November 8, 2016

Ms. Alison Steinfeld
Director of Planning and Community Development
Town of Brookline
333 Washington Street, Third Floor
Brookline, MA 02445

RE: Environmental Technical Review
Proposed Mixed-Use Development
1180 Boylston Street, Brookline MA

Dear Ms. Steinfeld:

Fuss & O'Neill has completed a review of the documents associated with the proposed redevelopment of the 1180 Boylston Street property (hereafter, the Site). The materials reviewed included the Zoning Board of Appeals (ZBA) application documents, Massachusetts Department of Environmental Protection (MassDEP) case files, and the Town of Brookline Fire Department files. The project developer is Chestnut Hill Investments, LLC (Chestnut Hill).

The objective of our review was to evaluate if the reported environmental conditions pose risks to the proposed development of the site, and to provide recommendations that the Zoning Board may want to consider in the permitting process of the proposed development. To address that objective, we have provided below a summary of our understanding of the environmental conditions and associated regulatory status, followed by construction considerations and recommendations for the Zoning Board to consider in its deliberations of the proposed project.

Executive Summary

Based on the materials provided for review, the proposed development is intended to be built and operated on a parcel that will continue, after development, to contain soil, groundwater, and subsurface vapors contaminated by former gasoline releases at the site. This residual gasoline contamination does pose risks relative to construction management of contaminated materials (including soil, groundwater and rock removal) and operationally after construction in the prevention of potential vapor migration to the constructed building on the site and ongoing removal and treatment of contaminated groundwater. The materials provided to Fuss & O'Neill for review suggest that the developer is proposing measures sufficient to address these issues and protect the users of the site from exposure the residual contamination. In addition, regulatory programs of the United States Environmental Protection Agency (USEPA) and MassDEP adequately regulate construction and operation activities related to the residual contamination.

50 Redfield Street
Suite 100
Boston, MA
02122
t 617.282.4675
800.286.2469
f 617.282.8253

www.fando.com

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However, Fuss & O'Neill has identified seven issues below for the ZBA to consider during its evaluation of the proposed development. These items are addressed in further detail in the following pages:

1. **Short-term dewatering during construction**. The development proposal indicates that the site will be dewatered to facilitate excavation during construction. The groundwater from the site, which contains petroleum-related contaminants, is proposed for treatment and discharge to the municipal storm drainage system, under a Notice of Intent filed with USEPA. The applicant will be required to perform maintenance and monitoring and certify reports to USEPA on compliance with USEPA's General Permit. This activity is sufficiently regulated by USEPA but if the Zoning Board wants additional assurance of the applicant's compliance due to its interest in the municipal storm drainage system, ZBA could require review of permit documents or inspection of the treatment system during dewatering to ensure proper operational practices.

2. **Long-term dewatering and groundwater control**. The design team has indicated that dewatering and discharges to the public drain system will continue post-development. These flows should be counted as site-generated water discharges to the drainage system. The prior discussions of storm flows indicated that the Town would review the design flow rates to consider potential impacts to the overall drainage network capacity. This information was not provided in the documents provided to Fuss & O'Neill. The Zoning Board may want request this information to facilitate the capacity review.

   The long-term discharge will be regulated under a USEPA General Permit, and may also have regulatory implications with regard to the MassDEP cleanup program's designation of "remedy operation status" as a change in the nature of response actions. These regulatory issues are addressed by USEPA and MassDEP regulatory programs and Fuss & O'Neill does not recommend that the ZBA address these other than to require that the applicant meet applicable requirements of these regulatory programs.

3. **On-site accumulation of remediation waste**. A substantial volume of soil and rock, a portion of which may be classified as "remediation waste" under the MassDEP cleanup program, will be excavated for off-site disposal during development. This material will likely be relatively costly to dispose of properly. MassDEP requires a statement of financial assurance from the performing party prior to excavation but does not require the actual funding for disposal to be in place. If the Zoning Board wants stronger assurance from the developer that sufficient funds are available to dispose of the excavated material in a timely fashion, and that the material will be removed properly , the ZBA could:

- Request town review of the Release Abatement Measure (RAM) cleanup plan the applicant must prepare to address MassDEP regulatory requirements in order to verify the disposal approach and timing commitments.
- Require a financial assurance mechanism (FAM; e.g. a bond) to ensure sufficient funds are available to remove remediation waste from the site prior to generation (e.g. excavation) of the waste.
- Require that the developer provide proof of acceptance of the waste from the selected disposal facilities prior to initiation of excavation.

Although waste removal is adequately regulated by MassDEP, the measures listed above would provide the Town a higher degree of assurance that remediation waste will be removed in a timely fashion and not stored on-site longer than warranted.

4. **Bedrock removal**. The project will require rock removal to reach the foundation grade. Multiple methods can be used to remove the bedrock, including drilling, jackhammering, or blasting. While blasting may be possible at the site, it could pose a safety risk to adjacent properties, and could affect the bedrock fracture network and groundwater flow around the site. The developer has not proposed blasting in the materials reviewed but the Zoning Board may want to explicitly prohibit blasting on this project due to the presence of proximal neighbors and contaminated groundwater in the bedrock.

5. **Vapor intrusion**. Typically, one of the primary risks of situating buildings over residual petroleum contamination is the potential migration of contaminant vapors from the ground into overlying buildings where people can be exposed to the vapors. Petroleum vapors in the subsurface can migrate into low-lying structures, posing a risk to occupants. The development proposal calls for the installation of a waterproof barrier around the foundation, and an underground parking structure, which must be ventilated to control vehicle exhaust. These measures are integral to controlling vapor intrusion risks, and Zoning Board should specifically reference these components and tie them to any project approvals as a critical component of the design. The ZBA may also want greater assurance that the ventilation system remains operational at all times and may want to require a generator or other back up power system for the ventilation system until such time as MassDEP indicates there is no further risk of vapor migration into the building.

6. **Responsible parties**. Cumberland Farms has historically performed cleanup actions at the site, and continues to monitor the progress of remediation. Chestnut Hill will develop the project, which will significantly impact the site conditions and may affect the status of the site under the state cleanup program. The Zoning Board may want to clarify the relationships between these parties, and which party will be responsible for post-development environmental compliance. Ongoing operation of the ventilation and

dewatering systems around the subsurface garage will involve ongoing environmental compliance after the building is constructed and occupied.

7. **Environmental quality**. Several of the proposed construction and operation activities should, if properly implemented, reduce the levels of existing petroleum contamination in the subsurface of the site over time. Removal of contaminated soil and groundwater during construction will reduce the overall contaminant mass in the subsurface of the site. During operation of the site after construction, ventilation of the garage should mitigate risks posed by subsurface vapor migration and reduce contaminant levels in subsurface vapors and ongoing dewatering and treatment of groundwater discharge should also improve environmental quality. Therefor the overall construction and operation plan as proposed should reduce the levels of existing petroleum contamination in the subsurface over time. However, the construction process will be physically disruptive and require the handling of large volumes of affected media, and must therefore be carefully planned and implanted in order to mitigate risks to the surrounding properties and residents.

Project Understanding

Development Proposal

We understand that the ZBA is considering a six-story mixed-use development, consisting generally of the following elements:

- Five ground-floor retail spaces
- Five above-ground stories, with nine residential units per story. All 45 units will be age-restricted, and nine of these units (20% of the total occupancy) are reserved for low-income occupancy.
- A one-story underground parking garage, designed to accommodate up to approximately 90 parking spaces. The garage will feature hoisting systems capable of storing two cars in each bay, and as such will be taller than a traditional single-story garage.

We understand that in order to accommodate these features, specifically the parking garage and building foundation, the site will be excavated to a finished grade approximately 20 to 25 feet below the present-day ground surface. We further understand bedrock on the site is shallow (generally less than 10 feet below grade) and that significant rock removal will be required during the site activities.

Development Considerations Posed by the Environmental Conditions

The site was formerly used as a gas station form the 1950s to 2014 and during that time gasoline was released to the subsurface and contaminated groundwater, soil and bedrock beneath the site. Gasoline related contaminants remain in the subsurface of the site and clean-up of the residual subsurface gasoline contamination is still ongoing and will likely continue during site development and future operations and occupancy of the new development.

Two primary risks posed by the residual gasoline contamination will need to be addressed during development of the site to protect occupants and users of the site from exposure to the residual gasoline contamination in the subsurface. These two potential risks include vapor migration of the residual gasoline contaminants into structures and management of soil, groundwater and rock that may be disturbed during construction activities. Fuss & O'Neill has evaluated whether appropriate measures are being proposed by the developer to address these potential risks to site users and occupants.

A detailed summary of the environmental conditions and regulatory status follows, with specific recommendations for the Town of Brookline to consider offered at the end of this section.

Environmental Status

The project site was occupied by a retail gasoline filling station from approximately the 1950s until 2014. Several releases of gasoline to the subsurface have occurred at the site that have required cleanup under the MassDEP regulatory program. These releases have resulted in residual petroleum contamination being present in the subsurface soil, rock, groundwater and vapors beneath the site. The filling station was most recently operated by Cumberland Farms, and Cumberland Farms is the "responsible party" obligated under Massachusetts law to clean up the gasoline release and protect public health at the site in accordance with the Massachusetts Contingency Plan (MCP; 310 CMR 40.0000). The site is regulated under the MCP as a "disposal site," generally defined as any location in the Commonwealth where uncontrolled oil and/or hazardous material (OHM) has come to be located as a result of any intentional or accidental release (e.g. spill).

Based on a review of publically-available files, gasoline spills at the site are tracked by the Massachusetts Department of Environmental Protection under five Release Tracking Numbers (RTNs; state-assigned case files specific to individual releases of oil or hazardous materials like gasoline). The majority of the releases occurred in connection with the underground storage tanks (USTs) and petroleum dispensing equipment formerly located at the site. Details of the releases and response actions being conducted are tracked by MassDEP under the following five RTNs:

RTN 3-13540, RTN 3-19813, RTN 3-20511, RTN 3-32314 RTN 3-32394. Fuss & O'Neill can provide more specific detail of each of these RTNs if requested.

The fueling equipment and significant quantities of contaminated soil were removed from the site, and the site currently stands in "Remedy Operation Status," with ongoing monitoring of residual gasoline contaminant levels as those compounds biodegrade in the subsurface. No active remediation is ongoing or proposed at the site. Cumberland Farms performs semi-annual monitoring to document the progress of bioremediation at the site. Ultimately, over a period of years, the concentrations of petroleum compounds in on-site soil and groundwater would be anticipated to decline until a Condition of No Significant Risk exists.

Based on the data set from the September 2016 *Phase V Status Inspection and Monitoring Report in Support of Remedy Operation Status (ROS Report)* prepared by ECS, petroleum contaminants remain in on-site groundwater, with the highest concentrations along Hammond Street (on the western side of the property) in the vicinity of the former USTs. None of the target contaminants were reported at concentrations exceeding applicable MassDEP groundwater standards (GW-2 and GW-3) during the most recent rounds of sampling, performed in March and June, 2016. However, groundwater quality fluctuates seasonally, and multiple samples collected from the monitoring wells as recently as January 2016 exceeded applicable GW-2 standards. This data indicates that the potential for subsurface gasoline vapor migration should be addressed in the development plan.

Based on a review of public files at the Brookline Fire Department, all of the identified petroleum storage tanks, both above ground and underground, were removed from the Site as of 2014. Additionally, a letter from the Commonwealth of Massachusetts Department of Revenue was distributed to Chestnut Hill in August of 2015 stating that all of the USTs have been removed from the site, and that the site was therefore no longer eligible for state cleanup trust funds. Effectively all structures and equipment that store petroleum have been removed from the site and the only remaining gasoline is residual gasoline compounds left in the subsurface from spills and leaks.

Cumberland Farms continues to act as the responsible party under the MCP. Based on information in the ZBA Application, Chestnut Hill has owned the site since 2014. The ZBA application does not state whether or in what capacity Cumberland Farms would continue to be involved in site cleanup activities following development (e.g. continued action as a responsible party or transfer of obligations to the developer). Furthermore, the *Sample Development Agreement* (*Section 8* in the ZBA Application) indicates that Chestnut Hill would retain ownership following construction (leasing and managing the property) but has provisions in place to allow a sale. A sale or subdivision (e.g. condominium declaration) may include a transfer of continuing obligations under the MCP, affecting a future owner or operator of the site.

Construction Considerations

Soil Management

Release Abatement Measure

The development proposal indicates that the majority of the site will be excavated to approximately 20 to 25 feet below grade to accommodate the parking garage and building foundation. Pursuant to the MCP, soil and groundwater containing the residual gasoline compounds must be managed as "remediation waste." The applicant has indicated that a RAM Plan will be filed prior to the commencement of the soil management activities and Fuss & O'Neill concurs that this approach is appropriate. A RAM Plan would include protocols for on-site and off-site handling of remediation waste. The responsible party is required to serve the Chief Municipal Officer (i.e. Town Manager) and Chairman of the Board of Health with a letter indicating the availability of the RAM Plan. With few limitations (generally involving the use of chemical additives near sensitive receptors which is not anticipated at this site) RAM Plans are presumptively approved upon submittal to MassDEP and can begin immediately. The Town may consider requiring review of the RAM plan prior to disturbance of the subsurface to confirm that contaminated media will be disposed of properly and timely during construction.

Implications to Ongoing Monitored Natural Attenuation (MNA)

The proposed construction will result in removal of petroleum-contaminated soil and rock in the immediate vicinity of the former USTs, diminishing the source of petroleum in the environment. Removal of the source is likely to accelerate the cleanup of groundwater at and in the vicinity of the site. In addition, groundwater on site is less than 10 feet below grade, and dewatering contaminated groundwater would be required to excavate the deepest portion of the foundation (as described further below).

Based on a review of the most recent *ROS Report*, the highest dissolved petroleum concentrations are located near the former USTs. Removal of this groundwater would reduce the mass of dissolved-phase petroleum feeding the off-site groundwater plume. Overall, the proposed action would be expected to accelerate the pace of natural attenuation.

The proposed removal of contaminated soil, rock and groundwater from the site will accelerate the cleanup of the site and therefore Fuss & O'Neill concurs that these actions will have a positive impact on the environment and public health if conducted in accordance with applicable MassDEP regulations.

Potential Conditions

The Town may wish to place the following conditions on project construction:

- Public notice of the RAM Plan to include the Zoning Board, Building Commissioner, Town Engineer or other Town officials involved in the project. The town may want to conduct a cursory review of the RAM Plan to confirm contaminated media will be disposed of properly off-site and in a timely manner.
- A financial assurance mechanism (FAM) adequate to cover disposal costs for a portion of the anticipated remediation waste volume (e.g. 20% of the affected volume). A FAM would ensure that the developer maintains the funds to dispose of the remediation waste material through the course of the project. Due to site space constraints, it may not be feasible to generate or store on-site the full volume of waste in one phase, and therefore, a mechanism accounting for the cost to dispose of 10-20% of the soil may address the accumulated volume in the event that the project stalled.
- Evidence of disposal approval (i.e. a letter from a licensed disposal facility approving disposal) prior to the commencement of activities under the RAM Plan. This condition would ensure that the applicant could manage the waste in a timely manner, and would not excavate waste without a disposal destination already identified.

These remediation waste management activities are regulated by the MassDEP via the MCP and consequently, the Town may elect not to take any action and rely on the applicable regulatory programs to address waste disposal activities and timing.

Bedrock

GEI's 2015 foundation design report noted that the depth of bedrock was generally shallow across the site (as little as two feet below ground surface). Based on the depth of the proposed garage, bedrock removal will be required across the entire footprint of the property.

Bedrock removal can be performed using several methods. The most common methods include jackhammering, drilling, and blasting. Blasting can have adverse impacts, including damage and disruption to surrounding properties. In addition to the potential for physical damage to adjacent properties, blasting may have the potential to open fissures in the bedrock, which could increase or alter groundwater flow in the vicinity of the site, exacerbating issues with groundwater migration and water control (described in further detail below). As such, we recommend that the ZBA request the developer to provide a specific method that will be utilized for evaluation and consider a blasting prohibition as part of any redevelopment activity.

Water Control

The developer has proposed a significant underground parking structure, which will extend below the groundwater table. The structure will require waterproofing and thick concrete slabs to resist buoyant forces (i.e. the weight of displaced water around the foundation cavity, which would exert

an upward force on the foundation slab). Based on testimony from the August 2016 zoning board meeting, a drain system which will generate groundwater discharge will be included in the foundation in order to relieve pressure on the foundation system.

The waterproof foundation would generally be expected to eliminate the potential for a vapor intrusion pathway (i.e. petroleum vapors entering indoor air spaces from environmental media). In addition, the parking garage must be ventilated to prevent the buildup of automotive exhaust, which would eliminate the potential for vapor buildup, either from building emissions or from environmental contaminants. As such, if properly designed and operated, the garage would mitigate the potential for vapor intrusion into the building.

The developer team has indicated that construction activities will require a Remediation General Permit (RGP) discharge under the EPA National Pollutant Discharge Elimination System (NPDES) program. The RGP would require treatment of the influent groundwater and a discharge to a town-owned drain system, with periodic monitoring to verify the quality of the water. Over the operating life of the development, dewatering will be required, based on the foundation design. If dewatering is employed at the site on a long-term basis, the effluent discharge would require continued operation under a NPDES permit. The discharge should be considered as a hydraulic loading to the Town's drainage system, and be accounted in the Town's evaluation of the drainage impact to the municipal drainage system from the project. Stormwater has been considered and the Zoning Board has heard testimony regarding the magnitude of stormwater flows from the site, but if dewatering provides a consistent flow to the same drainage system, that volume must be understood.

Conclusions and Recommendations

Based on our technical review, Fuss & O'Neill offers the following conclusions and comments:

- The current proposal and most recent correspondence indicate that dewatering may be required for short-term construction and for long-term operation to relieve pressure on the foundation.
    - If permanent dewatering is required, we note that this may constitute a change in the environmental remedy from MassDEP's perspective (active groundwater capture, instead of the MNA performed to date) and warrant additional documentation under the MCP. This obligation would fall to the responsible parties and MassDEP and is sufficiently regulated under the MCP.
    - The discharge from a dewatering system could require treatment to remove petroleum compounds in accordance with the USEPA permit (e.g. NPDES RGP), and monitoring and reporting on the status of the discharge. This treatment is sufficiently regulated by USEPA.

  - Use of the storm drainage system for sustained dewatering would represent an increase in the non-storm discharges to the municipal storm water system, and should be accounted in the discussions of water discharges from the site.

- The development activities will proceed under a RAM and generate large volumes of "remediation waste" in the form of soil and rock for off-site disposal. The ZBA may wish to require financial assurance or evidence of disposal facility acceptance prior to the developer's handling of remediation waste (contaminated soil) under the RAM. While neither of these conditions are required under the RAM, they could provide the Town with an additional level of assurance that the work will be completed as proposed.
- Blasting may pose risks to neighboring properties and impact the flow of contaminated groundwater in bedrock. The Town may consider precluding the use of blasting to address these concerns.
- Vapor intrusion would be generally controlled under the proposed development using a combination of waterproofing barrier and ventilation in the construction of the garage. These components will therefore be critical to the elimination of vapor risks to the property occupants, and the ZBA may want to include specific references to these features in any decisions, and may want to include development conditions which would ensure their full-time operation, including backup generators to power the ventilation system.
- The distribution of responsibilities to address ongoing environmental liabilities associated with the gasoline releases between Cumberland Farms (the established responsible party) and Chestnut Hill (the developer/owner) is unclear. We recommend that the ZBA establish an understanding of that relationship, specifically as it pertains to the performance and costs of the RAM and long-term dewatering activities, any resulting MCP obligations, and the potential that the significant redevelopment of the site could affect the site's Remedy Operation Status.
- Overall, the proposed development project could result in the removal of contaminated media, accelerating the ongoing cleanup and resulting in positive impacts to groundwater and environmental quality in the vicinity of the site. However, in order to achieve these future benefits, the construction must be carefully planned and executed.

Please feel free to contact the undersigned with questions or comments.

Sincerely,

Daniel LaFrance, PE
Senior Engineer

John Chambers, PG, LSP
Senior Vice President