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August 30, 2022

Town of Ledyard Planning and Zoning Commission
Attn: Mrs. Juliet Hodge, Director of Planning
741 Colonel Ledyard Highway
Ledyard, CT 06339

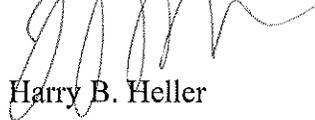
Re: Application of Avery Brook Homes, LLC for an affordable housing subdivision (C.G.S. §8-30g) on properties located at 94, 96, 98 and 100 Stoddards Wharf Road, Ledyard, Connecticut

Dear Juliet:

Enclosed herewith please find five (5) copies of the "Traffic Impact Study 94, 96, 98 and 100 Stoddards Wharf Road Ledyard, Connecticut Prepared For: Avery Brook Homes LLC Prepared By: KWH Enterprise, LLC August 2022". This report is being submitted in addition to the application package that was submitted on August 29, 2022 to the Ledyard Planning and Zoning Commission.

Should you have any questions, or need anything further at this time, please feel free to contact the undersigned.

Very truly yours,


Harry B. Heller

HBH/rmb
Enclosures

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AUG 31 2022

LAND USE DEPARTMENT



Traffic Impact Study

94, 96, 98, and 100 Stoddards Wharf Road
Ledyard, Connecticut

Prepared for:
Avery Brook Homes LLC

Prepared by:
KWH Enterprise, LLC
August 2022



Traffic Impact Study 94, 96, 98, and 100 Stoddards Wharf Road Ledyard, Connecticut

This study examines the traffic impact of 36 proposed single-family houses on Stoddards Wharf Road in Ledyard, Connecticut. Levels of Service (LOS) for traffic flows under 2025 build traffic conditions were analyzed to identify any deficiencies in existing and future traffic operations at area intersections. For the purpose of this traffic study, 2025 was assumed to be the year during which the houses are built and occupied.

I. Summary

- The 36 proposed single-family houses are estimated to generate 25 and 34 vehicular trips during the respective weekday morning and afternoon peak hours.
- Traffic movements at two site driveway intersections on Stoddards Wharf Road will operate at favorable LOS A or B during the peak hours when the houses are occupied. The traffic impact of the development will be negligible and will be adequately and safely accommodated by area roadways.

II. Project Description

The development site is located north of Stoddards Wharf Road and east of the Whalehead Road intersection in Ledyard, Connecticut. 36 single-family houses are proposed. Two site driveways will be provided on Stoddards Wharf Road.

III. Existing Traffic Conditions

To evaluate the quality of traffic operation in the vicinity of the site, the following intersections were analyzed for the study:

- Stoddards Wharf Road and western site driveway; and
- Stoddards Wharf Road and eastern site driveway.

2022 peak-hour traffic volumes were generated based on pre-pandemic counts on Stoddards Wharf Road collected by CTDOT in 2017 and an annual traffic growth rate of 0.6 percent between 2017 and 2022. Because the two site driveways are not existing, no traffic analysis was performed for the 2022 existing traffic conditions.

IV. Future Traffic Conditions

For the purpose of this traffic impact study, it was assumed that the residential houses will be built and occupied in 2025.

Figures 1 and 2 show the 2025 build traffic volumes, which were generated by using an annual background traffic growth rate of 0.6 percent between 2022 and 2025 and by

including the site trips discussed as follows. The 0.6 percent annual growth rate was recommended by CTDOT.

Trip Generation

Peak-hour vehicular trips generated by the houses in Table 1 were estimated based on data from ITE (Institute of Transportation Engineers) *Trip Generation Manual, 11th Edition*. The development is expected to generate 25 and 34 vehicular trips during the respective weekday morning and weekday afternoon peak hours.

Table 1 Trip Generation (vph)

ITE LU 210, Single-Family Detached Housing (36 Units)			
	Entry	Exit	Entry & Exit
Weekday AM peak hour of adjacent street	7	18	25
Weekday PM peak hour of adjacent street	21	13	34

vph Vehicles per hour

Table 2 depicts the distribution of the site-generated trips along area routes. The distribution takes into account the relative traffic volumes of area roadways and the development patterns in this part of Ledyard.

Table 2 Trip Distribution

To / From Route	Entry/Exit
East: Route 214	40%
West: Route 214	60%
Total	100%

Capacity Analysis

To assess the quality of traffic flow, intersection capacity analysis was conducted for the future build traffic conditions. Capacity analysis provides an indication of how well roadway facilities serve the traffic demands placed upon them. Synchro 10, a software package that includes the evaluation criteria of the *Highway Capacity Manual, 6th Edition*, was used to analyze the intersections.

Level of service (LOS) is the term used to describe the different operating conditions that occur on a given roadway segment or intersection under various traffic conditions. It is a qualitative measure of the effects of a number of factors including roadway geometry, speed, travel delay, freedom to maneuver, and safety. Six levels of service can be defined for each type of facility. Each level of service (LOS) is given a letter designation from A to F, with LOS A representing the best operating conditions and LOS F representing the worst.

Table 3 that follows shows the capacity analysis results for the analyzed intersections under the 2025 build traffic conditions. All traffic movements at the two site driveway intersections will operate at favorable LOS A or B during the weekday peak hours.

The vehicular trips of the development will be adequately accommodated by Stoddards Wharf Road. The traffic impact of the development on area roadways will be negligible.

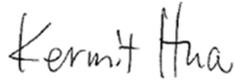
Table 3 Capacity Analyses for Build Conditions

Intersection	2025 Build Conditions			
	Weekday Morning Peak Hour of Adjacent Streets		Weekday Afternoon Peak Hour of Adjacent Streets	
	Delay (sec)	LOS	Delay (sec)	LOS
Stoddards Wharf Road and Site Driveway (W) (Unsignalized)				
EB Stoddards Wharf Road Left Turn	7.8	A	7.7	A
EB Stoddards Wharf Road Through	0.0	A	0.0	A
SB Site Driveway (W)	10.6	B	10.4	B
Stoddards Wharf Road and Site Driveway (E) (Unsignalized)				
EB Stoddards Wharf Road Left Turn	7.8	A	7.7	A
EB Stoddards Wharf Road Through	0.0	A	0.0	A
SB Site Driveway (E)	10.8	B	10.6	B

EB Eastbound
 WB Westbound
 NB Northbound
 SB Southbound
 LOS Level of Service

V. Conclusions

Area traffic operation was analyzed for the development of 36 houses under 2025 build traffic conditions. The traffic impact of the development will be negligible and will be adequately and safely accommodated by area roadways.



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Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.

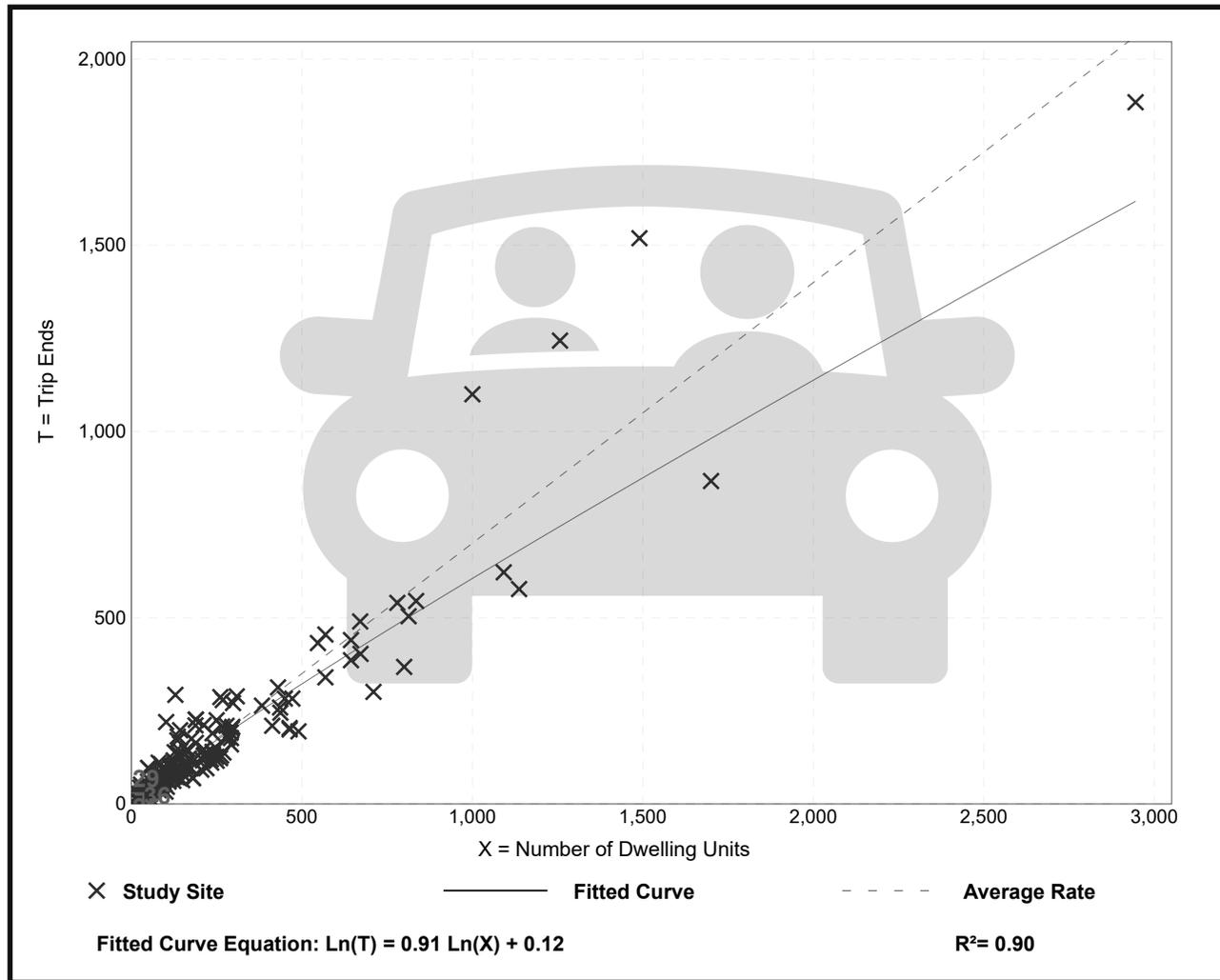
Setting/Location: General Urban/Suburban

Number of Studies: 192
 Avg. Num. of Dwelling Units: 226
 Directional Distribution: 26% entering, 74% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.70	0.27 - 2.27	0.24

Data Plot and Equation



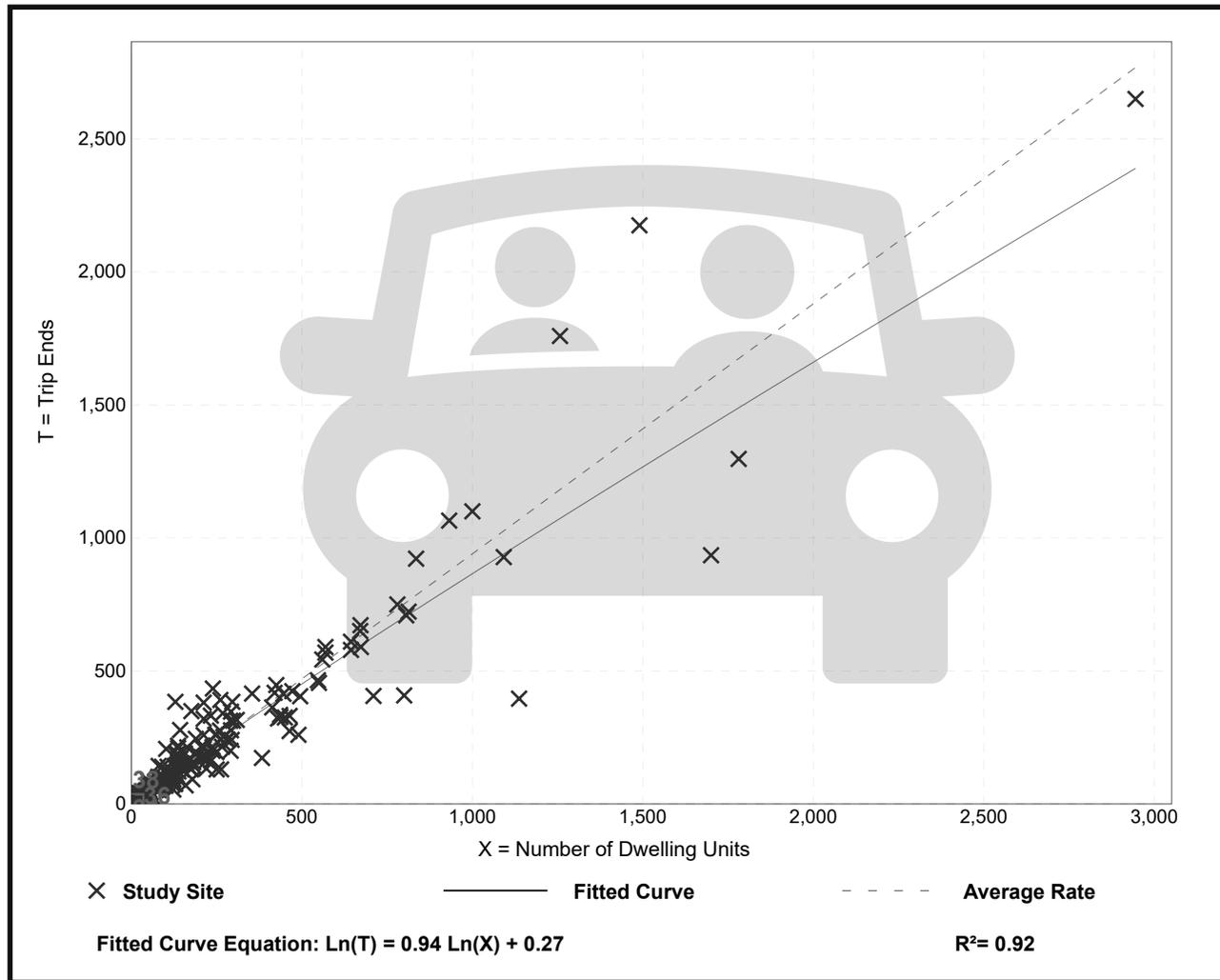
Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
 Number of Studies: 208
 Avg. Num. of Dwelling Units: 248
 Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.94	0.35 - 2.98	0.31

Data Plot and Equation



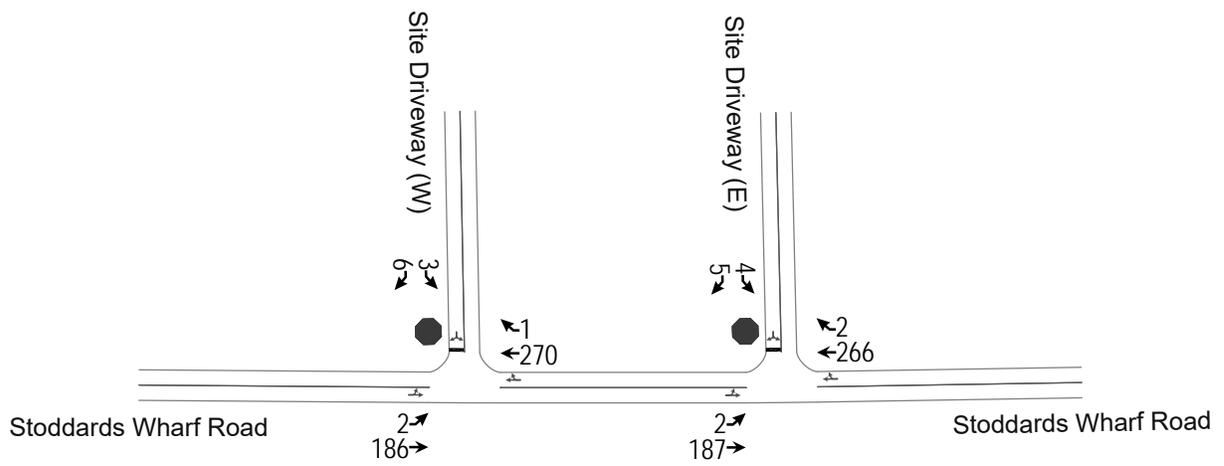


Figure 1 2025 Traffic Volumes for Build Conditions, Weekday Morning Peak Hour

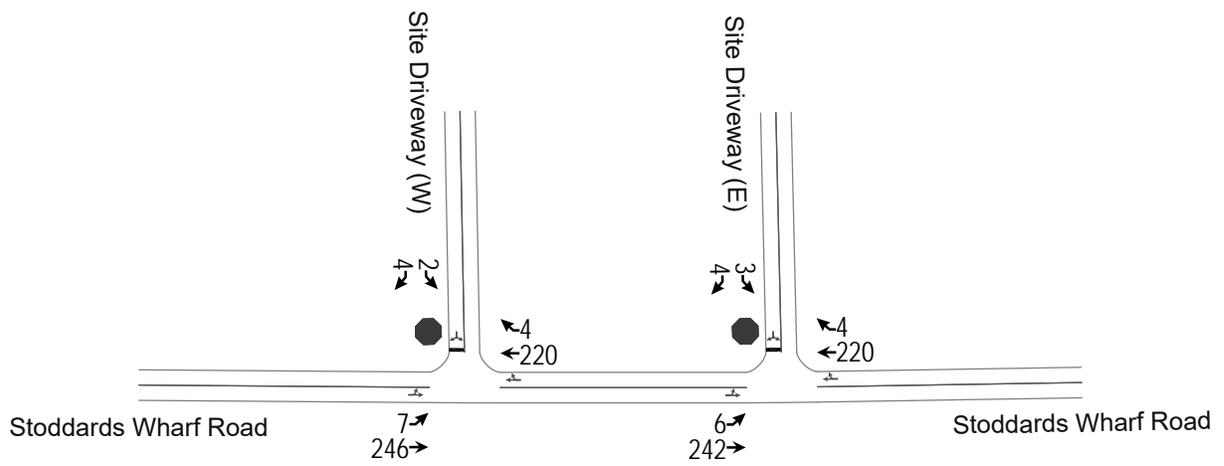


Figure 2 2025 Traffic Volumes for Build Conditions, Weekday Afternoon Peak Hour

HCM 6th TWSC
 2: Stoddards Wharf Road & Site Driveway (W)

08/26/2022

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	2	186	270	1	3	6
Future Vol, veh/h	2	186	270	1	3	6
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	202	293	1	3	7

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	294	0	-	0	500 294
Stage 1	-	-	-	-	294 -
Stage 2	-	-	-	-	206 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1268	-	-	-	530 745
Stage 1	-	-	-	-	756 -
Stage 2	-	-	-	-	829 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1268	-	-	-	529 745
Mov Cap-2 Maneuver	-	-	-	-	529 -
Stage 1	-	-	-	-	754 -
Stage 2	-	-	-	-	829 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1268	-	-	-	656
HCM Lane V/C Ratio	0.002	-	-	-	0.015
HCM Control Delay (s)	7.8	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	2	187	266	2	4	5
Future Vol, veh/h	2	187	266	2	4	5
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	203	289	2	4	5

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	291	0	-	0	497 290
Stage 1	-	-	-	-	290 -
Stage 2	-	-	-	-	207 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1271	-	-	-	532 749
Stage 1	-	-	-	-	759 -
Stage 2	-	-	-	-	828 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1271	-	-	-	531 749
Mov Cap-2 Maneuver	-	-	-	-	531 -
Stage 1	-	-	-	-	757 -
Stage 2	-	-	-	-	828 -

Approach	EB	WB	SB
HCM Control Delay, s	0.1	0	10.8
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1271	-	-	-	633
HCM Lane V/C Ratio	0.002	-	-	-	0.015
HCM Control Delay (s)	7.8	0	-	-	10.8
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC
 2: Stoddards Wharf Road & Site Driveway (W)

08/26/2022

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	↷
Traffic Vol, veh/h	7	246	220	4	2	4
Future Vol, veh/h	7	246	220	4	2	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	8	267	239	4	2	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	243	0	-	0	524 241
Stage 1	-	-	-	-	241 -
Stage 2	-	-	-	-	283 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1323	-	-	-	514 798
Stage 1	-	-	-	-	799 -
Stage 2	-	-	-	-	765 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1323	-	-	-	510 798
Mov Cap-2 Maneuver	-	-	-	-	510 -
Stage 1	-	-	-	-	793 -
Stage 2	-	-	-	-	765 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.4
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1323	-	-	-	672
HCM Lane V/C Ratio	0.006	-	-	-	0.01
HCM Control Delay (s)	7.7	0	-	-	10.4
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	6	242	220	4	3	4
Future Vol, veh/h	6	242	220	4	3	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	7	263	239	4	3	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	243	0	-	0	518 241
Stage 1	-	-	-	-	241 -
Stage 2	-	-	-	-	277 -
Critical Hdwy	4.12	-	-	-	6.42 6.22
Critical Hdwy Stg 1	-	-	-	-	5.42 -
Critical Hdwy Stg 2	-	-	-	-	5.42 -
Follow-up Hdwy	2.218	-	-	-	3.518 3.318
Pot Cap-1 Maneuver	1323	-	-	-	518 798
Stage 1	-	-	-	-	799 -
Stage 2	-	-	-	-	770 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1323	-	-	-	515 798
Mov Cap-2 Maneuver	-	-	-	-	515 -
Stage 1	-	-	-	-	794 -
Stage 2	-	-	-	-	770 -

Approach	EB	WB	SB
HCM Control Delay, s	0.2	0	10.6
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1323	-	-	-	646
HCM Lane V/C Ratio	0.005	-	-	-	0.012
HCM Control Delay (s)	7.7	0	-	-	10.6
HCM Lane LOS	A	A	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0