

Malcolm Ragan

From: Jesse Steadman
Sent: Tuesday, September 21, 2021 6:29 PM
To: Lori Clark; John Collano Romano (jcr@jcromano.com); Nancy.Arsenault; Karen Kelleher; Meg Costello; Mark Jones (markjones@busybusy.org)
Cc: Malcolm Ragan
Subject: Fw: Update for 137 Harvard Road

Hi all,

Please see the attached message from Sue Carter regarding further explanation of her findings at 137 Harvard Road.

See you soon.

Jesse Steadman
Town Planner | Town of Stow

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From: Susan Carter <scarter@placesassociates.com>
Sent: Tuesday, September 21, 2021 5:03 PM
To: Jesse Steadman <planning@stow-ma.gov>
Cc: Malcolm Ragan <planning2@stow-ma.gov>
Subject: RE: Update for 137 Harvard Road

Jesse and the Board,

This email is to summarize my findings for 137 Harvard Road. The information I have reviewed does not appear to clearly identify that the clearing operations and utility installations have resulted in greater runoff rates that prior to the work. Keep in mind that we have had very unusual rainfall this summer so this comparison is only valid when comparing similar rainfall events and cannot be used to compare last summer to this summer. The runoff we observed on the site walk in July was probably more consistent with what the site would look like in the spring when the soils are saturated and had limited capacity to absorb more rainfall. It has been our experience that when a site is clear cut, runoff is more visible from a distance and often appears heavier just because you couldn't notice it with leaf litter, ferns etc.

TOPOGRAPHY

When I reviewed the topography of this site last week, I did not have any point of reference to see if there were any changes redirecting the runoff to Harvard Road. Malcolm created a lidar topography for this site so I could compare the two surfaces. (Lidar data (Light Detection and Ranging) is a remote method to generate topography and is done by the government periodically. The lidar enables me to compare the Pre to the Post topography on this site. There were some variations in the contours, but they were generally the same. Some variations are always expected due to the way the data is interpolated. As a result, it does not appear that there have been any significant changes in the drainage patterns for runoff on the hillside.

DRAINAGE

For drainage calculations, the runoff is a function the surface cover, the soils and the time it takes from the water to reach the point of analysis from the furthest point on the watershed and the amount of rainfall over a 24 hour period for a specific rainfall event. Other factors include the saturation levels of the soil (antecedent moisture) which can impact the soil's ability to absorb water.

Drainage Calculations utilize a Curve Number (CN) which is based on the surface cover and the soils and the Time of Concentration (Tc) to determine the amount of runoff from the site. The higher the CN the more runoff. The longer the Tc, the lower the runoff rate. So, as an example, pavement has a CN of 98 where as lawns on sand and gravel soils have a CN of 30. So the lawns will absorb more rainfall resulting in less runoff with all the other variables the same. If the area was bare soil, the CN would jump up to 91, or almost the same as pavement.

In this case, Woods, good condition in C soils have a CN=70. For the same soils with a Brush/weed/grass mix in fair condition is 70. (I used fair condition as the brush is still growing back in). This site also has areas of exposed ledge – CN 98 with no difference in the surface cover. The change in surface cover will change the Tc as well. However because of the steepness of this site and the relatively short distance, Tc would be similar. As a result, I would not disagree with their engineer that the runoff calculations would be similar to the pre-development.

Several things that may improve the rate of runoff, once stabilized with vegetation, is the area of the gas line installation. It appears that they have created more of a yard area near the top of the slope (which slows the water down) as well as a flatter area by the road (which also slows water). If the stone is reused as a recharge area, it may help in smaller storms.

I hope this explanation helps you understand the thought process behind my previous comments that these two lots probably are not the cause of the drainage issues on Harvard Road and is more likely the result of the unusual rainfall patterns we have experienced with climate change.

Please contact me if you have further questions.

Sue

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