



589 Avenue D, Suite 10
PO Box 787
Williston, VT 05495

www.kas-consulting.com

802.383.0486 p
802.383.0490 f

December 1, 2021

Town of Richmond
Keith Osborne, Zoning Administrative Officer
203 Bridge Street
P.O. Box 285
Richmond, VT 05477

Delivered via email to koborne@richmondvt.gov

RE: Review of Proposed Richmond Market Design for Stormwater Management and Storm Sewer Standards

Dear Mr. Osborne:

As requested, KAS Inc. (KAS) has conducted a review of the proposed site design for the Richmond Market. The review was conducted to primarily review the proposed stormwater management and treatment for the proposed site redevelopment of the Richmond Home Supply Lumber Yard to the proposed Richmond Market. The proposed design was reviewed based on the Vermont Agency of Natural Resources (VTANR) 2017 Vermont Stormwater Management Manual Rule and Design Guidance (Stormwater Rules), and the 2016 Town of Richmond Public Improvement Standards & Specifications (Town Standards and Specification). The Town of Richmond provided KAS with the following design plans by O'Leary Burke Civil Associates:

- Richmond Market Overall Plan (Last Revised 10/11/2021)
- Richmond Market Site Plan (Last Revised 10/11/2021)
- Richmond Market EPSC Plan (Last Revised 10/11/2021)
- Richmond Market Stormwater Management Plan (Last Revised 10/11/2021)

Please note that KAS was not provided hydrologic or hydraulic stormwater calculations. In addition, KAS was not provided with information regarding the extents of the existing impervious surface that will be redeveloped in the existing Richmond Home Supply lumber yard area. Consequently, this stormwater review is considered incomplete and is based mostly on design observations, experience, knowledge of the various rules, and discussions with the project engineer, Mr. Bryan Currier, P.E.

VTANR Stormwater Rules:

Based on our review and coordination, the proposed stormwater management and treatment design concept was based on Section 2.4 Redevelopment of the Stormwater Rules. For reference, redevelopment projects are subject to the following Water Quality Treatment Standard (WQTS) requirements:



- The existing impervious surface area shall be reduced by 25% and restored to meet the Post-Construction Soil Depth and Quality Standard, Section 3.0, where applicable;
- A Stormwater Treatment Practice (STP) or STPs shall be designed to capture and treat 50% of the Water Quality Volume (WQV) from the redeveloped impervious surface area; or
- A combination of WQV treatment and impervious surface reduction equal to 50% of the WQV where one percent of impervious reduction is equivalent to two percent of WQV, using the following equation.

$$WQVR = (50 - 2 \times I_{Reduced}) \times WQV$$

where:

WQVR = Water quality volume for redeveloped site (Design Guidance: acre-feet)

I_{Reduced} = Existing impervious reduced (%)

Redevelopment projects may consider use of other design strategies, including Site Balancing and Net Reduction pursuant to Section 2.1.1 of the Stormwater Manual.

Based on our coordination with the project engineer, the proposed site redevelopment will result in a net reduction in impervious area compared to existing conditions. The stormwater treatment for the redevelopment project utilizes two separate Gravel Wetland STPs. Gravel Wetland #1 accepts flow from a majority of the parking lot and a portion of Whistle Stop Lane, located on the west side of the proposed Richmond Market building. Gravel Wetland #2 is designed to receive only rooftop runoff from the proposed Richmond Market, and consequently, does not require any pretreatment via a sediment forebay or other pretreatment technique. Since KAS was not provided with hydrologic or hydraulic calculations, we are unable to verify if the gravel wetlands are adequately sized. However, assuming the gravel wetlands are designed with the property treatment volumes, it appears the site has been designed so that the proposed STPs have the potential to collect and treat approximately 50% of the redeveloped site impervious area.

Based on our review of the information provided, it appears that the stormwater management design concept has the potential to meet the redevelopment standards per the current Stormwater Management Rules. However, there are some concerns with the onsite stormwater management plan per the following:

- Per the Site Plan, a French Drain is proposed on the east side of Catch Basin (CB) #7, which is supposed to collect and convey stormwater runoff from the proposed parking lot to the north, portions of the proposed Whistle Stop Lane, offsite flow conveyed from a proposed development to the northwest, and onsite green space to the north/northwest. This French Drain also has an



approximate 3 foot elevation difference across it, which is not typical for French Drains. French Drains in Vermont that accept parking lot runoff are prone to clogging due to sanding/salting during the winter, associated sediment transport, and decaying leaf debris. It is recommended that the stormwater drainage and collection concept for this area be redesigned/reconfigured. It is important that stormwater runoff that is conveyed to the east side of Whistle Stop Lane near the French Drain is not able to bypass the stormwater collection system, since this would result in stormwater flow being conveyed crossing the northwestern parking lot entrance from Whistle Stop Lane, which could cause issues.

- Per the Stormwater Management Plan, it appears there are some errors with the delineated drainage areas POI A, POI B2, and POI C associated with the grading along the west side of the proposed Richmond Market Building. It is recommended that these drainage areas be corrected, however, the errors appear to be minor and do not appear to impact the ability of the design concept to meet the applicable Redevelopment Standards.

Town Standards and Specifications

The redevelopment project includes proposed stormwater improvements within the Railroad Street Public Right of Way, which are subject to the Town Standards and Specification. In addition, stormwater improvements are also provided within the proposed Whistle Stop Lane right of way that are also subject to the Town Standards and Specification.

Per Section 3.1 – Description of the Town Standards and Specifications, except where approved by the Town, storm drainage systems shall be underground. In addition, the Town requires that drainage infrastructure be designed to accommodate the 25 year storm event, and that the developer's engineer submit stormwater design calculations for Town Review. A surface drainage ditch is proposed on the west side of Whistle Stop Lane, which collects and conveys runoff to CB #1, located at the intersection with Railroad Street. This surface drainage ditch will need to be approved by the Town. The details from CB#1 have not been provided at this time, but the Town should ensure the catch basin inlet has the hydraulic capacity to accept runoff from the proposed ditch for the 25 year storm event including with a clogging factor (50% recommended). If CB#1 is to become the responsibility of the Town, it is recommended that the Road Foreman review the drainage collection concept for CB#1, as this catch basin maybe prone to clogging from transported leaf debris and sediment. The Town also has the ability to require detention basins for new developments to ensure that 25 year post development flow rates equal the predevelopment 25 year flow rates. However, since the existing site has no onsite stormwater management or treatment and the site redevelopment incorporates STPs and reduces overall impervious area, it is



Mr. Osborne
Richmond Market Stormwater Review
Page 4

likely the current site plan design will result in a reduction of the 25 year peak flow rate when compared to existing conditions.

Per Section 3.2 – Materials, stormwater pipes that may be used include reinforced concrete pipe (RCP), high density polyethylene pipe (HDPE), and polyvinyl chloride pipe (PVC), or an approved equal. Per Section 3.3 – Sizes, stormwater pipes crossing under any public or private road right of way must have a minimum 18" diameter unless specifically approved by the Road Foreman. The design for the stormwater pipe network from Gravel Wetland #2 to CB#1, and the stormwater pipe from CB#4 to CB#1 utilize polyethylene (PE) pipes with a diameter of 15". The pipe from CB#1 to the outfall to the ditch to the west utilizes an 18" PE pipe. It is recommended that the design be revised so that all pipe sizes meet the minimum 18" diameter, and that pipe materials be HDPE or another town approved material. Conversely, the proposed project could seek specific approval from the Road Foreman and Town for the current design. It is also recommended that the Town request the design calculation for the stormwater infrastructure located within the road right of ways to ensure adequacy to collect and convey the 25 year storm event flows.

KAS was not provided design details for catch basins and stormwater pipes located within the road right of ways. However, it is recommended that the owners engineer review their details versus Section 3.4 – Construction Methods, and associated details contained in the Town Standards and Specification. While our review focused on Stormwater Management, it is also recommended that the design engineer review applicable sewer, water, and road standards and specifications to ensure compliance with Town requirements.

Conclusions

Based on our review, the redevelopment concept appears to have the ability to meet the VTANR redevelopment standards and obtain a Stormwater Operational Permit. The project has elements that currently deviate from the Town Standards and Specifications as previously noted in this letter. KAS is pleased to have conducted this stormwater review on behalf of the Town. Please feel free to contact me if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Stephen Diglio".

Stephen Diglio, PE
Project Manager

CC: KAS Project# 811210287