



Vermont Department of Environmental Conservation
Watershed Management Division
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Montpelier, VT 05620-3522



February 19, 2020

Kristen Leahy, Zoning Administrator
Town of Hardwick
P.O. Box 523
Hardwick, Vermont 05843
[by E-Mail]

Subject: Flood Hazard Review—Zoning Application
Yellow Barn Business Accelerator and Corporate Campus
281 Route 15

Dear Kristen:

I've reviewed the above-referenced application and offer the following comments.

According to the effective FEMA Flood Insurance Rate Map (7/17/2002), the proposed project is partially located in the floodplain, officially known as the Special Flood Hazard Area—Zone AE of the Lamoille River. A proposed stone stormwater outfall is also located in the regulatory floodway, the most restrictive portion of the Special Flood Hazard Area.

The Special Flood Hazard Area represents the low-lying land expected to be underwater during the flood having at least 1% chance of occurring in any given year. This flood is also called the “base flood” or commonly the “100-year flood” although floods of this size can occur more than once in 100 years. The highest water level of the base flood is called the Base Flood Elevation.

Floodplain directly borders the Yellow Barn site on the west, east, and south. Based on the FEMA Flood Insurance Study and Flood Insurance Rate Map, flooding on the Lamoille River is expected to come directly from the Lamoille River channel (from the west), as well as from the east across Route 15 from the vicinity of Log Yard Drive in an unusual split in flood flows (see attached map). Because of this flood split, the Base Flood Elevation (BFE) for the site must be considered from multiple directions. On the west, the BFE is 793.7' (NGVD 29) on the upstream side of the new building. From the east, the BFE ranges from ~803' at Route 15 to ~794' NGVD on the south side of the new building.

Based on the application materials, the following elements of the project appear to be located on lands within or very near the floodplain (Special Flood Hazard Area):

New accelerator building: The project plans indicate the new building is right on the edge of the floodplain. A new building in the Special Flood Hazard Area is required to meet the elevation or floodproofing requirements of Hardwick bylaws Section 5.3(G) 4 & 5. However, most of the building site is on land well above the Base Flood Elevation (BFE), and a Letter of Map Amendment (LOMA) has been issued by FEMA, removing a portion of the parcel from the regulated floodplain, including the proposed building footprint. Nevertheless, in reviewing the plan documents, I see the northwest corner of the building is proposed to be located at a low

point that is currently 2-3 feet below BFE (see the Topographic Site Plan provided by Russell Brown Land Surveying). This is concerning, given the area appears to be included in the LOMA.

Although the Letter of Map Amendment (LOMA) legally removes the obligation for development within the LOMA area to meet the flood hazard regulations, when part of the building is below BFE and the building is so close to the floodplain and wetlands, **there is still a real risk of flood damage to the building**. For this new community investment, the community should still take due precaution and care to design the building to ensure it will be safe from flood damage.

1. The best method of flood protection is to shift the layout of the building so that the entire foundation sits on lands already above Base Flood Elevation.
2. Even if the building layout is not shifted, the new building is exposed to flooding, and the foundation design should be reviewed by a structural engineer, particularly at the northwest corner, to make sure the footers are buried adequately and the foundation otherwise designed appropriately, considering there may be saturated soils associated with the floodplain and wetland underneath this corner that might destabilize the building. Filling around the foundation corner will not necessarily prevent subsurface floodwater from affecting the foundation.
3. A basement containing the building's major mechanicals/utilities could be vulnerable to groundwater seepage through the surrounding soil during flooding and at other times of seasonal groundwater changes. Therefore, even though it may be exempt from flood hazard regulations, we strongly advise that the building's lowest floor including basement should still be above BFE. Any below ground space like a basement should also be equipped to deal with this risk, e.g. with dry floodproofing techniques to make the walls/floor watertight and/or with sump pumps.
4. To be considered outside of the Special Flood Hazard Area, **all of the finished building** must be within the LOMA removed area or on land originally mapped as outside the SFHA, or a combination of the two. Prior to and during construction of the foundation, I recommend the town require the legally recorded LOMA boundary be clearly staked out by a professional engineer or licensed land surveyor

Fill: The project plans propose permanent fill around the northwest and southwest corners of the new accelerator building and in the vicinity of the proposed electrical service connection/transformer. Fill is defined in the bylaw's definitions as "any placed material that changes the natural grade, increases the elevation, or diminishes the flood storage capacity at the site." Table 2.8 D of Hardwick's bylaws specifically prohibits fill in the Special Flood Hazard Area, except for the purpose of "elevating structures." While the proposed fill might be considered part of elevating the building, I encourage the town to make sure the fill is the minimum necessary before giving zoning approval, because fill can reduce the floodplain's capacity to store floodwater. Incremental loss of floodplain storage can lead to floodwater being transferred onto other properties.

While not required by the bylaw, it may be possible to offset fill impacts by removing a like volume of existing earth material below BFE along the western edge of the building. If an offset excavation is planned, then I recommend the zoning office/DRB get details on how this will be done in the floodplain (e.g. plans showing existing and proposed topographic contours) before approving the zoning permit. An excavation should not go deeper than the existing low point of the floodplain and may require additional state approval under the Wetlands Rule. I recommend the zoning permit require all excavated materials to be relocated outside of the floodplain.

Stormwater treatment systems: The primary concern is to make sure the proposed stone outfall on the Lamoille River bank does not create a floodway encroachment. Encroachments (development that could block flood flows) are prohibited in the floodway without a hydrologic and hydraulic analysis demonstrating

no rise in flood elevations (see Section 5.3 H(1)). Section 5.3 H(2) of Hardwick's bylaws allows a public utility to be located in the floodway without the "no rise" analysis, as long as "a registered professional engineer certifies that there will be no change in grade and the utilities will be adequately protected from scour." So, before approving the stormwater proposal, the town should obtain such a certification from a professional engineer that the stone outfall will not change the riverbank dimensions, either by building up the ground on top of the bank or by extending the bank outward into the river channel, and that the pipe is protected from erosion (scour) that might unearth or expose any part of it during flood conditions.

Utilities: In addition to the stormwater systems, the following utilities appear to be located in the floodplain:

- Electrical service connections, including a meter and transformer box, at the northwest corner of the new accelerator building.
- Light poles
- Water supply/Wastewater service lines, crossing the floodplain to the south of the Yellow Barn

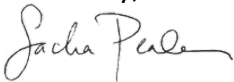
The applicable parts of Hardwick's flood hazard regulations appear to be 5.3 G(1) and (9). For electrical system components and light pole fixtures, it is best to locate these outside of the floodplain on lands already above BFE. If the transformer and meter must be located at the northwest corner of the building, then the transformer/vault and meter box should be elevated to at least 1' above BFE and anchored. Any electrical components (e.g. lines) that extend below BFE should be housed in watertight conduit and protected from exposure due to erosion (scour). For the water supply/wastewater service lines, all components below BFE must be watertight and adequately buried to protect from exposure due to erosion (scour).

Parking/walkway:

On the east side of the site, the plans include lowering the existing ground and a portion of the parking, walkway, and kiosk appear to be below BFE. These components can meet Hardwick's flood hazard regulations as long as built as proposed (no increase in ground elevations) and the kiosk is anchored. Again, I recommend the zoning permit require that all excavated materials be relocated outside of the floodplain.

Thank you for contacting the Vermont Rivers Program. These comments are offered in accordance with 24 VSA §4424. This technical review is not a state permit but is intended to help the Town of Hardwick apply the community's flood hazard regulations (Hardwick Unified Development Bylaw—Amended 9-26-19), maintain good standing as a participating community in the National Flood Insurance Program (NFIP), and avoid changes to the floodplain that could increase hazards. Please feel free to contact me at (802) 490-6162 or sacha.pealer@vermont.gov if you have questions.

Sincerely,



Sacha Pealer

Regional Floodplain Manager

River Corridor & Floodplain Protection Program

Attachment: Digital Flood Insurance Rate Map (DFIRM)