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Mr. Merrick Turner
BETA Group, Inc.
315 Norwood Park South
2nd Floor
Norwood, MA 02062

April 26, 2013

Via Email

Subject: University Station – Westwood, MA
Design Review Comments
Preliminary Street and Parking Lot Lighting

Dear Merrick:

Per your request, Power Engineers, LLC has reviewed the most recent lighting photometric plans related to the proposed lighting levels and roadway & parking lot design for the University Station project. This letter details our review comments and recommendations for possible changes or improvements to lighting levels, placement etc.

The following information has been provided to us for review:

- Site Lighting Drawings SL-1 through SL-8, dated 4/17/2013 by Engineering Advantage, Inc.
- Response to 4/1/2013 comments, by Engineering Advantage, dated 4/8/2013

Based on a review of the preliminary information listed above, the following comments and recommendations are being made by Power Engineers, LLC:

1. The revised Table 1 provided by Engineering Advantage in their 4/8/2013 response to comments has been reviewed and is being used as the basis for evaluating the photometric lighting levels, and uniformity as shown on the proposed lighting plans SL-1 through SL-8.
2. The Harvard Street average lighting level is calculated to be 2.15 fc, which is well above the 0.9 minimum maintained average per Table 1 provided by EA on 4/8/2013. This and the uniformity ratio are acceptable.
3. The “Main Parking” area has an acceptable average level of illumination but the uniformity ratio is listed as 10.45, which is well above the expected 4.0 average/minimum uniformity ratio. The minimum value of lighting in this parking area is listed as 0.4 fc, which is below the industry accepted perimeter minimum of 0.5 in IESNA RP-20 for parking areas with

enhanced security. As was recommended in our 4/1/2013 memo. The proponent should consider the use of fixtures smaller than 400W to reduce the high maximum level of illumination directly below the fixture, and also should consider revised fixture placement to improve the minimum lighting levels at the perimeter. The proponent may also consider the use of 2 fixtures per pole instead of 3 fixtures per pole to improve the uniformity, in combination with additional or revised fixture location to improve perimeter minimums.

4. The “Behind Building” area minimum lighting is listed as 0.1 fc. This contributes to the high Uniformity Ratio, which is well above the 3.0-4.0 ratio that would be expected for this area. It is recommended that the lighting in this area be reviewed to minimize the dark corners. Note that this comment was made in our 4/1/2013 memo and does not appear to have been addressed. Also note that there are two “Behind Building” entries on the tabular data provided on Sheet SL-1 with no definition of what each area covers; this should be revised.
5. The Rosemont Road area has acceptable average lighting levels and an acceptable uniformity ratio based on Table 1 provided by EA on 4/8/2013. Fixtures are provided on one side only and appear to provide adequate lighting based on the photometric calculations provided.
6. The “Entry Park” area is shown with an unacceptable minimum lighting level (0.0 fc). The area of calculation may not adequately reflect the actual pathway area itself and should be verified or revised. A uniformity ratio of close to 4.0 should be demonstrated in this area.
7. The provided photometrics include a single set of calculations for “Intersections”. It is recommended to provide calculations for each intersection, to be able to review individual intersection lighting levels and uniformity ratios.
8. The “Intersections” minimum maintained average level of 2.24 fc is acceptable for a Major / Collector intersection. The uniformity ratio is listed at 7.47 which is well above the expected 3.0 and indicates some dark areas between fixtures and areas that are bright below the fixtures. The design should be revised with changes to fixture locations, etc. to provide better uniformity in each intersection. The proponent should consider lower fixture wattages as an alternative to the proposed 400W fixtures, to improve uniformity.
9. The University Avenue area has acceptable average lighting levels and an acceptable uniformity ratio based on Table 1 provided by EA on 4/8/2013. Note that these values do not appear to be based on a grid spacing that represents the entire roadway.
10. The “Well Park” area has acceptable average lighting levels and an acceptable uniformity ratio based on Table 1 provided by EA on 4/8/2013.
11. On Sheet SL-8, the chosen grid spacing for the photometrics does not provide values for the north side sidewalk. It is recommended to utilize smaller grid spacing due to the nature of the roadway, to be able to evaluate the lighting levels on the roadway and sidewalk on both sides.
12. The submission does not address the parking garage as discussed in the prior comments and discussed with the proponent during prior conference calls. It is recommended that final photometric data for the parking garage be provided for review.

13. The lighting fixture Type G & H are listed as 12-foot tall poles. The EA memo of 4/8/2013 and at the 4/9/2013 Planning Board meeting it was discussed that the 12 foot poles would be increased to 14 feet to improve lighting levels and visual consistency with the taller roadway poles. The poles appear to still be 12-foot, and lower than expected lighting levels are being shown.

Based on a review of the preliminary information listed above, the following comments and recommendations are being made by BETA Group Inc.:

SL-1

1. Light uniformity is poor on south bound approach to Rosemount. Suggest that Type F fixture be used on both sides of University Avenue between Blue Hill Drive and Rosemount. This also improves the aesthetic.
2. At University Avenue and Rosemount Street intersection preferred placement would be one pole close to each corner. Evaluation will need to consider the proposed locations for signal equipment. This comment also applies to the intersections of University Avenue with the North and South site drives.

SL-2

3. It appears that wall pack units will be necessary for "back of house" areas. Incorporate into the photometric plan.
4. Align second bay of fixtures in main parking lot. They are offset by one stall approaching the residential.

SL-3

5. It appears that wall pack units will be necessary for "back of house" areas. Incorporate into the photometric plan.
6. Move Type B fixture along Harvard Street into parking lot.

SL-6

7. Per 4/23 Board meeting, add fixtures to meadow area behind DWWD.
8. Remove light pole from the small delta island adjacent to building "O". This island is flush and light is vulnerable.
9. For small parking lot adjacent to building N - move type K fixtures to end island.

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SL-7

10. Suggest that Type F fixture be used on both sides of University Avenue between Harvard and the end of the median about 200 feet north. This also provides for a consistent aesthetic when approaching from the south or the north.

SL-8

11. There is a large space between the first and second fixture on the southbound side of University Avenue. Add/slightly re-org fixtures to close gap.

It is recommended that the comments listed above be addressed and revised drawings and photometric calculations be provided for review.

If you have any questions, or require additional information, please feel free to give me a call.

Sincerely,

A handwritten signature in black ink, appearing to read "D. Colombo", is enclosed in a light gray rectangular box.

David J. Colombo, P.E.
Principal