
# Traffic Impact and Access Study

## Laconia Village
## Parade Road and Meredith Center Road
## Laconia, New Hampshire

**TFM Project #96126.01**

**September 19, 2025**

*Prepared for:*
**Pillsbury Realty Development, LLC**

*Submitted to:*
**City of Laconia**
**NHDOT District 3**


*Prepared by:*

TFM®

Civil Engineers
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Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

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# Full-Build Intersection Analysis – Masterplan

**Date:** 19 September 2025

**To:** City of Laconia

**From:** Bob Duval, PE
Jen Porter, PE

**Project:** Laconia Village - Parade Road & Meredith Center Road, Laconia NH
TFM# 96126.01

**Subject:** **Masterplan Traffic Study**

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## Introduction

This Memo describes recommended traffic mitigation measures for the approved Laconia Village Masterplan by Pillsbury Development Realty, LLC (Developer). The Masterplan proposes a mixed-use development at the former State School on Right Way Path in Laconia.

Trip Generation and Distribution have been previously reviewed and approved by the City and NHDOT and is included as Part D of this report.

The traffic analysis study area is 23 intersections including two proposed intersections at the project site. The study area is divided into three Parts for convenience: The intersections in each part are located as follows:

**Part A - "Front Door" intersections adjacent to Laconia Village** (See Part A Memo)

3. Parade Rd at Right Way Path/Old North Main St
2. Parade Rd at Meredith Center Rd/Elm St
32. Meredith Center Rd at Connector Rd
4. Meredith Center Rd at Eastman Rd/Lane Rd
31. Eastman Rd at Right Way Path

**Part B - "City intersections" under City jurisdiction** (See Part B Memo)

14. North Main St at Lexington Dr
15. North Main St at Oak St
19. North Main St at New Salem St
16. North Main St at Church St
17. North Main St at Union Ave/Court St
20. Court St at Fair St
13. Union Ave at Elm St/Clinton St
18. Union Ave at Gilford Ave
21. Union Ave at Church St/Winter St/Davis Pl

**Part C - "State intersections" under direct NHDOT control** (See Part C Memo)

5. NH104 at Meredith Center Rd
1. Parade Rd (NH106) at Lane Rd/Severance Rd
9. Parade Rd (NH106) at Roller Coaster Rd
8. US3 at Parade Rd (NH106)/Upper Mile [Roundabout]

6&7. NH104 at US3 [2 Signals]

10. US3 at Roller Coaster Rd
11. US3 at Endicott St. [Roundabout]
12. US3 at US3 Bus/Blaisdell Ave

## Project Overview

This full build analysis is based on complete build-out of the approved Masterplan, assumed to take place by year 2037. It is not expected that the full build mitigation recommendations will need to be in place for opening year, as this project is proposed in at least three major phases. Individual site plans will be prepared for each phase. At that point a new Traffic Study will be prepared for each Site Plan application, and those studies will be responsible for evaluating the required mitigation based on the individual and cumulative traffic impacts of that particular phase.

The full build Masterplan includes the following building elements:

- 125 Room Hotel
- 75,000 sf Recreation (YMCA or similar)
- 100,000 sf Office (General & Medical)
- 2,050 units Residential (Multifamily, Independent Elderly, Townhouse, Single Family)
- 120,000 sf Retail (In-Line)
- 75,000 sf Civic (Library, Town Offices)

Please refer to Masterplan phasing map on the following page:

## Conceptual Phasing Plan – Laconia Village

**Scope of Study**

The following summary of Traffic Study parameters is pertinent to this memo:

*Analysis Periods:*

- *Weekday peak hours: AM (7am - 9am) and PM (3pm – 6pm)*
- *Weekend peak hours: SAT (11am – 1pm) midday peak hours*

| | |
|---|---|
| *Background growth:* | *1% annual minimum* |
| *Seasonal Adjustment:* | *NHDOT Group 5, March 2023 data = 56%, June 2023 data = 5%* |
| *Opening Year/Future Year:* | *2027/2037* |
| *Other Developments:* | *none* |
| *Internal Trip Capture:* | *7% AM, 24% PM & SAT* |
| *Signal Timing Source* | Signal timings for State intersections provided by NHDOT<br>Signal timings for City intersections provided by Laconia DPW |

# Part A

## Front Door

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# Full-Build Front Door Intersection Analysis – Part A

## Introduction

This section focuses on Part A intersections located at the “Front Door” directly abutting the project site, listed below.


## Part A Study Area

## Intersection Summaries

For each study area intersection, a map, brief description, and 2037 peak hour volume diagrams are provided below, followed by a summary of operational results and discussion of proposed mitigation strategies.

*Methodology*.
Trafficware "Synchro" v11 software (based on HCM 2000) was used to analyze signalized and unsignalized intersections during AM, PM and SAT peak hours. Roundabouts were analyzed using SIDRA INTERSECTION 10.

*Level of Service (LOS)*
The relationship between control delay and LOS is shown in the following table.

| Level of Service (LOS) | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Signalized Control Delay (sec) | ≤10.0 | 10.1 to 20.0 | 20.1 to 35.0 | 35.1 to 55.0 | 55.1 to 80.0 | Over 80.0 |
| Unsignalized Control Delay (sec) | ≤10.0 | 10.1 to 15.0 | 15.1 to 25.0 | 25.1 to 35.0 | 35.1 to 50.0 | Over 50.0 |

*Queue Analysis.*
Vehicle queue lengths are reported for each intersection movement at the 95$^{th}$ percentile in feet.

*Volume to Capacity (v/c) ratios*
The ratios of traffic volume for each movement within an intersection and the theoretical capacity of that movement are reported as a decimal. Also reported is the overall v/c ratio for the intersection.

*Summary Tables*
LOS, delays, queues, and v/c ratios are presented for each intersection overall and for each approach within each intersection in the summary tables in the following section.

# Intersection #3
# Parade Road/Right Way Path/Old N. Main Street

*Existing Conditions*

This is an existing 4-way, stop controlled intersection under State jurisdiction.

Parade Road (NH106) forms the NB and SB approaches, Right Way Path (site access) is the EB approach and Old North Main Street forms the WB approach.

Each approach carries two-way traffic on single lanes. Parade Road (NH106) has free flow; Right Way Path and Old North Main Street have stop control.

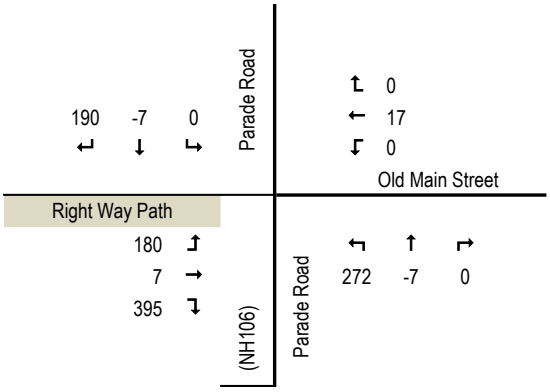
The posted speed limit is 40 mph through the intersection. There is a single cobra-head streetlight at the northeast corner of the intersection. There are no pedestrian facilities.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

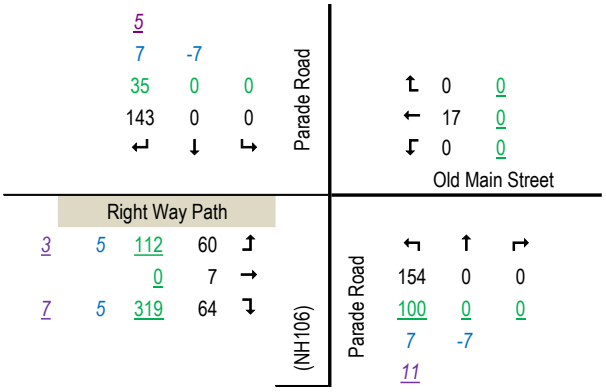
*No crashes were reported during this period for this intersection.*

## AM Total Site Trips

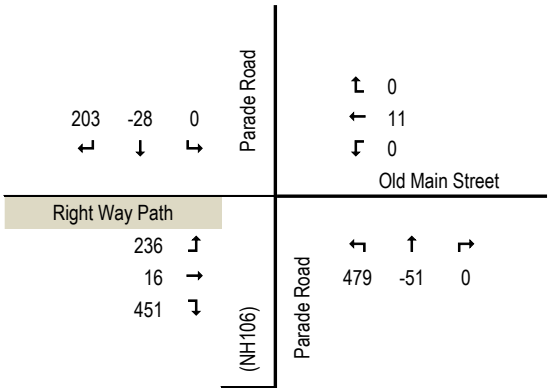



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

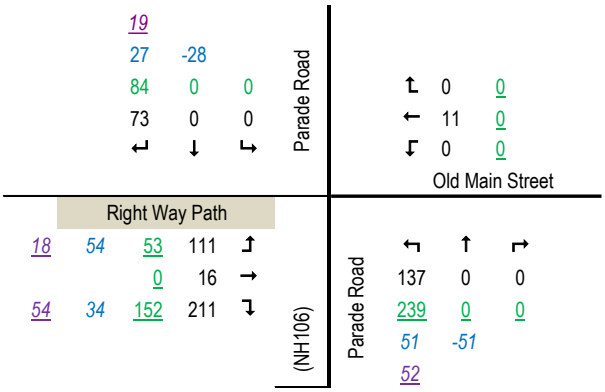



## PM Total Site Trips

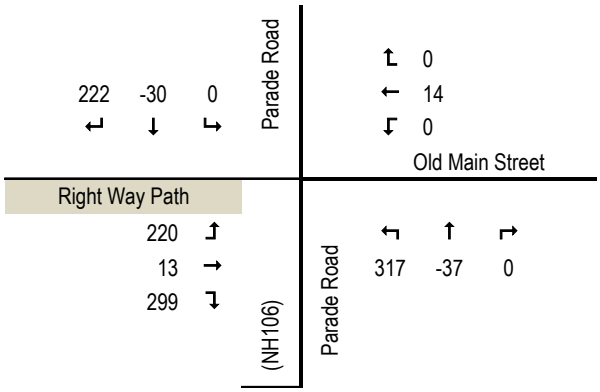



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

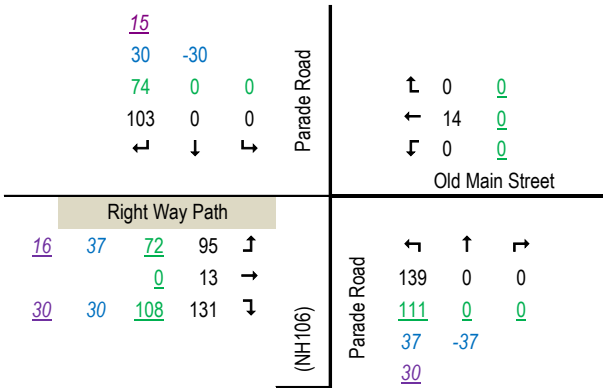



## SAT Total Site Trips

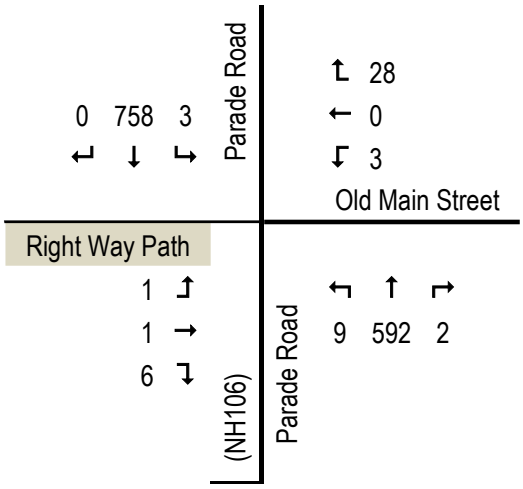



## SAT Site Composition Trips

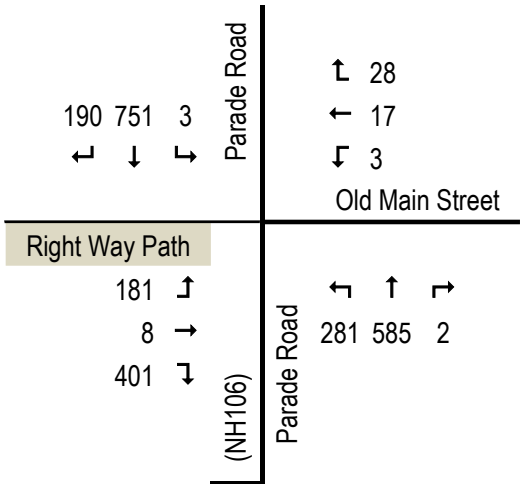
Primary, *Pass-by*, *Diverted Link*, Residential



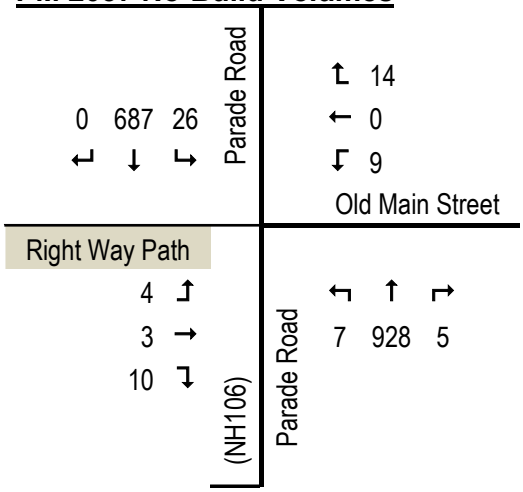
**AM 2037 No-Build Volumes**



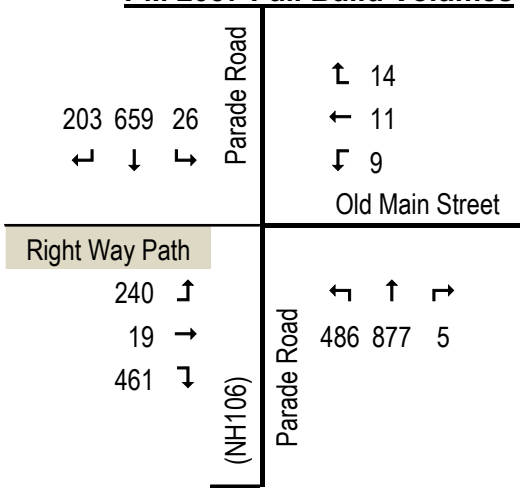

**AM 2037 Full Build Volumes**



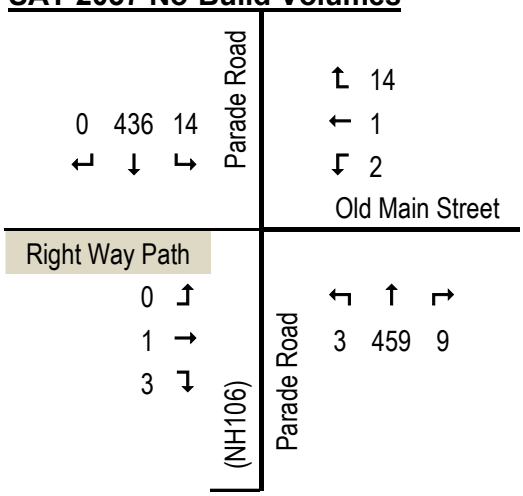

**PM 2037 No-Build Volumes**



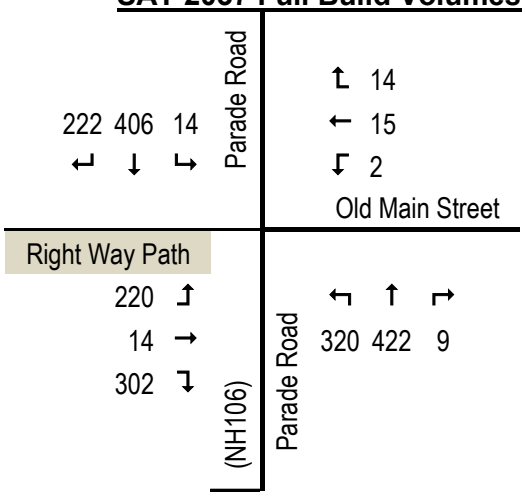

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #3: Parade Road at Right Way Path/Old North Main Street**

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build [Mitigation] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| **3: Parade Road (NH106) at Right Way Path/Old Main St [Unsignalized]** | | | | | | | | | | | | |
| ***AM Peak* OVERALL** | --- | 0.7 | A | --- | --- | >300 | F | --- | 0.59 | 10.9 | B | --- |
| EB All | 0.04 | 21.6 | C | 3 | Err | >300 | F | >500 | 0.59 | 17.9 | C | 86 |
| WB All | 0.10 | 16.7 | C | 8 | Err | >300 | F | >500 | 0.17 | 10.4 | B | 14 |
| NB All | 0.01 | 0.3 | A | 1 | 0.48 | 13.2 | B | 65 | 0.47 | 8.6 | A | 68 |
| [NWB All] | - | - | - | - | - | - | - | - | 0.03 | 10.6 | B | 3 |
| SB All | 0.00 | 0.1 | A | 0 | 0.00 | 0.1 | A | 0 | 0.47 | 8.8 | A | 75 |
| ***PM Peak* OVERALL** | --- | 0.7 | A | --- | --- | >300 | F | --- | 0.75 | 15.7 | C | --- |
| EB All | 0.15 | 40.1 | E | 13 | Err | >300 | F | >500 | 0.66 | 19.5 | C | 116 |
| WB All | 0.26 | 52.1 | F | 23 | Err | >300 | F | >500 | 0.14 | 16.2 | C | 10 |
| NB All | 0.01 | 0.3 | A | 1 | 0.73 | 22.2 | C | 164 | 0.75 | 16.9 | C | 320 |
| [NWB All] | - | - | - | - | - | - | - | - | 0.17 | 14.0 | B | 12 |
| SB All | 0.04 | 1.2 | A | 3 | 0.04 | 1.2 | A | 3 | 0.52 | 11.0 | B | 84 |
| ***SAT Peak* OVERALL** | --- | 0.5 | A | --- | --- | >300 | F | --- | 0.42 | 7.7 | A | --- |
| EB All | 0.01 | 13.5 | B | 1 | 9.25 | >300 | F | >500 | 0.36 | 8.4 | A | 41 |
| WB All | 0.04 | 13.4 | B | 3 | 0.71 | 179.0 | F | 71 | 0.08 | 8.1 | A | 6 |
| NB All | 0.00 | 0.1 | A | 0 | 0.39 | 8.4 | A | 46 | 0.42 | 8.1 | A | 54 |
| [NWB All] | - | - | - | - | - | - | - | - | 0.11 | 8.1 | A | 9 |
| SB All | 0.01 | 0.4 | A | 1 | 0.01 | 0.4 | A | 1 | 0.27 | 6.6 | A | 30 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] 95th percentile queue in feet

| *Intersection #3: Parade Road at Right Way Path / Old North Main Street* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1403 | 1047 | 42.7% |
| PM Peak Hour | 1693 | 1317 | 43.8% |
| SAT Peak Hour | 942 | 1018 | 51.9% |

### *Analysis*

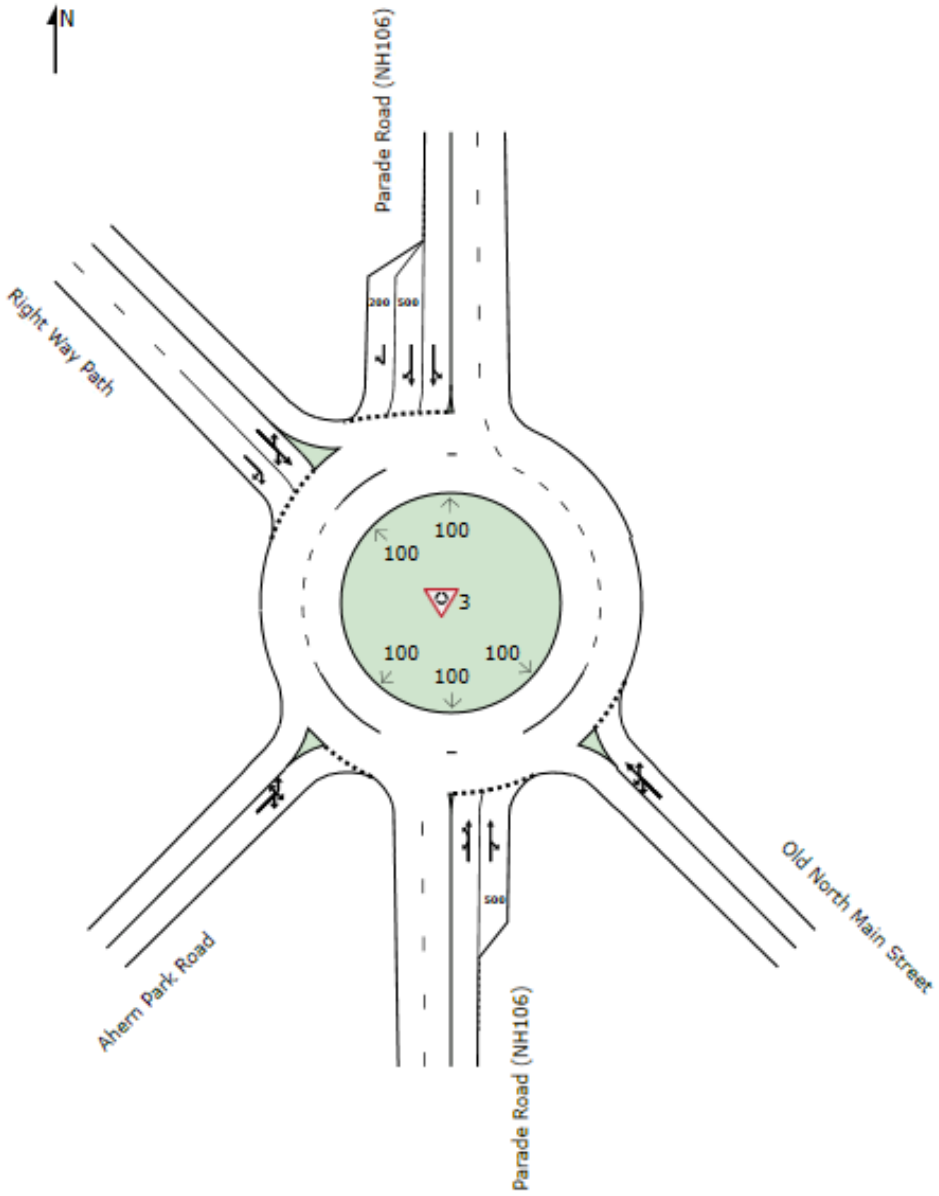
This intersection will be the main access point for the Laconia Village Development. Because of turning volumes, the need to accommodate Ahern Park Road near its current position, and to separate Ahern Park traffic (frequent RVs, campers, trailers, etc.) into the residential and commercial site roadways, we are proposing a roundabout for this intersection with Ahern Park Road as a 5th leg.

For Full Build conditions, the roundabout should contain two center circulation lanes around the entire roundabout. Northbound and southbound approaches should have two entering lanes and two exiting lanes.

Old North Main Street and Ahern State Park should have single lane approaches entering and exiting. Right Way Path should have two lanes entering the roundabout and a single lane exiting. There should be an exclusive southbound right lane to direct Laconia Village traffic into the site without entering the roundabout.

***Recommended Mitigation***

- Construct 5-leg roundabout with two circulating lanes.




Intersection #3 - Proposed 5-Leg, Two-Lane Roundabout at Parade Road/Right Way Path

# Intersection #2

# Parade Road at Meredith Center Road/Elm Street

*Existing Conditions*

This is an existing 4-way signalized intersection under State jurisdiction.

Parade Road (NH106) forms the NB and SB approaches with Meredith Center Road forming the EB approach and Elm Street forming the WB approach. The EB and WB approaches both have two lanes; an exclusive right-turn lane and a left-thru lane. The NB approach has three lanes, an exclusive left-turn lane, a thru lane and an exclusive right-turn lane. The SB approach has an exclusive left-turn lane and thru-right lane.

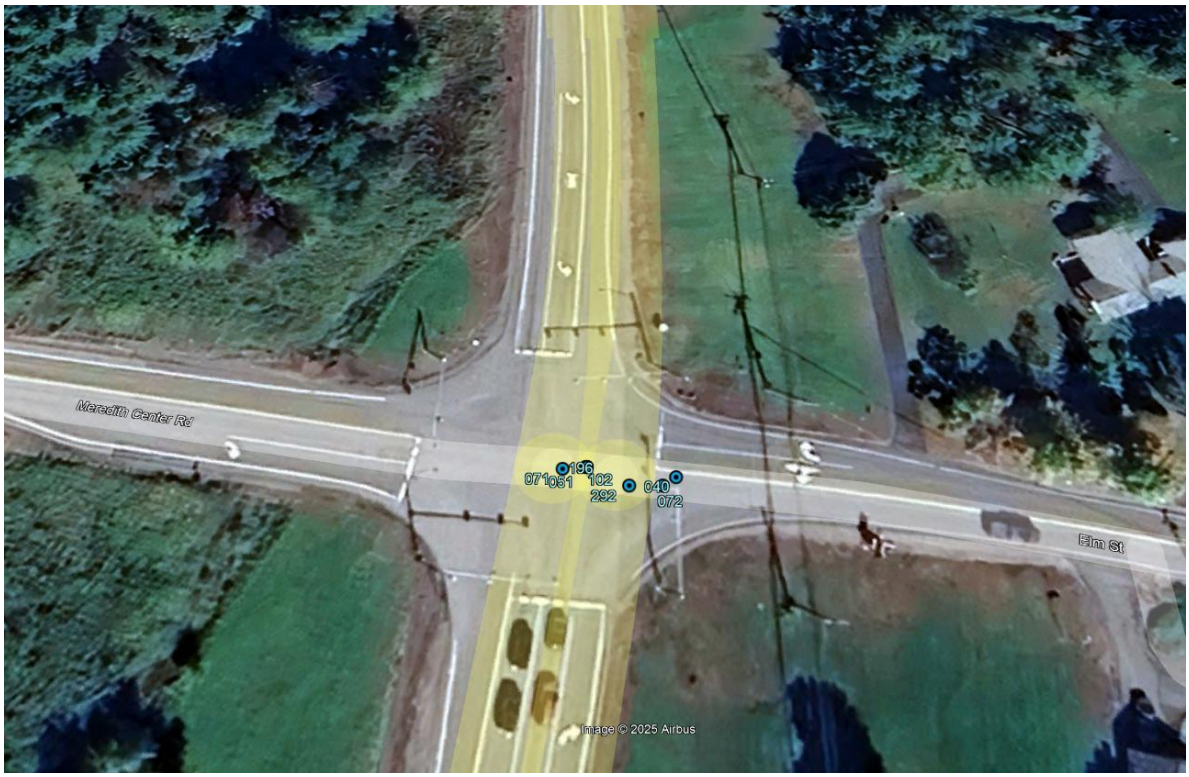
The posted speed limit is 40 mph on Parade Road and Meredith Center Road. On Elm Street the posted speed limit is 30 mph. There are cobra-head street lights on top of the mast arms at the northeast and southwest corners of the intersection. There are no pedestrian facilities.

*Accident Evaluation*

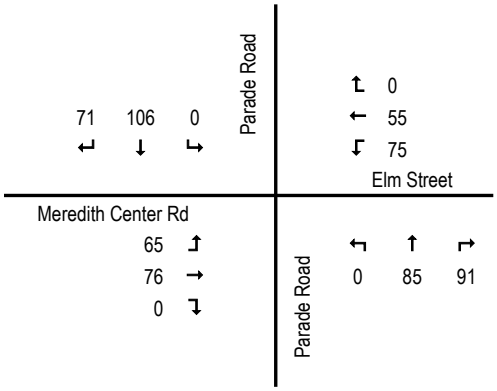
Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Considering the volume passing through this intersection, the crash history is favorable.

**Crash Data Summary**
**Intersection #2: Parade Road at Meredith Center Road and Elm Street**

| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 8 |
| Crashes per Year (Avg) | 2 |
| **CRASH SEVERITY** | |
| Property Damage Only | 5 |
| Injury | 3 |
| Fatality | 0 |
| **CRASH TYPE** | |
| Fixed Object | 0 |
| Other Motor Vehicle | 8 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 1 |
| Snow/Ice | 2 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 0 |
| Weekday PM (3-6pm) | 1 |
| Non-Commuter Peak | 7 |

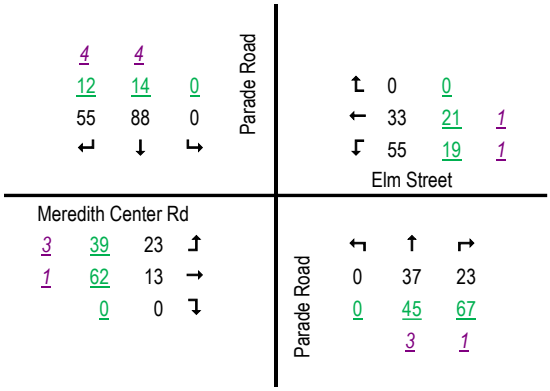


## AM Total Site Trips

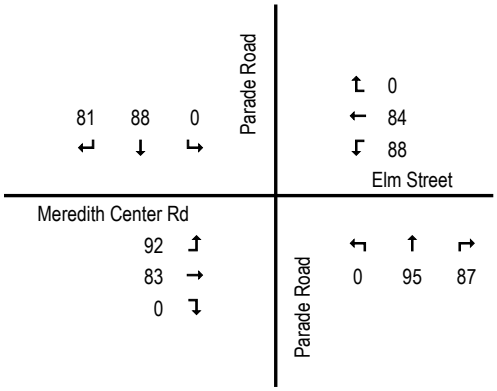



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

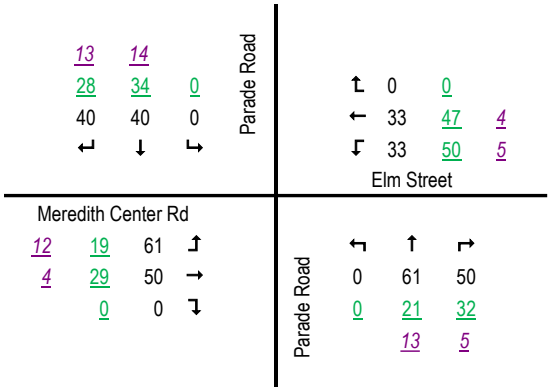



## PM Total Site Trips

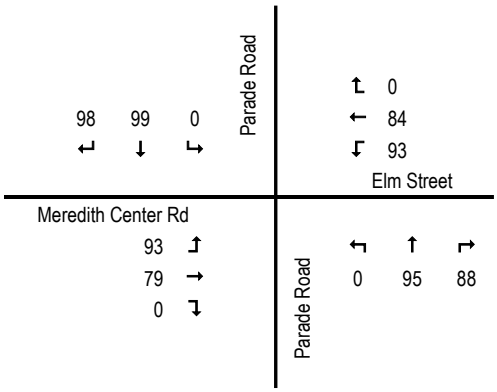



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

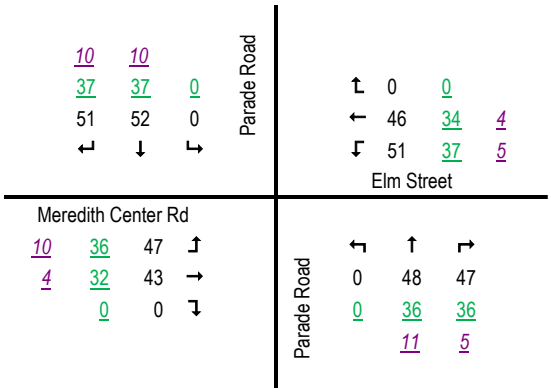



## SAT Total Site Trips

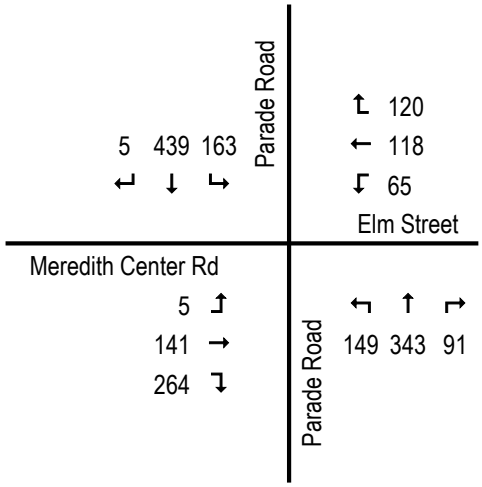



## SAT Site Composition Trips

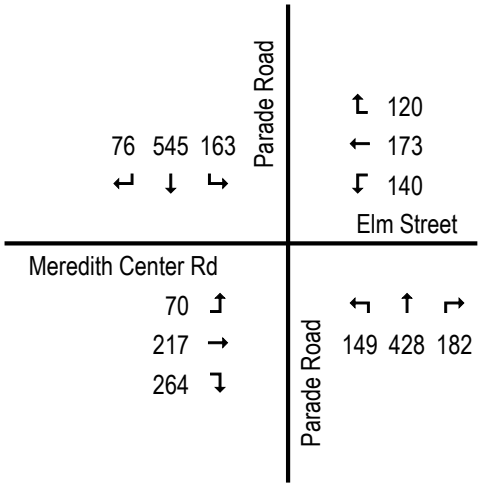
Primary, *Pass-by*, *Diverted Link*, Residential



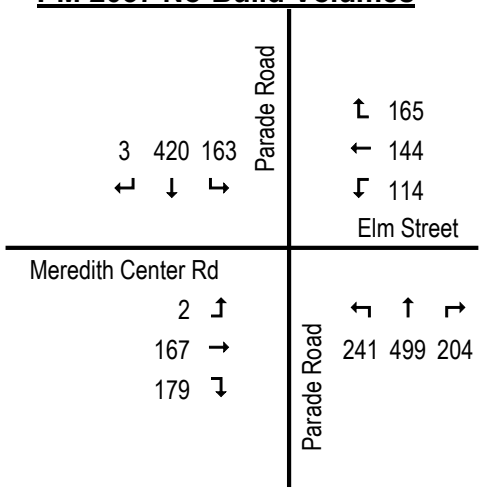
## AM 2037 No-Build Volumes



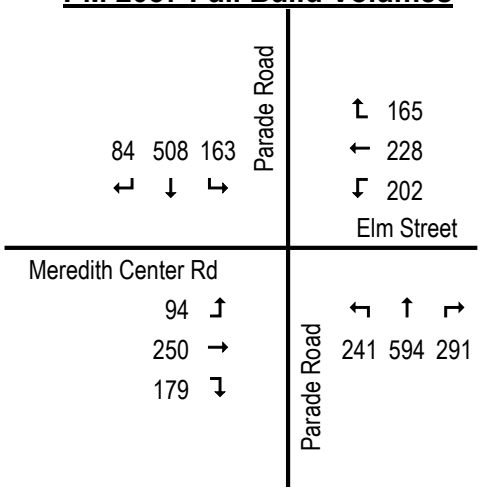

## AM 2037 Full Build Volumes



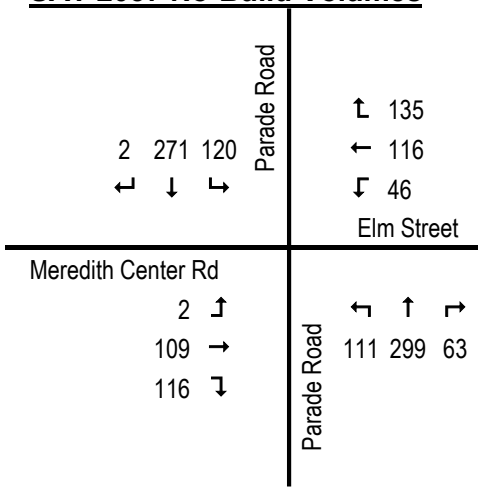

## PM 2037 No-Build Volumes



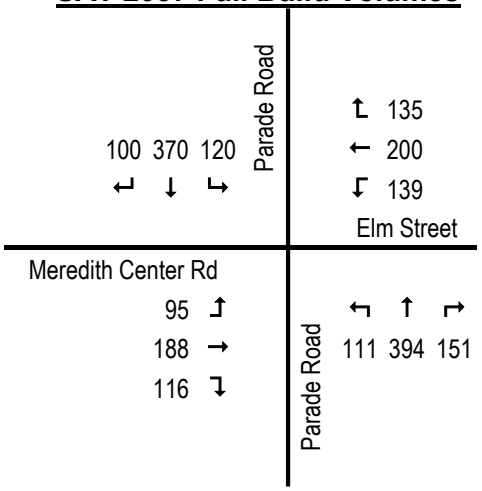

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

## Intersection #2: Parade Road at Meredith Center Road and Elm Street

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build [Mitigation*] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| **2: Parade Road (NH106) at Meredith Center Rd/Elm St [Signalized]** | | | | | | | | | | | | |
| ***AM Peak* OVERALL** | 0.61 | 21.8 | C | --- | 0.98 | 53.4 | D | --- | 0.80 | 40.1 | D | --- |
| [EB L] | - | - | - | - | - | - | - | - | 0.43 | 47.3 | D | 108 |
| EB LT [T] | 0.36 | 22.2 | C | 129 | 0.75 | 33.5 | C | 321 | 0.71 | 48.8 | D | 274 |
| EB R | 0.19 | 21.0 | C | 58 | 0.19 | 21.2 | C | 57 | 0.34 | 24.3 | C | 148 |
| [WB L] | - | - | - | - | - | - | - | - | 0.62 | 48.0 | D | 186 |
| WB LT [T] | 0.54 | 24.5 | C | 165 | 1.09 | 105.9 | F | 432 | 0.79 | 50.4 | D | 353 |
| WB R | 0.09 | 20.3 | C | 41 | 0.13 | 20.7 | C | 56 | - | - | - | - |
| NB L | 0.47 | 25.3 | C | 145 | 0.56 | 37.3 | D | 153 | 0.61 | 46.4 | D | 191 |
| NB T | 0.58 | 19.3 | B | 281 | 0.77 | 32.9 | C | 434 | 0.69 | 30.7 | C | 420 |
| NB R | 0.07 | 14.6 | B | 33 | 0.18 | 21.3 | C | 69 | 0.13 | 12.8 | B | 37 |
| SB L | 0.48 | 25.0 | C | 154 | 0.58 | 37.4 | D | 165 | 0.76 | 58.8 | E | 260 |
| SB TR [T] | 0.72 | 22.5 | C | 376 | 1.08 | 87.6 | F | >500 | 0.90 | 48.1 | D | 688 |
| [SB R] | - | - | - | - | - | - | - | - | 0.05 | 15.9 | B | 6 |
| ***PM Peak* OVERALL** | 0.77 | 27.9 | C | --- | 1.30 | 144.7 | F | --- | 0.97 | 47.2 | D | --- |
| [EB L] | - | - | - | - | - | - | - | - | 0.66 | 49.7 | D | 132 |
| EB LT [T] | 0.34 | 23.2 | C | 145 | 1.69 | >300 | F | 534 | 0.83 | 52.0 | D | 287 |
| EB R | 0.13 | 21.4 | C | 48 | 0.16 | 22.6 | C | 62 | 0.19 | 20.2 | C | 71 |
| [WB L] | - | - | - | - | - | - | - | - | 0.82 | 54.5 | D | 244 |
| WB LT [T] | 0.75 | 34.0 | C | 251 | 1.94 | >300 | F | 661 | 0.96 | 65.7 | E | 416 |
| WB R | 0.18 | 21.9 | C | 68 | 0.22 | 23.1 | C | 90 | - | - | - | - |
| NB L | 0.67 | 34.1 | C | 241 | 0.73 | 43.1 | D | 241 | 0.85 | 55.1 | E | 281 |
| NB T | 0.80 | 30.0 | C | 526 | 0.96 | 53.0 | D | 675 | 0.96 | 51.9 | D | 585 |
| NB R | 0.22 | 18.3 | B | 89 | 0.35 | 22.3 | C | 143 | 0.28 | 12.2 | B | 89 |
| SB L | 0.52 | 31.9 | C | 155 | 0.56 | 38.7 | D | 155 | 0.79 | 56.5 | E | 201 |
| SB TR [T] | 0.72 | 28.3 | C | 357 | 1.01 | 70.9 | E | 629 | 0.92 | 49.5 | D | 483 |
| [SB R] | - | - | - | - | - | - | - | - | 0.05 | 16.5 | B | 18 |
| ***SAT Peak* OVERALL** | 0.46 | 16.5 | B | --- | 0.83 | 36.0 | D | --- | 0.70 | 33.8 | C | --- |
| [EB L] | - | - | - | - | - | - | - | - | 0.50 | 42.1 | D | 138 |
| EB LT [T] | 0.26 | 16.4 | B | 91 | 0.82 | 37.6 | D | 342 | 0.52 | 34.6 | C | 231 |
| EB R | 0.08 | 15.4 | B | 39 | 0.08 | 18.0 | B | 38 | 0.08 | 20.2 | C | 12 |
| [WB L] | - | - | - | - | - | - | - | - | 0.55 | 40.2 | D | 179 |
| WB LT [T] | 0.41 | 17.5 | B | 130 | 0.97 | 63.6 | E | 427 | 0.78 | 41.9 | D | 420 |
| WB R | 0.09 | 15.5 | B | 42 | 0.15 | 18.5 | B | 64 | - | - | - | - |
| NB L | 0.39 | 21.0 | C | 101 | 0.45 | 34.8 | C | 118 | 0.47 | 39.6 | D | 146 |
| NB T | 0.53 | 15.7 | B | 207 | 0.70 | 28.9 | C | 338 | 0.73 | 34.2 | C | 372 |
| NB R | 0.04 | 12.4 | B | 15 | 0.13 | 20.4 | C | 53 | 0.10 | 14.0 | B | 60 |
| SB L | 0.42 | 21.1 | C | 106 | 0.47 | 34.6 | C | 125 | 0.55 | 42.0 | D | 165 |
| SB TR [T] | 0.48 | 15.0 | B | 185 | 0.84 | 36.2 | D | 453 | 0.71 | 34.0 | C | 374 |
| [SB R] | - | - | - | - | - | - | - | - | 0.06 | 16.3 | B | 0 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] 95th percentile queue in feet

| *Intersection #2: Parade Road at Meredith Center Road and Elm Street* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1903 | 624 | 24.7% |
| PM Peak Hour | 2301 | 698 | 23.3% |
| SAT Peak Hour | 1390 | 729 | 34.4 |

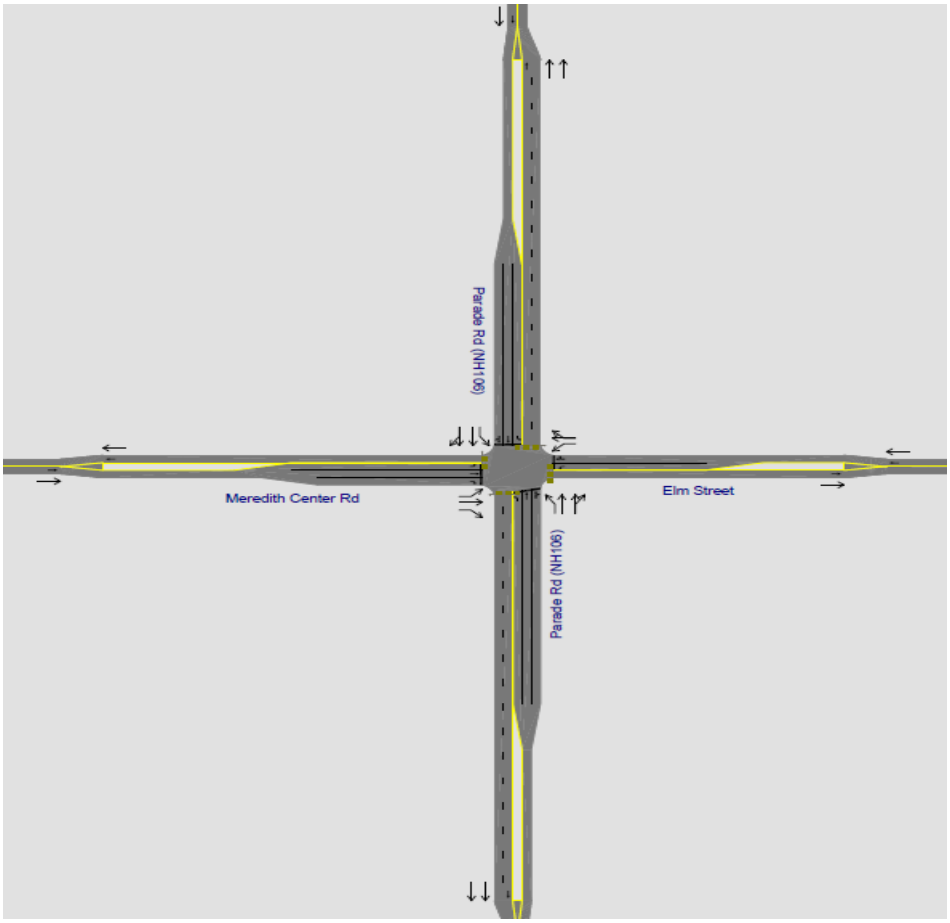
### *Analysis*

This intersection will experience site trips in all four directions as each roadway leads to a direct access point of Laconia Village: the Right Way Path entrance to the south on Parade Road, and the new Connector Road entrance to the west up Meredith Center Road.

In full build conditions, turn volumes are heavy, and are not effectively mitigated with signal timing adjustments only. Additional lanes are needed along with timing adjustments at the following approaches:

### *Recommended Mitigation*

- Eastbound: add turn lane EBL to existing EBT, EBR
- Westbound: new lane assignment – WBL, WBT/R.
- Northbound: new lane assignment – NBL, NBT, NBT/R; two exiting lanes
- Southbound: add lane – SBL, SBT, SBT/R; two exiting lanes




Intersection #2 - Proposed New Lanes, Parade Rd at Meredith Center Rd/Elm St

# Intersection #32:
# Meredith Center Road at Connector Road

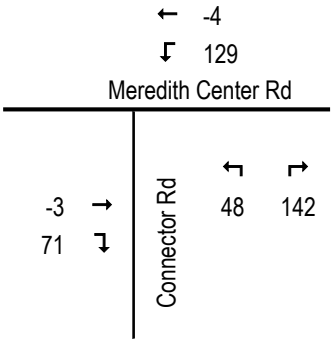
*Existing Conditions*

This is a proposed new stop-controlled T intersection that will serve as a secondary entrance into the middle of the development from Meredith Center Road, approximately halfway between Parade Road and Eastman Road.

Meredith Center Road forms the free-running EB and WB approaches, and Connector Road will form the NB, stop-controlled approach to Meredith Center Road.

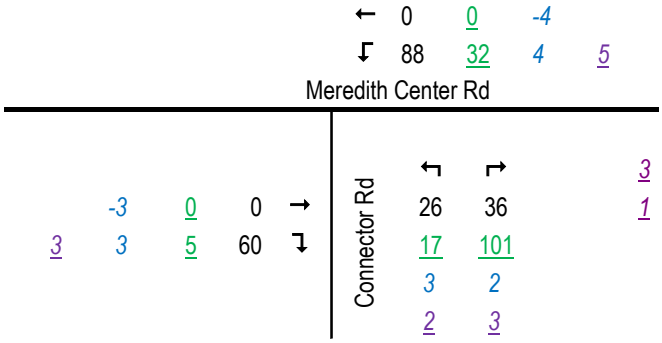
The posted speed is 40 mph on Meredith Center Road. The Village speed limit will be 25 mph. There is no lighting along the connector roadway and no pedestrian facilities. There is no streetlighting on Meredith Center Road, and no pedestrian facilities.

## AM Total Site Trips

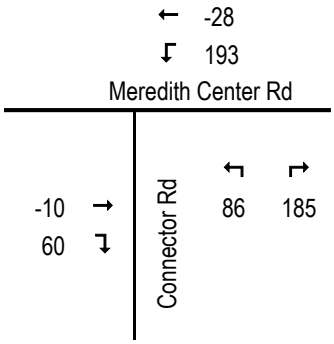



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

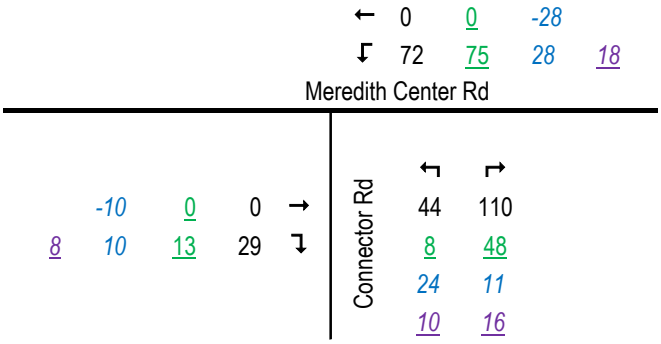



## PM Total Site Trips

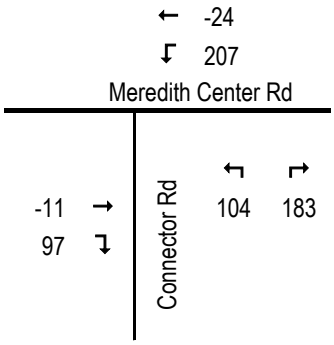



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

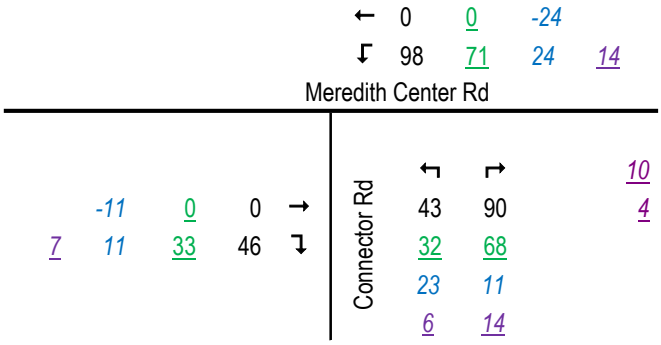



## SAT Total Site Trips

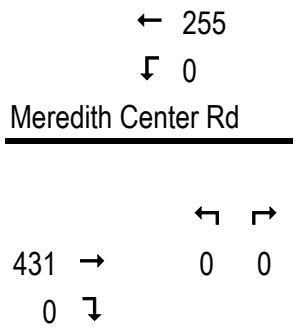



## SAT Site Composition Trips

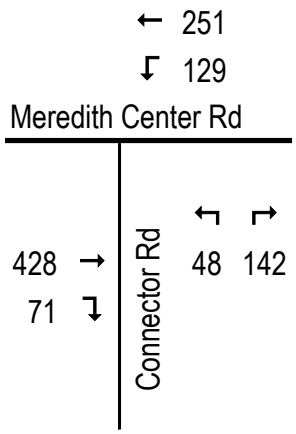
Primary, *Pass-by*, *Diverted Link*, Residential



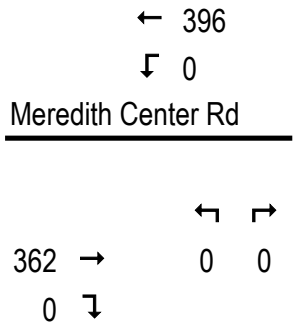
**AM 2037 No-Build Volumes**



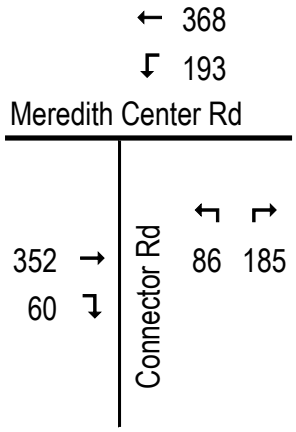

**AM 2037 Full Build Volumes**



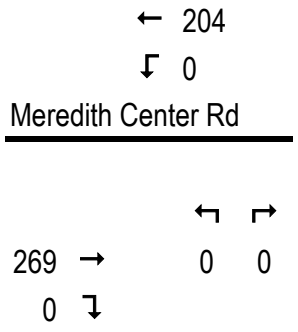

**PM 2037 No-Build Volumes**



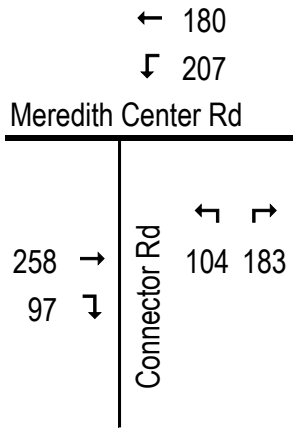

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #32: Meredith Center Road at Connector Road**

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build [Mitigation] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| **32: Meredith Center Rd at Connector Road [Unsignalized]** | | | | | | | | | | | | |
| ***AM Peak*** **OVERALL** | --- | - | - | --- | --- | 5.8 | A | --- | --- | 4.2 | A | --- |
| EB All | - | - | - | - | 0.33 | 0.0 | A | 0 | 0.33 | 0.0 | A | 0 |
| [WB L] | - | - | - | - | - | - | - | - | 0.14 | 9.1 | A | 12 |
| WB [T] | - | - | - | - | 0.14 | 4.1 | A | 12 | 0.16 | 0.0 | A | 0 |
| NB [ L] | - | - | - | - | 0.54 | 24.4 | C | 77 | 0.28 | 17.5 | C | 29 |
| ***PM Peak*** **OVERALL** | --- | - | - | --- | --- | 19.2 | C | --- | --- | 7.8 | A | --- |
| EB All | - | - | - | - | 0.27 | 0.0 | A | 0 | 0.27 | 0.0 | A | 0 |
| [WB L] | - | - | - | - | - | - | - | - | 0.19 | 9.0 | A | 18 |
| WB [T] | - | - | - | - | 0.19 | 4.6 | A | 18 | 0.24 | 0.0 | A | 0 |
| NB [ L] | - | - | - | - | 0.96 | 78.6 | F | 248 | 0.63 | 29.2 | D | 108 |
| ***SAT Peak*** **OVERALL** | --- | - | - | --- | --- | 14.9 | B | --- | --- | 8.0 | A | --- |
| EB All | - | - | - | - | 0.23 | 0.0 | A | 0 | 0.23 | 0.0 | A | 0 |
| [WB L] | - | - | - | - | - | - | - | - | 0.20 | 8.9 | A | 18 |
| WB [T] | - | - | - | - | 0.20 | 5.7 | A | 18 | 0.12 | 0.0 | A | 0 |
| NB [ L] | - | - | - | - | 0.83 | 46.0 | E | 188 | 0.54 | 22.1 | C | 80 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] 95th percentile queue in feet

| *Intersection #32: Meredith Center Road at Connector Road* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 686 | 383 | 35.8% |
| PM Peak Hour | 758 | 486 | 39.1% |
| SAT Peak Hour | 476 | 556 | 53.7% |

### *Analysis*

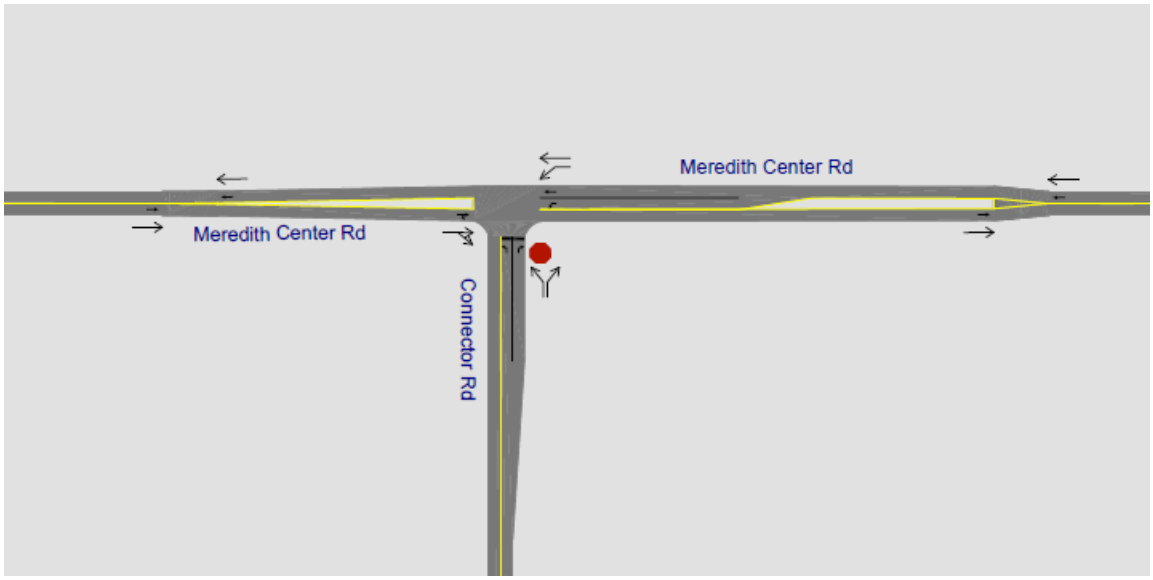
Under full-build conditions, the left turn volume into the site from Meredith Center Road meets warrants for an auxiliary turn lane. The exiting Connector Road does not meet warrants for the second lane on a minor road, however, without a separate exiting left turn lane, the movements are at capacity and delays are lengthy.

With turn lanes in place, the left turn operates at moderate LOS C/D, with 4 car queue or less and adequate reserve capacity in all peak hours.

We recommend the construction of a northbound left turn lane on Meredith Center Road, with a two-lane approach (separate left and right-turn lanes) on the new Connector Road.

### *Recommended Mitigation*

- Construct northbound left turn lane on Meredith Center Road
- Construct two-lane approach (separate left and right-turn lanes) on Connector Road.




Intersection #32 - Meredith Center Road at Connector Road

# Intersection #4:

# Meredith Center Road at Eastman Road / Lane Road

*Existing Conditions*

This is an existing stop-controlled intersection in the northwest corner of the site. Site trips using the western access point of the Village will pass through this intersection. Meredith Center Road forms the free-running EB and WB approaches, Eastman Road forming the NB approach, and Lane Road forming the SB approach. Each approach accommodates two way traffic with a single approach lane. Eastman Road and Lane Road have stop signs.

The posted speed limit is 40 mph on Meredith Center Road, 25 mph on Eastman Road, and 35 mph on Lane Road. There is a cobra-head streetlight at the north corner of the intersection. There are no pedestrian facilities. Approximately 180’ to the south is the entrance to the Robbie Mills Sports Complex, and less than 100’ to the south is the north terminus of Right Way Path.

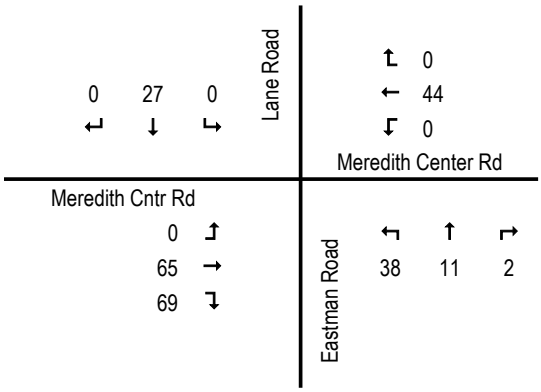
*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. The crash history is favorable.

**Crash Data Summary**
**Intersection #4: Meredith Center Rd at Eastman Rd/Lane Rd**

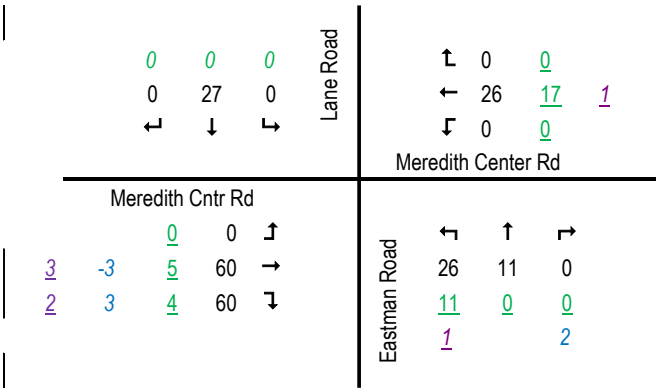
| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 1 |
| Crashes per Year (Avg) | 0.25 |
| **CRASH SEVERITY** | |
| Property Damage Only | 1 |
| Injury | 0 |
| Fatality | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 1 |
| Other Motor Vehicle | 0 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 0 |
| Snow/Ice | 1 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 0 |
| Weekday PM (3-6pm) | 0 |
| Non-Commuter Peak | 1 |

## AM Total Site Trips

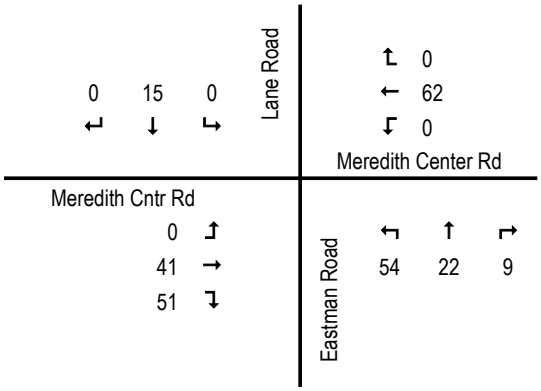



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

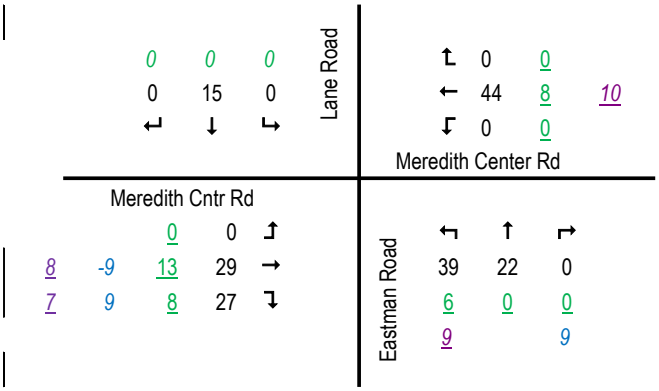



## PM Total Site Trips

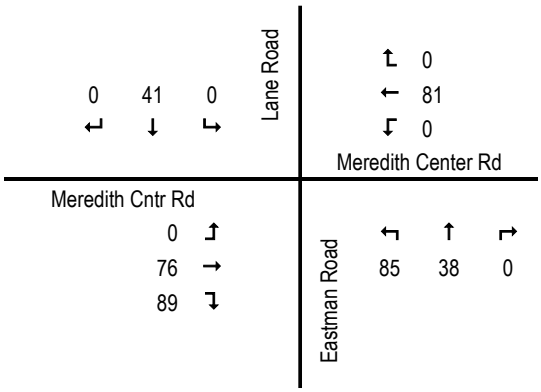



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

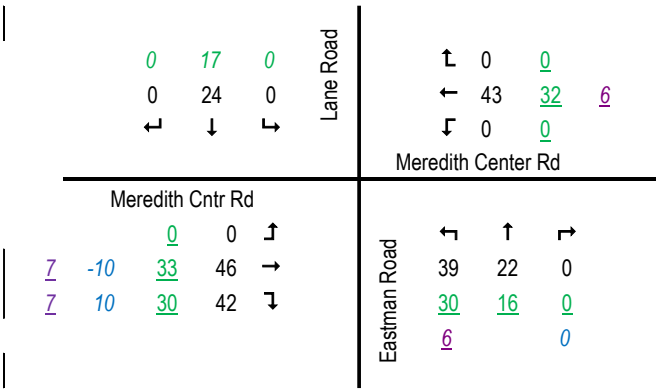



## SAT Total Site Trips

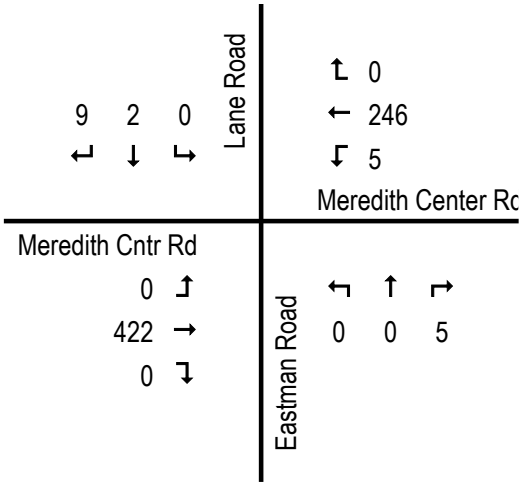



## SAT Site Composition Trips

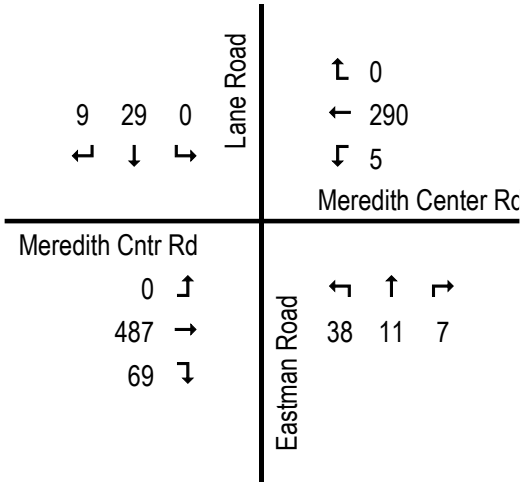
Primary, *Pass-by*, *Diverted Link*, Residential



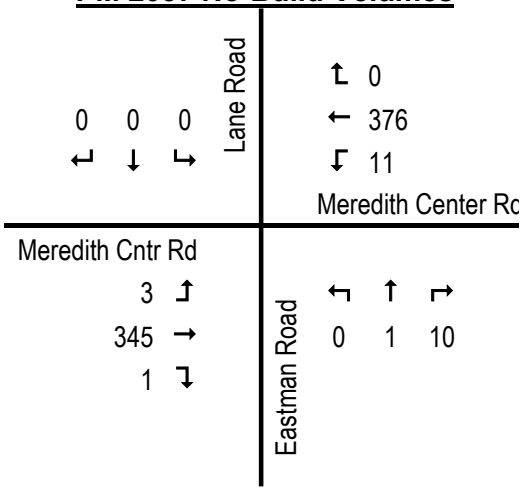
## AM 2037 No-Build Volumes



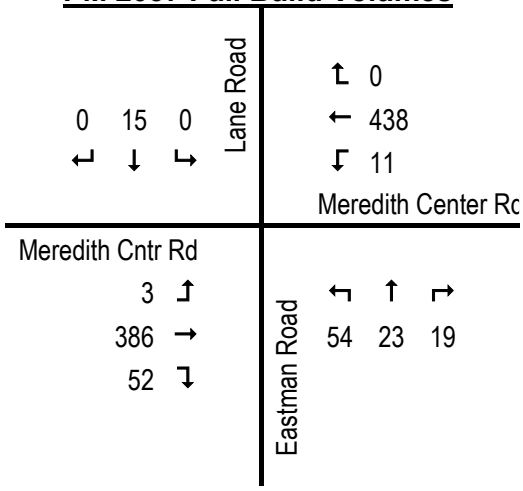

## AM 2037 Full Build Volumes



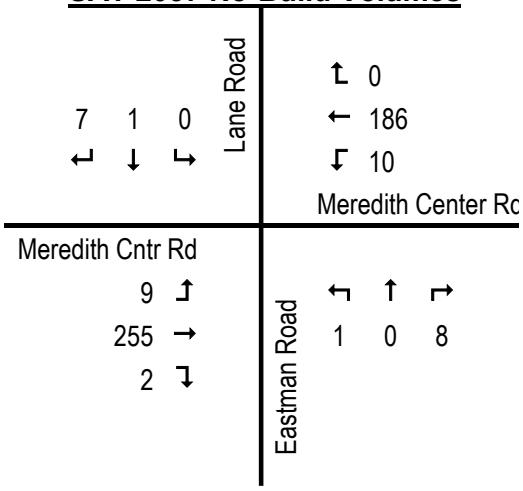

## PM 2037 No-Build Volumes



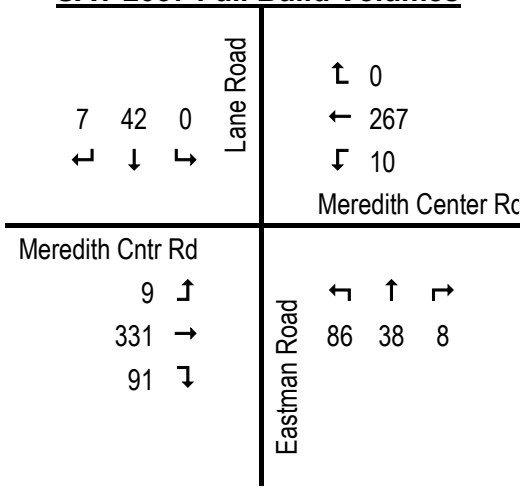

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #4: Meredith Center Rd at Eastman Rd/Lane Rd**

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build [Mitigation*] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| **4: Meredith Center Rd at Eastman Rd/Lane Rd [Unsignalized]** | | | | | | | | | | | | |
| ***AM Peak* OVERALL** | --- | 0.3 | A | --- | --- | 2.3 | A | --- | --- | | | --- |
| EB All | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | | | | |
| WB All | 0.01 | 0.2 | A | 0 | 0.01 | 0.2 | A | 0 | | | | |
| NB All | 0.01 | 11.1 | B | 1 | 0.25 | 24.4 | C | 24 | | NO | MIT | |
| SB All | 0.02 | 10.8 | B | 1 | 0.14 | 18.6 | C | 12 | | | | |
| ***PM Peak* OVERALL** | --- | 0.4 | A | --- | --- | 3.3 | A | --- | --- | | | --- |
| EB All | 0.00 | 0.1 | A | 0 | 0.00 | 0.1 | A | 0 | | | | |
| WB All | 0.01 | 0.3 | A | 1 | 0.01 | 0.3 | A | 1 | | | | |
| NB All | 0.02 | 11.1 | B | 2 | 0.42 | 29.1 | D | 49 | | NO | MIT | |
| SB All | 0.14 | 0.0 | A | 0 | 0.07 | 21.3 | C | 6 | | | | |
| ***SAT Peak* OVERALL** | --- | 6.2 | A | --- | --- | 15.9 | C | --- | --- | | | --- |
| EB All | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | | | | |
| WB All | 0.01 | 0.3 | A | 0 | 0.01 | 0.2 | A | 0 | | | | |
| NB All | 0.36 | 14.3 | B | 41 | 0.69 | 29.4 | D | 129 | | NO | MIT | |
| SB All | 0.01 | 10.3 | B | 0 | 0.64 | 44.5 | E | 96 | | | | |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] 95th percentile queue in feet

| *Intersection #4: Meredith Center Rd at Eastman Rd/Lane Rd* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 689 | 256 | 27.1% |
| PM Peak Hour | 747 | 254 | 25.4% |
| SAT Peak Hour | 479 | 410 | 46.1% |

### *Analysis*

This intersection accommodates thru traffic on Meredith Center Road from the Connector Road access point, as well as site trips using the Eastman Road access point. Since the Eastman Road access point has relatively low volume, there are fewer turns than at other “front door” intersections.

Since most site trips are thru movements and right turns, at full build there are no major issues at this intersection. Left turns from the side roads experience moderate delay (LOS D/E) in the PM and Sat peak hours; and queues are reasonable at 4 cars PM and 5 cars Sat, with adequate reserve capacity in each case.

### *Recommended Mitigation*

- No mitigation is required at this intersection.

# Intersection #31

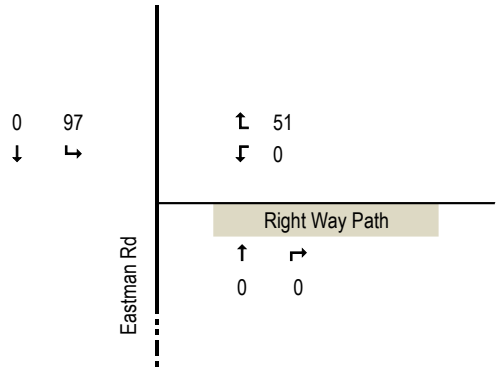
# Eastman Road at (Relocated) Right Way Path

*Existing Conditions*

The Masterplan calls for a third site access point along Eastman Road along the western edge of the site. This is a relocation of the existing Right Way Path intersection with Eastman Road, currently located only 100' from Meredith Center Road. The new location is approximately 500' farther south, providing better sight distance and safety for Eastman Road traffic.

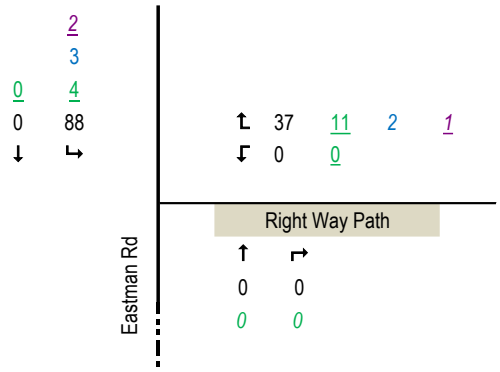
Eastman Road will form the free-running NB and SB approaches, and the relocated Right Way Path approach forms the westbound "T" stop-controlled approach. All approaches are single-lane approaches. The posted speed limit is 25 mph on Eastman Road and Right Way Path. There is no lighting along the roadway and no pedestrian facilities.

## AM Total Site Trips

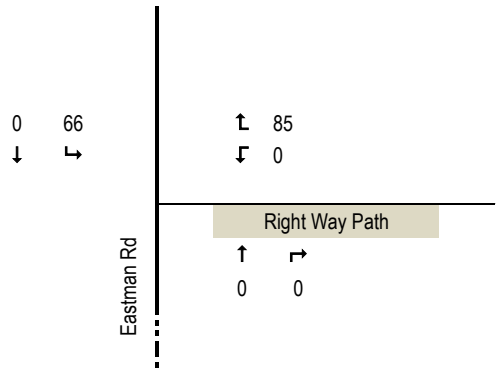



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

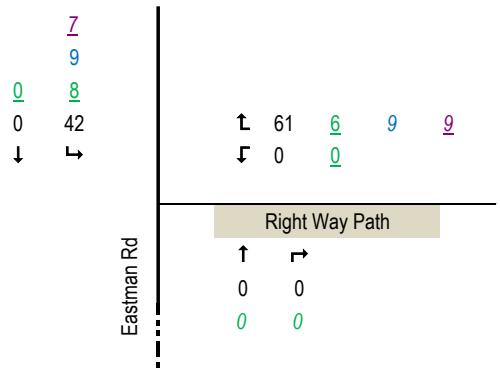



## PM Total Site Trips

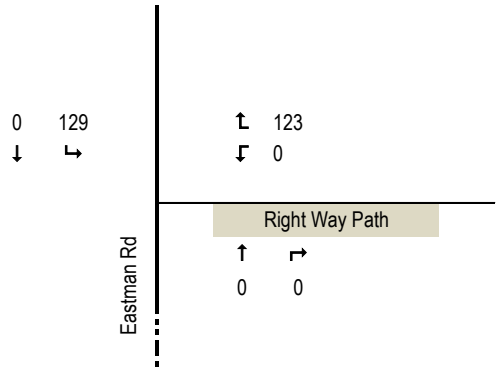



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

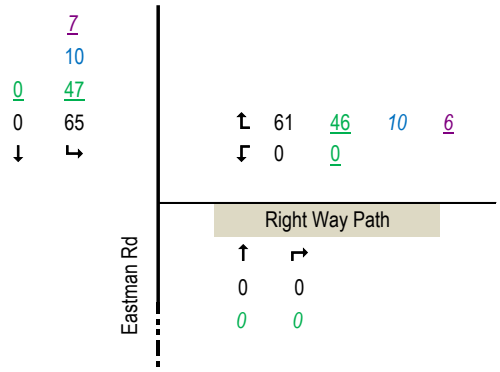



## SAT Total Site Trips

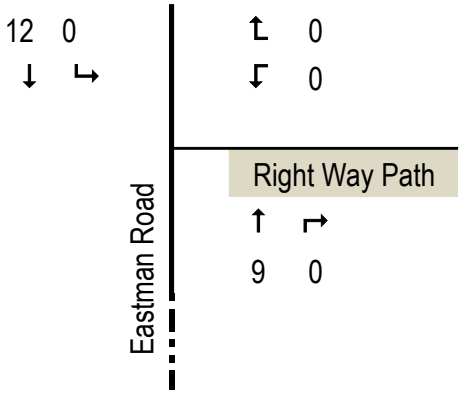



## SAT Site Composition Trips

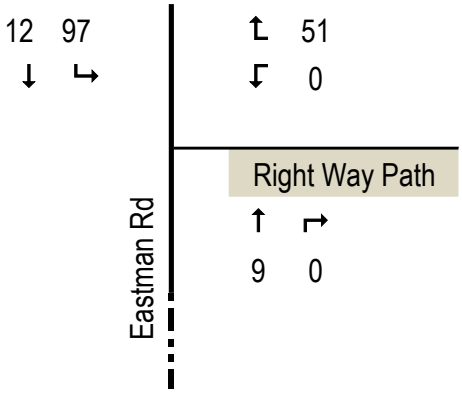
Primary, *Pass-by*, *Diverted Link*, Residential



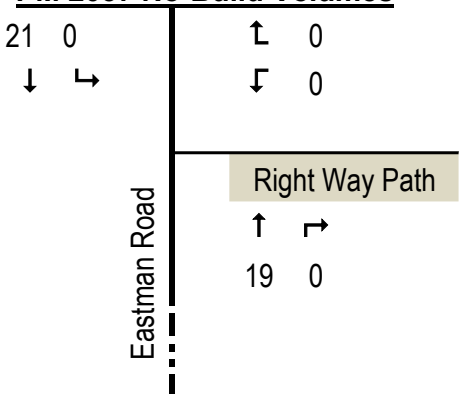
**AM 2037 No-Build Volumes**



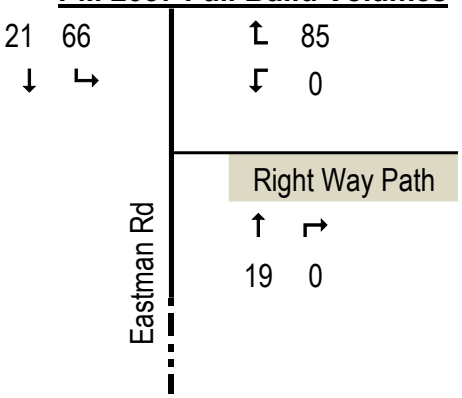

**AM 2037 Full Build Volumes**



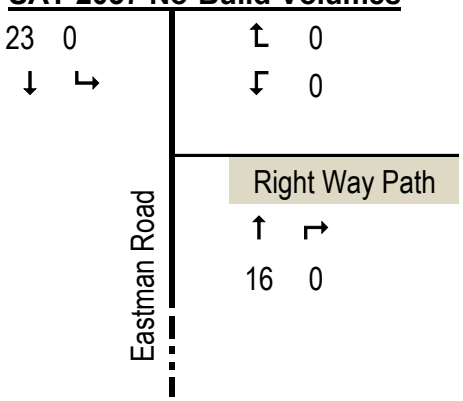

**PM 2037 No-Build Volumes**



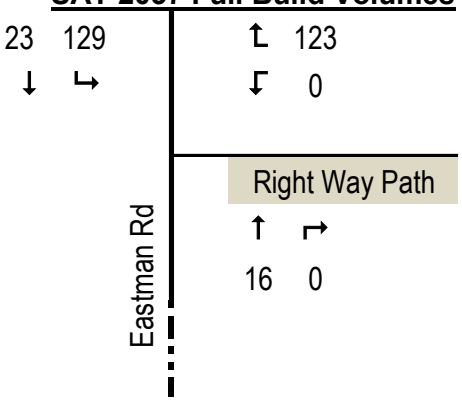

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #31: Eastman Road at (Relocated) Right Way Path**

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build [Mitigation*] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| **31: Eastman Road at Right Way Path [Unsignalized]** | | | | | | | | | | | | |
| ***AM Peak*** **OVERALL** | --- | - | - | --- | --- | 6.9 | A | --- | --- | | | --- |
| WB All | - | - | - | - | 0.05 | 8.5 | A | 4 | | | | |
| NB All | - | - | - | - | 0.01 | 0.0 | A | 0 | | NO | MIT | |
| SB All | - | - | - | - | 0.07 | 6.7 | A | 5 | | | | |
| ***PM Peak*** **OVERALL** | --- | - | - | --- | --- | 6.5 | A | --- | --- | | | --- |
| WB All | - | - | - | - | 0.09 | 8.7 | A | 7 | | | | |
| NB All | - | - | - | - | 0.01 | 0.0 | A | 0 | | NO | MIT | |
| SB All | - | - | - | - | 0.05 | 5.7 | A | 4 | | | | |
| ***SAT Peak*** **OVERALL** | --- | - | - | --- | --- | 7.1 | A | --- | --- | | | --- |
| WB All | - | - | - | - | 0.13 | 8.9 | A | 11 | | | | |
| NB All | - | - | - | - | 0.01 | 0.0 | A | 0 | | NO | MIT | |
| SB All | - | - | - | - | 0.09 | 6.4 | A | 7 | | | | |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] 95th percentile queue in feet

| *Intersection #31: Eastman Road at (Relocated) Right Way Path* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 21 | 148 | 87.6% |
| PM Peak Hour | 40 | 151 | 79.1% |
| SAT Peak Hour | 39 | 252 | 86.6% |

### *Analysis*

The relocated Right Way Path provides a third site access point to the site along its western edge. Traffic using this access point will consist mainly of right turns out and left turns in from Eastman Road. Volume is relatively light during all peak hours.

Eastman Road will be free flowing on the NB and SB approaches, and the new WB "T" approach will be stop-controlled. All approaches will be single-lane approaches.

There are no traffic problems at this intersection. With little opposing traffic, all approaches operate at LOS A in Full-Build conditions.

### *Recommended Mitigation*

- No mitigation is required at this intersection.

END OF PART A

# Part B

## City Intersection Analysis

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

# Full-Build City Intersection Analysis– Part B

## Introduction

This section focuses on Part B intersections under City control, listed below.


## Part B - City Intersections:

## Intersection Summaries

For each study area intersection, a map, brief description, and 2037 peak hour volume diagrams are provided below, followed by a summary of operational results and discussion of proposed mitigation strategies.

*Methodology*.
Trafficware "Synchro" v11 software (based on HCM 2000) was used to analyze signalized and unsignalized intersections during AM, PM and SAT peak hours. Roundabouts were analyzed using SIDRA INTERSECTION 10.

*Level of Service (LOS)*
The relationship between control delay and LOS is shown in the following table.

| Level of Service (LOS) | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Signalized Control Delay (sec) | ≤10.0 | 10.1 to 20.0 | 20.1 to 35.0 | 35.1 to 55.0 | 55.1 to 80.0 | Over 80.0 |
| Unsignalized Control Delay (sec) | ≤10.0 | 10.1 to 15.0 | 15.1 to 25.0 | 25.1 to 35.0 | 35.1 to 50.0 | Over 50.0 |

*Queue Analysis.*
Vehicle queue lengths are reported for each intersection approach's longest length at the 95$^{th}$ percentile in feet.

*Volume to Capacity (v/c) ratios*
The ratios of traffic volume for each approach within an intersection and the theoretical capacity of that approach are reported as a decimal. Also reported is the overall v/c ratio for the intersection.

*Summary Tables*
LOS, delays, queues, and v/c ratios are presented for each intersection overall and for each approach within each intersection in the summary tables in the following section.

# *Intersection #14:*
# *Parade Rd (NH106) / N.Main St at Lexington Dr*

*Existing Conditions*

This is an existing 3-way stop controlled intersection. Parade Road (NH106) forms the NB approach, N.Main Street forms the SB approach and Lexington Drive forms the EB approach.

Lexington Drive serves an industrial park and single family homes along Shore Drive.

Each approach accommodates two-way traffic. The NB approach has an exclusive left-turn lane and a thru lane where SB has a single lane approach. EB has both a left-turn lane and a right-turn lane each of about 900 feet in length.

The posted speed limit is 35 mph on Parade Road/N.Main Street and 30 mph on Lexington Drive. There are cobra-head street lights on the east side of NH106 directly across from Lexington Drive and on a utility pole at the northwest corner of the intersection. There are no pedestrian facilities.

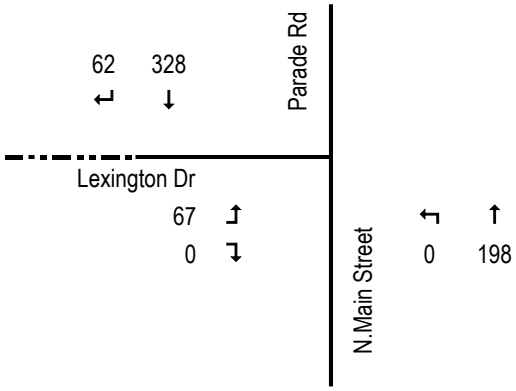
*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience is low at 1 crash per year.

**Crash Data Summary**
**Intersection #14: Parade Rd (NH106) at Lexington Dr**

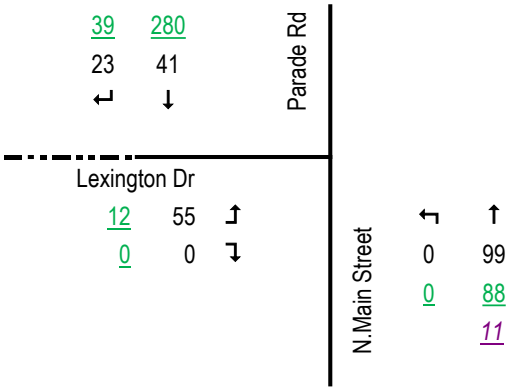
| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 4 |
| Crashes per Year (Avg) | 1 |
| **CRASH SEVERITY** | |
| Property Damage Only | 3 |
| Injury | 1 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 0 |
| Other Motor Vehicle | 4 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 0 |
| Snow/Ice | 1 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 0 |
| Weekday PM (3-6pm) | 1 |
| Non-Commuter Peak | 3 |

## AM Total Site Trips

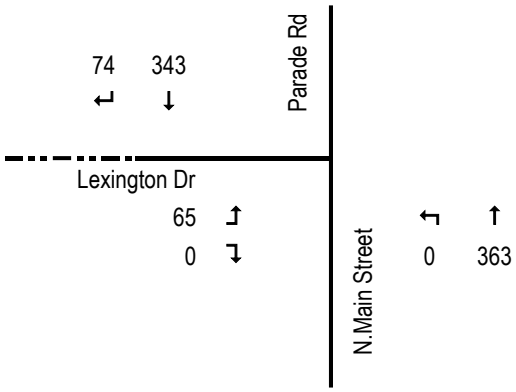



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

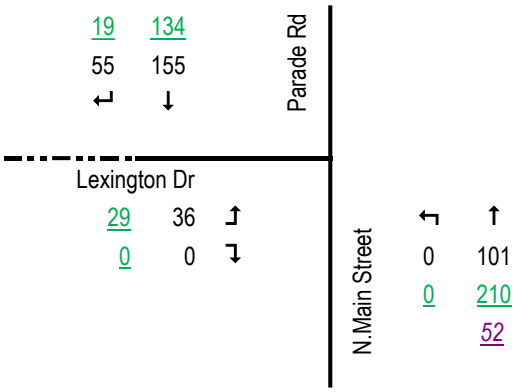



## PM Total Site Trips

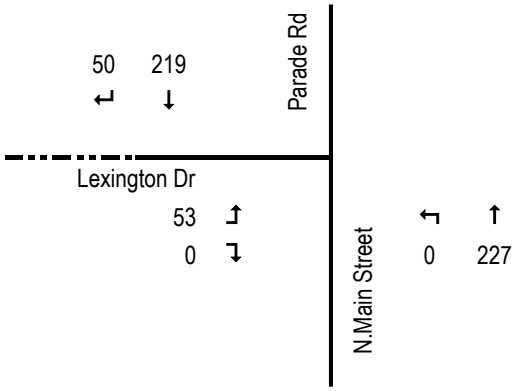



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

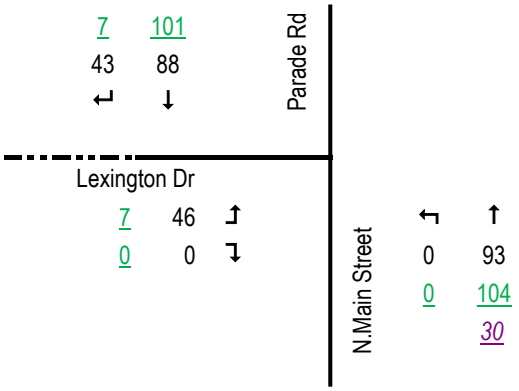



## SAT Total Site Trips

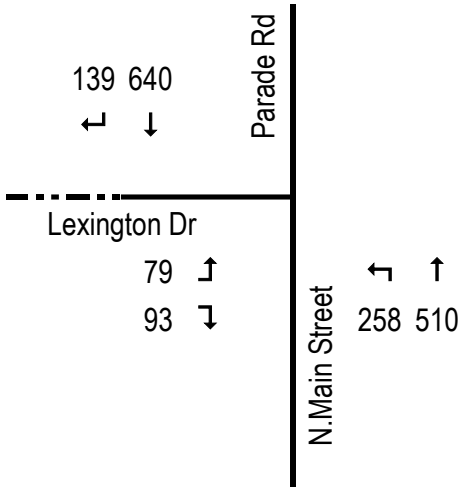



## SAT Site Composition Trips

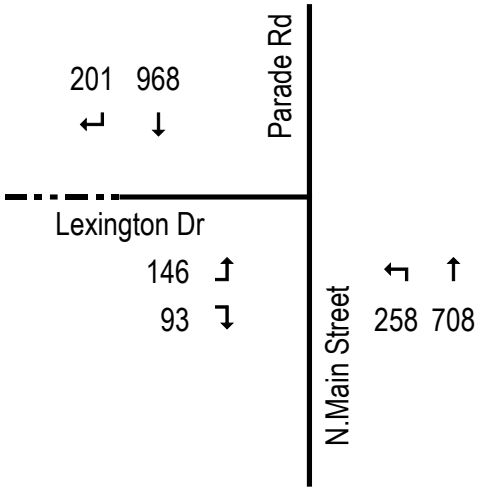
Primary, *Pass-by*, *Diverted Link*, Residential



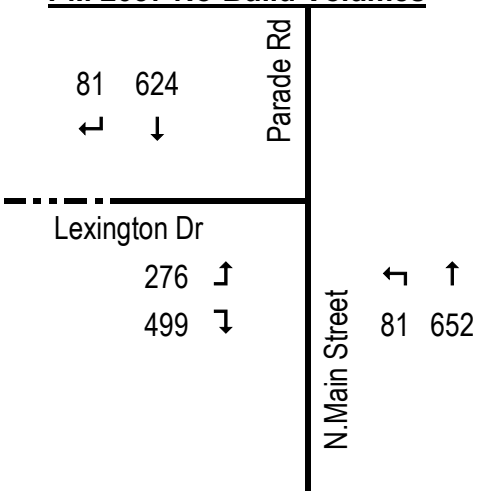
**AM 2037 No-Build Volumes**



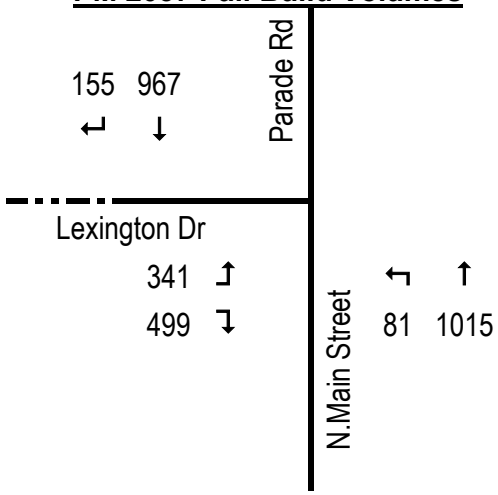

**AM 2037 Full Build Volumes**



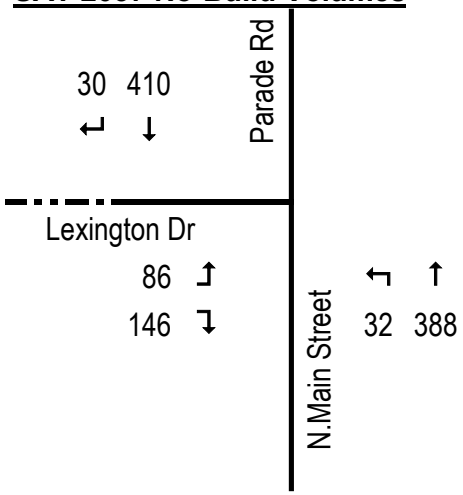

**PM 2037 No-Build Volumes**



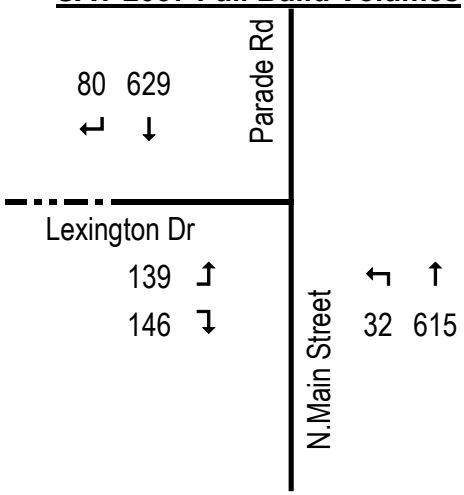

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #14: Parade Rd (NH106) at Lexington Dr** [Unsignalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Signal | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | --- | 30.9 | C | ---- | --- | >300 | F | --- | 0.73 | 18.4 | B | --- |
| EB | --- | 293.2 | F | 221 | --- | >300 | F | >800 | --- | 29.2 | C | 162 |
| NB | --- | 4.2 | A | 43 | --- | 5.3 | A | 81 | --- | 13.0 | B | 236 |
| SB | --- | 0.0 | A | 0 | --- | 0.0 | A | 0 | --- | 20.7 | C | 390 |
| ***PM Peak* OVERALL** | --- | >300 | F | --- | --- | >300 | F | --- | 0.98 | 30.8 | C | --- |
| EB | --- | >300 | F | >800 | --- | >300 | F | >800 | --- | 53.2 | D | 417 |
| NB | --- | 1.1 | A | 9 | --- | 0.9 | A | 14 | --- | 26.7 | C | 852 |
| SB | --- | 0.0 | A | 0 | --- | 0.0 | A | 0 | --- | 17.8 | B | 347 |
| ***SAT Peak* OVERALL** | --- | 4.0 | A | --- | --- | 19.1 | C | --- | 0.58 | 10.3 | B | --- |
| EB | --- | 17.8 | C | 39 | --- | 109.3 | F | 232 | --- | 17.4 | B | 101 |
| NB | --- | 0.7 | A | 3 | --- | 0.5 | F | 3 | --- | 7.6 | A | 227 |
| SB | --- | 0.0 | A | 0 | --- | 0.0 | F | 0 | --- | 9.8 | A | 162 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service [d] Longest 95th Queue at approach

| *Intersection #14: Parade Rd (NH106) at Lexington Dr* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1719 | 655 | 27.6% |
| PM Peak Hour | 2213 | 845 | 27.6% |
| SAT Peak Hour | 1092 | 649 | 37.3% |

### *Analysis*

The Main Street/Parade Road approaches are unaffected as they run free. Lexington Drive traffic runs over capacity during weekday peak hours with lengthy delays under no-build conditions.

New project-related traffic is largely through traffic on Parade Road/Main Street, but may include some site-related turns related to local residents visiting Laconia Village and Laconia Village residents that work on Lexington Drive.

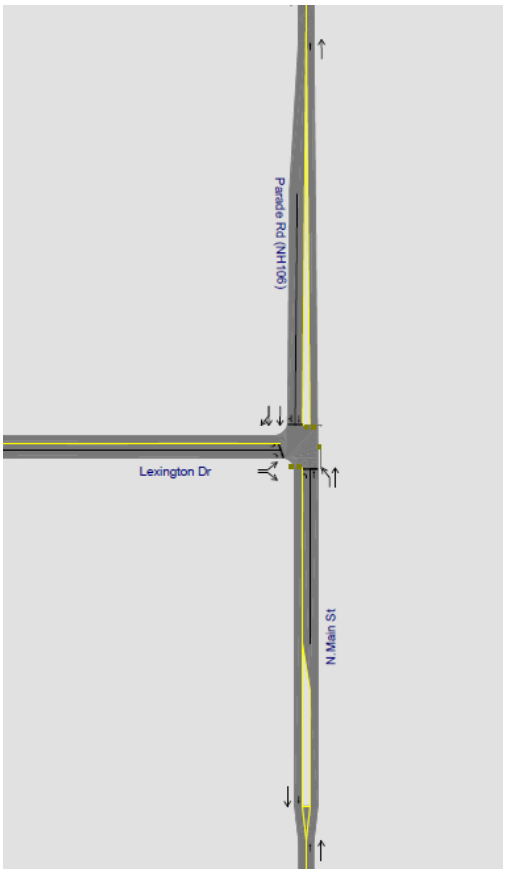
We considered signalization and a roundabout (see Attachments) as potential mitigation options. All critical storage lanes are already present at this intersection which will simplify signalization. The Two SB thru lanes are needed to process SB volumes during all peak hours. The roundabout would need a bypass for NB thru travel and slip lanes for SBR and EBR.

We find the signalization option to be the most cost-effective and appropriate solution for this intersection.

### *Recommended Mitigation*

- Construct signalized intersection

Signal Alternate




Roundabout Alternate

# *Intersection #15:*
# *N.Main St (NH106) at Oak St*

*Existing Conditions*

This is an existing 4-way signalized intersection within City jurisdiction.

N.Main Street (NH106) forms the NB and SB approaches with Oak Street forming the EB and WB approaches.

The EB and WB legs are single lane approaches accommodating two-way traffic. NB and SB approaches each have an exclusive left turn lane and a thru-right lane.

The posted speed limit is 30 on N.Main Street and default speed is 30 mph along Oak Street. There are cobra-head streetlights on top of the mast arms at the northeast and southwest corners of the intersection. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.

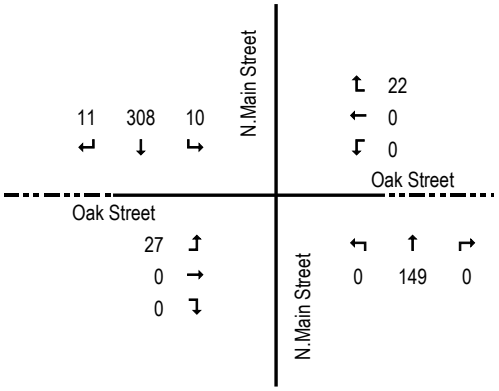
*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience is reasonable at 2.5 crashes (1 injury) per year.

**Crash Data Summary**
**Intersection #15: Parade Rd (NH106) at Oak St**

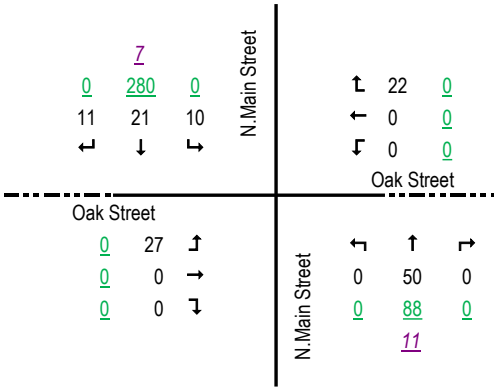
| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 10 |
| Crashes per Year (Avg) | 2.5 |
| **CRASH SEVERITY** | |
| Property Damage Only | 6 |
| Injury | 4 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 0 |
| Other Motor Vehicle | 10 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 0 |
| Snow/Ice | 0 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 1 |
| Weekday PM (3-6pm) | 1 |
| Non-Commuter Peak | 8 |

## AM Total Site Trips

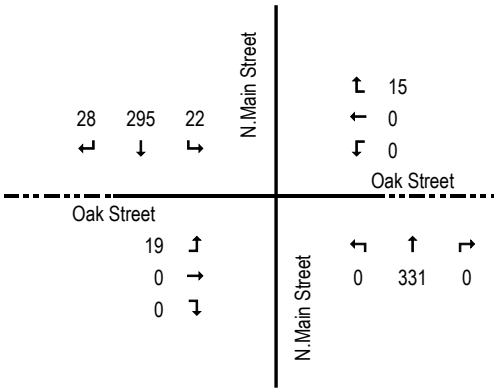



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

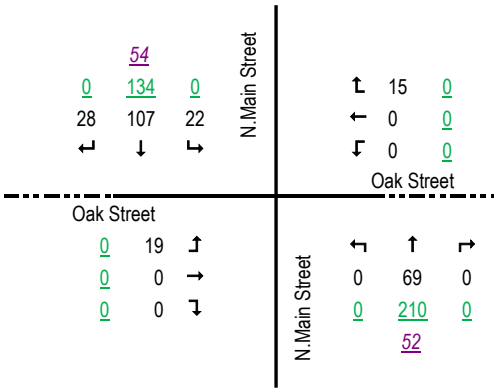



## PM Total Site Trips

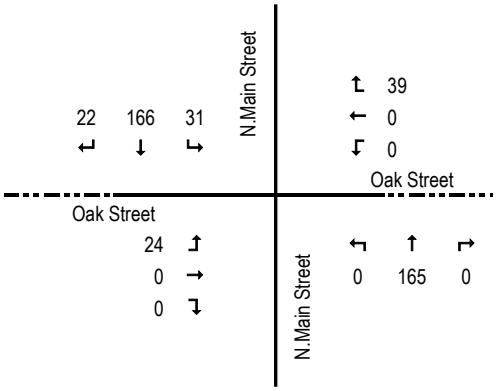



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

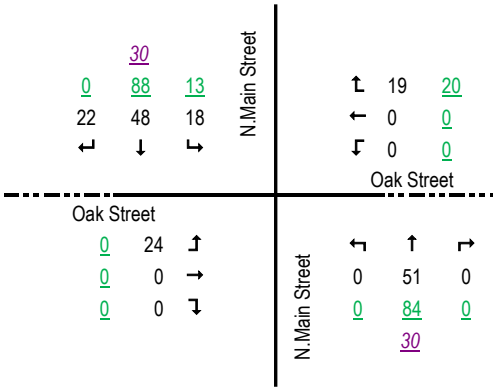



## SAT Total Site Trips

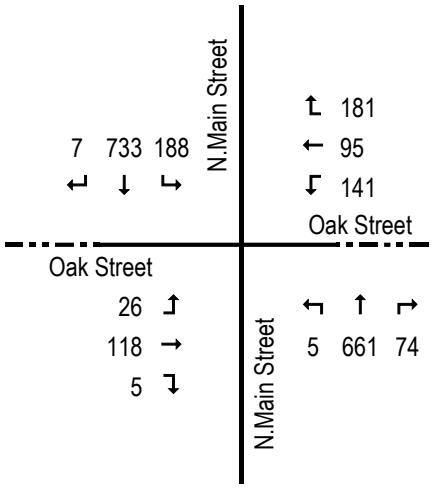



## SAT Site Composition Trips

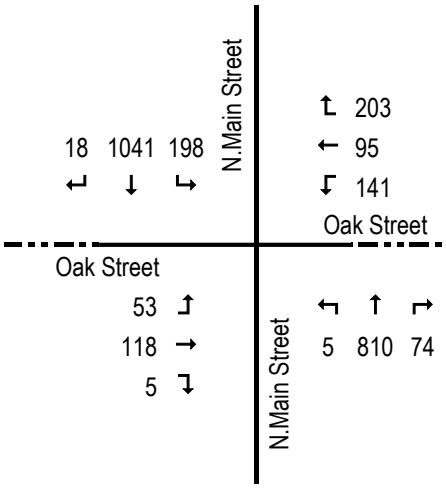
Primary, *Pass-by*, *Diverted Link*, Residential



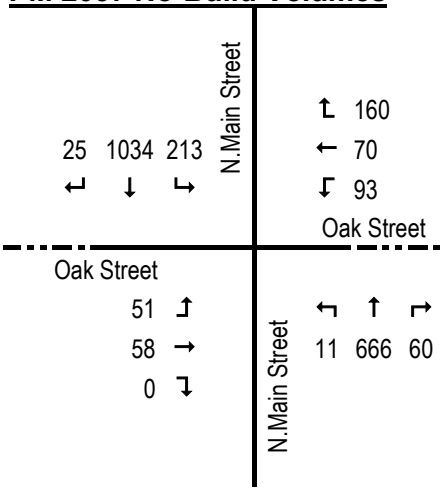
## AM 2037 No-Build Volumes



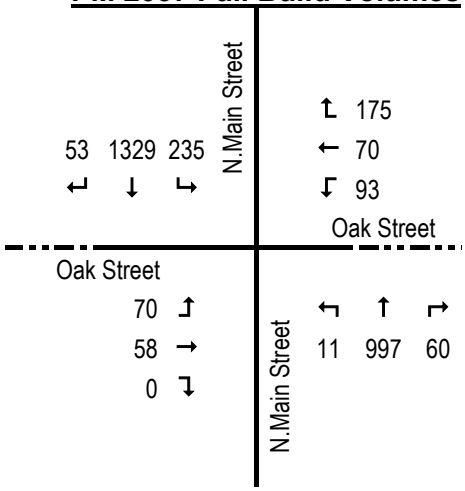

## AM 2037 Full Build Volumes



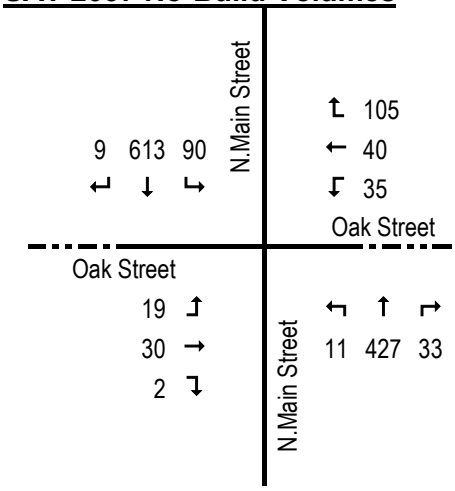

## PM 2037 No-Build Volumes



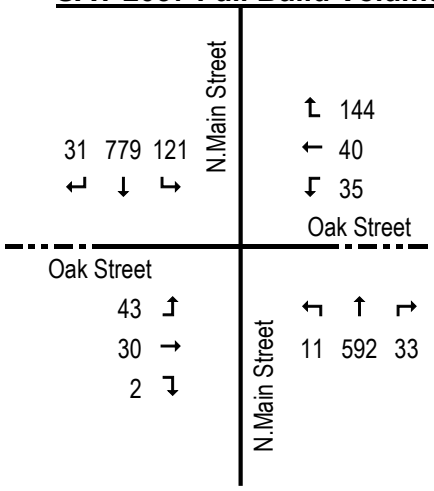

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #15: N.Main St (NH106) at Oak St** [Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Conc Peds | | | | 2037 Build Mitigation: Lanes | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 1.08 | 88.2 | F | --- | 1.25 | 152.9 | F | --- | 1.23 | 125.8 | F | --- | 0.87 | 40.2 | D | --- |
| EB | --- | 32.9 | C | 179 | --- | 39.2 | D | 248 | --- | 41.4 | D | 219 | --- | 26.6 | C | 180 |
| WB | --- | 251.3 | F | 679 | --- | 287.7 | F | 718 | --- | 254.5 | F | 710 | --- | 59.2 | E | 575 |
| NB | --- | 81.7 | F | 1049 | --- | 169.4 | F | 1318 | --- | 136.8 | F | 1203 | --- | 46.2 | D | 493 |
| SB | --- | 28.3 | C | 957 | --- | 109.5 | F | 1528 | --- | 84.7 | F | 1460 | --- | 31.1 | C | 599 |
| ***PM Peak* OVERALL** | 1.07 | 73.3 | E | --- | 1.32 | 175.9 | F | --- | 1.28 | 155.7 | F | --- | 0.84 | 33.6 | C | --- |
| EB | --- | 65.9 | E | 212 | --- | 153.3 | F | 270 | --- | 125.6 | F | 250 | --- | 37.7 | D | 168 |
| WB | --- | 237.7 | F | 560 | --- | 264.4 | F | 582 | --- | 205.5 | F | 541 | --- | 59.7 | E | 444 |
| NB | --- | 32.0 | C | 964 | --- | 161.5 | F | 1585 | --- | 152.4 | F | 1430 | --- | 38.6 | D | 554 |
| SB | --- | 56.0 | E | 1489 | --- | 168.7 | F | 2084 | --- | 149.8 | F | 1969 | --- | 24.5 | C | 764 |
| ***SAT Peak* OVERALL** | 0.62 | 20.5 | C | --- | 0.76 | 24.7 | C | --- | 0.75 | 24.7 | C | --- | 0.53 | 17.2 | B | --- |
| EB | --- | 29.5 | C | 71 | --- | 35.7 | D | 103 | --- | 33.9 | C | 113 | --- | 23.2 | C | 86 |
| WB | --- | 33.2 | C | 171 | --- | 39.5 | D | 420 | --- | 38.0 | D | 256 | --- | 25.0 | C | 168 |
| NB | --- | 18.6 | B | 531 | --- | 23.3 | C | 837 | --- | 26.1 | C | 514 | --- | 21.2 | C | 250 |
| SB | --- | 18.0 | B | 770 | --- | 21.4 | C | 1100 | --- | 19.8 | B | 806 | --- | 12.1 | B | 296 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service [d] Longest 95th Queue at approach
NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase
MIT Peds: optimizes cycle/phases and runs concurrent pedestrians; MIT Lanes: adds a thru lane to both NB and SB approaches

| *Intersection #15: N.Main St (NH106) at Oak St* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 2234 | 527 | 19.1% |
| PM Peak Hour | 2441 | 710 | 22.5% |
| SAT Peak Hour | 1414 | 447 | 24.0% |

### *Analysis*

Weekday AM and PM peak hour traffic is already over-capacity in no-build conditions. Saturday traffic is acceptable in build condition. The great majority of project-related traffic at the intersection consists of through-traffic on Main Street, along with some turns to/from Oak Street by Laconia residents working or shopping at the project site.

The existing signal runs an exclusive pedestrian phase. Changing to a concurrent pedestrian phase brings the intersection closer to pre-existing conditions; however, a single NB and SB through lane cannot effectively process the weekday through volumes trips at the intersection. However, there is insufficient ROW available to add auxiliary through lanes, which would improve the intersection to better than no-build conditions.

### *Recommended Mitigation*

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider acquiring additional ROW to add through lanes on Main St.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

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# *Intersection #19:*
# *N.Main Street at New Salem St*

*Existing Conditions*

This is an existing 3-way, stop controlled intersection under City jurisdiction.

N. Main Street forms the NB and SB approaches, New Salem Street forms the EB approach.

Each approach carries two-way traffic on single lanes. North Main Street has free flow, where New Salem Street is under stop control.

The speed limit is 30 mph on N. Main Street and not posted on New Salem with no street lighting at the intersection. There is a pedestrian crosswalk at the EB approach. A major trail crossing is stripped east-west across N. Main Street that connects the WOW bike/walking Trail.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience at this intersection is low -less than 2per year

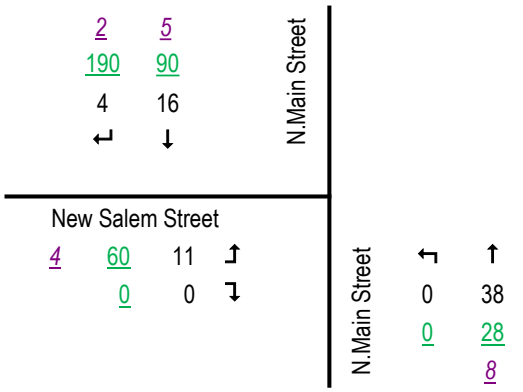
**Crash Data Summary**
**Intersection #19: N.Main Street at New Salem St**

| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 5 |
| Crashes per Year (Avg) | 1.25 |
| **CRASH SEVERITY** | |
| Property Damage Only | 3 |
| Injury | 2 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 0 |
| Other Motor Vehicle | 5 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 0 |
| Snow/Ice | 0 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 0 |
| Weekday PM (3-6pm) | 1 |
| Non-Commuter Peak | 4 |

## AM Total Site Trips


## AM Site Composition Trips

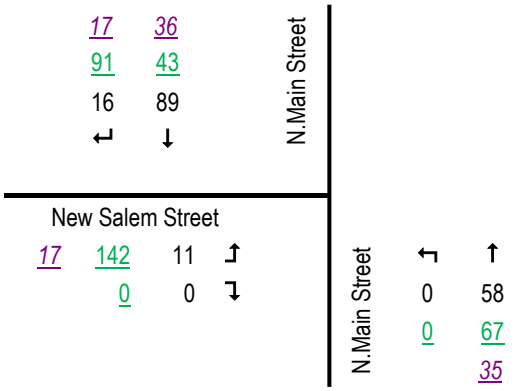
Primary, *Pass-by*, *Diverted Link*, Residential




## PM Total Site Trips


## PM Site Composition Trips

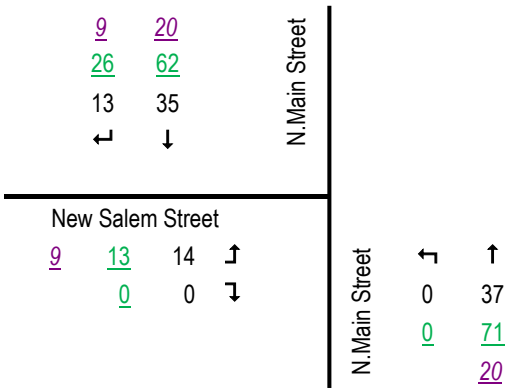
Primary, *Pass-by*, *Diverted Link*, Residential




## SAT Total Site Trips

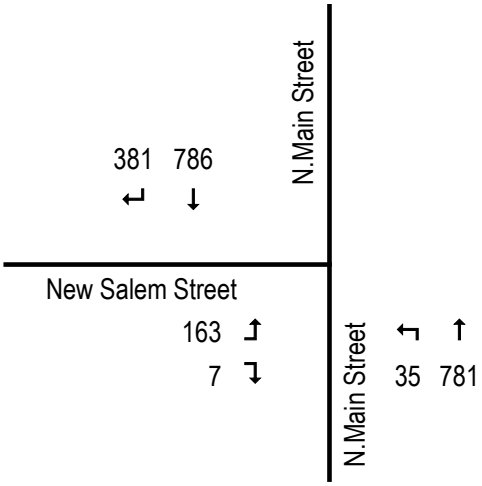

## SAT Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential



**AM 2037 No-Build Volumes**


**AM 2037 Full Build Volumes**




**PM 2037 No-Build Volumes**


**PM 2037 Full Build Volumes**


**SAT 2037 No-Build Volumes**


**SAT 2037 Full Build Volumes**

*Summary of Operating Conditions*

**Intersection #19: N.Main Street at New Salem St** [Unsignalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Lanes | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | --- | 3.0 | A | --- | --- | 26.5 | D | --- | --- | 6.4 | A | --- |
| EB | 0.50 | 37.8 | E | 63 | 1.48 | 315.9 | F | 408 | 0.85 | 72.8 | F | 197 |
| NB | 0.07 | 2.0 | A | 5 | 0.11 | 4.1 | A | 11 | 0.06 | 1.7 | A | 0 |
| SB | 0.56 | 0.0 | A | 0 | 0.76 | 0.0 | A | 0 | 0.51 | 0.0 | A | 0 |
| ***PM Peak* OVERALL** | --- | 14.1 | B | --- | --- | >300 | F | --- | --- | 105.3 | F | --- |
| EB | 1.21 | 235.3 | F | 196 | 5.08 | Err | F | >800 | 2.96 | >300 | F | >800 |
| NB | 0.08 | 2.9 | A | 8 | 0.13 | 7.1 | A | 19 | 0.07 | 2.5 | A | 19 |
| SB | 0.77 | 0.0 | A | 0 | 0.96 | 0.0 | A | 0 | 0.68 | 0.0 | A | 0 |
| ***SAT Peak* OVERALL** | --- | 1.7 | A | --- | --- | 3.8 | A | --- | --- | 2.1 | A | --- |
| EB | 0.28 | 17.7 | C | 28 | 0.60 | 38.3 | E | 66 | 0.39 | 20.5 | C | 46 |
| NB | 0.03 | 0.8 | A | 2 | 0.03 | 1.0 | A | 3 | 0.02 | 0.6 | A | 0 |
| SB | 0.44 | 0.0 | A | 0 | 0.55 | 0.0 | A | 0 | 0.38 | 0.0 | A | 0 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service [d] Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase
MIT Lanes: adds a right turn lane EB and SB approaches

| *Intersection #19: N.Main Street at New Salem St* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1697 | 456 | 21.2% |
| PM Peak Hour | 1986 | 622 | 23.8% |
| SAT Peak Hour | 1204 | 329 | 21.5% |

### *Analysis*

Main Street approaches are unaffected as they run free. NB traffic on New Salem Street runs over capacity during the PM peak hour due to EB left turns and through volumes on Main Street. The 22% new traffic added to the intersection are primarily on Main Street, but do include some EB left turns on New Salem Street. Note that as left turn delays increase, left turning traffic may also turn right on Pleasant Street and left at the Main Street signal, which will reduce delays at the stop sign. Adding a channelized SB right turn will increase gaps in Main Street traffic and also improve left turn delays. The intersection meets all turn lane warrants – left, right and second lane. However, right of way limitations and on street parking do not permit adding auxiliary lanes.

Signalizing the intersection is not recommended since there is only 250' to the Veterans Sq/Church St signal, which would likely cause congestion and blocking in peak hours. Warrant analysis shows only the PM peak hour signal warrant is likely to be met.

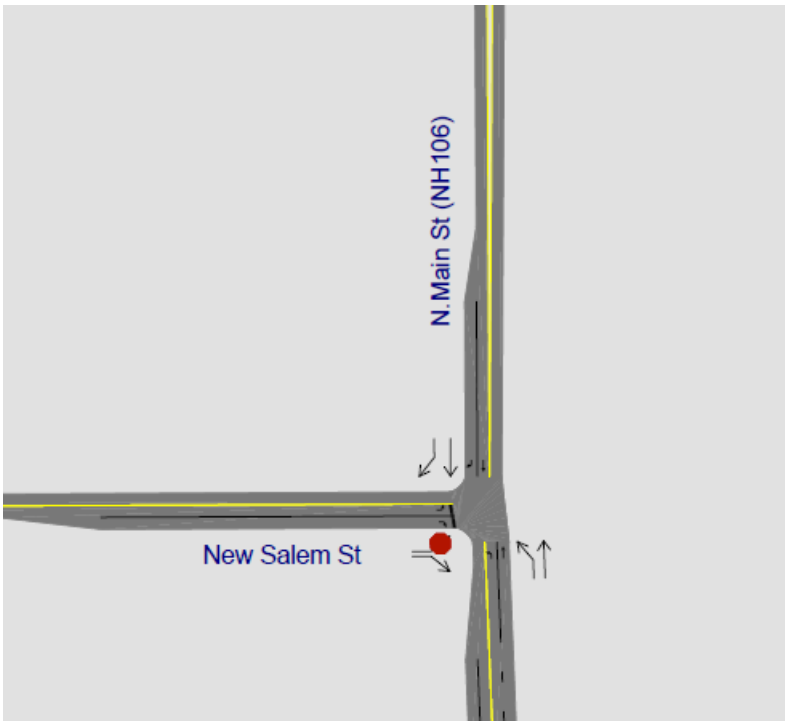
Another option the City could explore is to make a one-way traffic pair with New Salem Street one-way south between Main Street and Pleasant Street, and Veterans Square one-way north to the Main St signal, providing a signalized left turn for NB traffic.

### *Recommended Mitigation*

- Add a channelized SB right turn lane on Main Street.

- The City may wish to consider making a one-way pair with New Salem southbound and Veterans Square northbound to improve left turn conditions at New Salem Street.

Right Turn Lane Alternate




Intersections #19 & #16
New Traffic Pattern: One-way Pair
North Main Street
One-Way
Enter
New Salem Street
Laconia
One-Way
Exit
North Main Street
Pleasant Street
STOP
STOP
One-Way
Enter
New Salem
Street
Pleasant Street
One-Way
Google Earth
Image © 2025 Airbus
400 ft
N

# *Intersection #16:*

# *N.Main Street (NH106) at Veterans Sq / Church St*

*Existing Conditions*

This is an existing 4-way signalized intersection (City jurisdiction).

N.Main Street (NH106) forms the NB and SB approaches with Veterans Square forming the EB approach and Church Street forming the WB approach.

The NB approach is one way only allowing exiting traffic. All other approaches accommodate two-way traffic. SB approach has a left turn and right turn lane. EB has a left turn lane and a thru lane where the WB approach has right turn lane and a thru lane.

The City speed limit is 30 mph. There are no streetlights on top of the mast arms but there are streetlamp on the sidewalks at the NE, SE and SW corners. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.

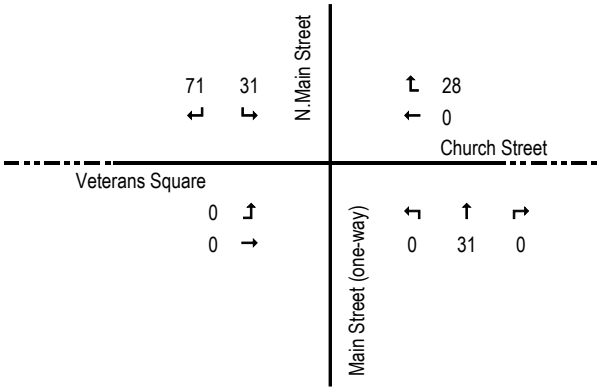
*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience at this intersection is less than 2 per year.

**Crash Data Summary**
**Intersection #16: N.Main Street (NH106) at Veterans Sq / Church St**

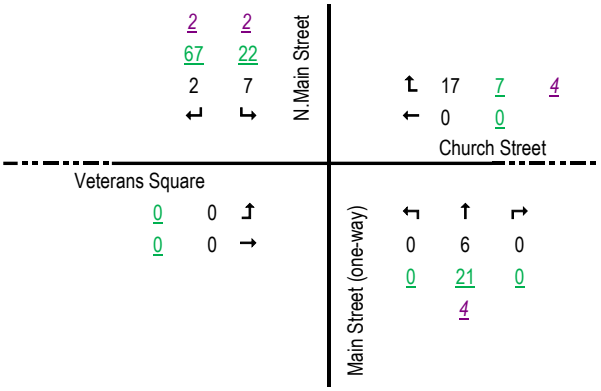
| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 7 |
| Crashes per Year (Avg) | 1.75 |
| **CRASH SEVERITY** | |
| Property Damage Only | 6 |
| Injury | 1 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 0 |
| Other Motor Vehicle | 7 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 0 |
| Snow/Ice | 0 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 0 |
| Weekday PM (3-6pm) | 3 |
| Non-Commuter Peak | 4 |

## AM Total Site Trips

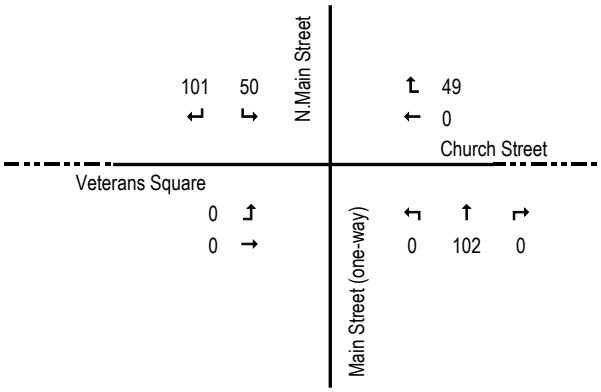



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

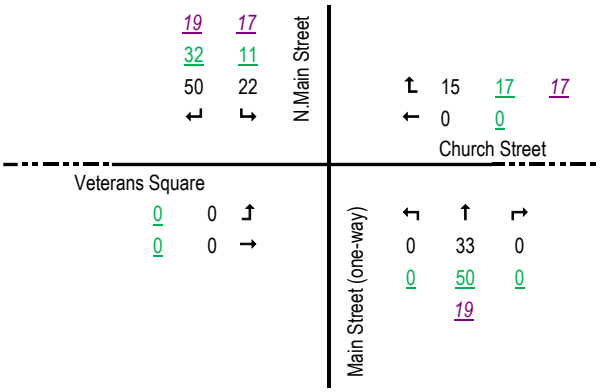



## PM Total Site Trips

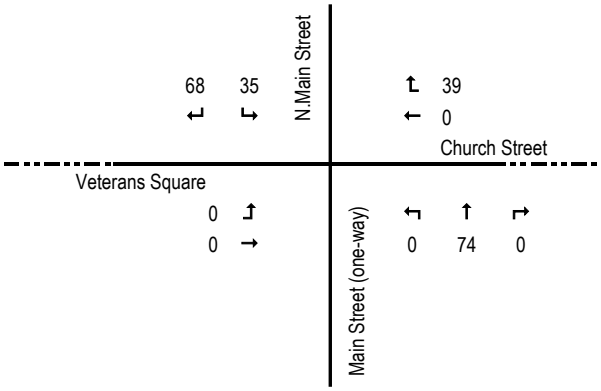



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

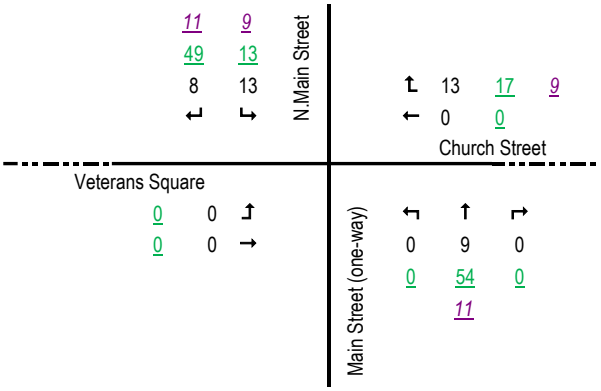



## SAT Total Site Trips

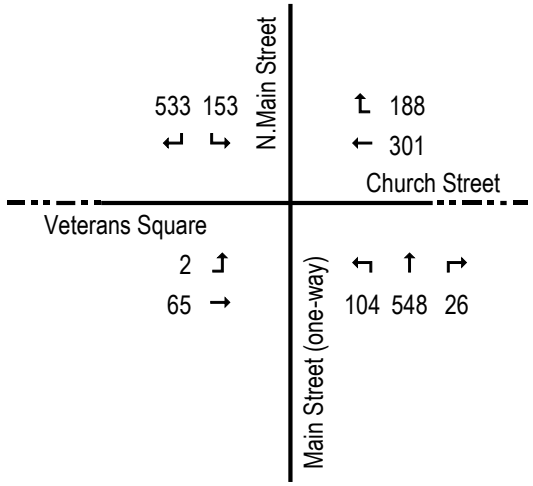



## SAT Site Composition Trips

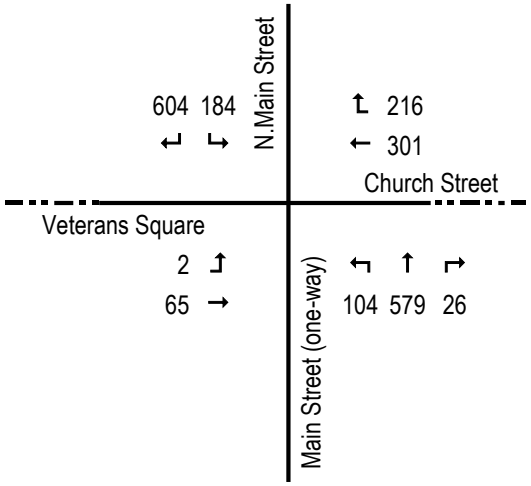
Primary, *Pass-by*, *Diverted Link*, Residential



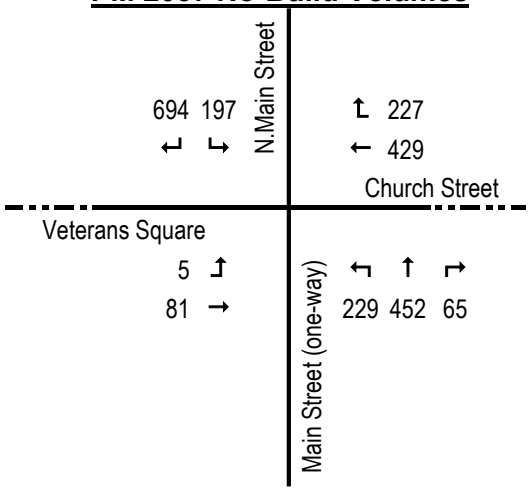
## AM 2037 No-Build Volumes



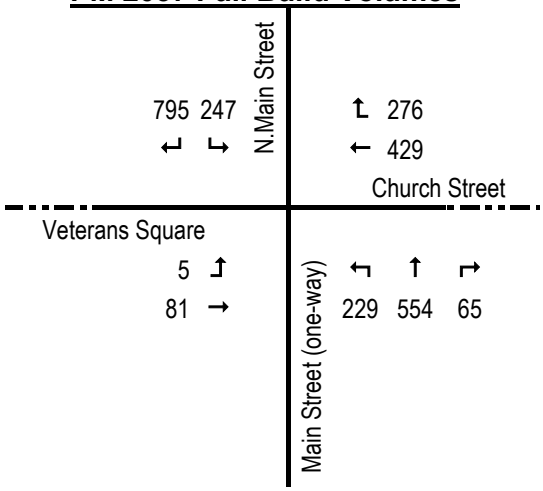

## AM 2037 Full Build Volumes



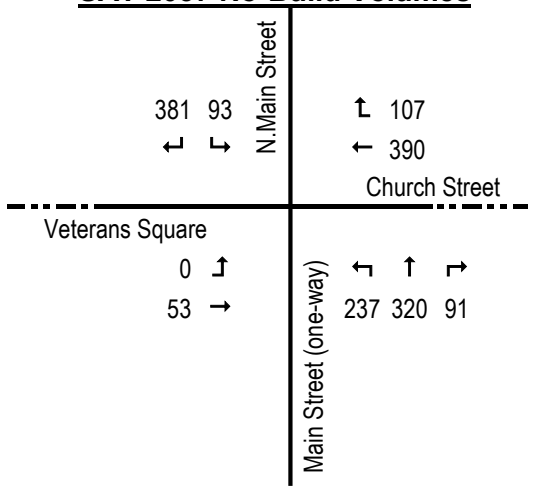

## PM 2037 No-Build Volumes



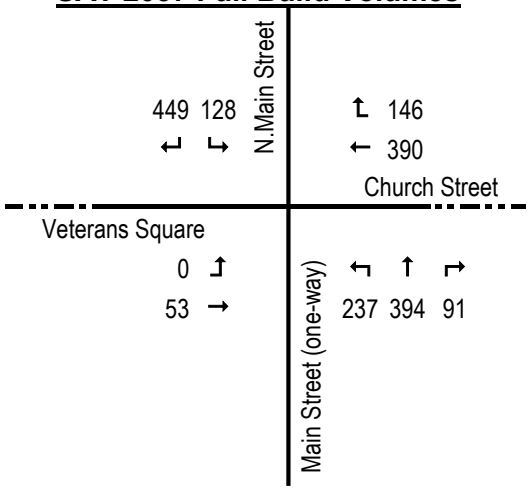

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #16: N.Main St (NH106) at Veterans and Church St** [Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Conc Peds | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.75 | 46.2 | D | --- | 0.80 | 58.3 | E | --- | 0.79 | 29.9 | C | --- |
| EB | --- | 20.3 | C | 79 | --- | 21.3 | C | 79 | --- | 28.8 | C | 80 |
| WB | --- | 21.0 | C | 371 | --- | 21.3 | C | 371 | --- | 34.1 | C | 383 |
| NB | --- | 90.5 | F | 786 | --- | 126.5 | F | 836 | --- | 32.9 | C | 653 |
| SB | --- | 22.8 | C | 164 | --- | 24.3 | C | 196 | --- | 24.4 | C | 199 |
| ***PM Peak* OVERALL** | 0.79 | 34.2 | C | --- | 0.89 | 57.5 | E | --- | 0.89 | 45.7 | D | --- |
| EB | --- | 21.5 | C | 94 | --- | 22.6 | C | 94 | --- | 26.9 | C | 91 |
| WB | --- | 35.3 | D | 582 | --- | 37.9 | B | 582 | --- | 47.1 | D | 544 |
| NB | --- | 44.5 | D | 620 | --- | 103.5 | F | 789 | --- | 47.5 | D | 663 |
| SB | --- | 25.8 | C | 208 | --- | 36.0 | D | 390 | --- | 44.8 | D | 404 |
| ***SAT Peak* OVERALL** | 0.59 | 25.7 | C | --- | 0.67 | 26.4 | C | --- | 0.69 | 26.1 | C | --- |
| EB | --- | 19.2 | B | 67 | --- | 19.8 | B | 67 | --- | 19.9 | B | 58 |
| WB | --- | 27.3 | C | 515 | --- | 27.3 | C | 515 | --- | 27.1 | C | 423 |
| NB | --- | 24.7 | C | 401 | --- | 29.1 | C | 527 | --- | 28.3 | C | 433 |
| SB | --- | 26.6 | C | 105 | --- | 22.9 | C | 139 | --- | 23.0 | C | 123 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach
NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase
MIT Peds: optimizes cycle/phases and runs concurrent pedestrians

| Intersection #16: N.Main St (NH106) at Veterans and Church St | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1920 | 161 | 7.7% |
| PM Peak Hour | 2379 | 302 | 11.3% |
| SAT Peak Hour | 1672 | 216 | 11.4% |

### *Analysis*

Existing intersection runs within capacity during all peak hours, however, the NB approach operates at LOS F in AM conditions. The project adds only 11% new traffic to the intersection. ROW restrictions do not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions. This intersection is unlikely to be improved by coordination.

### *Recommended Mitigation*

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

# *Intersection #17:*

# *Court St (US3Bus)/Union Ave (US3Bus) at S.Main/N.Main St*

*Existing Conditions*

This is an existing 4-way signalized intersection (City jurisdiction).

N.Main Street and S.Main Street (NH106) forms the NB and SB approaches respectively, with Court Street (US3Bus) forming the EB approach and Union Street (US3Bus) forming the WB approach.

All approaches accommodate two-way traffic. Each approach provides three lanes, an exclusive left turn lane, a thru lane and an exclusive right turn lane.

The City speed limit is 30 mph. There are cobra-head streetlights at all four corners on top of the signal mast arms. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.

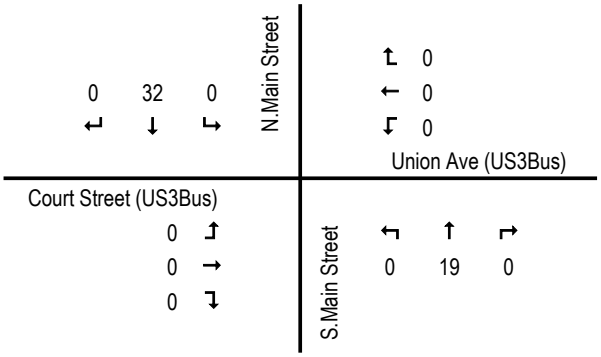
*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Crash experience at less than 8 per year (only 4 injury accidents) is not exceptional for the high volume of traffic (30,000+ ADT) at this location.

**Crash Data Summary**
**Intersection #17: Court St (US3Bus) / Union Ave (US3Bus) at S.Main St / N.Main St**

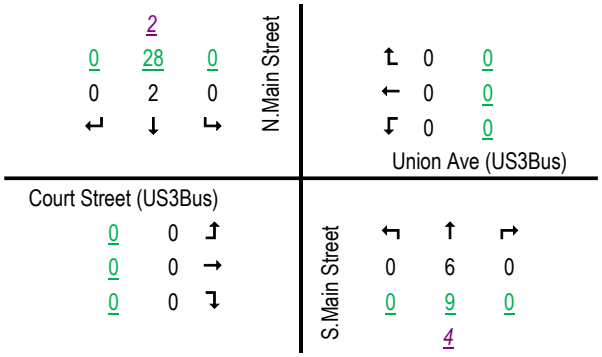
| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 30 |
| Crashes per Year (Avg) | 7.5 |
| **CRASH SEVERITY** | |
| Property Damage Only | 26 |
| Injury | 4 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 4 |
| Other Motor Vehicle | 24 |
| Pedestrian | 2 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 7 |
| Snow/Ice | 1 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 4 |
| Weekday PM (3-6pm) | 9 |
| Non-Commuter Peak | 17 |

## AM Total Site Trips

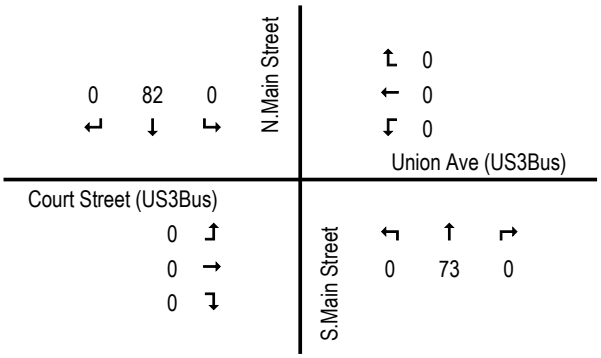



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

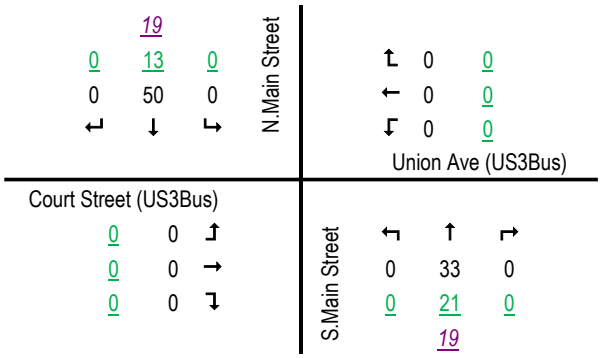



## PM Total Site Trips

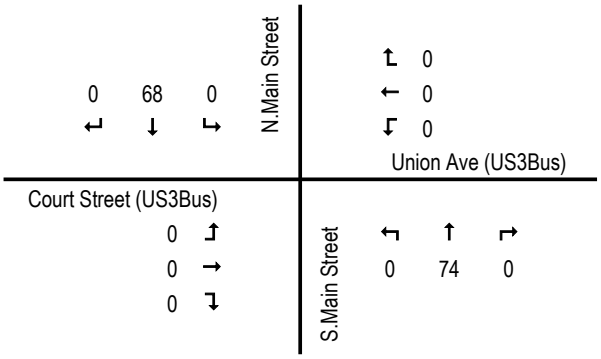



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

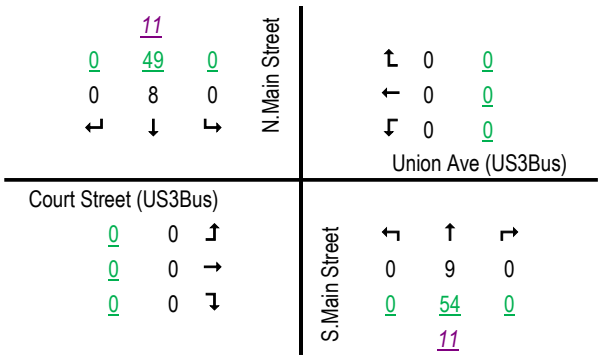



## SAT Total Site Trips

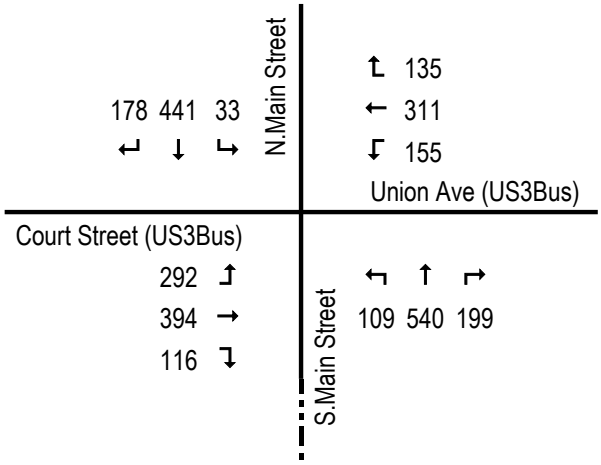



## SAT Site Composition Trips

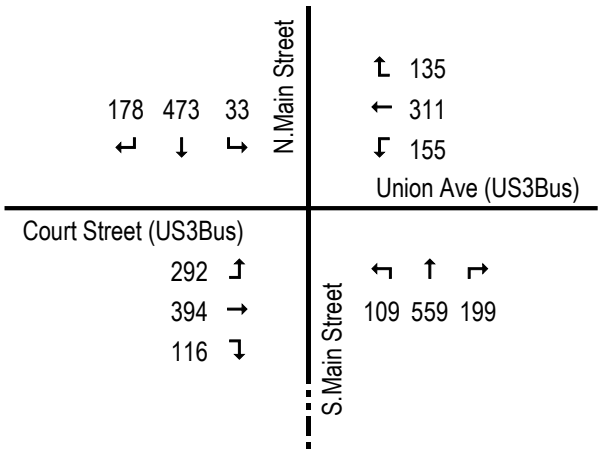
Primary, *Pass-by*, *Diverted Link*, Residential



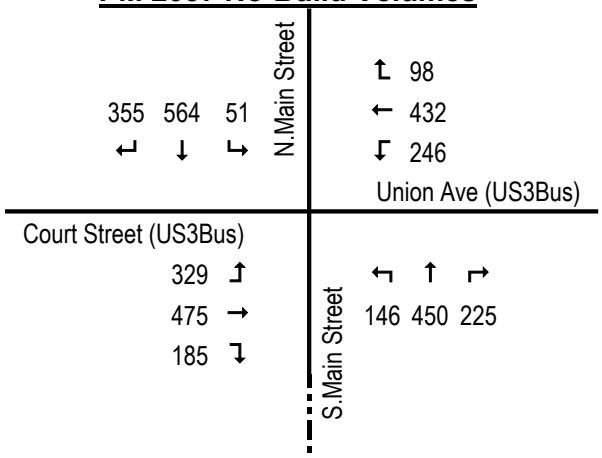
## AM 2037 No-Build Volumes



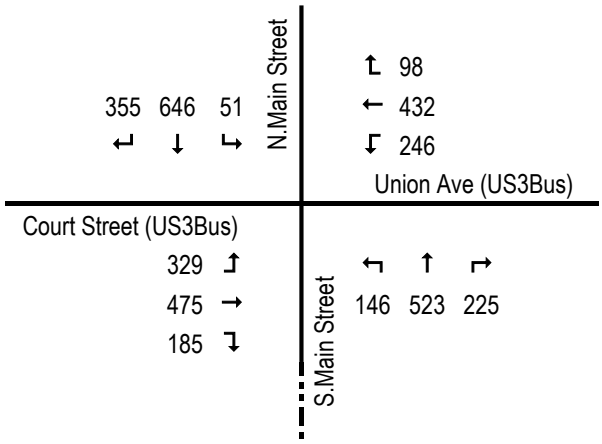

## AM 2037 Full Build Volumes



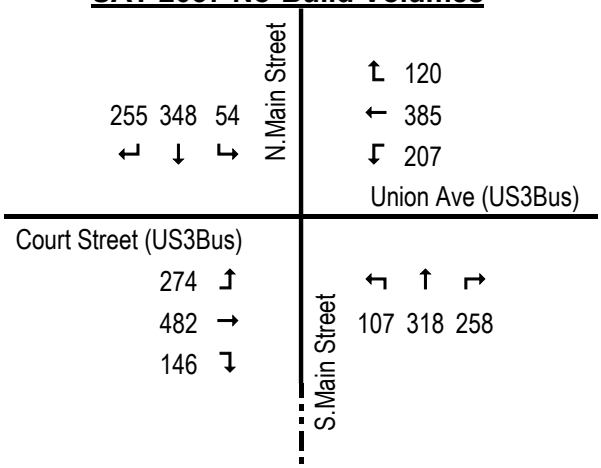

## PM 2037 No-Build Volumes



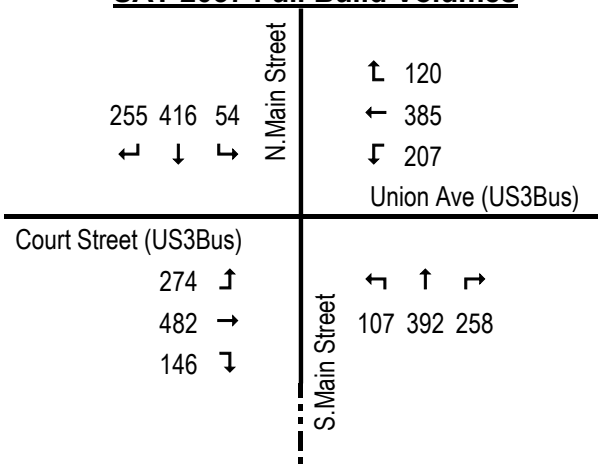

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #17: Court St (US3Bus) / Union Ave (US3Bus) at S.Main St / N.Main St**
[Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Conc Peds | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.94 | 85.4 | F | --- | 0.95 | 91.8 | F | --- | 0.96 | 59.1 | E | --- |
| EB | --- | 126.6 | F | 786 | --- | 126.6 | F | 786 | --- | 78.2 | E | 513 |
| WB | --- | 47.2 | D | 479 | --- | 47.2 | D | 479 | --- | 52.4 | D | 385 |
| NB | --- | 74.9 | E | 1161 | --- | 82.6 | F | 1211 | --- | 51.6 | D | 801 |
| SB | --- | 82.9 | F | 1023 | --- | 101.2 | F | 1112 | --- | 51.9 | D | 638 |
| ***PM Peak* OVERALL** | 1.06 | 143.2 | F | --- | 1.12 | 168.7 | F | --- | 1.16 | 100.7 | F | --- |
| EB | --- | 181.9 | F | 903 | --- | 181.9 | F | 903 | --- | 106.2 | F | 652 |
| WB | --- | 100.3 | F | 707 | --- | 100.3 | F | 707 | --- | 80.7 | F | 556 |
| NB | --- | 65.5 | E | 919 | --- | 90.1 | F | 112 | --- | 53.2 | D | 715 |
| SB | --- | 201.7 | F | 1366 | --- | 269.8 | F | 1591 | --- | 149.7 | F | 995 |
| ***SAT Peak* OVERALL** | 0.82 | 71.1 | E | --- | 0.87 | 76.5 | E | --- | 0.89 | 51.8 | D | --- |
| EB | --- | 104.9 | F | 862 | --- | 104.9 | F | 862 | --- | 51.8 | D | 585 |
| WB | --- | 63.6 | E | 579 | --- | 63.6 | E | 579 | --- | 57.2 | E | 458 |
| NB | --- | 47.5 | D | 524 | --- | 51.5 | D | 724 | --- | 39.3 | D | 493 |
| SB | --- | 57.8 | E | 737 | --- | 79.7 | E | 925 | --- | 59.2 | E | 597 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach
NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase
MIT Peds: optimizes cycle/phases and runs concurrent pedestrians

| **Intersection #17: Court St (US3Bus) / Union Ave (US3Bus) at S.Main St / N.Main St** | ***Total Background Volume*** | ***Added Site Trips*** | ***% Added to Intersection*** |
|---|---|---|---|
| AM Peak Hour | 2903 | 51 | 1.7% |
| PM Peak Hour | 3556 | 155 | 4.2% |
| SAT Peak Hour | 2954 | 142 | 4.6% |

### *Analysis*

Intersection is at capacity in existing AM and PM conditions, and near capacity in the Saturday peak hours. Project site trips add only a few percent new trips to the intersection. ROW restrictions do not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions. This intersection is unlikely to be improved by coordination.

### *Recommended Mitigation*

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

# *Intersection #20:*
# *Fair St at Court St (US3Bus)*

*Existing Conditions*

This is an existing 4-way intersection with side-street stop control under City jurisdiction.

Locally, Court Street runs east/west, and Fair Street forms the NB and SB approaches, Court Street (US3Bus) forms the EB and WB approaches .

The NB approach is one way only allowing exiting traffic with a single lane. All other approaches accommodate two-way traffic. SB approach has a left turn and right turn lane. EB has a left turn lane and a thru lane where the WB approach has right/thru lane with a TWLT pocket striped.

The speed limit is 30 mph on Court Street and there are cobra-head streetlights on utility poles at the NE and SE corners. There are no crosswalks stripped at the intersection but there are sidewalks at all four corners.

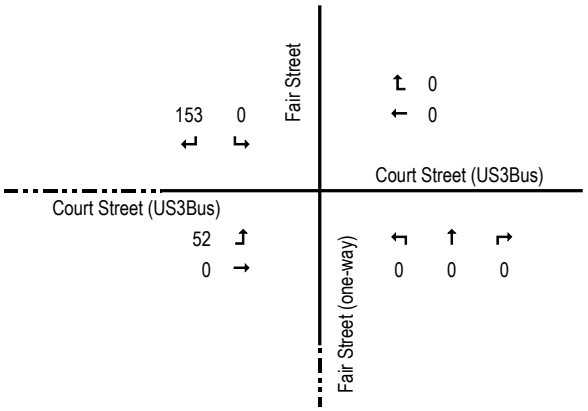
*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Although crash experience is reasonable, many crashes are caused by a sight distance restriction for SB left turns from Fair St. onto Court St. See Mitigation section below.

**Crash Data Summary**
**Intersection #20: Fair St at Court St (US3Bus)**

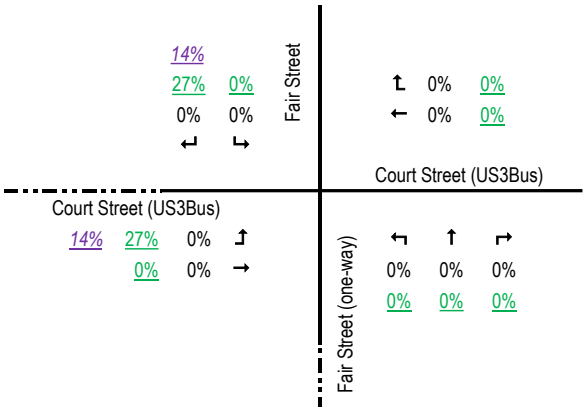
| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 9 |
| Crashes per Year (Avg) | 2.25 |
| **CRASH SEVERITY** | |
| Property Damage Only | 6 |
| Injury | 3 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 0 |
| Other Motor Vehicle | 9 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 0 |
| Snow/Ice | 0 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 0 |
| Weekday PM (3-6pm) | 5 |
| Non-Commuter Peak | 4 |

## AM Total Site Trips

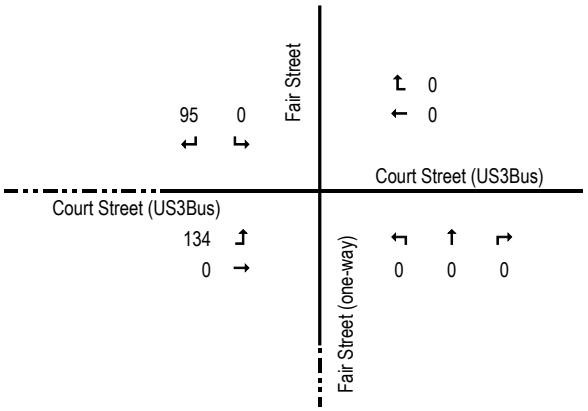



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

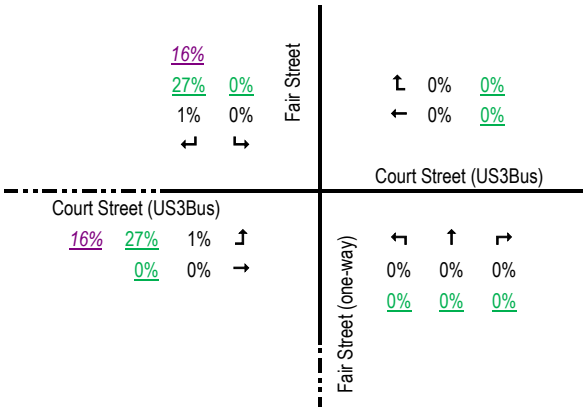



## PM Total Site Trips

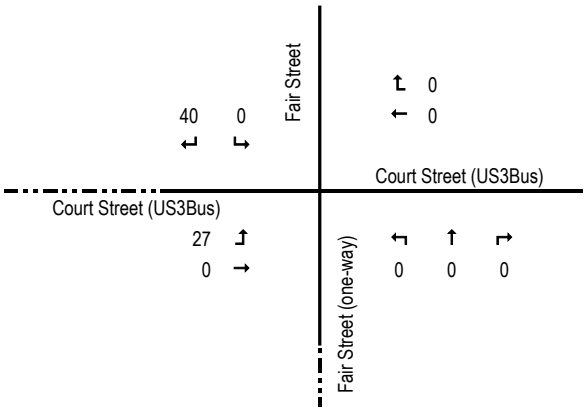



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

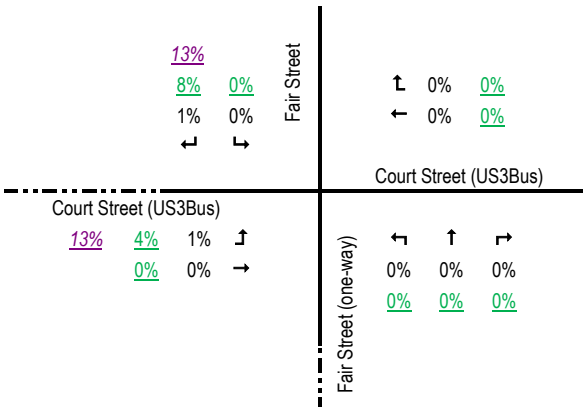



## SAT Total Site Trips

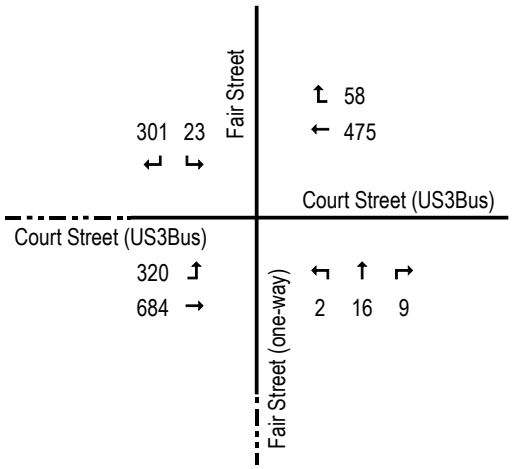



## SAT Site Composition Trips

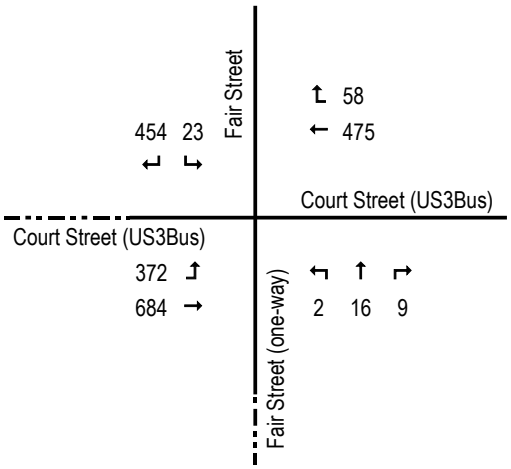
Primary, *Pass-by*, *Diverted Link*, Residential



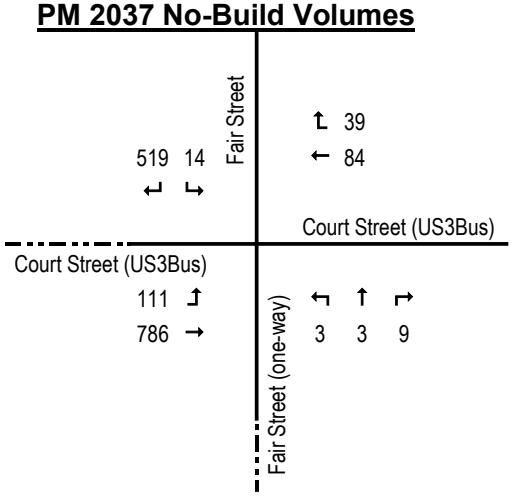
## AM 2037 No-Build Volumes



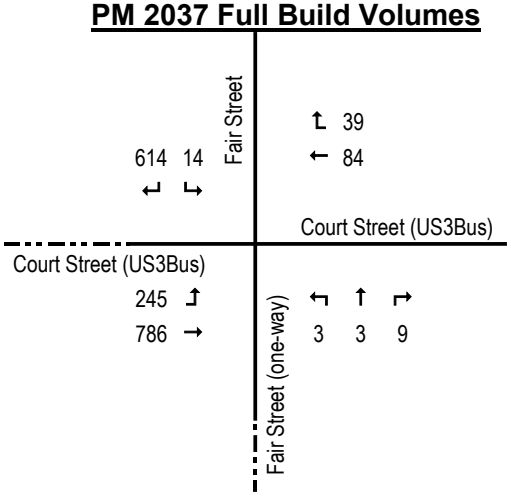

## AM 2037 Full Build Volumes



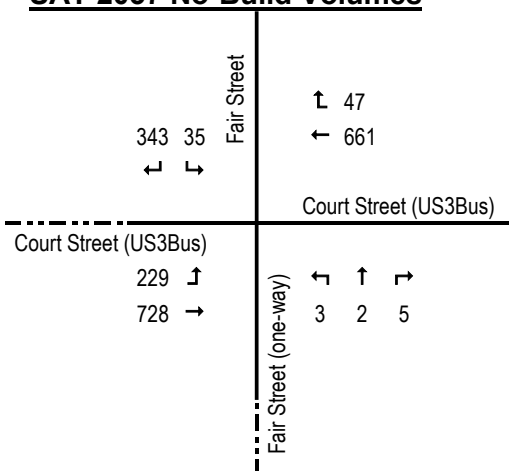

## PM 2037 No-Build Volumes



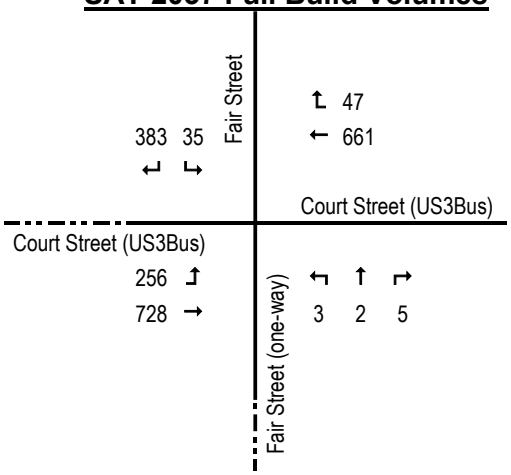

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #20: Fair St at Court St (US3Bus)** [Unsignalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: No SBL | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | --- | 17.3 | C | --- | --- | 157.2 | F | --- | --- | 144.9 | F | --- |
| EB | 0.45 | 3.4 | A | 41 | 0.45 | 3.9 | A | 52 | 0.45 | 3.9 | A | 52 |
| WB | 0.34 | 00 | A | 0 | 0.34 | 0.0 | A | 0 | 0.34 | 0.0 | A | 0 |
| NB | 0.82 | 259.6 | F | 74 | 3.83 | >300 | F | >800 | 3.83 | >300 | F | >800 |
| SB | 1.42 | 68.2 | F | 106 | 2.27 | 53.1 | F | 297 | 0.94 | 53.1 | F | 297 |
| ***PM Peak* OVERALL** | --- | 6.3 | A | --- | --- | 9.3 | A | --- | --- | 8.8 | A | --- |
| EB | 0.51 | 1.0 | A | 7 | 0.51 | 1.9 | A | 17 | 0.51 | 1.9 | A | 17 |
| WB | 0.08 | 0.0 | A | 0 | 0.08 | 0.0 | A | 0 | 0.08 | 0.0 | A | 0 |
| NB | 0.18 | 54.5 | F | 16 | 0.46 | 174.6 | F | 38 | 0.46 | 174.6 | F | 38 |
| SB | 0.61 | 15.2 | C | 109 | 0.72 | 19.2 | C | 164 | 0.72 | 18.2 | C | 164 |
| ***SAT Peak* OVERALL** | --- | 31.8 | C | --- | --- | >300 | F | --- | --- | >300 | F | --- |
| EB | 0.47 | 2.7 | A | 31 | 0.47 | 3.0 | 3.0 | 37 | 0.47 | 3.0 | A | 37 |
| WB | 0.46 | 0.0 | A | 0 | 0.46 | 0.0 | 0.0 | 0 | 0.46 | 0.0 | A | 0 |
| NB | 2.80 | >300 | F | 63 | >5.0 | >300 | >300 | >800 | >5.0 | >300 | F | >800 |
| SB | 1.31 | 99.7 | F | 260 | 1.50 | 130.5 | 130.5 | 346 | 1.05 | 89.3 | F | 346 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

MIT No SBL: removes south bound left turn lane, no SBL at intersection

| *Intersection #20: Fair St at Court St (US3Bus)* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1888 | 205 | 9.8% |
| PM Peak Hour | 1568 | 229 | 16.6% |
| SAT Peak Hour | 2053 | 67 | 3.2% |

### *Analysis*

Locally, US3Bus forms the B and EB approaches, and Fair St runs north-south. All project trips at this intersection are SB right turns and EB left turns to/from the marina and New Salem Street. The problem movements at this intersection are not caused by site trips.

The primary safety issue is a hedge on private property that obstructs sight distance for SB left turns. If the City cannot get permission from the owner to trim this hedge, SB left turns from Fair St onto Court Street should be restricted.

The operational issue is lengthy delays at the Fair St stop-controlled approaches. However, these are relatively low-volume movements that do not include site-related trips. It would be our recommendation to prohibit left turns to increase safety and lessen delays at the intersection.

### *Recommended Mitigation*

- Obtain owner's permission to trim hedge at 173 Court Street or,
- Restrict SB left turns from Fair Street onto Court Street

# *Intersection #13*

# *Union Ave (US3Bus) at Elm St / Clinton St*

*Existing Conditions*

This is an existing 4-way signalized intersection.

Union Street (US3Bus) forms the NB and SB approaches with Elm Street forming the EB approach and Clinton Street forming the WB approach.

Each approach accommodates two-way traffic. The EB and SB approaches have exclusive right-turn lanes with a left-thru lane. WB is a single lane approach. The NB approach has an exclusive left-turn lane and a thru-right lane.

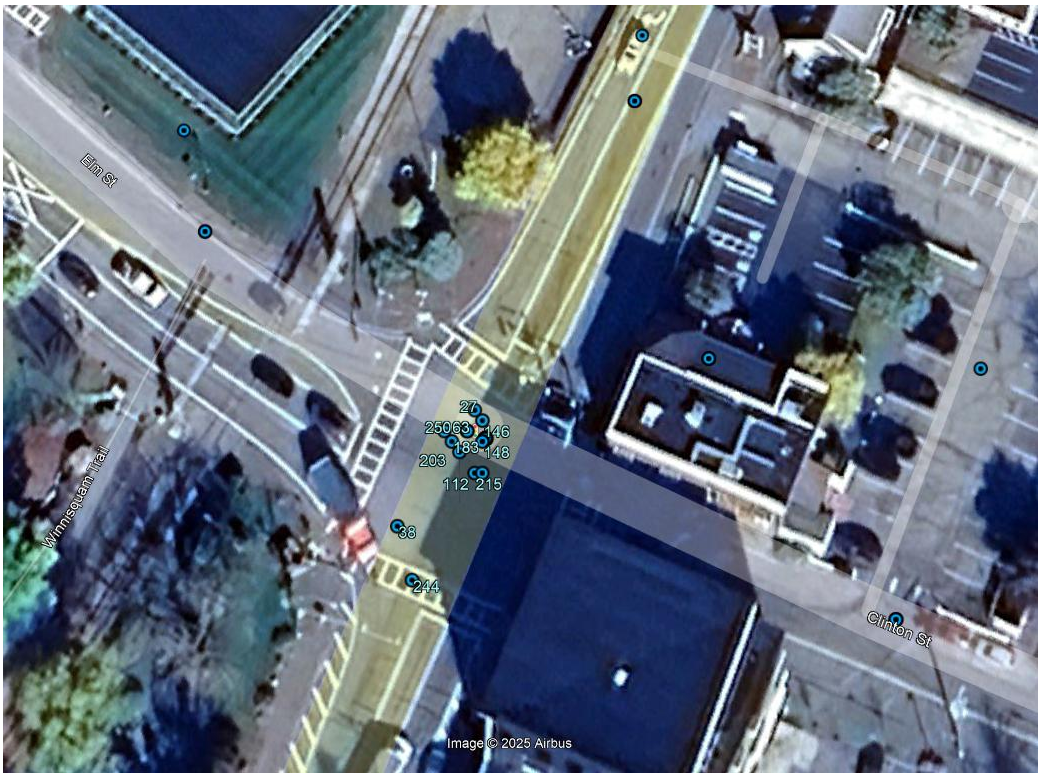
The posted speed limit is 30 mph on Elm Street and Union Ave (US3Bus). There are cobra-head streetlights on top of the mast arms at the northwest and southwest corners of the intersection and on a utility pole at the northeast corner. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches.

*Accident Evaluation*

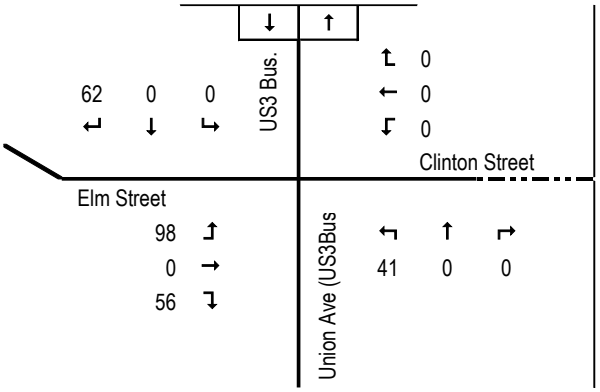
Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. At less than 6 crashes per year, crash experience is relatively low.

**Crash Data Summary**
**Intersection #13: Union Ave (US3Bus) at Elm St / Clinton St**

| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 22 |
| Crashes per Year (Avg) | 5.5 |
| **CRASH SEVERITY** | |
| Property Damage Only | 8 |
| Injury | 4 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 0 |
| Other Motor Vehicle | 21 |
| Animal | 1 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 4 |
| Snow/Ice | 0 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 1 |
| Weekday PM (3-6pm) | 5 |
| Non-Commuter Peak | 16 |

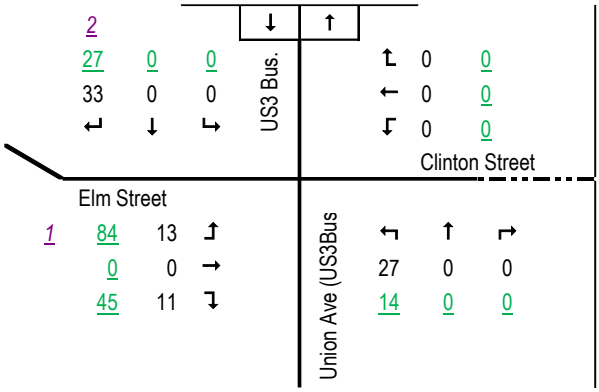


## AM Total Site Trips

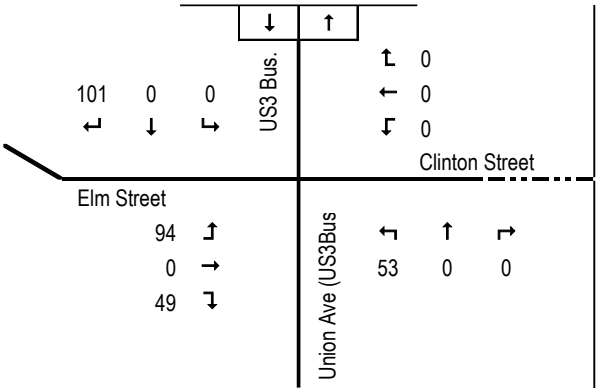



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

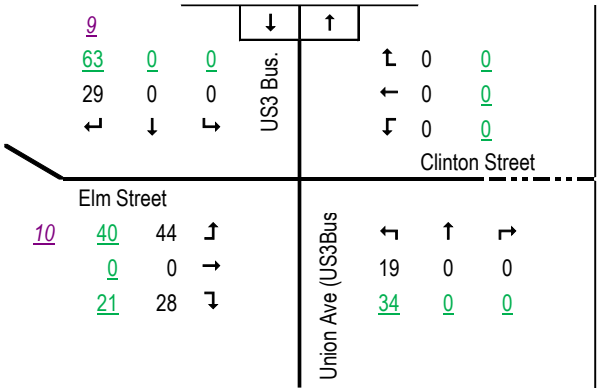



## PM Total Site Trips

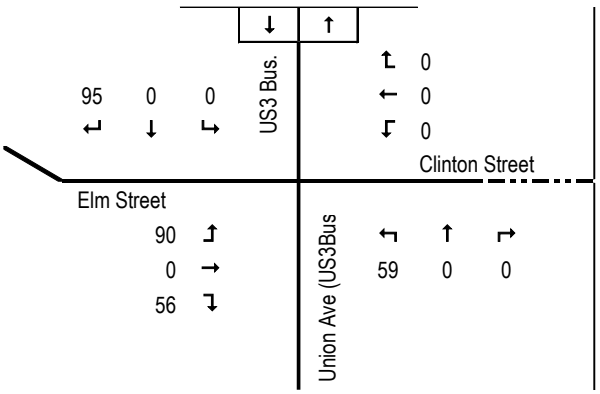



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

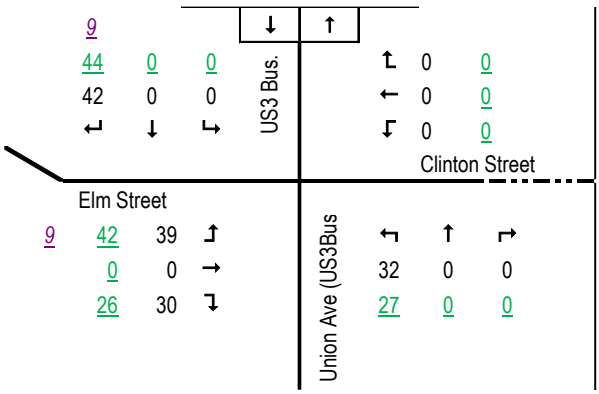



## SAT Total Site Trips

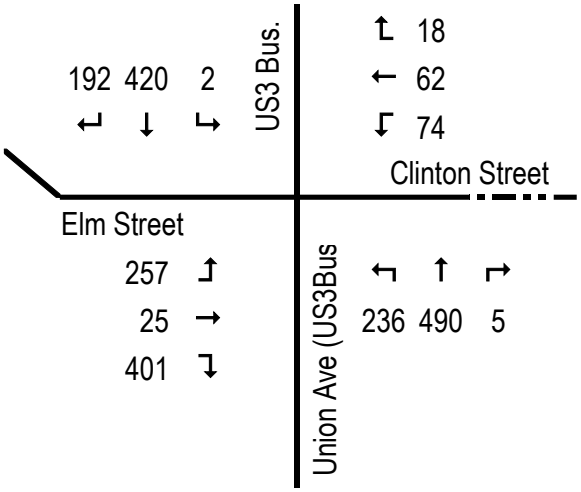



## SAT Site Composition Trips

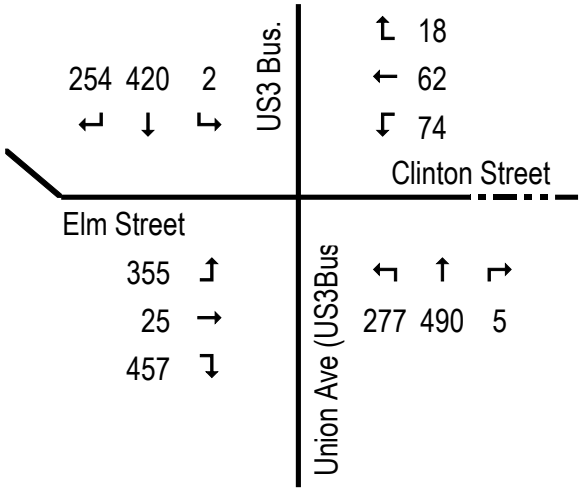
Primary, *Pass-by*, *Diverted Link*, Residential



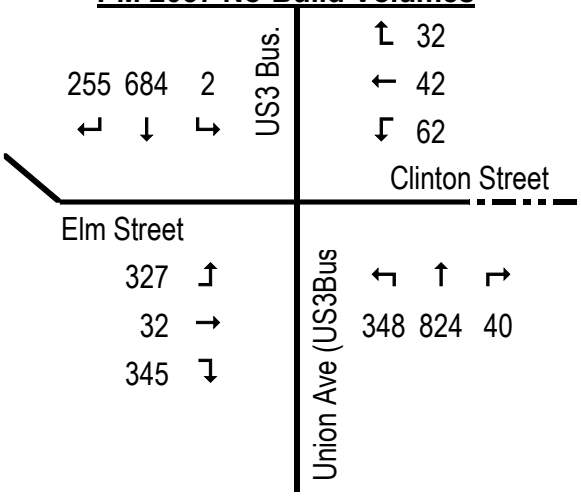
**AM 2037 No-Build Volumes**



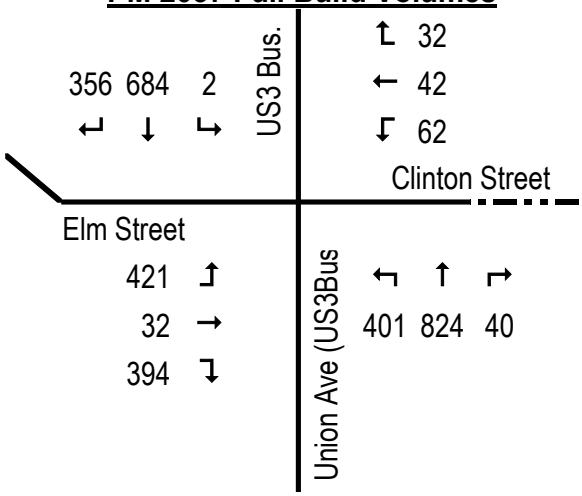

**AM 2037 Full Build Volumes**



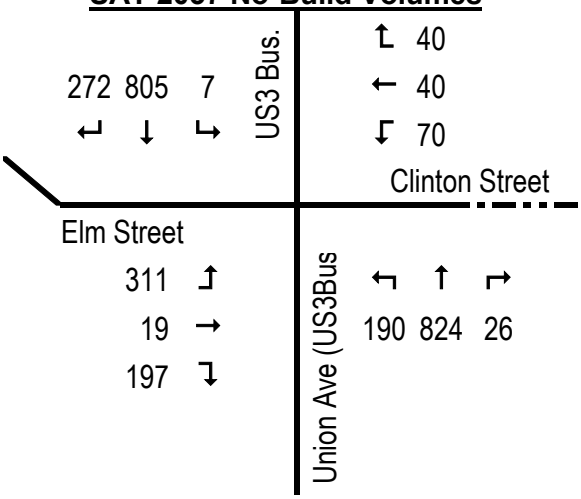

**PM 2037 No-Build Volumes**



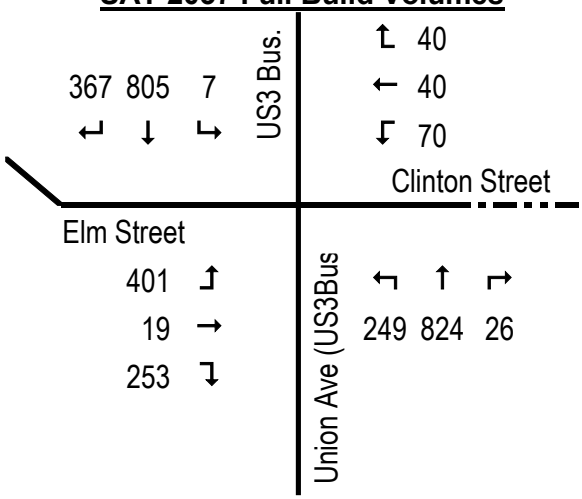

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #13: Union Ave (US3Bus) at Elm St / Clinton St** [Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Conc Peds | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.88 | 35.9 | D | --- | 1.86 | >300 | F | --- | 1.04 | 52.3 | D | --- |
| EB | --- | 35.0 | D | 389 | --- | 92.1 | F | 570 | --- | 60.5 | E | 495 |
| WB | --- | 27.6 | C | 178 | --- | 70.0 | E | 252 | --- | 30.1 | C | 170 |
| NB | --- | 33.2 | C | 525 | --- | >300 | F | 398 | --- | 43.4 | D | 440 |
| SB | --- | 42.3 | D | 564 | --- | 141.1 | F | 675 | --- | 56.7 | E | 545 |
| ***PM Peak* OVERALL** | 1.24 | 119.0 | F | --- | 1.61 | 177.3 | F | --- | 1.41 | 131.1 | F | --- |
| EB | --- | 122.9 | F | 564 | --- | 213.9 | F | 724 | --- | 129.2 | F | 676 |
| WB | --- | 105.2 | F | 249 | --- | >300 | F | 274 | --- | 61.6 | E | 226 |
| NB | --- | 71.4 | F | 1008 | --- | 97.0 | F | 1008 | --- | 72.7 | E | 907 |
| SB | --- | 177.7 | F | 1002 | --- | 164.5 | F | 1002 | --- | 210.5 | F | 1026 |
| ***SAT Peak* OVERALL** | 1.53 | 269.9 | F | --- | 1.78 | 264.2 | F | --- | 1.38 | 128.0 | F | --- |
| EB | --- | 33.8 | C | 468 | --- | 73.7 | E | 631 | --- | 136.9 | F | 677 |
| WB | --- | 23.4 | C | 163 | --- | 26.0 | C | 194 | --- | 77.8 | E | 264 |
| NB | --- | 66.3 | E | 1096 | --- | 67.1 | E | 1096 | --- | 44.7 | D | 901 |
| SB | --- | >300 | F | 1335 | --- | >300 | F | 1336 | --- | 208.1 | F | 1207 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase
MIT Peds: optimizes cycle/phases and runs concurrent pedestrians

| *Intersection #13: Union Ave (US3Bus) at Elm St / Clinton St* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 2182 | 257 | 10.5% |
| PM Peak Hour | 2993 | 297 | 9.0% |
| SAT Peak Hour | 2801 | 300 | 9.7% |

### *Analysis*

Intersection is near capacity in existing AM conditions, and significantly over capacity in PM and Saturday peak hours. Limited ROW does not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions. This intersection is unlikely to be improved by coordination.

### *Recommended Mitigation*

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

# *Intersection #18:*
# *Union Ave (US3Bus) at Rite Aid / Gilford Ave*

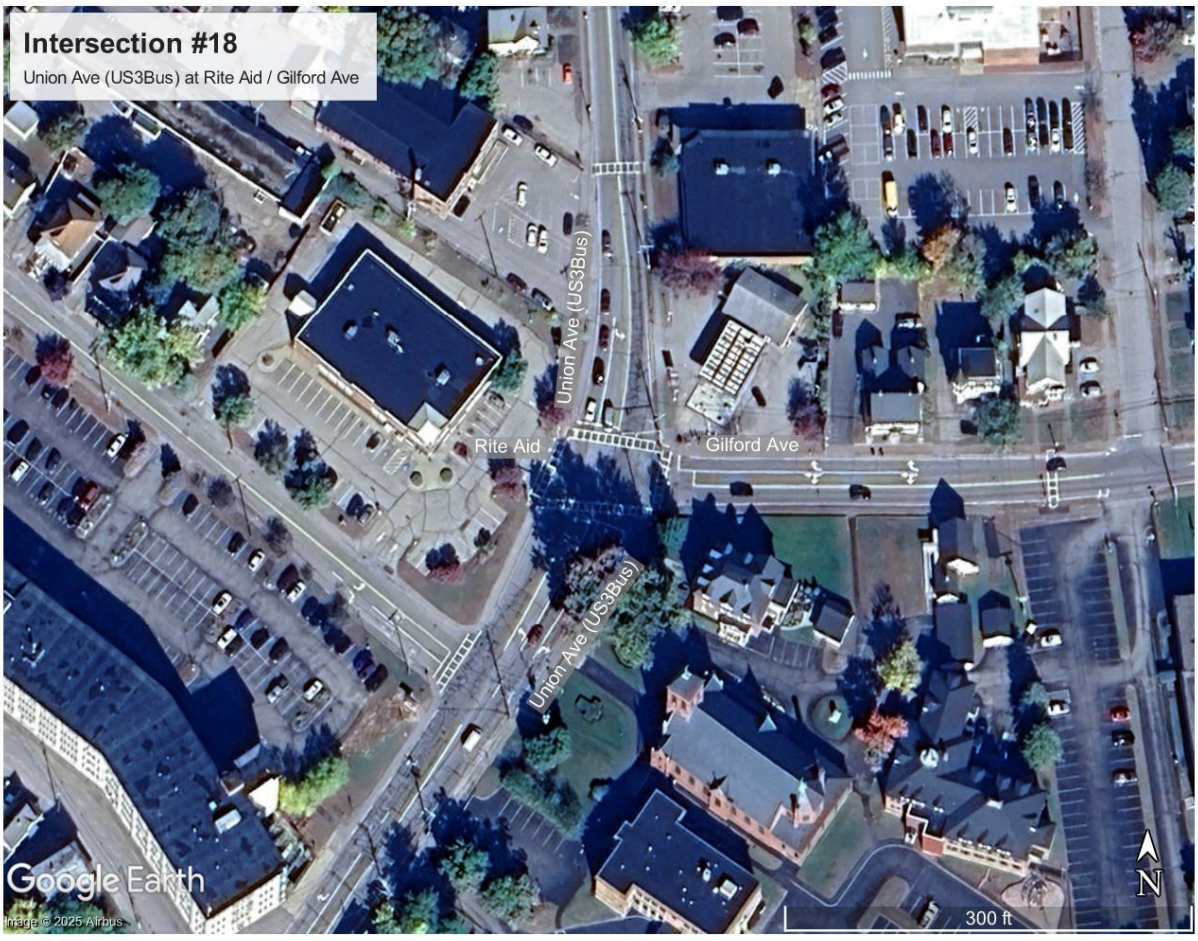
*Existing Conditions*

This is an existing 4-way signalized intersection (City jurisdiction).

Union Street (US3Bus) forms the NB and SB approaches with Rite Aid forming the EB approach and Gilford Ave forming the WB approach.

All approaches accommodate two-way traffic. The EB Rite Aid driveway and WB Gilford Ave each have a left/thru lane and a right turn lane. NB has three lanes, an exclusive left turn lane, a thru lane and an exclusive right turn lane. SB provides an exclusive left turn lane and a thru/right lane.

The City speed limit is 30 mph. There is a cobra-head streetlight on a utility pole at the NE corner of the intersection. There are pedestrian crosswalks with pedestrian signals and push buttons at all four intersection approaches. There is an exclusive pedestrian signal phase.

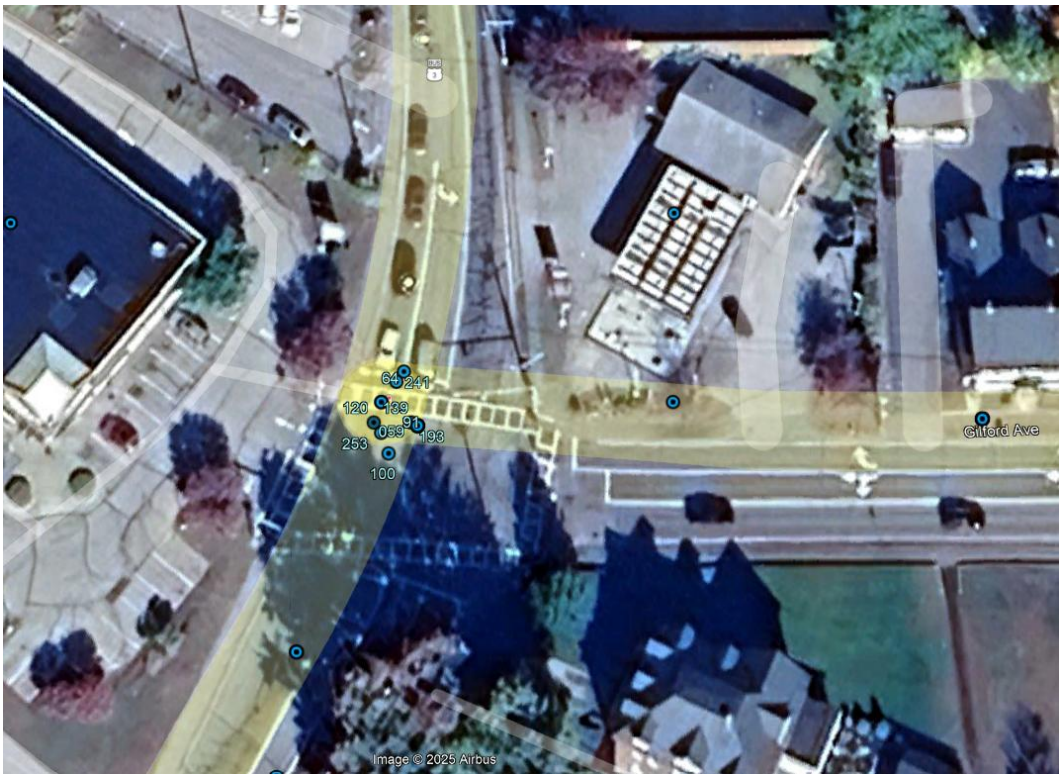


*Accident Evaluation*

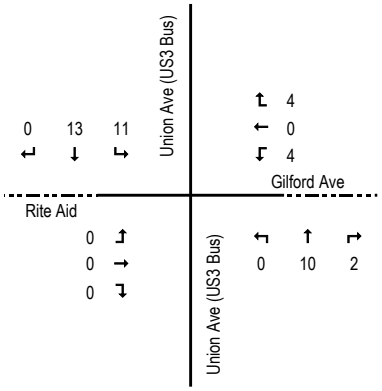
Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. The crash experience for this intersection is relatively low.

**Crash Data Summary**
**Intersection #18: Union Ave (US3Bus) at Rite Aid / Gilford Ave**

| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 15 |
| Crashes per Year (Avg) | 3.75 |
| **CRASH SEVERITY** | |
| Property Damage Only | 11 |
| Injury | 4 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object/Ditch | 1 |
| Other Motor Vehicle | 14 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 0 |
| Snow/Ice | 1 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 1 |
| Weekday PM (3-6pm) | 2 |
| Non-Commuter Peak | 12 |

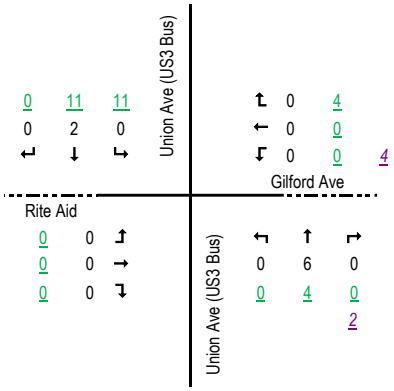


## AM Total Site Trips

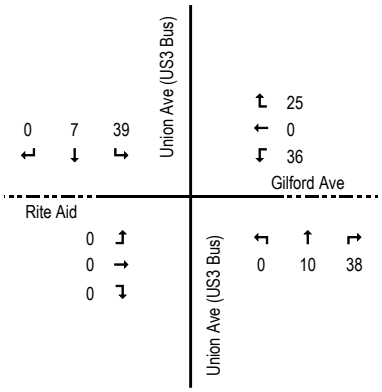



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

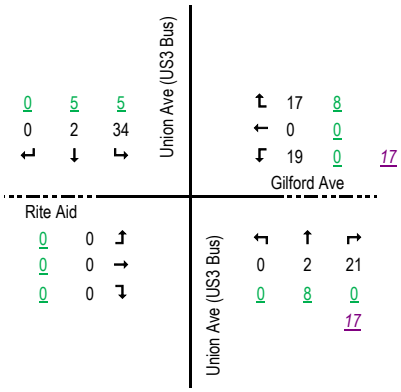



## PM Total Site Trips

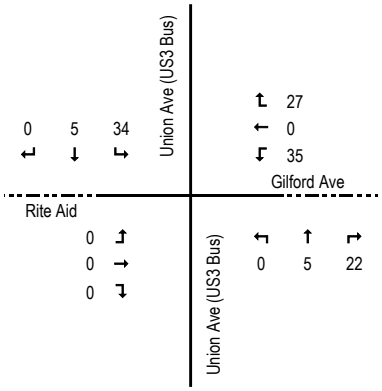



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

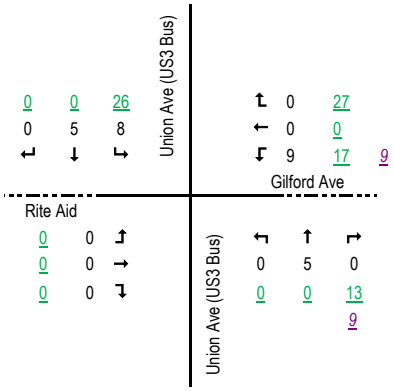



## SAT Total Site Trips

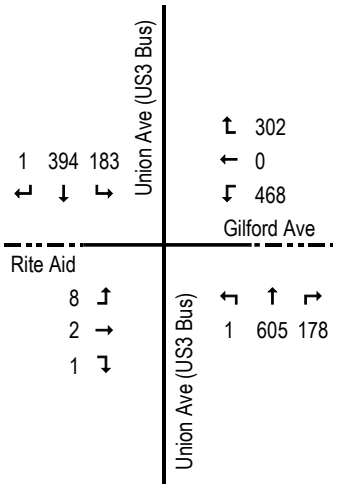



## SAT Site Composition Trips

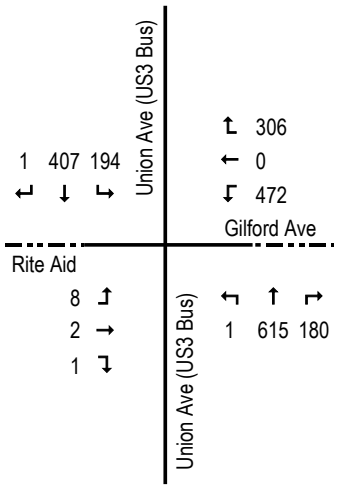
Primary, *Pass-by*, *Diverted Link*, Residential



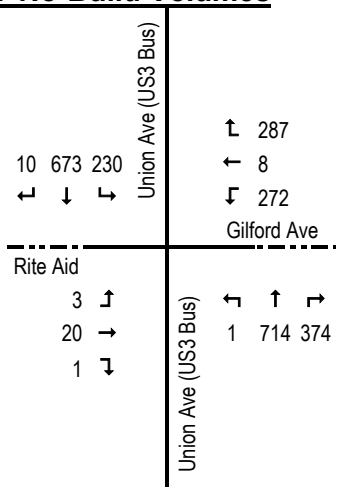
## AM 2037 No-Build Volumes



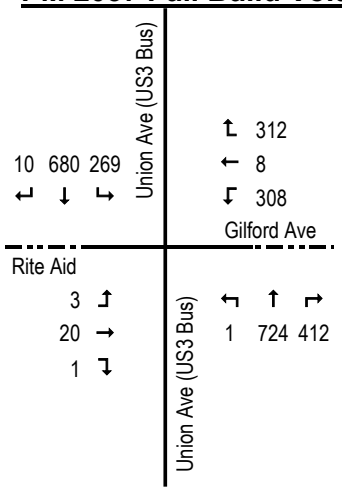

## AM 2037 Full Build Volumes



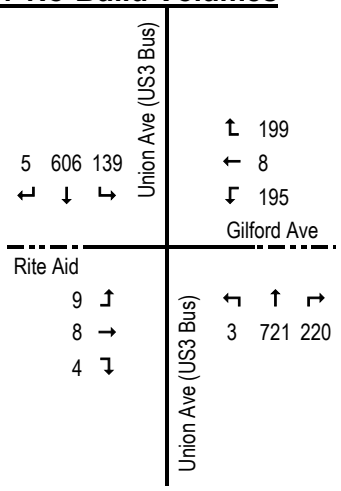

## PM 2037 No-Build Volumes



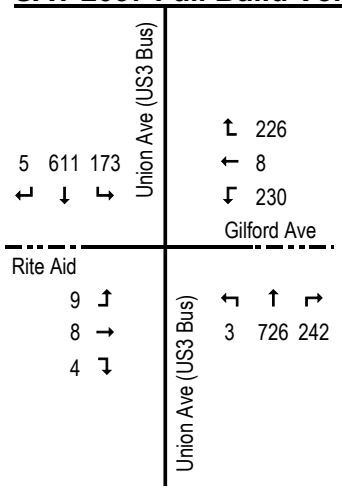

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #18: Union Ave (US3Bus) at Rite Aid / Gilford Ave** [Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Conc Peds | | | | 2037 Build Mitigation: Coord | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 1.00 | 85.0 | F | | 1.06 | 109.1 | F | | 0.96 | 55.6 | E | | 1.02 | 51.4 | D | |
| EB | --- | 26.7 | C | 24 | --- | 29.2 | C | 24 | --- | 21.4 | C | 19 | --- | 22.0 | C | 19 |
| WB | --- | 186.7 | F | 800 | --- | 218.2 | F | 806 | --- | 49.8 | D | 656 | --- | 46.4 | D | 665 |
| NB | --- | 31.5 | C | 774 | --- | 47.3 | D | 790 | --- | 64.8 | E | 799 | --- | 37.0 | D | 592 |
| SB | --- | 21.6 | C | 407 | --- | 33.4 | C | 422 | --- | 54.2 | D | 430 | --- | 73.1 | E | 418 |
| ***PM Peak* OVERALL** | 0.81 | 39.0 | D | | 0.88 | 45.4 | D | | 0.95 | 40.3 | D | | 0.90 | 38.2 | D | |
| EB | --- | 37.9 | D | 49 | --- | 38.6 | D | 49 | --- | 22.1 | C | 30 | --- | 29.1 | C | 35 |
| WB | --- | 57.6 | E | 526 | --- | 75.7 | E | 616 | --- | 33.8 | C | 344 | --- | 40.7 | D | 395 |
| NB | --- | 32.1 | C | 919 | --- | 32.3 | C | 940 | --- | 33.8 | C | 669 | --- | 21.5 | C | 278 |
| SB | --- | 35.3 | D | 897 | --- | 40.5 | D | 914 | --- | 52.6 | D | 659 | --- | 56.0 | E | 804 |
| ***SAT Peak* OVERALL** | 0.81 | 38.1 | D | | 0.88 | 48.9 | D | | 0.85 | 32.6 | C | | 0.80 | 30.4 | C | |
| EB | --- | 26.5 | C | 33 | --- | 27.3 | C | 33 | --- | 24.4 | C | 27 | --- | 34.5 | C | 33 |
| WB | --- | 33.5 | C | 305 | --- | 39.1 | D | 374 | --- | 32.7 | C | 269 | --- | 46.1 | D | 355 |
| NB | --- | 47.7 | D | 996 | --- | 64.4 | E | 1005 | --- | 32.8 | C | 803 | --- | 21.7 | C | 427 |
| SB | --- | 28.8 | C | 800 | --- | 36.3 | D | 809 | --- | 32.5 | C | 633 | --- | 31.9 | C | 576 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service [d] Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase

MIT Peds: optimizes cycle/phases and runs concurrent pedestrians; MIT Coord: Coordinates intersections #18 and #21 with concurrent peds

| *Intersection #18: Union Ave (US3Bus) at Rite Aid / Gilford Ave* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 2143 | 44 | 2.0% |
| PM Peak Hour | 2593 | 155 | 6.0% |
| SAT Peak Hour | 2117 | 128 | 5.7% |

### *Analysis*

Site-related trips account for only a few percent of traffic at this intersection. Limited ROW does not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing brings intersection operations near to pre-existing conditions.

### *Recommended Mitigation*

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- Coordinate signal with adjacent intersection: 21. Union Ave at Church/Winter St.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

# *Intersection #21*

## *Union Ave (US3Bus) at Church St / Winter St / Davis Place*

*Existing Conditions*

This is an existing 5-way signalized intersection (City jurisdiction).

Union Street (US3Bus) forms the NB and SB approaches with Church Street forming the EB approach and Winter Street forming the WB approach. Davis Place forms the fifth leg of the SEB approach.

All approaches accommodate two-way traffic. The EB/WB/NB/SEB all have a single lane approach. SB provides an exclusive right turn lane and a thru/left lane.

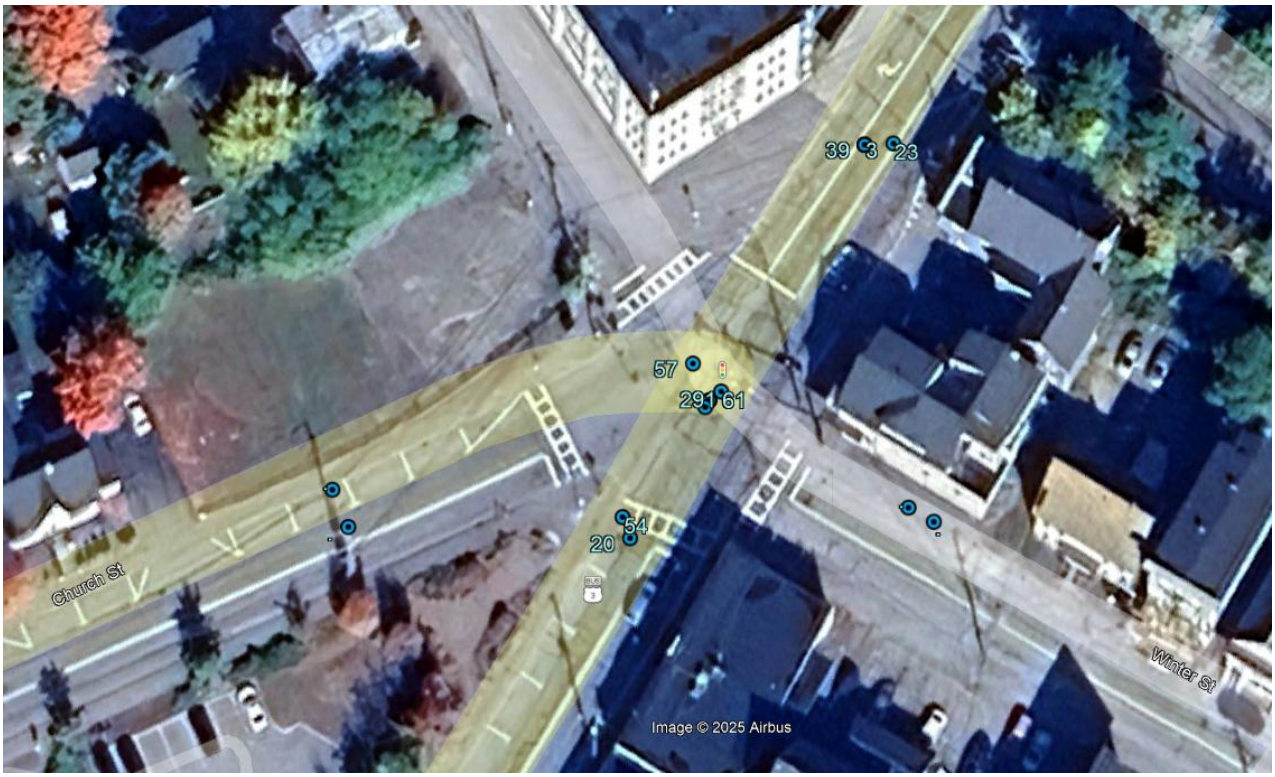
The City speed limit is 30 mph. There are cobra-head streetlights on a utility pole at the NE and NW (south of Davis Pl) corners of the intersection and a street lamp pole between Union NB and Church St. There are pedestrian crosswalks with pedestrian signals and push buttons at all four of the intersection approaches, except for no crosswalk at the SB approach of Union St. There is an exclusive pedestrian signal phase.

*Accident Evaluation*

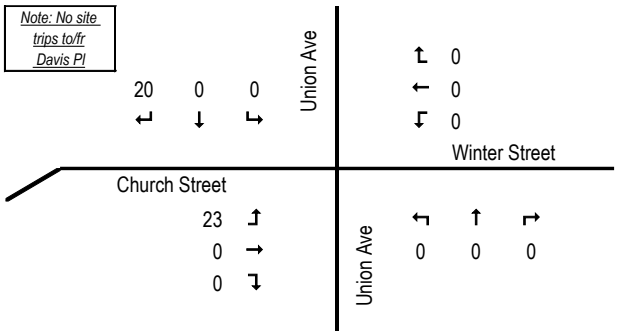
Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Considering the complex intersection geometry and traffic volumes, the crash experience for this intersection is relatively low.

**Crash Data Summary**
**Intersection #21: Union Ave (US3Bus) at Church St / Winter St / Davis Pl**

| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 11 |
| Crashes per Year (Avg) | 2.75 |
| **CRASH SEVERITY** | |
| Property Damage Only | 8 |
| Injury | 3 |
| Fatalities | 0 |
| **CRASH TYPE** | |
| Fixed Object | 1 |
| Other Motor Vehicle | 10 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 2 |
| Snow/Ice | 1 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 0 |
| Weekday PM (3-6pm) | 3 |
| Non-Commuter Peak | 8 |

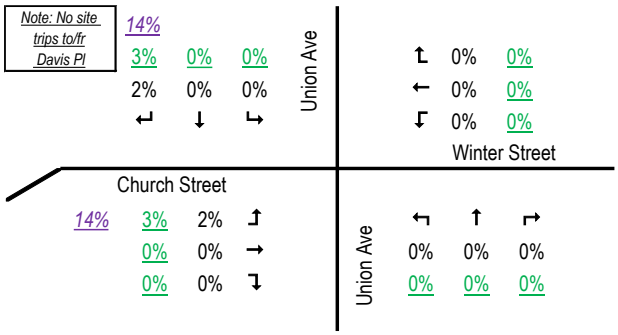


## AM Total Site Trips

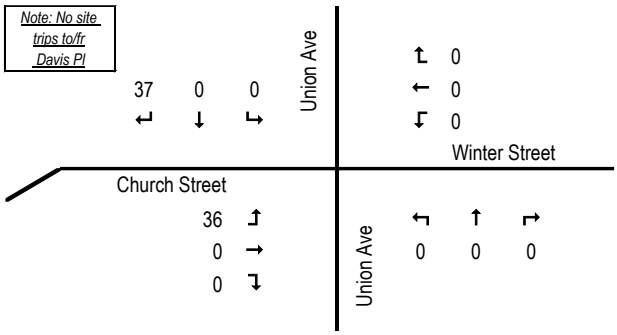



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

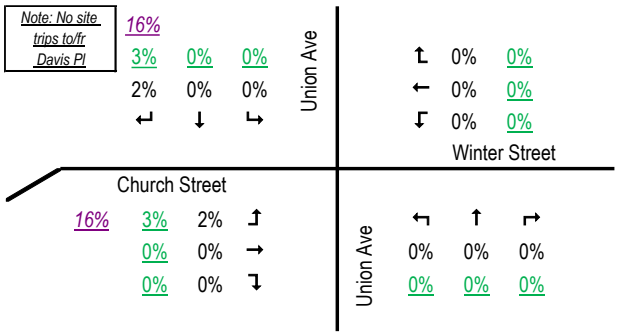



## PM Total Site Trips

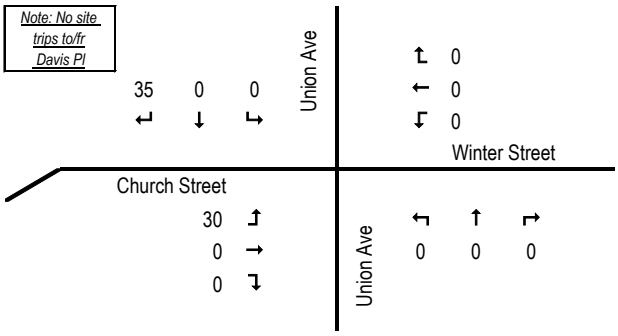



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

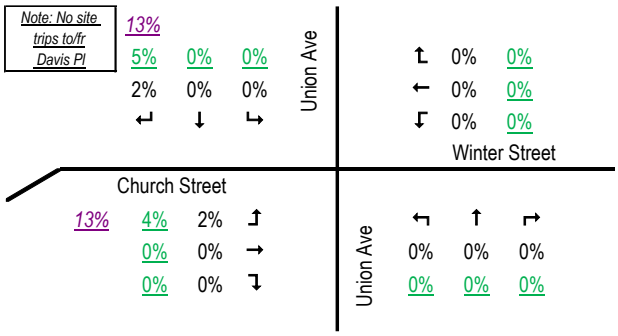



## SAT Total Site Trips

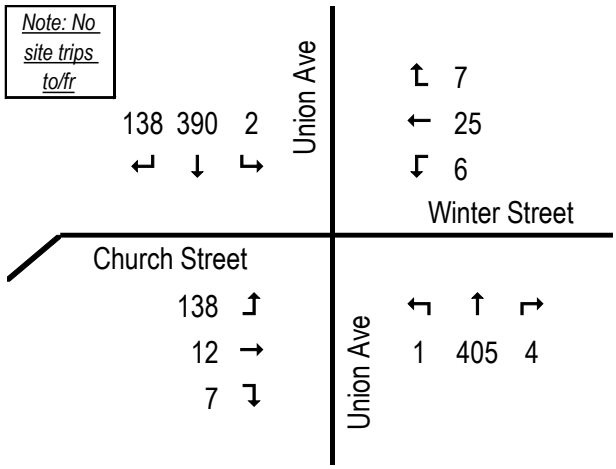



## SAT Site Composition Trips

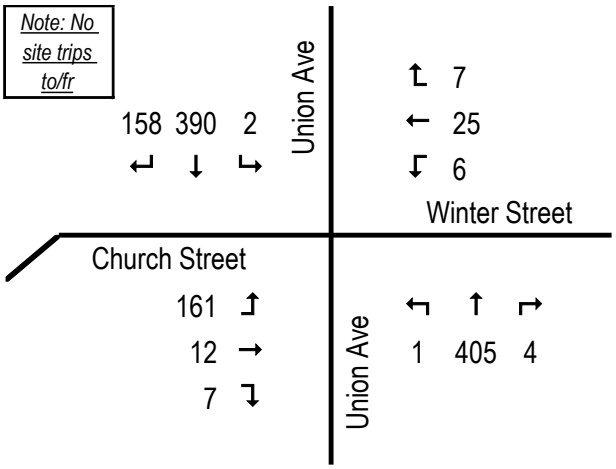
Primary, *Pass-by*, *Diverted Link*, Residential



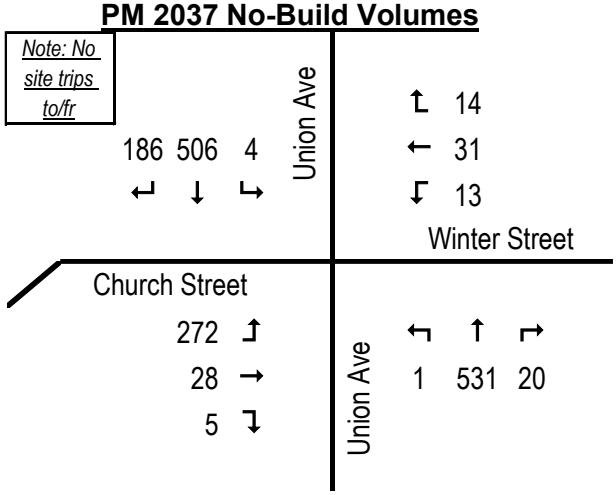
## AM 2037 No-Build Volumes



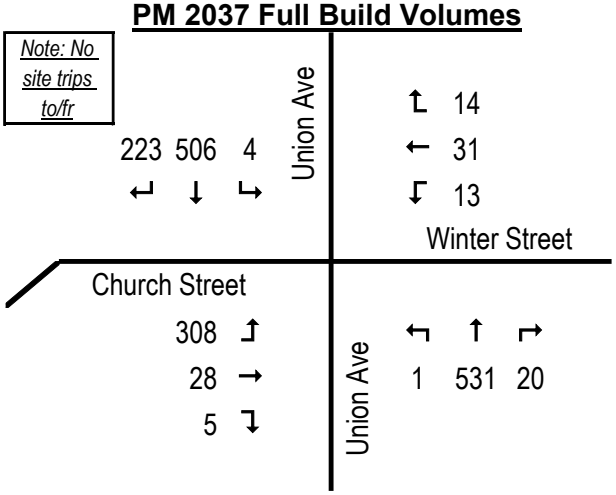

## AM 2037 Full Build Volumes



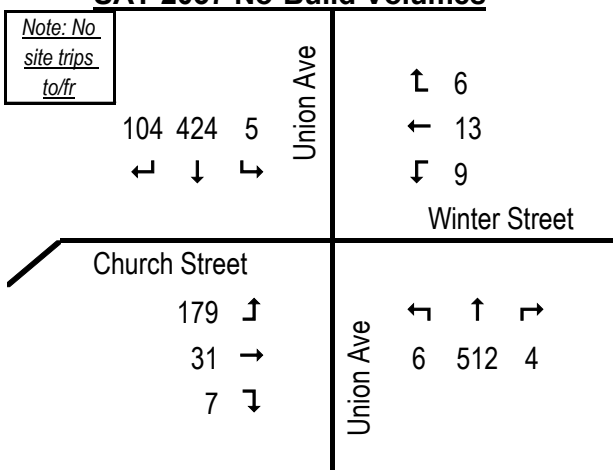

## PM 2037 No-Build Volumes



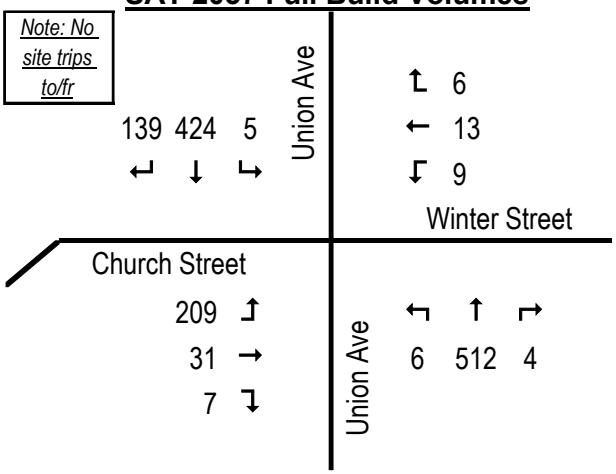

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #21: Union Ave (US3Bus) at Church St / Winter St / Davis Pl** [Signalized[

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Conc Peds | | | | 2037 Build Mitigation: Coord | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.98 | 66.1 | E | --- | 1.14 | 94.0 | F | --- | 1.16 | 82.0 | F | --- | 1.14 | 80.2 | F | --- |
| EB | --- | 286.4 | F | 407 | --- | >300 | F | 468 | --- | 298.4 | F | 391 | --- | >300 | F | 392 |
| WB | --- | 41.6 | D | 71 | --- | 41.1 | D | 71 | --- | 58.9 | E | 69 | --- | 59.8 | E | 69 |
| NB | --- | 31.7 | C | 452 | --- | 33.2 | C | 453 | --- | 45.9 | D | 565 | --- | 51.3 | D | 565 |
| SB | --- | 27.6 | C | 429 | --- | 28.5 | C | 429 | --- | 38.2 | D | 530 | --- | 29.3 | C | 441 |
| SEB | --- | 42.9 | D | 37 | --- | 42.4 | D | 37 | --- | 54.0 | D | 36 | --- | 59.4 | E | 36 |
| ***PM Peak* OVERALL** | 1.38 | 215.4 | F | --- | 1.50 | 262.1 | F | --- | 1.60 | 198.8 | F | --- | 1.55 | 175.5 | F | --- |
| EB | --- | >300 | F | 658 | --- | >300 | F | 737 | --- | >300 | F | 583 | --- | >300 | F | 584 |
| WB | --- | 49.5 | D | 95 | --- | 49.6 | D | 95 | --- | 81.8 | F | 123 | --- | 101.4 | F | 123 |
| NB | --- | 37.2 | D | 720 | --- | 37.2 | D | 720 | --- | 135.1 | F | 839 | --- | 89.9 | F | 810 |
| SB | --- | 28.4 | C | 542 | --- | 28.3 | C | 542 | --- | 48.5 | D | 649 | --- | 31.1 | C | 576 |
| SEB | --- | 50.4 | D | 0 | --- | 50.4 | D | 0 | --- | 50.2 | D | 0 | --- | 55.3 | E | 0 |
| ***SAT Peak* OVERALL** | 0.81 | 53.2 | D | --- | 0.88 | 70.0 | E | --- | 0.89 | 53.2 | D | --- | 0.87 | 49.6 | D | --- |
| EB | --- | 202.1 | F | 444 | --- | 281.7 | F | 510 | --- | 133.1 | F | 447 | --- | 135.4 | F | 447 |
| WB | --- | 45.9 | D | 0 | --- | 45.8 | D | 0 | --- | 48.9 | D | 0 | --- | 55.3 | E | 0 |
| NB | --- | 25.0 | C | 562 | --- | 25.1 | C | 562 | --- | 41.3 | D | 676 | --- | 42.2 | D | 676 |
| SB | --- | 20.6 | C | 434 | --- | 20.4 | C | 434 | --- | 29.6 | C | 502 | --- | 18.8 | B | 494 |
| SEB | --- | 48.4 | D | 12 | --- | 48.4 | D | 12 | --- | 51.4 | D | 13 | --- | 57.8 | E | 13 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service [d] Longest 95th Queue at approach

NB and B runs City Timing: AM – MAX I, PM – MAX II, SAT – MAX I with exclusive pedestrian phase
MIT Peds: optimizes cycle/phases and runs concurrent pedestrians; MIT Coord: Coordinates intersections #18 and #21 with concurrent peds

| *Intersection #21: Union Ave (US3Bus) at Church St / Winter St / Davis Pl* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1154 | 43 | 3.6% |
| PM Peak Hour | 1644 | 73 | 4.3% |
| SAT Peak Hour | 1306 | 65 | 4.7% |

### *Analysis*

Site-related trips account for only a few percent of traffic at this intersection. Limited ROW does not permit additional lanes to be added to this intersection. The current signal phasing runs with exclusive pedestrian phase. Changing to concurrent pedestrian phasing benefits intersection operations.

### *Recommended Mitigation*

- Adjust signal phasing to concurrent pedestrians and left turn phase to lagging left.
- Optimize signal timing.
- Coordinate signal with adjacent intersection: 18. Union Ave at Gilford Ave.
- The City should consider a real-time signal monitoring system to allow timing adjustments as needed.

END OF PART B

# Part C

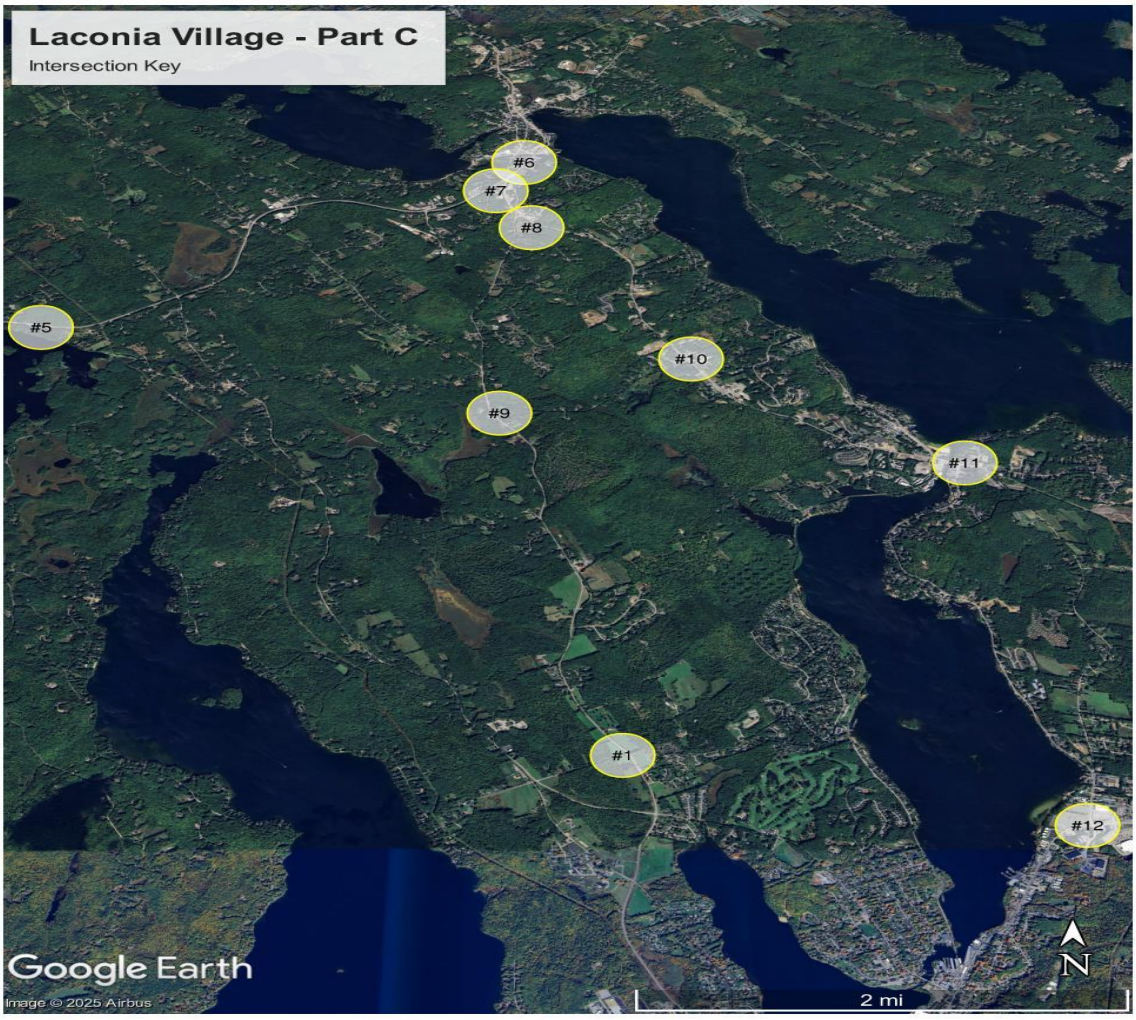
## State Intersection Analysis

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

# Full-Build State Intersection Analysis – Part C

## Introduction

This section focuses on Part C intersections under State control, listed below.




## Part C Study Area

## Intersection Summaries

For each study area intersection, a map, brief description, and 2037 peak hour volume diagrams are provided below, followed by a summary of operational results and discussion of proposed mitigation strategies.

*Methodology*.
Trafficware "Synchro" v11 software (based on HCM 2000) was used to analyze signalized and unsignalized intersections during AM, PM and SAT peak hours. Roundabouts were analyzed using SIDRA INTERSECTION 10.

*Level of Service (LOS)*
The relationship between control delay and LOS is shown in the following table.

| Level of Service (LOS) | A | B | C | D | E | F |
|---|---|---|---|---|---|---|
| Signalized Control Delay (sec) | ≤10.0 | 10.1 to 20.0 | 20.1 to 35.0 | 35.1 to 55.0 | 55.1 to 80.0 | Over 80.0 |
| Unsignalized Control Delay (sec) | ≤10.0 | 10.1 to 15.0 | 15.1 to 25.0 | 25.1 to 35.0 | 35.1 to 50.0 | Over 50.0 |

*Queue Analysis.*
Vehicle queue lengths are reported for each intersection approach's longest length at the 95$^{th}$ percentile in feet.

*Volume to Capacity (v/c) ratios*
The ratios of traffic volume for each approach within an intersection and the theoretical capacity of that approach are reported as a decimal. Also reported is the overall v/c ratio for the intersection.

*Summary Tables*
LOS, delays, queues, and v/c ratios are presented for each intersection overall and for each approach within each intersection in the summary tables in the following section.

# *Intersection #5*
# *NH104 at Meredith Center Rd*

*Existing Conditions*

This is an existing 3-way intersection with side-road stop control under State jurisdiction.

NH104 forms the free EB and WB approaches, Meredith Center Road forms the stop-controlled NB approach.

Each approach carries two-way traffic with the EB approach providing exclusive right turn and thru lanes. NH104 has free flow, and Meredith Center Road is under stop control.

The speed limit is 55 mph on NH104 and 30 mph on Meredith Center Road with a cobra-head light mounted on a pole at the SW corner of the intersection. There are no pedestrian facilities.

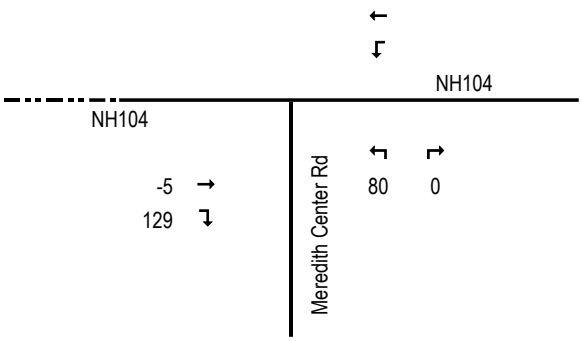
*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Considering the volume passing through this intersection, the crash history is favorable. The crash history is low with less than 2 crashes per year.

**Crash Data Summary**
**Intersection #5: NH104 at Meredith Center Road**

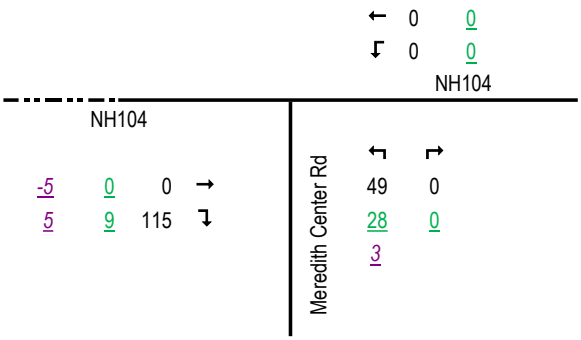
| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 5 |
| Crashes per Year (Avg) | 1.25 |
| **CRASH SEVERITY** | |
| Property Damage Only | 3 |
| Injury | 2 |
| Fatality | 0 |
| **CRASH TYPE** | |
| Fixed Object | 2 |
| Other Motor Vehicle | 3 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 1 |
| Snow/Ice | 1 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 1 |
| Weekday PM (3-6pm) | 1 |
| Non-Commuter Peak | 3 |

## AM Total Site Trips

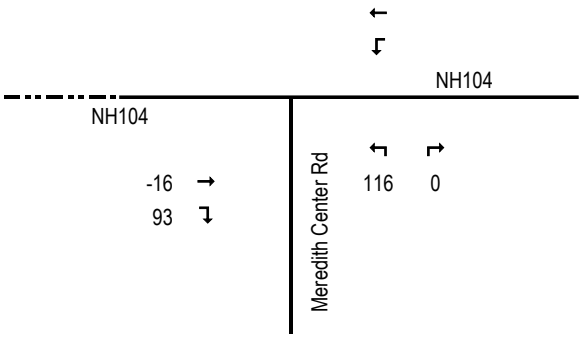



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

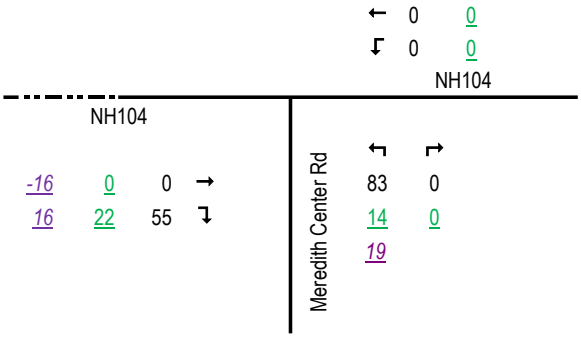



## PM Total Site Trips

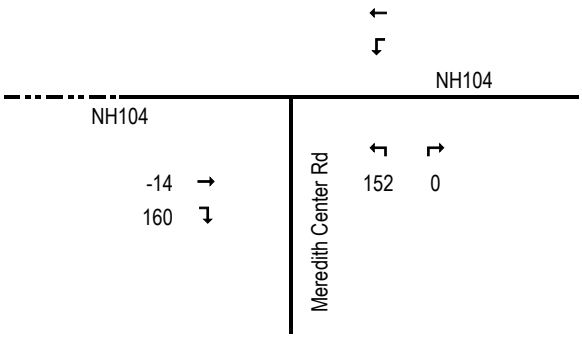



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

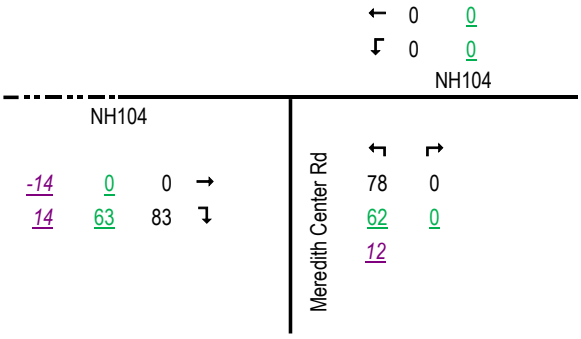



## SAT Total Site Trips

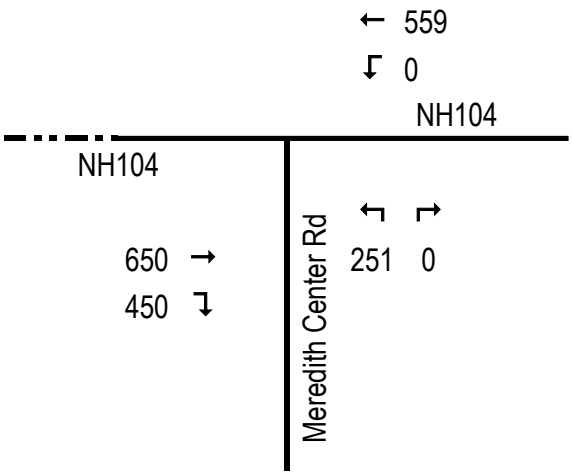



## SAT Site Composition Trips

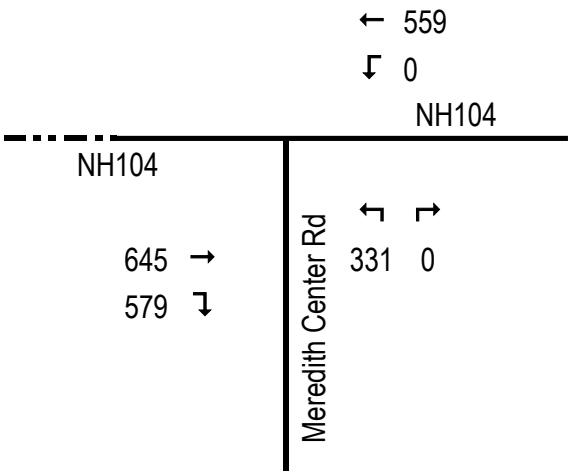
Primary, *Pass-by*, *Diverted Link*, Residential



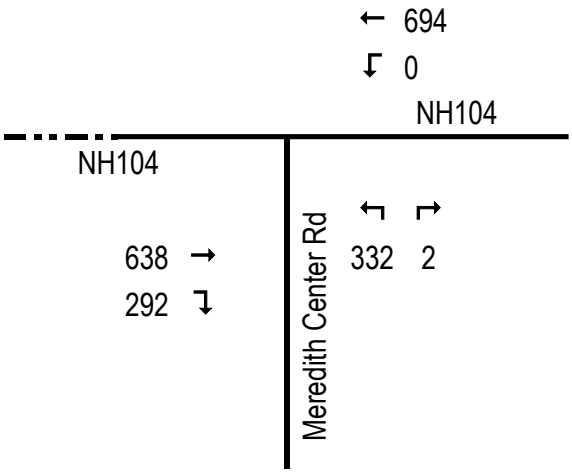
**AM 2037 No-Build Volumes**



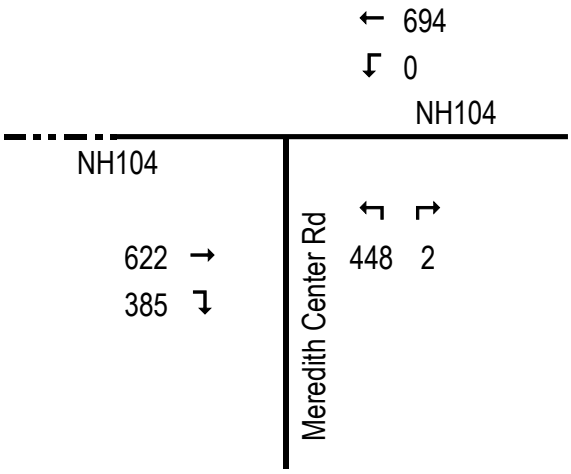

**AM 2037 Full Build Volumes**



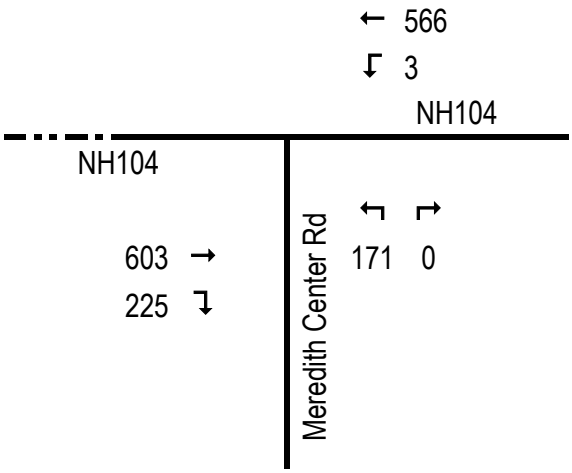

**PM 2037 No-Build Volumes**



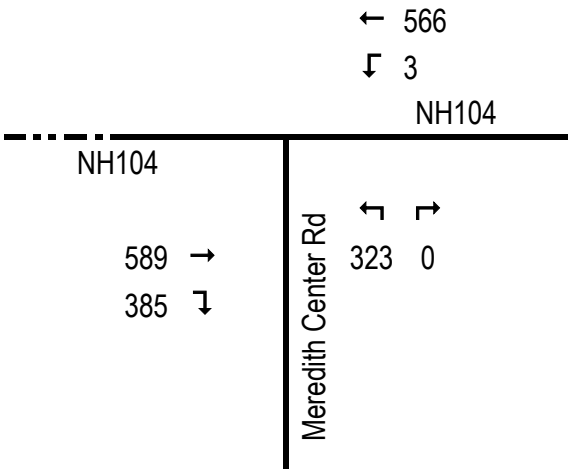

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #5: NH104 at Meredith Center Road** [Unsignalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Signal | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | --- | 51.0 | F | --- | --- | 96.3 | F | --- | 0.72 | 9.9 | A | --- |
| EB | 0.42 | >300 | F | 0 | 0.42 | 0.0 | A | 0 | --- | 7.6 | A | 304 |
| WB | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | --- | 10.6 | B | 237 |
| NB | 1.70 | 0.0 | A | 492 | 2.22 | >300 | F | 748 | --- | 17.4 | B | 193 |
| ***PM Peak* OVERALL** | --- | 129.3 | F | --- | --- | >300 | F | --- | 0.81 | 14.2 | B | --- |
| EB | 0.42 | 0.0 | A | 0 | 0.41 | 0.0 | A | 0 | --- | 8.3 | A | 282 |
| WB | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | --- | 16.8 | B | 409 |
| NB | 2.57 | >300 | A | 792 | 3.39 | >300 | A | >800 | --- | 23.7 | C | 303 |
| ***SAT Peak* OVERALL** | --- | 15.8 | C | --- | --- | 88.32 | F | --- | 0.66 | 9.7 | A | --- |
| EB | 0.39 | 0.0 | A | 0 | 0.38 | 0.0 | A | 0 | --- | 7.1 | A | 255 |
| WB | 0.00 | 0.1 | A | 0 | 0.00 | 0.1 | A | 0 | --- | 11.0 | B | 241 |
| NB | 1.08 | 144.4 | F | 234 | 0.99 | >300 | F | 682 | --- | 15.3 | B | 184 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

MIT Signal: adds a signal to the intersection

| *Intersection #5: NH104 at Meredith Center Road* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1910 | 204 | 9.6% |
| PM Peak Hour | 1958 | 193 | 9.0% |
| SAT Peak Hour | 1568 | 298 | 16.0% |

### *Analysis*

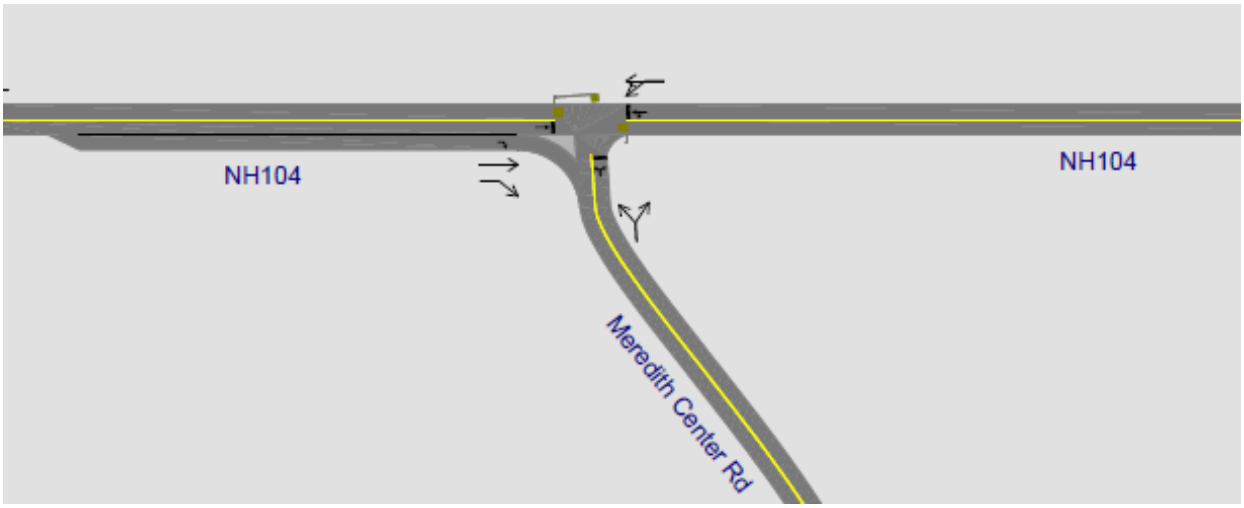
Project site trips at this intersection are headed to/from the west on NH104. The NB approach is in failure under no-build conditions with excessive left turn delays. There are few NB right turns. The existing pavement currently accommodates all pertinent auxiliary lanes.

Signal warrant analysis show the intersection meets peak hour and 4-hour signal warrants for weekday peak hours under no-build conditions. 8-hour counts were not taken here so the 8-hour warrant was not evaluated at this time.

Signalization provides suitable mitigation for this intersection.

### *Recommended Mitigation*

- Install traffic signal within existing pavement limits.


NH104
NH104
Meredith Center Rd

# *Intersection #1*
# *Parade Rd (NH106) at Lane Rd / Severance Rd*

*Existing Conditions*

This is an existing 4-way intersection with side-road stop control under State jurisdiction.

Parade Road (NH106) forms the free NB and SB approaches, Lane Road forms the EB approach and Severance Road (dead end) forms the WB approach.

Each approach accommodates two way traffic with a single lane.

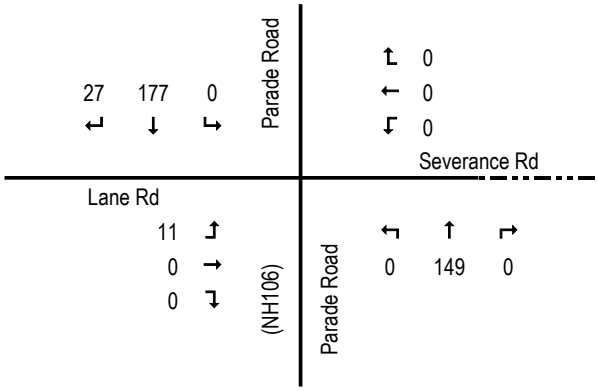
The speed limit is 40 mph on Parade Road, 35 mph on Lane Road and the city speed limit is 30 mph. There are no streetlights or pedestrian facilities at the intersection.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

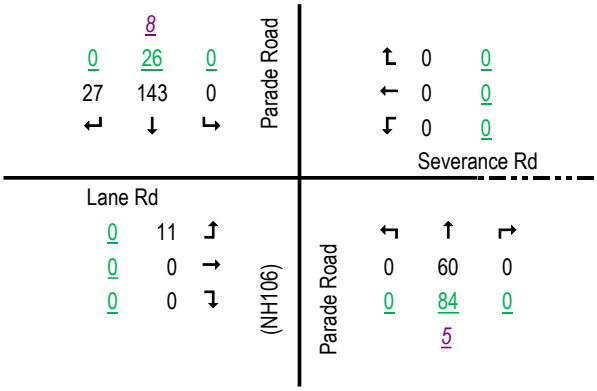
*No data available for this intersection.*

## AM Total Site Trips

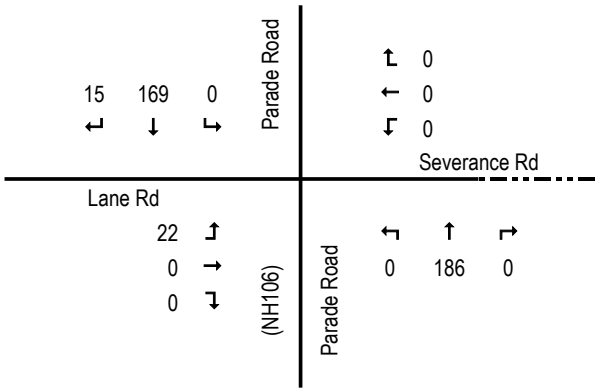



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

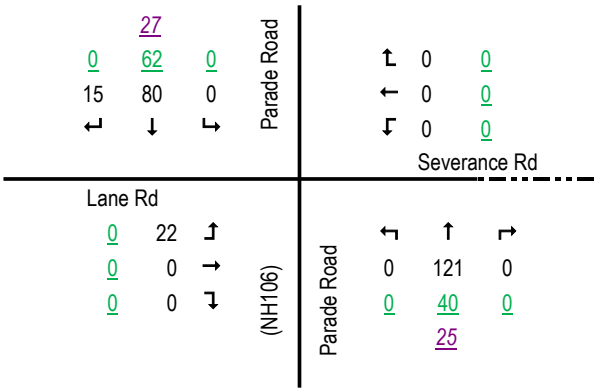



## PM Total Site Trips

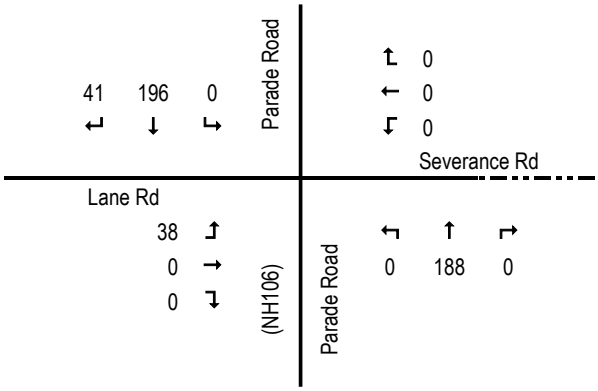



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

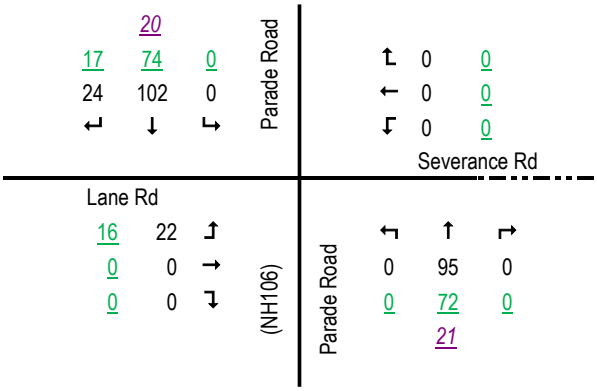



## SAT Total Site Trips

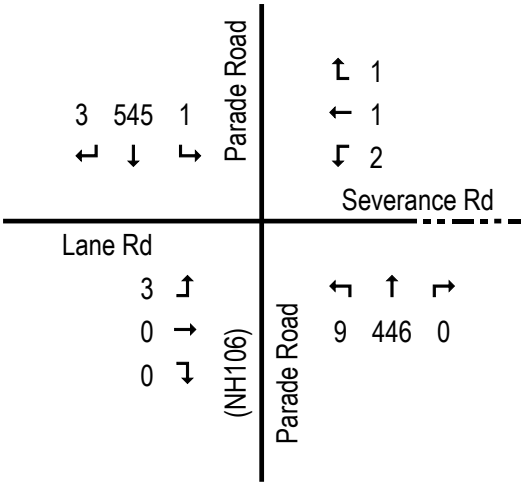



## SAT Site Composition Trips

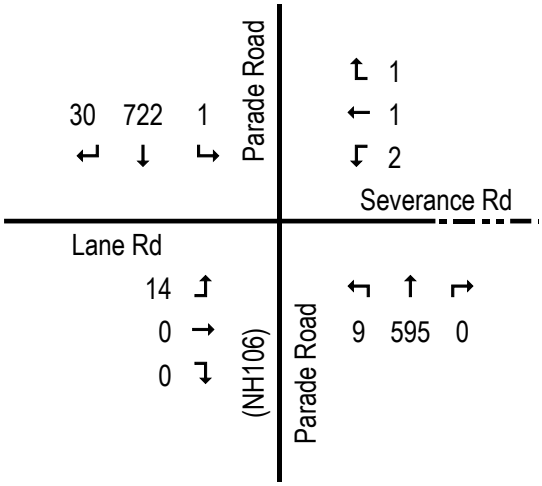
Primary, *Pass-by*, *Diverted Link*, Residential



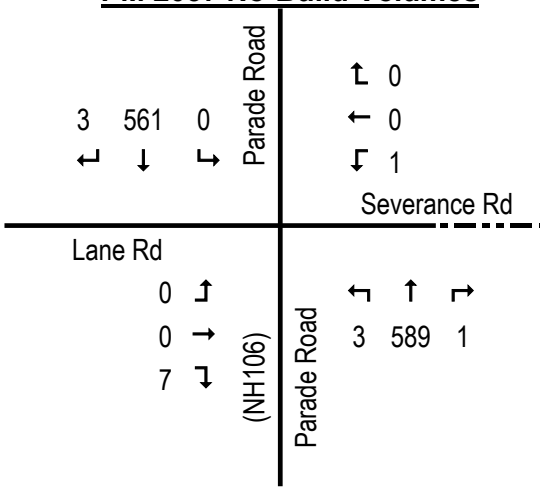
**AM 2037 No-Build Volumes**



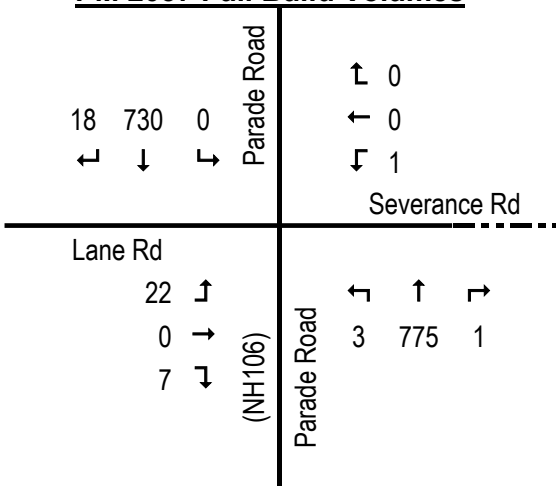

**AM 2037 Full Build Volumes**



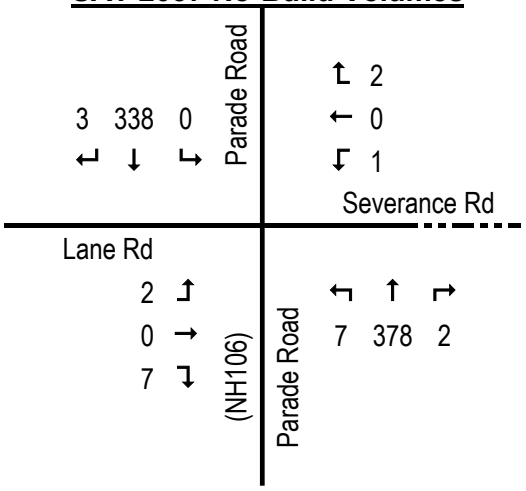

**PM 2037 No-Build Volumes**



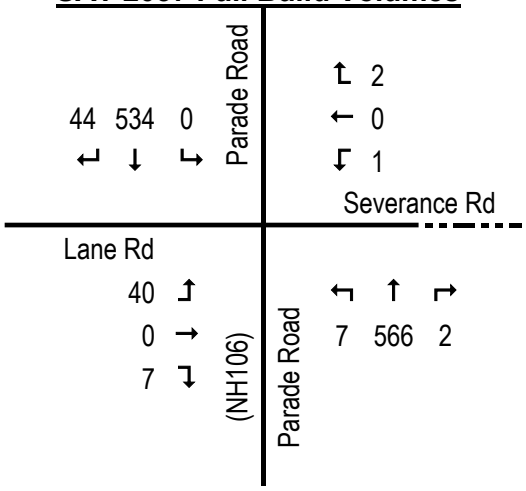

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #1: Parade Rd (NH106) at Lane Rd / Severance Rd** [Unsignalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | --- | 0.3 | A | --- | --- | 0.8 | A | --- | NA | | | |
| EB | 0.02 | 25.4 | D | 1 | 0.06 | 48.8 | E | 14 | | | | |
| WB | 0.02 | 21.3 | C | 1 | 0.03 | 33.7 | D | 2 | NA | | | |
| NB | 0.01 | 0.3 | A | 1 | 0.01 | 0.3 | A | 1 | | | | |
| SB | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | | | | |
| ***PM Peak* OVERALL** | --- | 0.1 | A | --- | --- | 1.2 | A | --- | | | | |
| EB | 0.02 | 12.4 | B | 1 | 0.34 | 60.9 | F | 33 | | | | |
| WB | 0.01 | 30.9 | D | 1 | 0.01 | 54.6 | F | 1 | NA | | | |
| NB | 0.00 | 0.1 | A | 0 | 0.00 | 0.1 | A | 0 | | | | |
| SB | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | | | | |
| ***SAT Peak* OVERALL** | --- | 0.3 | A | --- | --- | 1.6 | A | --- | | | | |
| EB | 0.02 | 11.9 | B | 1 | 0.31 | 36.4 | E | 32 | | | | |
| WB | 0.01 | 12.9 | B | 0 | 0.01 | 18.3 | C | 1 | NA | | | |
| NB | 0.01 | 0.2 | A | 1 | 0.01 | 0.2 | A | 1 | | | | |
| SB | 0.00 | 0.0 | A | 0 | 0.00 | 0.0 | A | 0 | | | | |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

| *Intersection #1: Parade Rd (NH106) at Lane Rd / Severance Rd* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1011 | 364 | 26.5% |
| PM Peak Hour | 1165 | 392 | 25.2 |
| SAT Peak Hour | 740 | 463 | 63% |

### *Analysis*

Project site trips are mainly through trips on Parade Road, with few turns to/from Lane Road. Although the percentage volume increase is substantial, Parade Road traffic is not affected. Minor road volumes make up just 1% to 2% of total intersection volume in weekday peak hours, with few added trips and queues of one car or less on Lane Road.

The low volumes on the minor roadways does not logically warrant additional lanes to mitigate added delay.

### *Recommended Mitigation*

- No mitigation required.

# *Intersection #9*

# *Parade Rd (NH106) at Roller Coaster Rd*

*Existing Conditions*

This is an existing 3-way intersection with stop control on Roller Coaster Road, under State jurisdiction.

Parade Road (NH106) forms the free NB and SB approaches, Roller Coaster Road forms the WB approach under stop control. Each single-lane approach carries two-way traffic.

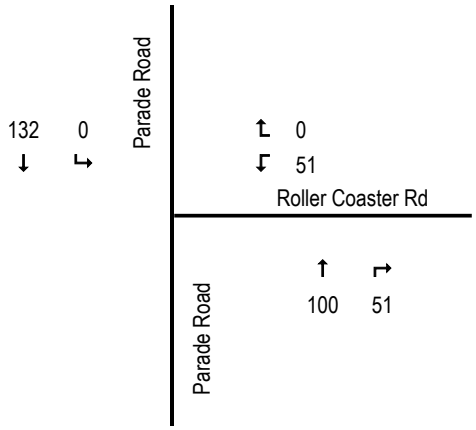
The speed limit is 50 mph on NH106 and 30 mph on Roller Coaster Road. There is a cobra-head light mounted on a utility pole directly across from Roller Coaster Road. There are no pedestrian facilities.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

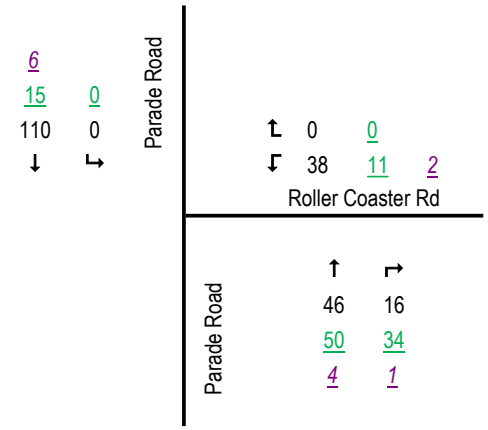
*No data available for this intersection.*

## AM Total Site Trips

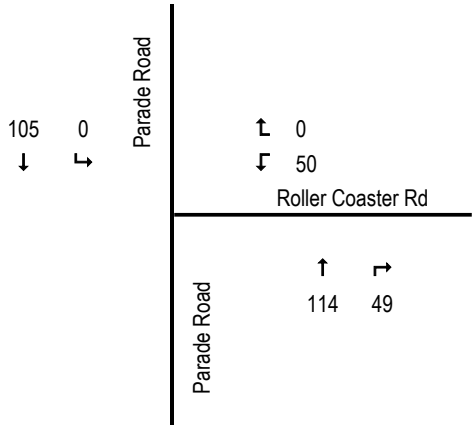



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

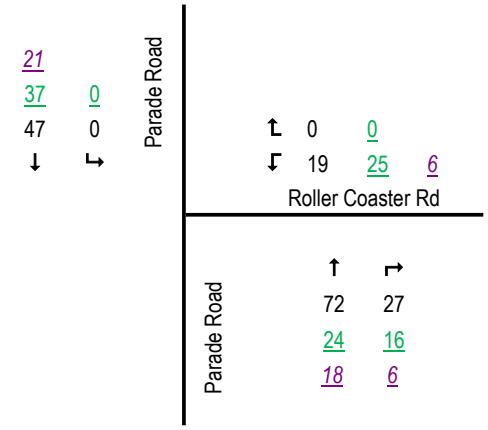



## PM Total Site Trips

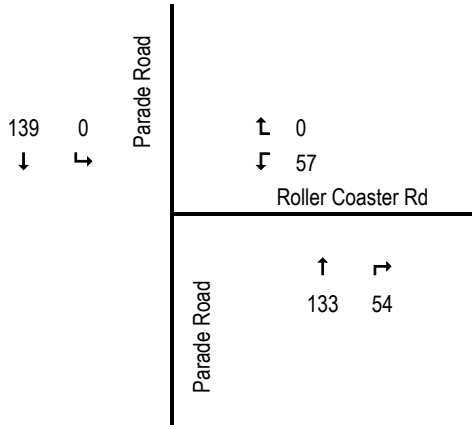



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

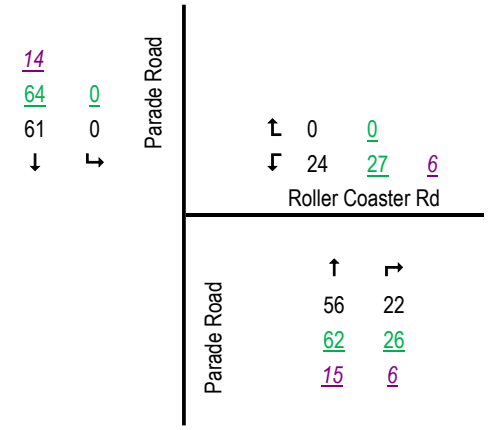



## SAT Total Site Trips

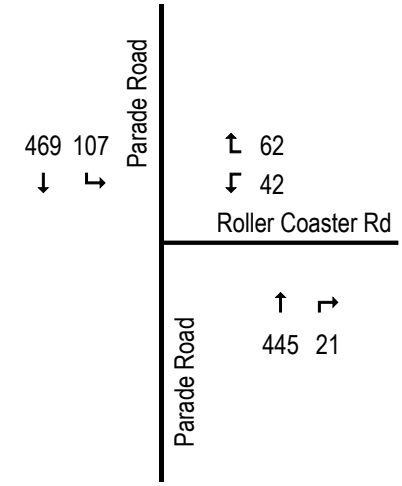



## SAT Site Composition Trips

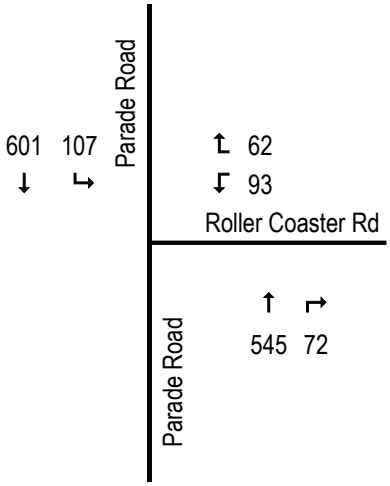
Primary, *Pass-by*, *Diverted Link*, Residential



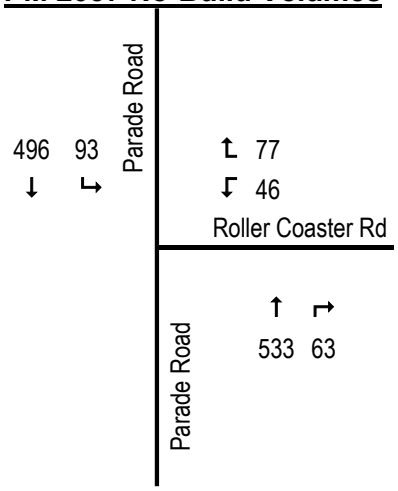
**AM 2037 No-Build Volumes**



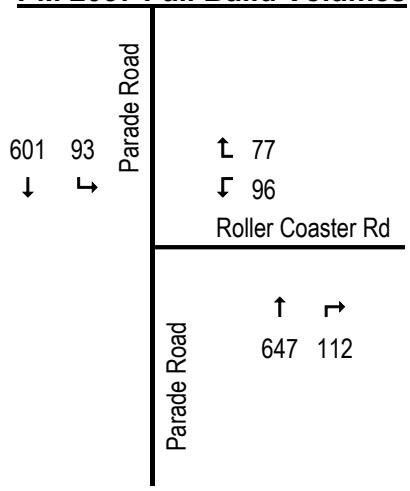

**AM 2037 Full Build Volumes**



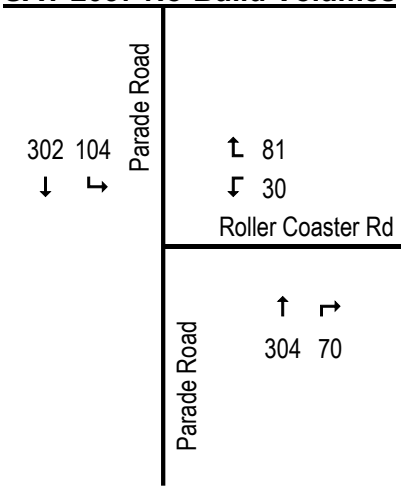

**PM 2037 No-Build Volumes**



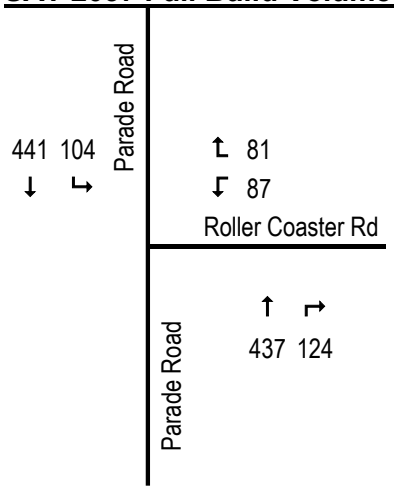

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #9: Parade Rd (NH106) at Roller Coaster Rd** [Unsignalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Lane | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | --- | 3.7 | A | --- | --- | 16.4 | B | --- | --- | 10.5 | B | --- |
| WB | 0.39 | 25.5 | D | 44 | 1.06 | 147.0 | F | 211 | 0.87 | 88.9 | F | 161 |
| NB | 0.30 | 0.0 | A | 0 | 0.40 | 0.0 | A | 0 | 0.36 | 0.0 | A | 0 |
| SB | 0.11 | 2.8 | A | 10 | 0.13 | 3.2 | A | 11 | 0.39 | 3.2 | A | 11 |
| ***PM Peak* OVERALL** | --- | 4.3 | A | --- | --- | 25.9 | C | --- | --- | 13.6 | B | --- |
| WB | 0.52 | 32.4 | D | 69 | 1.28 | 224.7 | F | 288 | 0.98 | 112.1 | F | 208 |
| NB | 0.37 | 0.0 | A | 0 | 0.47 | 0.0 | A | 0 | 0.40 | 0.0 | A | 0 |
| SB | 0.11 | 2.7 | A | 9 | 0.12 | 3.1 | A | 11 | 0.39 | 3.1 | A | 11 |
| ***SAT Peak* OVERALL** | --- | 3.2 | A | --- | --- | 7.9 | A | --- | --- | 5.6 | A | --- |
| WB | 0.25 | 15.0 | C | 24 | 0.73 | 51.1 | F | 127 | 0.52 | 33.5 | D | 71 |
| NB | 0.24 | 0.0 | A | 0 | 0.36 | 0.0 | A | 0 | 0.28 | 0.0 | A | 0 |
| SB | 0.10 | 3.0 | A | 8 | 0.12 | 3.0 | A | 10 | 0.29 | 3.0 | A | 10 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

MIT Lane: adds a 250' WB Right-Turn Lane

| *Intersection #9: Parade Rd (NH106) at Roller Coaster Rd* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1146 | 334 | 22.6% |
| PM Peak Hour | 1308 | 318 | 19.6% |
| SAT Peak Hour | 891 | 383 | 30.1% |

### *Analysis*

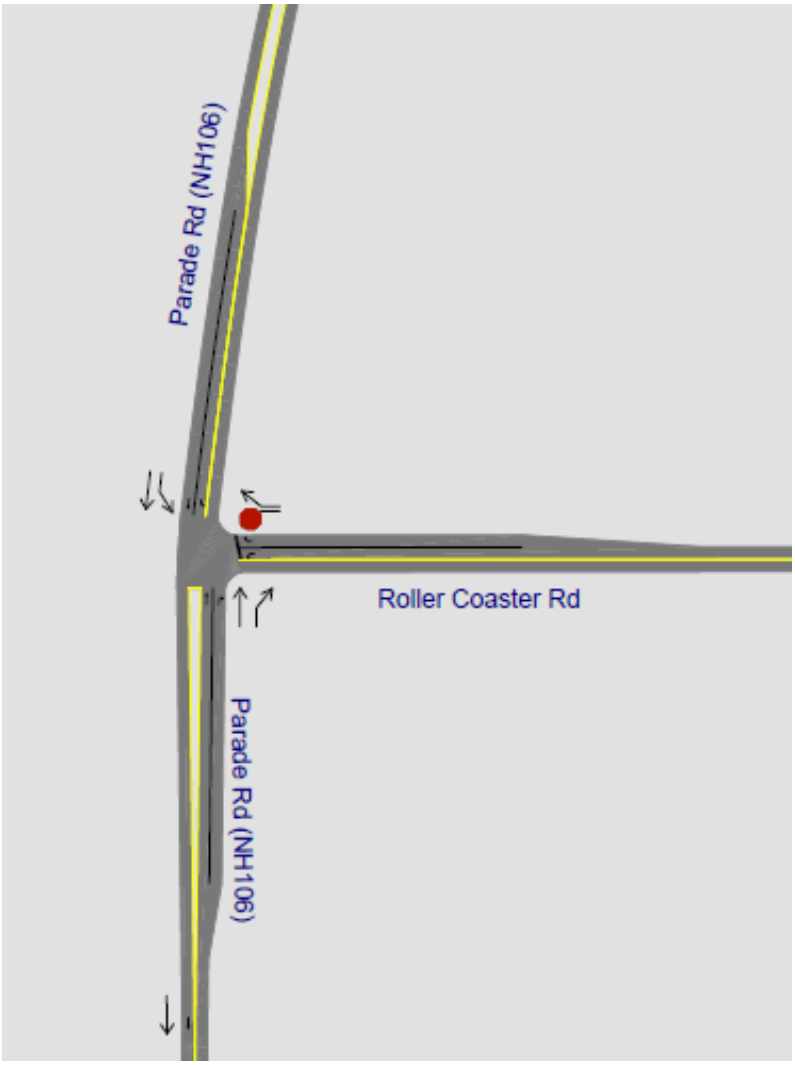
Project site trips are approximately 75% through trips on Parade Road, and 25% turns to/from the east on Roller Coaster Road. In Build conditions, the WB approach delays increase due to traffic volumes on Parade Road. By adding a right turn lane, it reduces delays by allowing right turns to slip out and not be obstructed by waiting left turns. It does not match no-build left turn delay but greatly improves overall WB approach delay.

The intersection meets lane warrants under existing conditions for the NB right-turn lane and SB left-turn lane. In build conditions, the WB approach meets the warrant to recommend a second lane on the minor road.

The intersection does not meet signal warrants under full-build conditions.

### *Recommended Mitigation*

- Construct WB right-turn lane
- Construct NB right-turn lane
- Construct SB left-turn lane


Parade Rd (NH106)
Roller Coaster Rd
Parade Rd (NH106)

# *Intersection #8*

# *US3 at Parade Rd (NH106) / Upper Mile Pt Drive*

*Existing Conditions*

This is an existing 4-leg roundabout under State jurisdiction.

US3 (DW Highway) forms the NB and SB approaches, with Parade Road (NH106) forming the EB approach and Upper Mile Drive (Private dead-end) forming the WB approach.

All approaches accommodate two-way traffic with a single lane entering the one-lane roundabout.

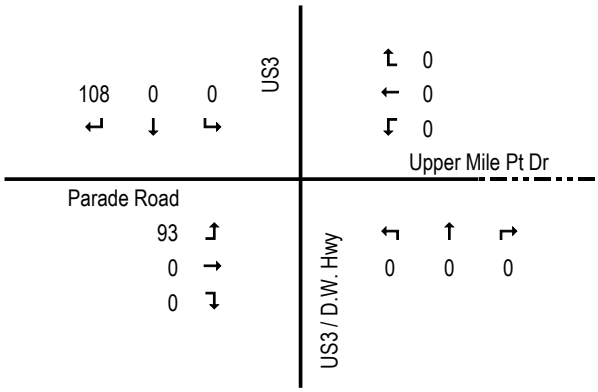
The speed limit on US3 is 35 mph north of the roundabout, 40 mph to the south, and Parade Rd is 40 mph. There are cobra-head streetlights at the NE and SW quadrants of the roundabout as well as the approaches for the NB and SB legs. There are pedestrian crossings through the splitter islands at each approach.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

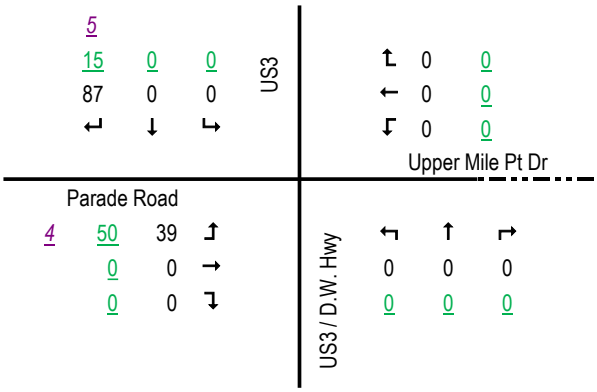
*No data available for this intersection.*

## AM Total Site Trips

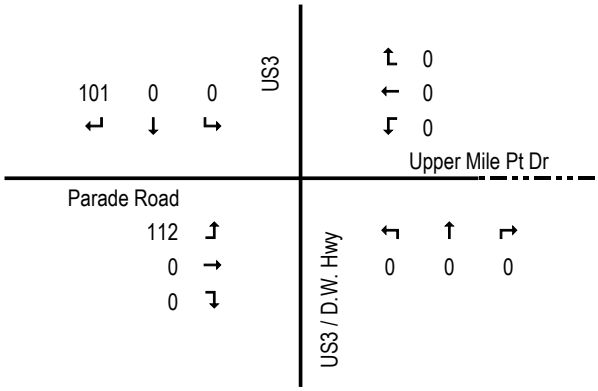



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

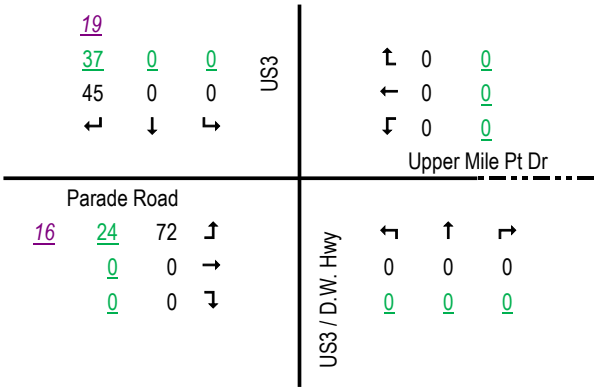



## PM Total Site Trips

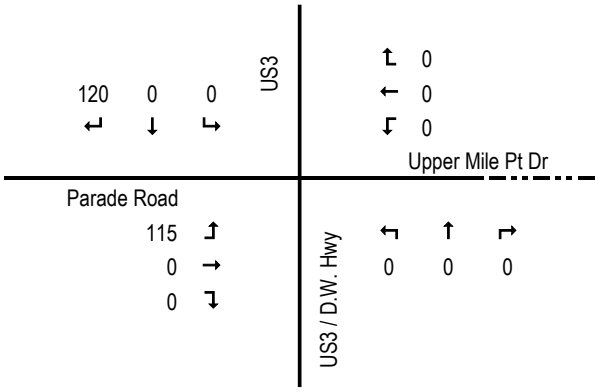



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

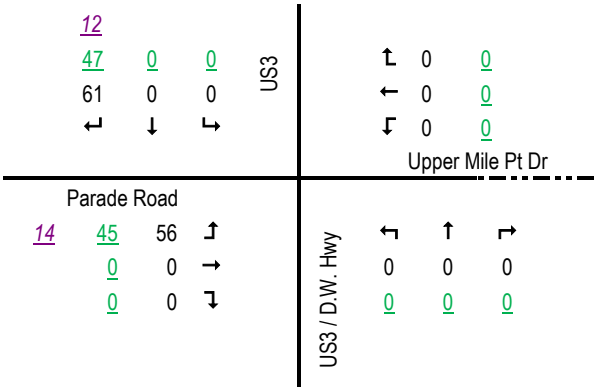



## SAT Total Site Trips

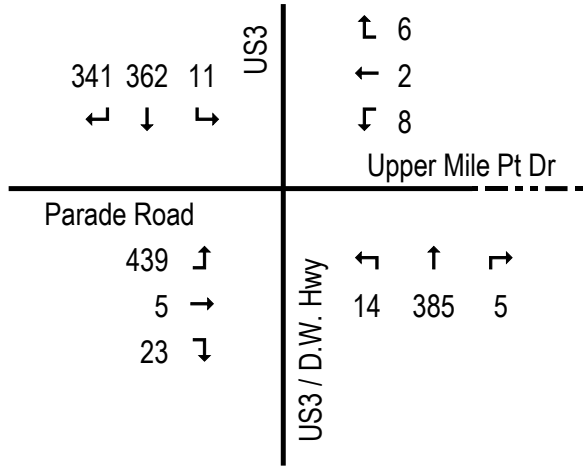



## SAT Site Composition Trips

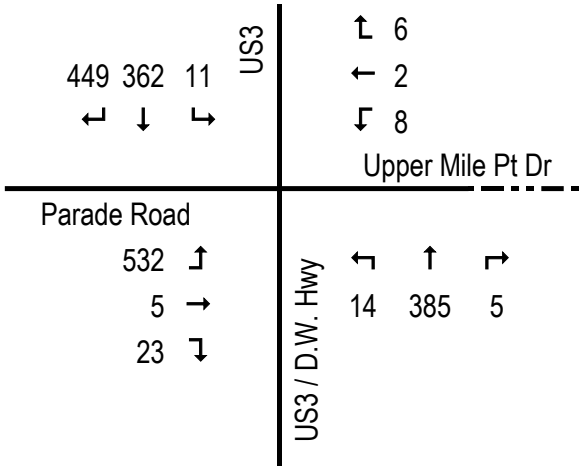
Primary, *Pass-by*, *Diverted Link*, Residential



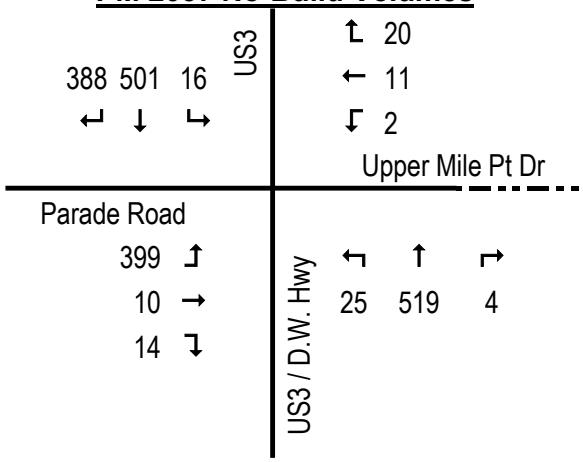
**AM 2037 No-Build Volumes**



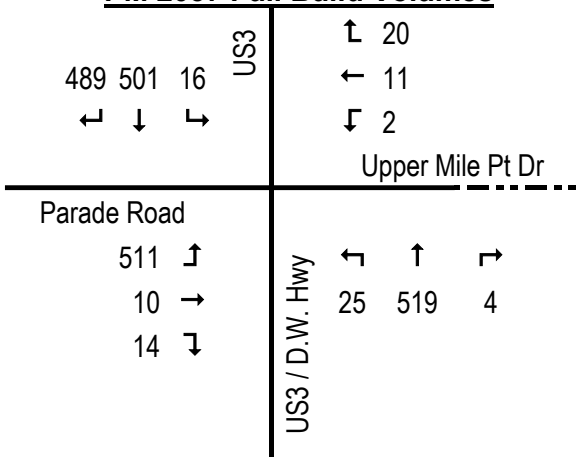

**AM 2037 Full Build Volumes**



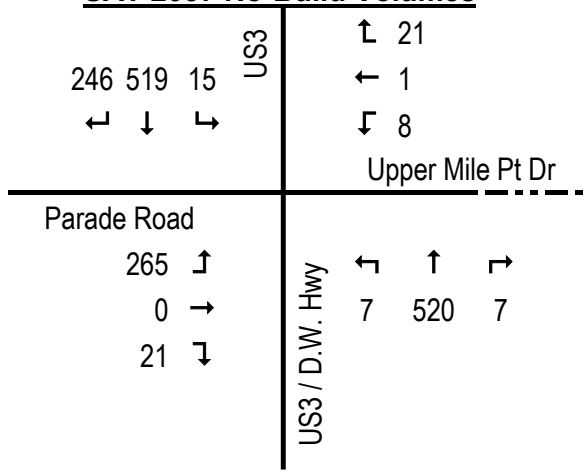

**PM 2037 No-Build Volumes**



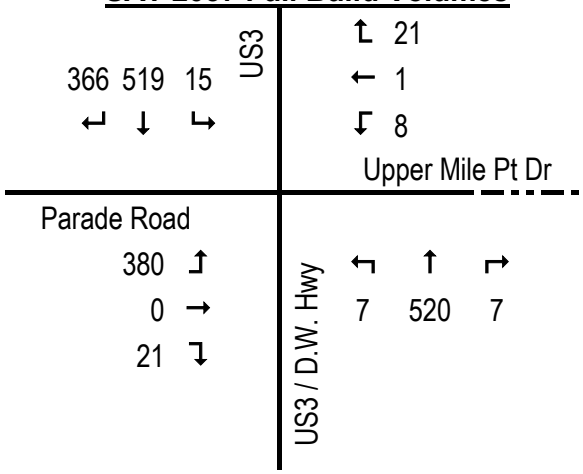

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #8: US3 at Parade Rd (NH106) / Upper Mile PT Dr** [Roundabout]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.77 | 16.4 | C | --- | 0.90 | 25.1 | D | --- | | | | |
| EB | 0.75 | 19.3 | C | 278 | 0.90 | 32.4 | D | 557 | | | | |
| WB | 0.06 | 9.6 | A | 5 | 0.07 | 11.1 | B | 6 | | No | | |
| NB | 0.77 | 24.8 | C | 210 | 0.89 | 40.9 | E | 281 | | MIT | | |
| SB | 0.60 | 8.7 | A | 150 | 0.69 | 10.3 | B | 219 | | | | |
| ***PM Peak* OVERALL** | 0.77 | 14.4 | B | --- | 0.85 | 21.1 | C | --- | | | | |
| EB | 0.63 | 15.6 | C | 142 | 0.80 | 24.4 | C | 271 | | | | |
| WB | 0.10 | 9.1 | A | 9 | 0.11 | 10.6 | B | 10 | | No | | |
| NB | 0.70 | 17.0 | C | 206 | 0.80 | 24.9 | C | 254 | | MIT | | |
| SB | 0.77 | 12.6 | B | 297 | 0.85 | 15.6 | C | 472 | | | | |
| ***SAT Peak* OVERALL** | 0.65 | 10.5 | B | --- | 0.75 | 13.8 | B | --- | | | | |
| EB | 0.45 | 11.3 | B | 68 | 0.63 | 16.3 | C | 138 | | | | |
| WB | 0.08 | 8.0 | A | 7 | 0.09 | 9.3 | A | 8 | | No | | |
| NB | 0.65 | 13.0 | B | 191 | 0.74 | 18.4 | C | 247 | | MIT | | |
| SB | 0.65 | 8.6 | A | 189 | 0.75 | 10.1 | B | 301 | | | | |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

| *Intersection #8: US3 at Parade Rd (NH106) / Upper Mile Rd* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1601 | 201 | 11.2% |
| PM Peak Hour | 1901 | 213 | 10.1% |
| SAT Peak Hour | 1630 | 235 | 12.6% |

### *Analysis*

The roundabout processes approximately 10% to 12% added site trips entering the EB and SB legs. The EB leg experiences 10-15 seconds of additional delay due to project-related volumes. All movements continue to operate within capacity under full-build conditions.

### *Recommended Mitigation*

- None

# *Intersection #6 & #7:*
# *NH104 at US3*

*Existing Conditions*

This is an existing, offset pair of signalized intersection under State jurisdiction. The two signals function as one intersection with a single controller.

US3 forms the NB and SB approaches, with access from NH104 via the one-way EB approach with left and right lanes from NH104 at the southern intersection, and a WB receiving lane for traffic heading south on NH104 at the northern signal. There are two SB thru lanes and one NB thru lane with a NB left lane on US3 at the northern signal.

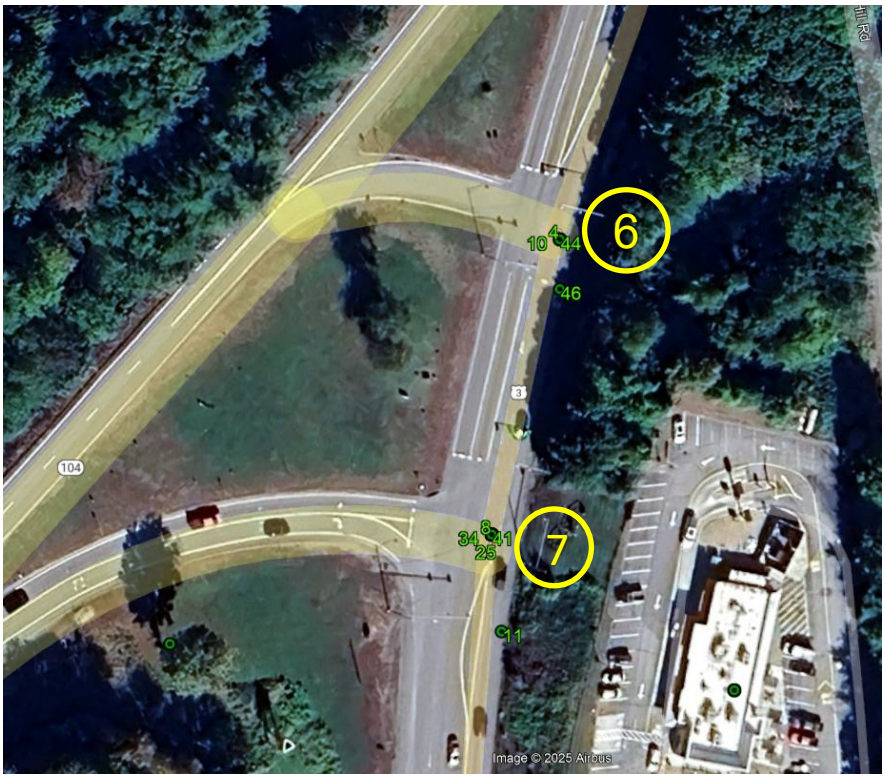
The speed limit on US3 and NH104 is 35 mph at the intersection. There are cobra-head streetlights at the SE corner of both intersections. There are no pedestrian facilities.

*Accident Evaluation*

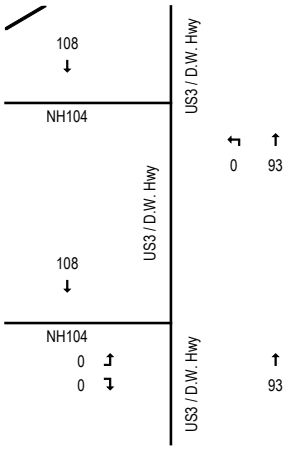
Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below. Considering the volume passing through this intersection, the crash history is low at 3 crashes per year.

**Crash Data Summary**
**Intersection #6 & #7: NH104 at US3**

| | |
|---|---|
| **CRASH FREQUENCY** | |
| Total Crashes | 12 |
| Crashes per Year (Avg) | 3 |
| **CRASH SEVERITY** | |
| Property Damage Only | 9 |
| Injury | 3 |
| Fatality | 0 |
| **CRASH TYPE** | |
| Fixed Object | 1 |
| Other Motor Vehicle | 11 |
| Animal | 0 |
| **WEATHER** | |
| Sun Glare | 0 |
| Rain/Wet | 2 |
| Snow/Ice | 2 |
| **WEEKDAY COMMUTER PEAK** | |
| Weekday AM (6-9am) | 1 |
| Weekday PM (3-6pm) | 1 |
| Non-Commuter Peak | 10 |

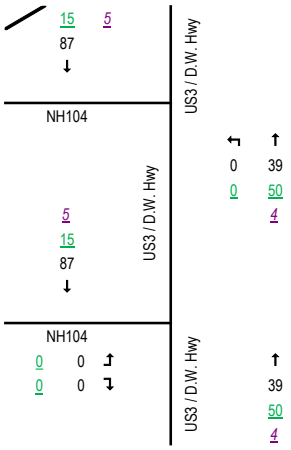


## AM Total Site Trips

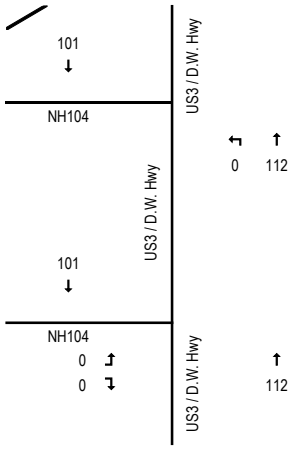



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

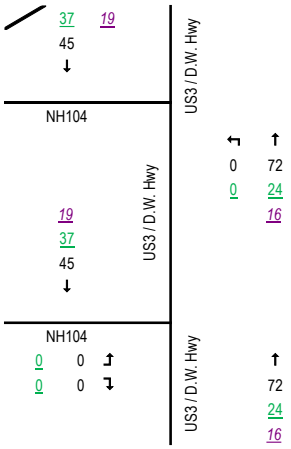



## PM Total Site Trips

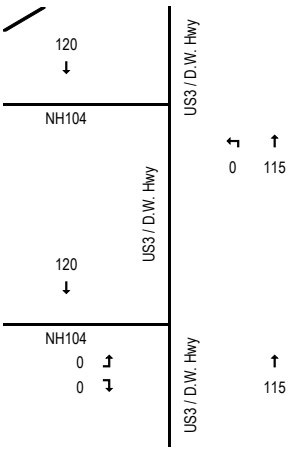



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

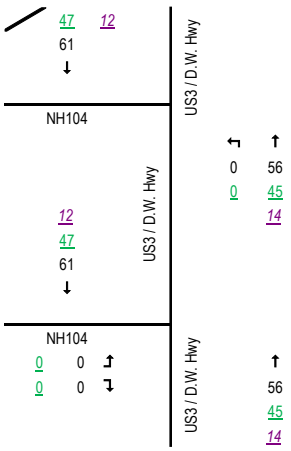



## SAT Total Site Trips

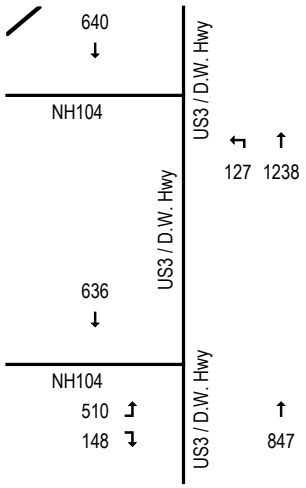



## SAT Site Composition Trips

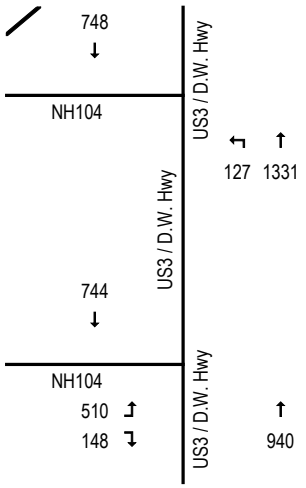
Primary, *Pass-by*, *Diverted Link*, Residential



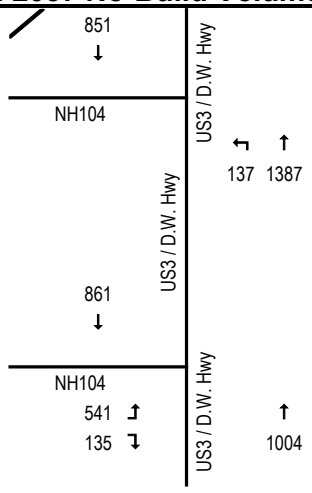
## AM 2037 No-Build Volumes



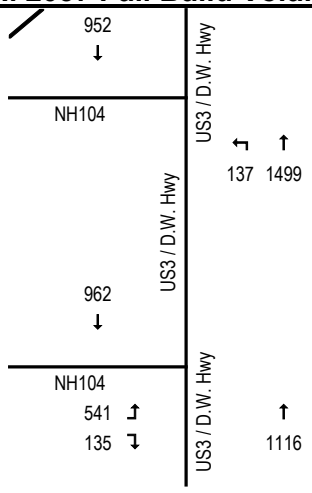

## AM 2037 Full Build Volumes



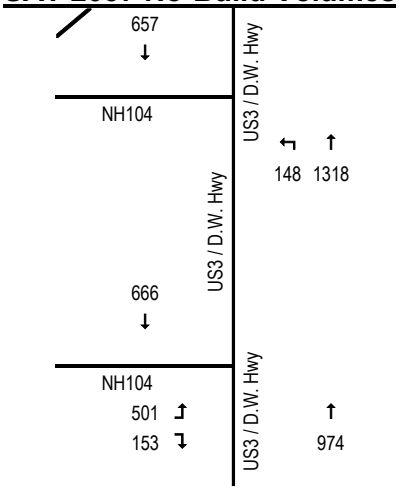

## PM 2037 No-Build Volumes



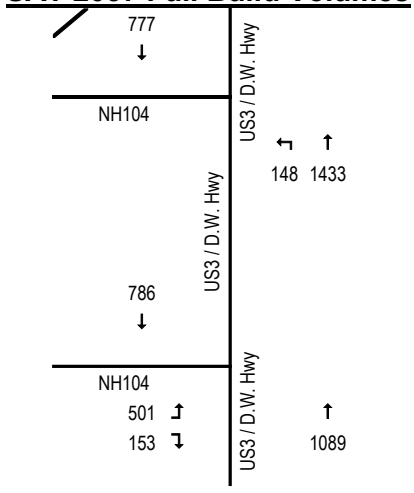

## PM 2037 Full Build Volumes




## SAT 2037 No-Build Volumes




## SAT 2037 Full Build Volumes



*Summary of Operating Conditions*

**Intersection #6 & #7: NH104 at US3** [Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Timing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak*** **6** | 0.84 | 1.1 | A | --- | 0.91 | 1.4 | A | --- | 0.89 | 1.4 | A | --- |
| **OVERALL 7** | 1.04 | 65.6 | E | --- | 1.11 | 88.2 | F | --- | 0.98 | 36.2 | D | --- |
| 6 NB | --- | 0.3 | A | 0 | --- | 0.4 | A | 0 | --- | 0.9 | A | 6 |
| SB | --- | 3.0 | A | 67 | --- | 3.3 | A | 84 | --- | 2.5 | A | 62 |
| 7 EB | --- | 29.3 | C | 435 | --- | 29.4 | C | 435 | --- | 58.1 | E | 560 |
| NB | --- | 125.9 | F | 838 | --- | 181.9 | F | 956 | --- | 42.0 | D | 885 |
| SB | --- | 22.9 | C | 217 | --- | 22.0 | C | 243 | --- | 9.4 | A | 104 |
| ***PM Peak*** **6** | 0.89 | 1.7 | A | --- | 0.97 | 2.2 | A | --- | 0.96 | 1.2 | A | --- |
| **OVERALL, 7** | 1.10 | 115.8 | F | --- | 1.18 | 147.9 | F | --- | 1.05 | 53.2 | D | --- |
| 6 NB | --- | 0.6 | A | 256 | --- | 1.1 | A | 234 | --- | 0.6 | A | 0 |
| SB | --- | 3.8 | A | 130 | --- | 4.1 | A | 150 | --- | 2.2 | A | 77 |
| 7 EB | --- | 25.8 | C | 368 | --- | 25.8 | C | 368 | --- | 66.7 | E | 683 |
| NB | --- | 248.8 | F | 1394 | --- | >300 | F | 1574 | --- | 77.4 | E | 1314 |
| SB | --- | 28.2 | C | 397 | -- | 28.1 | C | 484 | --- | 15.0 | B | 296 |
| ***SAT Peak*** **6** | 0.81 | 1.2 | A | --- | 0.88 | 1.4 | A | --- | 0.87 | 1.9 | A | --- |
| **OVERALL 7** | 1.02 | 64.8 | E | --- | 1.10 | 90.1 | F | --- | 0.97 | 34.4 | C | --- |
| 6 NB | --- | 0.2 | A | 0 | --- | 0.3 | A | 1 | --- | 0.8 | A | 0 |
| SB | --- | 3.1 | A | 72 | --- | 3.4 | A | 92 | --- | 3.3 | A | 72 |
| 7 EB | --- | 26.0 | C | 347 | --- | 26.1 | C | 347 | --- | 45.8 | D | 513 |
| NB | --- | 124.6 | F | 891 | --- | 185.1 | F | 1024 | --- | 46.7 | D | 948 |
| SB | --- | 21.4 | C | 227 | --- | 21.0 | C | 260 | --- | 9.5 | A | 122 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

NB and B runs State Timing: AM – MAX I, PM – MAX II, SAT – MAX I
MIT Timing: adjusts phase timings

| *Intersection #7: NH104 at US3* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 2141 | 201 | 8.6% |
| PM Peak Hour | 2541 | 213 | 8.4% |
| SAT Peak Hour | 2294 | 235 | 9.3% |

### *Analysis*

Project site trips through this intersection are north-south along US3 (DW Highway) to/from Meredith. In no-build conditions, the NB movement at the southern (#7) signal is over-capacity and experiencing heavy delays. By adjusting the timing between the intersections, the delays can be improved to nearly match no-build conditions.

### *Recommended Mitigation*

- Signal Timing Adjustments

# *Intersection #10:*
# *US3 at Roller Coaster Rd / Watson Rd*

*Existing Conditions*

This is an existing 4-way signalized intersection under State jurisdiction.

US3 (D.W. Highway) forms the NB and SB approaches, Roller Coaster Road forms the EB approach, and Watson Road forms the WB approach.

All approaches accommodate two-way traffic. Each approach provides a single lane.

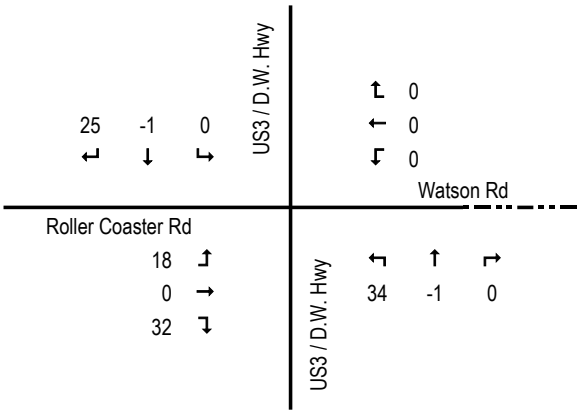
The speed limit is posted 40 mph on US3 and 30 mph on Watson Road and Roller Coaster Road. There are no streetlights at the intersection and no pedestrian crosswalks.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

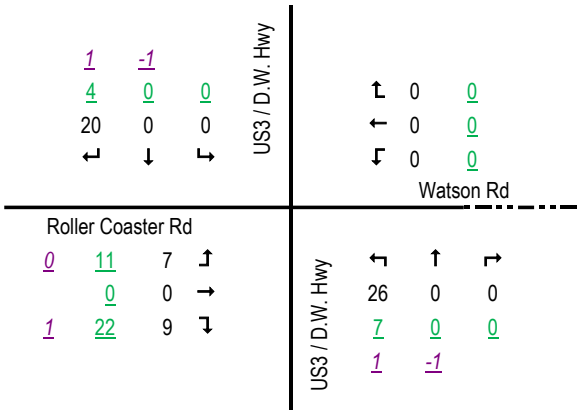
*No data available for this intersection.*

## AM Total Site Trips

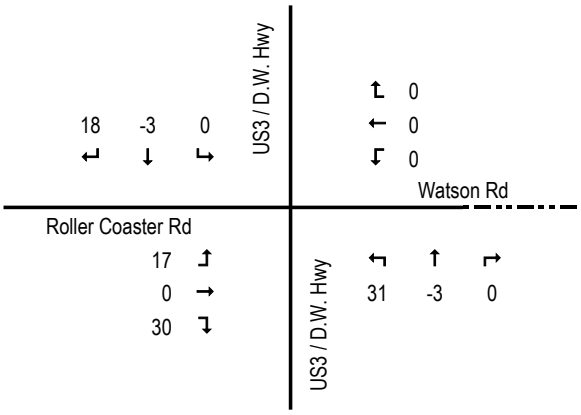



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

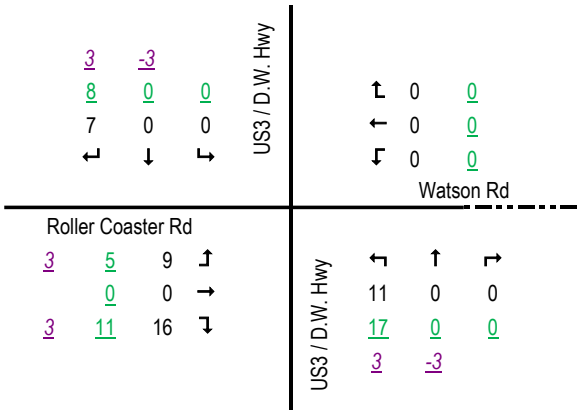



## PM Total Site Trips

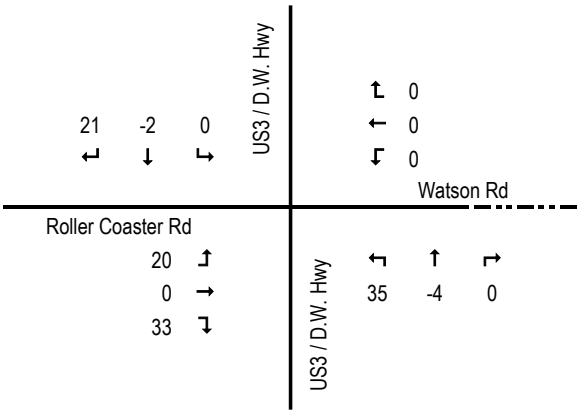



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

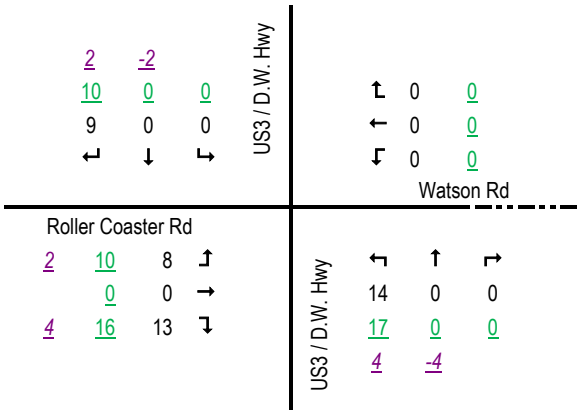



## SAT Total Site Trips

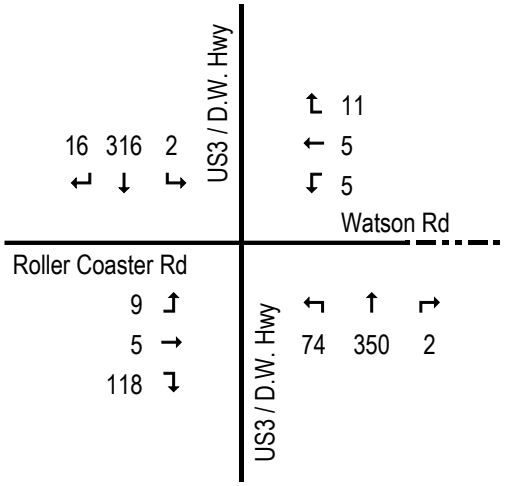



## SAT Site Composition Trips

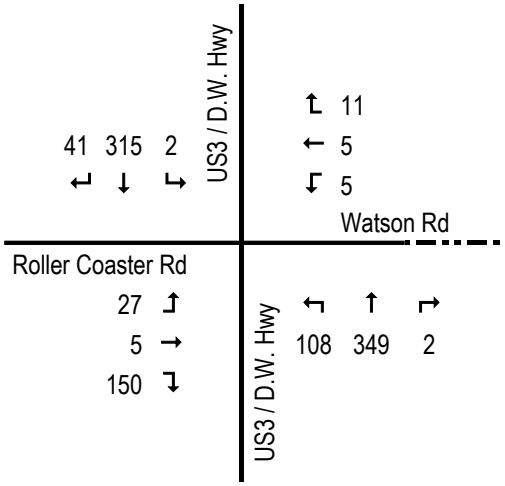
Primary, *Pass-by*, *Diverted Link*, Residential



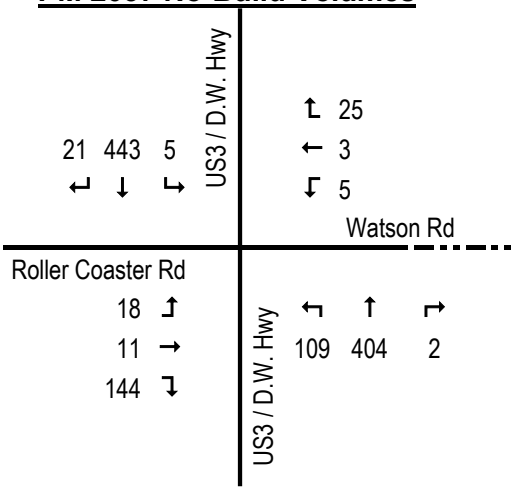
**AM 2037 No-Build Volumes**



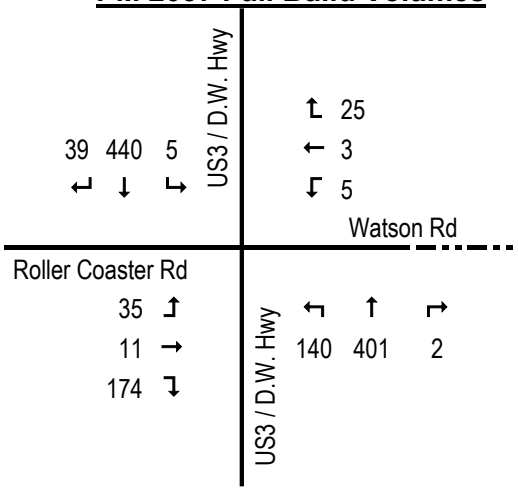

**AM 2037 Full Build Volumes**



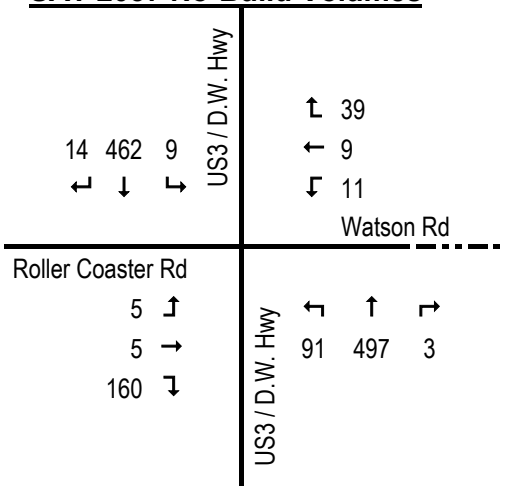

**PM 2037 No-Build Volumes**



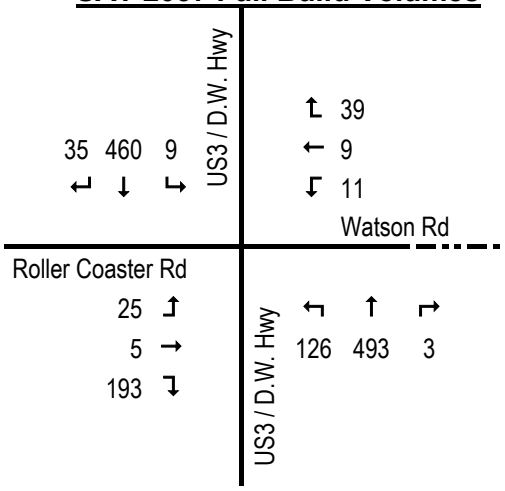

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #10: US3 at Roller Coaster Rd / Watson Rd** [Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.41 | 5.9 | A | --- | 0.49 | 6.9 | A | --- | | | | |
| EB | --- | 12.8 | B | 29 | --- | 12.9 | B | 38 | | | | |
| WB | --- | 12.5 | B | 13 | --- | 12.2 | B | 13 | | No | | |
| NB | --- | 4.9 | A | 129 | --- | 6.1 | A | 210 | | MIT | | |
| SB | --- | 4.1 | A | 81 | --- | 4.4 | A | 95 | | | | |
| ***PM Peak* OVERALL** | 0.51 | 6.9 | A | --- | 0.58 | 8.0 | A | --- | | | | |
| EB | --- | 13.3 | B | 36 | --- | 13.5 | B | 43 | | | | |
| WB | --- | 12.7 | B | 15 | --- | 12.4 | B | 14 | | No | | |
| NB | --- | 6.3 | A | 228 | --- | 8.0 | A | 268 | | MIT | | |
| SB | --- | 4.8 | A | 136 | --- | 5.2 | A | 154 | | | | |
| ***SAT Peak* OVERALL** | 0.53 | 7.8 | A | --- | 0.63 | 9.9 | A | --- | | | | |
| EB | --- | 14.2 | B | 42 | --- | 12.7 | B | 41 | | | | |
| WB | --- | 14.0 | B | 29 | --- | 12.1 | B | 21 | | No | | |
| NB | --- | 7.5 | A | 220 | --- | 11.8 | B | 323 | | MIT | | |
| SB | --- | 5.1 | A | 139 | --- | 5.9 | A | 157 | | | | |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

NB and B runs State Timing: AM – MAX I, PM – MAX II, SAT – MAX I

| *Intersection #10: US3 at Roller Coaster Rd / Watson Rd* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 913 | 107 | 10.5% |
| PM Peak Hour | 1190 | 90 | 7.0% |
| SAT Peak Hour | 1305 | 103 | 7.3% |

### *Analysis*

This intersection distributes project site trips to US3 north and south to the project site via Roller Coaster Road.

This signalized intersection operates at LOS A/B and 50% capacity in the no-build condition, and the 7-10% added site trips have no significant effect on delays or v/c ratios in the Build conditions. No mitigation is necessary.

### *Recommended Mitigation*

- None required.

# *Intersection #11:*
# *US3 at Endicott St*

*Existing Conditions*

This is an existing 3-leg roundabout intersection under State jurisdiction.

US3 (D.W. Highway) forms the EB and NB approaches, and Endicott Street forms the WB approach. Each approach is a single lane that carries two-way traffic around a single lane roundabout.

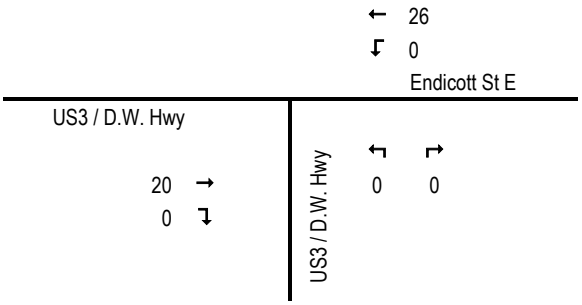
The speed limit is 40 mph on Endicott St and 30 mph on DW Highway approaching the roundabout. Lighting is provided by a cobra-head light mounted on a pole at each approach. There are pedestrian crossings at each of the approaches to the roundabout through the splitter islands.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

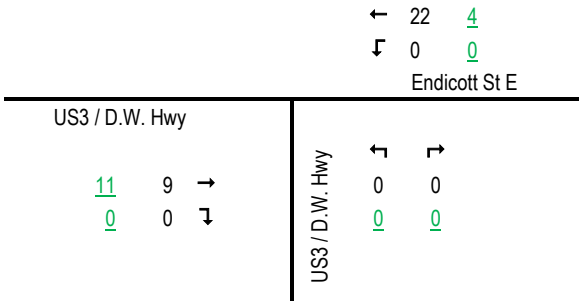
*No data available for this intersection.*

## AM Total Site Trips

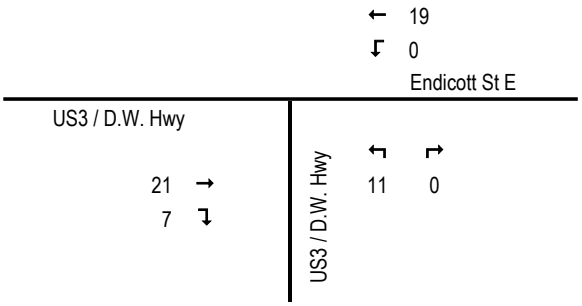



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

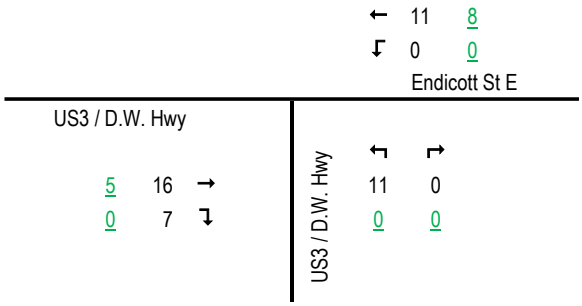



## PM Total Site Trips

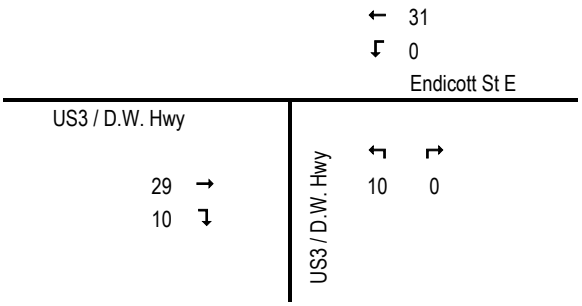



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

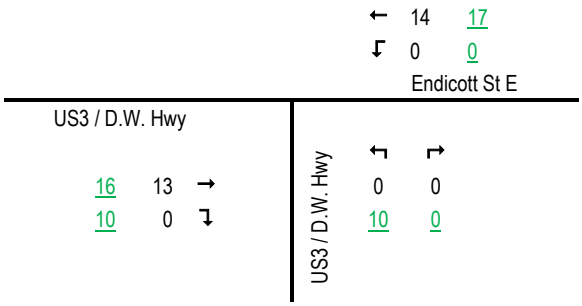



## SAT Total Site Trips

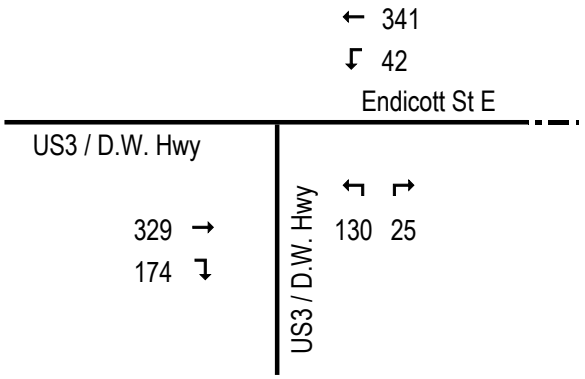



## SAT Site Composition Trips

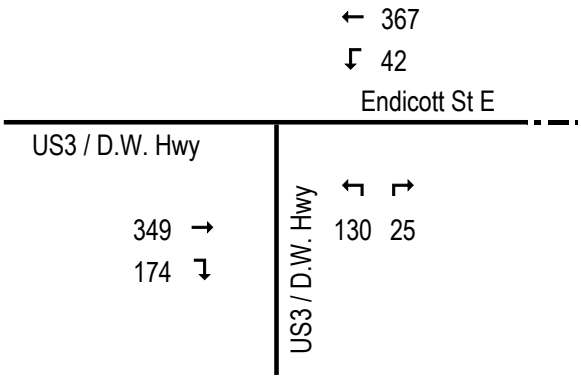
Primary, *Pass-by*, *Diverted Link*, Residential



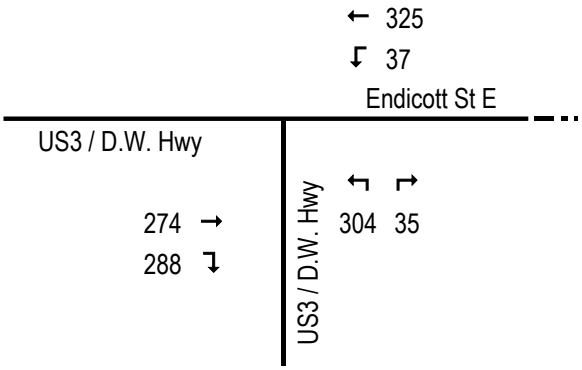
**AM 2037 No-Build Volumes**



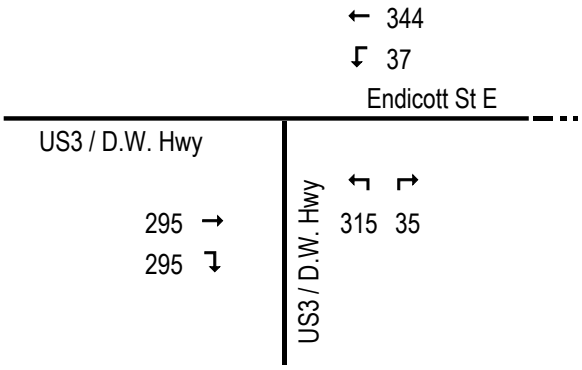

**AM 2037 Full Build Volumes**



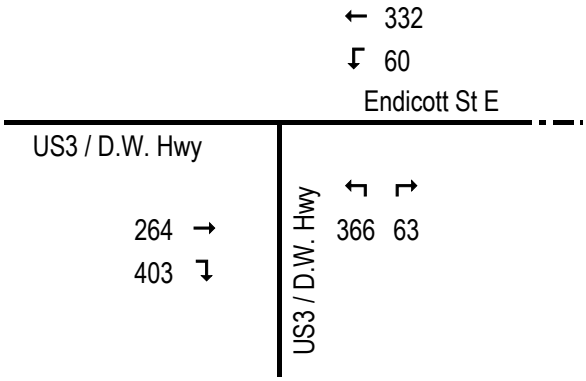

**PM 2037 No-Build Volumes**



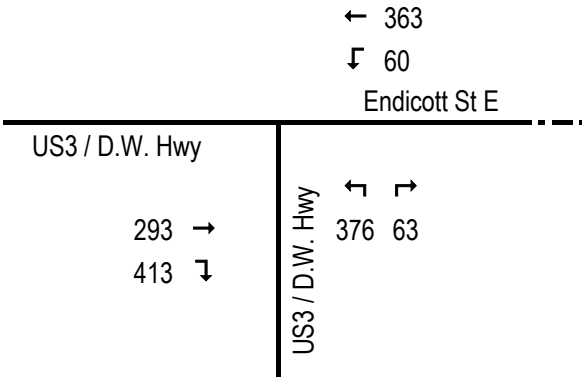

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #11: US3 at Endicott St** [Roundabout]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.47 | 7.1 | A | --- | 0.49 | 7.4 | A | --- | | | | |
| EB | 0.47 | 7.2 | A | 88 | 0.49 | 7.5 | A | 94 | | | | |
| WB | 0.39 | 7.3 | A | 59 | 0.42 | 7.7 | A | 66 | | No | MIT | |
| NB | 0.22 | 6.2 | A | 25 | 0.23 | 6.4 | A | 26 | | | | |
| ***PM Peak* OVERALL** | 0.47 | 7.9 | A | --- | 0.49 | 8.3 | A | --- | | | | |
| EB | 0.47 | 7.0 | A | 88 | 0.49 | 7.3 | A | 96 | | | | |
| WB | 0.45 | 9.3 | A | 69 | 0.48 | 9.9 | A | 83 | | No | MIT | |
| NB | 0.38 | 7.7 | A | 52 | 0.40 | 8.1 | A | 56 | | | | |
| ***SAT Peak* OVERALL** | 0.60 | 9.6 | A | --- | 0.64 | 10.5 | B | --- | | | | |
| EB | 0.60 | 9.3 | A | 142 | 0.64 | 10.0 | B | 163 | | | | |
| WB | 0.50 | 10.4 | B | 88 | 0.54 | 11.4 | B | 111 | | No | MIT | |
| NB | 0.49 | 9.4 | A | 82 | 0.52 | 10.3 | B | 101 | | | | |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

| *Intersection #11: US3 at Endicott St* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1041 | 46 | 4.2% |
| PM Peak Hour | 1263 | 58 | 4.4% |
| SAT Peak Hour | 1488 | 80 | 5.1% |

### *Analysis*

At this intersection site trips are routed along US3 through the roundabout with no more than 10 or 20 added trips in any direction during peak hours. In no-build conditions, the roundabout operates at LOS A/B with v/c ratios under 60%.

In build conditions, the roundabout can accommodate these few site trips with negligible impact to roundabout operations. No mitigation is necessary.

### *Recommended Mitigation*

- None required.

# *Intersection #12:*
# *US3 at US3 Bus / Blaisdell Ave*

*Existing Conditions*

This is an existing 4-way signalized intersection under State jurisdiction.

Union Ave (US3Bus) forms the EB approach and Blaisdell Ave forms the NB Approach. The WB and SB (Lake Street) approaches are formed by US3 (DW Highway). The Gilford/Laconia municipal line is near the EB approach.

All approaches accommodate two-way traffic. Each approach provides an exclusive left turn lane. The NB and EB approaches have a thru/right lane. The WB approach has a thru lane and a slip right lane. The SB approach provides a left/thru lane and a right slip lane.

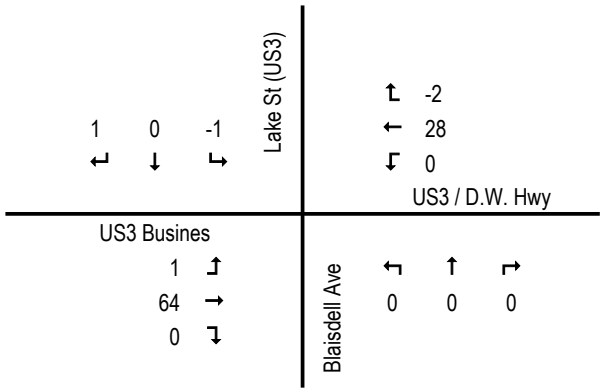
The speed limit is posted at 30 mph, except for Lake Street ats 35 mph. There are cobra-head streetlights at the SE and NW corners of the intersection. There are no sidewalks or pedestrian facilities at this intersection.

*Accident Evaluation*

Crash data requested for the study intersections was received from the NHDOT Safety and Active Transportation Section for the years 2020-2023 (4-years). A summary of the crash data is provided in the table below.

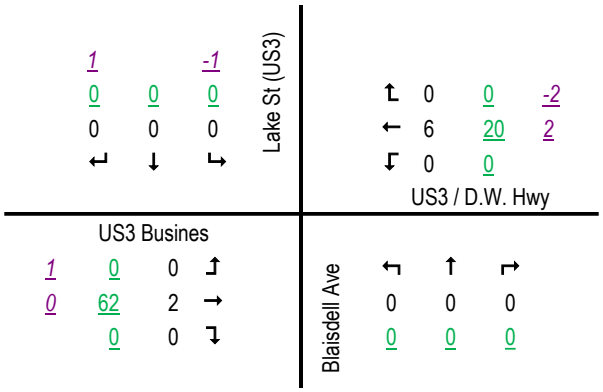
*No data available for this intersection.*

## AM Total Site Trips

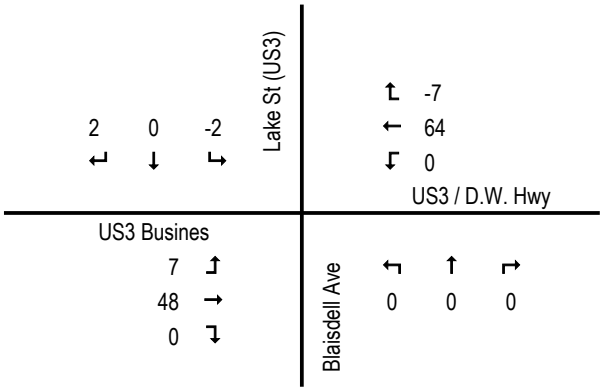



## AM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

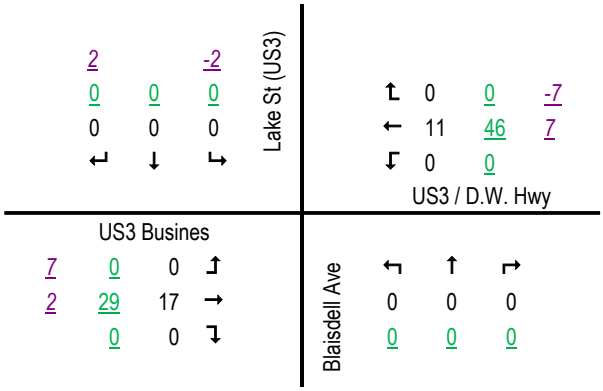



## PM Total Site Trips

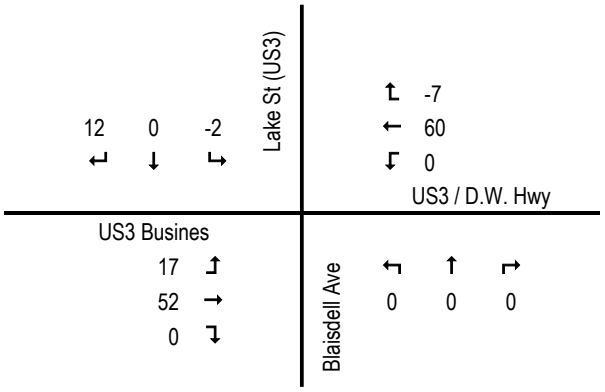



## PM Site Composition Trips

Primary, *Pass-by*, *Diverted Link*, Residential

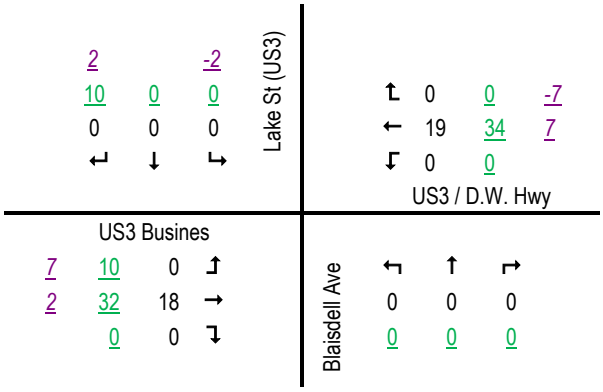



## SAT Total Site Trips

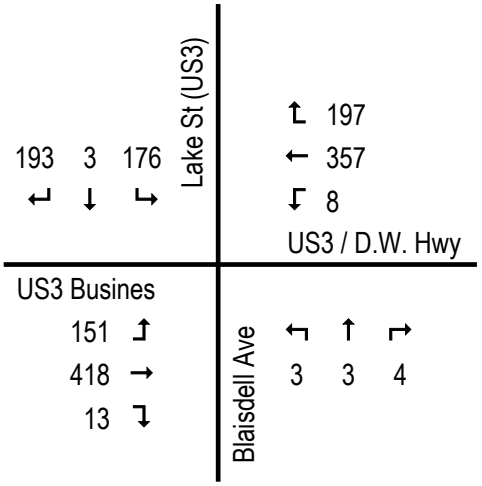



## SAT Site Composition Trips

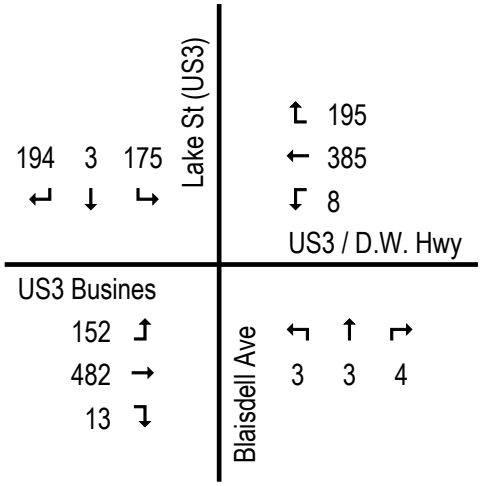
Primary, *Pass-by*, *Diverted Link*, Residential



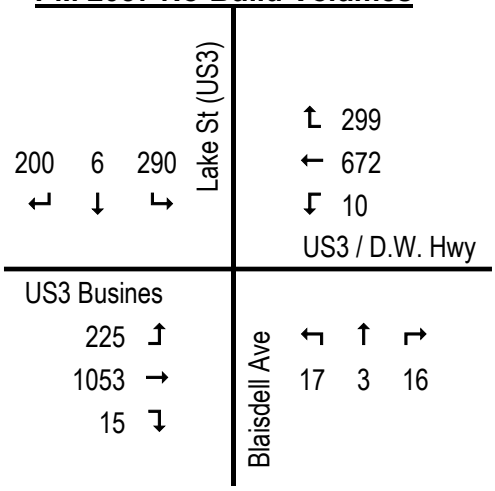
**AM 2037 No-Build Volumes**



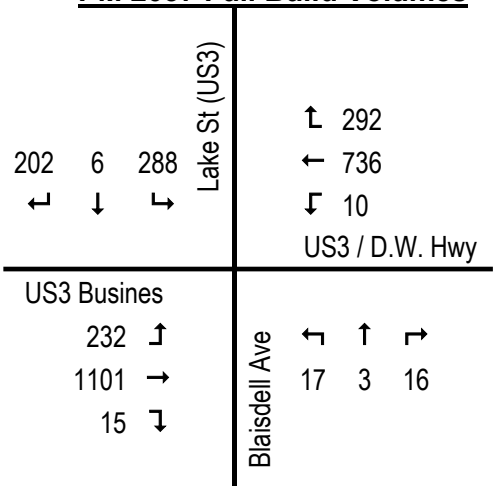

**AM 2037 Full Build Volumes**



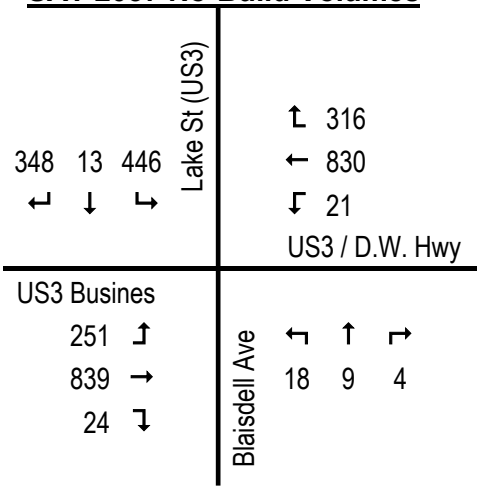

**PM 2037 No-Build Volumes**



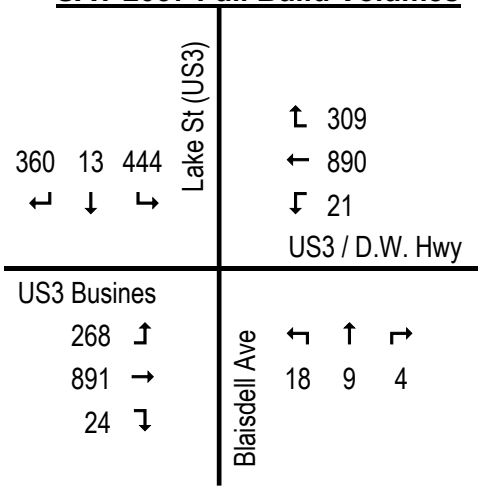

**PM 2037 Full Build Volumes**




**SAT 2037 No-Build Volumes**




**SAT 2037 Full Build Volumes**



*Summary of Operating Conditions*

**Intersection #12: US3 at US3Bus / Blaisdell Ave** [Signalized]

| | 2037 No-Build | | | | 2037 Build | | | | 2037 Build Mitigation: Timing | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Approach | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] | v/c[a] | Del[b] | LOS[c] | Q[d] |
| ***AM Peak* OVERALL** | 0.49 | 17.7 | B | --- | 0.50 | 18.2 | B | --- | 0.51 | 16.2 | B | --- |
| EB | --- | 19.3 | B | 321 | --- | 19.7 | B | 386 | --- | 17.4 | B | 299 |
| WB | --- | 16.2 | B | 325 | --- | 16.9 | B | 356 | --- | 14.8 | B | 291 |
| NB | --- | 36.1 | D | 16 | --- | 37.2 | D | 2 | --- | 35.4 | D | 16 |
| SB | --- | 16.9 | B | 115 | --- | 17.3 | B | 51 | --- | 15.8 | B | 110 |
| ***PM Peak* OVERALL** | 0.89 | 45.9 | D | --- | 0.92 | 64.0 | E | --- | 0.94 | 40.8 | D | --- |
| EB | --- | 64.4 | E | 1448 | --- | 77.7 | E | 1540 | --- | 55.7 | E | 1147 |
| WB | --- | 42.4 | D | 1011 | --- | 64.2 | E | 1138 | --- | 26.7 | C | 749 |
| NB | --- | 49.1 | D | 29 | --- | 49.3 | D | 29 | --- | 47.1 | D | 35 |
| SB | --- | 28.8 | C | 204 | --- | 28.8 | C | 204 | --- | 31.1 | C | 188 |
| ***SAT Peak* OVERALL** | 0.96 | 65.9 | E | --- | 1.03 | 96.6 | F | --- | 0.98 | 52.5 | D | --- |
| EB | --- | 43.2 | D | 1146 | --- | 63.6 | E | 1246 | --- | 44.3 | D | 991 |
| WB | --- | 116.3 | F | 1205 | --- | 178.6 | F | 1361 | --- | 70.0 | E | 1035 |
| NB | --- | 51.3 | D | 41 | --- | 50.2 | D | 41 | --- | 52.5 | D | 39 |
| SB | --- | 28.2 | C | 302 | --- | 29.0 | C | 301 | --- | 38.0 | D | 327 |

[a] Volume-to capacity ratio – [b] Average control delay (sec/veh) – [c] Level of Service – [d] Longest 95th Queue at approach

NB and B runs State Timing: AM – MAX I, PM – MAX II, SAT – MAX I
MIT Timing: adjusts phase timing

| *Intersection #12: US3 at US3Bus / Blaisdell Ave* | *Total Background Volume* | *Added Site Trips* | *% Added to Intersection* |
|---|---|---|---|
| AM Peak Hour | 1526 | 91 | 5.6% |
| PM Peak Hour | 2806 | 112 | 3.8% |
| SAT Peak Hour | 3119 | 132 | 4.1% |

### *Analysis*

In no-build conditions, the PM peak hour is approaching capacity, and the Saturday peak hour is at capacity. Project site trips through this intersection are primarily through traffic along the EB and WB approaches, with a small amount of traffic turning onto Lake Street.

In build conditions, increases in delay are effectively managed by adjusting timing. These adjustments effectively mitigate and in some cases improve traffic operations.

### *Recommended Mitigation*

- Signal Timing Adjustments

END OF PART C

# Part D

## Trip Generation and Distribution

Civil Engineers
Structural Engineers
Traffic Engineers
Land Surveyors
Landscape Architects
Scientists

# Traffic Memo – Full-Build Trip Generation and Distribution

**Date:** 14 April 2025

**To:** NHDOT District 3
Laconia Planning & Public Works

**Project:** Laconia Village
Parade Road (NH106) and Meredith Center Road, Laconia NH
TFM# 96126.01

**Subject:** Step 1 – Trip Generation and Distribution

## *Introduction*

Pillsbury Development Realty, LLC (Developer) is preparing a Master Plan for a mixed-use development at the former State School on Right Way Path in Laconia. In connection with that proposal, a Traffic Scoping Meeting was held with representatives of NHDOT, City of Laconia, Developer, and TFMoran on January 9, 2025 to determine the study area and other traffic study parameters for this project.

At that meeting it was agreed that TFMoran would prepare an intermediate memo describing trip generation and distribution for discussion prior to completing the full TIAS. The objectives of this intermediate memo are to:

1. Determine trip generation, interaction, and composition for full build-out of the Master Plan.
2. Distribute site traffic through study area intersections identified at the Scoping Meeting.
3. Determine whether site trip volumes justify a full quantitative analysis of intersection operations (or a qualitative evaluation will be provided).

## *Proposal*

The Masterplan includes the following building elements:

- 125 Room Hotel
- 75,000 sf Recreation (YMCA)
- 100,000 sf Office (General & Medical)
- 2,050 units Residential (Multifamily, Independent Elderly, Townhouse, Single Family)
- 120,000 sf Retail (In-Line)
- 75,000 sf Civic (Library, Town Hall/Offices)

## Conceptual Plan – Laconia Village


### Scope of Study

The following excerpts of the Scoping Meeting are pertinent to this memo:

Analysis Periods:

- Weekday peak hours: AM (7am - 9am) and PM (3pm – 6pm)
- Weekend peak hours: SAT (11am – 1pm) midday peak hours

*Background growth:* 1% minimum annual growth rate

*Seasonal Adjustment:* NHDOT Group 5 most recent data

*Opening Year/Future Year:* 2027/2037

*Other Developments:* none identified

*Site Trip Generation/Composition: - use ITE 11th Edition LUC*

- LUC 312 Hotel
- LUC 495 Recreation Community Center
- LUC 710 General Office Building
- LUC 720 Medical-Dental Office Building
- LUC 220 Multifamily Housing (Low-Rise)
- LUC 210 Single-Family Detached Housing
- LUC 215 Single-Family Attached Housing
- LUC 221 Multifamily Housing (Mid-Rise)
- LUC 252 Senior Adult Housing
- LUC 821 Shopping Plaza (40-150k)
- LUC 850 Market/Retail
- LUC 590 Library
- LUC 715 Single Tenant Office Building (City Hall or City offices)

*Internal Capture* – use NCHRP 684 methodology

*Composition:*

- Retail: Use Primary, Pass-By and Diverted Link trips
- Other uses: Use Primary trips only

*Distribution:*

- Residential: Use Journey to Work patterns
- Other Uses: Pro-rata based on counts

*Study Area Intersections:*

1. Parade Road (NH106) at Lane Rd/Severance Rd [Stop Control]
2. Parade Rd (NH106) at Meredith Center Rd / Elm St [Signal]
3. Parade Road (NH106) at Right Way Path/Old North Main Street [Stop Control]
4. Meredith Center Rd at Eastman Rd/Lane Rd [Stop Control]
5. NH104 at Meredith Center Rd [Stop Control]
6. NH104 at Winona Rd/Pease Rd [Signal]

7A & 7B. NH104 at US3 [separate Signals]

8. US3 at Parade Rd (NH106)/Upper Mile [Roundabout]
9. Parade Rd at Roller Coaster Rd [Stop Control]
10. US3 at Roller Coaster Rd [Signal]
11. US3 at Endicott St. [Roundabout]
12. US3 at US3 BUS/Blaisdell Ave [Signal]
13. Union Ave (US3 BUS) at Elm St/Clinton St [Signal]
14. North Main St (NH106) at Lexington Dr [Stop Control]
15. North Main St (NH106) at Oak St [Signal]
16. North Main St (NH106) at Church St {Signal]
17. North Main St (NH106) at Union Ave/Court St [Signal]
18. Union Ave (US3BUS) at Gilford Ave (NH11A) [Signal]
19. Main St at New Salem St [Stop Control]
20. Court St at Fair St [Stop Control]
31. Eastman Road at Right Way Path [Stop Control]
32. Meredith Center Road at Proposed Road2 [Stop Control]

*Other Items:*

- Access to Ahern State Park must be maintained in similar location and condition to existing access way.
- Existing CAROW along the frontage of this site will not inhibit access.

## 2. BACKGROUND VOLUMES

To quantify existing peak hour traffic volumes within the study area, turning movement counts were taken at the study intersections. These counts are tabulated in the Appendix.

Peak Hour counts were taken at all study intersections on Thursday March 6, 2025 – 7am to 9am and 3pm to 6pm and Saturday March 8, 2025 – 11am – 1pm.

12 hour counts were also taken on March 8 same date from 6am – 6pm at Parade Road (NH106) at Right Way Path.

24-hour ATRs were taken that date at the following locations:

3. Parade Road (NH106) south of Right Way Path.
4. Meredith Center Road east of Eastman Road

***Seasonal Adjustment.***
To account for seasonal variations, the data was seasonally adjusted upward by a factor of 53% during March for all peak hours to reflect peak month traffic volume.

***Balance***
Volumes were balanced between intersections with little or no intermediate driveways.

***Diagrams***
Due to the geographic extent of the study area, the Background Traffic diagrams are separated into three parts:

- North Network = Union Ave/Lake St to NH104/DW Hwy
- Site Network = Parade Road/Right Way Path to Parade Road/Lane Rd
- South Network = Court St/Union Ave to Parade Road/Lexington Dr

## 3. TRIP GENERATION

*Proposed Trips*

Proposed development consists of retail, residential (SFH, TH, and multi-family), office, hotel, and civic uses. The intent is to create a live-work-play community by offering a place to live, retail for everyday use, nature trails, and employment within walking distance. Table 1 below presents the trip generation associated with the development. This trip generation is based on the ITE1 (11th Edition), for the uses listed below.

**Table 1: Proposed Trips (before internal capture)**

| Land Use | In | Out | Total |
|---|---|---|---|
| **Proposed 125 Room Hotel (LUC 312)** | | | |
| Weekday AM Peak Hour Adjacent Street | 18 | 27 | 45 |
| Weekday PM Peak Hour Adjacent Street | 21 | 18 | 39 |
| Weekend SAT Peak Hour of the Generator | 28 | 30 | 58 |
| **Proposed 75,000 sf Recreation (LUC 495)** | | | |
| Weekday AM Peak Hour Adjacent Street | 95 | 48 | 143 |
| Weekday PM Peak Hour Adjacent Street | 88 | 100 | 188 |
| Weekend SAT Peak Hour of the Generator | 43 | 37 | 80 |
| **Proposed 100,000 sf Office (LUC 710 & 720)** | | | |
| Weekday AM Peak Hour Adjacent Street | 187 | 41 | 228 |
| Weekday PM Peak Hour Adjacent Street | 85 | 234 | 319 |
| Weekend SAT Peak Hour of the Generator | 114 | 88 | 202 |
| **Proposed 2,050 Units Residential (LUC 220, 210, 215, 221, 252)** | | | |
| Weekday AM Peak Hour Adjacent Street | 190 | 601 | 791 |
| Weekday PM Peak Hour Adjacent Street | 550 | 351 | 901 |
| Weekend SAT Peak Hour of the Generator | 441 | 429 | 870 |
| **Proposed 120,000 sf Retail (LUC 821 & 850)** | | | |
| Weekday AM Peak Hour Adjacent Street | 230 | 150 | 380 |
| Weekday PM Peak Hour Adjacent Street | 529 | 550 | 1079 |
| Weekend SAT Peak Hour of the Generator | 605 | 595 | 1200 |
| **Proposed 75,000 sf Civic (LUC 590& 715)** | | | |
| Weekday AM Peak Hour Adjacent Street | 114 | 16 | 130 |
| Weekday PM Peak Hour Adjacent Street | 56 | 140 | 196 |
| Weekend SAT Peak Hour of the Generator | 67 | 59 | 126 |
| **Total Trips before Internal Capture** | | | |
| Weekday AM Peak Hour Adjacent Street | 834 | 883 | 1717 |
| Weekday PM Peak Hour Adjacent Street | 1329 | 1393 | 2722 |
| Weekend SAT Peak Hour of the Generator | 1298 | 1238 | 2536 |

***Internal Capture.***

Interaction between proposed uses at Laconia Village reduces the total number of external trips generated by the development. This reduction is known as the "internal capture" rate. Standard NCHRP 684 methodologies were used to estimate these internal capture rates, resulting in 7%

[1] *Trip Generation Manual*, Institute of Transportation Engineers (ITE), 11th Edition.

during the weekday AM peak hour, and 24% in the PM peak hour and SAT weekend peak hour. Applying these overall internal capture deductions yields the results tabulated below in Table 2 on the following page. Calculations are provided in Appendix A.

**Table 2: Net Site Trips (adjusted for Internal Capture)**

| Land Use | In | Out | Total |
|---|---|---|---|
| **Total Proposed Trips (Unadjusted)** | | | |
| Weekday AM Peak Hour Adjacent Street | 834 | 883 | 1717 |
| Weekday PM Peak Hour Adjacent Street | 1329 | 1393 | 2722 |
| Weekend SAT Peak Hour of the Generator | 1298 | 1238 | 2536 |
| **Internal Capture Adjustments** | | | |
| Weekday AM Peak Hour Adjacent Street (7%) | (58) | (60) | (118) |
| Weekday PM Peak Hour Adjacent Street (24%) | (317) | (334) | (651) |
| Weekend SAT Peak Hour of the Generator (24%) | (311) | (297) | (608) |
| **Net New Trips (after Internal Capture)** | | | |
| Weekday AM Peak Hour Adjacent Street | 776 | 823 | 1599 |
| Weekday PM Peak Hour Adjacent Street | 1012 | 1059 | 2071 |
| Weekend SAT Peak Hour of the Generator | 987 | 941 | 1928 |

## 4. TRIP COMPOSITION, DISTRIBUTION AND ASSIGNMENT

*Composition*
Based on ITE guidance[2], site generated trips can be broken down into three categories: primary trips, pass-by trips, and diverted-linked trips.

Primary trips go directly from origin to generator and return to origin, while pass-by trips are vehicles already on the adjacent roadways. Thus pass-by trips originate on Parade Road and Meredith Center Road and then return to the same road to continue to their destination.

Diverted-linked (D-L) trips are attracted from traffic on other nearby roads without direct access to the site. Like primary trips, these trips enter the site and then return to their original roadway (diverted from) to their original destination. Unlike primary trips, D-L trips are already counted in the volumes of the roadway diverted from.

**Table 2: New Trip Composition**

| | Non Pass-By | | Pass-By | | Total Trips at Site | **New** Trips on Streets |
|---|---|---|---|---|---|---|
| | In | Out | In | Out | | |
| Weekday AM Peak Hour Adjacent Street | 752 | 806 | 24 | 17 | 1599 | **1558** |
| Weekday PM Peak Hour Adjacent Street | 887 | 927 | 125 | 132 | 2071 | **1814** |
| Weekend SAT Peak Hour of the Generator | 875 | 830 | 112 | 111 | 1928 | **1705** |

[2] ITE Trip Generation Handbook (3rd edition), Appendix E, September 2017.

*Distribution*

The residential portion of the project is based on Journey to Work data for weekdays from Census.gov using Table 3 (Residence MCD/County to Workplace MCD/County 5-Year ACS, 2011-2015). Distribution for Non-Residential uses and Saturday residential uses were prorated through the network using the turning movement counts from March 2025.

- *9% North via Parade Road*
- *75% South via Parade Road*
- *5% East via Meredith Center Road*
- *11% West via Elm Street*

There are three access points to the development, the main drive at Right Way Path/Parade Road, the relocated intersection of Right Way Path/Eastman Road, and a new access point approximately midway up Meredith Center Road.

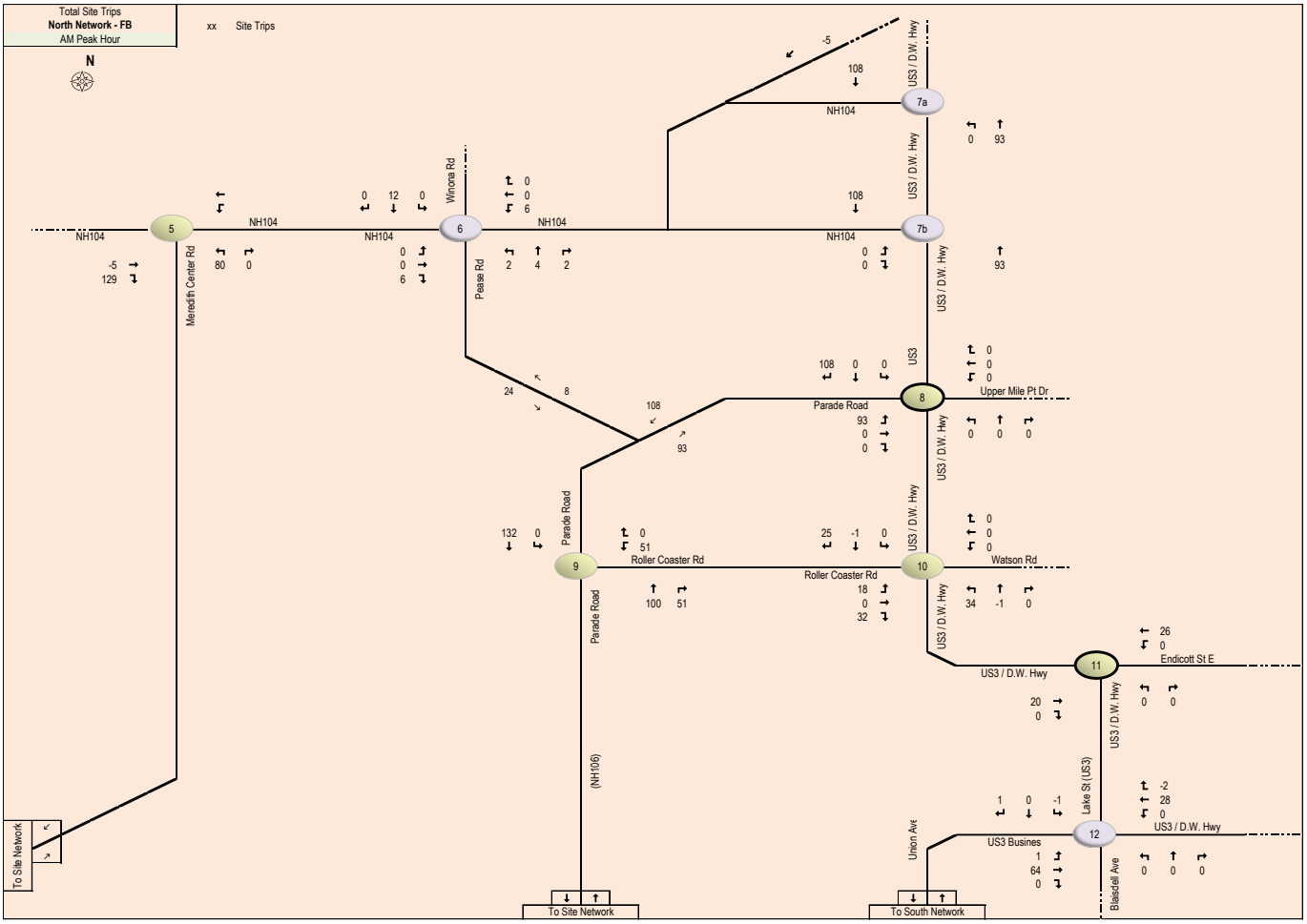
Distribution of site access trips was based on direction of travel with heavier distribution at the Parade Road and Meredith Center Road access ways.

Due to the extended geographical area of the study area, primary and D-L trips were distributed through the network on the following basis:

- 50% of site trips originated within a 2-mile radius of the site. See map In Attachment D.
- Journey to Work trips for people who live and work within the City limits of Laconia were distributed to the nearest site access points; i.e. Parade Rd, Meredith Center Rd, or Eastman Rd. The City limits Journey to Work map is in Attachment D.
- There will be Diverted Links adjustments for trips from outside the 2-mile radius. See map of D-L trips in Attachment D.

The following pages include diagrams that show the total site trips for the site the network. Journey to Work, Distribution Diagrams and Site Trip Assignments are in Attachment E.

## AM Peak Hour


Total Site Trips
North Network - FB
AM Peak Hour
xx Site Trips
N
NH104
Meredith Center Rd
Winona Rd
Pease Rd
Parade Road
Roller Coaster Rd
Watson Rd
Upper Mile Pt Dr
US3 / D.W. Hwy
US3
Endicott St E
Lake St (US3)
US3 Busines
Union Ave
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(NH106)
To Site Network
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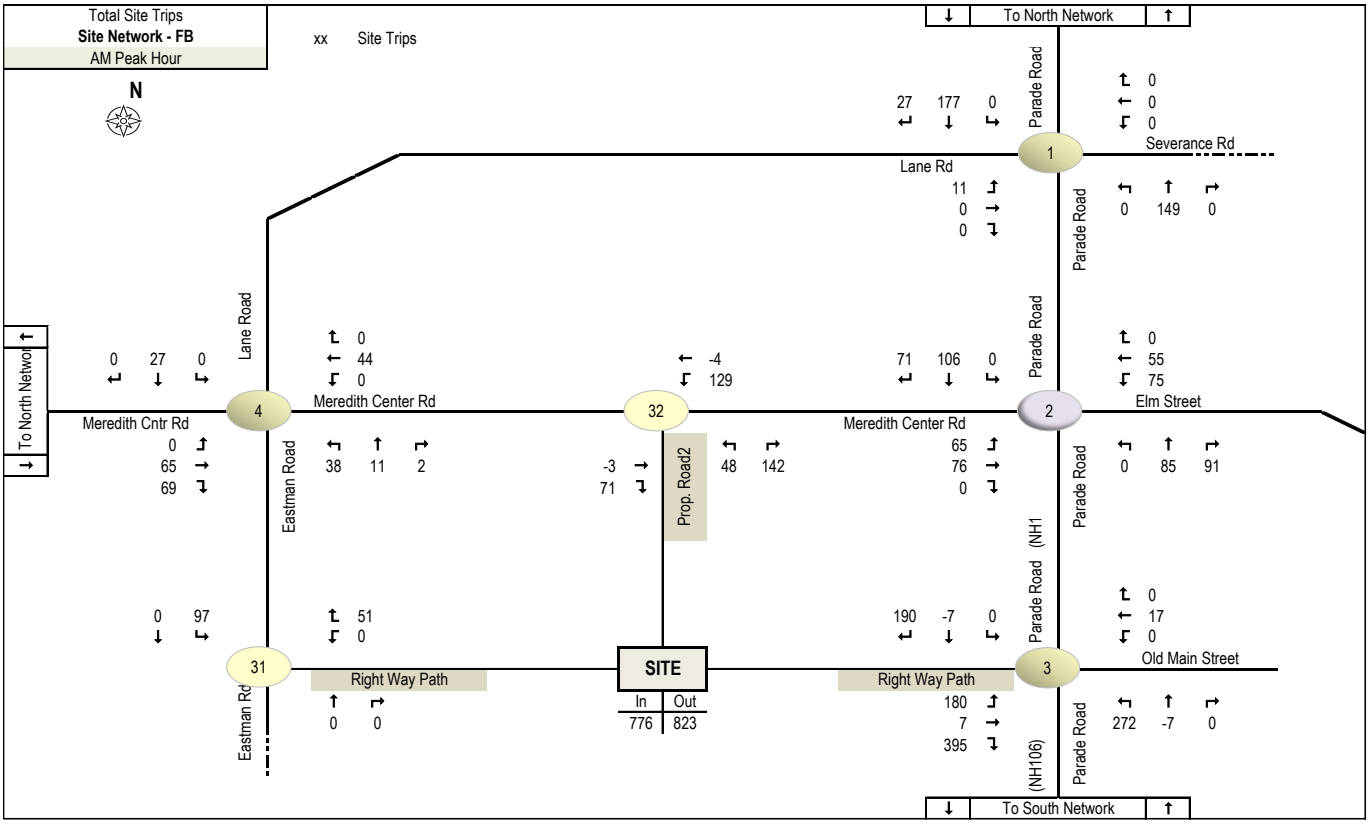
Total Site Trips
Site Network - FB
AM Peak Hour
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Parade Road
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Meredith Center Rd
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Eastman Road
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Parade Road (NH1
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Right Way Path
Right Way Path
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0 0 0
11 0 0
0 149 0
0 27 0
0 44 0
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71 106 0
0 55 75
0 65 69
38 11 2
-3 71
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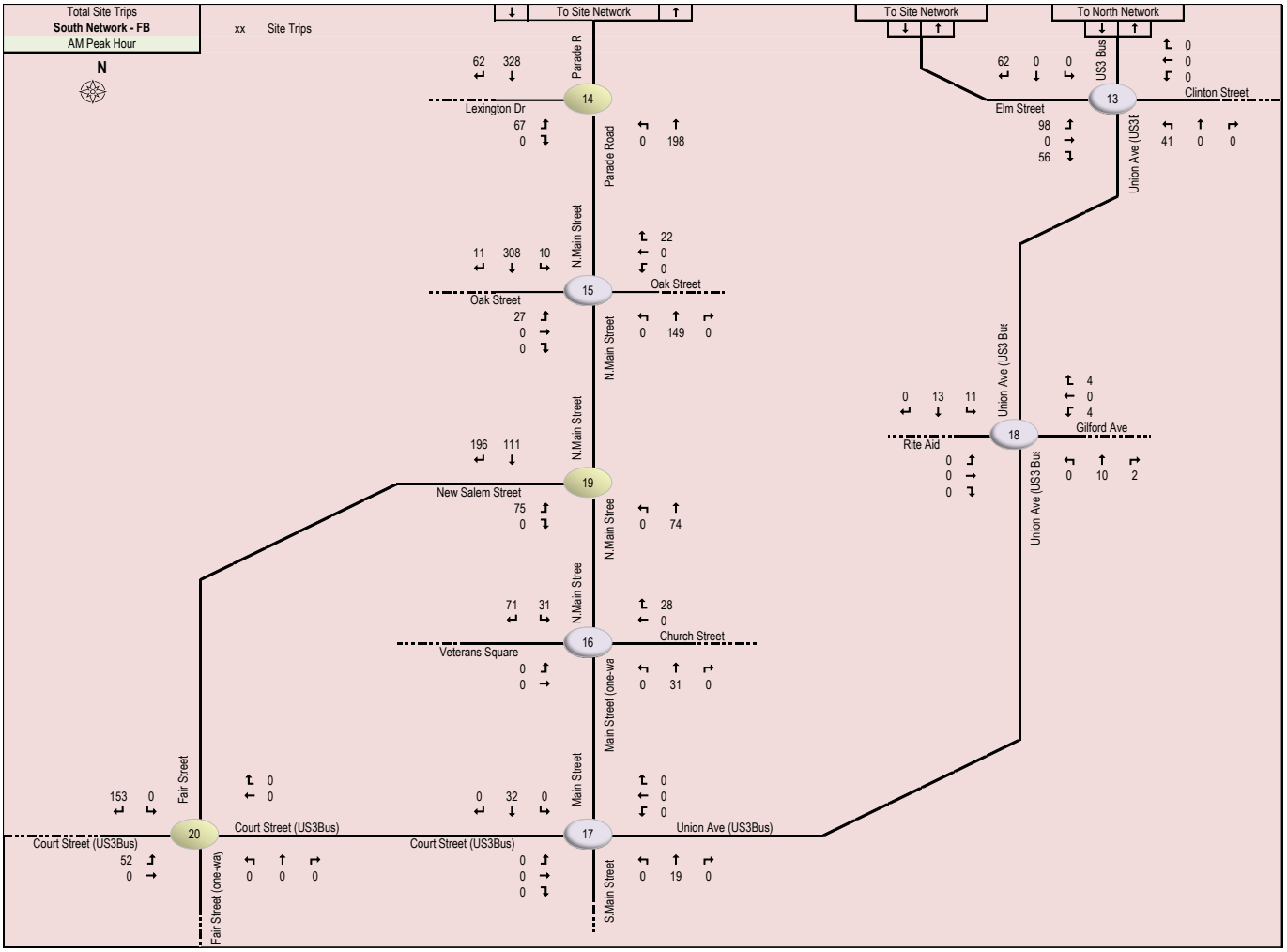
180 7 395
272 -7 0


Total Site Trips
South Network - FB
AM Peak Hour
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Parade R
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New Salem Street
Veterans Square
Church Street
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Court Street (US3Bus)
Fair Street
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Gilford Ave
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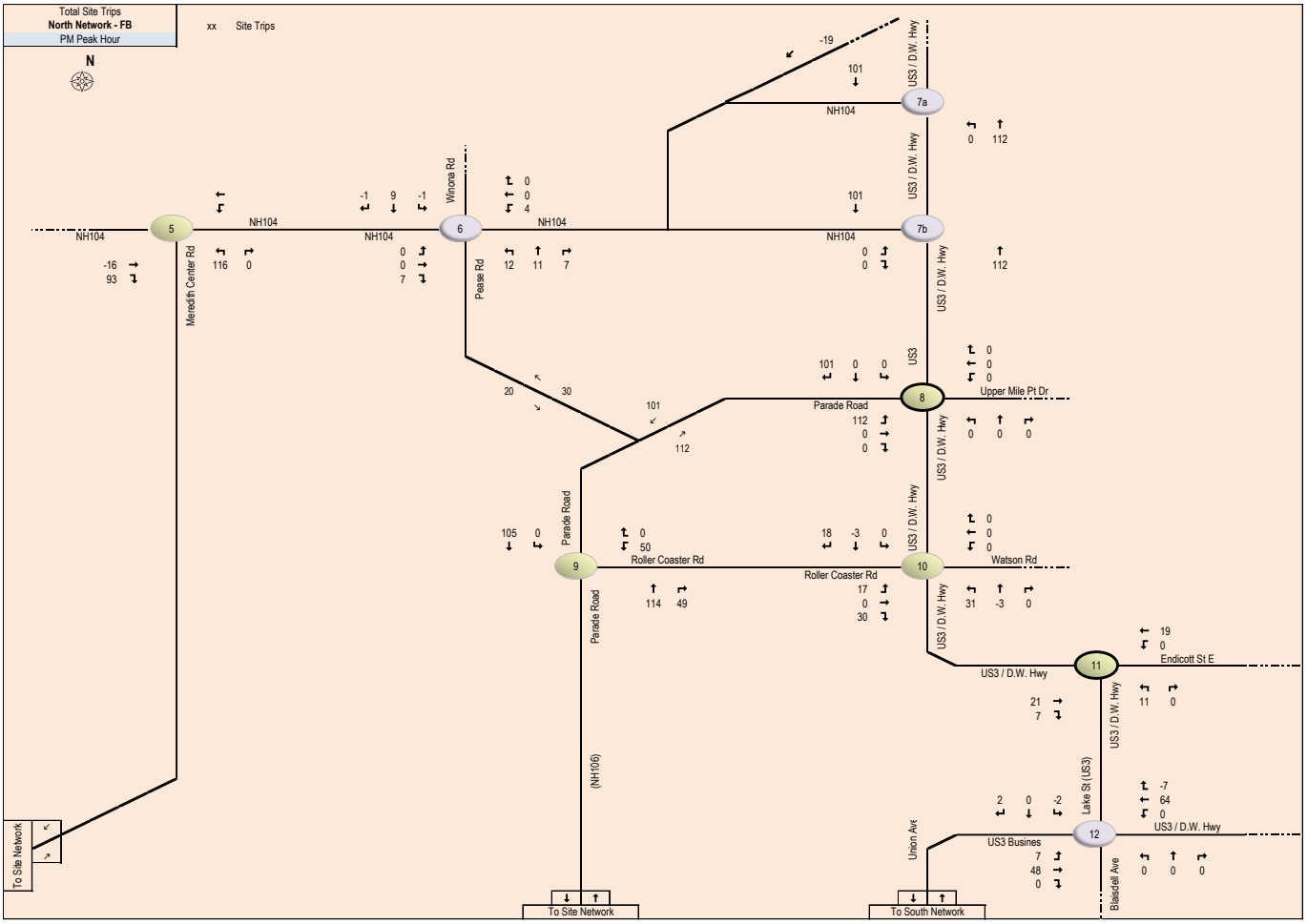
13

## PM Peak Hour


Total Site Trips
North Network - FB
PM Peak Hour
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NH104
Meredith Center Rd
Winona Rd
Pease Rd
Parade Road
Roller Coaster Rd
Watson Rd
Upper Mile Pt Dr
Endicott St E
US3 / D.W. Hwy
US3
Lake St (US3)
US3 Busines
Union Ave
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To Site Network
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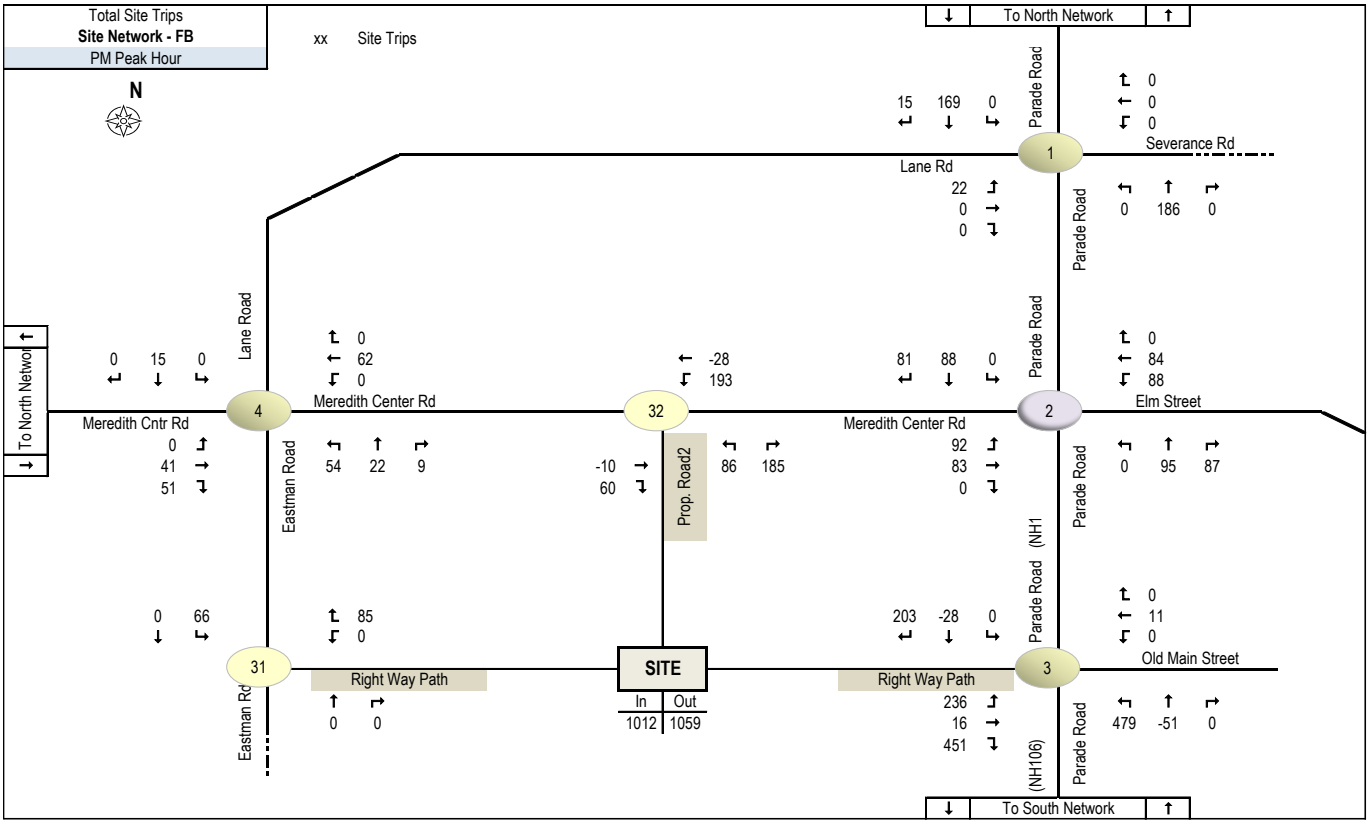
Total Site Trips
Site Network - FB
PM Peak Hour
xx Site Trips
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To North Network
To South Network
To North Network
Parade Road
Lane Road
Meredith Cntr Rd
Meredith Center Rd
Eastman Road
Prop. Road2
Severance Rd
Elm Street
Old Main Street
(NH1
(NH106)
Right Way Path
SITE
In
Out
1012
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15 169 0
22 0 0
0 15 0
0 62 0
-28 193
81 88 0
0 84 88
0 41 51
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0 66
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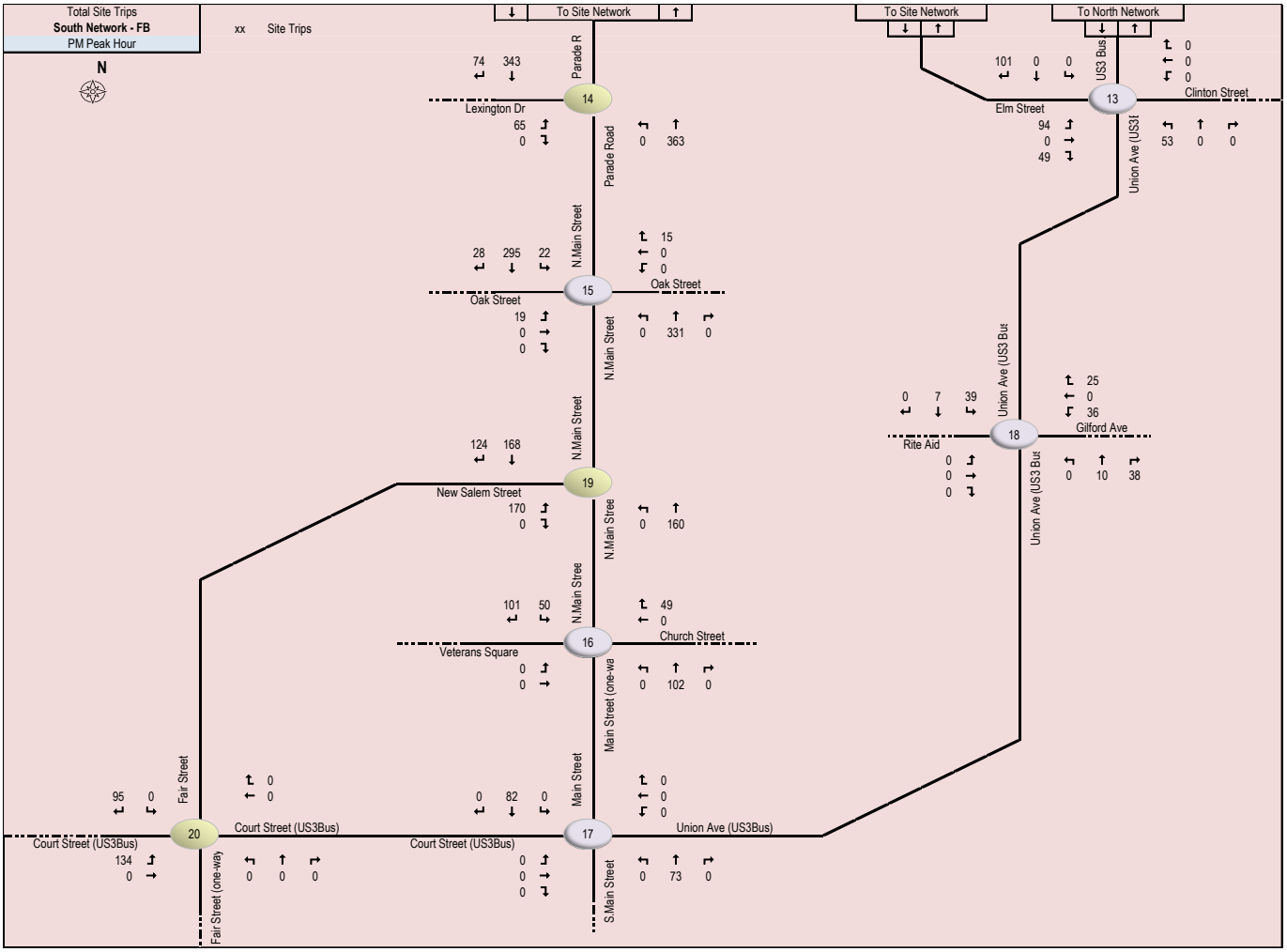
203 -28 0
0 11 0
236 16 451
0 186 0
479 -51 0


Total Site Trips
South Network - FB
PM Peak Hour
xx Site Trips
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To Site Network
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To North Network
Parade R
Lexington Dr
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Union Ave (US3Bus)
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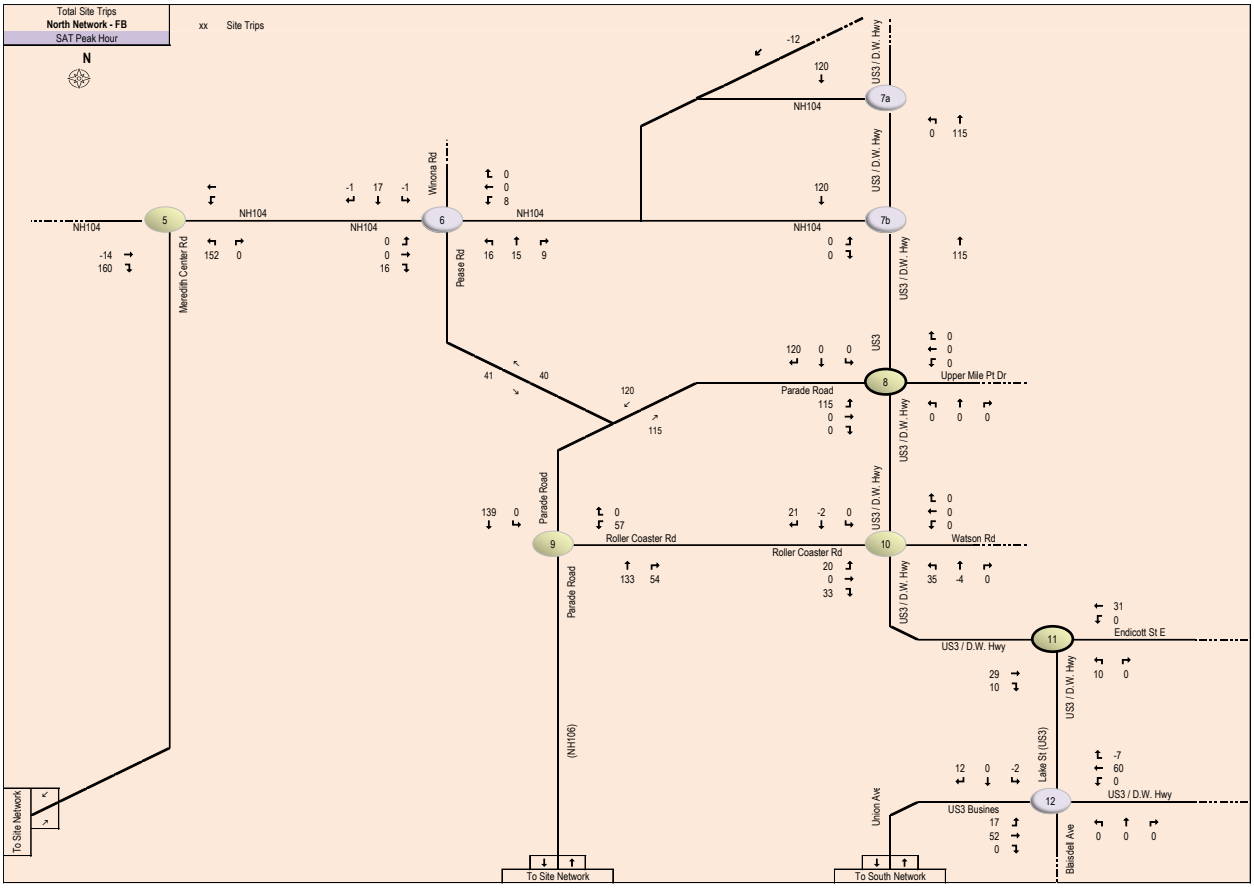
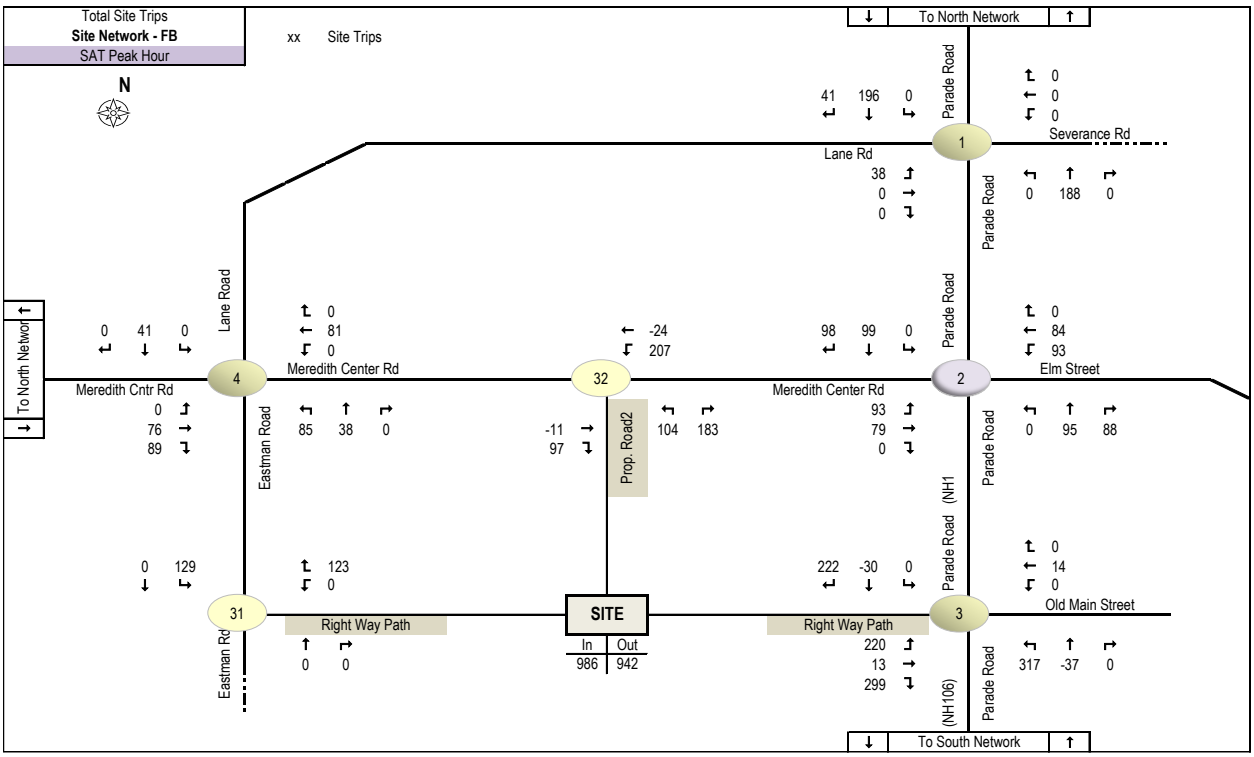
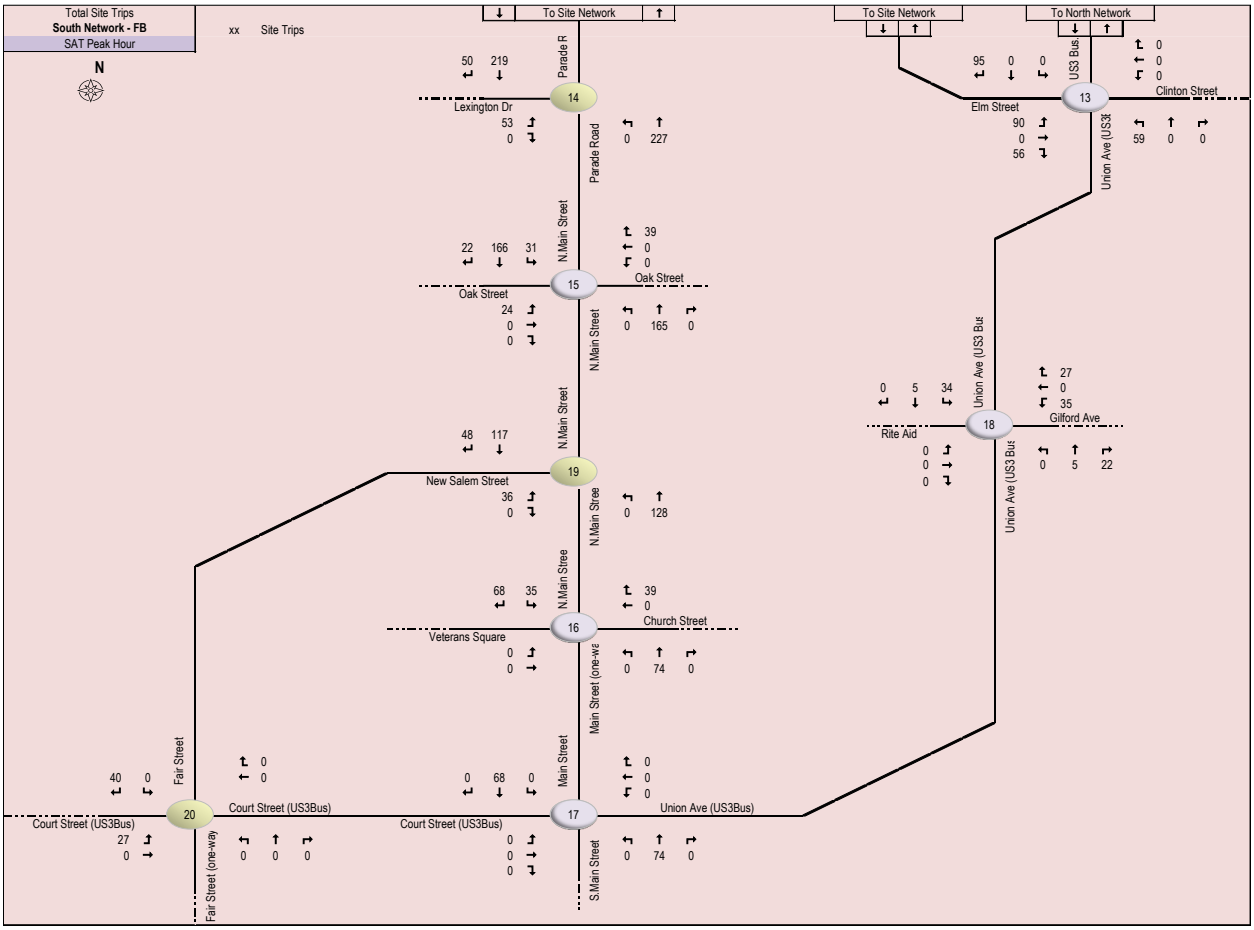
## SAT Peak Hour




Total Site Trips
South Network - FB
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Veterans Square
Church Street
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Main Street
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Fair Street (one-way
S.Main Street
US3 Bus
Clinton Street
Elm Street
Union Ave (US3
Union Ave (US3 Bus
Rite Aid
Gilford Ave
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## 5. NEW TRIPS TO NETWORK INTERSECTIONS

The results of trip distribution are tabulated below for each network intersection. Intersections recommended for qualitative evaluation only are highlighted with gray:

| | New Trips (Non Pass-By) | | |
|---|---|---|---|
| **FULL BUILD** | **AM Site Trips Added to Intersection** | **PM Site Trips Added to Intersection** | **SAT Site Trips Added to Intersection** |
| 5. NH104 at Meredith Center Road | 204 | 193 | 298 |
| 6. NH104 at Winona Road / Pease Road | 32 | 48 | 79 |
| 7a. US3 (DW Highway) at NH104 | 196 | 194 | 223 |
| 7b. US3 (DW Highway) at NH104 | 201 | 213 | 235 |
| 8. US3 (DW Highway) at Parade Road / Upper Mile Pt Dr | 201 | 213 | 235 |
| 10. US3 (DW Highway) at Roller Coaster Road / Watson Road | 107 | 90 | 103 |
| 11. US3 (DW Highway) at Endicott Street East | 46 | 58 | 80 |
| 12. US3 (DW Highway) / Blaisdell Ave at US3Bus / US3 (DW Highway) | 91 | 112 | 132 |
| 9. Parade Road at Roller Coaster Road | 334 | 318 | 383 |
| 1. Parade Road (NH106) at Lane Rd / Severance Rd | 364 | 392 | 463 |
| 2. Parade Road (NH106) at Meredith Center Road / Elm Street | 624 | 698 | 729 |
| 3. Parade Road (NH106) at Right Way Path / Old Main Street | 1037 | 1230 | 951 |
| 4. Meredith Center Road at Eastman Road / Lane Road | 254 | 245 | 400 |
| 31. Eastman Road at Prop Road1 | 143 | 133 | 232 |
| 32. Meredith Center Road at Prop Road2 | 378 | 451 | 522 |
| 13. Union Ave (US3Bus) at Elm Street / Clinton Street | 257 | 297 | 300 |
| 18. Union Ave (US3Bus) at Rite Aid / Gilford Ave | 44 | 155 | 128 |
| 14. Parade Road (NH106) at Lexington Drive | 655 | 845 | 549 |
| 15. N.Main Street at Oak Street | 527 | 710 | 447 |
| 19. N.Main Street at New Salem Street | 456 | 622 | 329 |
| 16. N.Main Street at Veterans Square / Church Street | 161 | 302 | 216 |
| 17. Main Street / S.Main Street at Court Street (US3Bus) / Union Ave (US3Bus) | 51 | 155 | 142 |
| 20. Court Street (US3Bus) at Fair Street | 205 | 229 | 67 |

## 6. RECOMMENDATIONS

Based on the above trip distribution through the network, we recommend quantitative analysis only for intersections meeting the following criteria:

1. less than 100 total trips in any peak hour, or,
2. less than 150 trips in any peak hour that are primarily through trips or right turns.

The intersections recommended for quantitative evaluation only include the following:

- Northern Network
    6. NH104 at Winona Road / Pease Road
    10. US3 (DW Highway) at Roller coaster Road / Watson Road
    11. US3 (DW Highway) at Endicott Street East
    12. US3 (DW Highway) at / Blaisdell Ave at US3Bus / US3 (DW Highway)
- Southern Network
    17. Main Street / S. Main Street at Court Street (US3Bus) / Union Ave (US3 Bus)
    18. Union Ave (US3bus) at RiteAid / Gilford Ave

Please review the information presented in this memo and let us know when you will be available for a meeting to review these matters, so that we can move ahead with completion of the full TIAS for this project.

Respectfully Submitted,
**TFMoran Inc.**

Robert Duval, PE
Jennifer Porter, PE