

Nic Anderson

From: Mary O'Neil
Sent: Thursday, March 28, 2013 12:27 PM
To: Nic Anderson
Subject: FW: 110 Riverside
Attachments: 2012-3-13 Traffic Brief Update.pdf

For DRB review 4/2/2013. See attached.

From: Guillermo Gomez
Sent: Thursday, March 28, 2013 12:27 PM
To: Mary O'Neil
Subject: RE: 110 Riverside

Good Afternoon Mary:

I received the attached update to the Traffic Brief for 110 Riverside on March 15th. After reviewing it, we still had some concerns, which we discussed with Abby Dery from Trudell Consulting Engineers in a meeting last Tuesday, March 26th.

Please include the following information for the review board:

- The Initial Traffic Impact Analysis submitted by the Consultant provided an analysis of the proposed conditions and impact of the development on the surrounding area. One of the most significant concerns that came from the initial report submitted is the lack of pedestrian connectivity. The nearest pedestrian crossing is several hundred feet west of the development, and any pedestrian wishing to cross Riverside Avenue to walk towards Winooski would have to walk several hundred feet west to cross and then back. Instead of doing this, pedestrians would likely cross directly in front of the development in an unsafe way. DPW asked the consultant to provide a sight distance analysis to ensure that vehicles have enough time to react to a pedestrian or a vehicle leaving the development. DPW also suggested the consultant to examine the feasibility of providing a pedestrian mid-block crossing. DPW believes having two driveways at this location is not necessary, though it may provide a higher level of convenience to residents to the proposed development, it further complicates the safe accommodation of the pedestrian crossing for this project. In response our initial comments, the Consultant provided an updated Traffic Impact Report that includes a sight distance analysis, and proposes restricting left turn movements on the westernmost driveway (see schematic in the attached file). The Consultant concluded that a pedestrian mid-block crossing is warranted, and their updated design calls for the pedestrian crossing to be positioned in between the two proposed driveways. Staff reviewed this proposed configuration and still finds it problematic. Our concern with this placement is that: exiting traffic will be centrally focused on entering the stream of traffic and not on pedestrians in the crosswalk. To further complicate the decision making for exiting traffic, they will need to contend and coordinate with three conflicting movements (entering into heavy stream of traffic on Riverside Avenue, pedestrians in the crosswalk and the second driveway in close proximity at the same property). Upon meeting with the Consultant, staff suggested restricting the western driveway to allow only a right-in movement (no exiting traffic allowed). All traffic exiting the development would have to do so through the eastern driveway. This eliminates the conflicting movements from exiting traffic on the western driveway. If this is implemented, the placement of the mid-block crossing can be reanalyzed to make sure it is proposed at the safest possible location, with adequate sight distances on all approaches and an some distance for vehicles exiting the traffic stream from the eastern driveway to enter the traffic stream and become aware of the pedestrians and the crossing.

- Another concern identified during the initial review was the impact that the traffic generated from the development would have on the intersection of Riverside Avenue and Barrett Street. The consultant provided a Level of Service analysis and evaluated the queue length and the delay on the intersection and the conclusion is that the impact on the queues and delay are not significant. This issue needs no further discussion
- Staff has identified a concern regarding the gate proposed to access the underground parking. There is the potential for vehicles to block the sidewalk on the westernmost driveway while they wait for the gate to open, and during rush hour, this could translate into vehicles queuing and blocking the traffic flow on Riverside Avenue.
- DPW staff will need to see a design addressing these issues and time to review it before approve the project in terms of traffic.

Thanks and please let me know if there are any further questions.

Guillermo Gomez
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Burlington, VT 05401
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E-mail: ggomez@burlingtonvt.gov

From: Mary O'Neil
Sent: Wednesday, March 27, 2013 4:28 PM
To: Guillermo Gomez
Subject: 110 Riverside

Hello Guillermo,
Can you send me your comments re: 110 Riverside Avenue traffic by tomorrow morning so that we may send them to the DRB prior to the hearing (next week.) Comments need to be posted by tomorrow.

Thanks!



Mary O'Neil, AICP
Senior Planner
Coordinator, Certified Local Government Program
Please note! New city domain and email: mcneil@burlingtonvt.gov
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Introduction

The purpose of this Traffic Impact Summary is to identify potential traffic impacts relating to the proposed construction of a 57 unit apartment building on Riverside Avenue in Burlington, Vermont. The project is located on the south side of Riverside Avenue on the site of the former M&H Auto building. Figure 1: *Location Map* illustrates the property location in relation to the street network in the immediate area. A capacity analysis (level of service) and a crash analysis were conducted for the project access using projected traffic volumes and Vermont Agency of Transportation (VTrans) crash records. The procedures and methodologies used in this study are suggested in publications by the Institute of Transportation Engineers (ITE).

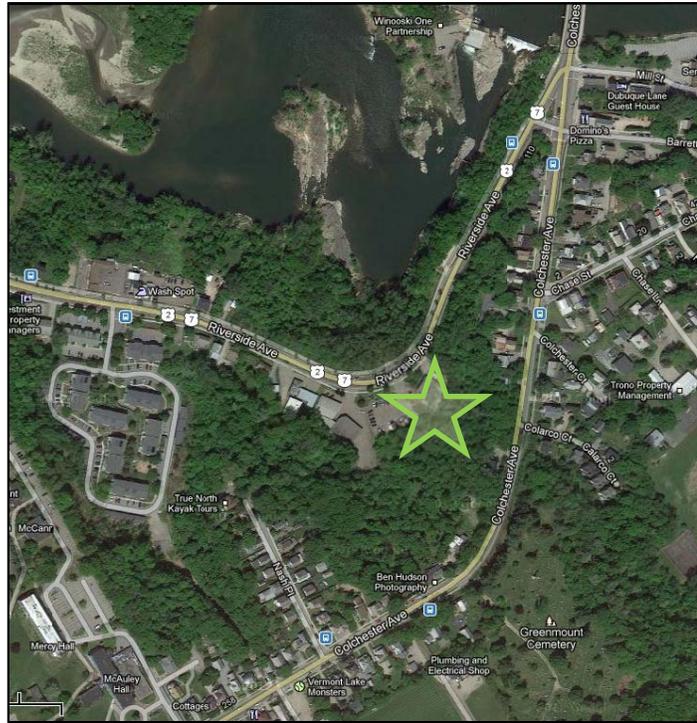


Figure 1: Location Map

Existing Conditions

Riverside Avenue is classified by VTrans as an Urban Principal Arterial, and is also known as US Route 2/7 in this location. For the purpose of this report, Riverside Ave will be referred to as running east-west. An annual average daily traffic (AADT) volume of 15,300 vehicles per day was recorded in 2010 at automatic traffic recorder (ATR) station S6D156, located 0.5 miles south (or west) of Colchester Avenue. There is a single lane of travel, plus a bike lane, in each direction. The speed limit is posted at 30 miles per hour (mph). A shared-use path is located on the north side of the road, and a concrete sidewalk runs along the project's frontage on the south side of the road from the west, terminating and the eastern property boundary.

Hourly and directional traffic distribution on Riverside Ave in front of the site was determined by a 12-hour turning movement count conducted by VTrans at the intersection of Riverside and Colchester Ave on 6/14/2012 and 6/15/2012. Peak traffic hour volumes occur between 7:30-8:30 AM and in the afternoon between 4:30-5:30 PM.

Proposed Conditions

There are two driveways proposed for access to the project. The easternmost driveway, located on an existing curb cut, will provide direct access to and from the surface parking area, which leads to the basement parking level. The western driveway provides access

directly to the basement level parking. Turning movements at this driveway will be limited to right-in/right-out only. This new driveway will replace an existing curb cut, shifting the location 60 feet to the west.

Overall traffic volume is not expected to experience measureable growth on Riverside Ave over the next 5 years, per VTrans Continuous Traffic counter Grouping Study and Regression Analysis, Based on 2011 Traffic Data. Their analysis shows a 1.00 traffic growth factor through 2018 for urban roads. A Design Hour Volume of 1592 vehicles per hour (vph) was calculated using the urban "k" factor of 0.1040 listed in the VTrans Grouping Study.

Estimated project-generated traffic was calculated using ITE Trip Generation, 9th Edition. ITE Land Use 220: *Apartment* was selected as most resembling the proposed use. Table 1 below outlines the anticipated project-generated traffic during the AM and PM peak hour of traffic on the adjacent street.

Table 1: ITE Project-Generated Traffic Rates -

Land Use	Description	Size	Trip Generation Rate	Trips	% Enter/ %Exit	Enter	Exit
220	Apartment	57 units	$0.49(x) + 3.73$	32	20/80	6	26
			$0.55(x) + 17.65$	49	65/35	32	17

Proposed trip distribution is based primarily on analogy to this short count. Projected traffic volumes in front of the site during morning and evening peak traffic hours are illustrated in the diagrams below.

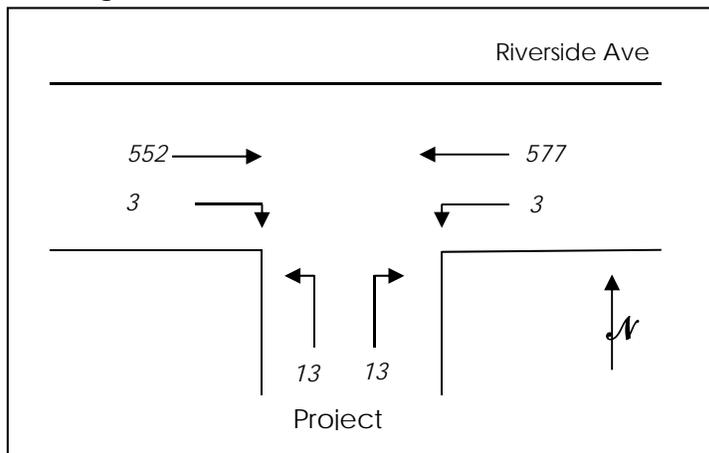


Figure 2: AM Peak Traffic Distribution

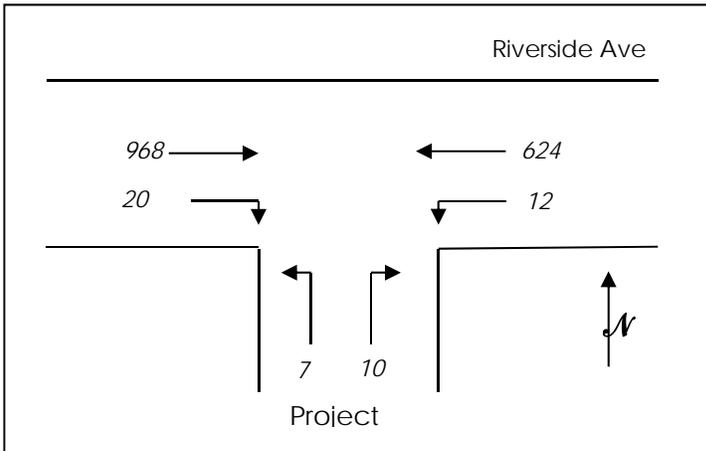


Figure 3: PM Peak Traffic Distribution

Level of Service Analysis – Project Driveway

A capacity analysis was performed on the intersection of the project driveway with Riverside Avenue. For analysis purposes, only the eastern driveway was modeled, with all of the traffic utilizing that entrance. It is anticipated that some of the right turning movements (ingress and egress) will take place at the western driveway. Level of Service (LOS) was calculated for the unsignalized intersection using McTrans Highway Capacity Software (HCS), which uses methodologies described in the Highway Capacity Manual (HCM). The HCM levels of service used in the analysis are based on control delay of critical movements and are summarized in the table below.

Table 2: Level-of-Service Designation Summary – Unsignalized Intersections

LEVEL OF SERVICE	CONTROL DELAY (sec/veh)
A	≤10
B	>10 and ≤15
C	>15 and ≤25
D	>25 and ≤35
E	>35 and ≤50
F	>50

Table 3: 2013 AM Peak Results

	Level of Service	Delay (seconds)	Queue Length (vehicles)	volume:capacity ratio
Westbound (Riverside Ave)	A	8.6	0.01	0.00
Northbound (Project)	C	17.5	0.27	0.08

Table 4: 2013 PM Peak Results

	Level of Service	Delay (seconds)	Queue Length (vehicles)	volume:capacity ratio
Westbound (Riverside Ave)	B	10.2	0.05	0.02
Northbound (Project)	D	27.6	0.32	0.10

LOS on Riverside Ave will remain an A with the addition of the project-generated traffic during the AM peak, and a B during the PM peak. LOS for vehicles exiting the project during the AM peak will be a C, with 17.5 seconds delay, while vehicles exiting during PM peak could experience 27.6 seconds delay, or a LOS D. Vehicle queuing at the project driveway is low due to the low turning volume. Full analysis output reports are located in the Appendix.

Traffic Impact – Riverside Ave/Barrett St Intersection

At the request of the City of Burlington, impacts on the intersection of Riverside Ave and Barrett Street from the proposed project were reviewed, specifically relating to vehicle queuing. As show in the diagram below, a low number of vehicles are anticipated to be added to the intersection, with most movements being added to the northbound and southbound Riverside Ave through movements correlating to background travel patterns.

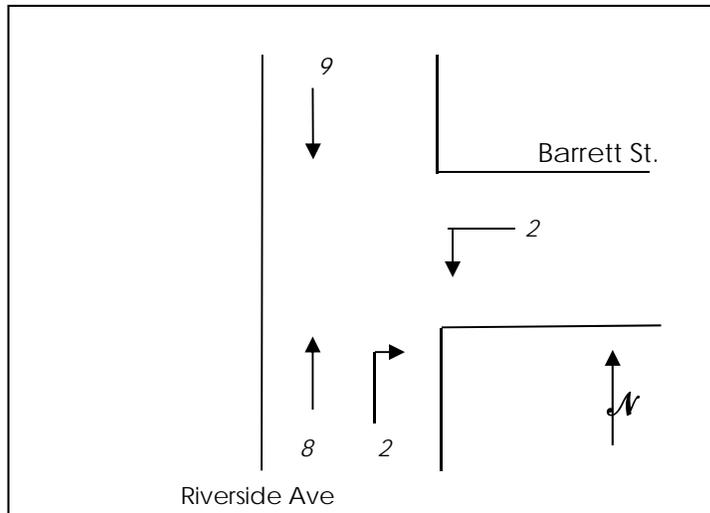


Figure 4: Peak Hour Traffic Increase

The table below identifies the two controlling (and highest traffic volume) intersection approaches and identifies the estimated project-generated traffic impacts. The northbound Riverside Ave approach currently experiences long queues and delay during the peak hour (4:30-5:30PM), however, the added trips to this approach does not result in a significant increase in delay or vehicle queue. The distance between the intersection and the easternmost project driveway is approximately 740 feet. There are no conflicting

crossings or driveways that are affected by this existing traffic queue, aside from the trailhead parking on the north side of Riverside Ave.

Table 5: Peak Hour Analysis

	Northbound Riverside Ave (through movement)			Southbound Riverside Ave (through movement)		
	No-Build	Build	Net	No-Build	Build	Net
Traffic Volume	821	829	+8 veh (1.0%)	520	529	+9 (1.7%)
Delay	81.5 s	89.3 s	+8 sec	3.5 s	3.7 s	+0.2
LOS	F	F	-	A	A	-
Queue Length	706 ft	717 ft	+11 ft	130 ft	136 ft	+6 ft

Crash History – Project Driveway

The *General Yearly Summaries 2007 to 2011 – Crash Listings* provided by the Highway Research Department of VTrans was used to determine the number of crashes occurring within a 0.2 mile (approximately 1000 ft) section of Riverside Avenue, centered on the proposed project. According to this listing, 17 crashes occurred during the five-year period between 2007 and 2011. A crash rate of 2.80 crashes per million vehicle miles (Cr/MVM) was calculated for the corridor. The critical rate calculated for Urban Principal Arterials in Vermont is 4.815 Cr/MVM. The actual crash rate does not exceed the critical rate and therefore this section of roadway is not considered a High Crash Location. The full Crash Summary Listings are located in the Appendix.

Sight Distance

Sight distance measurements were taken on Riverside Avenue at the two driveway locations. The table below outlines the measured sight distance and the AASHTO recommended intersection and stopping sight distances.

		Measured 3/6/2013	Intersection Sight Distance ¹		Stopping Sight Distance
			Left from Stop	Right From Stop	
East Driveway	To East	342 ft	335 ft	-	200 ft
	To West	312* ft	-	290 ft	200 ft
West Driveway	To East	317 ft	335 ft	-	200 ft
	To West	676 ft	-	290 ft	200 ft

*limited by street tree trunks on north side of road – maintaining low-hanging branches will help

Minimum stopping sight distance is met at both driveway locations. The available sight distance exceeds the AASHTO recommended intersection sight distance in both directions at the eastern driveway.

The western driveway turning movements will be limited to right-in, right-out only turning movements to mitigate the shorter intersection sight distance to the east and to minimize conflicts along Riverside Avenue. The driveway will be configured to discourage left-turning vehicles and signage will be added to westbound Riverside Ave.

¹ Table 9-6, 9-8; A Policy on the Geometric Design of Highways and Streets, 2011, AASHTO.

Pedestrian Access

There is currently a sidewalk located along the lot frontage, terminating at the eastern property boundary. There is a multi-use path located on the north side of Riverside Avenue, and on-street bike lanes on both the north and south side of Riverside Avenue. The nearest crosswalk is located approximately 800 feet to the west of the project, at the signalized entrance to the Salmon Run housing development. This would serve as the safest location for pedestrians to cross Riverside Avenue currently. If a mid-block crossing were to be placed in front of the proposed project, the best location, in terms of sight distance, would be between the two entrance driveways. It is recommended that a crosswalk in this location be striped and well signed, with a flashing beacon.

The VTrans Guidelines for the Installation of Crosswalk Markings (July 2004) would be followed. Criteria for installation of a marked non-school mid-block crossing are as follows:

- The speed limit is 40 mph or less – *Met*. The speed limit is 30 mph.
- There are 20 or more pedestrians using the crossing per hour during the vehicular AM and PM peak periods (lesser volumes may be considered if a large percentage consists of young, elderly, or disabled): *Possibly Met*. The 57-unit apartment building may generate some pedestrian traffic, but it's difficult to predict if there will be 20 peds per hour requiring the crosswalk.
- The AADT for the roadway exceeds 3000 vehicles per day: *Met*. The AADT on Riverside Ave is 15,300 vpd.
- There is not another crosswalk across the same roadway within 200 feet: *Met*. The nearest crosswalk is at the Salmon Run intersection, 800 feet to the west.
- A determination has been made that the pedestrian shall have the right of way over vehicular traffic: *Met*. If a striped crosswalk is to be placed, the pedestrian has the right of way, per VT state law.
- Adequate sight distance is available in both directions. *Met*: The stopping sight distance for a posted speed limit of 30mph is 200 ft. Sight distance available is at least 300 feet in both directions.

Summary of Findings

Based on review and analysis of the existing and proposed traffic conditions, the following conclusions are presented.

1. Sisters and Brothers Investment Group is proposing the construction of a 57 unit apartment building to be located at 110 Riverside Avenue in Burlington. The property is located on the south side of the road, approximately 0.2 miles west of Colchester Avenue.
2. The project will have access to Riverside Avenue via two driveways. The eastern driveway will allow both ingress and egress, while the west driveway movements will be limited to right-in/right-out only. The new driveways will replace two existing curb cuts.

3. Based on turning movement counts performed by VTrans, peak hours of traffic on Riverside Ave occur from 7:30 to 8:30 AM and from 4:30 to 5:30 PM, with a significantly higher volume of traffic occurring during the PM peak hour.
4. According to ITE, the project is expected to generate approximately 32 new trips during the AM peak, with 6 entering and 26 exiting. During the afternoon peak, the project is estimated to generate 49 trips, 32 entering and 17 exiting.
5. Based on estimated PM peak hour trip distribution, the additional 49 trips on the road resulting from the proposed project represents 2.9% of total peak hour traffic.
6. Level of service on Riverside Ave at the new driveway intersection will operate at a Level of Service A during the AM and a B during the PM peak hours. Level of service at the project access will be a C (17.5 seconds delay) during AM peak and a D (27.5 seconds delay) during the PM peak hour. Excessive queuing is not anticipated at the project driveway due to the low number of turning vehicles.
7. It is estimated that the proposed project will add approximately 10 vehicles to northbound Riverside Ave at the Barrett Street/Colchester Ave intersection, and 9 vehicle trips to southbound Riverside Ave. This increase does not result in a substantial increase in vehicle delay or queue length.
8. Review of most recent available crash data for Riverside Avenue indicates that 17 crashes have occurred along a 0.2 mile section of Riverside Ave, centered on the project access, during the five-year period between 2007 and 2011. Based on the calculated crash rate, this is not considered a High Crash Location.
9. A pedestrian crossing featuring pedestrian called flashing beacons is recommended in front of the proposed project to connect the sidewalk that is currently in front of the project with the multi-use path on the north side of Riverside Ave.

- 1) Restrict lefts at west driveway
- 2) Add mid-block crosswalk w/ rapid flashing yellow lights
- 3) Add Bike rack to front sidewalk secure storage located at garage level

Note: Schematic only
Not for construction



TRUDELL CONSULTING ENGINEERS
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802.879.6331 | WWW.TCEV.COM

Revisions	No.	Description	Date	By

- Use of these Drawings
- Unless otherwise noted, these Drawings are intended for preliminary planning, coordination with other disciplines or utilities, and/or approval from the regulatory authorities. They are not intended as construction drawings unless noted as such.
 - Only drawings specifically marked "For Construction" are intended to be used in conjunction with contract documents, specifications, owner/contractor agreements and to be fully coordinated with other disciplines, including but not limited to, the Architect, if applicable. These Drawings shall not be used for construction layout. Contact TCE for any construction surveying services or to obtain electronic data suitable for construction layout.
 - These Drawings are specific to the Project and are not transferable. As instruments of service, these drawings, and copies thereof, furnished by TCE are its exclusive property. Changes to the drawings may only be made by TCE. If errors or omissions are discovered, they shall be brought to the attention of TCE immediately.
 - By use of these drawings for construction of the Project, the Owner represents that they have reviewed, approved and accepted the drawings and have met with all applicable parties/disciplines to insure these plans are properly coordinated with other aspects of the Project. The Owner and Architect are responsible for any buildings shown, including an area measured a minimum five (5) feet around any building.
 - It is the User's responsibility to ensure this copy contains the most current revisions.

ZONING NOTES:

ZONING DISTRICT: NEIGHBORHOOD ACTIVITY CENTER - RIVERSIDE (NAC-R)
PROPERTY USE: 57 RESIDENTIAL UNITS - 27 1-BDRM, 30 2-BDRM
SETBACKS - FRONT: 0 FT
SIDE (S): 15 FT
SIDE (W): 0 FT
REAR: 15 FT
BUILDING HEIGHT: 40 FT
PARKING: SHARED PARKING DISTRICT
1 SPACES/UNIT * 57 UNITS = 57 SPACES REQUIRED
49 UNDERGROUND + 12 SURFACE = 61 SPACES PROVIDED
DESIGN REVIEW APPLICABLE: YES
NATURAL RESOURCE OVERLAY: NO

PROJECT IMPACTS:

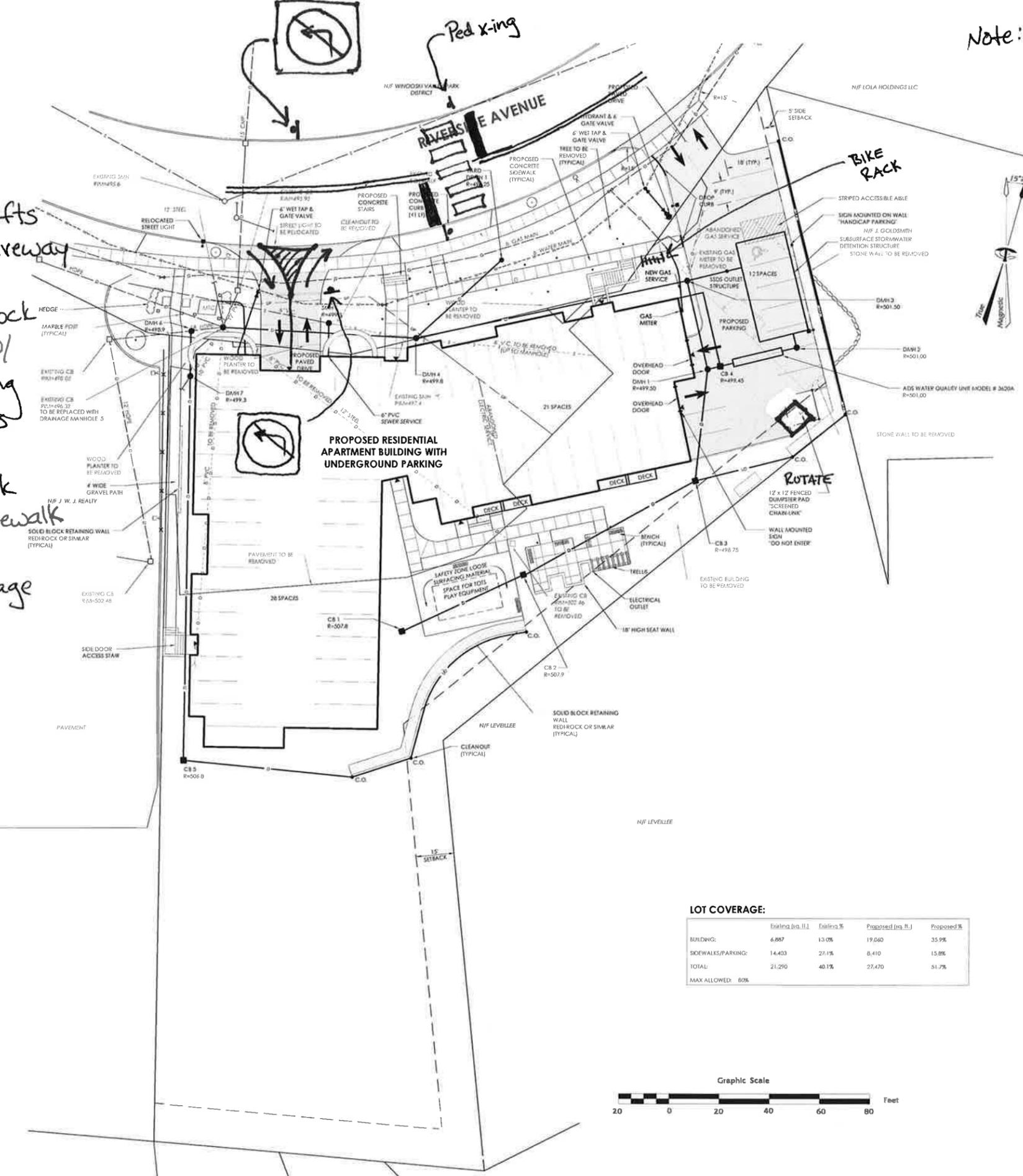
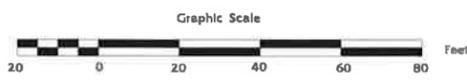
WATER DEMAND: 27 1-BDRM UNITS @ 150 GPD/BDRM = 4,050 GPD (GALLONS PER DAY)
30 2-BDRM UNITS @ 150 GPD/BDRM = 4,500 GPD
TOTAL AVERAGE WATER DEMAND = 8,550 GPD * 0.90 = 7,695 GPD
MAXIMUM DAILY DEMAND = 11,745/720 = 16.3 GPM (GALLONS PER MINUTE)
INSTANTANEOUS PEAK DEMAND = 49 UNITS * 5 GMP = 245 GPM
WASTEWATER DEMAND: 57 UNITS * 210 GPD/UNIT = 11,970 GPD
TRAFFIC: ITE TRIP GENERATION 9TH EDITION
LAND USE 200-APARTMENTS
WEEK DAY: T = 6.65(X) * 379 TRIPS
AM PEAK: T = 0.47(X) * 3.73 = 32 TRIPS
PM PEAK: T = 0.55(X) * 17.65 = 49 TRIPS

GENERAL NOTES:

- OWNER OF RECORD: SISTERS AND BROTHERS INVESTMENT GROUP
- TAX PARCEL ID: 046-3-081
- PHYSICAL ADDRESS OF PROPERTY: 110 RIVERSIDE AVE. BURLINGTON, VERMONT 05401
- PARCEL SIZE: 1.22 ACRES
- REFER TO C2-02 "GRADING PLAN" FOR SEE GRADING
- REFER TO C2-03 "UTILITY PLAN" FOR DETAILED UTILITY INFORMATION, INCLUDING RWS, INVERTS, CROSSINGS, AND CONNECTIONS.
- REFER TO C5-01 FOR DEMOLITION AND EROSION CONTROL PLAN AND DETAILS.
- REFER TO L1-01 AND L1-02 FOR PLANT SPECIES, LOCATION AND DETAILS.
- REFER TO L2-01 "LIGHTING PLAN" FOR SITE LIGHTING FIXTURES, SCHEDULE AND DETAILS

LOT COVERAGE:

	Existing (sq. ft.)	Existing %	Proposed (sq. ft.)	Proposed %
BUILDING:	4,887	13.0%	19,060	35.9%
SIDEWALKS/PARKING:	14,403	27.1%	8,410	15.8%
TOTAL:	21,290	40.1%	27,470	51.7%
MAX ALLOWED:	80%			



For Permitting Only
Project Title

Sisters and Brothers Investment Group
110 Riverside Ave.
Burlington, Vermont

Sheet Title

Site Plan

Date: 11/21/2012
Scale: 1" = 20'
Project Number: 2010083
Drawn By: P.J.M.
Project Engineer: A.A.S.
Approved By:

C2-01



Products

R920 Rectangular Rapid Flashing Beacon



R920 Rendering - RRF activation at a crosswalk

A new device developed to improve safety at uncontrolled marked crosswalks, RRFs are a pedestrian actuated warning system that alerts vehicles to people wanting to enter the crosswalk. The high intensity rapid flashing yellow lights achieve yielding rates that previously have only been achieved with devices that have a red indication.

Compact and self-contained, the solar wireless Carmanah R920 RRFB delivers years of maintenance free operation in an extremely cost effective and easy to install package.

Benefits	Features
<ul style="list-style-type: none"> Vehicle yielding rates of between 72% and 96%* No trenching, cabling, or in-ground wiring No scheduled maintenance for up to five years No metering or electrical bills 	

U.S. Department of Transportation Federal Highways Administration, Publication No. FHWA-HRT-10-043 - (*) 'Effects of Yellow Rectangular Rapid-Flashing Beacons on Yielding at Multilane Uncontrolled Crosswalks'

IN THE NEWS

CARMANAH CLOSES ACQUISITION OF SPOT DEVICES

You are watching - Carby Crosswalk (Carmanah RRFB)

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RELATED APPLICATIONS

Crosswalk Flashing Beacons

Carmanah Has Acquired Spot Devices!

Learn more about the exciting combination of products and services now available by Carmanah! More information about the acquisition can be found in this news release.



Date: 7 Jan, 2013



Carmanah announces today that it has completed the previously announced (November 15, 2012) transaction to acquire the assets of Spot Devices, Inc., ("Spot Devices").

[Read more](#)

Rated for 400 to 1,000 daily activations, year round, in the USA. See our daily activation map for more information.



CARMANAH TECHNOLOGIES ANNOUNCES ACQUISITION OF SPOT DEVICES INCLUDING LICENSE OF SIMA SYSTEM

Date: 15 Nov, 2012

Carmanah Technologies (TSX: CMH) announced today a definitive agreement to acquire the assets of Spot Devices, Inc., ("Spot Devices") a Nevada, USA-based manufacturer of pedestrian and school zone safety systems.

[Read more](#)

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CARMANAH SIGNS NEW TRAFFIC DISTRIBUTOR FOR EASTERN CANADA

Date: 31 Aug, 2012

Carmanah is pleased to announce the recent signing of a new Traffic Distributor for Eastern Canada. Tacel Ltd is a Canadian owned and operated traffic signal Company that has been in business for over 30 years and

[Read more](#)

DOCUMENTATION

[R920 Specification Sheet](#)

[Warranty](#)

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- [SB435HP/SB430 Rectangular Rapid Flashing Beacon](#)
- [R820 - Solar Pedestrian Crosswalk Flashing Beacon](#)
- [SB440 Pedestrian Hybrid Beacon \(HAWK\)](#)
- [SB410 Networked School Zone Flashing Beacon](#)
- [DF510 & DF520 Driver Feedback Sign](#)
- [SC305 Retrofit School Zone Time Clock](#)

