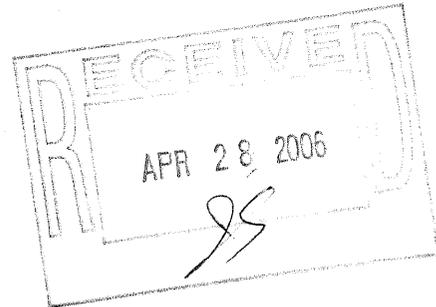




April 27, 2006

Mr. Jay Szklut  
Planning and Economic Development Manager  
Town of Belmont  
Zoning Board of Appeals  
19 Moore Street  
Belmont, MA 02478



Subject: The Residences at Acorn Park  
Chapter 40B – Comprehensive Permit  
Belmont, Massachusetts

Dear Mr. Szklut:

*Fay, Spofford & Thorndike (FST)* is pleased to submit this letter report, which addresses the civil/sitework and wastewater elements of the subject project. These elements include site layout, grading, stormwater management, site utilities and wastewater management. Materials received to date relative to this peer review include the following:

- Comprehensive Permit Application package, dated December 9, 2005, and “Residences at Acorn Park”, Site Development Plan set (17 Sheets), dated December 6, 2005, each as submitted by AP Cambridge Partners II, LLC. (APCP). The referenced plan set and design calculations submitted as part of the application were prepared by Rizzo Associates, Inc.

The Comprehensive permit submittal was reviewed for conformance with the Massachusetts Housing Partnership (MHP) *Local 40B Review and Decision Guidelines*, Town of Belmont’s Zoning Bylaws and generally accepted engineering practice. We offer the following comments regarding “The Residences at Acorn Park” Comprehensive Permit submittal for the Board’s consideration.

#### Site Area

The proposed project consist of five (5) buildings, with a total of two hundred ninety-nine (299) multi-family units, surface and underground parking facilities, landscaping, open space, pool area and associated utilities all situated on a 15.6 acre parcel of land. A small portion of the land (approximately 2.7 acres) is located in the City of Cambridge. The remaining 9.73 acres of the development is located within the Town of Belmont “Belmont Uplands” Zoning District, with approximately 625 feet of frontage on Acorn Park Drive (Private) and approximately 307 feet of frontage on Frontage Road (Public). The project site is primarily a wooded area located within the Mystic River Basin Watershed. Surface runoff from the site is tributary to the Little River and

Little Pond water bodies. As shown on the site development plan, the proposed development will be serviced by municipal water and sewer.

### General Civil Review

1. Ingress and egress to the site is shown via (3) three roadway curb cuts located off of Acorn Park Drive. FST recommends the intersection and/or stopping site distance at the three entrance/exit locations onto Acorn Park Drive be evaluated, documented and included in the Comprehensive Permit submittal
2. FST questions the length of each proposed entrance/exit drive located off of Acorn Park Drive in providing the required vehicle storage to avoid the potential conflict with vehicles entering and exiting the site. We recommend additional documentation addressing this issue be submitted by the Applicant.
3. As shown on the submitted site plan, parking for the site will be provided under each building and on the surface in small block areas surrounding the buildings. FST recommends a typical cross-section of the surface parking areas identifying items such as location of sidewalk, guard rail, grass strip, pavement width, median, curbing, driveway crown and side slopes be provided on the site plan.
4. Due to the layout of the buildings and parking lots, we recommend turning movements for an SU-30 vehicle (e.g. fire truck/delivery vehicle) within the on-site parking lot areas be analyzed and submitted for review. Also provisions for emergency vehicle access along the rear of Building Nos. B and D need to be addressed by the Applicant.
5. FST recommends the limits and layout of the proposed sidewalk be reviewed by the applicant. We note that no sidewalks are currently shown within the front entrance parking lot areas associated Building Nos. A and E. Limits of the proposed sidewalk located adjacent to Acorn Park Drive needs to be further detailed on the site plan.
6. Provisions for trash removal and location of dumpsters with proper screening need to be provided on the site plan.
7. Applicant indicates that snow will be stored on pervious areas to promote infiltration. These areas are not shown on the plans and we recommend they be shown on the plans.
8. We recommend a property line plan of the subject property, stamped by a Professional Land Surveyor (PLS) be provided to the Board.

As stated in the Comprehensive Permit Application, Section 9, the applicant has requested specific waivers from the Town of Belmont's Zoning By-Laws, specifically *Section 6B. Belmont Uplands District* and other local land use requirements. FST recommends the Board of Appeals review these requested waivers, consult with the various town boards and officials before making a decision on these requests. We do not recommend waivers from the Town of Belmont's Zoning By-laws, regulations, ordinances and policies without valid reasoning by the Applicant.

### Stormwater Management

Based on our review of the proposed stormwater management report prepared by Rizzo Associates, we offer the following comments/recommendations:

1. For existing conditions, Figure 1 in the report indicates the sheet flow calculation for Subcatchment 2S is based on a 2 percent slope. The supporting HydroCAD calculations for sheet flow are based on a 1 percent slope.
2. We note that for proposed conditions, the times of concentration for Subcatchments 1S, 2S, 4S, 5S, and 6S are less than five minutes. Typically, five minutes is used as the minimum value for a time of concentration. However, in this case, by using a value of less than five minutes, the peak flows that are generated are higher than those that would be generated for a time of concentration of five minutes. Therefore, more conservative results are being generated.
3. On Figure 3, the grassed area in proposed area Subcatchment 1S is located in a D soil, not in a B soil, as used in the HydroCAD calculations.
4. We requested the Applicant provide a soil survey map to verify the delineation of the B and D soils. We note that the aerial map provided to us indicates that B soils terminate east of Acorn Park Drive. Figure 3 in the stormwater management report indicates B soils terminating west of Acorn Park Drive.
5. The stormwater runoff from the impervious area to the west of the proposed pool in Subcatchment 9S, sheets off towards the wetland without receiving treatment.
6. In proposed Subcatchment 8S, the grading in the parking lot adjacent to the flood compensation area indicates that stormwater runoff from the parking lot will flow directly towards Acorn Park Drive and will not travel through the grass-filter strip. In addition, all the stormwater runoff from paved areas that is directed towards Acorn Park Drive does not appear to flow into the grassed swale adjacent to Acorn Park Drive, but instead appears to continue flowing down Acorn Park Drive.
7. The package submitted by the Applicant does not contain detailed calculations for the closed drainage systems. We recommend submittal of final design calculations to demonstrate system adequacy inclusive of, but not necessarily limited to, gutter flow capacity, width of gutter flow spread, inlet capacity / percent interception versus percent bypass for the selected inlet grate configurations, and pipe sizing calculations including the hydraulic grade line determination. The Town's Zoning By-Laws, *Section 6B. Belmont Uplands District*, require the storm drain system to be designed to convey the 10-year storm frequency. However, we recommend the Applicant demonstrate that flows in excess of the 10-year storm frequency will be conveyed to the stormwater management systems for treatment and attenuation.
8. We note several comments/recommendations regarding the detention/retention basins:

- a) Detention Basins 1 and 2 are located in D soils, which are not conducive to infiltration. Percolation tests have not been performed for this submittal and the Applicant states that these tests will be performed as part of final design. We stress that these tests must be done for both detention basins and the retention basin as part of the project's design efforts to verify that these basins, particularly the ones located in D soils, will be capable of infiltrating the runoff.
  - b) Based on the existing groundwater testing presented in the report, there is less than the recommended 2 feet of separation between the bottom of the detention basin and the high groundwater elevation for Detention Basins 1 and 2. The percolation tests done during final design will also determine the high groundwater elevation at the detention basins.
  - c) For Detention Basins 1 and 2, the downstream inverts of the outlet pipes are 7.8 feet and 7.7 feet, respectively, and they discharge within the 100-year floodplain. The HydroCAD calculations were performed assuming free discharge and an empty detention basin. The 100-year flood is at elevation 9.8 feet; therefore, the outlet pipes will be submerged during the 100-year storm and water will backflow into the detention basins to an elevation of 9.8 feet. We recommend revising the model for the 100-year storm to reflect these conditions in order to ensure that these basins will be capable to attenuating the peak flow for the 100-year storm. Additionally, we recommend the Applicant estimate the flood elevations for the lesser storm events to determine whether the outlet pipes will be submerged. If so, the HydroCAD model should be revised to reflect these conditions to verify that these basins will attenuate the peak flows.
  - d) No overflow spillway is provided for Detention Basin 2. We recommend the Applicant provide some method of conveying flows should the outlet control structure become clogged.
  - e) For Detention Basin 1 and the Retention Basin, details of the overflow spillway were not provided, except to indicate that the spillways are located at elevation 10.0 feet, which also appears to be the top of the basins. The spillways were also not included in the HydroCAD model. We recommend the Applicant demonstrate that these basins will be capable of directing flows over the spillways in a controlled manner in the event that the outlet control structure clogs (in the case of the detention basin) or infiltration proves to be less effective than anticipated.
  - f) The detention basins and retention basin do not provide a defined forebay area at the discharge points. In order to take the 70 percent credit in the TSS removal, defined sediment forebays must be shown on these basins.
9. We note several comments/recommendations regarding the infiltration chambers:
- a) The plans indicate that an oil/grit separator will be used to treat the pavement runoff prior to discharge into an infiltration chamber. No details of the oil/grit separator were provided. On April 14, we requested details of the oil/grit

separator from the Applicant for our review. As of the writing of this letter, we have not received this information.

- b) We note that the infiltration chambers are located less than the recommended 20 feet away from the building foundations.
- c) We note that Infiltration Chamber 2 is located in D soils, which is not conducive to infiltration and not recommended in the DEP standards because they will not function adequately in those soils. In addition, the boring log for OW-5, which is closest to this chamber, indicate the soils in that area are peat and organic silt situated over blue clay and inorganic silt. As previously mentioned, percolation tests have not been performed for this submittal and the Applicant states that these tests will be performed as part of final design. We stress that these tests must be done for the infiltration chambers to verify that these chambers, particularly the one located in D soils, will be capable of infiltrating the runoff.
- d) Based on the existing groundwater testing presented in the report, there is less than the recommended 2 feet of separation between the bottom of the infiltration chamber and the high groundwater elevation for Infiltration Chamber 3. The percolation tests done as part of the project design process will also determine the high groundwater elevation at the infiltration chambers.
- e) Given that the high groundwater elevations are close to the bottom of the infiltration chambers and that during the 100-year storm the groundwater elevation will rise, we recommend the Applicant prepare a mounding analysis for the infiltration chambers to ascertain their effectiveness under various storm events.
- f) The HydroCAD model does not include the 8-inch overflow pipe within the infiltration chambers and these elevations are not provided within the documentation. We recommend the Applicant provide the elevation of these overflow pipes. We also recommend the Applicant consider the condition where the infiltration chambers fail to perform as proposed and water flows through the overflow pipes because it will impact the peak flows at the point of analysis.
- g) In the HydroCAD calculations, a flow rate of 0.12 cfs was used for all the infiltration chambers, as well as the detention and retention basins, to quantify the amount of exfiltration. The hand calculation provided in the documentation indicates a different flow rate was determined for each structure. On April 14 we asked the Applicant to clarify the reasoning for the infiltration calculations. As of the writing of this letter we have not received that clarification and we are therefore unable to fully evaluate the adequacy of the infiltration calculations. We also note, however, that the flow rate was derived from an infiltration rate 0.52 inches per hours, based on the assumption of a loam in a B soil group. With the exception of OW-5, this is a reasonable initial estimate for an infiltration rate because the boring logs for OW-1 through OW-4 indicate the soils are generally sandy. We also note that for HydroCAD, an infiltration rate can be directly entered into the model, rather than a flow rate.

10. Based on the groundwater elevation shown in OW-4, the garage elevation appears to be beneath the groundwater elevation, which may result in seepage of water into the garage.
11. The measurement date of the groundwater elevations in the observation wells is not shown on the plans. At the request of FST, the Applicant provided the groundwater monitoring reports for the observation wells. These reports indicate that the readings were taken on April 2, 2001 after a heavy rain event. Therefore, the elevations shown on plans appear to represent high groundwater levels. We recommend the measurement date of the groundwater elevations be added to the plans.
12. The TSS calculation for Subcatchment 8S appears to count the grass filter strip twice in the calculations. Table 9 in the report only counts the grass filter strip once.
13. There is an inconsistency between the text and the supporting calculations on the amount of runoff required to be infiltrated because the amount of impervious area over B soils is different. The text indicates the area is 3.866 acres, but the hand calculation uses an area of 2.79 acres. In addition, review of the soils map indicates that there may be more areas in B soils, than originally estimated. The Applicant should confirm the amount of B soils being impacted by this project.
14. The peak storage volumes and 100-year peak water surface elevations in Table 5 do not always match those values shown in the HydroCAD calculations. The Applicant should resolve these inconsistencies.
15. As a further point, when estimating the volume for recharge, the Applicant does not consider the impervious surfaces over the D soils because it is not conducive to infiltration. However, the Applicant assumes those same soils will be conducive to infiltration for Infiltration Chamber 3 when demonstrating the effectiveness of this chamber. We note these assumptions are contradictory.
16. The Applicant acknowledges that the proposed project will result floodplain filling between elevations 5.0 and 9.8 feet. The Applicant provides floodplain compensation on a foot-by-foot basis and indicates that the compensatory storage volume will increase the available volume by 10 percent. However, we note that Town's Zoning By-Laws, *Section 6B. Belmont Uplands District*, require floodplain compensation at 1.5 times the volume impacted.
17. The erosion and sedimentation controls and schedule of inspections outlined for the construction period are reasonable. However, we note that the Applicant will need to obtain an NPDES General Permit for Stormwater Discharges from Construction Activities at the time of construction because this project will disturb greater than one acres of land. As a requirement of this permit, the Applicant will need to prepare a Stormwater Pollution Prevention Plan, which should incorporate the erosion and sedimentation controls and inspections discussed in Rizzo Associate's stormwater management report.

18. The Applicant proposes to inspect catchbasins, area drains and drop inlets on a quarterly basis and clean them on a semi-annual basis. We find this maintenance schedule to be reasonable, but we note that the DEP Stormwater Management Policy recommends monthly inspections and quarterly cleanings.
19. The Applicant proposes to inspect and clean the sediment forebays at least once per year. The DEP Stormwater Management Policy recommends sediment forebays be inspected monthly and cleaned quarterly. We recommend the sediment forebays be inspected quarterly and cleaned semi-annually as a minimum, or more frequently, if necessary, based on the amount of accumulated sediments. We also note that the sediment forebays are not well-defined in the detention and retention basins.
20. The maintenance measures for the detention and retention basins are reasonable. However, the DEP Stormwater Management Policy recommends a minimum 10-foot-wide access way for maintenance that does not cross the emergency spillway. For the Retention Basin and Detention Basin 1, this recommendation is not met because of the proximity of the basins to the proposed buildings.

### **Wastewater Management**

The completed project will include 463 bedrooms. Based on the Title 5 requirement of 110 gallons per day (gpd) per bedroom average daily flow (ADF), the Applicant has projected an ADF of 50,930 gpd. The Applicant proposes to provide sewer service to the project site via the construction of a pump station and a 4 or 5-inch force main along Acorn Park Drive, Frontage Road, Lake Street and Garrison Road. The proposed force main will connect to the existing Town of Belmont gravity sewer at the intersection of Garrison Road and Gilmore Road. The Applicant has further stated that the Town has plans to replace the existing 8-inch sewers in Gilmore Road and Oliver Road and anticipates working with the Town to increase the capacity (i.e. size) of the sewers as part of the planned replacement project.

FST contacted Mr. Glenn Clancy, Director of Belmont's Office of Community Development, regarding planned rehabilitation of the Gilmore and Oliver Road sewers. In 2004, the Town replaced approximately 440 feet of sewer on Oliver Road (Lodge Rd. to Staunton Rd.) with 8-inch ductile iron pipe. Remaining sewers on Oliver Road and sewers on Gilmore Road are designated for cured-in-place relining in summer/fall 2006 as part of a sewer and storm drain rehabilitation project. Mr. Clancy stated he has not been contacted regarding the possibility of increasing the size of the sewers on Oliver and Gilmore Roads.

The 8-inch gravity sewer from Oliver Road flows into a 15-inch gravity sewer on Brighton Street before discharging into Belmont's 30-inch connection to the MWRA on Flanders Road. To determine existing wastewater loading, FST installed a flow monitor on April 14, 2006 in the 15-inch sewer just prior to connection with the 30-inch (at Hill Road). Initial data should be received the week of April 24, 2006 and will provide the basis for calculating available capacity in this section of the Town's sewer system.

As of this draft report, we have requested, but yet not received, any conceptual information regarding the proposed pumping station, specifically, the peak hourly flow (PHF) and proposed pumping rate. This key information is essential for determining the impact on the Town's

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existing sewerage system. Consequently, FST's review of the wastewater component of the project cannot advance any further until this information is received.

**Wetland Resource Areas**

FST retained the services of Marshall Dennis to prepare a wetland resource evaluation report. His report has been attached to this letter.

We trust the information presented herein is responsive to your request for civil/sitework peer review services for the subject project. We appreciate the opportunity to provide these services to the Belmont Board of Appeals and will present a summary of our findings at the May 4, 2006 ZBA meeting. Please feel free to contact me at 781-221-1270 or by email to [schapman@fstinc.com](mailto:schapman@fstinc.com) should you desire additional information or wish to discuss any aspect of this letter prior to the meeting.

Very truly yours,

FAY, SPOFFORD & TORNDIKE

By



Stephen A. Chapman, P.E.  
Vice President

Attachment

Cc: Marshall Dennis/Wetland & Wildlife, Inc  
David Albrecht/Rizzo Associates