

March 13, 2015

Carlisle Zoning Board of Appeals  
c/o Ms. Lisa Davis Lewis  
Zoning Board of Appeals, Chair  
66 Westford Street  
Carlisle, MA 01741

RE: Nitsch Project #10399  
Peer Review  
Comprehensive Permit – 40B  
100 Long Ridge Road  
Carlisle, MA

Dear Ms. Lewis:

This letter is intended to provide formal documentation of our recent review of new information submitted for the project known as the "The Birches," located at 100 Long Ridge Road in Carlisle, Massachusetts.

On February 6, 2015, we received the following new plans and documents from the Applicant:

- A plan set entitled, "Residential Site Plan Set, Affordable Housing Development, The Birches, Carlisle, Massachusetts," prepared by Meisner Brem Corporation, dated November 14, 2014, and revised February 6, 2015 (11 sheets).
- A report entitled, "The Birches, A 40B Residential Project off Long Ridge Road, Carlisle, Massachusetts,- Final Stormwater Management Report (Volumes 1 and 2)," prepared by Meisner Brem Corporation, dated July 1, 2014, and revised February 6, 2015.

As directed by the Board, Nitsch Engineering's review only focused on the Stormwater Report (narrative, calculations, and model), and drainage design information provided on the plans. The purpose was to determine if the proposed stormwater management system generally met the quantity mitigation requirements of Standard 2 of the MassDEP Stormwater Management Standards.

Nitsch Engineering performed a preliminary review of the revised drainage report and plans submitted by the Applicant. Generally, the revised stormwater model continued to report several error messages and we could not determine if the proposed project would meet the stormwater quantity mitigation requirements of Standard 2 of the Massachusetts Departments of Environmental Protection (MassDEP) Stormwater Management Standards. We also provided the following specific comments, which were initially issued in an email dated February 18, 2015:

1. There is a discrepancy in the total proposed impervious area between the HydroCAD model (71,057 sf) and the other calculations (including recharge calculations) provided in the Stormwater Report (88,984 sf).
2. The sediment forebay and irrigation cistern should be removed from the HydroCAD model, as these "ponds" should be assumed to be full during storm events.
3. The Applicant is including offsite area in the HydroCAD model because it flows onto the project site towards the design point. While we generally agree with this approach, this area should be modeled the same in both the existing and proposed conditions analysis because it is not changing. Currently, the proposed watershed has a lower peak rate than the existing watershed, which may be impacting the overall analysis.
4. The proposed recharge system is generating several warnings in the 10-, 25-, and 100-year storm events. These errors are specifically related to "ponds" that are undersized for the flow going to

them. Additionally, the storage of the recharge system is exceeded beginning in the 10-year storm, which indicates that stormwater may pond in the cul-de-sac.

5. The model includes all proposed drainage pipes to be used for conveyance, but in several instances these pipes are over capacity, even in smaller storm events. It should be noted that in HydroCAD, when capacity is exceeded in reaches (pipes, swales, etc.), the program loses the volume and the peak runoff rate is also impacted.
6. Based on the grading provided, there are several pipes located below pavement that appear to have little or no cover.

We received an email from the Applicant on February 26, 2015 that provided revised plans and calculations to address our comments and improve the overall accuracy of the stormwater calculations. The following documents were attached to the email:

- A plan set entitled, "Residential Site Plan Set, Affordable Housing Development, The Birches, Carlisle, Massachusetts," prepared by Meisner Brem Corporation, revised February 25, 2015 (four [4] sheets provided - Grading-5, Profile-6, Profile-7, Details-8).
- A Final Stormwater Management Report (Volumes 1 and 2), prepared by Meisner Brem Corporation, revised February 26, 2015.

We reviewed these documents to determine if the Applicant has addressed our comments on the drainage analysis. Based on the revised documentation, including the HydroCAD model, it appears that the proposed drainage system will meet the stormwater quantity mitigation requirements of Standard 2 of the MassDEP Stormwater Management Standards.

During our review of the plan set, we did identify a few items that should be updated to reflect the current HydroCAD model:

1. As previously discussed, the Applicant should provide an underdrain beneath the proposed swales and rain gardens to ensure there will be no standing water within these systems.
2. Curbing should be considered by the Applicant in portions of the roadway that are being collected by catch basins, especially at the intersection with Long Ridge Road.
3. The plans and details showing the quantity of the proposed Cultec recharge system are different from what is indicated on the current HydroCAD model. This also includes the depth of the stone envelope proposed around the chambers.
4. The Applicant should confirm that sufficient cover is being provided over the driveway culverts. In some areas, it appears there is less than six (6) inches of cover. Providing 1-foot contours would improve the clarity of the grading, especially around the driveways, swales, and rain gardens.

The site design may still change due to the on-going hydrogeological study, and other outstanding comments (e.g. snow storage) previously issued by Nitsch Engineering and the Town of Carlisle. Nitsch Engineering did not perform a full review of the plan set with the understanding that the Applicant will provide a complete plan set that incorporates and addresses all outstanding comments from both Nitsch Engineering, and the Town of Carlisle's Board and Commissions.

As requested by the Board, Nitsch Engineering will hold off on reviewing the plans for the other outstanding design issues identified in our previous letters.

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Please contact us should you have any questions on our review.

Very truly yours,

**Nitsch Engineering, Inc.**

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