

November 30, 2005

Zoning Board of Appeals Town of Holliston 703 Washington Street Holliston, MA 01746

RE:

Responses to Traffic Peer Review Cedar Ridge Estates Holliston, MA

Dear Board Members:

The following are our responses to the comments received in a Technical Memorandum, Dated November 7, 2005, prepared by Professional Services Corporation, PC for the Holliston Zoning Board of Appeals. Specific comments from the Technical Memorandum are listed below in normal font with our responses included in italics font.

1. The proposed project is forecast to generate over 1100 vehicle trips per day on both weekday and Saturday. Accordingly, we have a concern that the Traffic Study Area should be expanded to include additional intersection locations to more fully evaluate project impacts.

We believe the study area chosen for the project is appropriate for the size and type of development proposed. A typical threshold used for determining if an intersection will be impacted is the addition of 50 or more new vehicle trips in a peak hour period. Once project related traffic is distributed on Marshall Street and on Prentice Street the only intersections receiving 50 or more trips are the site driveways and the Marshall Street at Prentice Street intersection.

It is our understanding that the Town's peer review engineer, Professional Services Corporation, PC, utilizes a 10% threshold for determining if an intersection will be impacted due to the projected site traffic. To this end, Coler & Colantonio, Inc. has reviewed the Abend Associates Technical Memo, dated January 16, 2004, and titled: Traffic Impact Assessment for Highland Meadows on Highland Street.

The intersection of Prentice Street at Highland Street is a three-way stop controlled intersection with Prentice Street under stop sign control. Prentice Street is a single lane approach that flares out at the intersection to allow for two lanes of traffic to stack for two car lengths.

Based on the trip distribution documented in the Coler & Colantonio, Inc. Traffic Impact Report, 40% of Cedar Ridge Estates related traffic is expected to head to or come from the west on Prentice Street. Although some of the 40% may actually turn off of Prentice Street before reaching Highland Street it was assumed for this analysis that all 40% of the traffic passed through the Prentice Street at Highland Street intersection.



The Abend Associates Highland Meadows report included a weekday AM and weekday PM peak hour analysis. Cedar Ridge Estates is projected to add 38 vehicles to the intersection in the AM peak hour for an increase of 2.7%. A total of 44 vehicles would be added in the PM peak hour representing an increase of 2.8% at the intersection.

As documented in the Highland Meadows report the level of service for the stop controlled Prentice Street approach at the intersection of Prentice Street at Highland Avenue is expected to be LOS "F" during both the weekday AM and weekday PM peak hour period in 2008 with the traffic from the Highland Meadows project. The level of service on the Highland Avenue approaches will be LOS "A". With the addition of the Cedar Ridge Estates project traffic the level of service for the Prentice Street approach as well as the Highland Avenue approaches would remain the same. Copies of the level of service analyses are attached with this letter.

Based on the fact that traffic volume at the intersection of Prentice Street at Highland Avenue will increase by less than 3% and no change in level of service is expected from the development of Cedar Ridge Estates, we believe that there is limited impact at this location due to this project.

2. Given the anticipated distribution of traffic to/from the east on Prentice Street, it is recommended that the Prentice Street intersections with Mill Street and the Pine Crest Golf Club driveway intersection be included in the Traffic Study Area. Safety and capacity issues at these locations should be evaluated and addressed at these additional locations.

Based on the analysis described in Response #1, it is our opinion that the fewer than 3% increase in the volume would result in limited impacts at this location due to this project. Please refer to Response #1 above.

3. Given the anticipated distribution of traffic to/from the west on Prentice Street, the Prentice Street and Route 85 (Hayden Rowe) intersection in Hopkinton should also be included in the Traffic Study Area.

Based on the analysis described in Response #1, it is our opinion that the fewer than 3% increase in the volume would result in limited impacts at this location due to this project. Please refer to Response #1 above.

4. Manual turning movement counts (TMCs) were conducted at the study area intersection of Prentice Street and Marshall Street and automatic traffic recorder (ATR) counts were conducted along Prentice Street and Marshall Street in the vicinity of the proposed site in October 2003. Supplemental ATRs were conducted along Prentice Street and Marshall Street in September and October 2005 to determine if any adjustment was needed to represent a current 2005 existing addition. Accordingly, the 2003 base traffic volumes were adjusted with an annual growth rate based on the average rate of increase from the ATR counts, on average 8.5%. Although the TMCs exceed the general state guidelines of a 2-year threshold, the Board could allow use of this data.

No response required.

5. A summary of the MassHighway crash data for the study area intersection, including intersection crash rates, for the most recent three-year period available (2001-2003) is

provided in the Traffic Study. The MassHighway data was supplemented with accident data from the Holliston Police Department. Based on a review of crash data presented in the Traffic Study, it does not appear that significant safety problems exist at this location.

No response required.

6. As stated in Section III Future Traffic Growth, the Town of Holliston was contacted to determine if any planned or approved specific developments that would generate a significant volume of traffic on the study area roadways within the project's design horizon should be considered in the Traffic Study. One development was identified, which consists of the construction of two full-size soccer fields and four practice fields to be located on the east side of Marshall Street, south of the proposed development. As the use of the proposed development is a seasonal use, a separate peak soccer condition analysis was included as part of the traffic study. We concur with this methodology; however, given the projects proximity on Prentice Street to Hopkinton, MA, officials from the Town of Hopkinton should have also been contacted regarding potential background developments. Should significant pipeline projects be identified in Hopkinton, the traffic volumes should be revised and operations reevaluated.

The Town of Hopkinton Planning Department was contacted on November 8, 2005 in order to determine if there were any known development projects planned in the Town of Hopkinton that would add traffic to the Prentice Street area. The Town indicated that there were no definitive plans for development in the area. They indicated that there were two residential developments in the preliminary stages that they were aware of (one on Chestnut Street and one on Hayden Rowe) but neither had filed any information on projected traffic.

- 7. Also stated in Section III of the Traffic Study, the Town of Holliston US Census data and the 2003 and 2005 ATR data was used to determine an annual traffic growth rate. This information revealed a 0.7% annual increase in population occurred between 1990 to 2000 and a 0.7% and 8.8% annual growth rate occurred between 2003 and 2005 on Prentice Street and Marshall Street, respectively. Therefore, the Traffic Study used a 3.5% annual growth rate, which appears to be an average of the aforementioned three values. Historical traffic volume data from automatic traffic recorders conducted by MassHighway should also have been reviewed, given that data is available on Prentice Street at the Hopkinton Town Line. In addition, this data conflicts with earlier annual adjustments of approximately 8.5% per year from 2003 to 2005. While a 3.5% annual growth rate could be reasonable, justification for the aforementioned inconsistency should be provided.
 - The 3.5% annual growth rate was calculated as an average of the growth rates available from population statistics as well as the historic traffic count data. This differs from the 8.5% rate used to adjust the 2003 turning movement counts on Marshall Street because the 8.5% is an uncharacteristically high growth rate most likely associated with added traffic from the newly constructed soccer fields. The traffic on Marshall Street is not expected to continue to grow at such a high rate. A typical growth rate for roadways in residential areas is 1% to 2% per year and therefore we believe the 3.5% per year growth rate used to project future conditions represents a conservative analysis.
- 8. As stated in Section IV Future Build Conditions: Trip Distribution and Assignment, "the assignment of resulting percentages to/from local communities was based on existing

travel patterns and logical travel routes and the assumption that the majority of drivers will seek the most efficient travel route to and from the site." These assignments are presented on Figure 4 and indicate that 40 percent of the site traffic is expected to and from the east on Prentice Street, 30 percent to and from the west on Prentice Street and 30 percent to and from the south on Marshall Street. Based on the existing roadway network, this distribution does not appear reasonable; specifically the large volume assigned to Marshall Street. Justification for this trip distribution should be provided, which includes the review of available 2000 US Census Journey to Work information for the Town of Holliston.

The trip distribution percentages used in the traffic analyses were based on the existing travel patterns on Marshall Street. Automatic traffic recorder counts on Marshall Street from both 2003 and 2005 indicate that approximately 30% of the traffic is headed south on Marshall Street in the weekday AM peak period. Based on the data available, we believe the 70% northbound and 30% southbound predicted split in site traffic is reasonable for Marshall Street. Potential destinations for residents southbound on Marshall Street include points on Route 16 in Holliston as well as a travel route of Marshall Street, to Adams Street, to Route 16, to Milford to access Route 495.

9. As stated in the Sight Distance section of the Traffic Study, at the intersection of Marshall Street and Prentice Street, intersection sight distance looking to the west is hindered by both vegetation on Prentice Street and the vertical alignment of Prentice Street. The study further states, "it is our observation that the sight distance at the intersection is an existing problem, and the proposed development will not worsen the sight distance condition." While we do concur that it is an existing site distance issue at this location, the development will add a substantial amount of its traffic (70% per the study) through this intersection, which could create a safety issue. However, the study indicates that the applicant is willing to perform clearing and grading in order to improve the existing sight distance deficiency at the intersection. A permanent sight-line easement should be granted to the Town to allow for perpetually maintenance of available sight lines.

Our recommendation is to keep sight lines at the intersection of Marshall Street at Prentice Street free of obstructions. The applicant will consider if a permanent sight line easement at the intersection of Marshall Street at Prentice Street is feasible as part of the project.

10. Also stated in the Sight Distance section of the Traffic Study, the recommended Intersection Sight Distance (ISD) is not meet looking to the north at the proposed site driveway #1 and looking to the south at the proposed site driveway #2 due to the vertical alignment of Marshall Street. The study states, "although these directions do not meet the recommended intersection distances they do meet the minimum distances for vehicles to stop and do not represent a safety concern." We do not concur with creating major new intersections in location where intersection sight distance is not provided. The Traffic Study should explore options for upgrading the vertical geometry of Marshall Street in order to improve available intersection sight distance.

As stated in the report, the sight distance available at the site driveways exceeds AASHTO minimums. The proposed site driveways do not represent "major intersections" as they are driveways located on a relatively low volume road. The AASHTO recommended sight distances are based on not inconveniencing the traffic on the through

roadway. The AASHTO minimum distances, which are met, are based on providing enough sight distance to safely stop if necessary. Alterations to the vertical geometry on Marshall Street are not necessary to provide safe access and egress at the proposed site driveways.

Options for upgrading the vertical geometry of Marshall Street have been analyzed in order to improve the intersection sight distance at the site driveway. A conceptual level opinion of probable construction cost has been prepared, see attached, that includes lowering the Marshall Street profile by +/- 1.5 feet from Sta. 18+50 to Sta. 21+00, the location of the vertical curve deficiency. The order of magnitude costs for this type of improvement is approximately \$55,000.00.

11. The proposed Cedar Ridge Estates development consists of the construction of 200 residential townhouse style condominiums on the existing parcel located at the southwest corner of Prentice Street and Marshall Street, which is currently vacant. As stated in Section IV Future Build Conditions: Project Trip Generation, and presented in Table 8 (Trip Generation Summary), the proposed trips were generated using trip rates published in the Institute of Transportation Engineers (ITE) Trip Generation manual, Land Use Code (LUC) 230 – Residential Condominium/Townhouse, and the regression equations were utilized to provide a conservative analysis condition. Trip generation estimates used in the Traffic Study are in accord with standard engineering practice.

No response required.

12. Based on a review of the capacity analysis worksheets provided in the Traffic Study Appendix, default peak hour factors (PHFs) of 0.85 were used on all intersection approaches, while the calculated values ranged from 0.813 to 1.0 and default heavy truck percentages (%HV) of 2 percent were used on all critical movements, while the calculated values ranged from 0 to 8 percent. Actual PHFs and %HVs from the Turning Movement Counts (TMCs) should be utilized to provide a realistic analysis including new locations to be included in an expanded Traffic Study Area.

The peak hour capacity analyses at the study area intersections have been revised to reflect the actual peak hour factor and truck percentages in place of default values. The revised analyses are attached with this letter. No significant changes in results were noticed in the revised capacity analyses.

13. Based on the analysis provided, all study area intersections operate at acceptable levels of service (LOS) C or better and there are no significant changes in LOS as a result of the proposed development without the background soccer field development. However, it is recommended that additional safety analysis such as left-turn warrants should be conducted, specifically at the intersection of Prentice Street and Marshall Street, given the projected site left-turn volume at this intersection, as well as the operation with the use of the proposed soccer fields.

The levels of service and queues realized on Marshall Street at the intersection with Prentice Street under average season traffic conditions do not warrant the addition of a left turn lane. Addition of a left turn lane would result in minimal improvements to delay.

Under peak soccer conditions an improvement in level of service on the northbound approach would be realized with the addition of a left turn lane on Marshall Street.

Options for geometric upgrades to the Prentice Street and Marshall Street intersection with a left-turn lane have been analyzed. Additionally, a geometric analysis of adding a right-turn lane on Prentice Street has been analyzed. A conceptual level opinion of probable construction cost has been prepared, see attached, that includes these improvements. The order of magnitude costs for this type of improvement is approximately \$67,000.00.

14. Based on the analysis provided the Marshall Street approach operates at a LOS F during the weekday evening and Saturday midday peak hours under peak soccer field use. An analysis of 2010 Build with peak soccer conditions was not provided for the site driveway intersections. These analyses should be provided to ensure acceptable operation at the site driveway locations with the development in place. This further necessitates the need for additional safety analysis (i.e., turn lane warrant analysis and lane separation) at the study intersections.

Peak hour capacity analyses have been performed for the site driveway intersections with Marshall Street under peak soccer conditions. The results are included in the attached Level of Service Summary Table. The results of the analyses indicate that the site driveways operate at LOS "C" or better and do not warrant left turn lanes.

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Concerns were expressed at the public hearings that Saturday counts had not been performed during a period when the new soccer fields on Marshall Street were in use. The original traffic counts performed in 2003 were done before the fields were constructed and the October 2005 counts were performed in poor weather conditions. Although the Traffic Impact Report included an analysis for an average Saturday without soccer field use as well as a worst case Peak Soccer Field use conditions, based on all available parking spaces at the field being utilized by successive soccer games, the question of actual Saturday traffic with the soccer fields was asked.

Traffic counts were performed on Marshall Street at the location of the site on Saturday November 12 and Sunday November 13, 2005. Counts were performed while the soccer fields on Marshall Street were still in use. A copy of the daily traffic count data is attached with this report. The results of the counts indicate that the peak hour traffic volume on Saturday with the soccer fields in use is approximately 50% higher than the original Saturday traffic counts performed in 2003. However, the traffic volumes on Marshall Street were found to be approximately half of what was assumed in the Peak Soccer Season analyses included in the Traffic Impact Report.

A traffic capacity analysis for the weekend peak hour was performed for the intersection of Prentice Street at Marshall Street based on the traffic volumes with the soccer field in use. A copy of the level of service analysis worksheets is attached with this letter. The peak hour during the weekend was determined to be from 2:00pm to 3:00 pm on Saturday November 12, 2005. Traffic volumes at the intersection were projected to 2010 Build conditions based on the new Saturday counts, the growth rate of 3.5% per year and the added traffic from the proposed development.

The results of the analysis indicate that the stop controlled Marshall Street approach to the intersection will operate at LOS "C" in the Saturday peak hour under future 2010 Build conditions with the soccer fields in use. This indicates that the intersection is expected to operate at an acceptable level of service in the peak weekend condition and

better than the worst-case peak soccer field use condition presented in the Traffic Impact Report.

- 15. As a mitigating measure, we recommend that the substandard geometric characteristics of Marshall Street be addressed. The roadway width on Marshall Street is only 18 to 22 feet wide and intersection sight distance is not provided for either project driveway. The one lane north bound approach and the one lane westbound approach to the Marshall and Prentice Streets intersections are insufficient given future build traffic volumes.
 - a. The applicant may wish to submit information concerning the feasibility and cost of upgrading Marshall Street and the Marshal and Prentice Streets intersection during the application process.
 - b. As a Condition of Approval of any Comprehensive Permit, the proponent should be required to prepare final Roadway Improvement Plans for the reconstruction of Marshall Street including the Marshall Street and Prentice Street intersection. The applicant should submit both "25% plans" and final plans to the Town for approval.
 - c. The Roadway Improvement Plans should provide for a widened pavement of 24 feet or such width as may be recommended by Coler & Colantonio.
 - d. The Roadway Improvement Plans should provide for reconstruction of segments of the street as required to provide intersection sight distance adequate to accommodate the 85th percentile speed.
 - e. The plans should provide for two approach lanes on Marshall Street accommodating the 95th percentile queue.
 - f. If practicable pavement widening on Prentice accommodating a designated or defacto left turn lane should be provided.
 - g. As a Condition of Approval, the applicant should construct the proposed roadway and intersection improvements.

The majority of the comments outlined in item 15 have been addressed in the previous comments and responses with the traffic related impacts clarified. The engineering of 25% plans should not be considered part of the traffic subject matter and should be taken up under other headings.

If you have any questions regarding our responses to the peer review comments please do not hesitate to contact us.

Regards,

COLER & COLANTONIO, INC.

Virgil Q. Gray, P.E

Division Manager

Transportation Engineering Division

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P.O. Box 334 Wakefield, MA 01880 Tel. (781) 587-0086 Fax (781) 587-0189 Cell (781) 316-4663 E: mperonel@comcast.net

Page 3 03464Bspeed Site Code: 03464

Marshall Street south of Prentice Street

City, State: Holliston, MA Client: C&C/J. Morgan

22:00

23:00

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Daily

31 MPH 15th Percentile : 36 MPH 41 MPH 45 MPH 50th Percentile : 85th Percentile 95th Percentile:

Mean Speed(Average) : 10 MPH Pace Speed : Number in Pace : 36 MPH 31-40 MPH 70.2% 603 53.1% Percent in Pace : Number of Vehicles > 35 MPH: Percent of Vehicles > 35 MPH:

P.O. Box 334 Wakefield, MA 01880 Tel. (781) 587-0086 Fax (781) 587-0189

Page 1 03464Bspeed Site Code: 03464

Marshall Street

south of Prentice Street

Cell (781) 316-4663 E: mperone1@comcast.net

City, State: Holliston, MA Client: C&C/J. Morgan

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95th Percentile: 44 MPH

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74.2% 532 46.7% Number of Vehicles > 35 MPH: Percent of Vehicles > 35 MPH:

P.O. Box 334 Wakefield, MA 01880 Tel. (781) 587-0086 Fax (781) 587-0189 Cell (781) 316-4663 E: mperonel@comcast.net

03464Bspeed Site Code: 03464

Page 2

31 MPH

Marshall Street south of Prentice Street

City, State: Holliston, MA Client: C&C/J. Morgan

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P.O. Box 334 Wakefield, MA 01880 Tel. (781) 587-0086 Fax (781) 587-0189 Cell (781) 316-4663 E: mperone1@comcast.net

Page 4 03464Bspeed Site Code: 03464

Marshall Street south of Prentice Street

City, State: Holliston, MA

Client: C&C/J. Morgan

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31 MPH 37 MPH 15th Percentile: Daily 50th Percentile : 85th Percentile : 95th Percentile: **47 MPH**

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Overall

31 MPH 36 MPH 42 MPH 45 MPH 15th Percentile: 50th Percentile: 85th Percentile: 95th Percentile: Mean Speed(Average) : 10 MPH Pace Speed : 36 MPH 31-40 MPH 1114 67.3% 920 Number in Pace : Percent in Pace : Number of Vehicles > 35 MPH : Percent of Vehicles > 35 MPH : 55.6%

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Vehicle Volumes ar	nd Adjustn	nents								
Major Street		Eastbound					Westbou	ınd	,	
Movement	1	2	3			4	5			6
	L	T	R			L	T			R
Volume		211	7			5	218			
Peak-Hour Factor, PHF	1.00	0.81	0.81			87	0.87			.00
Hourly Flow Rate, HFR	0	260	8			7	250			0
Percent Heavy Vehicles	2	<u> </u>				8		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
Median Type				Undiv	ided					
RT Channelized			0				7.02			0
Lanes	0	1	0		(0	1			0
Configuration			TR		L.	T				
Upstream Signal		0					0			
Minor Street		Northbound					Southboo	und		
Movement	7	8	9			10	11			12
	L	T	R		*******	L	Т			R
Volume	25		67		-					
Peak-Hour Factor, PHF	0.81	1.00	0.81		1.	00	1.00		7	.00
Hourly Flow Rate, HFR	30	0	82			0	0			0
Percent Heavy Vehicles	0	0	2			0	0			0
Percent Grade (%)		0	. 				0			
Flared Approach		I N					N			
Storage		0					0			
RT Channelized			0							0
Lanes	0	0	0			0	0			0
Configuration		LR								
Delay, Queue Length, a	nd Level of	Service								
	Eastbound	Westbound	1	orthbo	ound		S	outhl	bound	1
Movement	1	4	7	8		9	10		11	12
Lane Configuration		L.T		LR						
v (vph)		17		112						
C (m) (vph)		1262		673						
v/c		0.01		0.17	7					
95% queue length		0.04		0.59	,					
Control Delay		7.9		11.4	ı					
LOS		A	»···	В	_		1	T		
Approach Delay				11.4			1	.1		l
		The state of the s								

	TWO-	WAY STOP (CONTRO	DL S	UMI	MARY				
General Informatio	n		Site In	forn	natio	on				
Analyst	JBB		Interse	ction			Marshall S St.	St. @ 1	Prenti	ce
Agency/Co.	Coler & C	olantonio	Jurisdic	tion			Holliston			
Date Performed	11/8/05	(A. AE E. AE	Analysi	s Yea	ır		2005 PM I	Existir	ng	
Analysis Time Period	РМ Реак	(4:45-5:45pm)	-							
Project Description Pl	Л Peak Hour E	xisting Conditio	ns							
ast/West Street: Pren			North/S				all Street			
ntersection Orientation:	East-West		Study P	eriod	(hrs)	: 0.25				
/ehicle Volumes a	nd Adiustm	ents		.,						
lajor Street		Eastbound					Westboun	d		
Movement	1	2	3			4	5		6	
TOTOTACE	L	T	R			L.	T		R	
/olume		214	18	[64	251		0.0	<u> </u>
eak-Hour Factor, PHF	0.85	0.82	0.82			70	0.87		0.8: 0	
lourly Flow Rate, HFR	0	260	21			73	288			
Percent Heavy Vehicles	2					2				
Median Type				Undiv	raed			-T	. 0	
RT Channelized			0				1		0	
anes	0	1	0			0				
Configuration			TR			LT	0			
Jpstream Signal		0								
Minor Street		Northbound				40	Southbour	าด	1:	2
Movement	7	8	9			10	11 T		F	
	L	Т	R			L			r	1
Volume	20		41			0.85	0.85		0.8	35
Peak-Hour Factor, PHF		0.85	1.00		- 1	0.85	0.83		0.0	
Hourly Flow Rate, HFR	20	0	41 3			0	0		0	
Percent Heavy Vehicles	6	0	3			V	0			
Percent Grade (%)		0	1				N N			
Flared Approach		N	<u> </u>				0			
Storage		0					-			······································
RT Channelized			0				<u> </u>		- 0	
Lanes	0	0	0			0	0		C	<i></i>
Configuration		LR								
Delay, Queue Length,	and Level of	Service								
Approach	Eastbound	Westbound	١	Iorthb	ounc			outhbo		
Movement	1	4	7	8	}	9	10	11		12
Lane Configuration		LT		LF	?					
v (vph)		73		61	1					
C (m) (vph)		1282		57	0					
v/c		0.06		0.1	1					
		0.00		0.3						
95% queue length				12		 		l		
Control Delay		8.0		E				 	一十	
LOS		<u>.</u> A		<u> </u>		<u> </u>		<u> </u>		
Approach Delay				12						····· · · · · · · · · · · · · · · · ·
Approach LOS				E	5					

eneral Information		/	Site In	form	atio	on					
	JBB		71				Marshall S	St. @	Prer	ntice	
Analyst	Coler & Co	alantonio	Interse	ction			St.	J., U	, , , , , ,		
Agency/Co. Date Performed	11/8/05	namonio	Jurisdic	tion			Holliston	05 SAT Existing Street			
		(11:00am-	Analysi		r		2005 SAT	Exi	sting		
Analysis Time Period	12:00pm)	(11.000									
roject Description SA	T Peak Hour	Existing Conditi	ons								
ast/West Street: Prentic			North/S				all Street				
ntersection Orientation:	East-West		Study F	eriod	(hrs)	: <i>0.25</i>					
ehicle Volumes an	d Adjustm	ents									
lajor Street		Eastbound					Westbour	nd			
lovement	1	2	3			4	5				
	L	T	R			L.	T			R	
olume		157	25			99				O.C.	
eak-Hour Factor, PHF	0.85	0.86	0.86).83					
lourly Flow Rate, HFR	0	182	29			119				<u> </u>	
Percent Heavy Vehicles	2			ليب		1		1			
/ledian Type				Undiv	ided			· · · · · ·		^	
T Channelized			0								
anes	0	1	0			0	7			0	
Configuration	-		TR		:	LT					
Jpstream Signal		<u> </u>	<u> </u>							·	
Minor Street		Northbound						nd		40	
Movement	7	8	9			10					
	<u> </u>	T	R			L	1			н	
/olume	24		106				0.05			000	
Peak-Hour Factor, PHF	0.89	0.85	0.89			0.85	1		Ĺ		
Hourly Flow Rate, HFR	26	0	119			0					
Percent Heavy Vehicles	0	0	4			0	<u> </u>			0	
Percent Grade (%)		0									
Flared Approach		N									
Storage		0					0				
RT Channelized			0								
anes	0	0	0			0	0			0	
Configuration		LR					<u> </u>		<u> </u>		
Delay, Queue Length, a	nd Level of	Service									
	astbound	Westbound	١	Iorthb	ounc		S	outh	bound	1	
Movement	1	4	7	8		9	10		11	12	
Lane Configuration		LT		LR	?						
		119		145							
v (vph)		1366		713						 	
C (m) (vph)				0.2			 	 		 	
v/c		0.09						 			
95% queue length		0.29		0.7				├		 	
Control Delay		7.9		11.			1	 		 	
LOS		A		В				<u> </u>		<u></u>	
Approach Delay	**	***		11.	3						
Approach LOS			1	В			1				

· · · · · · · · · · · · · · · · · · ·	TWC	-WAY STOP	CONTR	OL S	SUM	IMARY			
General Informat	ion		Site I	nfori	mat	ion			
Analyst	JBB		Inters	ection			Marshall St.	St. @	Prentice
Agency/Co.		Colantonio	Jurisd	iction			Holliston		
Date Performed	11/8/05	(/7.00.0.00.)	— Analy		ar		2010 AN		uild
Analysis Time Period		k (7:00-8:00am)							
		No-Build Condi		ماريد	Ctro	ot: Maro	hall Street		
East/West Street: Pilentersection Orientation		<u> </u>				s): 0.25	nali Sireet		
Vehicle Volumes									
Major Street	and Adjusti	Eastbound					Westbou	nd	
Movement	1 1	2	3			4	5	110	6
MOACHIGHT	<u> </u>	- 	R			L	Ť		R
Volume	-	251	8			18	259		• •
Peak-Hour Factor, Ph	IF 1.00	0.81	0.81			0.87	0.87		1.00
Hourly Flow Rate, HF		309	9			20	297		0
Percent Heavy Vehicl						8			
Median Type	<u> </u>	I		Undi	vided		J		
RT Channelized			0					<u> </u>	0
Lanes	0	1 1	0			0	1		0
Configuration		-	TR			LT			
Upstream Signal		0	1 111	:		,	0		
Minor Street		Northbound					Southboo	ind	-
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume	30		80						· · · · · · · · · · · · · · · · · · ·
Peak-Hour Factor, Ph		1.00	0.81			1.00	1.00		1.00
Hourly Flow Rate, HF		0	98			0	0		0
Percent Heavy Vehicl		0	2			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					Ν		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration		LR							
Delay, Queue Lengti									
Approach	Eastbound	Westbound		Iorthb				outhbo	
Movement	1	4	7	8		9	10	11	12
Lane Configuration		LT		LF					
v (vph)		20		135	5				
C (m) (vph)		1209		610	0				
v/c		0.02		0.2	2				
95% queue length		0.05		0.8	4				
Control Delay		8.0		12.	6				
LOS		Α		В					
Approach Delay				12.	6				
Approach LOS				В					

		TWO-	WAY STOP (
General Inform	ation			Site In	forn	natio	on				
Analyst		JBB		Intersed	ction	******		Marshall S St.	St. @ F	Prenti	ce
Agency/Co.		Coler & Co	olantonio	Jurisdic	tion			Holliston			
Date Performed		11/8/05		Analysi	s Yea	r		2010 PM I	No-Bui	ild	
Analysis Time Peri	od	PM Peak	(4:45-5:45pm)	_							
Project Description	PM	Peak Hour N	lo-Build Conditio	ons							
ast/West Street:				North/S				all Street			
ntersection Orienta				Study P	eriod	(hrs)	: <i>0.25</i>				
/ehicle Volume			ents		• • • • • • • • • • • • • • • • • • • •						
Aajor Street			Eastbound					Westboun	d		
Movement		1	2	3			4	5		6	
TOVOITO		L.	T	R			L	T		R	
/olume			254	21			76	298		1.0	2
Peak-Hour Factor,		1.00	0.82	0.82			0.87	0.87		1.00	,
lourly Flow Rate, I		0	309	25			87	342			
Percent Heavy Veh	icles	2			1	.7.44	2	**			
Median Type					Undiv	raed				0	
RT Channelized				0				1 "			
anes		0	1:	0			0			: <u>0</u>	
Configuration	·			TR			LT	0		<i>E'</i>	
Jpstream Signal			0					0	<u> </u>		
Minor Street			Northbound					Southbour	na 📗	1:	2
Movement		7	8	9			10	11 T		<u></u> F	
		L	Т	R			<u> </u>			Г	t .
Volume		24		49			1.00	1.00		1.0	n
Peak-Hour Factor,		1.00	1.00	1.00			1.00 0	0		0	
Hourly Flow Rate,		24	0	49 3			0	0		0	
Percent Heavy Vel		6	0	3			U	0			
Percent Grade (%)			0					T N	————		
Flared Approach			N					0			
Storage			0					0		C)
RT Channelized				0				 		- 0	
Lanes		0	0	0			0	0		Ĺ	,
Configuration			LR					<u> </u>		<u></u>	
Delay, Queue Lei	igth, a	nd Level of	Service		······································						
Approach	1	Eastbound	Westbound		Iorthb				outhbo		
Movement		1	4	7	8	3	9	10	11		12
Lane Configuratio	n l		LT		LF	7				L	,
v (vph)			87		73	3					
			1225		49	8					
C (m) (vph)			0.07		0.1						
v/c		,	0.07		0.5					1	
95% queue length					13						
Control Delay			8.2						 		
LOS			Α		E		<u> </u>		<u> </u>		
Approach Delay					13						
Approach LOS	I				E	<u> </u>		1			

		TWO-	WAY STOP								
eneral Informa	tion			Site In	form	natio	on				
Analyst		JBB		Interse	ction			Marshall S	St. @	Pren	ice
Agency/Co.		Coler & C	olantonio					St.			
Date Performed		11/8/05		Jurisdic				Holliston 2010 SAT	r No-F	Ruild	
Analysis Time Perio	d		(11:00am-	Analysi	s yea	ır		2010 SA1	NO-E	Julia	
į		12:00pm)	N - D - Ud O di	<u> </u>				<u> </u>		110	
Project Description	SAI	Peak Hour	No-Bulla Conal	North/S	outh 9	Stree	t Marsi	nall Street			
ast/West Street: Intersection Oriental		East-West		Study F				ian on our			
				lotady	01100	(1110					
/ehicle Volume	s and	d Adjustm			—т			Westbour	ad		
Najor Street		4	Eastbound 2	3			4	5	10		
Novement		1 1	 2	R			- -	T			₹
/olume		<u> </u>	186	30			118	173			
Peak-Hour Factor, F	HF	1.00	0.86	0.86			0.83	0.83		1.0	00
lourly Flow Rate, H		0	216	34			142	208		()
Percent Heavy Vehi		2					1	*-			-
/ledian Type					Undiv	rided					
RT Channelized				0		-				. ()
anes		0	1	0			0	1)
Configuration				TR			LT	•			
Jpstream Signal			0					0	<u>L</u>		
Minor Street	T		Northbound					Southbou	ınd		
viovement		7	8	9			10	11			2
		L	Т	R			L	Т			R
/olume		29		126							
Peak-Hour Factor, I		0.89	1.00	0.89			1.00	1.00			00
Hourly Flow Rate, F		32	0	141			0	0			0
Percent Heavy Veh	icles	0	0	4			0	0	L		0
Percent Grade (%)			0					0			
Flared Approach			N					N			
Storage			0					0			
RT Channelized				0							0
anes		0	0	0			0	0			0
Configuration			LR								
Delay, Queue Len	gth, a	nd Level of									
Approach		astbound	Westbound		lorthb				outhb		
Movement		1	4	7	8		9	10	1	1	12
Lane Configuration			LT		LF	}					
v (vph)			142		17:	3					
C (m) (vph)	$\neg \vdash$		1321		64	9					
v/c			0.11		0.2	7					
95% queue length	_		0.36		1.0						
	_		8.1	— ——	12.				1		
Control Delay			A. 1		B				f		
LOS	_				12.				<u> </u>	J	
Approach Delay	_	••		<u> </u>				-			
Approach LOS	ı			<u> </u>	В			<u></u>			

<u> </u>		-WAY STOP							
General Informatio	n		Site II	<u>nforr</u>	nati	on			
Analyst	JBB		Interse	ction			Marshall St.	St. @ P	rentice
Agency/Co.		Colantonio	Jurisdi	ction			Holliston		
Date Performed	11/8/05	(7.00.0.00)	Analys	is Yea	ar 🤄		2010 AM	Build	
Analysis Time Period		(7:00-8:00am)							
		Build Conditions		\	Ctro	t Mara	hall Street		
ast/West Street: Prentersection Orientation:): 0.25	iali Sireel		
			Jotady	CHOO	(1110)	j. <u>0.20</u>			
/ehicle Volumes a	<u>nd Adjustn</u>						Masthau	a d	
lajor Street		Eastbound				4	Westbour 5	10	6
Novement	<u> </u>	2	3			4	T		R
	<u> </u>	T 051	R 12		···	25	259		11
/olume	100	251	0.81			25).87	0.87		1.00
eak-Hour Factor, PHF	1.00	0.81 309	14			28	297		0
Hourly Flow Rate, HFR		309	14			8			
Percent Heavy Vehicles	4		<u> </u>	Undi	ided		1		
Median Type			0	J.,					0
	1 0	1 7	0			0	1		0
anes	1 0		TR			LT			
Configuration		1 0	1/1		.,	<i>L1</i>	0		
Jpstream Signal			J				Southbou	ınd	
Ainor Street	<u> </u>	Northbound	9		-	10	11	inu .	12
Movement	7	8 T	R			L	T		R
	<u> </u>		111			<u> </u>	<u> </u>		+ 1
/olume	52	1.00	0.81			1.00	1.00		1.00
Peak-Hour Factor, PHF		0	137			0	0		0
Hourly Flow Rate, HFR		1 0	2			0	0		0
Percent Heavy Vehicles Percent Grade (%)	5 0	0	1				0		
		T N	1				N		
Flared Approach	_	0					0		
Storage RT Channelized			0		:				0
Lanes	1 0	0	0			0	0		0
Configuration	 	LR	 						
	and lovel of		1						
Delay, Queue Length, Approach	Eastbound	Westbound		lorthb	ounc		S	outhbou	ınd
Viovement	1	4	7	8		9	10	11	12
ane Configuration	•	LT		LF					
v (vph)		28		20	-				
C (m) (vph)		1204		58					
v/c		0.02		0.3					
		0.07		1.5				i e	
95% queue length		8.1		14				 	
Control Delay				14 E				 	
LOS		A	<u> </u>	<u> </u>		<u> </u>		<u> </u>	
Approach Delay				14					
Approach LOS			l	Е	3				

eneral Information			Site In	form	atio	n			
zeneral information							Marshall S	t. @ Pre	entice
Analyst	JBB		Intersec	ction			St.		
Agency/Co.	Coler & Co	olantonio	Jurisdic	tion			Holliston		
Date Performed	11/8/05		Analysis	s Year			2010 PM E	Build	
Analysis Time Period	PM Peak	(4:45-5:45pm)	ၗ				<u> </u>		
roject Description PM	Peak Hour E	Build Conditions							
ast/West Street: Prenti							all Street		
tersection Orientation:	East-West		Study P	eriod (hrs):	0.25			
ehicle Volumes an		ents							
	u Aujustiii	Eastbound					Westboun	d	
lajor Street lovement	1	2	3			4	5		6
ioverneur i	Ĺ	T	R			L.	Т		R
/olume		254	42			05	298		
Peak-Hour Factor, PHF	0.85	0.82	0.82			.87	0.87		0.85
lourly Flow Rate, HFR	0	309	51			20	342		0
Percent Heavy Vehicles	2					2			
Median Type				Undivi	ded		N. T.		
RT Channelized	<i>.</i>		0						0
anes	0	1	0			0	1		0
Configuration			TR			LT ·		i	
Jpstream Signal		0					0		
Minor Street		Northbound					Southbou	nd	
Movement	7	8	9			10	11		12
	L	Т	R			L	Т		R
Volume	34		56						0.05
Peak-Hour Factor, PHF	1.00	0.85	1.00		(0.85	0.85		0.85 0
Hourly Flow Rate, HFR	34	0	56			0	0		0
Percent Heavy Vehicles	6	0	3			0	0		U
Percent Grade (%)		0					0		
Flared Approach		N					N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0			0	0		0
Configuration		LR							
Delay, Queue Length,	and Level of	Service							
Approach	Eastbound	Westbound	١	orthbo	ound		S	outhbou	nd
Movement	1	4	7	8		9	10	11	12
		LT		LR					
Lane Configuration		120		90					
v (vph)		<u> </u>		435				l	
C (m) (vph)		1199					-		1
v/c		0.10		0.2				 	-
95% queue length		0.33		0.7					
		8.3		15.					
Control Delay						1	1	1	1
		A		C				<u> </u>	
Control Delay LOS Approach Delay	-	A		15.					

	TWO-	WAY STOP	CONTRO	OL S	UMI	VIARY				
General Information	on		Site Ir	nform	natio	on				
Analyst	JBB		Interse	otion				St. @	Prent	ice
Agency/Co.	Coler & C	olantonio					St.			
Date Performed	11/8/05		Jurisdi				Holliston	T D. 3.	0.85 0	
Analysis Time Period	SAT Peal 12:00pm)	k (11:00am-	Analys	is Yea	ar		2010 SA	i Build		
Project Description S		Build Condition	s							
ast/West Street: Pre	ntice Street		North/S	South S	Stree	et: <i>Marsl</i>	hall Street			
ntersection Orientation	: East-West		Study F	eriod	(hrs)): <i>0.25</i>				
/ehicle Volumes a	and Adjustn	nents								
lajor Street		Eastbound					Westbou	nd		
Novement	1	2	3			4	5			
	L	Т	R			L	T		F	}
/olume		186	46			141	173			
Peak-Hour Factor, PHF		0.86	0.86			0.83	0.83			
lourly Flow Rate, HFR		216	53			169	208			
Percent Heavy Vehicle:	s 2		<u> </u>			1	•			
/ledian Type				Undiv	rided		r			
RT Channelized	,		. 0							
anes	0	1 .	0			0	1) .
Configuration		<u> </u>	TR			LT				
Jpstream Signal		0	<u> </u>				0			
Minor Street		Northbound					Southbou	ınd		
Movement	7	8	9			10	11			
	L	Т	R			L	Т			3
Volume	43		144							
Peak-Hour Factor, PHF		0.85	0.89		(0.85	0.85			
Hourly Flow Rate, HFF		0	161			0	0			
Percent Heavy Vehicle	s 0	0	4			0	0		(,
Percent Grade (%)		0					0			
Flared Approach		N					N			
Storage		0					0			
RT Channelized			0						()
Lanes	0	0	0			0	0		()
Configuration		LR								
Delay, Queue Length	. and Level of	Service						-		
Approach	Eastbound	Westbound	N	orthb	ound		S	outhbo	ound	
Movement	1	4	7	8		9	10	11		12
Lane Configuration	•	LT		LFI			1		一十	
**************************************		169		209						
v (vph)		1300		588	_					
C (m) (vph)								 		
v/c		0.13	<u> </u>	0.3				 		
95% queue length		0.45	<u> </u>	1.6				1		
Control Delay		8.2		14.			-	<u> </u>		
LOS		Α		В				<u></u>	1	
Approach Delay				14.	5					,
Approach LOS				В						

	T۱	۷O-۱	NAY STOP	CONTRO	DL S	UMI	VIARY			•
General Informat	ion			Site Ir	nforn	nati	on			
Analyst	JBB			Interse	ction			Marshall S St.	St. @ P	rentice
Agency/Co.			lantonio	Jurisdio	ction	·		Holliston		
Date Performed	11/8/			Analys	is Yea	ır		2010 PM	Build w	/ Soccer
Analysis Time Period	PM F	eak (4:45-5:45pm)							
Project Description	PM Peak H	our B	uild Conditions							
East/West Street: Pr	entice Stree	t						nall Street		
ntersection Orientation	n: <i>East-W</i>	'est		Study F	eriod	(hrs): <i>0.25</i>			
Vehicle Volumes	and Adiu	stme	ents							
Major Street			Eastbound					Westbour	d	
Movement	1		2	3			4	5		6
	L		Т	R			L	T		R
Volume			254	65	ļ		243	298		1.00
Peak-Hour Factor, Ph) 	0.82	0.82			0.87	0.87 342		1.00 0
Hourly Flow Rate, HF			309	79			279 2			
Percent Heavy Vehicl	es <i>2</i>		<u></u>	<u> </u>	I la cli	اء برارز،				
Median Type					Undiv	naea				0
RT Channelized			<u> </u>	0				1		0
anes	0		1	0			0			
Configuration				TR			LT	0		•
Upstream Signal		0		<u> </u>						
Minor Street	·	Northboun		1 6			40	Southbou 11	na	12
Movement	7		8	9			10	T		<u></u>
} :	L		Т	1	R		_L			n
Volume	103		1.00	148 1.00			1.00	1.00		1.00
Peak-Hour Factor, Pl			1.00	1.00		0		0		0
Hourly Flow Rate, HF		5	0	0		0		0		0
Percent Heavy Vehic	les 2		0					0		
Percent Grade (%)			0	T				l N		
Flared Approach			N					0		
Storage			0					U		0
RT Channelized				0				0		0
Lanes	0		0	0			0	U		V
Configuration			LR						<u> </u>	<u> </u>
Delay, Queue Lengi	h, and Leve	el of S	Service							1
Approach	Eastbou	nd	Westbound		Iorthb				outhbou	
Movement	1		4	7	8		9	10	11	12
Lane Configuration			LT		LF	?				
v (vph)			279		25	1				
C (m) (vph)			1170		27	2				
v/c			0.24		0.9	2				
95% queue length			0.93		8.4	8				
		\dashv	9.0		77	-			1	
Control Delay			A A		F					
LOS				<u> </u>	77.		<u> </u>		<u> </u>	
Approach Delay					F				······································	
Approach LOS				<u>L</u>						

eneral Information	3		Site In	form	atio	n					
			7	tion			Site Drive	vay #1 @			
nalyst	JBB	-ldania	intersec				Marshall S	it .			
gency/Co.	Coler & Co	piantonio	Jurisdic				Holliston	1/ 0			
ate Performed	11/8/05	(4:45-5:45pm)	Analysi	s Year	r		2010 Build	W/ Socce	er .		
nalysis Time Period			┨								
		Build Conditions	6.1.1/2			March	all Stroot				
ast/West Street: Site I					_	: Marsh	all Street				
tersection Orientation:	North-South		Study P	enou	(1118).	0.20					
ehicle Volumes ar	nd Adjustm	<u>ents</u>					O =	ابر			
lajor Street		Northbound				4	Southbour 5		6		
lovement	11	2	3 R			1	T		R		
	7	T 241	<u>n</u>			<u> </u>	287		?1		
olume	0.84	0.84	1.00	-+	1	.00	0.80		80		
eak-Hour Factor, PHF	0.84 8	286	0			0	358	2	?6		
lourly Flow Rate, HFR Percent Heavy Vehicles	1	200		一十		0			-		
Median Type				Undiv	ided						
RT Channelized			0						0		
anes	0	1	0			0	1		0		
Configuration	LT								r _R		
Jpstream Signal		0					0				
Minor Street		Eastbound					Westbour	nd			
Movement	7	8	9			10	11		12		
vioverneric	L	Т	R			L	Т		R		
/olume	10		3								
Peak-Hour Factor, PHF		1.00	0.85		1	.00	1.00		.00		
Hourly Flow Rate, HFR	11	0	3			0	0		0		
Percent Heavy Vehicles	0	0	0			0	0		0		
Percent Grade (%)		0					0				
Flared Approach		N					N				
Storage		0					0				
RT Channelized			0						0		
Lanes	0	0	0			0	0		0		
Configuration		LR									
Delay, Queue Length,	and Level of	Service									
Approach	Northbound	Southbound	٧	Vestb	ound		E	astbound			
Movement	1	4	7	8		9	10	11	12		
Lane Configuration	LT			<u> </u>				LR			
	8							14			
v (vph)	1148							458			
C (m) (vph)	0.01			 				0.03			
v/c				 			 	0.09			
95% queue length	0.02			-				13.1	1		
Control Delay	8.2			 				B	1		
LOS	A			<u> </u>				13.1	1		
Approach Delay		1	B				B .	10.1			

	TWO	-WAY STOP	CONTR	OL S	SUM	MARY					
General Information	n		Site I	nfori	mati	on					
Analyst	JBB		Interse	ection			Site Drive Marshall		@		
Agency/Co.		Colantonio	Jurisd	iction			Holliston				
Date Performed	11/8/05	// AE E AE	Analys	sis Ye	ar		2010 Bui	ld w/ Soc	cer		
Analysis Time Period	РМ Реак	(4:45-5:45pm)									
£		Build Conditions			<u> </u>						
East/West Street: Site		. 1					nall Street				
Intersection Orientation			Study	Period	ı (nrs): <i>0.25</i>					
Vehicle Volumes a	nd Adjustn										
Major Street		Northbound			<u></u>		Southbou	nd			
Movement	11	2	3			4	5		6		
	<u> </u>	Т	R			L	T		R		
Volume	14	233	1 2 2 2			1.00	261		29		
Peak-Hour Factor, PHF		0.84	1.00			1.00	0.80		0.80		
Hourly Flow Rate, HFR	16	277	0		,	0	326		36		
Percent Heavy Vehicles	7			11		0					
Median Type			T -	Undi	video	· · · · · · · · · · · · · · · · · · ·					
RT Channelized			0						0		
Lanes	0	1	0			0	1		0		
Configuration	LT								TR		
Upstream Signal	<u>, l </u>	0	<u> </u>				0	L			
Minor Street		Eastbound					Westbou	nd			
Movement	7	8	9			10	11		12		
	L	Т	R			L	Т		R		
Volume	15		7								
Peak-Hour Factor, PHF	0.85	1.00	0.85			1.00	1.00		1.00		
Hourly Flow Rate, HFR		0	8			0	0		0		
Percent Heavy Vehicles	3 0	0	0			0	0		0		
Percent Grade (%)		0					0				
Flared Approach		N					N				
Storage		0					0				
RT Channelized			0						0		
Lanes	0	0	0			0	0		0		
Configuration		LR									
Delay, Queue Length,							,				
Approach	Northbound	Southbound	V	Vestb	ound		E	astbound	l l		
Movement	1	4	7	8		9	10	11	12		
Lane Configuration	LT							LR			
v (vph)	16							25			
C (m) (vph)	1169							490			
v/c	0.01							0.05			
95% queue length	0.04							0.16			
Control Delay	8.1							12.7			
LOS	А							В	1		
Approach Delay	**	**	· · · · ·					12.7			
Approach LOS	**			 				В			
_ · · ·							·				

Name and Indonesian			Site In	form	atio	\n					
eneral Information			Site iii	IOIII	auc	/11	Marshall S	24 @ D.	ontico		
Analyst	JBB		intersed	ction			St.	ot. & Fi	ernice		
\gency/Co.	Coler & C	olantonio	Jurisdic	tion			Holliston				
Date Performed	11/8/05		Analysi		ſ		2010 Build w/ Soccer				
Analysis Time Period	Weekend	mid-day Peak									
roject Description We	ekend mid-da	ay Peak Hour Be	uild Condit	ions							
ast/West Street: Prentic			North/S	outh S	tree	t: <i>Marsh</i>	all Street				
ntersection Orientation:			Study P	eriod	(hrs)	: 0.25					
ehicle Volumes and		ents									
lajor Street	a Aujustiii	Eastbound					Westboun	d			
lovement	1	2	3			4	5		6		
OVOBIOIN	L	T	R			L	T		R		
olume		186	69			79	173		1.00		
eak-Hour Factor, PHF	1.00	0.86	0.86			.83	0.83		1.00 0		
lourly Flow Rate, HFR	0	216	80		3	336	208	_ -			
Percent Heavy Vehicles	2				-1	2					
Nedian Type				Undivi	aed		1. 1. 1.		0		
T Channelized			0				1		0		
anes	0	1	0			0					
Configuration			TR			L.T	0				
Jpstream Signal		0						nd :			
Minor Street		Northbound				40	Southbou	na -	12		
Movement	7	8	9 B			10	T		R		
	L	Т	R		<u> </u>		1		11		
Volume	112	4 60	236	1.00		1.00	1.00		1.00		
Peak-Hour Factor, PHF	0.89	1.00	0.89 265		0		0		0		
Hourly Flow Rate, HFR	125	0 0	0			0	0		0		
Percent Heavy Vehicles	2						0				
Percent Grade (%)		0	T			·····	N N				
Flared Approach		N				.,,,,	0				
Storage		0	 						0		
RT Channelized			0				0		0		
Lanes	0	0	0			0					
Configuration		LR									
Delay, Queue Length, a	nd Level of	Service					L 6.	outhbou	nd		
Approach	Eastbound	Westbound		lorthb					12		
Movement	1	4	7	8		9	10	11	12		
Lane Configuration		LT		LR			<u> </u>	 			
v (vph)		336		390)						
C (m) (vph)		1265		35	5			<u> </u>			
v/c		0.27		1.1	0						
95% queue length		1.08		14.4	18						
Control Delay		8.9		111	.5						
		A		F							
LOS Approach Delay				111		<u> </u>					
= 0 MM PARADON 10101/			-	, , ,							

	1 44 0-1	NAY STOP C							
eneral Informatio	n		Site In	form	atio	<u> </u>			
nalyst	JBB		Intersec	tion			Site Drivey	vay #1 @	
gency/Co.	Coler & Co	olantonio	L				Marshall S Holliston	l .	
Date Performed	11/8/05		Jurisdic		r	<u> </u>	2010 Build	w/Socce	r
Analysis Time Period		midday Peak	Analysis	srea			2010 Dulla	W/ CCCCC	
	Hour		الــــــــــــــــــــــــــــــــــــ						
roject Description W	eekend midda	y Peak Hour Bu	Id Condition	ons	Stroot	March	all Street		
ast/West Street: Site			Study P				idii on oo.		
ntersection Orientation:			Study i	Citoa	(1110):				
/ehicle Volumes a	<u>nd Adjustm</u>	<u>ents</u>					Southboun	ď	
Najor Street		Northbound				4	5		6
Novement	11	2 T	<u>3</u> R			- 	Ť		R
	<u> </u>	334	<u> </u>				332		6
/olume	5 0.84	0.84	1.00		1.	00	0.55	0.	<i>55</i>
Peak-Hour Factor, PHF	0.84 5	397	0	一十		0	603		29
Hourly Flow Rate, HFR Percent Heavy Vehicles				一十		0			
	<u>`</u>	.1		Undiv	rided				
Median Type			. 0						0
	0	1 7	0		:	0	1		0
anes	LT				1 11				ſR
Configuration		0					0		
Upstream Signal		Eastbound	<u> </u>				Westbour	nd	
Minor Street	7	8	9			10	11		12
Movement	1 1	T	R			L	Т		R
X - 1	14		5						
Volume Peak-Hour Factor, PHF		1.00	0.85		1	.00	1.00	1	.00
Hourly Flow Rate, HFR		0	5			0	0		0
Percent Heavy Vehicle		0	0			0	0		0
Percent Grade (%)		0					0		
Flared Approach		N					N		
		0					0		
Storage		· ·	0						0
RT Channelized	0	0	0			0	0		0
Lanes		LR	<u> </u>						
Configuration	<u> </u>				<u> </u>				
Delay, Queue Length	, and Level of	Southbound	1	Nesth	ound		T E	astbound	
Approach	Northbound		7		3	9	10	11	12
Movement	1	4		 			- 	LR	
Lane Configuration	LT			<u> </u>				21	1
v (vph)	5			 				295	
C (m) (vph)	941							ļ	
v/c	0.01							0.07	
95% queue length	0.02							0.23	
Control Delay	8.8							18.1	
LOS	Α							C	
Approach Delay				<u> </u>				18.1	
Approach LOS								С	

		WAY STOP							
General Informatio	n		Site Ir	nforn	nation				
Analyst	JBB		Interse	ction			Site Drive	way #2 @	Ð
Agency/Co.	Coler & Co	olantonio					Marshall S Holliston	> <i>t</i>	
Date Performed	11/8/05		Jurisdi				2010 Build	d w/ Soco	or
Analysis Time Period		midday Peak	Analys	is rea	<u> </u>		ZUTU DUM	3 W/ 30CC	,6,
i i	Hour	- Deale House Di		iono					
		y Peak Hour Bu	North/S	outh	Stroot:	Marsh	all Street		
ast/West Street: Site ntersection Orientation:			Study F				an onco.		
			jouday .	00	(1110).	07-0			
/ehicle Volumes a	nd Adjustm	ents		—Т			Southbour	nd	
flajor Street	<u> </u>	Northbound	3		4		5		6
Novement		2 T	R	┯╂	L		Ť		Ř
/aluma	<u>L</u>	321	- 13		<u> </u>		309		23
olume Peak-Hour Factor, PHF	<u> </u>	0.84	1.00		1.0	0	0.55	().55
lourly Flow Rate, HFR	13	382	0		0		561		41
Percent Heavy Vehicles	<u> </u>				0				
Median Type		. 4		Undiv	rided .				
RT Channelized		1	0						0
anes	0	1	0		0		1	11	0
Configuration	LT								TR
Jpstream Signal		0					0		
Minor Street		Eastbound					Westbour	nd	
Movement	7	8	9 10		0	11		12	
	L	Т	R		L.		Т		R
Volume	18		9						
Peak-Hour Factor, PHF	0.85	1.00	0.85		1.0		1.00		1.00
Hourly Flow Rate, HFR	21	0	10		0		0		0
Percent Heavy Vehicles	s 0	0	0		0)	0		0
Percent Grade (%)		0					0		
Flared Approach		N				•	N		
Storage		0					0		
RT Channelized			0						0
Lanes	0	0	0		()	0		0
Configuration		LR							
Delay, Queue Length,	and Level of	Service							
Approach	Northbound	Southbound	1	Vestb	ound		E	astbound	i e
Movement	1	4	7	8		9	10	11	12
Lane Configuration	LT			<u> </u>				LR	
	13							31	
v (vph)	966							321	
C (m) (vph)				 -			1	0.10	1
v/c	0.01							0.32	1
95% queue length	0.04			 			-	17.4	+
Control Delay	8.8			<u> </u>					<u> </u>
LOS	Α			<u> </u>				C	
Approach Delay								17.4	,
Approach LOS		***]				l	С	

			Site In	form	atio	n						
ieneral Informatio			Site iii	OHIII	auc	711	Marshall S	t @ Pro	ntice			
nalyst	JGM		Intersec	tion			St.	ı. W Fie	mice			
gency/Co.	Coler & Co	olantonio	Jurisdic	tion			Holliston					
Pate Performed	11/28/05 SAT Peak	(2:00nm	Analysis				2010 SAT	Build				
nalysis Time Period	3:00pm)	(2.00pm-	1									
is at Departmention C		Build Conditions	(w/ Undai	ted Vo	lum	es)						
roject Description S. ast/West Street: Pren		Dalla Cortainone	North/Sc	outh S	treet	: Marsl	hall Street					
tersection Orientation:			Study Pe									
		onto										
ehicle Volumes a	na Aajustin	Eastbound					Westboun	d				
ajor Street	1	2	3	_		4	5		6			
lovement	L	 	R			L	Т		R			
'olume		186	54	一十	1	75	173					
eak-Hour Factor, PHF	0.85	0.86	0.86			.83	0.83		0.85			
lourly Flow Rate, HFR	0	216	62		2	210	208		0			
Percent Heavy Vehicles						1						
ledian Type				Undivi	ded							
RT Channelized			0				1 41 1		0			
anes	1 0	. 1	0			0	1		0			
Configuration			TR			LT		i.				
Jpstream Signal		0					0					
Minor Street		Northbound					Southbour	nd				
Movement	 7	8	9			10	11		12			
VIOVERNEIA		Т	R			L	Т		R			
/olume	50		181									
Peak-Hour Factor, PHF		0.85	0.89		(0.85	0.85		0.85			
lourly Flow Rate, HFR		0	203			0	0		0			
Percent Heavy Vehicle		0	4			0	0		0			
Percent Grade (%)		0					0					
Flared Approach		N					N					
Storage		0					0					
RT Channelized		-	0						0			
	0	0	0			0	0		0			
Lanes Configuration		LR	1									
	and lovel of		I									
Delay, Queue Length	Eastbound	Westbound	N	lorthbo	ound	 	Sc	outhbour	nd			
Approach		4	7	8		9	10	11	12			
Movement	1			LR								
Lane Configuration		LT		259								
v (vph)		210					-					
C (m) (vph)		1291		557								
v/c		0.16		0.4								
95% queue length		0.58		2.4	5							
Control Delay		8.3		17.	0							
LOS		Α		С								
Approach Delay		•••		17.	0							
Approach Delay	<u> </u>	<u> </u>	 	C		······						

	≯	7	4	†	1	4				
Movement	EBL	EBR	NBL	NBT:	SBT	SBR				
Lane Configurations	75	74		र्स	1>			a sa		t to the control of the control of the con-
Sign Control	Stop			Free	Free					
Grade	0%			0%	-1%			son or help through the site	and regarded the area of	eminestrakstratika valtaises (s. j.
Volume (veh/h)	429	55	83	568	147	145				
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	ra v roser produktoroveno	rae agé a takén nadan	vitalisma en la tras el mass del	111526444565444
Hourly flow rate (vph)	466	60	90	617	160	158		100000000000000000000000000000000000000		
Pedestrians	n oc menoska coca anace			rocci protopo escici	en en en en en en en en en		3. H.S. 657 (558)			Y8838888888
Lane Width (ft)										
Walking Speed (ft/s)		arahiatika		eran markatan 180 Peranan markatan 180		200	esperatoria		and the State of t	
Percent Blockage								4094444		
Right turn flare (veh)	NIAGA .	2		KONO PROSTE				(SESSETTING FOR FOR	and the second s	
Median type	None	galaktili.								
Median storage veh)	Markin karat Bara		77. GU 36XX							
Upstream signal (ft) pX, platoon unblocked		an san san san		estation are considered in	ครามเลง (การคราย	Charles and Complete State Commencer and the Commencer of	Salah Salah Salah Salah Salah			
vC, conflicting volume	1036	239	317							
vC1, stage 1 conf vol	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	75 -0 0							Madalalanda (Mada)	Hrigag Joseph Joseph Amerika
vC2, stage 2 conf vol		gyay egenjalayeti Manaji talahaya						60 60 V460 SEPT		
vCu, unblocked vol	1036	239	317	6.69291.201.1617.19	myters masses and	Commission of the Commission o	ent, i in de perter e en el el el	Second Manager Second	A Anglisher Jay Loga, at Asis of	4, 460 /460 /50000 000000 00
tC, single (s)	6.4	6.2	4.1							- 54,94,94,000 S
tC, 2 stage (s)	land on Superior	-12-12-13 () 1 1 1 1 1 1 1 1 1	TO THE SECOND CONTRACTORS	geragane inga ayuun e wasii.	- 3 April 201 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	2002	2 2 . 2		·	
tF (s)	3.5	3.3	2.2	A VA						
p0 queue free %	0	93	93					mode aske it was more at all a	NACO CONTRACTOR CONTRACTOR	· · · · · · · · · · · · · · · · · · ·
cM capacity (veh/h)	238	800	1243							
Direction, Lane #	EB.1.	NB 1	SB 1							
Volume Total	526	708	317	892.2V (300)						
Volume Left	466	90	0	e, gray, ar gray and a second		Company of the Europe State Control of the Control			, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
Volume Right	60	0	158							
cSH	259	1243	1700					en se en		em (togensylvery) mengyyenen vida
Volume to Capacity	2.03	0.07	0.19							i (Vatus nicos)
Queue Length (ft)	964	6	0	a care in electromagnesis	agarbasa yan miyambari	and the second	gravisare o a seus gebrer		and a section of the	tarikatoret kalija vikiealitaja pedit.
Control Delay (s)	510.0	1.8	0.0							
Lane LOS	F	A	gerania an <u>a maka</u> ma	over a root to the consistent	anaren er en Nasiar	PUNCERROMASON YOURSTO	. egyztut et en et medan som		ra venteestud	
Approach Delay (s)	510. <u>0</u>	1.8	0.0		P. (22) Campberlin					
Approach LOS	F									
Intersection Summary					100					
Average Delay	Wile Lead Shown the	tan sant on a son	173.8	www.ondonativ.com		one di la companya di Lucio di Companya di Companya di Companya di Companya di Companya di Companya di Company Companya di Companya di Co	i, ki ma proposa estimbolista p	agong or e ma gneti		n sammanan ena
Intersection Capacity U	tilization		84.9%		CU Lev	el of Service		E.		
Analysis Period (min)	egyetigyet egyeletelek við	terrence paper i ne est int	15	espatiente de mo	e mengamanasan		any, lis pagregovant 1,024	Garana Nota	e incert descrip	509 X8 280 3708
		retisal.								

	<i>></i>	•	4	†	↓	4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR					
Lane Configurations	7	7		4	^}			er e ta segmente kee	tu takan Masari (1907)	nto sobjetu 700	
Sign Control	Stop			Free	Free						
Grade	0%	الراضي والمراجع والمراجع المراجع والمراجع	name of the second	0%	-1%		nkakakakatat				2000000000
Volume (veh/h)	250	104	72	191	445	484			Section		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Sakidaki rikisiryai	V-5-5705975-0:000569		**************************************	9000 A 2000
Hourly flow rate (vph)	272	113	78.	208	484	526			fat ledit i i r		New York
Pedestrians	environce / J.F.	enis more file	CAN KERENGANASA	#8677.771.775.745		(1.0 2 (3.05)	0.725 9087088				
Lane Width (ft)				98V 650 LV			%5/43.0553		Di kitainin		
Walking Speed (ft/s)	en alle en metron mod fins	s szakonták atártatá		5000 TSANSSA							
Percent Blockage									\$50000 (\$400 cc	(I) (B)(856) (S)(988)	SCREEN DOWN
Right turn flare (veh)	un grande divendes.	2		er egyegy (gross strokers gro Salten a salten hag geres f		e-encayout oo sor graye					
Median type	None			AMELIAN	Baker (MAKE)		30118900000000011844.9000n	DAG ATTACK SELECTION OF	t de la constitue de la consti	, agricultura (construidado)	CONTRACTOR CONTRACTOR
Median storage veh)		\$15797(89)(100)	erzekeze.					fanc's			\$2980 TO 1
Upstream signal (ft)							A Chapter Mouse May got a University	200 op 10 gelen verske en en 15g	No Service No. March S. Woman Co., 1941.		
pX, platoon unblocked vC, conflicting volume	1111	747	1010						and the second second second second		Santa.
vC1, stage 1 conf vol					marildu Bayleldi	The Arthur Control of the	2 511114 CT 1444 VANA				2940A.17,475
vC1, stage 1 conf vol						ne egyesaksisisteti Se egyesaksisisteti					
vCu, unblocked vol	1111	747	1010	photograph and a second	7 X -122 C C - 6 - 6 -	×			en en skap det skapt	a introducer description	especial est a la companion de la companion de La companion de la companion d
tC, single (s)	6.4	6.2	4.1							Examples	
tC, 2 stage (s)	end Market programme.		5 APPEN AND AND AND AND AND AND AND AND AND AN			anno a managan na mangana manaka sa m	ing one of the state of the sta		negoria degrada estriber a 76.	**************************************	Serententonia
tF(s)	3.5	3.3	⊸ 2,2						27.05.200 A	is territorial and the	esta zaran en esta de la
p0 queue free %	0	73	89	a w achola o har vanctor into		ere en				CONTRACTOR IN	en and and
cM capacity (veh/h)	205	413	686		e de la company	5.50340.00.0					
Direction, Lane #	EB 1	NB 1	SB 1				7.0				<u> </u>
Volume Total	385	286	1010	o ZZ Sesti					43 PY 123	Switzinik	MAN V6.09
Volume Left	272	78	0			one are by ancoming a city in City	er i ke alda disa kelibih dasi		managanama (nomi son		\$4090.9EU
Volume Right	113	0	526				Marketin and the Control		K.E.L		San Carlotte
cSH	246	686	1700	buda wasana mama	general verstandet.	harmaleifenslä	985511779303X				
Volume to Capacity	1.56	0.11	0.59							(v.10.186.1865236)	\$866 VISA \$4
Queue Length (ft)	587	10	0		nneukstek				21.6275577		
Control Delay (s)	308.8	4.0	0.0		Barray				hita in an	(1,1 1,1 1,1 1,1 1,1 1,1 1,1 1,1 1,1 1,1	
Lane LOS	F	A			gramalagaga gramalagaga	**************************************	7.21.0-21 9 0				
Approach Delay (s)	308.8	4.0	0.0	regri de la	ัยกรางสมัยให้	and the second second	organis de Madildad		ngging Arylan list ni	autalijas ir salaba siidista	July 12 2212 120 19-3
Approach LOS	F		- Long and the second s		anga-rani di katigong/Tiping/Sif			×7.70			
Intersection Summary				400	1000				46.5		
Average Delay			71.4		mark in a 1970s		s <u>an</u> ay ada 35 fak	TTUS PASSULA PAIA	E W/W/		147.477577£
Intersection Capacity I	Jtilization)	90.9%	\$402.804.90	ICU Lev	el of Servic	,e	Carlotte Services			ZECETUS (1972)
Analysis Period (min)	consistence for the land of	angering some term	15	y sy gydd y Alethrof	e gogetystski						
										TENERO TENERO	535 V S. S. S. P. T. M. P. T.

	•	¥	3	1	*	•					
Movement	EBL	EBR:	NBL	NBT	SBT	SBR			Prompto		
Lane Configurations	*5	74		4	Þ	one of the state o	e segregar a con a se e e con celebrar.	es commissions	mental soust a state		erratics
Sign Control	Stop			Free	Free						\$ A & & & & & & & & & & & & & & & & & &
Grade	0%	anyo salamini di Alias	nery ve paintain si	0%	-1%	and the second s		~10202000000000000000000000000000000000	September 15 in 1911	12.55 5 1 12.53 12.24 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.25 12.2 12.55 5 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	zirin
Volume (veh/h)	456	59	86	568	147	149					M.S.A
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92 162		7788301535307A			ATA 54,128
Hourly flow rate (vph)	496	64	93	617	160	104			satibilitiko		Cirr
Pedestrians	12080825775778	enchesenera		5000,570000 696	04457 FQ-81507						
Lane Width (ft) Walking Speed (ft/s)	ower and	MAGALLY.	AL PARESS		San San San			ŞOZOZKIĞI	Salak salah sala		elektri.
Percent Blockage								747 Ft 254080			557
Right turn flare (veh)		2			2.0111277				98)ZAC (CSL)LACI (L		Collins in
Median type	None			araytiya gri. Besindensi							
Median storage veh)		8560 MATERIA	and the second	05.648.43 <i>9.00</i> 486.73	er in gelyk els is elskiep 2000.	0.694 (1.004) N.944 (1.094) M.P.P.	testik illebili elementen haren 4.	etani ing murak kangaka	ing Section Section 2018 Section 2018	42 TE 60 100 (TE TTO BE SOLVED 1000	Eliteration of ele-
Upstream signal (ft)					F337589						200N
pX, platoon unblocked		lagia sebilist bira in d	atomas Juntina 1888	GREEN TOUT AND A	e Me tip e propertie de le	, C.S. C., C.C.C.S., a. M. dell. Chada A. M.C.	JA 1975 CHAR THE 1 THE 1 THE 1875				
vC, conflicting volume	1045	241	322								
vC1, stage 1 conf vol	XC-A1844444411 0 11 -11					**************************************	no anno anno anno anno anno ano antico		water and the analysis	Anne Control of the C	r Comerces
vC2, stage 2 confivol											
vCu, unblocked vol	1045	241	322	estadores de la composición	more consistent (ACC)	naka e melekupikan dibiring di	vine a Section and in	microsopoleto	a elizáren en pelencia.	ra mena menamena menamena.	SACRECO
tC, single (s)	6.4	: 6.2	4.1								
tC, 2 stage (s)		**************************************	200 A A 3	anta cuassin.	ario vidarez				engangyang d		
tF (s)	3.5	3.3	2.2								60,35A
p0 queue free %	0 234	92 798	92 1238			37 3 773			. 1274-138-128		
cM capacity (veh/h)	234	Self-re-re-re-re-re-re-re-re-re-	-5 THE 1 POLITICISTS AND IN						San Sanda		dollai Maria
Direction, Lane#	EB.1	NB 1	SB 1								
Volume Total	560	711	322			The Spirit			e de la companya de l		
Volume Left	496	93	0	conserva a transportion	nna baltone		na es mano empranto de Alexa.		en proposition		V45000094
Volume Right	64	0	162		ar padá	The second secon		and the second s			
cSH	255	1238	1700	3 53677777777		1.30. 48 16376.3.1100.	wasan salam	20 (DASSSÁR) I			THE STA
Volume to Capacity	2.19	0.08	0.19								Krissi Krissi
Queue Length (ft)	1074 581.5	6 1.9	0 0.0								34934
Control Delay (s) Lane LOS	၁၀ ၊ .၁ F			SASSES A			3000 k. 2000 2000		\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$		\$1.7E\$37
Approach Delay (s)	581.5	1.9	0.0	W\$139233	5123.58E	STRUKK			BEETEN KO		3.7.7
Approach LOS	501.5 F		\$4.0 Y:Y 3	åkeykelik öte alk	Errec i Affah				TO SPECIAL VIEW DESTRUCT	ise de Sectionie en de la Collectió de la Home	diam'r. S. E
•	•			77773							
Intersection Summary			00F 0	2.0					posta (continue		
Average Delay	[t:]]aatia=		205.3 86.8%	n de la companya de La companya de la co	C11120	el of Servi					
Intersection Capacity U Analysis Period (min)	unzauon		86.8% 15		OU LEV	ei ol Sel Al					86 Y.
Analysis Period (IIIII)		5831781 J.Z.O	1 0	KATUKATA	1450055			io en Haina			

	≯	*	4	†	1	4
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	*1	75		€Î	₽.	
Sign Control	Stop			Free	Free	
Grade	0%			0%	-1%	Vinit 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1
Volume (veh/h)	261	108	76	191	445	509
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	284	117	83	208	484	553
Pedestrians	viser met nitrera	e geste en entrem en greeke kan en	nin i sin mangangkat kahanat saha	g hanns o gage processors a seg	anakang pentebangan	C specifical backering or the first and deposits on the first of the f
Lane Width (ft)						
Walking Speed (ft/s)	structure tractions, no s	ziskrozkúrtaði sa	ndagonia magaloda em	okum kada salabaka	garageste processor de trade a causes	
Percent Blockage	14. 8 .3.4.6.					Control of the Contro
Right turn flare (veh)		2		TINGSON STATES		
Median type	None				1	Control of the Contro
Median storage veh) Upstream signal (ft)				57712-41665		
pX, platoon unblocked		Malikateri				
vC, conflicting volume	1133	760	1037			
vC1, stage 1 conf vol	((B) (1 (O) (O) (2)	5-6 5-75 -3	ko d . Y YA 1801	MUZKANIW	.G.M. 6.15 6 6 4 6	D. KANDESONIE PAR SANTAN DE SANTAN DE SANTAN BANDAN DE SANTAN DE SANTAN DE SANTAN PER DE DE SANTAN DE SANTAN D Bandan bandan banda
vC2, stage 2 conf vol		813/245	11 6 Sugar		A SOMANA	
vCu, unblocked vol	1133	760	1037	safriusia essi, ala	ulik i 184 aturus 200	dia 1908 and a suite de la company de la La company de la company de
tC, single (s)	6.4	6.2	4.1	SASSESS		
tC, 2 stage (s)	AL DE CLASSES IN THE SECOND		.E.C. (2000)	of refoured about touries	1 2 2 1 2 2 4 4 1 1 1 2 1 1 1 1	an egyulundakinggi sa 15 amin di di sen mannangalan bi Sastra Koldaba a di mbanya mata a 15 di mban bi anta unuka di koldaba. T
tF(s)	3.5	3.3	2.2			
p0 queue free %	0	71	88			
cM capacity (veh/h)	197	406	670			
Direction, Lane #	EB1	NB1	SB 1			
Volume Total	401	290	1037		S. V. 1447 (A	
Volume Left	284	83	0	(34.4.97.0%,000.1.1.4)	A miles of the second second second	TO STATE STA
Volume Right	117	0	553	18/02/9/10/2	Pakk	
cSH	236	670	1700			7.223.400 % 60 10 mm M at many 1 mm 1,2 mm 1 mm 1 mm 1 mm 1 mm 1 mm 1
Volume to Capacity	1.70	0.12	0.61			
Queue Length (ft)	659	10	0		. The state of the	TO BESTERNANTE ESTADOS CONTROS (CONTROS AND ESTADOS ENTENDANTO, DE LA PORTO DE LA POSTE DE LA PORTO DE LA PORT
Control Delay (s)	369.1	4.3	0.0			
Lane LOS	F	A		gganga dag sam	racio digini tayve.	
	369.1	4.3	0.0			
Approach LOS	F					
Intersection Summary						The second secon
Average Delay	galada ne ya arrawi ine	general establishment	86.4	gines necessaria	a a san assert	Begin Bright of the later of the second of
Intersection Capacity U	tilization		93.3%	⊹⊹: ! (U Leve	of Service F
Analysis Period (min)	guayensi sanan can	stelje rojemkih umik	15		and the property of	engengen in paganginagan dang na dang matapang dan basik ayan pad da dan manunan 1,500 mengang mengengangkinakan ang

CONCEPTUAL OPINION OF PROBABLE COST

CITY/TOWN PROJECT E.W.O. # Holliston

Cedar Ridge Estates - Marshall St Profile

ESTIMATED BY: ADM CHECKED BY: VQG DATE: 11/29/2005

FILE:

ITEM#	QUANT	UNIT	DESCRIPTION		UNIT PRICE	AMOUNT
120.1	450	CY	Unclassified Excavation	\$	15.00	\$ 6,750.00
151.01	195	CY	Gravel Borrow	\$	30.00	\$ 5,850.00
170	585	SY	Fine Grading & Compacting - Subgrade Areas	\$	3.00	\$ 1,755.00
460	210	TON	Hot Mix Asphalt	\$	115.00	\$ 24,150.00
464	10	GAL	Bitumen for Tack Coat	\$	3.00	\$ 30.00
751	15	CY	Loam Borrow	\$	30.00	\$ 450.00
765	115	SY	Seeding	\$	1.00	\$ 115.00
			SUBT	OTAL		\$ 39,100.00
			CONTIGENC	Y 15%		\$ 5,865.00
			ENGINEERING			\$ 5,865.00
			POLIC		:	\$ 3,910.00
			PROJECT 1	OTAL		\$ 54,740.00
1 +3 1				SAY .		\$ 55,000.00

CONCEPTUAL OPINION OF PROBABLE COST

CITY/TOWN PROJECT E.W.O. # Holliston

Cedar Ridge Estates INT Concept

ESTIMATED BY: ADM CHECKED BY: VQG

DATE: 11/29/2005

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11				1.7	UNIT	
ITEM#	QUANT	UNIT	DESCRIPTION	- 1	PRICE	AMOUNT
120.1	185	CY	Unclassified Excavation	\$	15.00	\$ 2,775.00
151.01	70	CY	Gravel Borrow	\$	30.00	\$ 2,100.00
170	550	SY	Fine Grading & Compacting - Subgrade Areas	\$	3.00	\$ 1,650.00
402	50	CY	Dense Graded Crushed Stone for Sub-Base	\$	30.00	\$ 1,500.00
420	140	TON	Hot Mix Asphalt Base Course	\$	115.00	\$ 16,100.00
460	160	TON	Hot Mix Asphalt	\$	115.00	\$ 18,400.00
464	15	GAL	Bitumen for Tack Coat	\$	3.00	\$ 45.00
751	15	CY	Loam Borrow	\$	30.00	\$ 450.00
765	135	SY	Seeding	\$	1.00	\$ 135.00
865.1	60	SF	Crosswalks and Stop Lines Refl. White (Thermo.)	\$	2.00	\$ 120.00
866.04.	350	LF	4-INCH Reflectorized White Line (Thermoplastic)	\$	1.00	\$ 350.00
867.04	700	LF	4-INCH Reflectorized Yellow Line (Thermoplastic)	\$	1.00	\$ 700.00
	2	LS	Relocate Utility Pole	\$	1,500.00	\$ 3,000.00
2**			and the second s			47,325.00
	;		SUB TOTAL		•	\$ 47,325.00
•			CONTIGENCY 15%			\$ 7,098.75
			ENGINEERING 15%			\$ 7,098.75
	:		POLICE 10%			\$ 4,732.50
			PROJECT TOTAL			\$ 66,255.00
			SAY	•		\$ 67,000.00