



TOWNSHIP of HOPEWELL
MERCER COUNTY

201 WASHINGTON CROSSING – PENNINGTON ROAD
TITUSVILLE, NEW JERSEY 08560-1410

PROJECT / APPLICATION

BLOCK:

LOT:

ADDRESS:

PROJECT NAME:

**REPORTS AND SUPPORTING
DOCUMENTS**

TRAFFIC ENGINEERING ASSESSMENT

Traffic Engineering, Transportation Planning & Design

277 White Horse Pike, Suite 203, Atco, NJ 08004
P: 609-714-0400 F: 609-714-9944 www.sallc.org

David R. Shropshire, PE, PP
A Andrew Feranda, PE, PTOE, CME
Randal C. Barranger, PE
Nathan B. Mosley, PE, CME

May 10, 2023

Mr. Greg Kanter
American Properties Realty, Inc.
517 Route 1 South, Suite 2100
Iselin, NJ 08830

(via email: gkanter@americanproperties.net)

Re: **Traffic Engineering Assessment**
Heritage at Hopewell Township
Block 78, Lot 20
Pennington Road (Route 31)
Hopewell Township, Mercer County, New Jersey
SA Project No. 23014

Dear Greg:

At your request, Shropshire Associates, LLC has prepared a Traffic Engineering Assessment report to evaluate the impact of the traffic to be generated by the proposed Heritage at Hopewell residential development. The proposed development is located along northbound Pennington Road (Route 31) in Hopewell Township, Mercer County, NJ. The property currently contains a single-family home along northbound Route 31, north of its intersection with Diverty Road, with access provided via two (2) driveways along northbound Route 31.

Based upon the current information, the proposal is for the construction of 55 townhome residential dwelling units and 12 apartment units for a total of 67 residential dwelling units on the property. Access to the development will be provided via one (1) new driveway along northbound Route 31. Route 31 is under the jurisdiction of the New Jersey Department of Transportation (NJDOT) and will therefore require final approval from the Department with regards to location, design, and operations. Based upon our preliminary meeting with the NJDOT Office of Major Access, right-in and right-out only movements will be permitted at the future driveway location. Therefore, the proposal is for right-in and right-out only movements at the driveway, no left-turns in or out of the site.

Existing Conditions

A field reconnaissance was conducted to determine the features of the adjacent roadway network within the study area. A description of the roadways and intersection that comprise the study area for this report is provided below.

Along the site's frontage, **Pennington Road (Route 31)** is a four-lane undivided roadway that is classified as an Urban Principal Arterial and under the jurisdiction of the NJDOT. Pennington Road has an approximate cartway width of 46' and consists of two (2) travel lanes in each direction. The posted speed limit is 45 MPH and for the purpose of this assessment, the roadway is assumed to extend in a general north-south direction.



South of the site, **Denow Road** is a two (2) lane undivided local roadway that is classified as an Urban Major Collector and is under the jurisdiction of the Hopewell Township. Denow Road has an approximate cartway width of 40' and consists of one (1) 12' travel lane and 8' shoulders in each direction. The posted speed limit is 35 MPH and for the purpose of this assessment, the roadway is assumed to extend in a general east-west direction.

The four-legged **Route 31/Denow Road** intersection is controlled by a two (2) phase semi-actuated traffic signal with a 100-second background cycle length. The northbound Route 31 approach consists of two (2) through-only lanes and a single shared through/right-turn lane. The southbound Route 31 approach consists of two (2) through-only lanes. All turning movements will occur at Route 31 off-ramp with access located north of the intersection. The eastbound Denow Road approach consists of a single left-turn only lane and a shared through/right-turn lane. The westbound Denow Road approach consists of a single left-turn only lane and a shared through/right-turn lane.

The T-shaped **Denow Road/Route 31 Off-Ramp** intersection is stop-controlled along the southbound Route 31 off-ramp approach. Both the eastbound and westbound Denow Road approaches consist of a single lane for through movements. The southbound Route 31 off-ramp consists of a left-turn only lane and a right-turn only lane.

Traffic Count Data

To determine the amount of traffic on the adjacent roadway network, manual turning movement counts (MTMC) were conducted at the study intersections on March 28, 2023. The counts were conducted during the weekday morning (7:00 AM to 9:00 AM) and the weekday afternoon (4:00 PM to 6:00 PM) peak periods. A summary of the traffic counts can be found in the appendix to this assessment and the existing peak hour volumes are illustrated on Figure 1.

Future Conditions

As indicated above, the proposed Heritage at Hopewell residential development will contain a total of 67 residential dwelling units. The traffic resulting from the proposed development will not affect the adjacent roadway network until 2026, when the development is expected to be fully built-out and occupied. A 1.00% annual traffic growth is projected to occur along the adjacent roadway network based on the *Annual Background Growth Table* prepared by the New Jersey Department of Transportation (NJDOT).

In addition to the annual background growth, site-specific traffic has been added to the background conditions to account for the following approved development in the vicinity of the site.

- An approved residential development, The Collection at Hopewell, located north of the proposed site along Washington Crossing Pennington Road. This development will include 379 multi-family dwelling units.

It is anticipated that a percentage of the future Collection at Hopewell peak hour volumes traveling along Washington Crossing Pennington Road will utilize Pennington Road where the proposed site is located.

Therefore, the No-Build volumes were estimated by applying a 1.00% annual growth rate to the existing roadway volumes, combined with the additional site-specific traffic for the



approved development in the vicinity of the site, and the associated redistribution. The future No-Build volumes are indicated in Figure 2.

Trip Generation

The amount of traffic to be generated by the proposed Heritage at Hopewell residential development was calculated based on data provided by NJDOT HAPS trip generation rates derived from the Institute of Transportation Engineers (ITE) in the *Trip Generation Manual, 11th Edition*. The types of residential dwelling units within the overall development are most similar to HAPS Land Use 220: Multifamily Housing (Low-Rise). Table 1 indicates the peak hour site traffic to be generated by the proposed 67-unit residential development based upon the ITE/HAPS trip generation data.

Table 1 Trip Generation – Heritage at Hopewell						
Development	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
Multifamily Housing (67 units)	9	30	39	29	17	46

The traffic to be generated by the proposed Heritage at Hopewell residential development must then be distributed to the adjacent roadway network in a manner in which we can reasonably expect the residents to travel. The site traffic was assigned to the roadway network based on the existing flow of traffic along the adjacent roadway (Figure 3). The site traffic (Figure 4) was then added to the total No-Build volumes (Figure 2) to project the Build volumes, which are illustrated on Figure 5.

Operational Analysis

In order to measure the quality of the traffic flow for the adjacent roadways and intersections, capacity analyses for the study intersections have been completed based upon the methods outlined in the *Highway Capacity Manual*. Capacity analysis is a procedure used to estimate the ability of the roadway network to carry traffic. Capacity analyses are performed based on a Level of Service methodology. Level of Service (LOS) is a qualitative measure that characterizes the operational conditions of a roadway or intersection based on the perceptions by motorists and passengers. Levels of Service are defined for each type of facility (i.e. freeways, highways, signalized intersections, unsignalized intersections). These Levels of Service range from LOS A to LOS F, with a LOS A representing the best operating conditions and a LOS F representing the worst operating conditions.

The LOS for signalized intersections is classified in terms of delay, which is based on the extent of driver discomfort and frustration, fuel consumption and lost travel time. The delay experienced by a motorist consists of many factors that relate to control, geometrics, and traffic. Some of these factors include the quality of progression, traffic signal cycle length, the green ratio, and the volume-to-capacity ratio. The determination for the LOS for an unsignalized intersection is based upon the average control delay associated with each minor movement (i.e. yielding left-turn movements from the major roads and stop-controlled movements from the minor approaches). The Level of Service criteria for signalized and unsignalized intersections is summarized below in Table 2.



Table 2		
Level of Service Criteria		
Level of Service	Unsignalized Delay (sec)	Signalized Delay (sec)
A	≤ 10	≤ 10
B	> 10 and ≤ 15	> 10 and ≤ 20
C	> 15 and ≤ 25	> 20 and ≤ 35
D	> 25 and ≤ 35	> 35 and ≤ 55
E	> 35 and ≤ 50	> 55 and ≤ 80
F	> 50	> 80

The existing and future operating conditions at the study intersections were evaluated using the above-described methodology. The existing and future levels of service are illustrated on Figures 6, 7 and 8; with the detailed capacity analyses worksheets attached for your review. A detailed description of the intersections' operating conditions is provided below.

Route 31 and Denow Road Intersection

Under existing conditions, the Route 31 and Denow Road signalized intersection operates at an overall LOS B during the weekday AM peak hour and an overall LOS C during the weekday PM peak hour. All individual movements currently operate at a LOS D or better during all peak hours with the exception of the westbound Denow Road left-turn movements, which currently operate at a LOS E during the PM peak hours.

Under the future No-Build and Build scenarios, the Route 31 and Denow Road signalized intersection will continue to operate at an overall LOS B during the weekday AM peak hour and continue operating at an overall LOS C during the weekday PM peak hour. In addition, all individual movements will continue to operate at existing levels of service during both peak hours.

The traffic resulting from the proposed Heritage at Hopewell residential development will cause no changes in the future levels of service at this study location. No further mitigation or improvements are recommended for this study location to accommodate the traffic to be generated by the proposed development.

Denow Road and Route 31 Off-Ramp Intersection

Under existing conditions, the southbound Route 31 off-ramp stop-controlled movements currently operate at a LOS A during both the weekday AM and weekday PM peak hours. In addition, under the future No-Build and Build scenarios, the southbound Route 31 off-ramp stop-controlled movements will continue to operate at a LOS A during both peak hours.

The traffic resulting from the proposed Heritage at Hopewell residential development will cause no changes in the future levels of service at this study location. No further mitigation or improvements are recommended for this study location to accommodate the traffic to be generated by the proposed development.



Route 31 and Site Driveway Intersection

Under the future Build scenario, access to the future Heritage at Hopewell residential development is proposed via one (1) new right-in/right-out only driveway along northbound Route 31, north of the Route 31 and Denow Road Intersection. The driveway will consist of single inbound and outbound lanes providing for all permitted movements and will be stop-controlled at its intersection with Route 31. Final approval will be required from the NJDOT for the future driveway location.

Based upon this configuration, the outbound stop-controlled right-turn movements will operate at a LOS C during both the weekday AM and weekday PM peak hours.

Conclusion

Based on the results presented in this traffic engineering assessment report, the traffic resulting from the proposed Heritage at Hopewell residential development will have a minimal impact on the adjacent roadway network based upon the following conclusions:

- Based upon the current ITE trip generation rates, the proposed Heritage at Hopewell residential development will generate a total of 39 trips during the AM peak hour and 46 trips during the PM peak hour.
- The traffic resulting from the proposed Heritage at South Brunswick residential development will cause no changes in the individual levels of service at the future Route 31/Denow Road signalized intersection during the weekday AM and weekday PM peak hour. Overall, the intersection will continue to operate at a LOS B during the AM Peak hour and operate at a LOS C during the PM peak hour. All individual movements will continue to operate at existing levels of service during both peak hours.
- The traffic resulting from the proposed Heritage at South Brunswick residential development will cause no changes in the individual levels of service at the future Denow Road/Route 31 off-ramp stop-controlled intersection during the weekday AM and weekday PM peak hour. The southbound Route 31 off-ramp left-turn and right-turn lanes will operate at a LOS A during both peak hours.
- Access to the Heritage at Hopewell residential development is proposed via one (1) new right-in/right-out only driveway along northbound Route 31. Final approval of all site accesses rests NJDOT.

Based upon his configuration, the outbound stop-controlled site driveway movements will operate at a LOS C during both the weekday AM and weekday PM peak hours.



Should you have any questions please feel free to contact us.

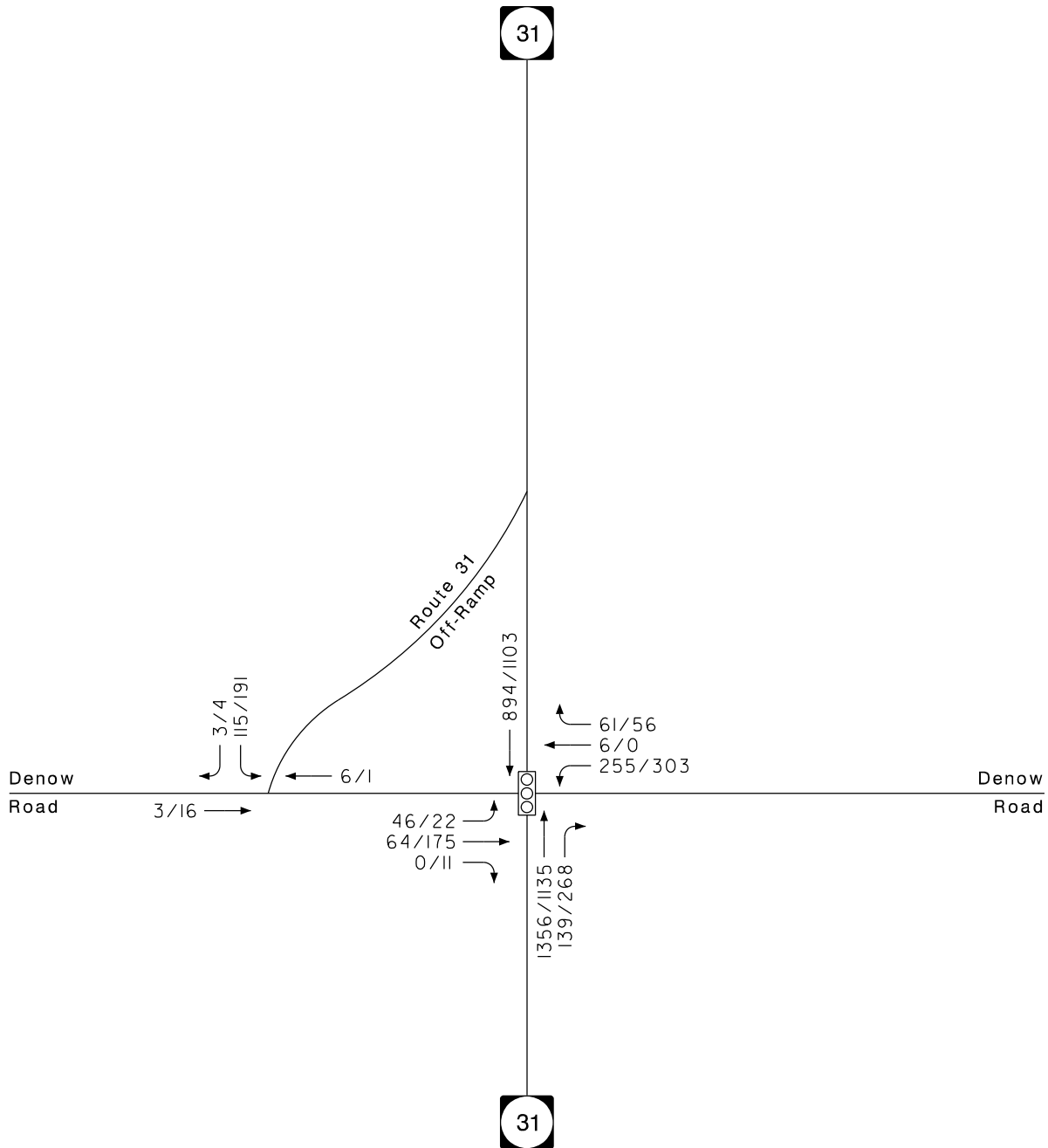
Sincerely,
Shropshire Associates LLC

A handwritten signature in black ink, appearing to read 'Nathan B. Mosley'.

Nathan B. Mosley, P.E., C.M.E.
Professional Engineer
N.J. License No. #48698
NBM/jab
Attachments

cc: Ian Burton
Jason Fogler

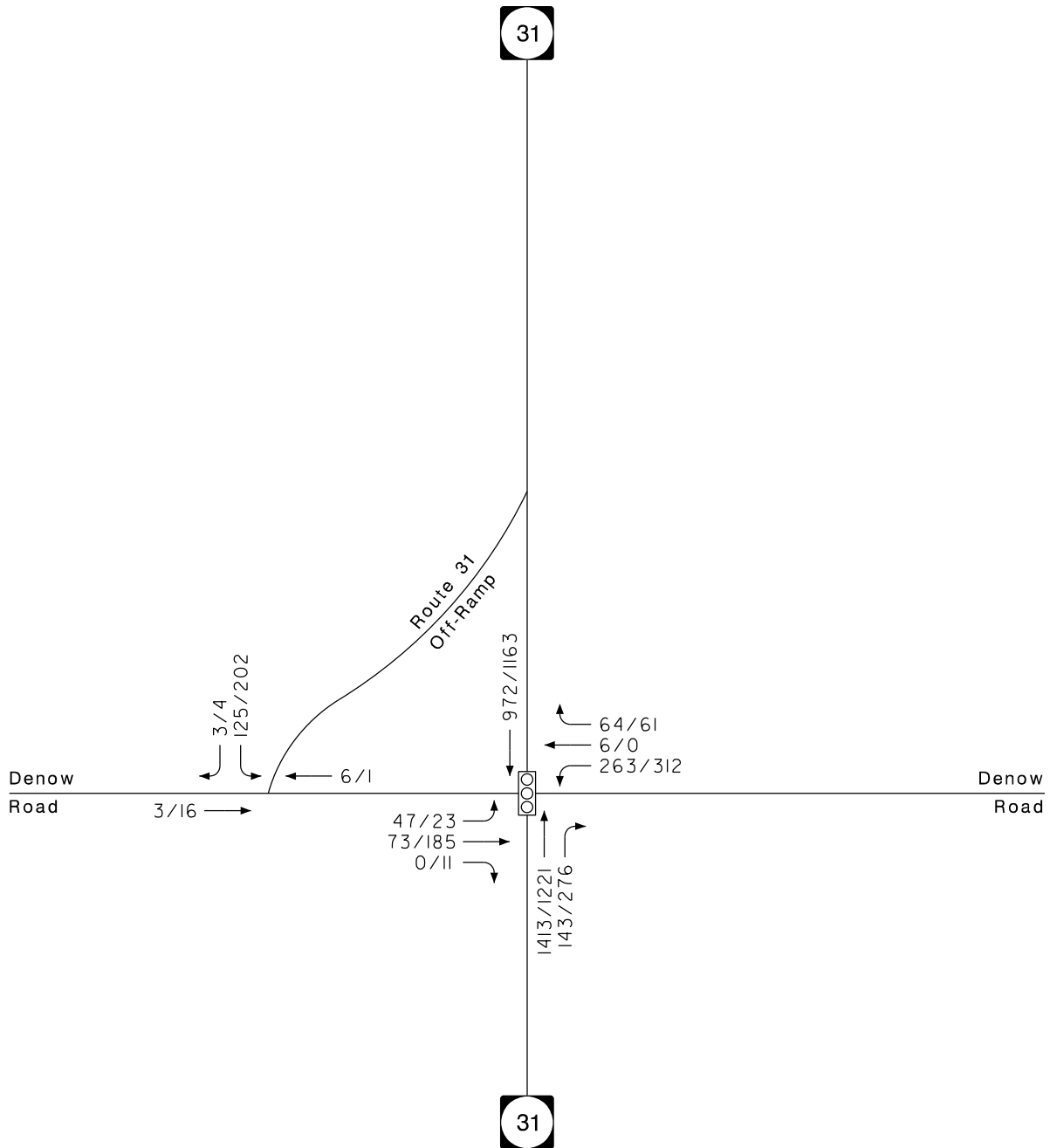
(via email: iburton@midatlanticeng.com)
(5 copies via UPS and email: jfogler@midatlanticeng.com)



Heritage at Hopewell

Hopewell Township, Mercer County, NJ
May 2023

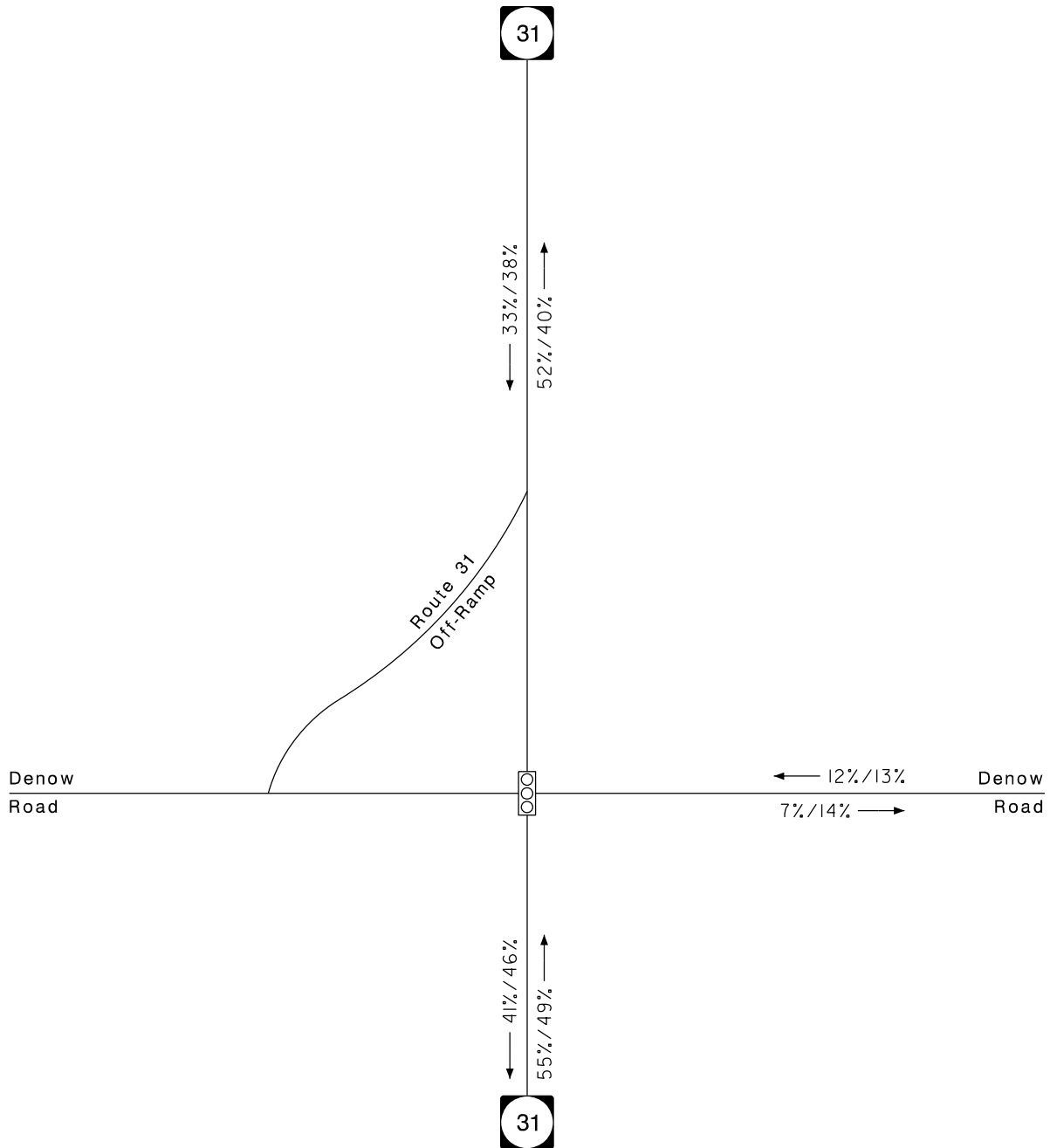
 TRAFFIC SIGNAL
AM/PM PEAK HOUR



Heritage at Hopewell

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May 2023

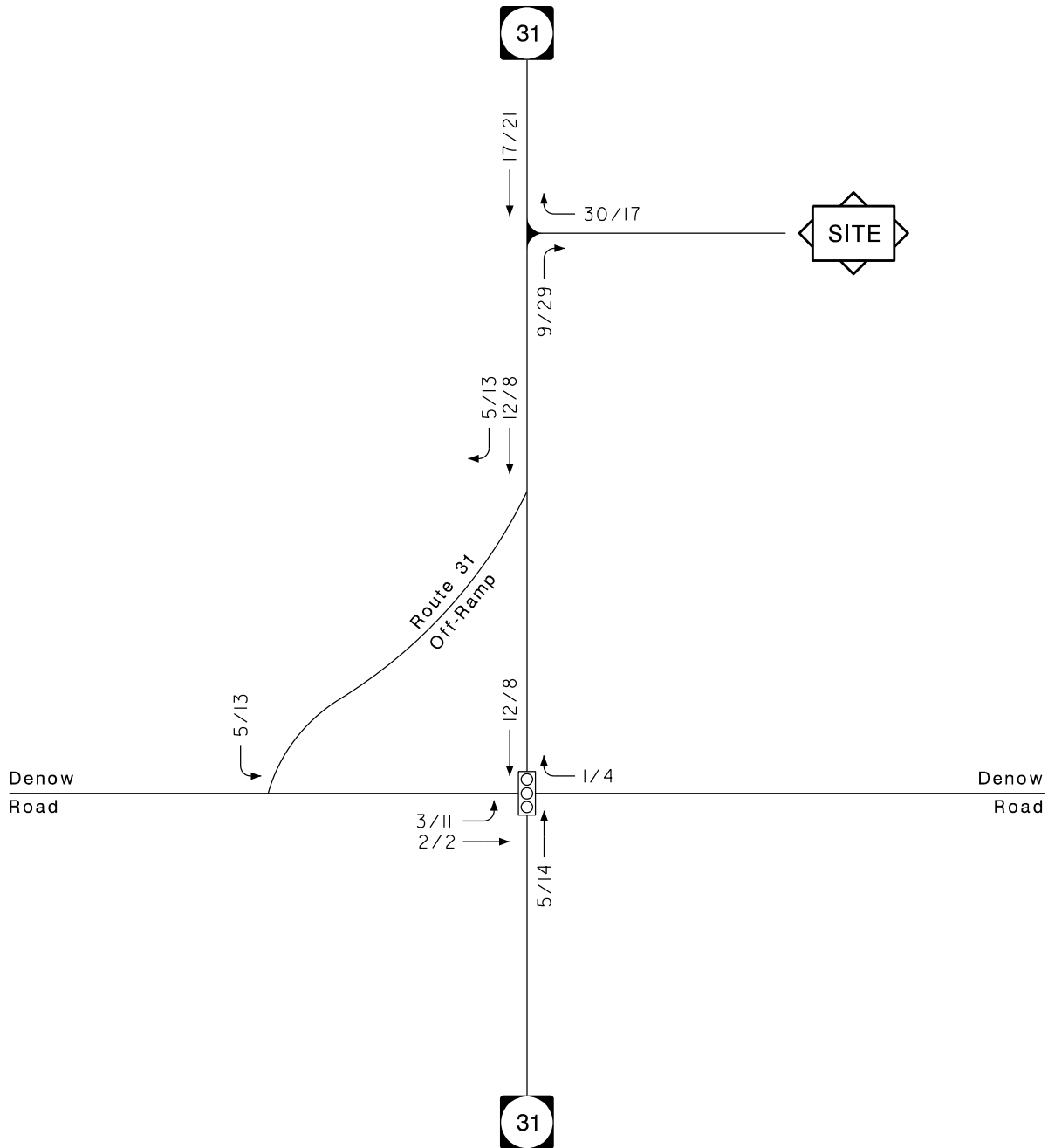
 TRAFFIC SIGNAL
AM/PM PEAK HOUR



Heritage at Hopewell

Hopewell Township, Mercer County, NJ
May 2023

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AM/PM PEAK HOUR



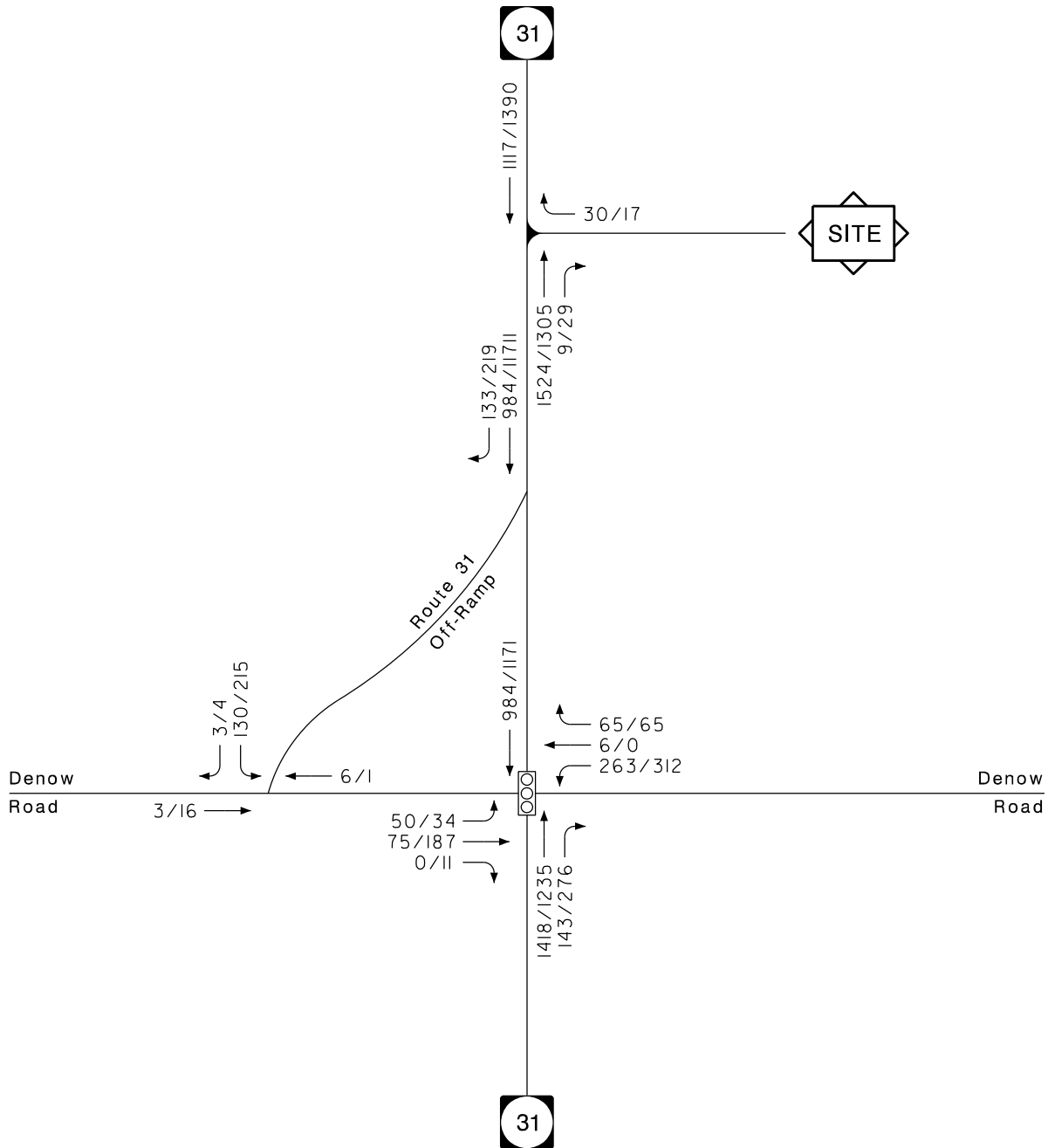
Heritage at Hopewell

Hopewell Township, Mercer County, NJ

May 2023

 TRAFFIC SIGNAL

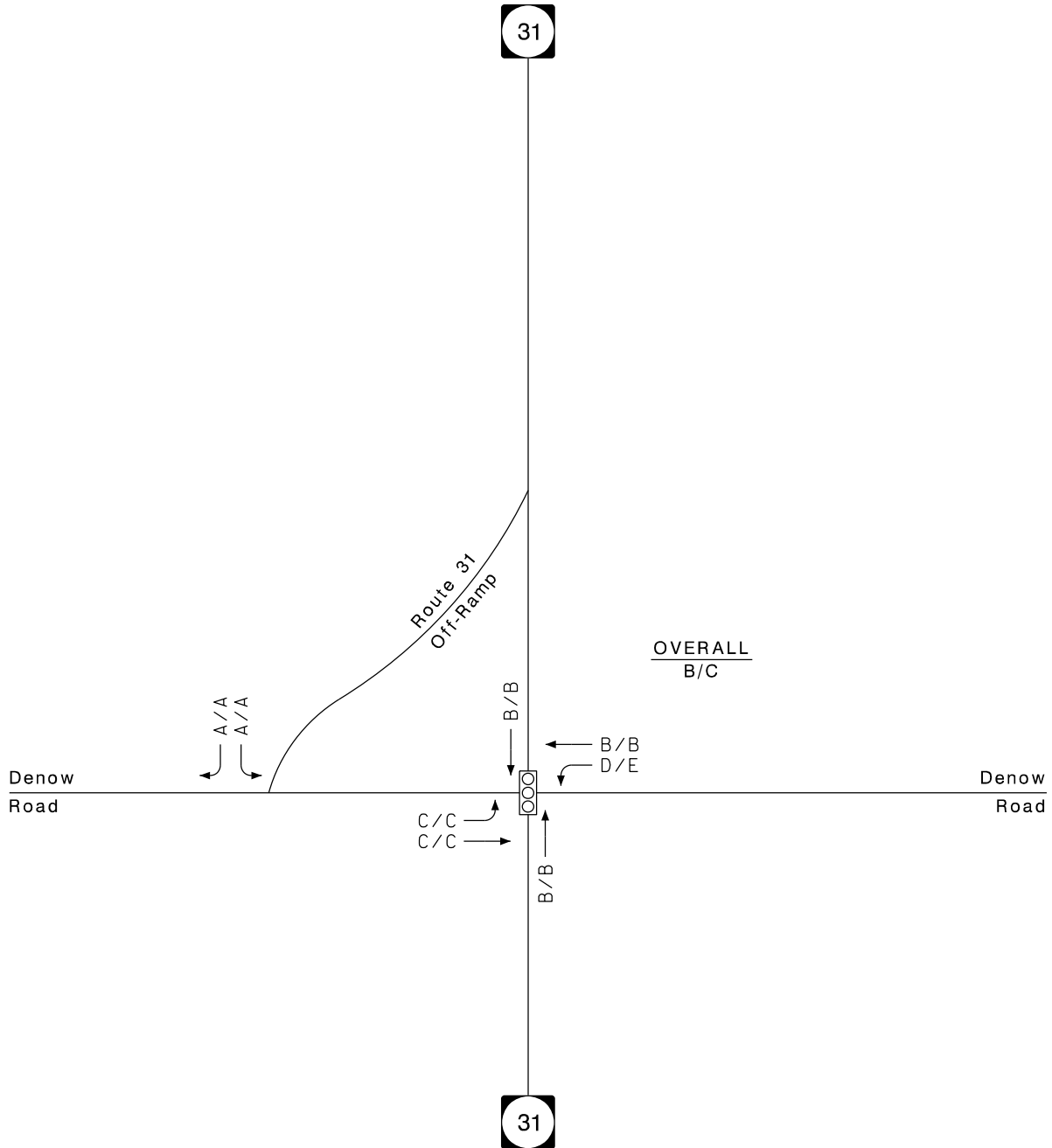
AM/PM PEAK HOUR



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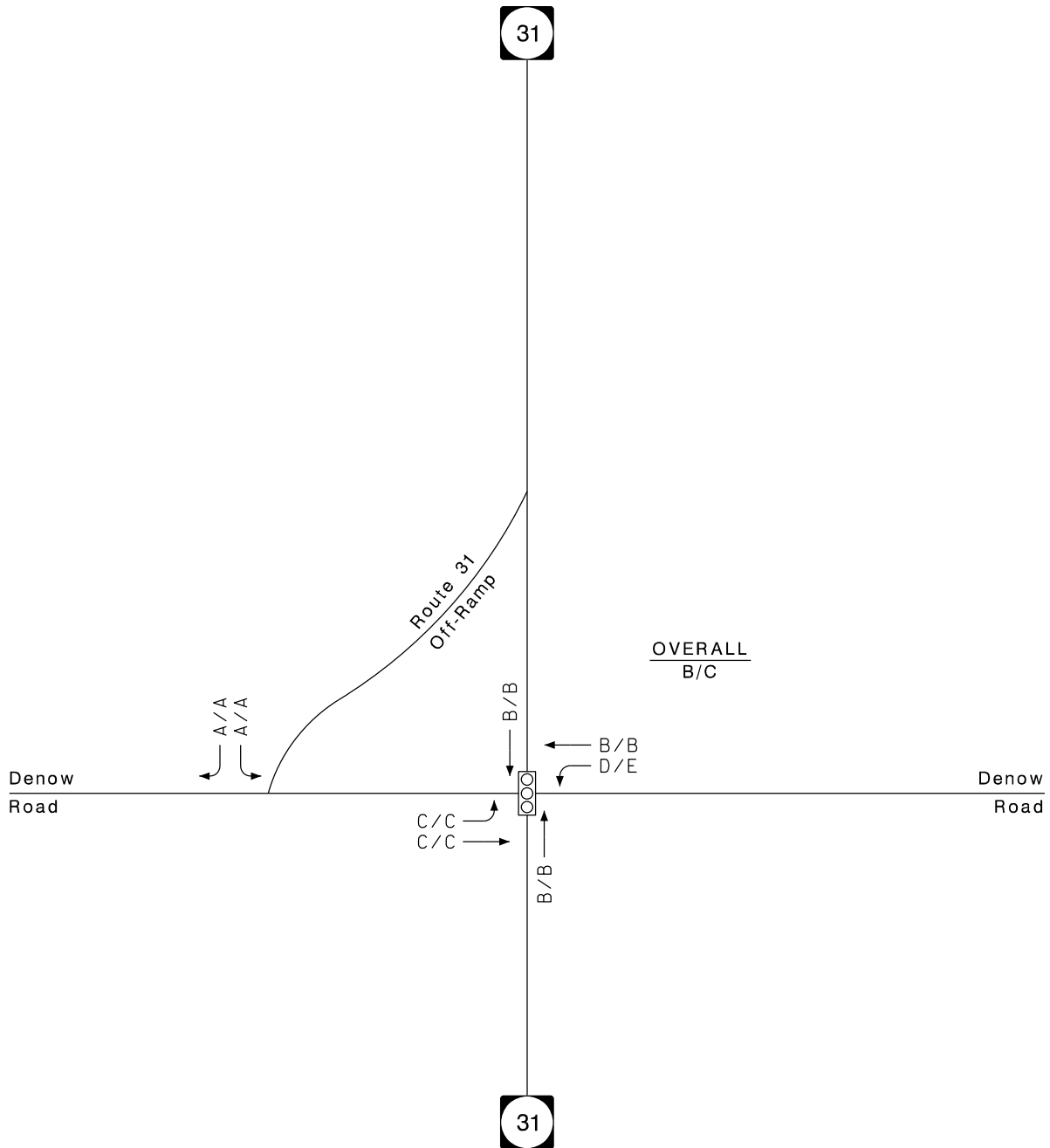
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Heritage at Hopewell

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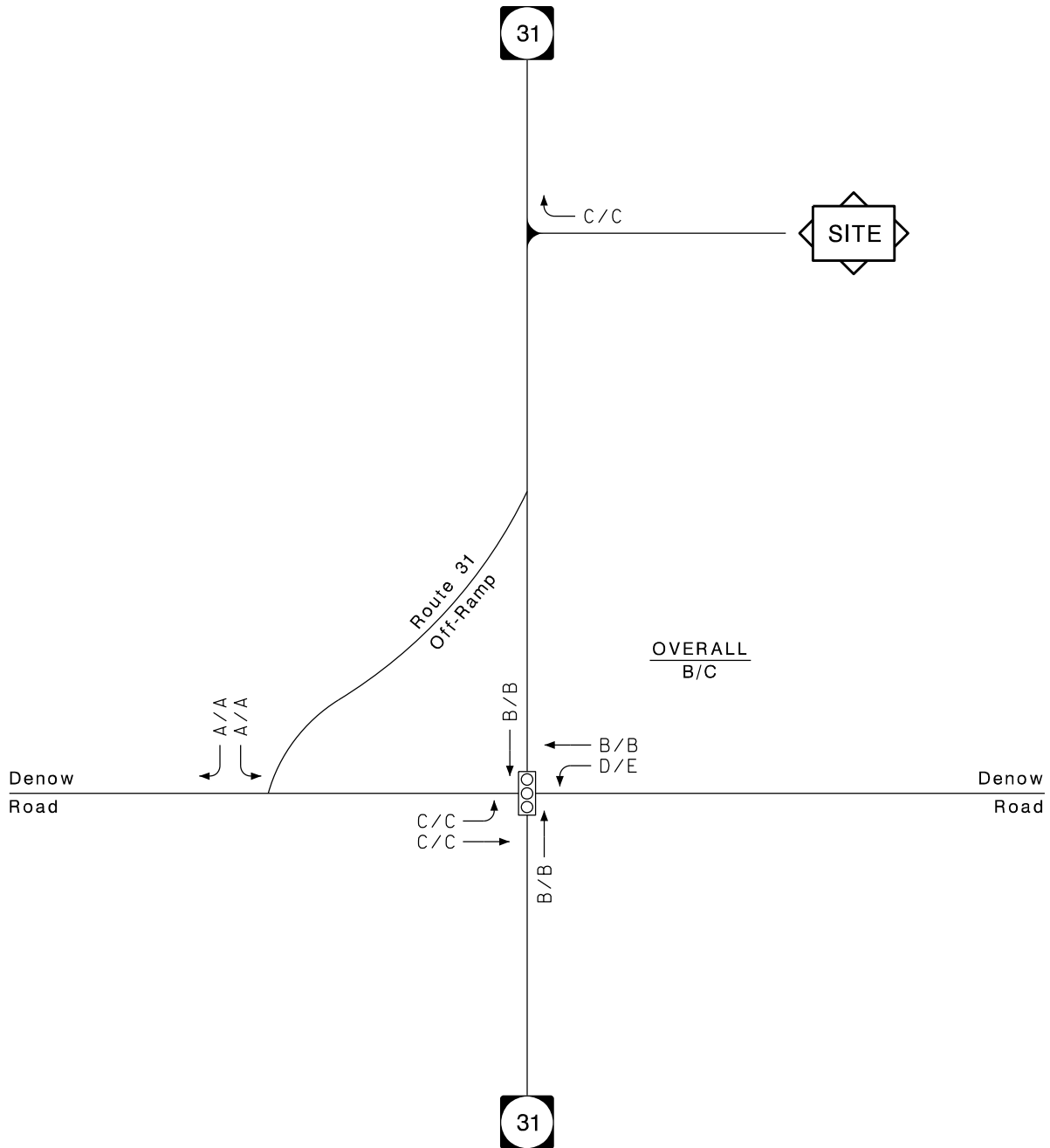
 TRAFFIC SIGNAL
AM/PM PEAK HOUR



Heritage at Hopewell

Hopewell Township, Mercer County, NJ
May 2023

 TRAFFIC SIGNAL
AM/PM PEAK HOUR



Heritage at Hopewell

Hopewell Township, Mercer County, NJ
May 2023

 TRAFFIC SIGNAL
AM/PM PEAK HOUR

Shropshire Associates LLC

277 Whitehorse Pike, Suite 203
Atco, NJ 08004

N/S Route: NJ-31 (Pennington Rd.)
E/W Route: Denow Rd.
Hopewell Township/Mercer County/NJ
Tuesday/Cloudy/JH/D4-3142

File Name : 23014001
Site Code : 23014001
Start Date : 3/28/2023
Page No : 1

Groups Printed- Unshifted - Tractor Trailers

	NJ-31 (Pennington Rd.) Southbound		Denow Rd. Westbound					NJ-31 (Pennington Rd.) Northbound				Denow Rd. Eastbound					
Start Time	Thru	App. Total	Right	Thru	Left	Right on Red	App. Total	Right	Thru	Right on Red	App. Total	Right	Thru	Left	Right on Red	App. Total	Int. Total
07:00 AM	145	145	4	2	33	0	39	12	234	4	250	0	3	6	0	9	443
07:15 AM	184	184	35	3	42	0	80	13	290	8	311	0	9	9	0	18	593
07:30 AM	168	168	27	0	58	0	85	20	385	2	407	0	7	15	0	22	682
07:45 AM	231	231	8	1	66	0	75	32	374	5	411	0	28	12	0	40	757
Total	728	728	74	6	199	0	279	77	1283	19	1379	0	47	42	0	89	2475
08:00 AM	254	254	5	4	63	1	73	28	329	8	365	0	17	9	0	26	718
08:15 AM	241	241	20	1	68	0	89	33	268	11	312	0	12	10	0	22	664
08:30 AM	254	254	18	1	57	0	76	32	250	5	287	0	27	7	1	35	652
08:45 AM	222	222	15	0	59	0	74	35	274	11	320	0	12	8	0	20	636
Total	971	971	58	6	247	1	312	128	1121	35	1284	0	68	34	1	103	2670
*** BREAK ***																	
04:00 PM	265	265	14	0	62	1	77	40	256	10	306	1	32	10	0	43	691
04:15 PM	228	228	21	3	47	0	71	49	259	10	318	1	28	5	0	34	651
04:30 PM	240	240	21	1	78	0	100	42	263	11	316	3	26	2	0	31	687
04:45 PM	262	262	22	0	68	0	90	41	284	19	344	1	48	6	0	55	751
Total	995	995	78	4	255	1	338	172	1062	50	1284	6	134	23	0	163	2780
05:00 PM	272	272	7	0	56	1	64	54	276	22	352	1	50	5	3	59	747
05:15 PM	323	323	14	0	89	0	103	61	286	16	363	1	55	4	0	60	849
05:30 PM	246	246	12	0	90	0	102	46	289	9	344	5	22	7	0	34	726
05:45 PM	226	226	25	0	60	0	85	57	253	9	319	0	31	8	0	39	669
Total	1067	1067	58	0	295	1	354	218	1104	56	1378	7	158	24	3	192	2991
Grand Total	3761	3761	268	16	996	3	1283	595	4570	160	5325	13	407	123	4	547	10916
Apprch %	100		20.9	1.2	77.6	0.2		11.2	85.8	3		2.4	74.4	22.5	0.7		
Total %	34.5	34.5	2.5	0.1	9.1	0	11.8	5.5	41.9	1.5	48.8	0.1	3.7	1.1	0	5	
Unshifted	3661	3661	268	16	992	3	1279	594	4430	160	5184	13	407	123	4	547	10671
% Unshifted	97.3	97.3	100	100	99.6	100	99.7	99.8	96.9	100	97.4	100	100	100	100	100	97.8
Tractor Trailers	100	100	0	0	4	0	4	1	140	0	141	0	0	0	0	0	245
% Tractor Trailers	2.7	2.7	0	0	0.4	0	0.3	0.2	3.1	0	2.6	0	0	0	0	0	2.2

Shropshire Associates LLC

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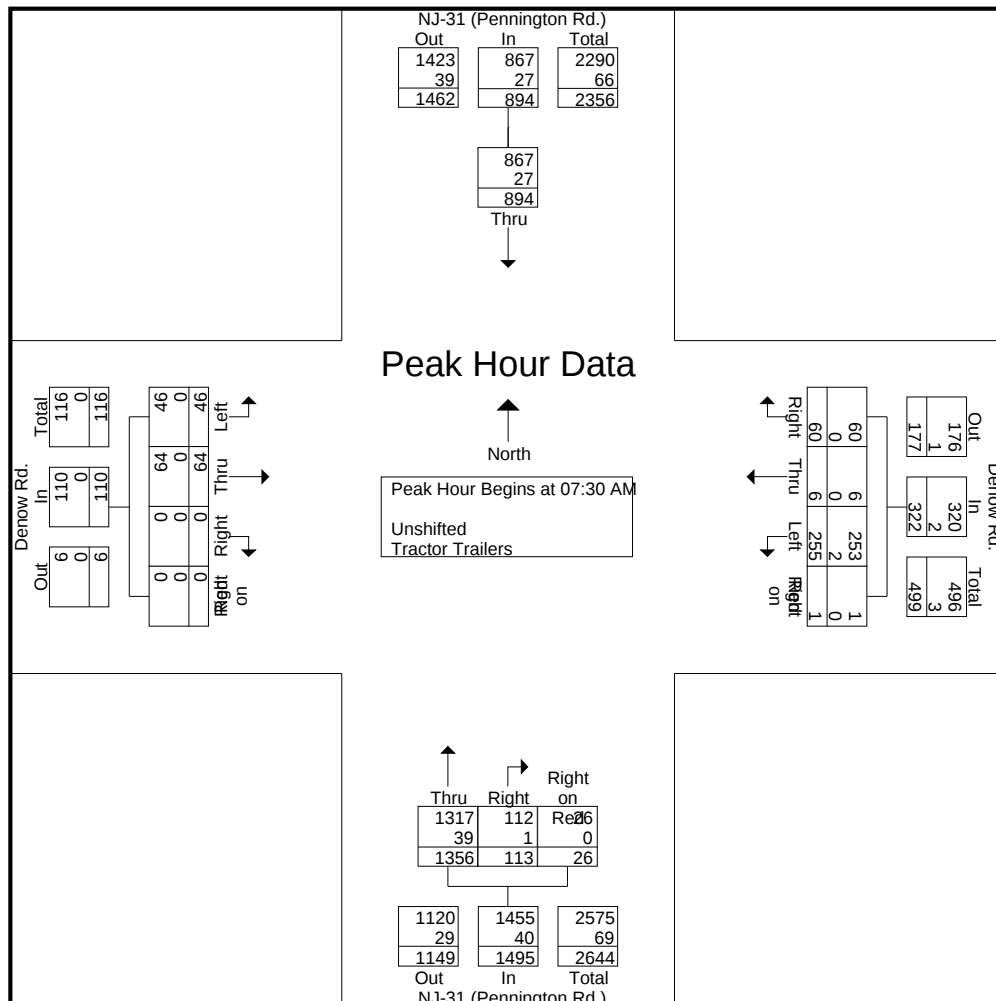
File Name : 23014001
Site Code : 23014001
Start Date : 3/28/2023
Page No : 2

	NJ-31 (Pennington Rd.) Southbound		Denow Rd. Westbound					NJ-31 (Pennington Rd.) Northbound				Denow Rd. Eastbound					
Start Time	Thru	App. Total	Right	Thru	Left	Right on Red	App. Total	Right	Thru	Right on Red	App. Total	Right	Thru	Left	Right on Red	App. Total	Int. Total

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:30 AM

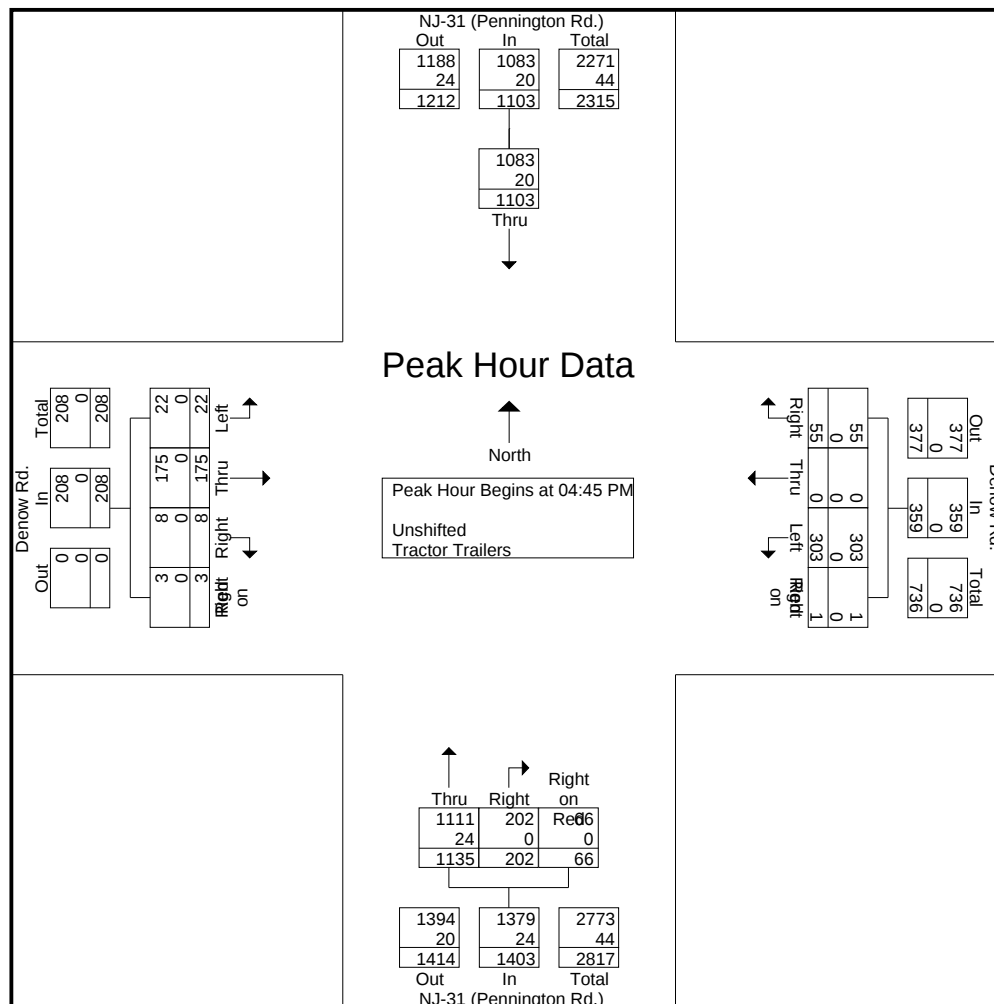
07:30 AM	168	168	27	0	58	0	85	20	385	2	407	0	7	15	0	22	682
07:45 AM	231	231	8	1	66	0	75	32	374	5	411	0	28	12	0	40	757
08:00 AM	254	254	5	4	63	1	73	28	329	8	365	0	17	9	0	26	718
08:15 AM	241	241	20	1	68	0	89	33	268	11	312	0	12	10	0	22	664
Total Volume	894	894	60	6	255	1	322	113	1356	26	1495	0	64	46	0	110	2821
% App. Total	100	100	18.6	1.9	79.2	0.3		7.6	90.7	1.7		0	58.2	41.8	0		
PHF	.880	.880	.556	.375	.938	.250	.904	.856	.881	.591	.909	.000	.571	.767	.000	.688	.932
Unshifted	867	867	60	6	253	1	320	112	1317	26	1455	0	64	46	0	110	2752
% Unshifted	97.0	97.0	100	100	99.2	100	99.4	99.1	97.1	100	97.3	0	100	100	0	100	97.6
Tractor Trailers	27	27	0	0	2	0	2	1	39	0	40	0	0	0	0	0	69
% Tractor Trailers	3.0	3.0	0	0	0.8	0	0.6	0.9	2.9	0	2.7	0	0	0	0	0	2.4



277 Whitehorse Pike, Suite 203
Atco, NJ 08004

File Name : 23014001
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Page No : 3

	NJ-31 (Pennington Rd.) Southbound		Denow Rd. Westbound					NJ-31 (Pennington Rd.) Northbound				Denow Rd. Eastbound					
Start Time	Thru	App. Total	Right	Thru	Left	Right on Red	App. Total	Right	Thru	Right on Red	App. Total	Right	Thru	Left	Right on Red	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1																	
Peak Hour for Entire Intersection Begins at 04:45 PM																	
04:45 PM	262	262	22	0	68	0	90	41	284	19	344	1	48	6	0	55	751
05:00 PM	272	272	7	0	56	1	64	54	276	22	352	1	50	5	3	59	747
05:15 PM	323	323	14	0	89	0	103	61	286	16	363	1	55	4	0	60	849
05:30 PM	246	246	12	0	90	0	102	46	289	9	344	5	22	7	0	34	726
Total Volume	1103	1103	55	0	303	1	359	202	1135	66	1403	8	175	22	3	208	3073
% App. Total	100		15.3	0	84.4	0.3		14.4	80.9	4.7		3.8	84.1	10.6	1.4		
PHF	.854	.854	.625	.000	.842	.250	.871	.828	.982	.750	.966	.400	.795	.786	.250	.867	.905
Unshifted	1083	1083	55	0	303	1	359	202	1111	66	1379	8	175	22	3	208	3029
% Unshifted	98.2	98.2	100	0	100	100	100	100	97.9	100	98.3	100	100	100	100	100	98.6
Tractor Trailers	20	20	0	0	0	0	0	0	24	0	24	0	0	0	0	0	44
% Tractor Trailers	1.8	1.8	0	0	0	0	0	0	2.1	0	1.7	0	0	0	0	0	1.4



Shropshire Associates LLC

277 Whitehorse Pike, Suite 203
Atco, NJ 08004

N/S Route: NJ-31 (Pennington Rd.) Southbound Off-Ramp
E/W Route: Denow Rd.
Hopewell Township/Mercer County/NJ
Tuesday/Cloudy/LW/D4-2870

File Name : 23014002
Site Code : 23014002
Start Date : 3/28/2023
Page No : 1

Groups Printed- Unshifted - Tractor Trailers

Start Time	NJ-31 (Pennington Rd.) Off-Ramp Southbound			Denow Rd. Westbound		Denow Rd. Eastbound		Int. Total
	Right	Left	App. Total	Thru	App. Total	Thru	App. Total	
07:00 AM	0	6	6	1	1	2	2	9
07:15 AM	0	19	19	3	3	1	1	23
07:30 AM	0	23	23	0	0	1	1	24
07:45 AM	2	39	41	0	0	1	1	42
Total	2	87	89	4	4	5	5	98
08:00 AM	0	24	24	4	4	0	0	28
08:15 AM	1	24	25	1	1	1	1	27
08:30 AM	0	28	28	1	1	1	1	30
08:45 AM	1	21	22	1	1	0	0	23
Total	2	97	99	7	7	2	2	108
*** BREAK ***								
04:00 PM	0	34	34	0	0	3	3	37
04:15 PM	2	34	36	3	3	4	4	43
04:30 PM	1	30	31	1	1	3	3	35
04:45 PM	3	56	59	0	0	3	3	62
Total	6	154	160	4	4	13	13	177
05:00 PM	0	54	54	0	0	8	8	62
05:15 PM	0	51	51	0	0	2	2	53
05:30 PM	0	27	27	0	0	6	6	33
05:45 PM	0	38	38	0	0	0	0	38
Total	0	170	170	0	0	16	16	186
Grand Total	10	508	518	15	15	36	36	569
Apprch %	1.9	98.1		100		100		
Total %	1.8	89.3	91	2.6	2.6	6.3	6.3	
Unshifted	10	508	518	15	15	36	36	569
% Unshifted	100	100	100	100	100	100	100	100
Tractor Trailers	0	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0	0

Shropshire Associates LLC

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N/S Route: NJ-31 (Pennington Rd.) Southbound Off-Ramp

E/W Route: Denow Rd.

Hopewell Township/Mercer County/NJ

Tuesday/Cloudy/LW/D4-2870

File Name : 23014002

Site Code : 23014002

Start Date : 3/28/2023

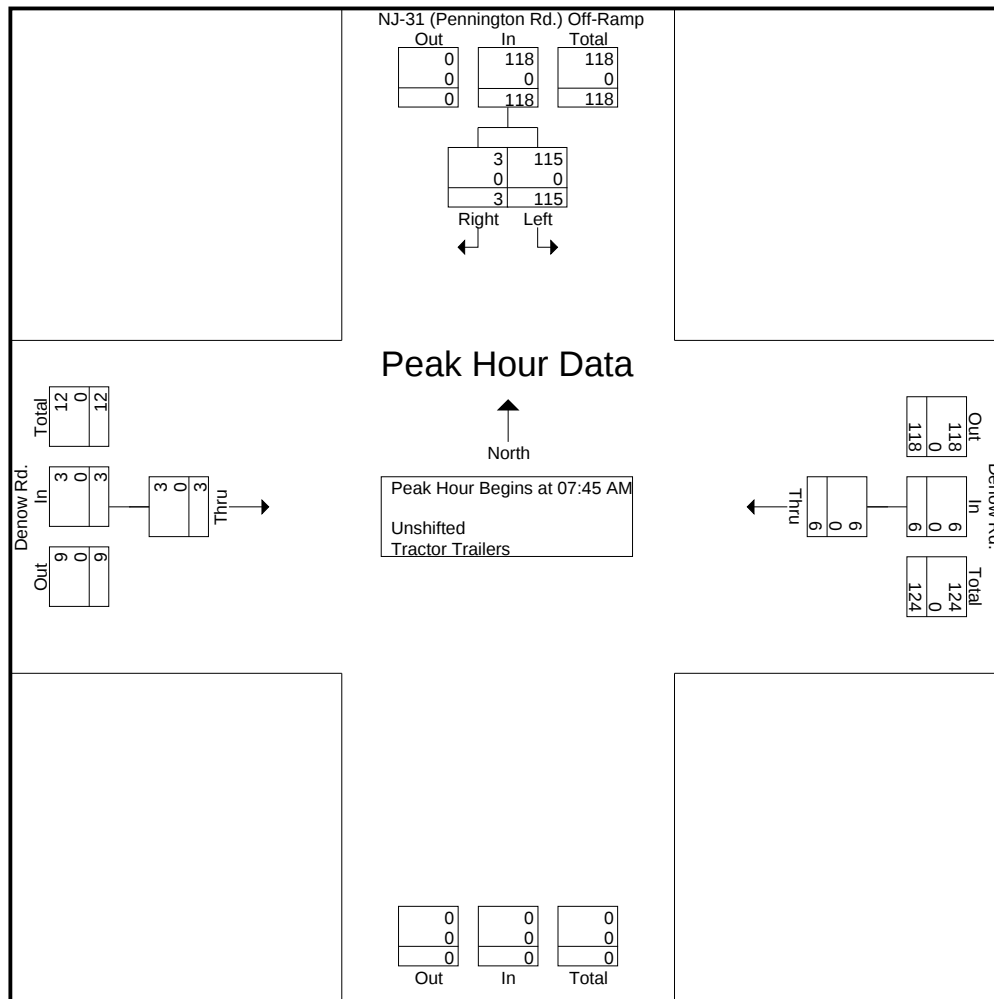
Page No : 2

	NJ-31 (Pennington Rd.) Off-Ramp Southbound			Denow Rd. Westbound		Denow Rd. Eastbound		
Start Time	Right	Left	App. Total	Thru	App. Total	Thru	App. Total	Int. Total

Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1

Peak Hour for Entire Intersection Begins at 07:45 AM

07:45 AM	2	39	41	0	0	1	1	42
08:00 AM	0	24	24	4	4	0	0	28
08:15 AM	1	24	25	1	1	1	1	27
08:30 AM	0	28	28	1	1	1	1	30
Total Volume	3	115	118	6	6	3	3	127
% App. Total	2.5	97.5		100		100		
PHF	.375	.737	.720	.375	.375	.750	.750	.756
Unshifted	3	115	118	6	6	3	3	127
% Unshifted	100	100	100	100	100	100	100	100
Tractor Trailers	0	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0	0



Shropshire Associates LLC

277 Whitehorse Pike, Suite 203
Atco, NJ 08004

N/S Route: NJ-31 (Pennington Rd.) Southbound Off-Ramp

E/W Route: Denow Rd.

Hopewell Township/Mercer County/NJ

Tuesday/Cloudy/LW/D4-2870

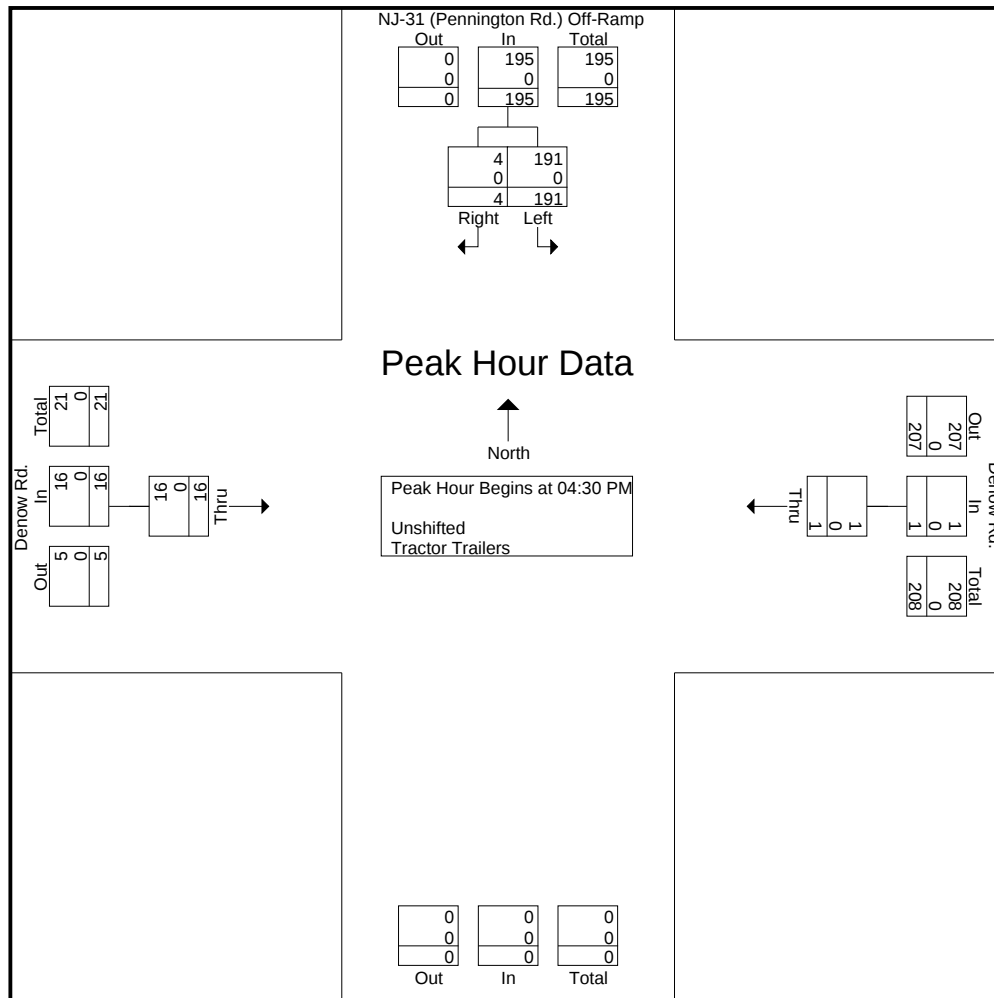
File Name : 23014002

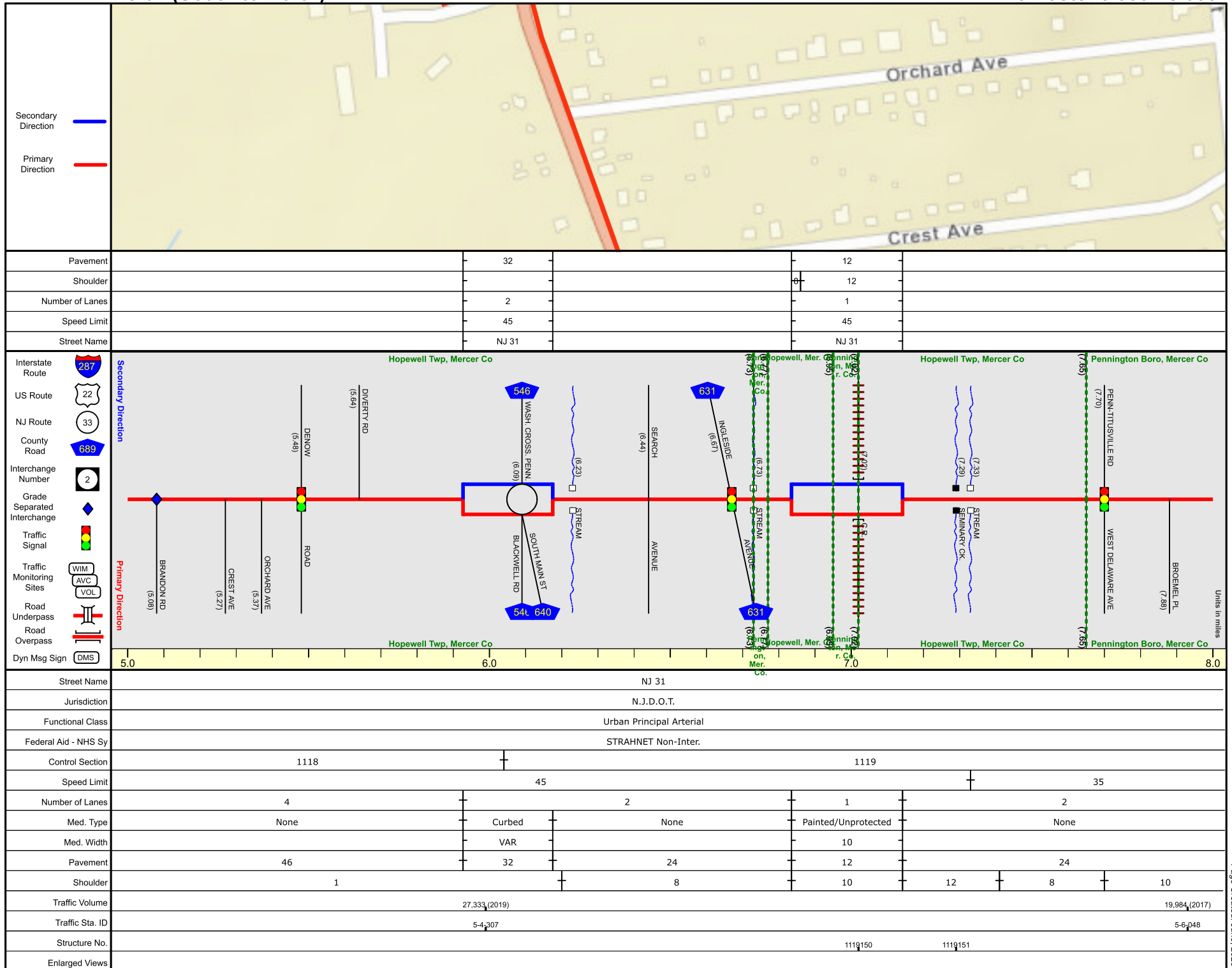
Site Code : 23014002

Start Date : 3/28/2023

Page No : 3

	NJ-31 (Pennington Rd.) Off-Ramp Southbound			Denow Rd. Westbound		Denow Rd. Eastbound		
Start Time	Right	Left	App. Total	Thru	App. Total	Thru	App. Total	Int. Total
Peak Hour Analysis From 04:00 PM to 05:45 PM - Peak 1 of 1								
Peak Hour for Entire Intersection Begins at 04:30 PM								
04:30 PM	1	30	31	1	1	3	3	35
04:45 PM	3	56	59	0	0	3	3	62
05:00 PM	0	54	54	0	0	8	8	62
05:15 PM	0	51	51	0	0	2	2	53
Total Volume	4	191	195	1	1	16	16	212
% App. Total	2.1	97.9		100		100		
PHF	.333	.853	.826	.250	.250	.500	.500	.855
Unshifted	4	191	195	1	1	16	16	212
% Unshifted	100	100	100	100	100	100	100	100
Tractor Trailers	0	0	0	0	0	0	0	0
% Tractor Trailers	0	0	0	0	0	0	0	0





SRI = 00000031__

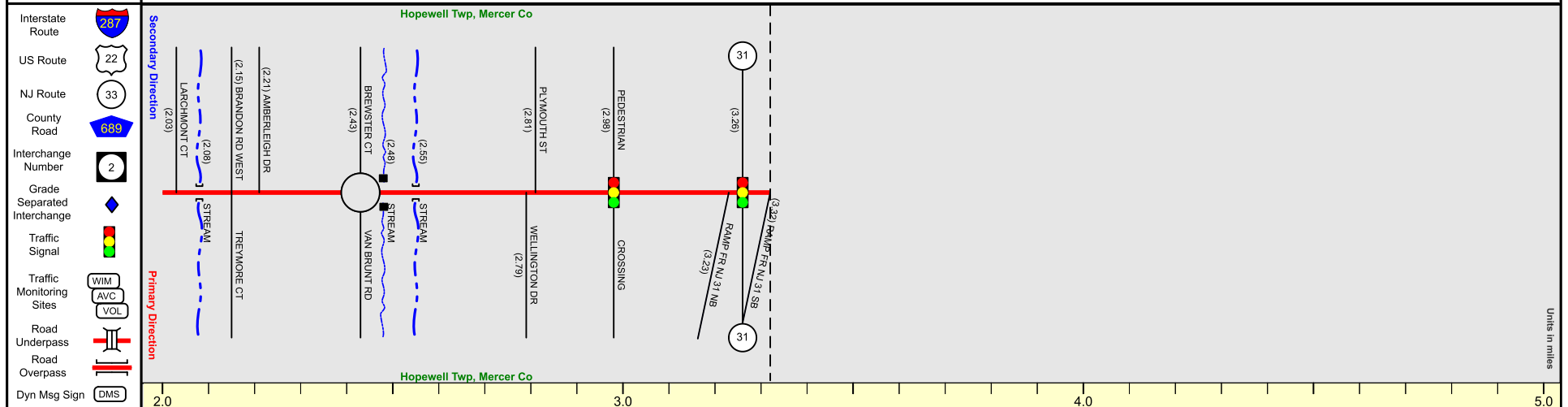
Date last inventoried: February 2019

DENOW RD (East to West)

Mile Posts: 2.000 - 3.320



Pavement	
Shoulder	
Number of Lanes	
Speed Limit	
Street Name	



Street Name	Denow Road	
Jurisdiction	Municipal	
Functional Class	Urban Major Collector	
Federal Aid - NHS Sy	STP	
Control Section		
Speed Limit	25	35
Number of Lanes	2	
Med. Type	None	
Med. Width		
Pavement	26	24
Shoulder		6
Traffic Volume		
Traffic Sta. ID		
Structure No.		
Enlarged Views		

SRI = 11071158__

Date last inventoried: June 2014

90 AND 100 SECOND BACKGROUND AND 69-90 SECOND VARIABLE CYCLES

<u>PHASE</u>	<u>SIGNAL INDICATIONS</u>				<u>TIME (SECONDS)</u>			
	<u>NORMAL OPERATION</u>				Plan I	Plan II	Plan III	Plan IV
	<u>1-6</u>	<u>7-12</u>	<u>13-16</u>	<u>17,18</u>	<u>(100)</u>	<u>(90)</u>	<u>(100)</u>	<u>(69-90)</u>
A) Route NJ 31 ROW	G	R	W	DW	58-32	48-27	58-32	27(min)
Pedestrian Clearance	G	R	FDW	DW	21	21	21	21
Change	Y	R	DW	DW	5*	5*	5*	5
Clearance	R	R	DW	DW	2	2	2	2
B) Denow Road ROW	R	G	DW	DW	7-33	7-28	7-33	7-28
Change	R	Y	DW	DW	4	4	4	4
Clearance	R	R	DW	DW	3	3	3	3
Emergency Flash	Y	R	DARK	DARK	-	-	-	-
OFFSETS					52	81	51	-

Directive Number: 313-21

Route 31 & Denow Road
Hopewell Township, Mercer County90 AND 100 SECOND BACKGROUND 69-90 SECOND VARIABLE CYCLESPEDESTRIAN ACTUATIONPHASE

	<u>SIGNAL INDICATIONS</u>				<u>TIME (SECONDS)</u>			
	<u>1-6</u>	<u>7-12</u>	<u>13-16</u>	<u>17,18</u>	<u>Plan I (100)</u>	<u>Plan II (90)</u>	<u>Plan III (100)</u>	<u>Plan IV (69-90) 27(min)</u>
A) Route NJ 31 ROW	G	R	W	DW	38-32	28-27	38-32	21
Pedestrian Clearance	G	R	FDW	DW	21	21	21	21
Change	Y	R	DW	DW	5	5	5	5
Clearance	R	R	DW	DW	2	2	2	2
B) Denow Road ROW	R	G	DW	W	7	7	7	7
Pedestrian Clearance	R	G	DW	FDW	20	20	20	20
vehicle Extension	R	G	DW	DW	0-6	0-1	0-6	0-1
Change	R	Y	DW	DW	4	4	4	4
Clearance	R	R	DW	DW	3	3	3	3
Emergency Flash	Y	R	DARK	DARK	-	-	-	-

NOTES

1. *Offset is measured from the beginning of yellow to Route 31 traffic at Bull Run Road to the beginning of yellow to Route 31 traffic at this intersection.
2. The vehicle memory is to be off.
3. The manual control is to be disconnected.
4. The vehicle extension is to be set to 4 seconds for Phase B.
5. The signal to be rest in Phase A (green/ walk).

Directive Number: 313-21

Route 31 & Denow Road
Hopewell Township, Mercer CountyCYCLE LENGTH
(SECONDS)

100

90

100

Variable

HOURS OF OPERATION

Plan I:	Monday through Friday	06:00 AM – 10:00 AM
Plan II:	Monday through Friday	10:00 AM – 02:00 PM
	Saturday and Sunday	08:00 AM – 08:00 PM
Plan III:	Monday through Friday	02:00 PM – 08:00 PM
Plan IV:	All other times	

Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

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: 49

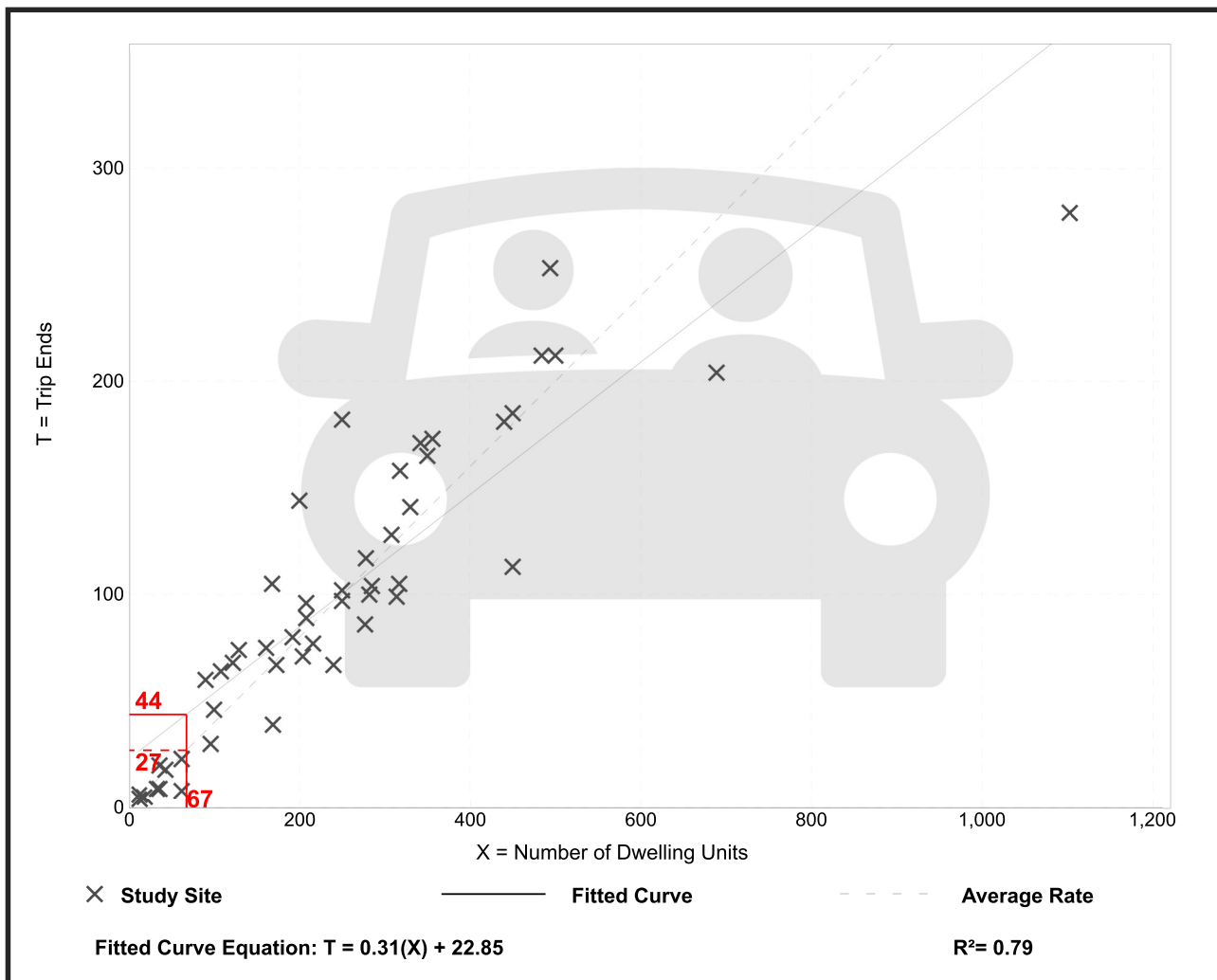
Avg. Num. of Dwelling Units: 249

Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



Multifamily Housing (Low-Rise) Not Close to Rail Transit (220)

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: 59

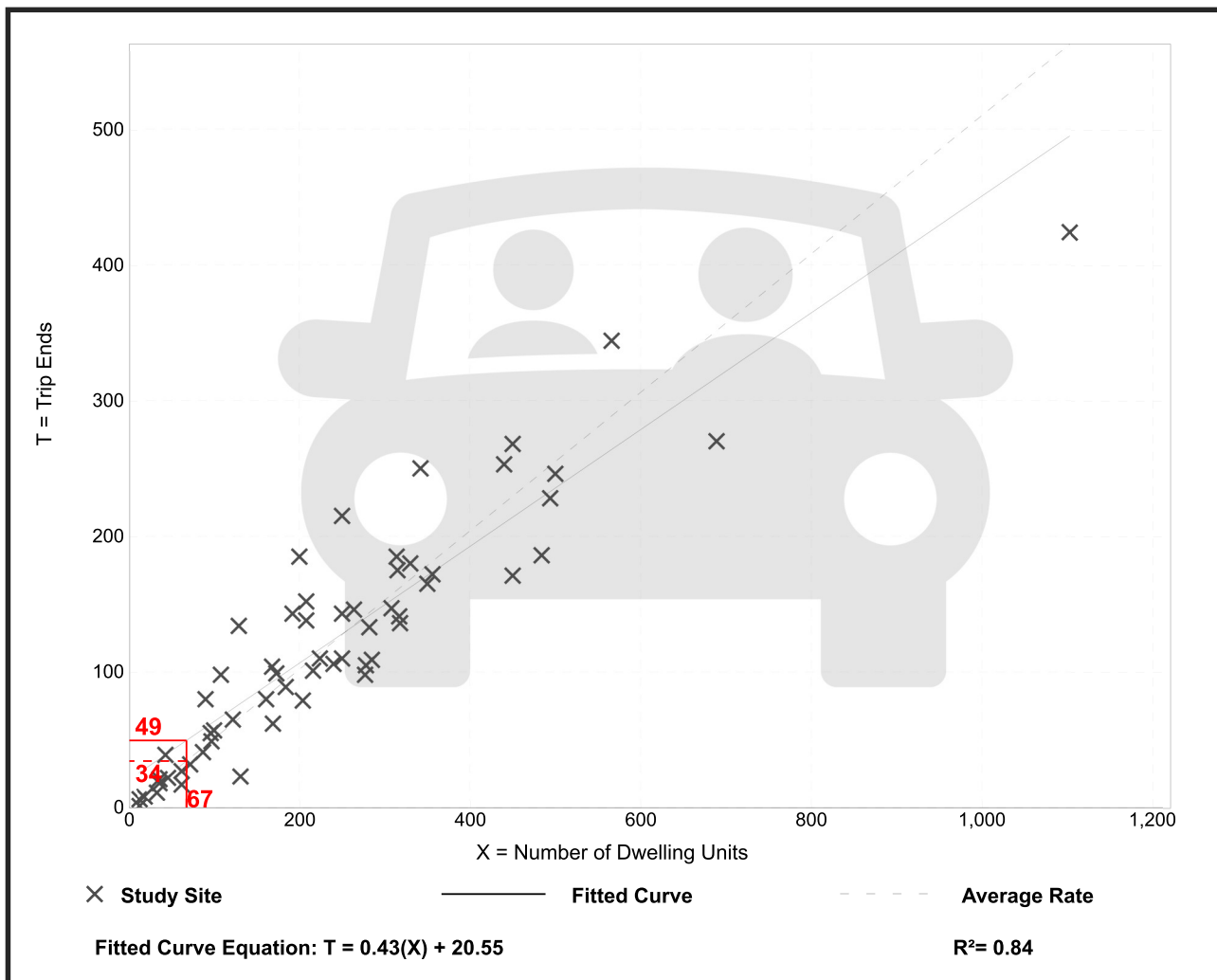
Avg. Num. of Dwelling Units: 241

Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Existing AM
04/05/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	46	64	0	255	6	61	0	1356	139	0	894	0
Future Volume (vph)	46	64	0	255	6	61	0	1356	139	0	894	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	50			50			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt					0.862			0.986				
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1805	1900	0	1787	1638	0	0	4974	0	0	3505	0
Flt Permitted	0.710			0.712								
Satd. Flow (perm)	1349	1900	0	1339	1638	0	0	4974	0	0	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					26			26				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		193			993			1427			2285	
Travel Time (s)		3.8			19.3			21.6			34.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	3%	1%	0%	3%	0%
Adj. Flow (vph)	49	69	0	274	6	66	0	1458	149	0	961	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	69	0	274	72	0	0	1607	0	0	961	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2			2			2	
Detector Template	Left	Thru		Left	Thru			Thru			Thru	
Leading Detector (ft)	20	100		20	100			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	6		20	6			6			6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Existing AM
04/05/2023

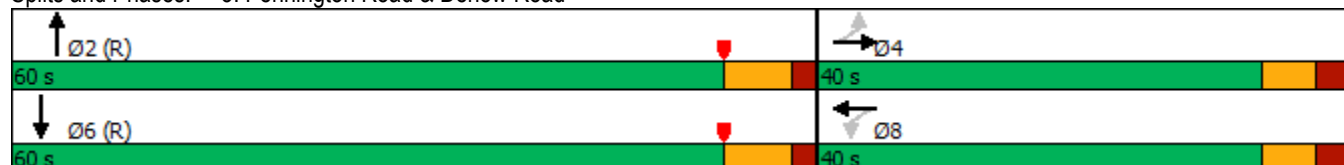
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								
Detector Phase	4	4		8	8			2			6	
Switch Phase												
Minimum Initial (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Minimum Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%			60.0%			60.0%	
Maximum Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0			5.0	
All-Red Time (s)	3.0	3.0		3.0	3.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Recall Mode	None	None		None	None			C-Max			C-Max	
Act Effect Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.53			0.53	
v/c Ratio	0.11	0.11		0.62	0.13			0.61			0.52	
Control Delay	24.3	24.0		35.6	16.8			17.2			16.5	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	24.3	24.0		35.6	16.8			17.2			16.5	
LOS	C	C		D	B			B			B	
Approach Delay	24.1			31.7			17.2			16.5		
Approach LOS	C			C			B			B		

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 15.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 100
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.62
 Intersection Signal Delay: 18.9
 Intersection Capacity Utilization 83.3%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service E

Splits and Phases: 3: Pennington Road & Denow Road



Intersection						
Int Delay, s/veh	8.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	3	6	0	115	3
Future Vol, veh/h	0	3	6	0	115	3
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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	4	8	0	151	4
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	12	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	4	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	1013	1080
Stage 1	0	-	-	0	1020	-
Stage 2	0	-	-	0	1024	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	1013	1080
Mov Cap-2 Maneuver	-	-	-	-	1013	-
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	1024	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.2		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	1013	1080		
HCM Lane V/C Ratio	-	-	0.149	0.004		
HCM Control Delay (s)	-	-	9.2	8.3		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	0.5	0		

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Existing PM
04/05/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	22	175	11	303	0	56	0	1135	268	0	1103	0
Future Volume (vph)	22	175	11	303	0	56	0	1135	268	0	1103	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	50			50			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.991			0.850			0.971				
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1805	1883	0	1805	1615	0	0	4956	0	0	3539	0
Flt Permitted	0.717			0.600								
Satd. Flow (perm)	1362	1883	0	1140	1615	0	0	4956	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			46			84				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		193			993			1427			2285	
Travel Time (s)		3.8			19.3			21.6			34.6	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	24	192	12	333	0	62	0	1247	295	0	1212	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	24	204	0	333	62	0	0	1542	0	0	1212	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2			2			2	
Detector Template	Left	Thru		Left	Thru			Thru			Thru	
Leading Detector (ft)	20	100		20	100			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	6		20	6			6			6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Existing PM
04/05/2023

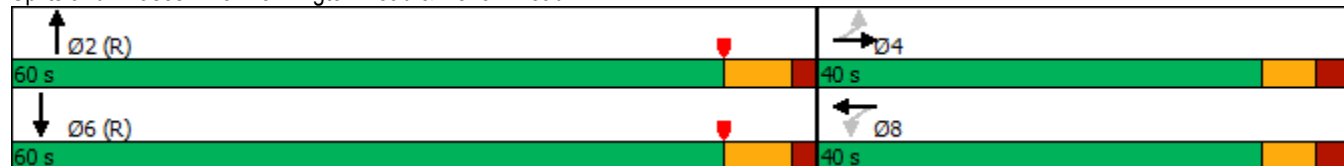
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								
Detector Phase	4	4		8	8			2			6	
Switch Phase												
Minimum Initial (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Minimum Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%			60.0%			60.0%	
Maximum Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0			5.0	
All-Red Time (s)	3.0	3.0		3.0	3.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Recall Mode	None	None		None	None			C-Max			C-Max	
Act Effect Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33			0.53			0.53	
v/c Ratio	0.05	0.33		0.89	0.11			0.58			0.65	
Control Delay	23.4	26.6		58.5	10.5			16.0			18.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	23.4	26.6		58.5	10.5			16.0			18.8	
LOS	C	C		E	B			B			B	
Approach Delay	26.3			50.9			16.0			18.8		
Approach LOS	C			D			B			B		

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 15.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
Natural Cycle: 100
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 21.8
Intersection Capacity Utilization 116.7%
Analysis Period (min) 15

Intersection LOS: C
ICU Level of Service H

Splits and Phases: 3: Pennington Road & Denow Road



Intersection						
Int Delay, s/veh	8.8					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	16	1	0	191	4
Future Vol, veh/h	0	16	1	0	191	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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	19	1	0	222	5
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	20	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	19	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	1002	1090
Stage 1	0	-	-	0	1028	-
Stage 2	0	-	-	0	1009	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	1002	1090
Mov Cap-2 Maneuver	-	-	-	-	1002	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	1009	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.6		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	1002	1090		
HCM Lane V/C Ratio	-	-	0.222	0.004		
HCM Control Delay (s)	-	-	9.6	8.3		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	0.8	0		

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

No-Build AM

04/18/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			  	
Traffic Volume (vph)	47	73	0	263	6	64	0	1413	143	0	972	0
Future Volume (vph)	47	73	0	263	6	64	0	1413	143	0	972	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	50			50			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt					0.862			0.986				
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1805	1900	0	1787	1638	0	0	4974	0	0	3505	0
Flt Permitted	0.708			0.706								
Satd. Flow (perm)	1345	1900	0	1328	1638	0	0	4974	0	0	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					22			26				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		193			993			1427			2285	
Travel Time (s)		3.8			19.3			21.6			34.6	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	3%	1%	0%	3%	0%
Adj. Flow (vph)	51	78	0	283	6	69	0	1519	154	0	1045	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	51	78	0	283	75	0	0	1673	0	0	1045	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2			2			2	
Detector Template	Left	Thru		Left	Thru			Thru			Thru	
Leading Detector (ft)	20	100		20	100			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	6		20	6			6			6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

No-Build AM
04/18/2023

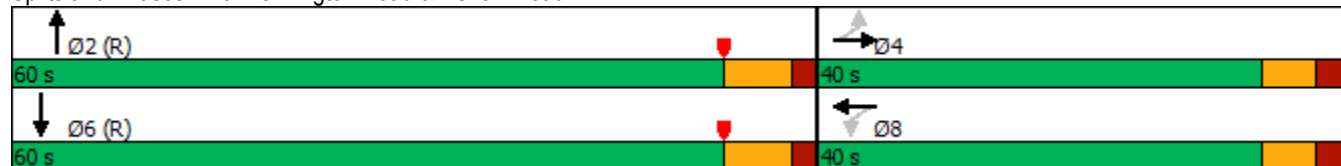
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								
Detector Phase	4	4		8	8			2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			53.0			53.0	
Minimum Split (s)	14.0	14.0		14.0	14.0			60.0			60.0	
Total Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%			60.0%			60.0%	
Maximum Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0			5.0	
All-Red Time (s)	3.0	3.0		3.0	3.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Recall Mode	None	None		None	None			C-Max			C-Max	
Act Effct Green (s)	26.7	26.7		26.7	26.7			59.3			59.3	
Actuated g/C Ratio	0.27	0.27		0.27	0.27			0.59			0.59	
v/c Ratio	0.14	0.15		0.80	0.17			0.57			0.50	
Control Delay	26.5	26.7		50.6	19.7			14.0			13.8	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	26.5	26.7		50.6	19.7			14.0			13.8	
LOS	C	C		D	B			B			B	
Approach Delay		26.6			44.1			14.0			13.8	
Approach LOS		C			D			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 15.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 17.8
 Intersection Capacity Utilization 77.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 3: Pennington Road & Denow Road



Intersection						
Int Delay, s/veh	8.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	3	6	0	125	3
Future Vol, veh/h	0	3	6	0	125	3
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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	4	8	0	164	4
Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	-	0	-	0	12	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	4	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	1013	1080
Stage 1	0	-	-	0	1020	-
Stage 2	0	-	-	0	1024	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	1013	1080
Mov Cap-2 Maneuver	-	-	-	-	1013	-
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	1024	-
Approach	EB		WB		SB	
HCM Control Delay, s	0		0		9.2	
HCM LOS					A	
Minor Lane/Major Mvmt	EBT		WBT		SBLn1	SBLn2
Capacity (veh/h)	-		-		1013	1080
HCM Lane V/C Ratio	-		-		0.162	0.004
HCM Control Delay (s)	-		-		9.2	8.3
HCM Lane LOS	-		-		A	A
HCM 95th %tile Q(veh)	-		-		0.6	0

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

No-Build PM
04/18/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations								  			 	
Traffic Volume (vph)	23	185	11	312	0	61	0	1221	276	0	1163	0
Future Volume (vph)	23	185	11	312	0	61	0	1221	276	0	1163	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	50			50			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.992			0.850			0.972				
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1805	1885	0	1805	1615	0	0	4961	0	0	3539	0
Flt Permitted	0.713			0.582								
Satd. Flow (perm)	1355	1885	0	1106	1615	0	0	4961	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			44			77				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		193			993			1427			2285	
Travel Time (s)		3.8			19.3			21.6			34.6	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	25	203	12	343	0	67	0	1342	303	0	1278	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	25	215	0	343	67	0	0	1645	0	0	1278	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2			2			2	
Detector Template	Left	Thru		Left	Thru			Thru			Thru	
Leading Detector (ft)	20	100		20	100			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	6		20	6			6			6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

No-Build PM
04/18/2023

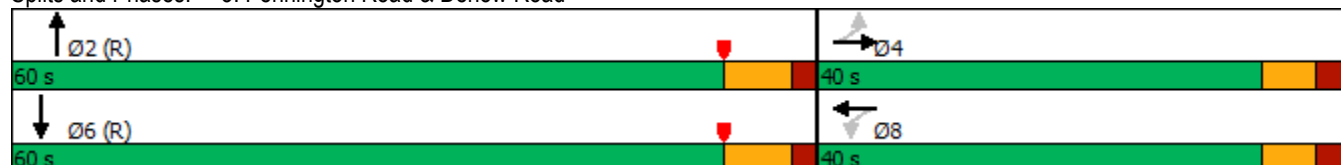
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								
Detector Phase	4	4		8	8			2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			53.0			53.0	
Minimum Split (s)	14.0	14.0		14.0	14.0			60.0			60.0	
Total Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%			60.0%			60.0%	
Maximum Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0			5.0	
All-Red Time (s)	3.0	3.0		3.0	3.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Recall Mode	None	None		None	None			C-Max			C-Max	
Act Effct Green (s)	32.4	32.4		32.4	32.4			53.6			53.6	
Actuated g/C Ratio	0.32	0.32		0.32	0.32			0.54			0.54	
v/c Ratio	0.06	0.35		0.96	0.12			0.61			0.67	
Control Delay	23.5	27.2		73.3	11.5			16.5			19.2	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	23.5	27.2		73.3	11.5			16.5			19.2	
LOS	C	C		E	B			B			B	
Approach Delay		26.8			63.2			16.5			19.2	
Approach LOS		C			E			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 15.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 23.5
 Intersection Capacity Utilization 89.4%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 3: Pennington Road & Denow Road



Intersection						
Int Delay, s/veh	9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	16	1	0	202	4
Future Vol, veh/h	0	16	1	0	202	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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	19	1	0	235	5
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	20	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	19	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	1002	1090
Stage 1	0	-	-	0	1028	-
Stage 2	0	-	-	0	1009	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	1002	1090
Mov Cap-2 Maneuver	-	-	-	-	1002	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	1009	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.7		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	1002	1090		
HCM Lane V/C Ratio	-	-	0.234	0.004		
HCM Control Delay (s)	-	-	9.7	8.3		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	0.9	0		

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Build AM
04/18/2023

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	50	75	0	263	6	65	0	1418	143	0	984	0
Future Volume (vph)	50	75	0	263	6	65	0	1418	143	0	984	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	50			50			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt					0.862			0.986				
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1805	1900	0	1787	1638	0	0	4974	0	0	3505	0
Flt Permitted	0.708			0.704								
Satd. Flow (perm)	1345	1900	0	1324	1638	0	0	4974	0	0	3505	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)					22			26				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		193			993			1427			1808	
Travel Time (s)		3.8			19.3			21.6			27.4	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	3%	1%	0%	3%	0%
Adj. Flow (vph)	54	81	0	283	6	70	0	1525	154	0	1058	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	81	0	283	76	0	0	1679	0	0	1058	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2			2			2	
Detector Template	Left	Thru		Left	Thru			Thru			Thru	
Leading Detector (ft)	20	100		20	100			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	6		20	6			6			6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Build AM
04/18/2023

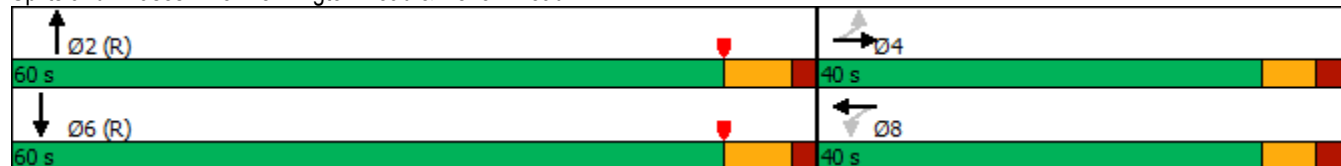
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								
Detector Phase	4	4		8	8			2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			53.0			53.0	
Minimum Split (s)	14.0	14.0		14.0	14.0			60.0			60.0	
Total Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%			60.0%			60.0%	
Maximum Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0			5.0	
All-Red Time (s)	3.0	3.0		3.0	3.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Recall Mode	None	None		None	None			C-Max			C-Max	
Act Effct Green (s)	26.7	26.7		26.7	26.7			59.3			59.3	
Actuated g/C Ratio	0.27	0.27		0.27	0.27			0.59			0.59	
v/c Ratio	0.15	0.16		0.80	0.17			0.57			0.51	
Control Delay	26.6	26.8		50.8	19.7			14.1			13.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	26.6	26.8		50.8	19.7			14.1			13.9	
LOS	C	C		D	B			B			B	
Approach Delay		26.7			44.2			14.1			13.9	
Approach LOS		C			D			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 15.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 80
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 17.9
 Intersection Capacity Utilization 77.1%
 Analysis Period (min) 15

Intersection LOS: B
 ICU Level of Service D

Splits and Phases: 3: Pennington Road & Denow Road



Intersection						
Int Delay, s/veh	0.2					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Vol, veh/h	0	30	1524	9	0	1117
Future Vol, veh/h	0	30	1524	9	0	1117
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	0	0	0
Mvmt Flow	0	33	1657	10	0	1214
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	834	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	316	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	316	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	17.7	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	- 316		-		
HCM Lane V/C Ratio	-	- 0.103		-		
HCM Control Delay (s)	-	- 17.7		-		
HCM Lane LOS	-	- C		-		
HCM 95th %tile Q(veh)	-	- 0.3		-		

Intersection						
Int Delay, s/veh	8.7					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	3	6	0	130	3
Future Vol, veh/h	0	3	6	0	130	3
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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	76	76	76	76	76	76
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	4	8	0	171	4
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	12	8
Stage 1	-	-	-	-	8	-
Stage 2	-	-	-	-	4	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	1013	1080
Stage 1	0	-	-	0	1020	-
Stage 2	0	-	-	0	1024	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	1013	1080
Mov Cap-2 Maneuver	-	-	-	-	1013	-
Stage 1	-	-	-	-	1020	-
Stage 2	-	-	-	-	1024	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.3		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	1013	1080		
HCM Lane V/C Ratio	-	-	0.169	0.004		
HCM Control Delay (s)	-	-	9.3	8.3		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	0.6	0		

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Build PM
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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	34	187	11	312	0	65	0	1235	276	0	1171	0
Future Volume (vph)	34	187	11	312	0	65	0	1235	276	0	1171	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	100		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	50			50			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	0.95	1.00
Frt		0.992			0.850			0.973				
Flt Protected	0.950			0.950								
Satd. Flow (prot)	1805	1885	0	1805	1615	0	0	4966	0	0	3539	0
Flt Permitted	0.711			0.579								
Satd. Flow (perm)	1351	1885	0	1100	1615	0	0	4966	0	0	3539	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3			44			76				
Link Speed (mph)		35			35			45			45	
Link Distance (ft)		193			993			1427			1818	
Travel Time (s)		3.8			19.3			21.6			27.5	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	2%	0%	0%	2%	0%
Adj. Flow (vph)	37	205	12	343	0	71	0	1357	303	0	1287	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	37	217	0	343	71	0	0	1660	0	0	1287	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2			2			2	
Detector Template	Left	Thru		Left	Thru			Thru			Thru	
Leading Detector (ft)	20	100		20	100			100			100	
Trailing Detector (ft)	0	0		0	0			0			0	
Detector 1 Position(ft)	0	0		0	0			0			0	
Detector 1 Size(ft)	20	6		20	6			6			6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex			Cl+Ex			Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		4			8			2			6	

Lanes, Volumes, Timings

3: Pennington Road & Denow Road

Build PM
04/18/2023

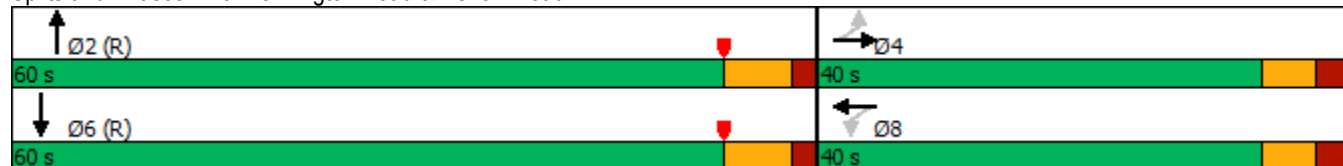
												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Permitted Phases	4			8								
Detector Phase	4	4		8	8			2			6	
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0			53.0			53.0	
Minimum Split (s)	14.0	14.0		14.0	14.0			60.0			60.0	
Total Split (s)	40.0	40.0		40.0	40.0			60.0			60.0	
Total Split (%)	40.0%	40.0%		40.0%	40.0%			60.0%			60.0%	
Maximum Green (s)	33.0	33.0		33.0	33.0			53.0			53.0	
Yellow Time (s)	4.0	4.0		4.0	4.0			5.0			5.0	
All-Red Time (s)	3.0	3.0		3.0	3.0			2.0			2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0			7.0			7.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.0	4.0		4.0	4.0			2.0			2.0	
Recall Mode	None	None		None	None			C-Max			C-Max	
Act Effect Green (s)	32.5	32.5		32.5	32.5			53.5			53.5	
Actuated g/C Ratio	0.32	0.32		0.32	0.32			0.54			0.54	
v/c Ratio	0.08	0.35		0.96	0.13			0.62			0.68	
Control Delay	23.9	27.2		73.5	11.9			16.6			19.4	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	23.9	27.2		73.5	11.9			16.6			19.4	
LOS	C	C		E	B			B			B	
Approach Delay		26.7			62.9			16.6			19.4	
Approach LOS		C			E			B			B	

Intersection Summary

Area Type: Other
 Cycle Length: 100
 Actuated Cycle Length: 100
 Offset: 15.5 (16%), Referenced to phase 2:NBT and 6:SBT, Start of Yellow
 Natural Cycle: 90
 Control Type: Actuated-Coordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 23.6
 Intersection Capacity Utilization 89.5%
 Analysis Period (min) 15

Intersection LOS: C
 ICU Level of Service E

Splits and Phases: 3: Pennington Road & Denow Road



Intersection						
Int Delay, s/veh	0.1					
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗↘			↗↘
Traffic Vol, veh/h	0	17	1305	29	0	1390
Future Vol, veh/h	0	17	1305	29	0	1390
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
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, %	0	0	0	0	0	0
Mvmt Flow	0	18	1418	32	0	1511
Major/Minor	Minor1	Major1		Major2		
Conflicting Flow All	-	725	0	0	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Critical Hdwy	-	6.9	-	-	-	-
Critical Hdwy Stg 1	-	-	-	-	-	-
Critical Hdwy Stg 2	-	-	-	-	-	-
Follow-up Hdwy	-	3.3	-	-	-	-
Pot Cap-1 Maneuver	0	372	-	-	0	-
Stage 1	0	-	-	-	0	-
Stage 2	0	-	-	-	0	-
Platoon blocked, %			-	-		-
Mov Cap-1 Maneuver	-	372	-	-	-	-
Mov Cap-2 Maneuver	-	-	-	-	-	-
Stage 1	-	-	-	-	-	-
Stage 2	-	-	-	-	-	-
Approach	WB	NB		SB		
HCM Control Delay, s	15.2	0		0		
HCM LOS	C					
Minor Lane/Major Mvmt	NBT	NBRWBLn1		SBT		
Capacity (veh/h)	-	- 372		-		
HCM Lane V/C Ratio	-	- 0.05		-		
HCM Control Delay (s)	-	- 15.2		-		
HCM Lane LOS	-	- C		-		
HCM 95th %tile Q(veh)	-	- 0.2		-		

Intersection						
Int Delay, s/veh	9.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑	↑		↘	↗
Traffic Vol, veh/h	0	16	1	0	215	4
Future Vol, veh/h	0	16	1	0	215	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	0
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	86	86	86	86	86	86
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	0	19	1	0	250	5
Major/Minor	Major1	Major2		Minor2		
Conflicting Flow All	-	0	-	0	20	1
Stage 1	-	-	-	-	1	-
Stage 2	-	-	-	-	19	-
Critical Hdwy	-	-	-	-	6.4	6.2
Critical Hdwy Stg 1	-	-	-	-	5.4	-
Critical Hdwy Stg 2	-	-	-	-	5.4	-
Follow-up Hdwy	-	-	-	-	3.5	3.3
Pot Cap-1 Maneuver	0	-	-	0	1002	1090
Stage 1	0	-	-	0	1028	-
Stage 2	0	-	-	0	1009	-
Platoon blocked, %		-	-			
Mov Cap-1 Maneuver	-	-	-	-	1002	1090
Mov Cap-2 Maneuver	-	-	-	-	1002	-
Stage 1	-	-	-	-	1028	-
Stage 2	-	-	-	-	1009	-
Approach	EB	WB		SB		
HCM Control Delay, s	0	0		9.8		
HCM LOS	A					
Minor Lane/Major Mvmt	EBT	WBT	SBLn1	SBLn2		
Capacity (veh/h)	-	-	1002	1090		
HCM Lane V/C Ratio	-	-	0.25	0.004		
HCM Control Delay (s)	-	-	9.8	8.3		
HCM Lane LOS	-	-	A	A		
HCM 95th %tile Q(veh)	-	-	1	0		