

Tisbury System of Connector Roads

Traffic Study – Interim Report



Prepared for the Tisbury Planning Board
By the Martha's Vineyard Commission

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1. INTRODUCTION

This report presents the findings and analysis of the proposed system of connector roads between Edgartown-Vineyard Haven Road and Upper State Road using the results of an origin destination study. This assessment was conducted by the transportation planning staff of Martha's Vineyard Commission at the request of the Tisbury Planning Board.

The Intersection of Edgartown-Vineyard Haven Road, State Road and Look Street (hereinafter called the "Look Intersection") is a major crossing point for Up-Island and Down-Island traffic and experiences a volume of almost 30,000 vehicles passing by per day during the peak summer time. An analysis of existing conditions indicates that the Look Intersection is operating at Level of Service (LOS) F. According to traffic engineering standards, this warrants that the intersection be upgraded to bring it back to acceptable LOS D or better. The left turning movements from Edgartown-Vineyard Haven Road to State Road have been experiencing very high delays, causing long queues and resulting in frustration of drivers using the intersection. The left turns from Edgartown-Vineyard Haven Road and Look Street onto State Road are possible only due to the courtesy of motorists on State Road who tend to stop and yield to the cross traffic; however, this increases backups on State Road and also is a safety hazard for the people using the intersection.

The Tisbury Planning Board has proposed a system of streets connecting State Road and Edgartown-Vineyard Haven Road to relieve the congestion along upper State Road, to improve safety, and to serve as a network of streets for a new mixed-use neighborhood. The connector road starts from Edgartown-Vineyard Haven Road near the Edgartown Bank, and continues along the NSTAR power lines, IFP property leading up past the MV Land Bank property to Town land. There it splits into three separate ways that connect to State Road, allowing drivers to sort themselves out according to their destination. The main branch travels past the Park-and-Ride lot to High Point Lane; those traveling Up-Island branch to the left around the landfill and on to Holmes Hole Road; and those going toward Pine Tree Road branch to the right and proceed past the DPW building to Evelyn Way.

The Tisbury Planning Board asked the MVC to study the feasibility of proposed system of connector roads. The primary focus of the study is to evaluate the existing conditions and future conditions with and without the connector roads.

Note that the Transportation Planning staff of the Martha's Vineyard Commission carried out this technical study. The Commission itself has not reviewed these proposals or this study and takes no position for or against the construction of some or all of the connector roads, or of the planning for the new mixed use neighborhood.

This study was funded in part by MassHighway and the National Highway Administration.



Fig1: Proposed system of connector roads

2. ORIGIN-DESTINATION SURVEY

2.1 Methodology

Martha’s Vineyard Commission conducted a “mail back” Origin Destination (OD) survey to study the travel patterns of the motorists at the Look Intersection and the information was used to analyze the impacts of the proposed connector roads. With OD survey, motorists at a specific point on a road or highway are asked to indicate the place where they began the journey they are currently making and where they will finish the journey.

The transportation planning staff of the MVC handed out cards to the motorists at the Look Intersection for them to later fill out and mail back. The Commission used preposted cards and also set up collection boxes at various key locations on the Vineyard for the collection of the surveys. The survey also included an incentive of a draw for five, one hundred dollar gift certificates for Vineyard restaurants and gifts.

The survey was conducted on Tuesday, August 10, 2004 and Saturday, August 14, 2004 from 7am to 7pm. On each day the survey crew stood at 50’ from the intersection on each approach and handed out cards to the motorists for an hour, rotating throughout the day on all the approaches. During the survey, signs saying “Traffic Survey Ahead” and “Traffic Survey” were placed at 1000 ft and 500ft from the intersection respectively to caution the motorists ahead and minimize delays. Traffic cones were also placed at the centerline to create a buffer zone and ensure safety for the survey crew. The Tisbury Police assisted to oversee the safe operation of the survey.

1. Where did you start this trip?

Address, known feature, or general location (e.g. "Oak Bluffs Ferry", "Down-Island Crony's", "Alleys")

2. If you made any intermediate stops, where was the last stop before you received this card?

Address, known feature, or general location

3. Where was your next stop after you received this card?

Address, known feature, or general location

4. If this next stop was an intermediate one, where was your final destination?

Address, known feature, or general location

5. What was the principal purpose of this overall trip?

Commute to or from work Shopping
 Business related Recreation
 To or from school Other - Please describe _____

6. How often do you make this overall trip?

5 or more times a week 1 to 3 times a month
 2 to 4 times a week Less than once a month
 Once a week This is the first time I have made this trip

7. How many people were in the vehicle when you received this card?

I was traveling alone 3 other people were with me
 1 other person was with me 4 other people were with me
 2 other people were with me More than 4 people were with me; how many? _____

8. What type of resident/visitor are you:

A year-round resident? A visitor who:

A seasonal resident (homeowner) who:
 is here only for the day
 is here for 2 to 3 days
 is here for 4 to 6 days
 is here for 1 to 2 weeks
 is here for more than 2 week

is here in summer only?
 is here in summer and some time in spring and fall?
 is here some time in all seasons?

Survey questionnaire

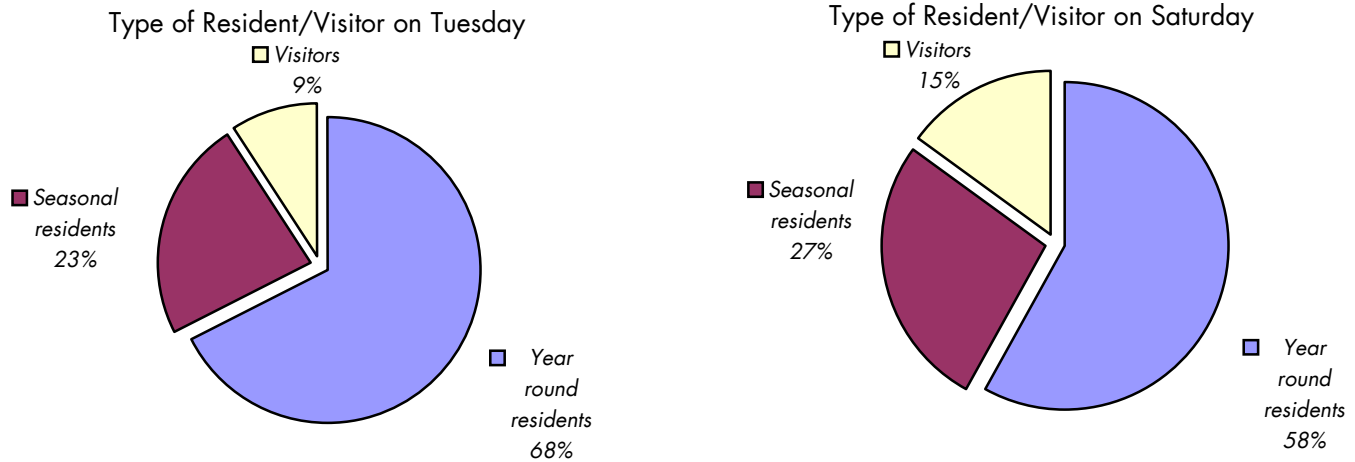
The survey questionnaire was designed not only to get the origin and destination of the trip but also to study the travel characteristics of the motorists. The transportation planning staff and traffic consultants of MVC were involved in the design of the survey questionnaire

The survey was designed to study the typical travel behavior of the motorists using the intersection on a summer weekday and a weekend day. A sample of 21% was returned from a total of 6050 cards handed out on two survey days. Microsoft Access database was used to code in the answers and interpret the results.

2.2 Driver Characteristics

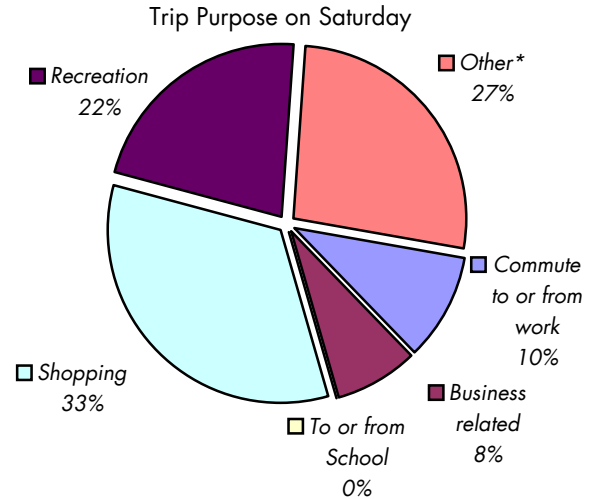
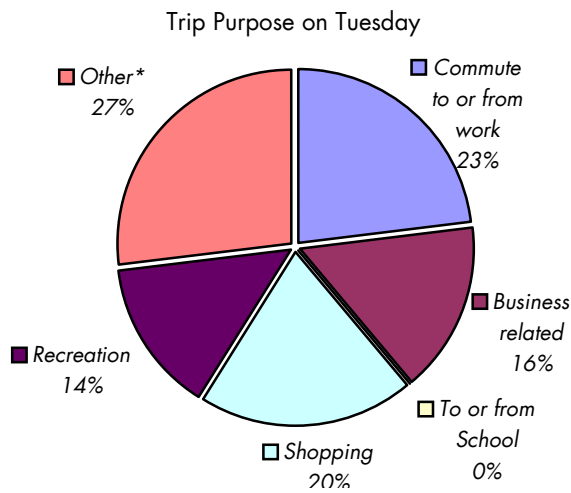
The following are some of the key characteristics of the sample of the traffic at the Look Intersection on the two survey days in August 2004

Type of Resident/Visitor



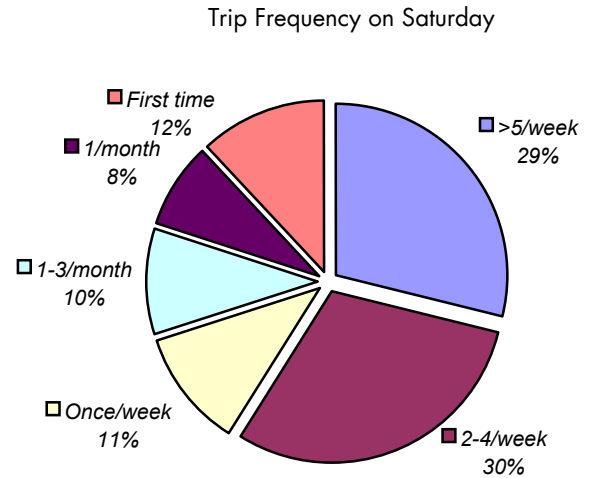
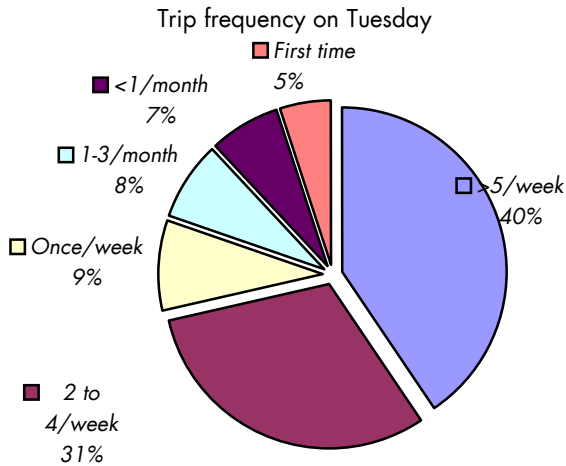
- A major portion of the traffic consisted of year round residents, 68% on Tuesday and 58% on Saturday.
- 23% on Tuesday and 27% on Saturday said they were seasonal residents i.e., homeowners here either in summer only, or during the summer and sometime in spring and fall, or some time in all seasons.
- 9% on Tuesday and 15% on Saturday said they were visitors i.e., here either only for day, for 2 to 3 days, for 4 to 6 days, for 1 to 2 weeks, or for more than 2 weeks.

Trip Purpose



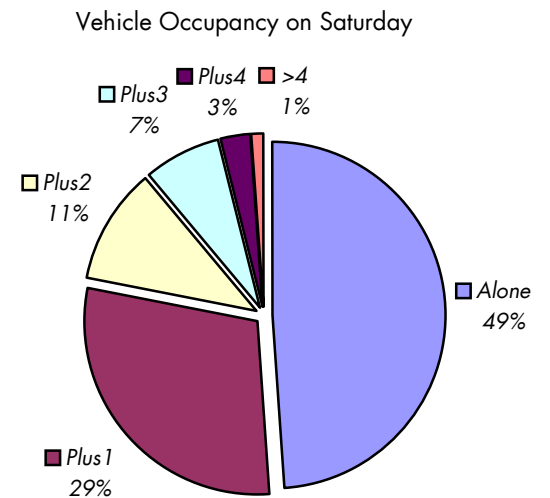
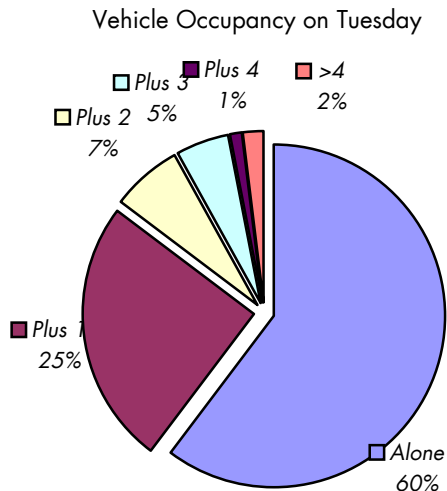
- The “primary purpose” of the trip on Tuesday was answered as “commute to or from work” by 23% of sample and the same was answered by only 10% on Saturday.
- 34% and 56% answered either “shopping” or “recreation” as their primary trip purpose on Tuesday and Saturday respectively.
- Of the sample who answered “Other” as trip purpose consisted of 17% and 29% SSA ferry related trips on Tuesday and Saturday respectively.
- Further analysis of the “primary purpose” of the trip by the type of motorists showed that of the sample who answered year round residents, 31% and 16% had commute to or from work as primary trip purpose on Tuesday and Saturday respectively. 23% and 44% of the year round residents had shopping or recreation as primary trip purpose on Tuesday and Saturday respectively.

Trip Frequency



- The sample showed that a clear majority of the motorists going through the intersection consisted of people who went through the intersection more than twice a week (72% on Tuesday and 59% on Saturday).
- 77% and 68% of the year round residents answered that they would be frequenting the intersection more than twice a week.

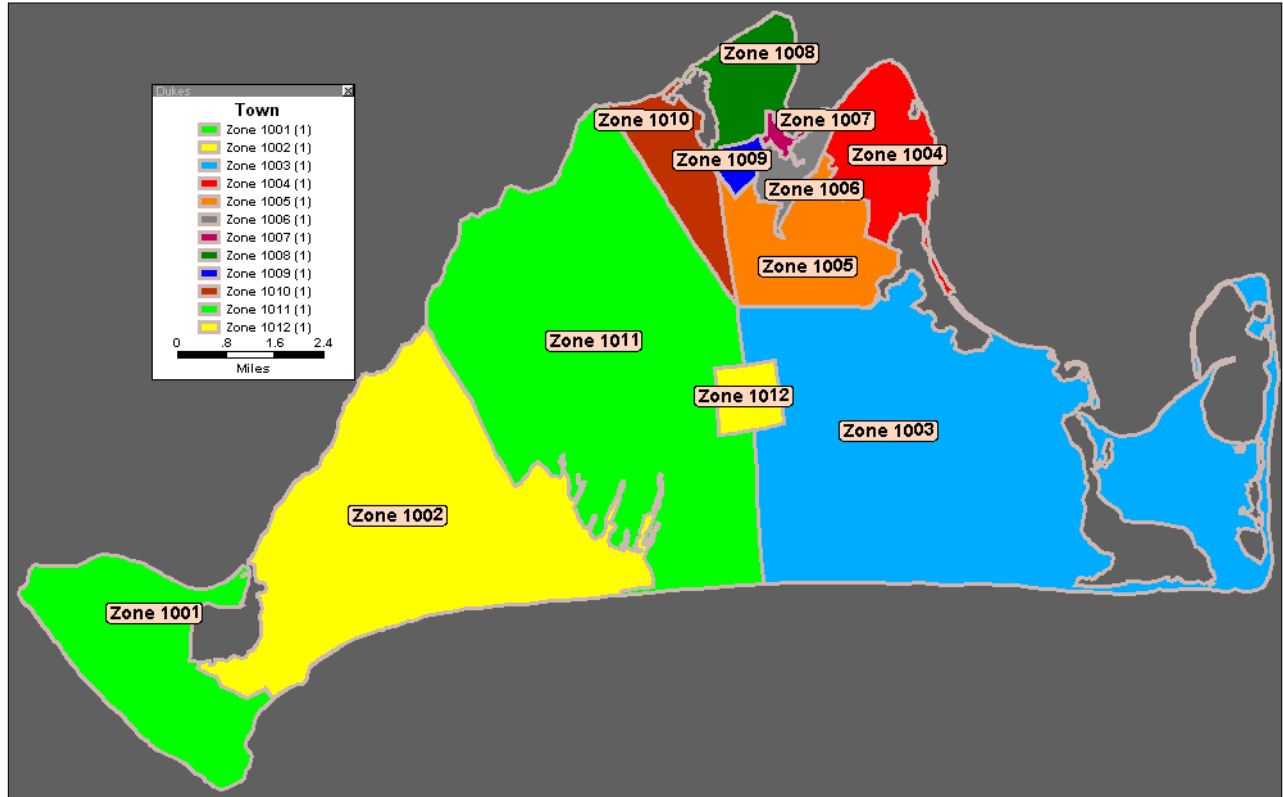
Vehicle Occupancy



- The major portion of the sample consisted of people who answered that they were driving alone (61% on Tuesday and 49% on Saturday).
- 71% and 60% year-round residents answered that they were driving alone on Tuesday and Saturday respectively.

2.3 Origin and Destination of Trips

For the purposes of this analysis, the Island was divided into 12 zones. For those cards where there the information was clear, the origin of the trip before receiving the survey card and the destination afterwards was analyzed.



(See appendix for description of zones)

The following are some of the key findings of the origins and destinations of the survey

- 15% of the trips coming on Edgartown-Vineyard Haven Road answered that they had their destinations Up Island (beyond Holmes Hole Road) or 32% of the total left turns from Edgartown-Vineyard Haven Road answered they had destinations Up-Island (beyond Holmes Hole Road)
- 11% of trips coming from State Road going Down Island answered that they have origins beyond Holmes Hole Road and destinations in Edgartown and Oak Bluffs around Blinker Intersection or 37% of the total left turns on State Road Down Island approach answered they had origins beyond Holmes Hole Road and destinations in Edgartown and Oak Bluffs around Blinker Intersection.

The following table analyzes the origins and destinations based on whether the trips lend themselves to using each of the new connector roads – bypass trips – or whether they would likely continue to use the Look Intersection – non-bypass trips.

Table 1: % of Traffic That Could Use Connector Roads													
Day	From Edg-VH Road				State Road going Down Island				State Road going Up-Island			From Look Street	
	C-1	C-2	C-3	Non-Bypass	C-1	C-2	C-3	Non-Bypass	Left	Thru	Right	C-3	Non Bypass
Tuesday	15%	33%	18%	34%	11%	18%	1%	70%	22%	68%	10%	70%	30%
Saturday	14%	30%	20%	37%	10%	13%	3%	74%	27%	64%	9%	77%	23%

C-1 – Up-Island Destinations, likely to use Holmes Hole Road Connector

C-2 – Destinations in the Upper State Road Corridor and other locations likely to use High Point Lane Connector

C-3 – Destinations in West Chop or other locations likely to use Evelyn Way Connector

Note: The Origin Destination trip table for both the two days of survey are included in the appendix

3. TRAFFIC STUDY

3.1 Methodology

The study focused on the impact of building the system of connector roads on the following intersections:

- State Road and Edgartown-Vineyard Haven Road
- State Road and Evelyn Way
- State Road and High Point Road
- State Road and Holmes Hole Road
- Edgartown-Vineyard Haven Road and Connector Road

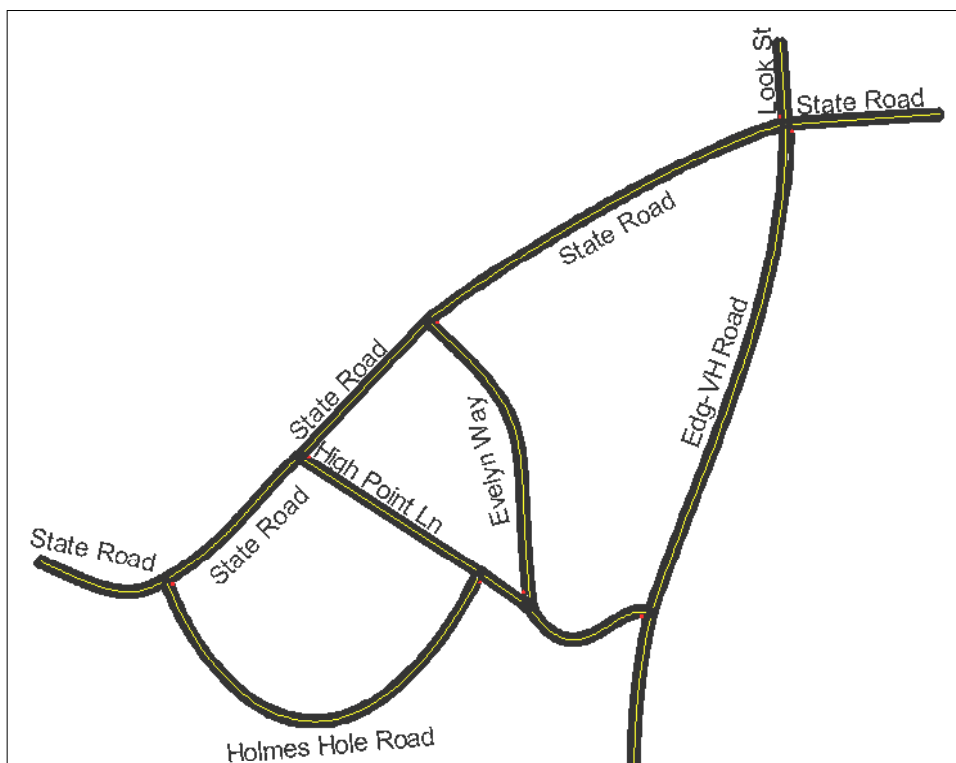


Fig2: Study area

Traffic Simulation software – SYNCHRO 6.0 – was used to study various Measures of Effectiveness (MOE) at the above intersections in several situations.

- Under existing conditions;
- In the year 2014 (based on the assumption that traffic would increase at a rate of 2% per year) – called the No-Build Scenario and used for comparison purposes.
- On the basis of the various alternative road configurations described below.

Each configuration was analyzed twice. First, traffic was assigned on the basis of the results of the Origin-Destination Survey and an estimate of the route that motorists would likely take.

However, experience indicates that the traffic would likely distribute itself more evenly within the network so that there would be similar delays on each of the intersections being connected. A second iteration reassigned the traffic so that there would be similar delays at the three intersections along State Road, called the “balanced network”. There are two factors that will probably result in traffic not perfectly balancing out: the fact that many users of the road network will be visitors who may not become familiar with “shortcuts”, and the fact that alternative routes might be less convenient even though theoretically faster. For example, some drivers heading to State Road may stay on High Point Lane even though the delay using Evelyn Way would be less, either because they are not aware of the latter option, or because the route is more circuitous and not worth the bother, at least most of the time. So the reality will probably somewhere between the two results, perhaps closer to the balanced system but not completely balanced

Finally, there was separate analysis of the possibility of making Look Street one-way.

Alternatives

The following five alternatives were studied. The short label is based on which connections are proposed to State Road. In all cases, it is assumed that the Evelyn Way connection will be built.

- Alternative 1a (Holmes-High-Evelyn): Connector roads on Holmes Hole Road and High Point Lane, as well as Evelyn Way.
- Alternative 1b (Holmes-High-Evelyn with Turning Lanes): Same as Alternative 1a but with 150ft-long turning lanes at the foot of High Point Lane and Holmes Hole Road.
- Alternative 1c (Holmes-High-Evelyn with One-Way Loop): Same as Alternative 1a but with High Point Lane as a one-way road heading up from State Road and Evelyn Way as a one-way road heading down to State Road.
- Alternative 2 (Holmes-Evelyn): Holmes Hole Road and Evelyn Way as the only connector roads.
- Alternative 3 (High-Evelyn): High Point Lane and Evelyn Way as the only connector roads.

Measures of Effectiveness

The following is a description of the various Measures of Effectiveness (MOE) used to evaluate the different options (note that some of these measures refer to tables in the appendix).

The Approach Delay for the Critical Movement is the average number of seconds it takes to pass through the intersection for that movement that has the longest delay, typically a vehicle on the minor road making a left turn onto the major road (e.g. turning left from High Point Lane onto State Road).

The Approach LOS for the Critical Movement translates these delays into a system of equivalent letters that corresponds to differences in delay that can be perceived by motorists, as summarized in table 4.

Table 2: Level of Service (LOS) Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (Seconds/Vehicle)
A	0-10
B	>10-15
C	>15-25
D	>25-35
E	>35-50
F	>50

Source: 2000 Highway Capacity Manual

The Approach Delay and Approach LOS for Left Turns from State Road gives the similar calculations of delay time in seconds and LOS for left turns from State Road.

The ICU is the Intersection Capacity Utilization, is the amount of traffic passing through the intersection as a percentage of its total capacity.

The ICU LOS translates these percentages into an equivalent letter system, similar to the Approach LOS, as summarized in table 5.

Table 3: Intersection Capacity Utilization (ICU) Level of Service Criteria

LOS	ICU	Description
A	<=55%	No congestion (can accommodate 40% more traffic)
B	>55% to 64%	Has very little congestion (can accommodate 30% more traffic)
C	>64% to 73%	Has no major congestion (can accommodate 20% more traffic)
D	>73% to 82%	Normally has no congestion (can accommodate 10% more traffic)
E	>82% to 91%	On the verge of congestion conditions (less than 10% reserve capacity)
F	>91% to 100%	Over capacity (congestion periods of 15 to 60 minutes)
G	>100% to 109%	Up to 9% over capacity (congestion periods of 60 to 120 minutes)
H	>109%	9% over capacity (congestion periods over 120 minutes)

Source: Intersection Capacity Utilization 2003

95th Queue is the number of 20'-long vehicles in the queue on the minor street at the 95% percentile, i.e. the 19th time out of 20.

Average Delay / Vehicle is the overall average delay of all vehicles on all roads entering the intersection.

Note that all these figures are "calculated" measures of effectiveness. In reality, the actual delays and other measures would likely be different, probably shorter. However, using these calculated measures of effectiveness provides an objective, quantifiable way of comparing various options.

Tables summarizing the Measures of Effectiveness for each of the intersections and options, both for the peak and off-peak seasons, are included in the Appendix.

3.2 Existing Conditions

Location	ADT (Vehs/day)		Weekday Peak Hour				Saturday Midday Peak Hour	
	Tuesday (vehs/day)	Saturday (vehs/day)	AM		PM		Vol. (vehs)	K (%)
			Vol. (vehs)	K (%)	Vol. (vehs)	K (%)		
State Road @ Causeway	23,353	20,656	1712	7.3%	1752	7.5%	1952	9.5%
Edgartown-Vineyard Haven Road @ Skiff Ave.	13,385	12,868	933	7.0%	955	7.1%	982	7.6%
State Road @ Martin Road	18,154	17,193	1298	7.1%	1378	7.6%	1383	8.0%
Look Street @ State Road	3,651	3,160	206	5.6%	298	8.2%	258	8.2%

Location	ADT (Vehs/day)	Weekday Peak Hour				Saturday Midday Peak Hour		
		AM		PM		Vol. (vehs)	K (%)	
		Vol. (vehs)	K (%)	Vol. (vehs)	K (%)			
<i>High Point Lane-North of State Road</i>								
July 1999	590	-	-	-	-	105	17.8%	
<i>Holmes Hole Road North of State Road</i>								
July 2004	795	85	11%	70	9%	-	-	

3.3 Results

Table 6: Summary of Alternatives – before balancing (average delay for critical approach in seconds)

Intersections	Existing	No-Build	Alternative 1a (Holmes-High-Evelyn)	Alternative 1b (Holmes-High-Evelyn &Turning Lanes)	Alternative 1c (Holmes-High-Evelyn with One-Way Loop)	Alternative 2 (Holmes –Evelyn)	Alternative 3 (High – Evelyn)
Look Intersection	*	*	42	42	42	42	42
Holmes Hole Road/State Road	15	23	66	39	78	94	23
High Point Lane / State Road	25	39	100	44	-	27	957
Evelyn Way / State Road	21	29	22	22	31	74	22
Connector Road / Edg-VH Road	NA	NA	26	26	26	19	26

Table 7: Summary of Alternatives – after balancing (average delay for critical approach in seconds)

Intersections	Existing	No-Build	Alternative 1a (Holmes-High-Evelyn)	Alternative 1b (Holmes-High-Evelyn &Turning Lanes)	Alternative 1c (Holmes-High-Evelyn with One-Way Loop)	Alternative 2 (Holmes –Evelyn)	Alternative 3 (High – Evelyn)
Look Intersection	*	*	42	34	42	65	215
Holmes Hole Road/State Road	15	23	42	33	40	66	23
High Point Lane / State Road	25	39	45	32	-	29	217
Evelyn Way / State Road	21	29	42	34	41	67	224
Connector Road / Edg-VH Road	NA	NA	26	26	26	20	24

■ LOS D or better;
 ■ LOS E;
 ■ LOS F;
 ■ delays more than 100sec

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Existing Conditions

- At the Look Intersection, the calculated delays for left turns from Edgartown-Vineyard Haven Road are theoretically infinite and we know, in fact, that there are very long queues. This intersection only works because of the kindness of motorists with the right of way that stop in order to allow cars waiting at the stop sign to turn.
- At other study intersections, delays for the minor street approach are at an acceptable LOS D or better.

No-Build Conditions for 2014

- This situation is based on the assumptions that there is no significant additional background development in the study area and but that there is a 2% annual growth rate in traffic. Note that this includes the traffic from the approved but not yet built Dukes County Savings Bank on Holmes Hole Road.
- The Look Intersection would continue to operate at LOS F with very high (theoretically infinite) delays for the left turns from Edgartown-Vineyard Haven Road onto State Road.
- All other intersections would have greater delays than at present, but would operate at an acceptable LOS D or better.

Alternative 1a – Holmes-High-Evelyn

- This option involves the construction of all the three connector roads and traffic equivalent to the No-Build Conditions for 2014.
- The Look Intersection would operate at LOS E with an average delay of 44 seconds for the left turning movements from Edgartown-Vineyard Haven Road onto State Road.
- The first iteration indicated that the intersections between the three connector roads and State Road would operate at LOS's between C and F and average delays between 23 and 100 seconds. (Holmes Hole Road - LOS F, average delay 67 seconds; High Point Lane -LOS F, average delay 100 seconds; Evelyn Way - LOS C delays of 23 seconds).
- The rebalanced iteration indicated that all three intersections would have an LOS of E and an average delay of 42 seconds.
- In both cases, the Edgartown-Vineyard Haven Road/Connector Road Intersection will operate at LOS D with average delay of 26 sec for the left turns from Connector Road to Edgartown-Vineyard Haven Road.

Alternative 1b – Holmes-High-Evelyn with Turning Lanes

- This option involves the construction of all three connector roads and 150ft right turning lanes on Holmes Hole Road and High Point Lane.
- As with alternative 1a, the Look Intersection would operate at LOS E with an average delay of 44 sec for left turns from Edgartown-Vineyard Haven Road to State Road,
- The first iteration indicated that the turning lanes would reduce the impact of the connector roads on the three intersections with State Road (Holmes Hole Road and High Point Lane - LOS E, average delays of 39 sec and 42 sec respectively; Evelyn Way - LOS C, average delay of 22).
- The rebalanced iteration indicated that the three intersections would have a LOS of D and an average delay around 32 seconds.

Alternative 1c – Holmes-High-Evelyn with a One-Way Loop

- This option involves the construction of all three connector roads with High Point Lane and Evelyn Way operating as one-way roads up from and down to State Road respectively. (The alternative of a one-way loop in the opposite direction was also analyzed but produced poorer results.)
- The Look Intersection would operate at LOS E with an average delay of 42 seconds for left turns from Edgartown-Vineyard Haven Road to State Road,
- The first iteration indicated that this solution significantly reduces the overall impact of the connector roads on the State Road intersections (Holmes Hole Road - LOS F, average delays of 78 seconds (a 150ft right turning lane will improve to LOS D with average delay of 35 sec); High Point Lane – LOS A and 6 seconds; Evelyn Way - LOS D, average delay of 31 seconds).
- The rebalanced iteration indicated that the High Point Lane intersection will continue to operate with LOS A, and the other three intersections would have a LOS E and an average delay of 42 seconds.

Alternative 2 – Holmes-Evelyn

- This option involves the construction of connector roads on Holmes Hole Road and Evelyn Way, but not High Point Lane.
- The first iteration had both the Look Intersection and the Holmes Hole Road Intersection operating at LOS F with an average delay of 429 seconds for left turns onto State Road and 110 seconds for left turns from State Road onto Holmes Hole Road. The High Point Lane and Evelyn Way intersections would operate with an acceptable LOS D or better.
- The rebalanced iteration indicated that the Look, Holmes Hole and Evelyn Way intersections would operate at LOS F with an average delay of about 66 seconds.

Alternative 3 – High-Evelyn

- This option involves the construction of connector roads on High Point Lane and Evelyn Way, but not on Holmes Hole Road.
- The unbalanced iteration showed the Look intersection with a perhaps unrealistically low LOS of E and delay of 42 seconds. However, the High Point Lane intersection would operate at LOS F, experiencing extremely long delays; the simulation showed that the left turns from High Point Lane would theoretically not be possible during the peak hour, and would result in very long queues. Effectively, this scenario transfers the present problem at Look Intersection to High Point Lane.
- Even with the balanced iteration, the three connections to State Road (at Look Street, High Point Lane and Evelyn Way) would experience very long delays of 215 seconds or more.

3.4 Making Look Street One-Way

The analysis of the existing conditions showed that at the Look Intersection, the Look Street approach experienced very high delays and would become even worse in the No-build scenario. The analysis of “alternative 1a” showed that Look Street would operate at LOS F with average delay of 295 seconds. Various people have suggested that it might be preferable to make Look Street one-way. The Look Intersection was then analyzed with Look Street as one way, inbound from State Road. The study showed that this would improve the average delay for the left turn approach from Edgartown-Vineyard Haven Road to 38 seconds with LOS E.

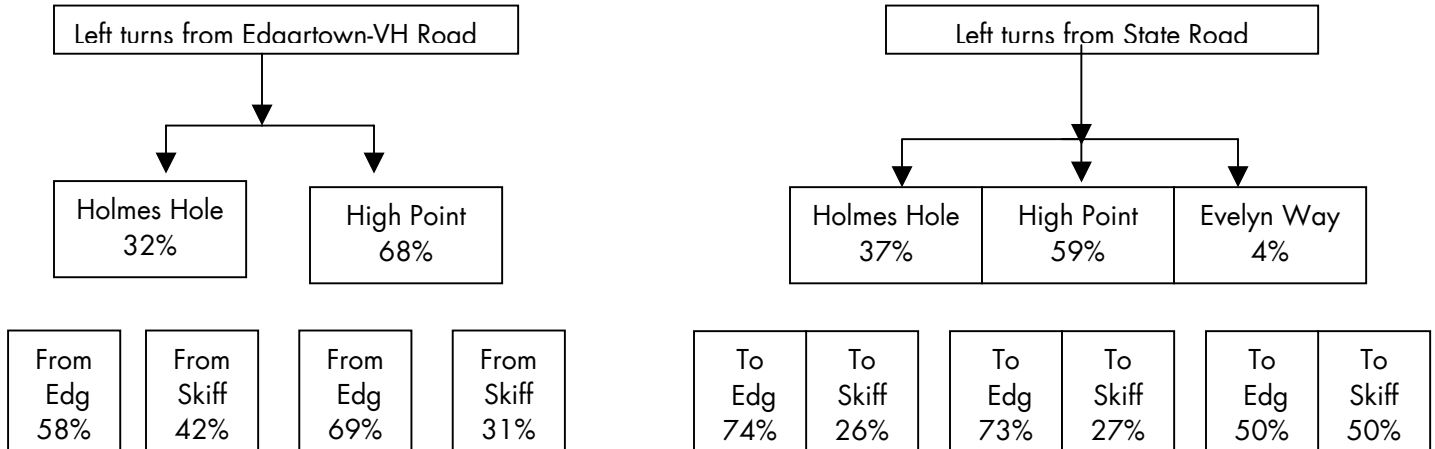
4. CONCLUSIONS

- The delays at the Look Intersection would be improved significantly with the construction of the Evelyn Way and High Point Lane connector roads. The total traffic volume at Look Intersection would decrease by 29%.
- Some of the traffic would be displaced to the new connector roads and would be dispersed over all the intersections with State Road. The scenario with all three connector roads connecting all the three intersections with State Road would have the least negative impact at the study area intersections.
- The impact of the connector roads at the Holmes Hole Road/State Road intersection and High Point Lane/State Road intersection could be reduced by adding right turning lanes. This slight advantage from a traffic point of view would have to be weighed with respect to the objective of keeping the new roads as traditional, Vineyard roads that are generally only two lanes wide.
- The delays on High Point Lane can also be reduced by making it part of a one-way loop with High Point Lane up from State Road and Evelyn Way down towards State Road. Here again, the possible traffic benefit would have to be weighed against the fact that the idea of a two-lane one-way road is not typical of Vineyard character.
- Making Look Street one-way heading out from State Road could further decrease the delays at the Look Intersection.
- The citizens of Tisbury are being asked to a survey of actual possible layouts of the connector road network. This study will clarify the feasibility of the various suggestions. If the Town moves ahead with this survey, the Commission can refine this study.

Appendix

Traffic Assignment

The traffic to the network was assigned to the proposed new connector roads based on the results from the O-D survey as described in the following flow chart.



At the Look Street intersection, not all traffic coming from Edgartown-Vineyard Haven Road and turning left on to State Road will use the Connector Roads, and not all traffic coming from State Road and turning right onto Edgartown-Vineyard Haven Road will use the Connector Roads. The following assumptions were made while assigning volumes to network.

- Coming from the area around Skiff Avenue, 80% will use Holmes Hole Road
- Coming from Edgartown, 95% will use Holmes Hole Road
- Coming from the area around Skiff Avenue, 75% will use High Point Lane
- Coming from Edgartown 85% will use High Point Lane
- Coming from Up-Island and going around Skiff Avenue via Holmes Hole Road –80%
- Coming from Up-Island and going to Edgartown via Holmes Hole Road-95%
- Coming from zone 1009 and going around Skiff Avenue via High Point Lane – 75%
- Coming from zone 1009 and going to Edgartown via High Point Lane – 85%

(zone 1009 is the Upper State Road commercial zone starting from Holmes Hole Road to Evelyn Way)

The above flow chart was directly used while analyzing alternatives 1a, 1b and as the basis for other alternatives.

For “alternative 1c” (one way loop analysis), the left and right turning movements (both existing movements and additional movements due to construction of connector roads) from High Point Lane to State Road were assigned to right turns from Holmes Hole Road and left turns from Evelyn Way respectively. Left and right turns (both existing movements and additional movements due to construction of connector roads) from State Road at High Point Intersection were assigned to right

turns from State Road to Evelyn Way and left turns from State Road to Holmes Hole Road respectively.

For alternative 2, the flow chart was used as the basis, and movements assigned to left and right turns (only additional movements due to construction of connector roads) from High Point Lane to State Road were reassigned as right turns from Holmes Hole Road and left turns from Evelyn Way respectively. Left and right turns (only additional movements due to construction of connector roads) from State Road to High Point Lane were assigned as right turns from State Road at Evelyn Way and left turns from State Road at Holmes Hole Road.

For alternative 3, the flow chart was used as the basis, basis and the movements assigned to left and right turns from Holmes Hole Road to State Road were assigned to left turns from High Point Lane to State Road. Left and right turns assigned from State Road to Holmes Hole Road were assigned as right turns from State Road to High Point Lane.

Traffic Analysis Zones

- 1001 - Aquinnah
- 1002 - Chilmark
- 1003 - Edgartown
- 1004 - North Oak Bluffs
- 1005 - Region of Oak Bluffs between Barnes Road, County Road and Edgartown-Vineyard Haven Road
- 1006 - Tisbury around Winyah subdivision (area along Skiff Ave., Hines Point Rd and Edgartown-Vineyard Haven Rd to town line)
- 1007 - Main Street area, Vineyard Haven SSA area, Beach Road from Five Corners to Lagoon Pond Bridge area, State Road from Martin Road to Five Corners area
- 1008 - West Chop, Franklin Street (most of North Tisbury), area along Pine Tree Road, Pine Street and Lake Street
- 1009 - Upper State Road commercial district starting from North of Holmes Hole Road to South of Evelyn Way, and area around Tisbury Park & Ride, Tisbury dump, DPW
- 1010 - Area between West Tisbury and Oak Bluff Town lines
- 1011 - West Tisbury
- 1012 - Area around Airport Business Park

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Table 8: Origin Destination Trip Table - Tuesday

Origin (Down)	Destination (Across)												Total	% Total Origins	
	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012			
1001			1	-	1	-	1						-	3	0.4%
1002			-	2	1	-	5						-	8	1.2%
1003	-	-		1				42	18	27	2	5		95	14.2%
1004	-	4	1		-	5			12	25	4	21	-	72	10.8%
1005	-	3		-				15	15	25	1	10		69	10.3%
1006	-	1		3				19	9	25	3	12		72	10.8%
1007	2	13	25		9	6			11	48	7	32	4	157	23.5%
1008			7	5	5	3	6						3	29	4.3%
1009			5	15	12	8	44						5	89	13.3%
1010			3	2	1	1	3							10	1.5%
1011			5	9	2	4	35							55	8.2%
1012	-	-		1				3	2	4	1	-		11	1.6%
Total	2	21	47	38	31	27	173	67	154	18	80	12		670	
% Total Destinations	0.3%	3.1%	7.0%	5.7%	4.6%	4.0%	25.7%	10.3%	23.2%	2.7%	12.0%	1.8%			

Table 9: Origin Destination Trip Table - Saturday

Origin (Down)	Destination (Across)												Total	% Total Origins	
	1001	1002	1003	1004	1005	1006	1007	1008	1009	1010	1011	1012			
1001			1	-	1	-	1						-	3	0.5%
1002			-	2	1	-	5						-	8	1.4%
1003	-	-		1			31	17	19	3	4			75	12.8%
1004	1	3	-		-	3		6	11	1	10	-		35	6.0%
1005	2	1		3			22	17	26	2	5			78	13.3%
1006	2	2		3			22	17	26	2	5			79	13.5%
1007	-	7	22		6	11		9	44	4	28	4		135	23.0%
1008			-	1	1	1	3						-	6	1.0%
1009			5	16	13	9	46						5	94	16.0%
1010			3	2	1	1	3							10	1.7%
1011			5	10	2	4	37							58	9.9%
1012	-	-		-			4	1	-	-	-			5	0.9%
Total	5	13	36	38	25	29	174	67	126	12	52	9		586	
% Total Destinations	0.9%	2.2%	6.1%	6.5%	4.3%	4.9%	29.7%	11.4%	21.5%	2.0%	8.9%	1.5%			

The following tables show the comparison of various measures of effectiveness (MOE) for the existing conditions, the No-Build Condition in 2014, and the five alternatives in 2014. Tables 8 to 13 show the results for the peak summer season. Tables 14 to 16 show the results for off-season. Only one peak hour analysis is shown as the analysis for different peaks did not yield a significant difference in the results and this approach offered the simplest way to interpret the results.

Measures of Effectiveness	Existing 2004	No-Build 2014	Alternative 1a Homes/High 2014	Alternative 1b Turning Lanes 2014	Alternative 1c One-Way Loop 2014	Alternative 2 Holmes Only 2014	Alternative 3 High Only 2014
Approach delay for the critical movement (seconds)	*	*	42	42	42	429	42
Approach LOS	F	F	E	E	E	F	E
ICU (%)	92%	107%	76%	76%	73%	81%	76%
ICU LOS	F	G	D	D	D	D	D
95th Queue (car lengths)	**	**	3	1	6	17	3
Average Delay/Vehicle (seconds)	*	*	37	37	37	140	37

ICU - Intersection Capacity Utilization

LOS - Level of Service

* - Delay greater than 10 minutes

** - 95th Queue length greater than 25 car lengths (1 car length = 20ft)

Measures of Effectiveness	Existing 2004	No-Build 2014	Alternative 1a Homes/High 2014	Alternative 1b Turning Lanes 2014	Alternative 1c One-Way Loop 2014	Alternative 2 Holmes Only 2014	Alternative 3 High Only 2014
Approach delay for the critical movement (seconds)	15	23	66	39	78	94	23
Approach LOS	B	C	F	E	F	F	C
ICU (%)	61%	71%	80%	75%	82%	84%	71%
ICU LOS	B	C	E	E	D	E	C
95th Queue (car lengths)	1	3	7	5	15	18	7
Average Delay/Vehicle (seconds)	1	1	11	7	14	20	1

Measures of Effectiveness	Existing 2004	No-Build 2014	Alternative 1a Homes/High 2014	Alternative 1b Turning Lanes 2014	Alternative 1c One-Way Loop 2014	Alternative 2 Holmes Only 2014	Alternative 3 High Only 2014
Approach delay for the critical movement (seconds)	25	39	100	44	-	27	957
Approach LOS	C	E	F	E	-	D	F
ICU (%)	53%	66%	102%	97%	95%	58%	116%
ICU LOS	A	C	G	F	F	B	H
95th Queue (car lengths)	2	2	9	6	23	3	**
Average Delay/Vehicle (seconds)	1	1	10	5	3	1	128

Table 13: Peak Season - State Road with Evelyn Way							
Measures of Effectiveness	Existing 2004	No-Build 2014	Alternative 1a Homes/High 2014	Alternative 1b Turning Lanes 2014	Alternative 1c One-Way Loop 2014	Alternative 2 Holmes Only 2014	Alternative 3 High Only 2014
Approach delay for the critical movement (seconds)	21	29	22	22	31	74	22
Approach LOS	C	D	C	C	D	F	C
ICU (%)	57%	67%	39%	39%	43%	75%	39%
ICU LOS	B	C	A	A	A	D	A
95th Queue (car lengths)	2	3	3	4	5	5	3
Average Delay/Vehicle (seconds)	1	1	2	2	5	3	2

Table 14: Peak Season - Connector Road with Edgartown-Vineyard Haven Road							
Measures of Effectiveness	Existing 2004	No-Build 2014	Alternative 1a Homes/High 2014	Alternative 1b Turning Lanes 2014	Alternative 1c One-Way Loop 2014	Alternative 2 Holmes Only 2014	Alternative 3 High Only 2014
Approach delay for the critical movement (seconds)	NA	NA	26	26	26	19	26
Approach LOS	NA	NA	D	D	D	C	D
ICU (%)	NA	NA	67%	67%	67%	63%	67%
ICU LOS	NA	NA	C	C	C	B	C
95th Queue (car lengths)	NA	NA	5	6	6	6	5
Average Delay/Vehicle (seconds)	NA	NA	10	10	10	7	10

Table 15: Peak Season - Alternative 1a After Rebalancing				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	42	42.2	44.7	42.1
Approach LOS	E	E	E	E
ICU (%)	76.5%	74.6%	62.1%	76.0%
ICU LOS	D	D	B	D
95th Queue (car lengths)	4	7	6	5

Table 16: Peak Season - Alternative 1b After Rebalancing				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	34	33	32	34
Approach LOS	D	D	D	D
ICU (%)	77%	72%	61%	75%
ICU LOS	D	D	B	D
95th Queue (car lengths)	4	5	3	5

Table 17: Peak Season - Alternative 1c After Rebalancing				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	42	40	-	41
Approach LOS	E	E	-	E
ICU (%)	77%	68%	99%	45%
ICU LOS	D	C	F	A
95th Queue (car lengths)	5	11	-	5

Table 18: Peak Season - Alternative 2 After Rebalancing				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	65	66	29	67
Approach LOS	F	F	D	F
ICU (%)	78%	81%	60%	81%
ICU LOS	D	D	B	D
95th Queue (car lengths)	6	11	3	5

Table 19: Peak Season - Alternative 3 After Rebalancing				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	215	23	217	224
Approach LOS	F	C	F	F
ICU (%)	82%	76%	67%	80%
ICU LOS	D	D	C	D
95th Queue (car lengths)	10	4	28	8

Table 20: Off-Peak Season - Existing Conditions				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	86	12	12	14
Approach LOS	F	B	B	B
ICU (%)	72%	55%	47%	48%
ICU LOS	C	B	A	A
95th Queue (car lengths)	6	1	2	2

Table 21: Off-Peak Season - No-Build 2014				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	525	14	13	17
Approach LOS	F	B	B	C
ICU (%)	82%	63%	51%	55%
ICU LOS	E	B	A	A
95th Queue (car lengths)	**	1	2	2

Table 22: Off-Peak Season - Build 2014 (alternative 1a)				
Measures of Effectiveness	Look Intersection	Holmes Hole Road Intersection	High Point Lane Intersection	Evelyn Way Intersection
Approach delay for the critical movement (seconds)	18	27	15	15
Approach LOS	C	D	B	B
ICU (%)	62%	69%	60%	55%
ICU LOS	B	C	B	B
95th Queue (car lengths)	5	3	2	3



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