

November 10, 2022 (**Revised January 18, 2023**)

Ms. Lelah Campo, Owner
Cozy Hill II Campground
1311 Bantam Road
Bantam, CT 06750

**Re: RV Park Traffic Impact Assessment
232 Klug Hill Road
Torrington, Connecticut
SLR #141.20174.00002**

Dear Ms. Lelah Campo,

SLR International Corporation (SLR) has taken on this evaluation to provide a traffic impact assessment of the proposed RV Park development at 232 Klug Hill Road in Torrington, Connecticut. **Figure 1** illustrates the site location.

The study is meant to assess the impacts of the proposed 92 lot RV Park accessed at the driveway intersection at Klug Hill Road and at a nearby intersection of Klug Hill Road at Route 4. The development is located on a large parcel of land, approximately 226 acres, that currently serves one single family residence and contains delineated wetlands.

This report includes: a review of existing roadway and traffic conditions, a review of existing traffic volumes and speeds, an evaluation of intersection sight distance, a review of the most recent five (5) year crash data and a capacity analysis that looks at the existing, no-build and build conditions. Note that this revision of the report (January 18, 2023) reflects comments provided Mr. Paul Kundzins, P.E., the Deputy Director of Public Works – City Engineer, in his December 7, 2022 Memorandum to Mr. Jeremy Leifert, City Planner.

Existing Roadway and Traffic Conditions

Klug Hill Road is a 25 mile per hour (mph), two-lane, 1-mile-long rural minor collector road that runs north/south in West Torrington, Connecticut and connects to Route 4 to the north and Allen Road and Westside Road to the south. The road serves only a few single-family houses and a farm which connects into more densely populated residential neighborhoods to the south. The site location includes an existing driveway near a sharp curve, surrounded by wetlands.

Route 4 is a 45 mph, two-lane, rural minor arterial that serves as the main artery for traffic heading in all directions to and from Klug Hill Road. This includes access to Route 63 (running north/south), Route 8

(running north/south) and Route 202 (running east/west). The latter two routes go directly through Torrington. Based on the location of the site, vehicles would only travel south on Klug Hill Road to reach limited specific destinations in west downtown Torrington, otherwise it is faster to head north to Route 4 and Route 8 to go south.

The intersection of Klug Hill Road, Wright Road and Route 4 is a four-way, minor lane stopped-controlled intersection with all approaches intersecting at 90 degrees. Wright Road, which is the roadway to the north, is a dead-end street serving residential, single-family houses. There is adequate sight distance along Route 4 for vehicles looking in either direction.

Per discussions with Torrington City staff and the Connecticut Department of Transportation (CTDOT), there are no proposed projects along Klug Hill Road and within the vicinity of the intersection with Route 4.

Existing Traffic Volumes

The annual average daily traffic (AADT) was obtained from the CTDOT Traffic Monitoring Station Viewer. Klug Hill Road's Average Annual Daily Traffic (AADT) was 600 vehicles in August 2021. Route 4 AADT was 6700 vehicles in August 2021.

Manual turning movement counts were collected during the morning and afternoon peak periods at the intersection of Klug Hill Road and Route 4 on March 15, 2022. From those counts, the morning (7:30 a.m. to 8:30 a.m.) and the afternoon (4:00 p.m. to 5:00 p.m.) peak-hour traffic volumes were extracted. The existing peak-hour traffic volumes are shown in **Figure 2**.

Existing Traffic Speeds

A 24-hour Automatic Traffic Recorder (ATR) count was conducted near the site driveway on Klug Hill Road on Wednesday March 30, 2022. Both traffic volume and vehicle speed data were assembled from that count. The 85th percentile speed is the speed at which 85 percent of the traffic at a location travel at or below. This speed, along with parking lot size, is used in Torrington to establish sight distance requirements as outlined in their parking regulations. It was determined that the 85th percentile speed was 40.1 mph northbound and 38.1 mph southbound. While higher than the posted speed limit, it is not unexpected due to Klug Hill Road being a rural, sparsely populated, lightly traveled roadway.

Intersection Sight Distance

At the proposed driveway location, available sight distances were evaluated. We determined the available intersection sight distance (ISD) and the available stopping sight distance (SSD). ISD is the distance that a driver exiting the site can see a car approaching from. Based on CTDOT guidelines, for a posted speed limit of 25 miles per hour, an ISD of 280 feet is recommended. Looking in both directions from the proposed driveway, the ISD easily exceeds 280 feet.

For vehicles on Klug Hill Toad, the critical sight distance in the SSD. This is the distance required for a vehicle approaching the driveway to stop should a car exit the driveway. There is a 0 percent grade for northbound vehicles and a -6 percent grade for southbound vehicles, which factors into the SSD calculations based CTDOT guidelines. For the 85th percentile speeds of 38.1 mph and 40.1 mph, an SSD of 280 feet for northbound vehicles and 335 feet for southbound vehicles, respectively, is required. Both criteria are met for this driveway location.

Crash History

Crash data obtained via the Connecticut Crash Data Repository for a 5-year period was evaluated from January 1, 2017, to August 4, 2022. The data is summarized in **Table 1** by crash severity. Type of collision was not available for this data set.

A total of 7 crashes occurred along Klug Hill Road. One crash near the site driveway where a car was trying to negotiate the curve and crashed into the mailbox resulting in a possible injury. Two other crashes occurred 450 feet north and 275 feet south of the site's existing driveway and resulted in property damage only. The rest of the crashes did not occur near the site driveway. None of the reports indicated speed was a factor, but due to the high 85th percentile speed, it is reasonable to assume the vehicles were traveling over the 25-mph speed limit.

A total of 5 crashes occurred within the vicinity of the Klug Hill Road and Route 4 intersection. While one crash resulted in a serious injury and two resulted in minor injuries, no fatalities were recorded. This is most likely due to the high speeds and heavier traffic volumes compared to Klug Hill Road. However, based on the crash data available, there are no crash trends.

Table 1 Crash Summary

Location	Crash Severity					
	Fatality	Serious Injury	Suspected Minor Injury	Possible Injury	Property Damage Only	Total
Klug Hill Road	-	-	-	2	5	7
Klug Hill Road @ Route 4	-	1	2	-	2	5
TOTAL	-	1	2	2	7	12

Source: Connecticut Crash Data Repository – January 1, 2017 to April 4, 2022

Site Generated Traffic & Distribution

Based on the proposed development of 92 RV Spaces, ITE land use code (LUC) 416, Campground/Recreational Vehicle Park, was used to estimate the site generated traffic. The A.M. Peak Hour and P.M. Peak Hour trip generation was used, there was no available data for Saturday Peak Hour. **Table 2** shows the generated trips for the proposed RV Park. Note that the ITE data includes all traffic generation from the sample sites. As such, both the arrival/departure trips as well trips made during the duration of stay trips are captured in the data base.

Table 2 Site Generated Volume

Land Use	Number Of Vehicle Trips					
	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
91 RV Spaces*	9	16	25	26	16	42

* ITE land use code (LUC) 416, Campground/Recreation Vehicle Park – based on 92 RV spaces

Trips were distributed based on a review of travel patterns in the area and the adjacent roadway network, as well as comments from the City Engineer who suggested a greater orientation to/from the east at Route 4. As discussed earlier, most vehicles leaving and entering the site would come to and from the north since most destinations to the south can be reached faster by first heading north to Route 4 and south on Route 8 or Route 63. Based on this, a directional distribution of 90 percent to/from the north and 10 percent to/from the south was assumed. The distribution at Route 4 assumed one-half of the traffic to/from the east, and one-half of the traffic to/from the west. **Figure 4** illustrates the site generated volumes based on that distribution.

Capacity Analysis

Future traffic volumes were modelled using *Synchro 11* and *HCM 6* methodology for Two Way Stop Controlled Intersections (TWSC) assuming a growth rate of 1 percent, provided by CTDOT, between the current year (2022) and the future opening year (2024). The *Synchro* output sheets are attached. The quality of traffic operations is expressed as a level of service (LOS), a qualitative indicator that uses the vehicle delay to produce a letter grade, A through F, that correlates to the performance of an intersection or movement. LOS A indicates an intersection or movement is operating efficiently, with no delay. LOS F indicates an intersection or movement is failing with significant delays or backups. **Table 3** summarizes the LOS results for Existing, No-Build and Build conditions. **Figures 5** and **Figure 6** illustrate the No-Build and Build conditions.

Table 3 LOS Results

Lane Group	Level of Service (LOS)					
	Weekday Morning Peak Hour			Weekday Afternoon Peak Hour		
	2022 Existing Conditions	2024 No-Build Condition	2024 Build Condition	2022 Existing Conditions	2024 No-Build Condition	2024 Build Condition
Site Entrance - 232 Klug Hill Road						
NE LR	A	A	A	A	A	A
NW LT	A	A	A	A	A	A
NW T	-	-	A	-	-	A
Klug Hill Road @ Route 4 Intersection						
NB LTR	B	B	B	C	C	C
EB L	A	A	A	A	A	A
WB L	A	A	A	A	A	A
WB T	A	A	A	A	A	A
SB LTR	A	A	A	B	B	B

NB = northbound, EB = Eastbound, WB = westbound, L = left, T = thru, R = right, LR = left right, LT = left thru, LTR = left thru right

Based on the results, the addition of 92 RV spaces will have no impact on the level of service for both the site driveway and the intersection at Route 4. The northbound Klug Hill Road approach to Route 4, shows LOS C, which is highly acceptable. All other LOSs are LOS A or LOS B.

Since Route 4 to/from the east provides access to Torrington and Route 8, we also evaluated a scenario where 75 percent of the northbound traffic was oriented to/from the east, and only 25 percent to/from the west. Under this assumption, we again found very good levels of service and no impact to operations at the Klug Hill Road/Route 4 intersection.

Conclusion & Recommendations

This traffic impact assessment was conducted to assess the impacts of the proposed 92 space RV park at 232 Klug Hill Road. The site is accessed via an existing driveway near a sharp curve. The ISD and SSD were found to meet State requirements for posted and 85th percentile speeds, respectively. While no immediate need was identified, the city should continue to maintain brush with their right-of-way so as not to obstruct visibility in the vicinity of the curve on Klug Hill Road near the site. Based on available crash data, there were no crash trends within the vicinity of the site on Klug Hill Road, nor on Route 4 near the intersection. Based on the results of the analysis, the proposed development will have little to no impact on LOS for both the site driveway and intersection with Route 4.

We hope this evaluation is useful to you. If you have any questions or need any further information, please do not hesitate to contact either of the undersigned.

Sincerely,

SLR International Corporation



David G. Sullivan, PE

US Manager of Traffic & Transportation Planning

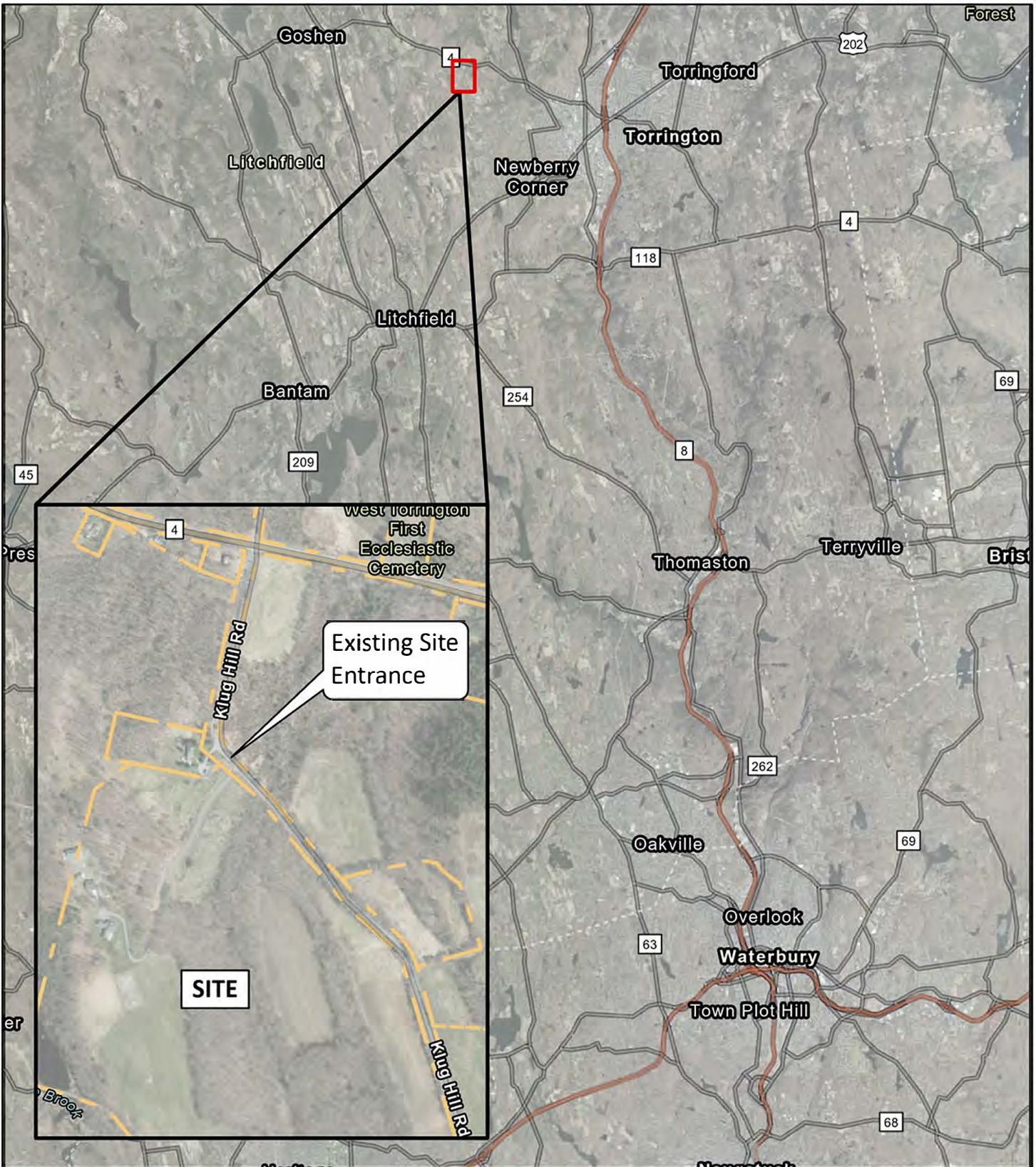
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Figures

- Figure 1 – Location Map
- Figure 2 – Existing Traffic Volumes
- Figure 3 – % Directional Distribution
- Figure 4 – Site Generated Trips
- Figure 5 – No-Build Condition
- Figure 6 – Build Condition

Attachments

- *Synchro* Analysis Worksheets




SLR

195 CHURCH STREET
 7TH FLOOR
 NEW HAVEN, CT 06511
 203.344.7887

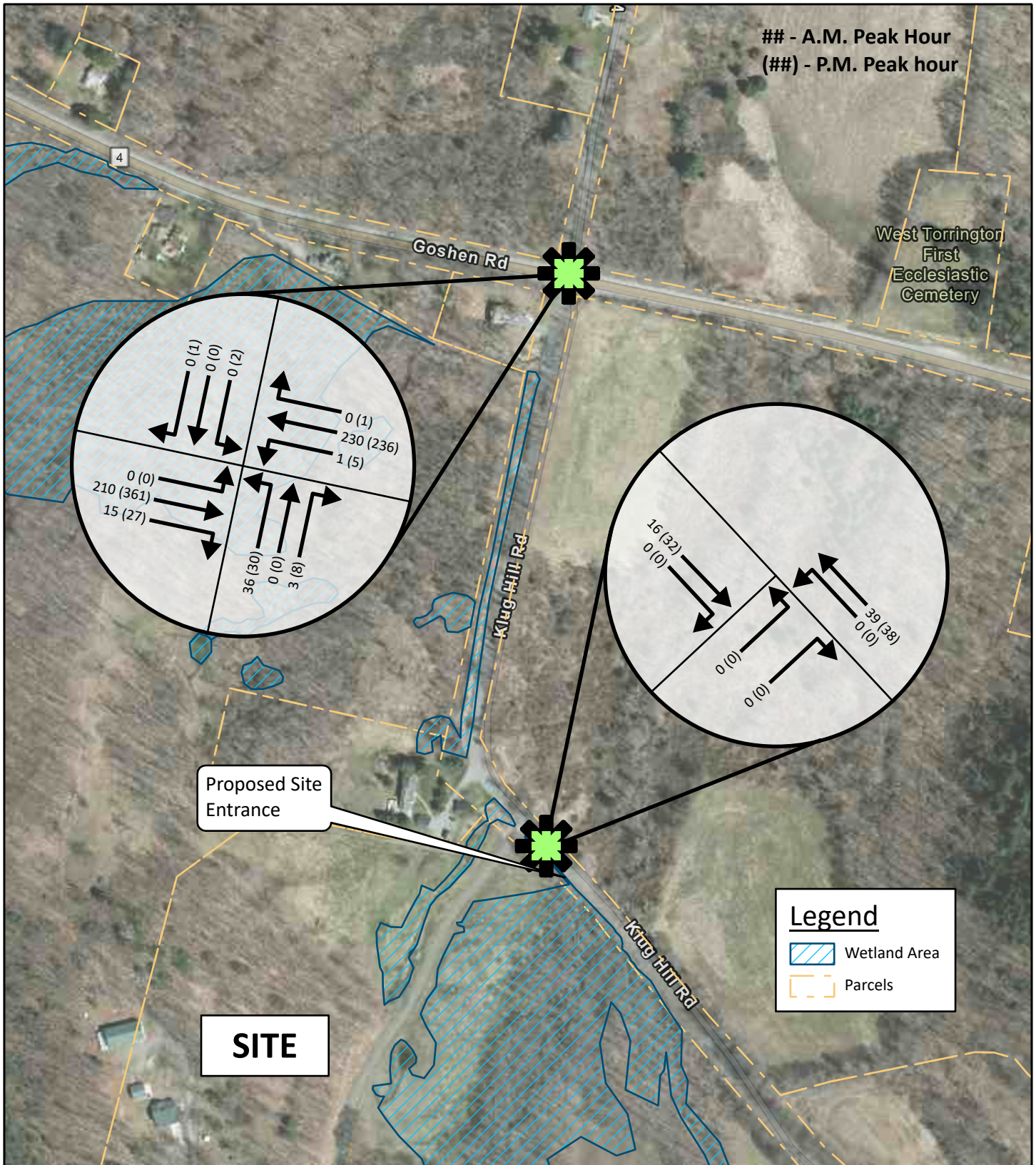
LOCATION MAP

232 Klug Hill Road, Torrington, CT
 RV Parking Traffic Impact Study

N



1 IN = 15,000 FT
 FIGURE 1



SLR

195 CHURCH STREET
 7TH FLOOR
 NEW HAVEN, CT 06511
 203.344.7887

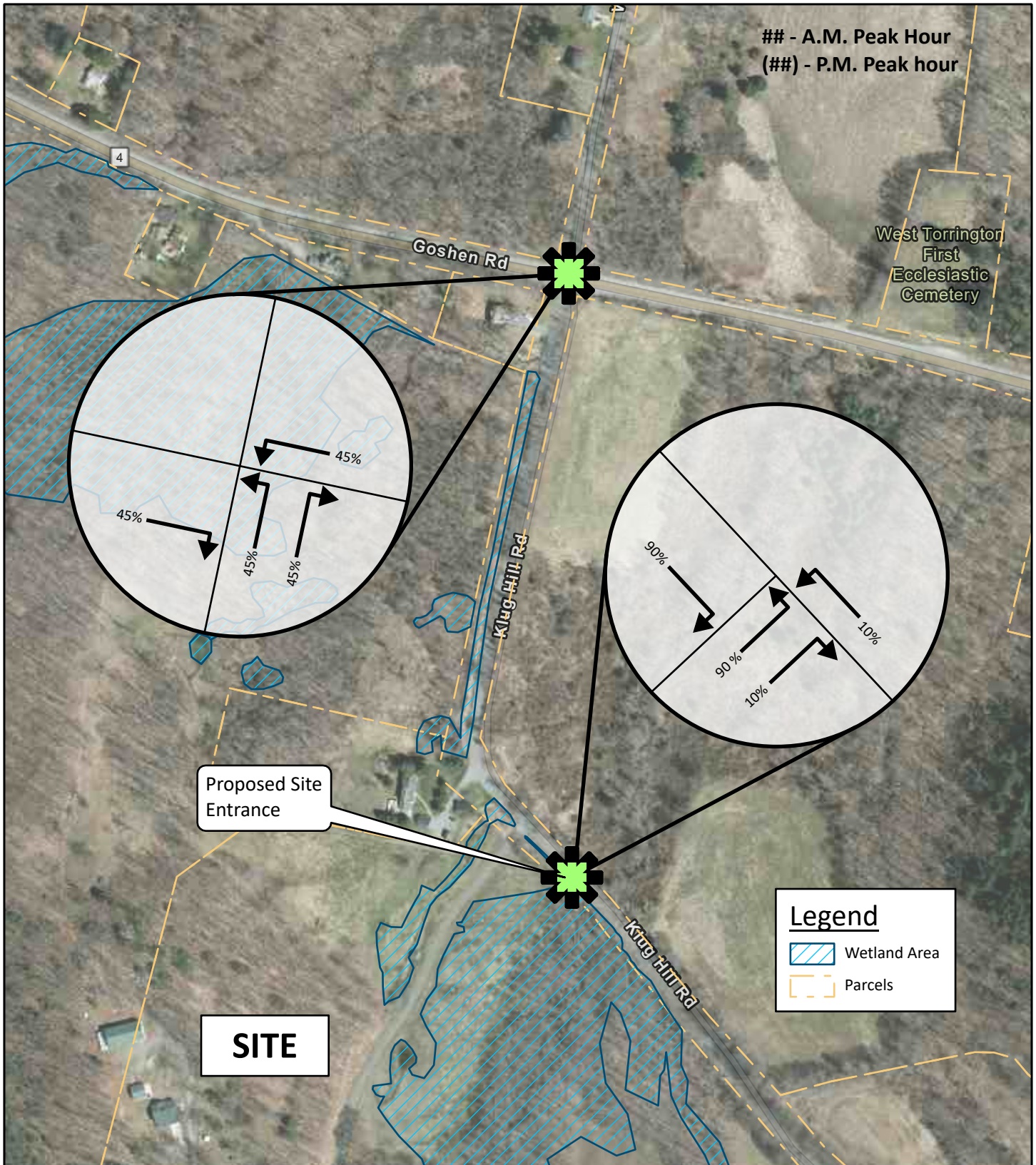
EXISTING CONDITION TRAFFIC VOLUMES

232 Klug Hill Road, Torrington, CT
 RV Parking Traffic Impact Study

N

1 IN = 300 FT

FIGURE 2



SLR

195 CHURCH STREET
 7TH FLOOR
 NEW HAVEN, CT 06511
 203.344.7887

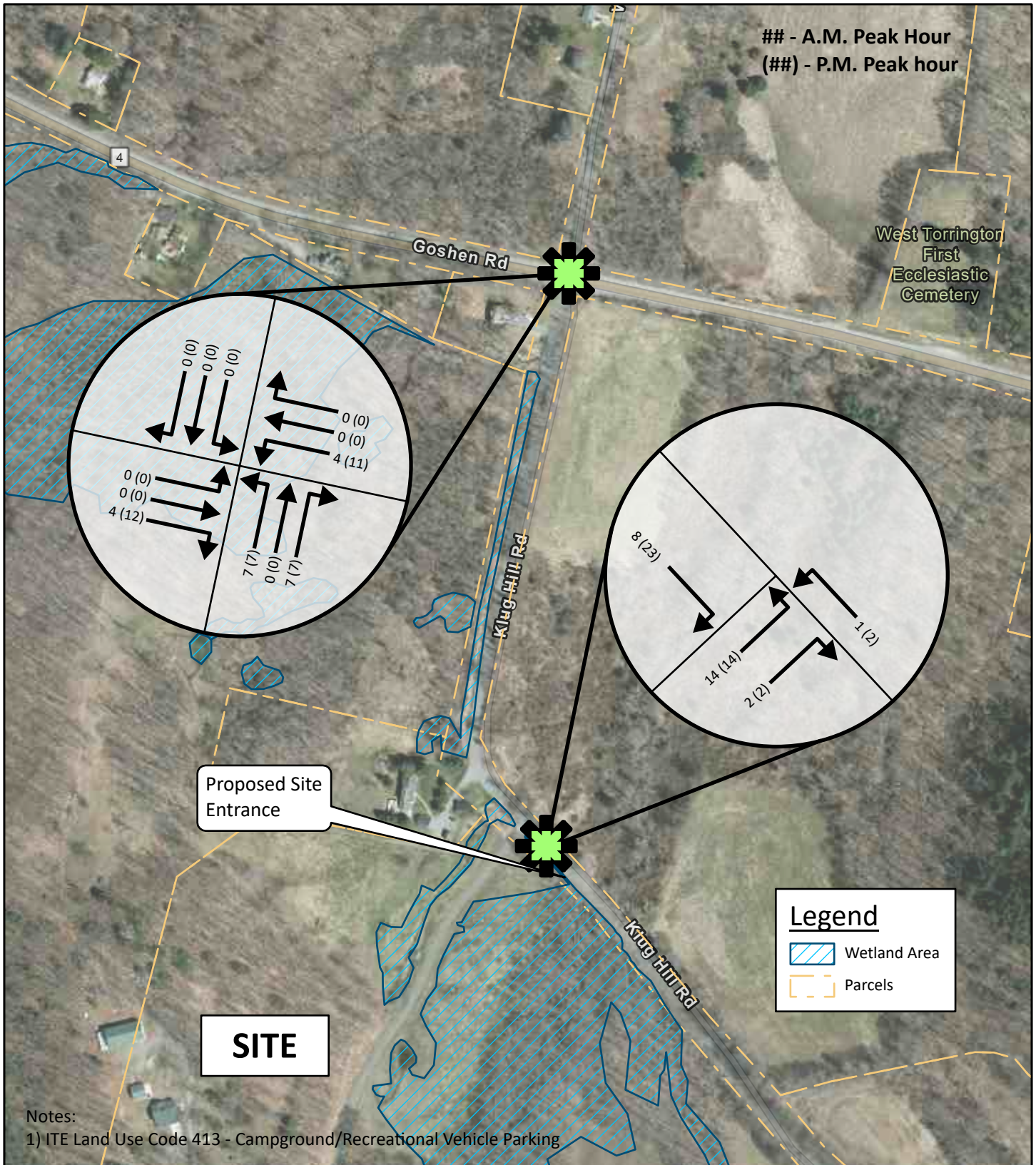
**% DIRECTIONAL DISTRIBUTION
 TRAFFIC VOLUMES**

232 Klug Hill Road, Torrington, CT
 RV Parking Traffic Impact Study

N

1 IN = 300 FT

FIGURE 4



SLR

195 CHURCH STREET
 7TH FLOOR
 NEW HAVEN, CT 06511
 203.344.7887

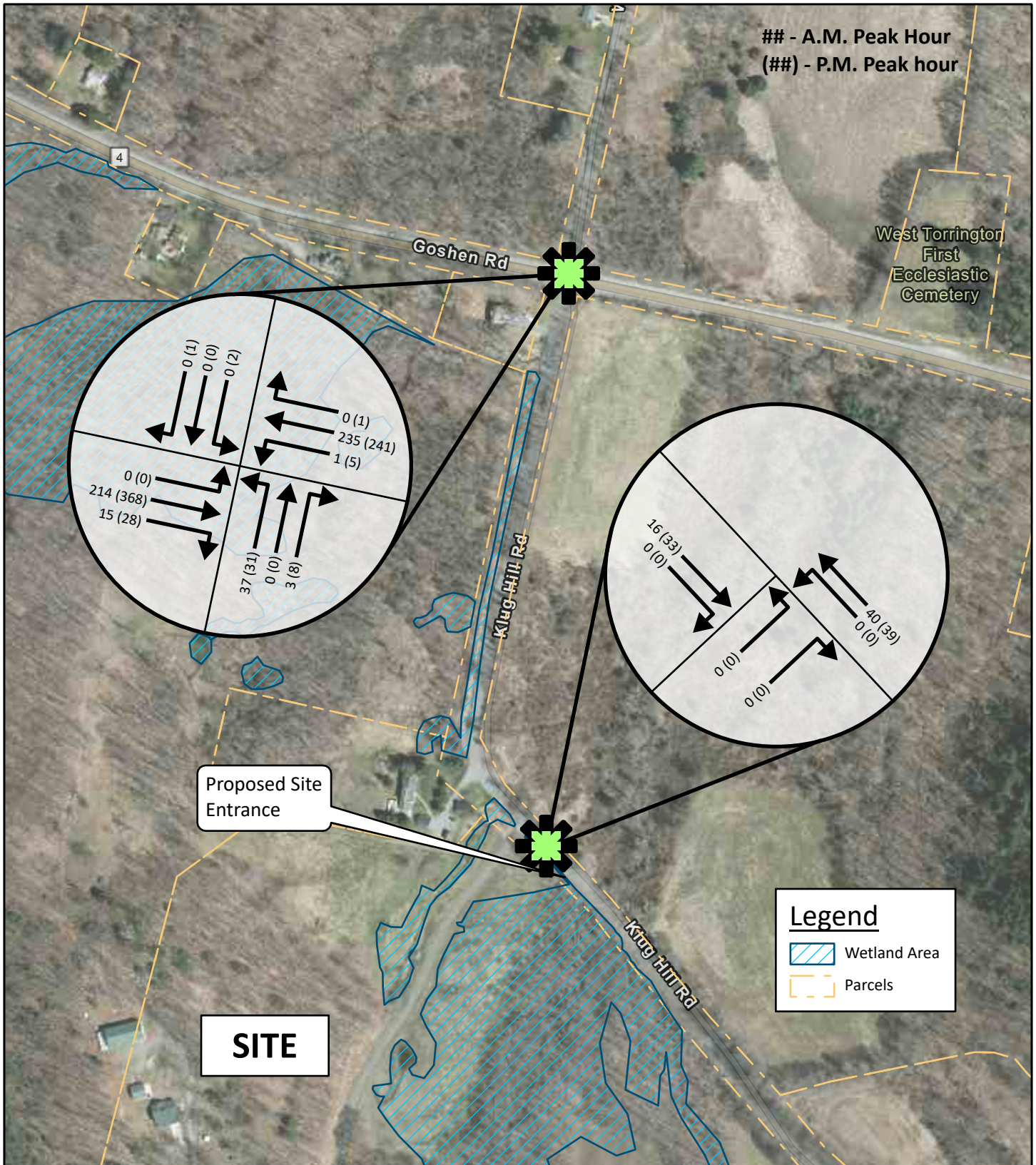
SITE GENERATED TRAFFIC VOLUMES

232 Klug Hill Road, Torrington, CT
 RV Parking Traffic Impact Study

N

1 IN = 300 FT

FIGURE 5



SLR

195 CHURCH STREET
 7TH FLOOR
 NEW HAVEN, CT 06511
 203.344.7887

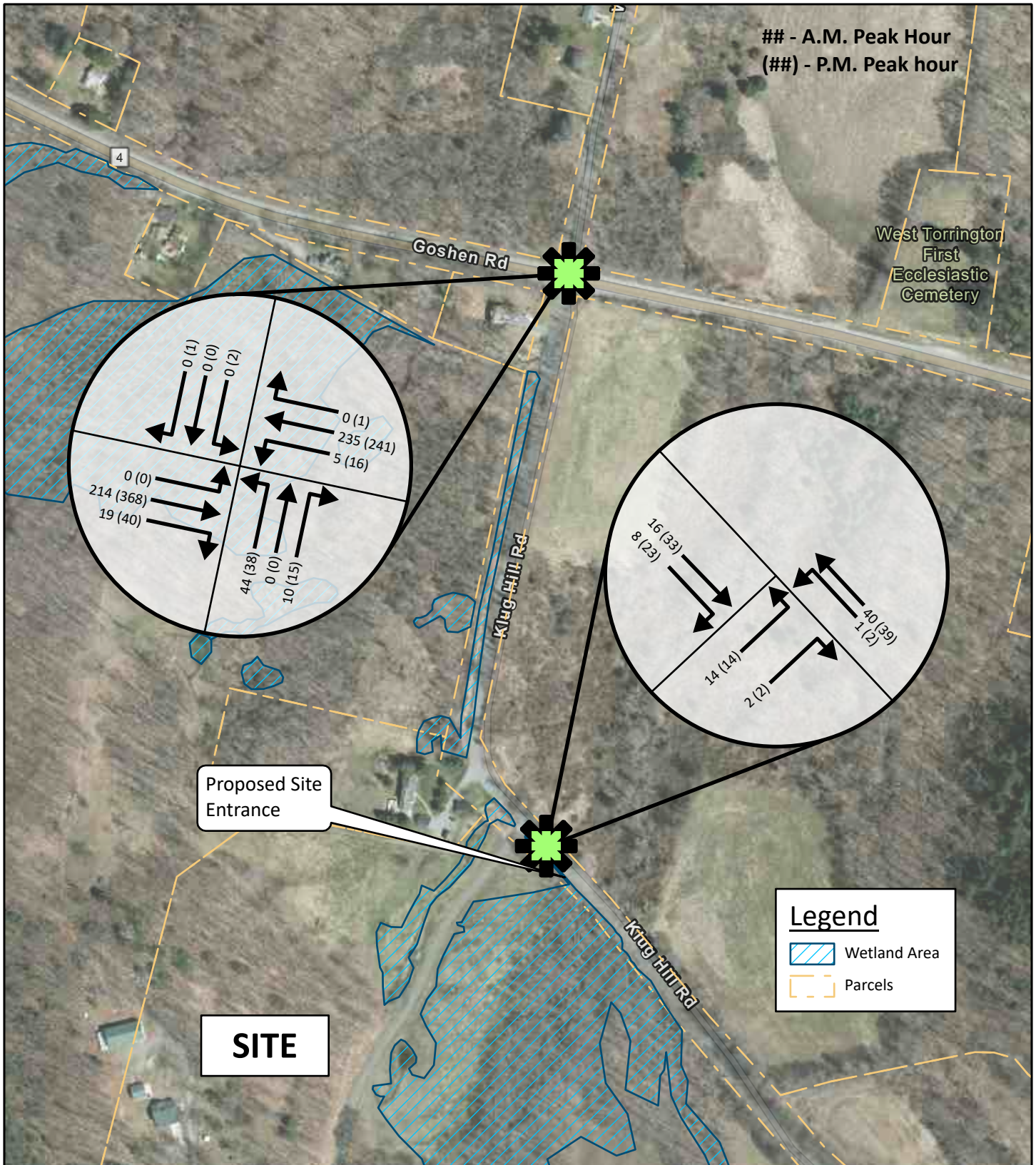
**2024 NO-BUILD
 TRAFFIC VOLUMES**

232 Klug Hill Road, Torrington, CT
 RV Parking Traffic Impact Study

N

1 IN = 300 FT

FIGURE 6



SLR

195 CHURCH STREET
 7TH FLOOR
 NEW HAVEN, CT 06511
 203.344.7887

**2024 BUILD
 TRAFFIC VOLUMES**

232 Klug Hill Road, Torrington, CT
 RV Parking Traffic Impact Study

N

1 IN = 300 FT

FIGURE 7

Intersection						
Int Delay, s/veh	1.9					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	16	8	1	40	14	2
Future Vol, veh/h	16	8	1	40	14	2
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	17	9	1	43	15	2

Major/Minor	Major1	Major2	Minor1			
Conflicting Flow All	0	0	26	0	67	22
Stage 1	-	-	-	-	22	-
Stage 2	-	-	-	-	45	-
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	-	-	1588	-	938	1055
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	977	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1588	-	937	1055
Mov Cap-2 Maneuver	-	-	-	-	937	-
Stage 1	-	-	-	-	1001	-
Stage 2	-	-	-	-	976	-

Approach	SE	NW	NE
HCM Control Delay, s	0	0.2	8.9
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	950	1588	-	-	-
HCM Lane V/C Ratio	0.018	0.001	-	-	-
HCM Control Delay (s)	8.9	7.3	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	214	19	5	235	0	44	0	10	0	0	0
Future Vol, veh/h	0	214	19	5	235	0	44	0	10	0	0	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	233	21	5	255	0	48	0	11	0	0	0

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	255	0	0	254	0	0	509	509	244	514	519	255
Stage 1	-	-	-	-	-	-	244	244	-	265	265	-
Stage 2	-	-	-	-	-	-	265	265	-	249	254	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1310	-	-	1311	-	-	475	467	795	471	461	784
Stage 1	-	-	-	-	-	-	760	704	-	740	689	-
Stage 2	-	-	-	-	-	-	740	689	-	755	697	-
Platoon blocked, %	-	-	-	-	-	-	-	-	-	-	-	-
Mov Cap-1 Maneuver	1310	-	-	1311	-	-	474	465	795	463	459	784
Mov Cap-2 Maneuver	-	-	-	-	-	-	474	465	-	463	459	-
Stage 1	-	-	-	-	-	-	760	704	-	740	686	-
Stage 2	-	-	-	-	-	-	737	686	-	745	697	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.2			12.9			0		
HCM LOS							B			A		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	512	1310	-	-	1311	-	-	-
HCM Lane V/C Ratio	0.115	-	-	-	0.004	-	-	-
HCM Control Delay (s)	12.9	0	-	-	7.8	0	-	0
HCM Lane LOS	B	A	-	-	A	A	-	A
HCM 95th %tile Q(veh)	0.4	0	-	-	0	-	-	-

Intersection						
Int Delay, s/veh	1.4					
Movement	SET	SER	NWL	NWT	NEL	NER
Lane Configurations						
Traffic Vol, veh/h	33	23	2	39	14	2
Future Vol, veh/h	33	23	2	39	14	2
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	36	25	2	42	15	2

Major/Minor	Major1	Major2	Minor1		
Conflicting Flow All	0	0	61	0	95 49
Stage 1	-	-	-	-	49 -
Stage 2	-	-	-	-	46 -
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	-	-	1542	-	905 1020
Stage 1	-	-	-	-	973 -
Stage 2	-	-	-	-	976 -
Platoon blocked, %	-	-	-	-	-
Mov Cap-1 Maneuver	-	-	1542	-	904 1020
Mov Cap-2 Maneuver	-	-	-	-	904 -
Stage 1	-	-	-	-	973 -
Stage 2	-	-	-	-	975 -

Approach	SE	NW	NE
HCM Control Delay, s	0	0.4	9
HCM LOS			A

Minor Lane/Major Mvmt	NELn1	NWL	NWT	SET	SER
Capacity (veh/h)	917	1542	-	-	-
HCM Lane V/C Ratio	0.019	0.001	-	-	-
HCM Control Delay (s)	9	7.3	0	-	-
HCM Lane LOS	A	A	A	-	-
HCM 95th %tile Q(veh)	0.1	0	-	-	-

Intersection												
Int Delay, s/veh	1.4											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	0	368	40	16	241	1	38	0	15	2	0	1
Future Vol, veh/h	0	368	40	16	241	1	38	0	15	2	0	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	0	400	43	17	262	1	41	0	16	2	0	1

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	263	0	0	443	0	0	719	719	422	727	740	263
Stage 1	-	-	-	-	-	-	422	422	-	297	297	-
Stage 2	-	-	-	-	-	-	297	297	-	430	443	-
Critical Hdwy	4.12	-	-	4.12	-	-	7.12	6.52	6.22	7.12	6.52	6.22
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	6.12	5.52	-
Follow-up Hdwy	2.218	-	-	2.218	-	-	3.518	4.018	3.318	3.518	4.018	3.318
Pot Cap-1 Maneuver	1301	-	-	1117	-	-	344	354	632	339	345	776
Stage 1	-	-	-	-	-	-	609	588	-	712	668	-
Stage 2	-	-	-	-	-	-	712	668	-	603	576	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1301	-	-	1117	-	-	339	348	632	326	339	776
Mov Cap-2 Maneuver	-	-	-	-	-	-	339	348	-	326	339	-
Stage 1	-	-	-	-	-	-	609	588	-	712	656	-
Stage 2	-	-	-	-	-	-	698	656	-	587	576	-

Approach	EB			WB			NB			SB		
HCM Control Delay, s	0			0.5			15.8			14		
HCM LOS							C			B		

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	390	1301	-	-	1117	-	-	404
HCM Lane V/C Ratio	0.148	-	-	-	0.016	-	-	0.008
HCM Control Delay (s)	15.8	0	-	-	8.3	0	-	14
HCM Lane LOS	C	A	-	-	A	A	-	B
HCM 95th %tile Q(veh)	0.5	0	-	-	0	-	-	0