WALL CONSULTANT GROUP

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To: Josi Kytle, Project Manager

From: Corey Mack, PE, Consultant Transportation Engineer

Subject: Richmond Creamery Trip Generation Study

WCG has reviewed the proposed mixed-use development at the Richmond Creamery site on Jolina Court in Richmond, VT. Following Town of Richmond Zoning Regulations, TIS Guidelines from the Vermont Agency of Transportation (VTrans) and standard engineering practice outlined by the Institute of Transportation Engineers (ITE) and other sources, WCG has prepared the following trip generation estimate.

In summary:

- The proposed project at partial build (Building 1 and Building 2) is estimated to generate 42 external vehicle trip ends in the AM peak hour, and 46 external vehicle trip ends PM peak hour.
- The proposed project at full build is estimated to generate 63 external vehicle trip ends in the AM peak hour, and 61 external vehicle trip ends PM peak hour.
- The peak hour trip generation threshold meriting further congestion or capacity analysis is 70 trips ends and 75 trip ends for Richmond Zoning Regulations and VTrans TIS Guidelines, respectively; the proposed project does not exceed either threshold.
- Compared to trip generation estimates from the former 2016 land use development program, the current full build proposal results in +10 AM hour trips, and +4 PM peak hour trips.

BACKGROUND

The Richmond Creamery project consists of four proposed buildings with a variety of land uses. The current land use development program by building is documented in Table 1. Building 1 is complete and occupied.

The site is subject to Act 250 permit 4C0150, originally issued in 1974 with the most recent amendment 2A in 2019.

The site is located within the Town of Richmond's Jolina Court "JC" zoning district.

An earlier land use development program from 2016 included restaurant and specialty retail commercial land uses. The Richmond Creamery Traffic Impact Review, dated 28 November 2016 estimated a trip generation of 53 AM and 57 PM peak hour external vehicle trip ends.

TABLE 1: PROPOSED LAND USE DEVELOPMENT PROGRAM AND ESTIMATED OCCUPANCY

		Building 1	Building 2	Building 3	Building 4
	Est. Occupancy	2020	2025	2030	2030
	Units				
Multifamily Residential Housing	DU	14	31	-	-
Commercial – Office	KSF	0.9	5.5	8.46	6.3
Commercial – Research & Development	KSF	4.4	-	-	-
Commercial – Health Club	KSF	-	1.5	-	-

DU = dwelling unit; KSF = thousand square feet of gross leasable area (not including common space)

ESTIMATED TRIP GENERATION

Trip generation refers to the number of vehicle trips originating at or destined for a particular land use development. The proposed project will generate new trip ends from the land uses being developed: residential dwelling units, commercial office space, research and development space, and the health club facility.

Base Vehicle Trip Generation

Base vehicle trips are the total estimated vehicle trips prior to any reductions associated with internal capture, pass-by, or transportation demand management (TDM) features.

Data from the Institute of Transportation Engineers (ITE) can be applied to estimate trip generation associated with the existing and proposed land uses. WCG consulted the most recent ITE Trip Generation Manual, 11th Edition to estimate base vehicle trips. The most applicable land uses relevant to the proposed site include:

- ITE Land Use Code (LUC) 220 – Multifamily Housing (Low-Rise):

  Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

- ITE LUC 712 – Small Office Building:

  A small office building is the same as a general office building (Land Use 710) but with less than or equal to 10,000 square feet of gross floor area. The building typically

houses a single tenant. It is a location where affairs of a business, commercial or industrial organization, or professional person or firm are conducted.

- ITE LUC 710 – General Office Building

  A general office building is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building houses multiple tenants that can include, as examples, professional services, insurance companies, investment brokers, a banking institution, a restaurant, or other service retailers. A general office building with a gross floor area of 10,000 square feet or less is classified as a small office building (Land Use 712).

- ITE LUC 760 – Research and Development Center:

  A research and development center is a facility or group of facilities devoted almost exclusively to research and development activities. The range of specific types of businesses contained in this land use category varies significantly. Research and development centers may contain offices and light fabrication areas.

- ITE LUC 492 – Research and Development Center:

  A health/fitness club is a privately-owned facility that primarily focuses on individual fitness or training. It typically provides exercise classes, fitness equipment, a weight room, spa, lockers rooms, and a small restaurant or snack bar. This land use may also include ancillary facilities, such as a swimming pool, whirlpool, sauna, limited retail, and tennis, pickle ball, racquetball, or handball courts. These facilities are membership clubs that may allow access to the general public for a fee.

Internally Captured Trips

Because of the complementary nature of the proposed commercial and residential land uses on the Creamery site, some trips are expected to be made entirely on-site. This capture of trips internal to the site has the net effect of reducing vehicle trip generation between the overall development site and the external street system (compared to the total number of trips generated by comparable land uses developed individually on stand-alone sites). For these internally captured trips, the origin, destination, and travel path are all within the site.

Internally captured trips have been estimated using the recommended methodology in the ITE Trip Generation Handbook[1]. Internal capture trips are estimated prior to splitting site generated external trips into pass-by and non-pass-by trips or estimating the effect of TDM strategies.

[1] NCHRP Report 684 - Enhancing Internal Trip Capture Estimation for Mixed-Use Developments

Pass-by and Primary Trip Classification

Pass-by trips are trips generated from the existing traffic stream. Pass-by trips result in a change in turning traffic at project intersections, but do not add traffic to the adjacent street network. As defined by the ITE Trip Generation Handbook, 3rd Edition:

> *"A pass-by trip is made as an intermediate stop on the way from an origin to a primary trip destination without a route diversion. Pass-by trips are attracted from traffic passing the site on an adjacent street…"*

Pass-by trips are estimated using the average pass-by rates surveyed by ITE for that land use. There is no applicable pass-by adjustment to the proposed land uses at the current Creamery site; all external trips are assumed to be primary trips.

Transportation Demand Management

Transportation demand management (TDM) encompasses a broad set of strategies to reduce or reallocate personal vehicle travel to achieve specific goals such as congestion mitigation, air quality improvements and emissions reductions, reduced parking demand, and improved public health. TDM strategies may generally be grouped into four categories: physical, operational, financial, and organizational.

Using VTrans TDM Guidance[2], the net reduction in external trip generation can be estimated by accounting for the physical infrastructure on and near the site. Using table 4.1 of the TDM Guidance in the "Other" land use category (no transit service), applicable trip generation reductions are compiled in Table 2.

TABLE 2: EXTERNAL VEHICLE TRIP ADJUSTMENT BASED ON TDM STRATEGIES

	Percent Trip Reduction	Details
Design site to support bicycle and walk access	1%	Front setback <20'; sidewalks throughout site
Secure bicycle parking	1%	Interior secure parking available in Building 1
Exterior bicycle parking	0.5%	Exterior bicycle racks at each building
Total	2.5%	

[2] VTrans Transportation Demand Management (TDM) Guidance, February 2016

Summary of Trip Generation

The estimated trip generation and adjustments for internal capture and TDM strategies is illustrated in the following tables.

TABLE 3: PARTIAL BUILD EXTERNAL VEHICLE TRIP GENERATION ESTIMATE

Proposed Partial Build Buildings 1 & 2				AM Peak Hour Base			PM Peak Hour Base			Weekday Base
ITE LUC	Description	Size	Unit	Enter	Exit	Total	Enter	Exit	Total	Total
220	Multifamily Housing (Low-Rise)	45	DU	4	14	18	14	9	23	364
712	Small Office Building	6.4	KSF	9	2	11	5	9	14	96
760	Research & Development	4.2	KSF	4	0	4	1	3	4	48
492	Health / Fitness Club	1.5	KSF	6	9	15	9	6	15	167
	Estimated Base Trip Generation, Partial Build Site			23	25	48	29	27	56	675
	Internally Captured Trips (NCHRP 684 Model)			2	2	4	4	4	8	74
	Total External Trips			21	23	44	25	23	48	601
	TDM Adjustment 2.5%			1	1	2	1	1	2	15
Total External Vehicle Trips, Partial Build Overall Site				**20**	**22**	**42**	**24**	**22**	**46**	**586**

TABLE 4: FULL BUILD EXTERNAL VEHICLE TRIP GENERATION ESTIMATE

Proposed Full Build Buildings 1, 2, 3 & 4				AM Peak Hour Base			PM Peak Hour Base			Weekday Base
ITE LUC	Description	Size	Unit	Enter	Exit	Total	Enter	Exit	Total	Total
220	Multifamily Housing (Low-Rise)	45	DU	4	14	18	14	9	23	364
710	General Office Building	21.2	KSF	28	4	32	5	26	31	302
760	Research & Development	4.2	KSF	4	0	4	1	3	4	48
492	Health / Fitness Club	1.5	KSF	6	9	15	9	6	15	184
	Estimated Base Trip Generation, Full Build Site			42	27	69	29	44	73	898
	Internally Captured Trips (NCHRP 684 Model)			2	2	4	5	5	10	86
	Total External Trips			40	25	65	24	39	63	812
	TDM Adjustment 2.5%			1	1	2	1	1	2	20
Total External Vehicle Trips, Full Build Overall Site				**39**	**24**	**63**	**23**	**38**	**61**	**792**

In the full-build land use development scenario, the total estimated external vehicle trip generation is 63 trip ends in the AM peak hour and 61 trip ends in the PM peak hour. This total trip generation is less than Richmond Zoning Regulation's 70 peak hour trip generation threshold and the VTrans TIS Guideline's 75 peak hour trip generation threshold meriting further congestion and capacity analysis.

Comparison to Previous Trip Generation Estimates

The most notable difference between the current land use development proposal and the 2016 land use development program is the increase in residential units, and the removal of restaurant and specialty retail space. While residential land uses generally have a lower trip generation rate than retail and restaurant space, the former restaurant and specialty retail space both contributed to increased adjustments in trip generation associated with internal capture and pass-by trip making. Additionally, retail and restaurants generate little traffic in the AM peak hour. The net result is an increase in external vehicle trip generation from 2016 to the current full build land use development program.

TABLE 5: COMPARISON OF EXTERNAL VEHICLE TRIP GENERATION ESTIMATES FROM FORMER 2016 TO CURRENT LAND DEVELOPMENT PROPOSAL

	AM Peak Hour External Vehicle Trip Ends	PM Peak Hour External Vehicle Trip Ends
2016 Richmond Creamery Traffic Study (11/28/16)	53	57
Current Development Program	63	61
Net Change	+10	+4