystic River Watershed Association (MyRWA) is a non-profit membership organization that works to preserve and restore the natural resources of the Mystic River Watershed. The proposed Belmont Uplands project is in the Alewife subbasin of this watershed.

MyRWA opposes the Belmont Uplands 40 B application on Acorn Park Road. We believe that any development on this site presents severe environmental problems, and that the site should be preserved as open space. We are particularly concerned about the very-oversized 300-unit development being proposed by O'Neill Properties for the 40B project. MyRWA analyzed previous proposals by O'Neill for this property, in particular the office & RD project that went through MEPA review. Very little detailed information has been provided concerning the 40B project, but its size alone indicates that it will present even greater problems than the previous office & RD proposal.

We are particularly concerned about impacts of developing the Belmont Uplands site on water quality and flooding in the Alewife area. The proposed development is located adjacent to Little River and immediately upstream of Alewife Brook, which are areas of special concern to us because of their important role in water quality, flooding and future recreational use issues within the watershed. We are also concerned about the impacts of developing the site on the high-quality wildlife habitat and open space values of the Belmont Uplands site. These values have been well documented by other commenters, however, and we will not address them here.

This letter discusses current water quality and flooding problems in the Alewife, and

describes why we believe that the proposed O'Neill development is unacceptable given these problems. We provide our findings in some detail, to make clear how vulnerable this site is and how inadequate the analysis of impacts on water quality and flooding has been to date for this site. No development should go forward on this site without a more thorough assessment of the proposed project itself and of regional options for addressing existing flooding and water quality problems.

The remainder of this letter first presents some overall observations. We then discuss water quality issues, describe flooding issues, and finally present our recommendations regarding decisions about this site.

General Observations

In general, the effects of development on water quantity and water quality are well documented: development changes the hydrologic regime of the land. The hydrologic regime includes the volumes, duration, rates, frequency, and routing of both stormwater and groundwater. Development also increases pollutant loading to receiving waters. Once a site is developed, it is virtually impossible to *replicate* pre-development hydrologic site conditions. The impacts of development can only be *mitigated*, typically by constructing Best Management Practices (BMPs) to control the peak rate and water quality of the discharge. It is important to keep this general point in mind, given that the O'Neill property is one of few undeveloped parcels within the Alewife area of the Mystic River Watershed. Once this property is developed, the existing hydrologic regime is forever changed.

The poor water quality and flooding problems that plague the Alewife area now are the result of many poor land use planning decisions in the past. These decisions have not taken adequate account of the flat topography of the area and the poor condition of much of the sewer infrastructure. Each decision about development can be portrayed as a minor contributor to the overall problems, and our fragmented town-by-town and site-by-site decision process has encouraged this shortsighted approach. The cumulative effects have been dramatic, however. It is clear that the area's wastewater infrastructure and capacity to control flooding are already inadequate, and the affected municipalities are just now beginning to deal with the high costs of past development decisions.

Ideally, no new development would be allowed until these capacity problems have been addressed. Belmont should meet its growth and revenue goals by encouraging redevelopment of previously developed sites that would reduce runoff and improve water quality. Any development of an undeveloped site should be viewed with great skepticism, and should be held to the highest possible standards. Given what we now know about the area's water quality and flooding problems, it is inexcusable to require only that a new development on valuable open space meet the minimal standards that would apply to any development. While MyRWA recommends that the Belmont Uplands site not be developed, we also suggest, should the development go forward, that the project be required to comply with *much* higher standards for mitigation of

environmental impacts, as described below. This would require a much smaller project than is currently proposed.

Water Quality

Current conditions:

MyRWA's Mystic Monitoring Network (MMN) has been collecting water quality data in the Alewife subwatershed since 2000. Our data show significant problems with water quality in the Winn Brook, Little River and the entire Alewife subwatershed, especially due to high levels of bacteria contamination and especially in wet weather. The following is a summary of MMN data for this area:

Results of MMN Bacteria Monitoring in the Alewife Area				
Location	# of Samples	Fecal Coliform Levels (cfu/100 ml)	Geometric Mean (cfu/100 ml)	% Violating MA Standard for Secondary Contact (>1,000 cfu/100 ml)
Winn's Brook Discharge to Little Pond	26	10-17,300	864	42.3%
Belmont Spy Pond Conduit	3	152-9,636	1,162	66.7%
Belmont Drain to NW Corner of Little Pond	3	2,900->200,000	39,155	100.0%
Mass Highway drain between Oliver Rd, Lake St	1	5,300	-	100.0%
East of Acorn Park Drive's West End	1	910	-	0.0%
Outflow from 'Martignetti Marsh'	1	2,700	-	100.0%
Source: Mystic River Watershed Association, Mystic Monitoring Network – samples from July 2000 through March 2003.				

A variety of factors contribute to the poor water quality of the Alewife subwatershed. These include infiltration/inflow (I&I) (extraneous clean water discharged to the sewer system), illegal connections, Combined Sewer Overflows, and overland stormwater runoff. The proponent states that there is adequate sewer capacity to handle wastewater from the project during dry weather. Our monitoring data suggest that this is not true – the condition of the sewer system is currently not adequate to prevent bacteria contamination of Little River and Alewife Brook.

Impact of development on water quality:

Stormwater runoff in urban areas contributes a number of pollutants to adjacent waterbodies. For example, the following data from New York State provides estimates of typical pollutants in runoff, including Total Suspended Solids, phosphorus and nitrogen, bacteria, copper, lead and zinc.

Constituent	TSS Mg/L	TP Mg/L	TN Mg/L	F. Coli.1000 col./mL	Cu Ug/L	Pb Ug/L	Zn Ug/L
Residential Roof	19	0.11	1.5	0.26	20	21	312
C/R Parking	27	0.15	1.9	1.8	51	28	139
Residential Street	172	0.55	1.4	37	25	51	173
Lawns	602	2.1	9.1	24	17	17	50
Landscaping	37	-	-	94	94	29	263
Driveway	173	0.56	2.1	17	17	-	107

Source: New York State Stormwater Management Design Manual. Appendix A

The Massachusetts Stormwater Policy addresses TSS removal from impervious surfaces, but does not address the substantial TSS releases from lawns. Moreover, under Massachusetts policy, roof water is considered clean and can be directly infiltrated. Roof runoff often contains elevated levels of nutrients and heavy metals, however, and roof runoff must be treated in New York.

The most recent fall conference of the Massachusetts Association of Conservation Commissioners emphasized the importance of protecting areas that buffer wetlands to prevent this contamination. A variety of site-specific factors affect the removal of particulates (TSS, sediments, toxic organics, metals and pathogens) and soluble nutrients from runoff. For example, removal is greater with vegetative cover and less with impervious surfaces and compacted soils, and removal is less with steeper slopes (as characterize the Belmont Uplands site.)¹ The less vegetative cover and the steeper the slope, the wider the buffer area must be to protect wetlands from pollutants in urban runoff.

In addition to stormwater pollutants, the proposed 40B residential development is expected to generate more wastewater than the proposed commercial development. As described above, this wastewater will be discharged to a sewer system that is not adequately containing contaminants.

The developer's analysis:

MyRWA questioned a number of assumptions made in the proponent's design of the stormwater system for the previous office & RD project, as described in the next section on flooding. The uncertainties in the analysis of flooding impacts also apply to the analysis of stormwater quality. More work is needed to ensure that pollutants in stormwater runoff do not adversely affect the quality of Little River and Alewife Brook.

The developer's analysis of environmental impacts did not consider the fact that the existing wastewater infrastructure is in poor condition. Decisions about new connections

¹ R. Buchsbaum and S. Jackson, *The Scientific Basis for Protecting Wetland Buffers*, presented at the Massachusetts Association of Conservation Commissions Fall 2003 conference.

to the existing system are premature, given the need for further work by Cambridge, Belmont and MWRA to identify the sources of bacteria contamination in Little River and Alewife Brook.

Implications and recommendations:

The Phase II stormwater requirements and EPA's 308 enforcement actions against Belmont and neighboring communities are requiring substantial work to locate and correct problems with sewers and stormwater runoff that are causing high bacteria levels. The cost of these efforts to Belmont can be expected to grow in the future.

Ideally, there should be a moratorium on adding new wastewater discharges to an already-overburdened system. At a minimum, any new developments should be required to retain the maximum amount of stormwater on-site and to fund very substantial improvements in the sewer systems. The review of impacts should recognize that both Belmont and Cambridge must undertake intensive infiltration and intrusion removal from their sewage conveyance systems, as well as an aggressive program to identify (through smoke tests, cameras, or dye tests) and remove illegal connections of sewage pipes to stormwater infrastructure, before any new sewer connections are allowed in this area.

We are aware that the developer has agreed, as part of a Memorandum of Understanding with Belmont, to provide \$115,000 in funding for I&I removal. This amount is likely to fall well short of what would be required to make a reasonable dent in Belmont's sewer improvement challenges. We recommend that the developer be required to achieve a specific level of level of mitigation, whatever that might cost. The mitigation should be at least 4-to-1. The Department of Environmental Protection has been routinely requiring proponents proposing to add significant new wastewater flow to assist in the I/I reduction effort to ensure that the additional wastewater flows are offset by the removal of I/I. Currently, DEP is typically using a minimum 4:1 ratio for I/I removal to new wastewater flow added.

It is also important to note that I/I removal is an on-going process, with a continuing need to investigate and address sources of I/I. MyRWA is concerned that a one-time effort to reduce I/I by a certain amount is not sufficient to ensure that the wastewater impacts of the proposed development will not overburden the capacity of an already-inadequate system. In addition to considering ways to reduce wastewater impacts, the proponent should commit to a continuing effort over the life of the project to provide I/I mitigation. Such a commitment might be expressed as a given amount of funding each year that would allow Belmont to keep I/I below current levels by the amount implied by a 10-to-1 mitigation requirement.

Flooding

Current conditions:

Current efforts by the Tricommunity Flooding Workgroup to understand the causes of flooding, along with research by Steve Kaiser and other area residents, show that:

- Flooding in the Alewife subwatershed is a serious problem and is apparently becoming worse.
- The dramatic reduction in available open space in the Alewife area over time is a major contributor to this situation.
- Current flood levels are not well documented, and there is evidence the 100-year floodplain is understated.
- The standard 100-year storm assumptions are out-of-date.

While more work is needed to develop solutions to the severe flooding problems, it is already evident that any additional contribution to stormwater flows cannot be tolerated in this region.

Impact of development:

The proposed project will eliminate a forest stand of mature trees. Several thousand gallons per acre of water are used by plants each day, thereby drying the soil and making more room in the "soil sponge" to hold floodwater. During the growing season, the resulting loss of evapotranspiration will increase soil and water temperatures and decrease on-site water infiltration.

Recent research indicates that the mere act of disturbing soil can increase runoff potential, and that this is not typically accounted for in pre-/post-development site hydrologic modeling. Soil compaction occurs when heavy pressure on the soil (from trucks and construction equipment) reduces pore space and closely packs particles in the soil. This reduces water and air storage in the soil, which increases runoff. Results of a study in Ocean County, New Jersey², showed that some soils that were classified as hydrologic soil groups "A and B" (well drained soils) actually had the infiltrative properties of "C and D" (poorly drained soils) when located in subdivisions and other cleared areas. Soils at the Uplands site were classified as hydrologic soil group "B" in the proponent's FEIR for the office & RD project.

The substitution of impervious surface for trees and compaction of the soils at the Uplands site will inevitably increase total runoff. Under the state Stormwater Policy, developers are required to prevent increases in peak runoff. This is often accomplished

² Ocean County Soil Conservation District, "Impact of Soil Disturbance During Construction on Bulk Density and Infiltration in Ocean County, New Jersey," March 2001 (revised June 2001).

by retaining stormwater to allow infiltration and delay runoff to surface waters. Depending on the rate of infiltration and evaporation, the BMPs used may or may not reduce overall runoff, however.

The Alewife area already experiences flooding at relatively common rainfall levels. A stormwater management system that prevents an increase in peak flow but does not actually reduce total runoff could simply *increase* the duration of the peak at existing levels – levels that already cause serious flooding. Avoiding an increase in peak runoff is not an adequate standard in an area that already suffers from widespread flooding. Any project in this area should be required to substantially *reduce* runoff with a high degree of certainty.

Developer's analysis:

The developer's analysis of flooding impacts for the office & RD project was inadequate to ensure that flooding will not be worsened by the proposed project. The proponent provided only a basic analysis of flooding impacts, which includes a number of assumptions that MyRWA questions. Moreover, the proposed stormwater system was designed only to meet the minimal standards for mitigation, despite the vulnerability of the area to flooding.

MyRWA commented on the use of infiltration as a BMP at the site during its review of the MEPA DEIR for this previous project. We feel our concerns were not adequately addressed in the FEIR and would continue to be a concern with the 40 B residential plan.

The commercial development includes the construction of an underground infiltration/detention basin. The performance of this basin depends heavily on the groundwater elevation below the vault and the surrounding soil conditions.

During a storm, the infiltration basin will fill up with stormwater, which will infiltrate into the soil to the groundwater table. Typically, the infiltration rate from the system is greater than the capacity of the soils to convey the water (hydraulic conductivity), and a groundwater "mound" forms underneath the system. This generally is not a problem, as long as the mound does not intersect the bottom of the infiltration system and is able to dissipate before the next storm. When the mound intersects the infiltration system, however, the infiltration capacity is significantly reduced, and any volume of water that exceeds the storage capacity of the system is routed through an overflow to a surface outfall.

According to the proponent, observed seasonal high groundwater elevations were about 3.7 feet below the bottom of the infiltration basin. The current separation guideline in Massachusetts is 2-feet. It should be noted, however, that other jurisdictions recommend greater separation distances. For example, the State of New York recommends a 3-foot separation, and the EPA recommends 4-feet. The serious flooding conditions that already plague this area suggest that more conservative standards be applied to this development.

Even if the design separation distance were adequate, the proponent has not adequately evaluated the ability of the subsurface soils to convey the infiltrated stormwater. MyRWA recommended that the proponent perform a mounding analysis as part of the FEIR, but this comment was not addressed. As part of the Town's Peer Review, the consultant-reviewer has also recommended that soil test pits be performed by a Certified Soil Evaluator to determine soil and groundwater information specific to the areas designated for use as treatment swales, detention basins and infiltration basins.

Another problem concerns the assumptions about rainfall levels. Currently, the Massachusetts DEP requires the use of rainfall data published in the National Weather Bureau's Technical Paper-40 (TP-40). Recent research indicates that the precipitation amounts for various frequency storms are greater than those reported in TP-40. The document was published in 1961, and therefore does not reflect the last 40 years of precipitation data. A more recent study of precipitation patterns was published by the Cornell University Northeast Regional Climate Center in 1993, in "Atlas of Precipitation Extremes for the Northeastern United States and Southeastern Canada." In eastern Massachusetts, the more recent Cornell Study precipitation values show up to a 29 percent increase in rainfall amounts for each frequency. In general, the greatest disparity between values occurs with the more extreme storms, which are those most likely to cause flooding. Although the use of TP-40 is specified by the Massachusetts Wetlands Protection Act, more stringent design storms may be used under a local bylaw or ordinance. For example, the Town of Holliston requires the use of the Cornell data in hydrologic and hydraulic calculations³.

Implications and recommendations:

The work of the Tricommunity Flooding Workgroup suggests that Belmont, Arlington and Cambridge will have to take a wide variety of measures to reduce flooding in the Alewife area – there are no quick fixes. Any development with the potential to worsen the flooding problem should therefore be required to meet a very high standard for mitigation of potential runoff. The proposed development does not provide adequate assurance that even the most basic mitigation standards (no increase in peak flow) will be met.

The developer should be required to conduct a more accurate infiltration and runoff analysis *before* any approvals are given for the project, because such an analysis may show that the current stormwater management plans are inadequate. Providing for more stormwater retention might dramatically affect the design of the project, and no approvals should be given until this issue is adequately addressed. Promising to look more carefully at assumptions about seasonal high groundwater levels and soil infiltration rates at a later date, in the detailed design phase, is not sufficient. These parameters are too important to the basic feasibility of a project in this location to be dealt with as an afterthought. Review of the project should require an analysis of infiltration, peak runoff,

³ Town of Holliston, Wetlands Administration Bylaw Regulations, Approved September 4, 2001.
<http://www.townofholliston.us/ConCom/WABR.html>

and duration of high runoff levels under more realistic assumptions about precipitation levels and compacted soil infiltration rates.

Given the serious flooding issues in this area, the developer should also be required to achieve a much higher level of stormwater control than is specified in the Stormwater Management Policy for a typical site. For example, Cambridge typically requires for developments outside the 100 year flood plain that there be no more peak runoff from the 25-year storm post-construction than would occur during the 2-year storm pre-construction. The Boston Water and Sewer Commission requires that the maximum amount of stormwater feasible be retained on-site. Proponents must fully investigate keeping stormwater on-site before BWSC will even consider discharges to their stormwater system. The developer should be required to meet similar, more aggressive standards for stormwater management in this flood-prone area.

Conclusion

In summary, MyRWA recommends against any development of the Belmont Uplands site, for reasons presented in this letter as well as to avoid loss of a valuable wildlife habitat and open space resource. Should a development go forward, we strongly urge application of *much* higher standards for mitigation of its adverse environmental impacts. This would require exploring ways to reduce the size of the project dramatically or to relocate the project in a less-sensitive area, as well as to improve the design of the stormwater and wastewater systems.

Thank you for the opportunity to comment on this important issue. Please feel free to contact me with any questions or comments.

Sincerely,

Nancy Hammett
Executive Director