

CITY OF BURLINGTON
NORTH WINOOSKI AVENUE AND ARCHIBALD STREET
INTERSECTION
PEDESTRIAN SAFETY & MOBILITY EVALUATION

FINAL REPORT

July 22, 2011



Prepared for the:



Prepared by:



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I. INTRODUCTION

The City of Burlington would like to evaluate options to improve pedestrian safety and mobility at the intersection of North Winooski Avenue and Archibald Street. To that end, the City has requested assistance from the CCMPO in developing a brief study to identify alternatives and approximate costs for evaluation of next steps at this intersection. The CCMPO, under a technical services contract, has retained DuBois & King, Inc. to develop the study on their behalf for the benefit of the City of Burlington.

DuBois & King's work on this study has consisted of conducting a site visit to review existing conditions and photograph the area, investigating several pedestrian and signal options, preparing construction cost estimates for the options, and preparing a brief report to summarize our findings.

II. BACKGROUND

For several years, the City of Burlington has desired to improve the pedestrian safety and mobility at this intersection. Historically, this intersection has had pedestrian improvements with the construction of Little Park which comprises the southwest corner of the intersection. The construction of the park not only provided an aesthetic element to this corner, it also removed the adjacent intersection of Bright Street and North Winooski Avenue. To further this pedestrian mobility and safety improvement effort, the City of Burlington had initiated some pedestrian signal improvements in the field; however, further design plans were not developed and the improvements were not constructed at that time. The City now desires to move this pedestrian improvement project forward by having an evaluation of pedestrian crossings, roadway alignment, and the signal system so that up-to-date cost information and options can be determined.



A field review and office meeting was held on May 17, 2011 with the City, CCMPO, and DuBois & King representatives to discuss options for the pedestrian improvements at this intersection. Topics discussed included possible curb adjustments, pork chop islands, signal systems, impacts to parking and turning radii. As a result of those discussions, a number of possible options for construction were identified for more detailed consideration. The following information documents the investigations and conclusions that were developed.

III. EXISTING CONDITIONS

North Winooski Avenue is primarily a north-south two lane roadway through the old North End of Burlington with connection to Riverside Avenue at the far north end. However, for the section north of North Street, this roadway heads northeasterly off of the north-south city grid line. The result is that this section of North Winooski is at approximately a 45 degree skew at its intersection with Archibald Street. Archibald is a two lane roadway which follows the east-west City street grid. The skew at this intersection from the standard perpendicular intersection is part of the cause for pedestrian safety and mobility concerns with increased non-perpendicular crossing distances and non-standard orientation. Typical of an urban intersection, there is minimal area available to provide a roadway realignment alternative. The land uses at this intersection include a mixed residential building on the northwest corner, an automotive service center and parking on the northeast corner, the Vermont Workers Center on the southeast corner, and Little Park on the southwest corner.

North Winooski is approximately 40 ft wide with parking allowed on both sides of the street. Currently, this is restricted on the northeast side with a “No Parking Here To Corner” sign and on the southeast side with a “15 minute parking” as a drop off location for the Vermont Workers Center. Archibald Street is approximately 30 ft wide with parking allowed only on the south and north side of the street for the west and east approaches respectively.

The intersection is currently signalized with a single span wire mounted signal head for each approach. This system does not have any signal approach redundancy or pedestrian signals. Based upon conversations with the City, the signal controller is a mechanical system which would not be able to be upgraded for any of the options being reviewed. However, during the previous initiative to upgrade this intersection, the City installed subsurface conduits that connect to all four corners and could be utilized for future pedestrian signals. Some pedestrian signal pole bases were also installed, but these have degraded and would need to be replaced.



The CCMPO performed a traffic turning movement count at this location in July 2010 (See Appendix A). Review of these volumes showed that the primary traffic pattern is the through movements for both North Winooski Avenue and Archibald Street. The approach turning vehicle volumes are significantly less with volumes less than 26 vehicles per hour for all turns except left turning vehicles from Archibald’s west approach at 48 vehicles per hour. For non-passenger vehicle volumes, the combined morning and afternoon four hour counts had a total of 164 pedestrian, 168 bicycle, 38 truck, and 15 bus movements. Based on discussions with the CCMPO, we also reviewed the Peak Hour and Four Hour traffic signal warrants for this turning movement count. Although this was not a full signal warrant evaluation, these signal warrants were not met for the traffic volumes in this count. The City would like to maintain the signal due to the potential for motorists to not see pedestrians at the skewed intersection corners.

IV. PEDESTRIAN ENHANCEMENTS

This section provides an evaluation of the various pedestrian mobility and safety alternatives considered at this intersection. For each of these alternatives, it is assumed that the City would prefer to maintain the signal at this intersection although traffic volumes may not warrant this. All of the alternatives include construction costs and associated impacts to upgrade the signal system with new controller, mast arm signal poles, signal heads, pedestrian signals and actuation.

It is important to note that although the current signal does not incorporate pedestrian signals, these are not automatically required at this location. In accordance with the Manual on Uniform Traffic Control Devices, Section 4E.03, pedestrian signal heads may be warranted if it is necessary to assist pedestrians in deciding when to begin crossing the roadway in the chosen direction, if no vehicular signal indications are visible to pedestrians, or if engineering judgment determines that pedestrian signal heads are justified to minimize vehicle-pedestrian conflicts. Thus the cost to upgrade the signal system could be eliminated in the event the City wished to phase implementation of the signal improvements. The alternatives evaluated are as follows.



A. Pork-Chop Islands

Right turning slip lanes and the associated “pork chop” islands could be installed at both the northeast and southeast intersection corners. This alternative would require geometric changes to the approach roadways to provide both the right turn lane and also to allow for an adequate and safe sized refugee island. The installation of these islands would improve pedestrian mobility by splitting the crossings into two movements and reducing crossing widths. This type of pedestrian refugee island is normally utilized at larger multi-lane intersections with higher right turn volumes, both conditions which are not at this intersection. The right turning slip lane and island increases difficulty with snow removal and creates an additional bicycle/vehicle conflict point. Although the installation of these islands reduces pedestrian crossing distances, the associated maintenance, and vehicular and bicycle impacts may outweigh the benefits.

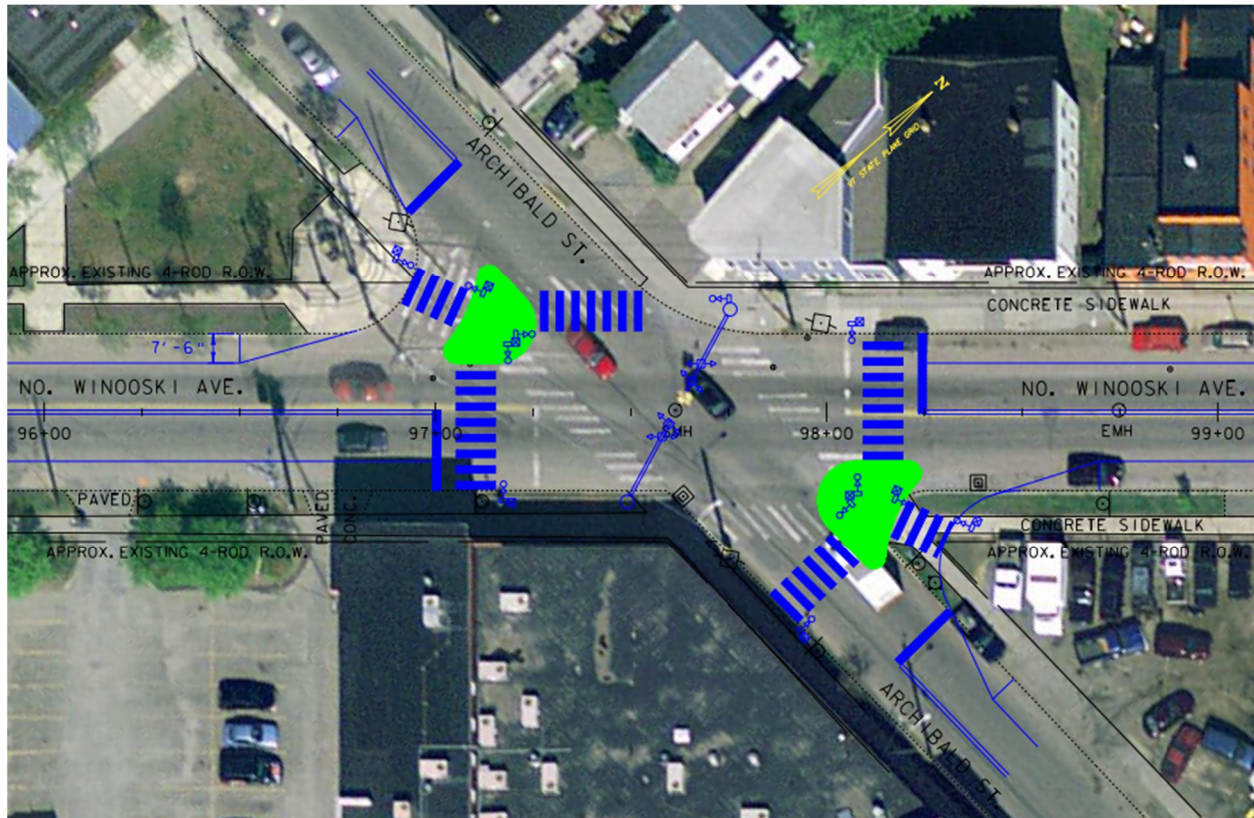


Figure 1: Alternative A- Pork Chop Islands

B. Perpendicular Crosswalks

The current crosswalks are parallel with the roadways, so they are not perpendicular at the roadway crossings. Crosswalks are ideally aligned to provide perpendicular crossings to reduce the distance crossing traffic. To implement perpendicular crossings at this location, the crosswalks and vehicular stop bars would need to be set back from intersection. These locations would provide shorter roadway crossing distances but would require pedestrians to walk further along the sidewalks and require that they take somewhat indirect routes. With these longer travel paths it is likely pedestrians will make illegal crossings at the existing crosswalk locations unless a preventative measure such as fencing is added.

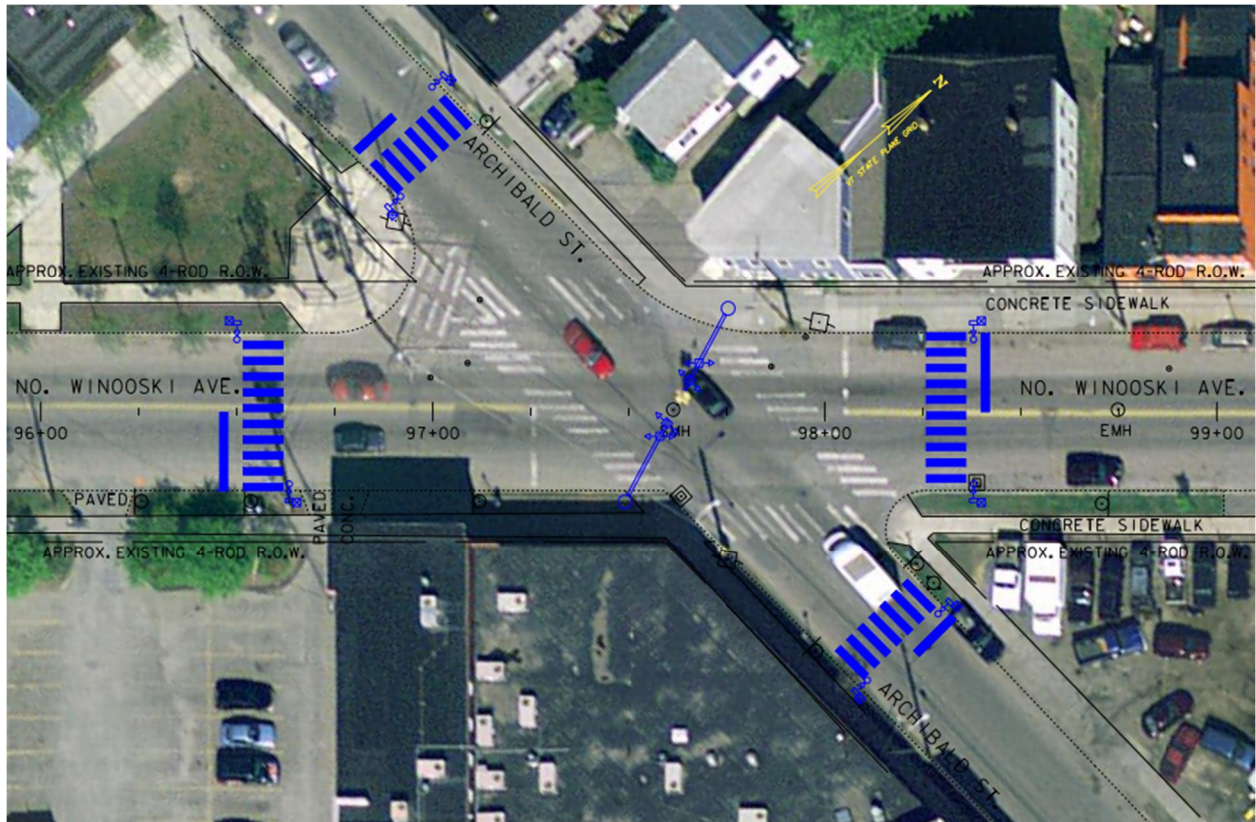


Figure 2: Alternative B - Perpendicular Crosswalks

C. Diagonal Crosswalks

A diagonal or “Barnes Dance” crosswalk could be installed between the northwest to southeast corner. The installation of this crosswalk in combination with the existing crosswalks or any of the other crosswalk alternatives would allow for additional street crossing options. For pedestrians looking to traverse from the northwest corner to the southeast corner, this diagonal crossing would allow this movement to be done directly instead of by making a North Winooski Avenue crossing and an Archibald Street crossing. This type of crosswalk has its best benefit for intersections with high pedestrian volumes since it allows for crossing in all directions at one time.

The implementation of this alternative would need to be performed with an All-Stop pedestrian signal phase which would be activated for any pedestrian crossing. This type of crossing movement and signal phase would have the greatest impact on vehicular delay.

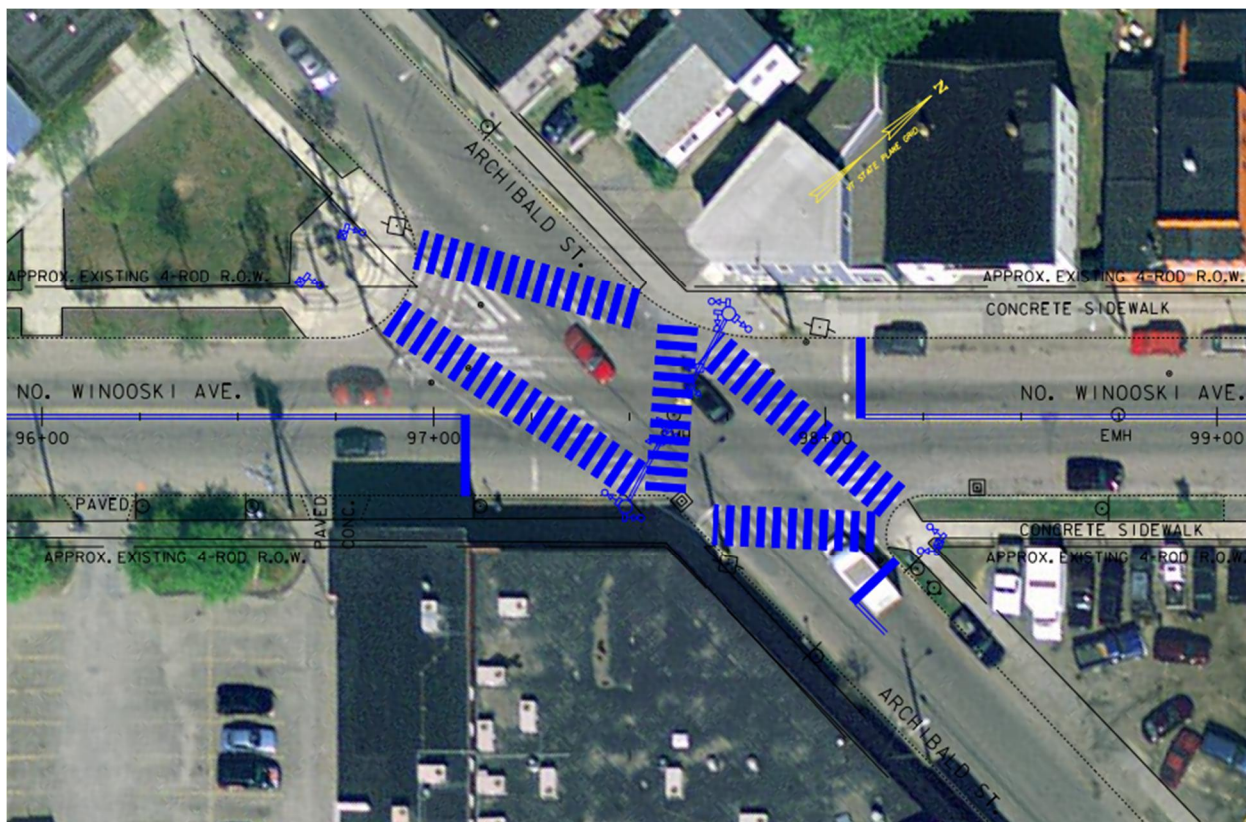


Figure 3: Alternative D - Perpendicular Crosswalks

D. Intersection Approach Bulb Outs

With the existing parking on each approach, curbing bulb outs can be incorporated without reducing the travel lane widths. The bulb outs would provide a dual role of reducing crossing distances and providing a traffic calming effect. These could be incorporated on both sides of the roadway along North Winooski. For the west leg of Archibald these could be incorporated on the south side and for the east leg on the north side. The implementation of bulb-outs similar to the pork chop islands presents additional snow removal difficulties. These bulb outs could be incorporated on their own or as part of the other alternatives to further reduce crossing distances. These distances are indicated as part of the Evaluation Matrix in Section V.



With the exception of the northeast side of North Winooski, these bulb outs would remove at minimum one parking space since all other locations allow parking up to the intersection. For the

southeast side of North Winooski, at least one of these parking spots would be in the Vermont Workers Center drop off zone.

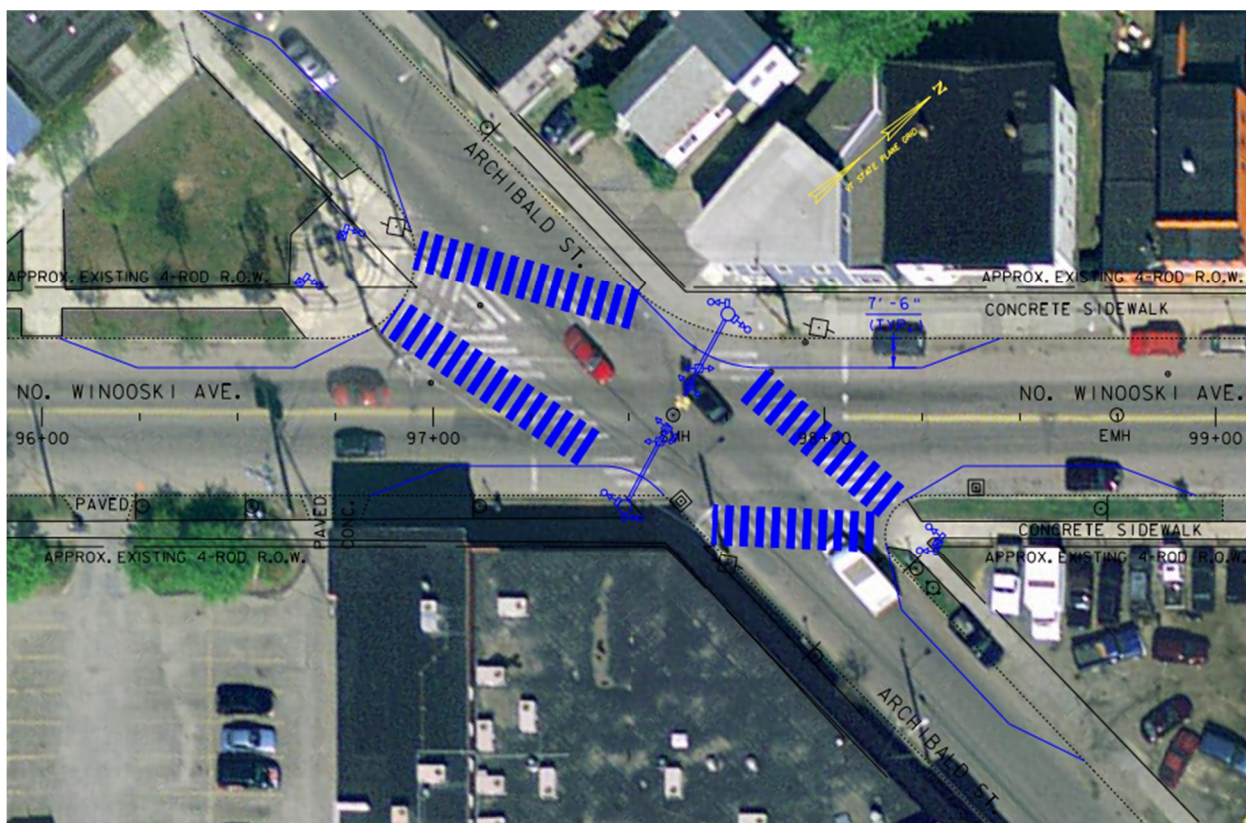


Figure 4: Alternative D - Intersection Approach Bulb Outs

E. Southwest Corner Radius Adjustment

Currently the southwest and northeast corners of the intersection have difficult turning radii due to the skewed intersection. For each of these approaches right turning vehicles need to turn approximately 135 degrees from Archibald onto North Winooski. Even at the southwest corner which has a larger corner radius of 21 ft, Single Unit, Bus, and Truck traffic turning paths currently impact opposing traffic lanes on both Archibald and North Winooski. The northeast corner has a shorter corner radius and thus these turning paths impact farther into these lanes.

The adjustment of the southwest corner to a lower curb radius would reduce the pedestrian crossing distances at this location. Currently, the pedestrian crossings to this corner are the longest and second longest. The adjustment of the curb line to a radius similar to that currently at the northeast corner would reduce the crossing distances by approximately 18 ft from the northwest corner and by 14 ft from the southeast corner. These distance reductions would be even greater if combined with a bulb-out (See Section V. Evaluation Matrix). This curb realignment would not have a significant vehicular impact due to the low right turning volumes at this location. Truck, bus, and emergency vehicles

would be able to negotiate this turn with only slightly more turning path impacts. This alternative may be combined with bulb outs for both the southwest and northeast corners (shown as dashed in Fig. 5). However, the radii and lane widths would need to be designed to ensure that passenger vehicle turning paths do not impact adjacent lanes.

No evaluation has been made to determine if any vehicular accidents has occurred at this location due to these turning paths, but given the lower volume and speeds of this urban street, the most likely impact is to capacity while turning vehicles are blocking these lanes. To provide a preliminary idea of the potential capacity impacts, we did review the traffic count to determine how many truck and bus right turn movements were occurring from Archibald Street. For the 4 hour morning and afternoon counts, the west and east approaches had zero truck turns and only one bus turn from the west. We cannot identify what this bus movement was from, but it is not part of the CCTA's regular routes. The CCTA City Loop route does go through this intersection. However, it travels northbound on North Winooski and turns right onto Archibald Street (See Appendix). This route is not affected by adjustments to the northeast or southwest corner radii.

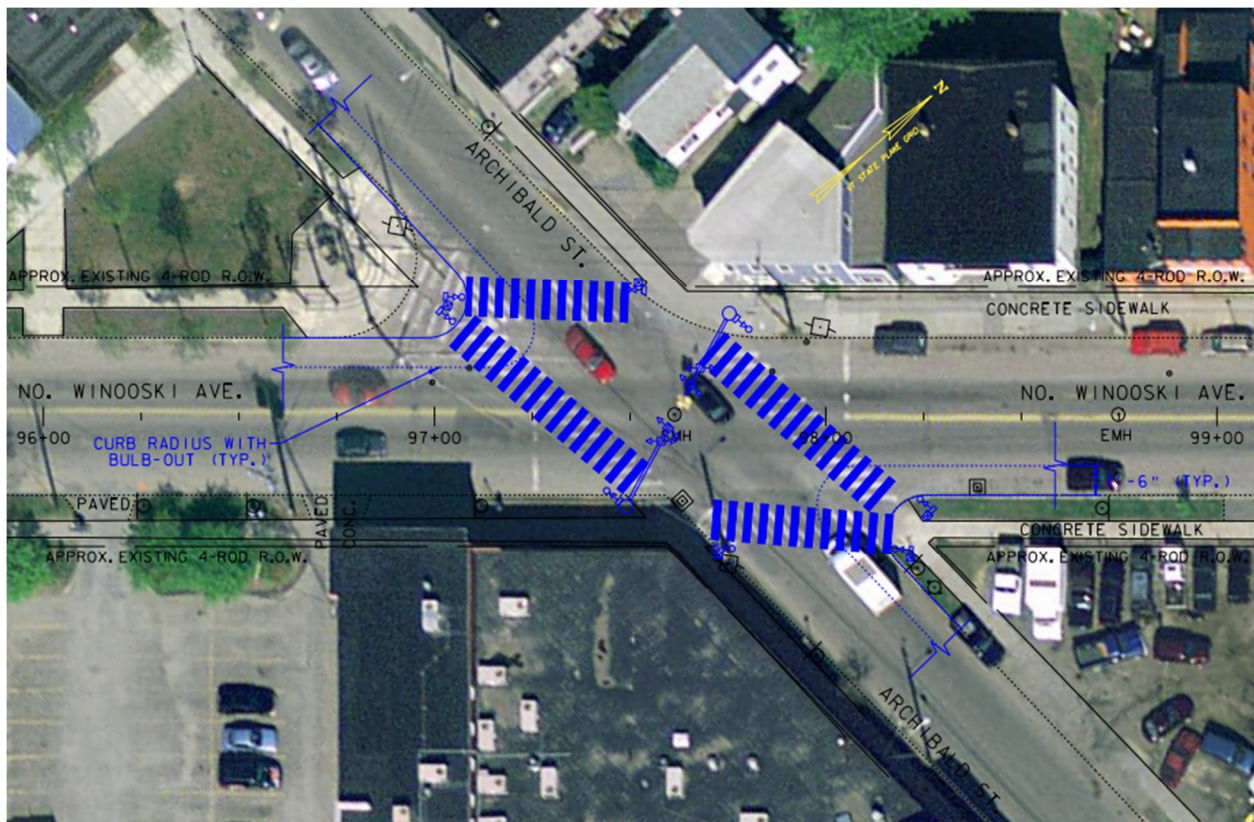


Figure 5: Alternative E - Southwest Corner Radius Adjustment

V. EVALUATION MATRIX AND CONSTRUCTION ESTIMATE

The below evaluation matrix provides a summary of benefits, impacts, and construction cost estimates for the no-build and considered pedestrian mobility and safety improvements.

Evaluation Item	No-Build Alternative	Alternative A Pork Chop Islands	Alternative B Perpendicular Crosswalk	Alternative C Diagonal Crosswalk	Alternative D Approach Bulb-Outs	Alternative E Corner Radii
Pedestrian Safety	No Change	Installation of pedestrian signals and actuated phasing Two stage crossing with reduced distances Pedestrian refuge islands with increased visibility	Installation of pedestrian signals and actuated phasing Reduced crossing distances Reduced pedestrian and vehicle visibility with increased crossing setback	Installation of pedestrian signals and actuated phasing Pedestrian crossing under all stop traffic phasing Reduced route and crossing distance for NW-SE crossing pedestrians	Installation of pedestrian signals and actuated phasing Reduced crossing distances	Installation of pedestrian signals and actuated phasing Reduced crossing distances
Pedestrian Crossing Distance						
NE – SE Crossing	49'	23' & 14'	30' 22' w/ bulb-out	No Change	No Change	No Change 26' w/ bulb-out
NE-NW Crossing	67'	33' & 14'	40' 32' w/ bulb-out	No Change	60'	No Change 44' w/ bulb-out
NW-SW Crossing	67'	23' & 14'	30' 22' w/ bulb-out	No Change	No Change	49' 31' w/ bulb-out
SE-SW Crossing	80'	33' & 14'	40' 32' w/ bulb-out	No Change	73'	66' 49' w/ bulb-out
NW-SE Crossing	n/a	n/a	n/a	44'	n/a	n/a
Vehicle Travel Pattern	No Change	Refugee islands create obstacle for snow removal Traffic calming with island offset and thru lanes width reduction	Reduced visibility of adjacent approaches with increased stop bar setbacks	No Change	Traffic calming with reduced width approaches	Increased right turning impact into adjacent travel lanes from trucks and buses on the Archibald East approach Passenger vehicle turning paths should be reviewed during design if combined with bulb-outs

Evaluation Item	No-Build Alternative	Alternative A Pork Chop Islands	Alternative B Perpendicular Crosswalk	Alternative C Diagonal Crosswalk	Alternative D Approach Bulb-Outs	Alternative E Corner Radii
Level of Service	No Change	Pedestrian actuated signal phase increase vehicular delay Improved right turn flow with slip lane. However, this would not be significant with the low overall and right turn volumes	Pedestrian actuated signal phase increase vehicular delay	Pedestrian actuated signal phase increase vehicular delay Implementation of all stop pedestrian phasing would further reduce traffic LOS	Pedestrian actuated signal phase increase vehicular delay	Pedestrian actuated signal phase increase vehicular delay
Bicycle/Pedestrian Access	No Change	Right turn slip lane would create an additional bicycle/vehicle conflict point	With the crossing setback increased, pedestrian travel distances are increased	The direct diagonal crossing removes two approach crossings	Reduced crossing distances which could be also be combined with one of the other alternatives	Reduced crossing distances
Parking	No Change	Approach parking lanes would require delineation to compliment island offset	May lose parking spaces at the relocated crossing points	No Change	Loss of at least one parking space at each approach bulb-out	No Change
Signal Equipment	Existing non-compliant signal without signal head redundancy	Fully compliant signal system	Fully compliant signal system	Fully compliant signal system	Fully compliant signal system	Fully compliant signal system
ROW Impacts	n/a	Northeast corner right turn slip lane may require additional ROW	n/a	n/a	n/a	n/a
CCTA Routes	No Change	No Change	No Change	No Change	No Change	No Change
Construction Estimate	n/a	\$184,661	\$170,440	\$147,302	\$164,175	\$156,767
Without Signal*	n/a	\$29,561	\$22,600	\$8,042	\$26,235	\$16,847

* Detailed construction estimate without signal has not been included in appendices

VI. SUMMARY & RECOMMENDATION

Although the intersection of North Winooski Avenue and Archibald Street is not a high volume signalized intersection, it is an important intersection for vehicular access to/from Winooski via Riverside Avenue and also for through traffic in the Old North End. It also provides for significant pedestrian and bicycle connections in and through the Old North End with its mix of residential, business, and community uses in the vicinity.

To that end, the City's desire to improve pedestrian safety & mobility at this intersection could be served by any of the reviewed options. However, based on this review and discussions with the City, Alternative E- Corner Radii option is recommended to be explored in greater detail since it provides a cost effective solution without creating significant vehicular or maintenance restrictions. This alternative may also be phased to incorporate approach bulb-outs at a later time.



APPENDIX A

TRAFFIC TURNING MOVEMENT COUNTS

Start Date: 7/20/2010
Start Time: 7:00:00 AM
Site Code: BURL-01
Comment 1: ID :BURL-01
Comment 2: LOC :NORTH WINOOSKI & ARCHIBALD
Comment 3: TOWN :BURLINGTON
Comment 4: COUNTERS :MB, TS

[illegible]

Comment 4: COUNTERS :MB, TS

[illegible]

Comment 4: COUNTERS :MB, TS

[illegible]

Start Date: 7/20/2010

Start Time: 7:00:00 AM

Site Code: BURL-01

Comment 1: ID :BURL-01

Comment 2: LOC :NORTH WINOOSKI & ARCHIBALD

Comment 3: TOWN :BURLINGTON

Comment 4: COUNTERS :MB, TS

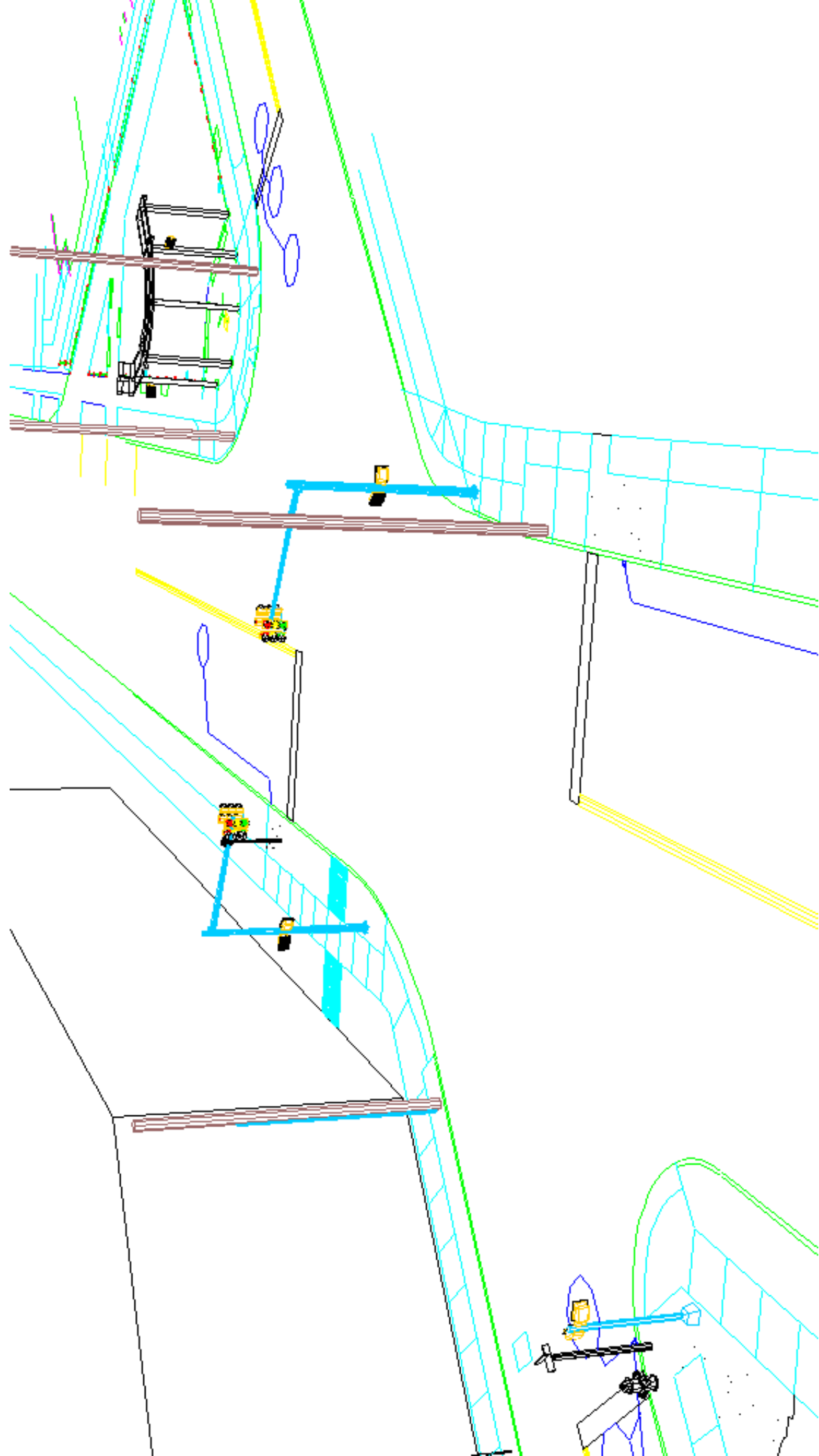
Start Time	N WINOOSKI From North				ARCHIBALD From East				N WINOOSKI From South				ARCHIBALD From West			
	Right	Thru	Left	N/A	Right	Thru	Left	N/A	Right	Thru	Left	N/A	Right	Thru	Left	N/A
07:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 AM	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:30 AM	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0
07:45 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
08:15 AM	0	0	0	0	0	0	0	0	2	1	0	0	0	0	0	0
08:30 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45 AM	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	0
04:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
04:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
04:30 PM	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0
04:45 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
05:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:15 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
05:30 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
05:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4 Hour Totals	0	1	0	0	1	0	0	0	10	2	0	0	0	1	0	0

Total Bus

15

APPENDIX B

CITY OF BURLINGTON, SIGNAL ISOMETRIC SKETCH



APPENDIX C

CITY OF BURLINGTON, PROPERTY LINE SKETCH



APPENDIX D

CCTA CITY LOOP BUS ROUTE

City Loop

MONDAY–FRIDAY

	Cherry Street	Burlington Police Dept.	North St. North Union	Fern Hill	McAuley Square	UHC / Waterman	Champlain College	Waterfront	Cherry Street
	1	2	3	4	5	6	7	8	1
	6:45	6:48	6:52	6:55	—	6:58	7:03	7:06	7:10
	7:15	7:18	7:22	—	7:26	7:28	7:33	7:36	7:40
	7:30	7:33	7:37	7:40	—	7:43	7:48	7:51	7:55
	7:45	7:48	7:52	—	7:56	7:58	8:03	8:06	8:10
	8:00	8:03	8:07	8:10	—	8:13	8:18	8:21	8:25
	8:15	8:18	8:22	—	8:26	8:28	8:33	8:36	8:40
	8:30	8:33	8:37	8:40	—	8:43	8:48	8:51	8:55
	8:45	8:48	8:52	—	8:56	8:58	9:03	9:06	9:10
	9:00	9:03	9:07	9:10	—	9:13	9:18	9:21	9:25
	9:15	9:18	9:22	—	9:26	9:28	9:33	9:36	9:40
	9:45	9:48	9:52	9:55	—	9:58	10:03	10:06	10:10
	10:15	10:18	10:22	—	10:26	10:28	10:33	10:36	10:40
	10:45	10:48	10:52	10:55	—	10:58	11:03	11:06	11:10
	11:15	11:18	11:22	—	11:26	11:28	11:33	11:36	11:40
AM	11:45	11:48	11:52	11:55	—	11:58	12:03	12:06	12:10
PM	12:15	12:18	12:22	—	12:26	12:28	12:33	12:36	12:40
	12:45	12:48	12:52	12:55	—	12:58	1:03	1:06	1:10
	1:15	1:18	1:22	—	1:26	1:28	1:33	1:36	1:40
	1:45	1:48	1:52	1:55	—	1:58	2:03	2:06	2:10
	2:15	2:18	2:22	—	2:26	2:28	2:33	2:36	2:40
	2:45	2:48	2:52	2:55	—	2:58	3:03	3:06	3:10
	3:15	3:18	3:22	—	3:26	3:28	3:33	3:36	3:40
	3:45	3:48	3:52	3:55	—	3:58	4:03	4:06	4:10
	4:15	4:18	4:22	—	4:26	4:28	4:33	4:36	4:40
	4:45	4:48	4:52	4:55	—	4:58	5:03	5:06	5:10
	5:15	5:18	5:22	—	5:26	5:28	5:33	5:36	5:40
	5:45	5:48	5:52	5:55	—	5:58	6:03	6:06	6:10
	6:15	6:18	6:22	—	6:26	6:28	6:33	6:36	6:40
	6:45	6:48	6:52	6:55	—	6:58	7:03	7:06	7:10
	7:15	7:18	7:22	—	7:26	7:28	7:33	7:36	7:40
	7:45	7:48	7:52	7:55	—	7:58	8:03	8:06	8:10
	8:15	8:18	8:22	—	8:26	8:28	8:33	8:36	8:40
	8:45	8:48	8:52	R	—	8:58	9:03	9:06	9:10
	9:40	9:43	9:45	—	R	9:53	9:58	10:00	10:05

R On-board request only.

Bus waits at and departs from the intersection of Cherry St. and St. Paul St., spot 6, and turns left onto St. Paul from Cherry St.



SATURDAY

	Cherry Street	Burlington Police Dept.	North St. North Union	Fern Hill	McAuley Square	UHC / Waterman	Champlain College	Waterfront	Cherry Street
	1	2	3	4	5	6	7	8	1
	6:25	6:28	6:32	6:35	—	6:38	6:43	6:46	6:50
	7:00	7:03	7:07	—	7:11	7:13	7:18	7:21	7:25
	7:30	7:33	7:37	7:40	—	7:43	7:48	7:51	7:55
	8:05	8:08	8:12	—	8:16	8:18	8:23	8:26	8:30
	8:35	8:38	8:42	8:45	—	8:48	8:53	8:56	9:00
	9:10	9:13	9:17	—	9:21	9:23	9:28	9:31	9:35
	9:45	9:48	9:52	9:55	—	9:58	10:03	10:06	10:10
	10:15	10:18	10:22	—	10:26	10:28	10:33	10:36	10:40
	10:45	10:48	10:52	10:55	—	10:58	11:03	11:06	11:10
	11:15	11:18	11:22	—	11:26	11:28	11:33	11:36	11:40
AM	11:45	11:48	11:52	11:55	—	11:58	12:03	12:06	12:10
PM	12:15	12:18	12:22	—	12:26	12:28	12:33	12:36	12:40
	12:45	12:48	12:52	12:55	—	12:58	1:03	1:06	1:10
	1:15	1:18	1:22	—	1:26	1:28	1:33	1:36	1:40
	1:45	1:48	1:52	1:55	—	1:58	2:03	2:06	2:10
	2:15	2:18	2:22	—	2:26	2:28	2:33	2:36	2:40
	2:45	2:48	2:52	2:55	—	2:58	3:03	3:06	3:10
	3:15	3:18	3:22	—	3:26	3:28	3:33	3:36	3:40
	3:45	3:48	3:52	3:55	—	3:58	4:03	4:06	4:10
	4:15	4:18	4:22	—	4:26	4:28	4:33	4:36	4:40
	4:45	4:48	4:52	4:55	—	4:58	5:03	5:06	5:10
	5:15	5:18	5:22	—	5:26	5:28	5:33	5:36	5:40
	5:45	5:48	5:52	5:55	—	5:58	6:03	6:06	6:10
	6:15	6:18	6:22	—	6:26	6:28	6:33	6:36	6:40

APPENDIX E

CONSTRUCTION COST ESTIMATES

- ☐ Randolph, VT 05060 (802) 728-3376
- ☐ Nashua, NH 03063 (603) 883-0463
- ☐ Rutland, VT 05495 (802) 773-7016
- ☐ Williston, VT 05495 (802) 878-7661

Engineering • Planning • Development • Management

JOB CCMPO- N. Winooski / Archibald

SHEET NO. 1 OF 1

CALCULATED BY: LDC DATE: 26-May-11

CHECKED BY: EPD DATE: _____

SCALE:

CONSTRUCTION COST ESTIMATE - ALTERNATIVE A: Pork Chop Islands

[illegible]

- ☐ Randolph, VT 05060 (802) 728-3376
- ☐ Nashua, NH 03063 (603) 883-0463
- ☐ Rutland, VT 05495 (802) 773-7016
- ☐ Williston, VT 05495 (802) 878-7661

Engineering • Planning • Development • Management

JOB CCMPO- N. Winooski / Archibald

SHEET NO. 1 OF 1

CALCULATED BY: LDC DATE: 26-May-11

CHECKED BY: EPD DATE: _____

SCALE:

CONSTRUCTION COST ESTIMATE - ALTERNATIVE B: Perpendicular Crosswalks

[illegible]

- ☐ Randolph, VT 05060 (802) 728-3376
- ☐ Nashua, NH 03063 (603) 883-0463
- ☐ Rutland, VT 05495 (802) 773-7016
- ☐ Williston, VT 05495 (802) 878-7661

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SHEET NO. 1 OF 1

CALCULATED BY: LDC DATE: 26-May-11

CHECKED BY: EPD DATE: _____

SCALE:

CONSTRUCTION COST ESTIMATE - ALTERNATIVE C: Diagonal Crosswalks

[illegible]

- ☐ Randolph, VT 05060 (802) 728-3376
- ☐ Nashua, NH 03063 (603) 883-0463
- ☐ Rutland, VT 05495 (802) 773-7016
- ☐ Williston, VT 05495 (802) 878-7661

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SHEET NO. 1 OF 1

CALCULATED BY: LDC DATE: 26-May-11

CHECKED BY: EPD DATE:

SCALE:

CONSTRUCTION COST ESTIMATE - ALTERNATIVE D: Approach Bulb Outs

[illegible]

- ☐ Randolph, VT 05060 (802) 728-3376
- ☐ Nashua, NH 03063 (603) 883-0463
- ☐ Rutland, VT 05495 (802) 773-7016
- ☐ Williston, VT 05495 (802) 878-7661

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SHEET NO. 1 OF 1

CALCULATED BY: LDC DATE: 26-May-11

CHECKED BY: EPD DATE: _____

SCALE:

CONSTRUCTION COST ESTIMATE - ALTERNATIVE E: Southwest Corner Radii

[illegible]