CONNECTICUT TRAFFIC SIGNAL PROGRAM INITIATIVE

Phase 1

Computerized Traffic Signal System Timing Plan Evaluation - CRCOG

JUNE 2023

COMPUTERIZED TRAFFC SIGNAL SYSTEM EVALUATION
Prepared for Connecticut Department of Transportation
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Connecticut Department of Transportation Partnering with
CRCOG CAPITOL REGION COUNCIL OF GOVERNMENTS
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List of Acronyms

Acronym	Definition
@	At
a.m.	ante meridiem or “before midday”
AVE.	Avenue
CCTV	Closed Circuit Television
CRCOG	Capital Region Council of Governments
CTDOT	Connecticut Department of Transportation
CTSS	Computerized Traffic Signal System
EB	Eastbound
FHWA	Federal Highway Administration
GPS	Global Positioning System
INDOT	Indiana Department of Transportation
INT	Intersection
LOS	Level of Service
MOE	Measures of Effectiveness
MPH	Miles Per Hour
N/A	Not Available
NB	Northbound
NCHRP	National Cooperative Highway Research Program
OST	Objectives, Strategies, Tactics
p.m.	post meridiem or “after midday”
SB	Southbound
ST.	Street
TSDWIN	Time Space Diagram Windows Program
Rd.	Road
RTE.	Route
UCONN	University of Connecticut
Vxx	Version Number
WB	Westbound

Glossary of Terms[i]

Capacity

The maximum rate at which vehicles can pass through an intersection under prevailing conditions.

Congestion

An excess of vehicles on a portion of roadway at a particular time resulting in speeds that are slower — sometimes much slower — than normal or "free flow" speeds.

Coordination

The ability to synchronize multiple intersections to enhance the operation of one or more directional movements in a system.

Cycle Length

The duration of a complete sequence of phases in the absence of priority calls. In an actuated controller unit, a complete cycle is dependent on the presence of calls for all non-priority phases. Some indications may be served more than once in a cycle. Occasionally, an indication may not be part of a normal cycle (e.g., a left-turn arrow may only be displayed during railroad preemption).

Offset

The time relationship between the coordinated phase(s) based on the offset reference point and a defined master reference (i.e., master clock or sync pulse).

Operating Environment

An area with similar characteristics that would have similar signal timing objectives.

Phase Splits

The time assigned to a phase (green and the greater of the yellow change plus red clearance or the pedestrian walk plus clearance times) during coordinated operations. May be expressed in seconds or as a percentage

Time-Space Diagram

A chart that plots the location of signalized intersections along the vertical axis and the signal timing along the horizontal axis. This is a visual tool that illustrates coordination relationships between intersections.

Traffic Signal Operations

The prioritization of objectives and active collection of information to efficiently manage traffic signal infrastructure and control devices to maximize safety and throughput while minimizing delays.

User Priority

A user may be assigned a relative or absolute priority based on operating environment and locally desired outcomes. These priorities may vary by movement.

Executive Summary

This document is meant to report the "before" and "after" results of the timing plan evaluation for the CTSS completed in Phase 1 of the optimization project. The Connecticut Department of Transportation (CTDOT) proposed the project to include approximately forty (40) corridors in the north-central portion of the State of Connecticut known as Capital Region Council of Governments (CRCOG) crcog.org. See Figures 3 and 4 for CRCOG location maps. These corridors were analyzed and refined to improve traffic flow and the safety of motorists and pedestrians. Below is a list of eight (8) corridors out of approximately forty (40) included in Phase 1 of the project:

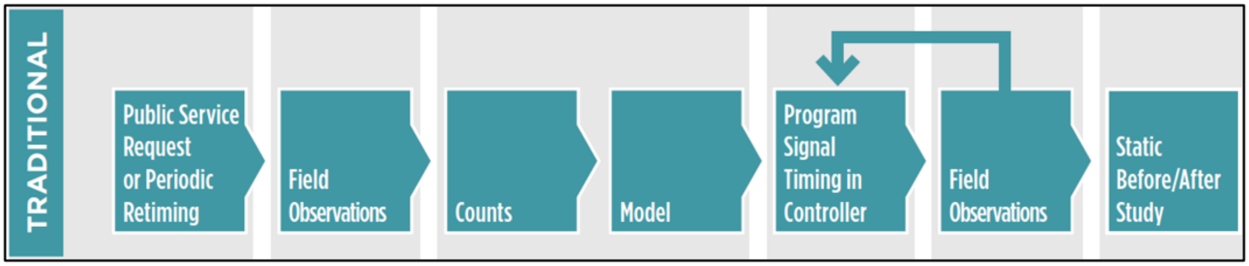
- Bloomfield/Windsor - Route 187 (Blue Hills Avenue), from Walsh Street to Park Avenue & Route 218 (Cottage Grove Road/Putnam Avenue), from Packard Street to I-91 Northbound Ramps
- East Windsor - Route 5 (South Main Street), from Abbe Road to Big Y Drive
- New Britain - Route 174 (Newington Avenue), from Chapman Street to Twin City Plaza
- Rocky Hill/Wethersfield - Route 99 (Silas Deane Highway), from I-91 SB Ramps to CVS & Wethersfield Shopping Plaza
- Southington - Route 10 (Queen Street), from Lazy Lane to River Street
- Windsor - Route 178 (Park Avenue), from I-91 Southbound Ramps to I-91 Northbound Ramps
- Windsor - Route 305 (Bloomfield Avenue), from Mountain Road to I-91 NB Ramps
- Windsor - Route 75 (Poquonock Avenue), from Hudson Lane to Shay Street

The purpose of the project was to prepare and implement traffic signal coordination timing plans along the study corridors and to measure the resulting changes in traffic signal operations. These timing plans were developed based on a data collection effort, field observations, operational / safety review, FHWA guidance and recommendations, and detailed traffic signal timing analysis which included utilizing a computerized software model (Such as Synchro/SimTraffic 11[ii] and Tru-Traffic[iii]).

Each corridor was evaluated from 6 a.m. to 6 p.m. Monday through Friday to improve CTSS operations by following the step-by-step signal system timing plan evaluation process as shown in Figure 1 below. CTDOT Bureau of Highway Operations - Traffic Management Unit updated the timing plans from 6 p.m. to 10 p.m. Monday through Friday and Saturday/Sundays. The added weekday evening, Saturday, and Sunday hours timing plans by CTDOT did not include evaluation measures.

The signalized intersections coordination timings were adjusted based on operating environment, volume demand during congestion and uncongested conditions, signal phasing, and proximity of intersections. Cycle lengths were balanced to move motor vehicles through the closely spaced signalized intersections while limiting wait times for side streets.

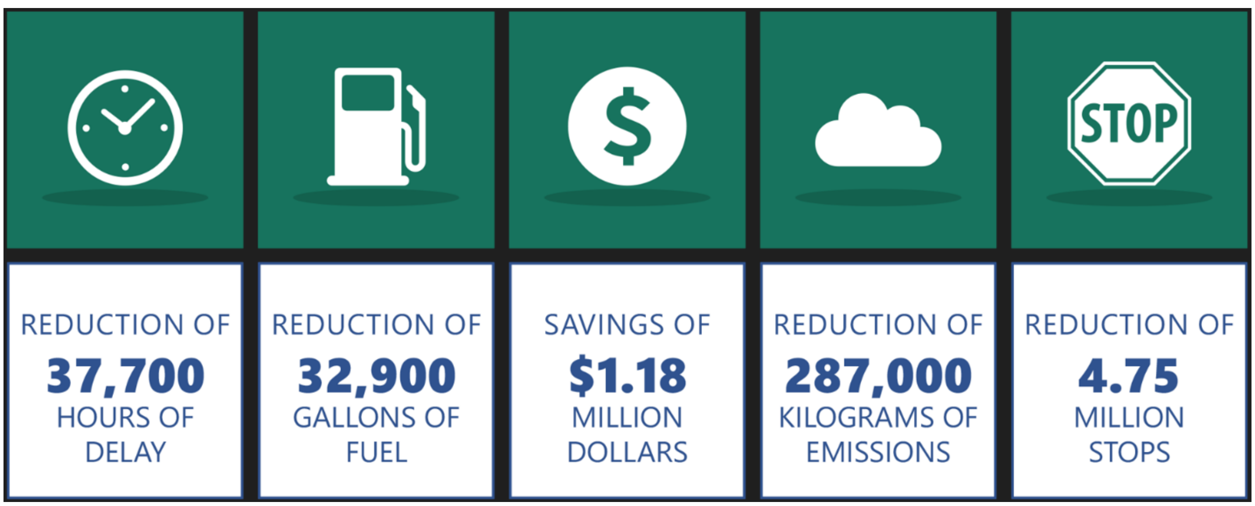
Figure 1: Timing Plan Evaluation Process



Source: NCHRP 954[iv]

The new traffic signal timing plans were implemented by the CTDOT Bureau of Engineering and Construction - Division of Traffic Engineering's Traffic Signal Lab and Bureau of Highway Operations - Traffic Management Unit. The timing plans were fine-tuned based on field observations to achieve the best results possible. To confirm and quantify these results, performance measures were documented in the form of travel time studies, which occurred both before and after the signal timing implementation and field fine-tuning tasks. Based on the "Before" and "After" data of the corridors studied in Phase 1, we saw reduction in the following: delays, fuel consumption, road user costs, emissions, and number of stops. This resulted in reducing travel times and improving travel speed. See results of the Benefit Cost calculations provided below for Phase 1 corridors in Figure 2.

Figure 2: Phase 1 Corridors Performance Measures Summary



It is determined that significant cost savings were achieved in all eight study corridors. On average, travel speeds were increased from an average of 24.6 mph to 28.7 mph, an increase of 17%. The number of stops were reduced by 4.75 million per year and travel times were reduced by an average of 16%. The Phase 1 reductions to delay and fuel are estimated to save Connecticut motorists over 37,700 hours of delay and $1.18 million in user (time and fuel) costs per year.

A benefit-to-cost analysis was completed for each phase study area to understand the return benefit based on the State's investment. The annual benefit of Phase 1 is estimated $1,180,000 for a 4-year life expectancy. The Consultant's cost of Phase 1 is $400,000 or $100,000 per year for 4 years. The benefit –to-cost ratio for Phase 1 is calculated to be 12:1.

This shows a significant return on investment through delay and fuel savings to Connecticut motorists. The reduction to stops and emissions provide a benefit to the air quality in Connecticut and is expected to provide added safety benefits by reducing crashes. Moreover, these savings are only inclusive for the portion of the day for which travel time data was collected.

Introduction

Timing plan evaluation of CTSS is a cost-effective method of improving traffic flow, reducing congestion, improving mobility and safety for all users. Federal Highway Administration (FHWA) guidance indicates that traffic signal systems need to be retimed every three (3) to five (5) years. The needs are based on changes in land use, population, demographics, and travel patterns. CTDOT's mission and goals emphasize a commitment to improving safety and mobility for all transportation users. This document identifies the results of the timing plan evaluation for approximately forty (40) corridors within the limits of the CRCOG area. This will help improve mobility and safety for all CTSS users and achieve CTDOT's mission and goals.

Phase 1 report documents the results of the first eight (8) corridors out of the approximately forty (40) studied in the CRCOG area. Figure 4 below shows the approximate CTDOT's CTSS locations.

Figure 3: CTDOT Statewide Map – CRCOG Region

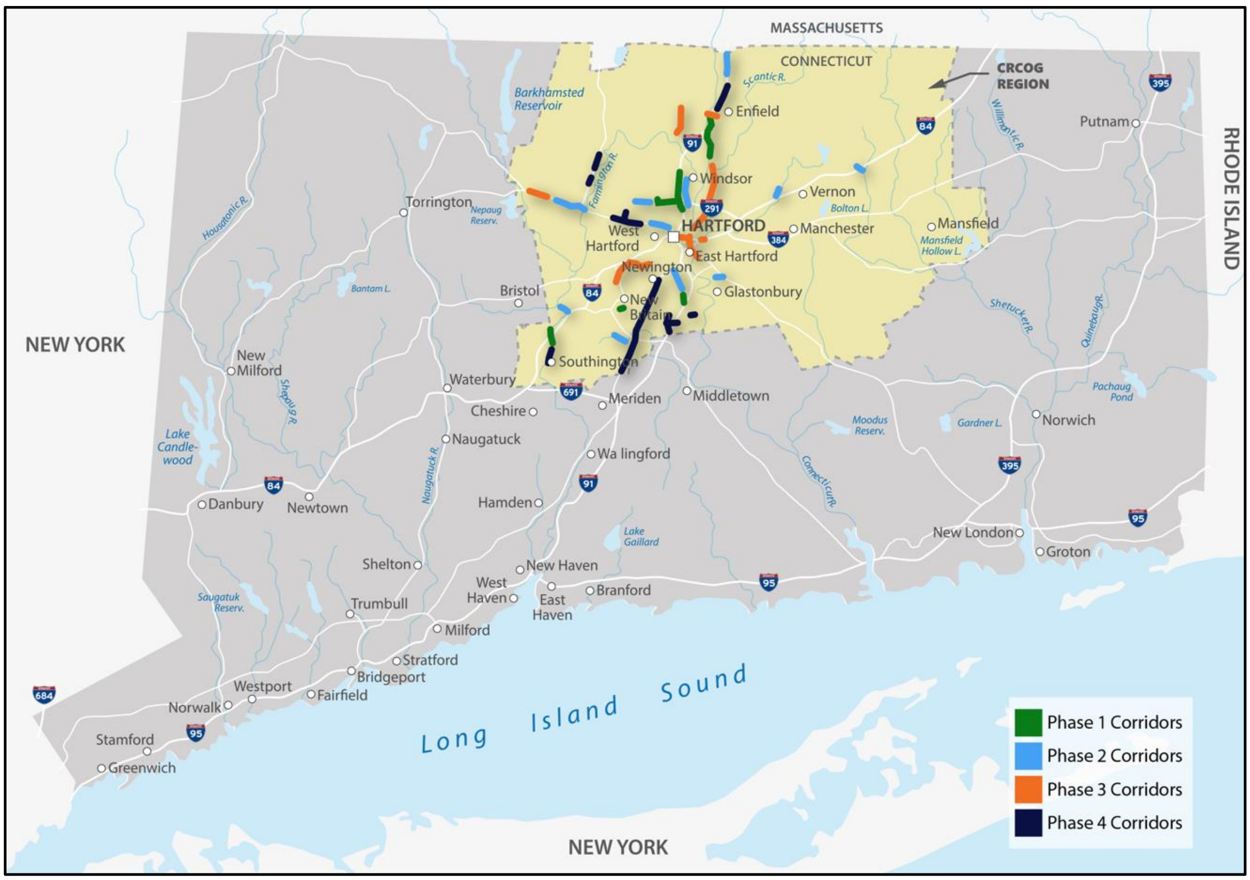
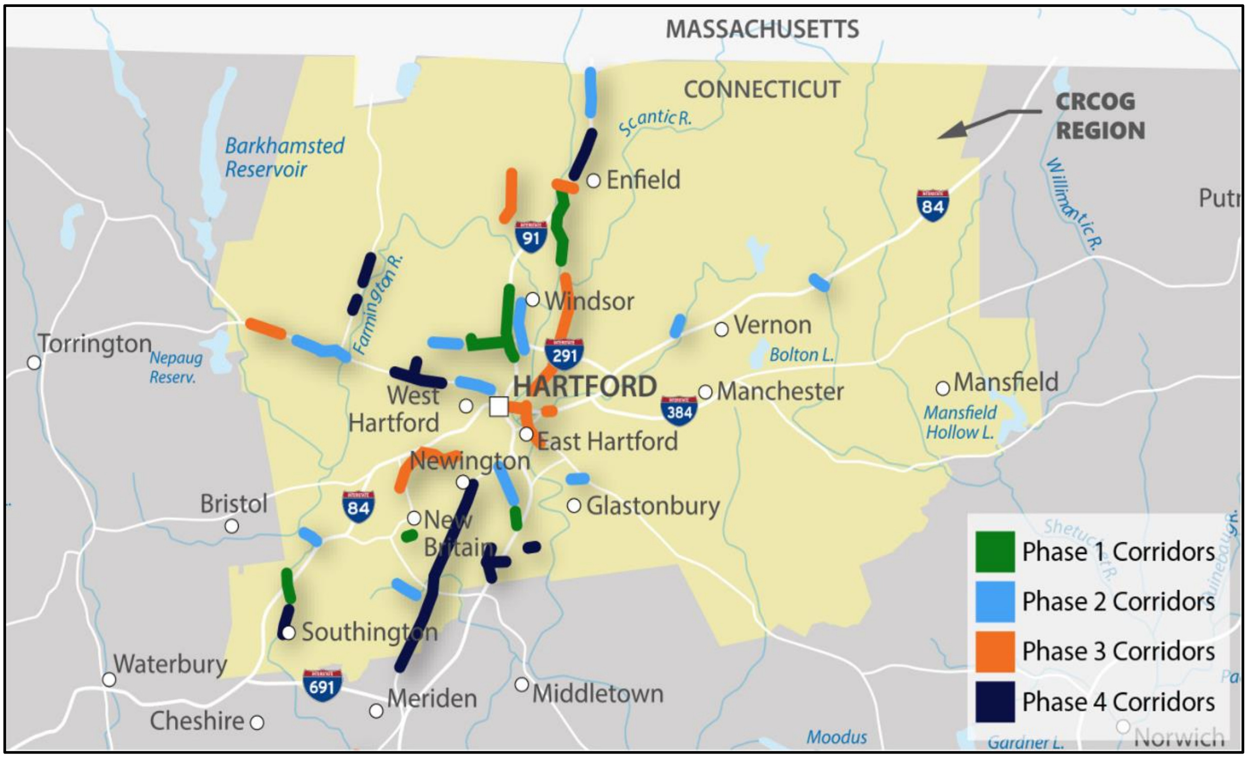
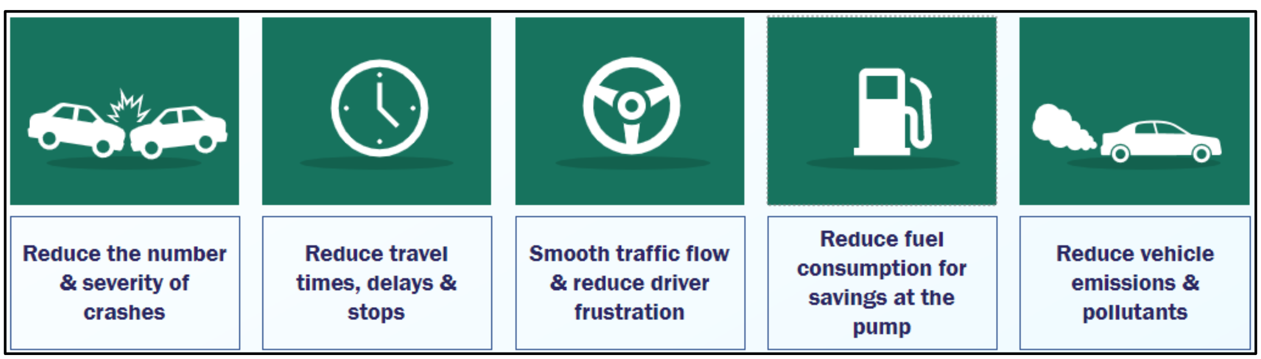


Figure 4: CTDOT CTSS Locations – CRCOG Region



CTDOT Green Light effort includes meeting key objectives and strategies shown below in Figure 5 that contribute to supporting CTDOT's mission and goals. The tactics are described in the timing plan development process below.

Figure 5: Project Objectives and Strategies



CTDOT and its Consultant team worked together to review the context of the corridors, perform traffic counts, travel time runs, and perform analysis to optimize each corridor using Synchro V11/SimTraffic, Tru-Traffic and field observations. Upon completion of the data collection tasks and optimization, new timing plans were implemented. CTDOT and the Consultant team then performed "after" travel time runs to quantify the benefits of the timing changes using the performance measures established by the project. The following is a list of the corridors, location, and system numbers, included in Phase 1. A detailed list of intersections within each corridor is provided in Appendix A.

- Bloomfield/Windsor - Route 187 (Blue Hills Avenue), from Walsh Street to Park Avenue & Route 218 (Cottage Grove Rd/Putnam Avenue), from Packard Street to I-91 Northbound Ramps
- East Windsor - Route 5 (South Main Street), from Abbe Road to Big Y Drive
- New Britain - Route 174 (Newington Avenue), from Chapman Street to Twin City Plaza
- Rocky Hill/Wethersfield - Route 99 (Silas Deane Highway), from I-91 SB Ramps to CVS & Wethersfield Shopping Plaza
- Southington - Route 10 (Queen Steet), from Lazy Lane to River Street
- Windsor - Route 178 (Park Avenue), from I-91 Southbound Ramps to I-91 Northbound Ramps
- Windsor - Route 305 (Bloomfield Avenue), from Mountain Road to I-91 NB Ramps
- Windsor - Route 75 (Poquonock Avenue), from Hudson Lane to Shay Street

The timing adjustments for the CRCOG area included travel time runs to calculate travel time measurement. Travel time runs include driving a vehicle though the study limits during weekday peak morning and afternoon hours to gather speed, stops, delay, and travel time measurements for both directions of travel. To learn more about the concept of how travel time runs are taken, watch the side-by-side video on the CTDOT Green Light website (CTDOT Green Light Main Page). The video demonstrates the before and after travel time runs for corridor Route 218 (Cottage Grove Road/Putnam Highway). See Appendix B for before and after travel times.

Figure 6: Route 218 (Travel Time Run Video)

Data Collection

Data collection and information review efforts were dual-purposed. First, it yielded the corridor characteristics, operating environment, and technical traffic signal information to perform calculations and support the development of new timing plans. Second, it provided the means to compare traffic signal operations from updated conditions to baseline conditions. See data sources used below:

State Provided Information

CTDOT provided the following:

- GRIDSMART or Miovision traffic volumes where available
- CTDOT Planning Unit volume counts
- Speed profiles from Google Maps
- Existing traffic signal plans
- Existing timing plan coversheets
- Existing time space diagrams
- Context of the corridors
- Travel time runs for assigned corridors

Consultant Collected Information

The Consultant team collected/created the following for each corridor

- Collected turning movement counts by classification from 6 a.m. to 6 p.m. Monday – Friday for specific intersections
- Collected crash data
- Collected distance between intersections
- Created travel time run data for assigned corridors
- Collected timing plan coversheets for assigned corridors
- Collected time space diagrams for assigned corridors
- Collected existing and created optimized Synchro V11 models for assigned corridors
- Collected field observations of traffic operations

Phase 1 Corridors Descriptions

The characteristic of each corridor was provided through CTDOT data sources, desktop reviews, and field observations as well as detailed discussion with CTDOT staff regarding the context of each intersection and corridor. Each corridor is described within this section including a map of locations and detailed technical table.

Bloomfield/Windsor, Route 187 & Route 218 (Blue Hills Avenue & Cottage Grove Road/Putnam Highway)

Route 187 and Route 218 (Blue Hills Avenue & Cottage Grove Road/Putnam Highway) corridor is a minor and principal arterial respectively through the towns of Bloomfield and Windsor. The arterial functional classifications for the project can be found on CTDOT's website at CTDOT Functional Classification. The corridor includes ten (10) signalized intersections beginning at Route 187 and Park Avenue (Int. 011-214) and ending at I-91 NB Ramps (Int. 164-251). The system is divided into two Subsystems A and B. See Figure 7 for location map. Each of the subsystems have common operating environments including roadway functionality, geographic surroundings, traffic signal phasing, motor vehicle volumes, buses, and pedestrian activity. Subsystem A (Blue Hills Avenue) begins at Park Avenue and spans two (2) signalized intersections for a half mile to Walsh Street/Englewood Avenue (Int. 011-212). Subsystem B (Cottage Grove Road/Putnam Highway) begins at Packard Street (Int. 011-248) and spans seven (7) signalized intersections to I-91 NB ramps. Blue Hills Avenue at Cottage Grove Road (Int. 011-211) is non-coordinated with adjacent intersections. The intersection is connected to monitor traffic signal operation from a central location. Blue Hills Avenue consists of two travel lanes in each direction with no median, sidewalks exist on both sides of the road, and no bike lane. Cottage Grove Road/Putnam Highway is approximately two miles long, has two travel lanes in each direction with no median, no existing sidewalks, and no bike lanes. The average two-way peak hour volumes for Cottage Grove Road/Putnam Highway are approximately 3,550, 2,300, and 3,600 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limits on Blue Hill Avenue and Cottage Grove Road/Putnam Highway are 30 and 40 mph, respectively. Routes 187 and 218 are considered a diversion route for I-91 when the highway experiences significant delays and queues.

The corridor's functional use varies from time of day, day of week. The Cottage Grove Road/Putnam Highway corridor serves as a major commuter route during the weekday mornings and the volumes continue to increase throughout the day. The Blue Hills Avenue corridor is primarily a commercial use area with some residential parcels. The corridor signalized intersections coordination timing was adjusted based on operating environment, operational objectives, volume demand, signal phasing, minimize wait times, and proximity of intersections.

The Blue Hills Avenue corridor users are a mix of motor vehicles, pedestrians, and public transportation – bus. There are pedestrian crosswalks/indications (Walk/Don't Walk) at Park Avenue, Walsh Street/Englewood Avenue, and Cottage Grove Road/Blue Hills Avenue. The pedestrian activity is considered moderate in this corridor. There are bus stops located along the corridor with moderate schedules. The Cottage Grove Road/Putnam Highway corridor users are predominantly motor vehicles. The I-291 Ramp (Int. 164-248) is a significant source of traffic volume for travel through the corridor. The Cottage Grove Road/Putnam Highway intersections do not include pedestrian indications except at Matianuck Avenue (Int. 164-247) where crosswalks/indications (Walk/Don't Walk) are provided for users. The Cottage Grove Road/Putnam Highway corridor does not include public bus transportation.

Late evening/night is uncongested with lower volume that is better suited for equitable green to reduce side street wait times by not providing preferential time for arterial coordination. In optimizing the traffic signal system timings, Blue Hills Avenue and Cottage Grove Road/Putnam Highway achieved better traffic flow in both directions and improved timings for local operational movements that meet all the user needs. Table 1 below shows further details of each signalized intersection throughout this corridor.

Figure 7: Bloomfield/Windsor, Route 187 & 218 Location Map

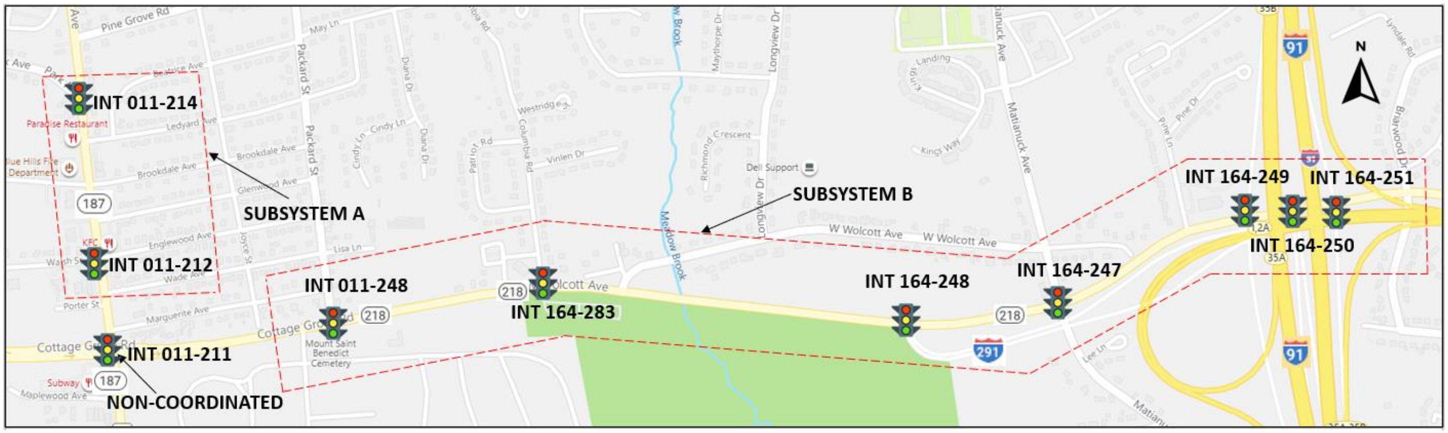


Table 1. Bloomfield/Windsor Details, Route 187 & Route 218 (Blue Hill Avenue & Cottage Grove Road/Putnam Highway)

Bloomfield/Windsor, Route 187 & Route 218						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
011-214	A	RTE 187 AT PARK AVENUE	V	V	Copper Aerial	Naztec V41
011-212	A	RTE 187 AT WALSH STREET	V	L	Copper Aerial/Underground	Naztec V41
011-211	N/A	RTE 187 AT RTE 218	V	V	Copper Underground	Naztec V41
011-248	B	RTE 218 AT PACKARD ST.	L	NONE	Copper Underground	Naztec V41
164-283	B	RTE 218 AT COLUMBIA RD.	V	NONE	Copper Underground	Naztec V41
164-248	B	RTE 218 AT I-291 RAMPS	L	NONE	Copper Underground	Naztec V41
164-247	B	RTE 218 AT MATIANUCK AVENUE	L	NONE	Copper Underground	Naztec V41
164-249	B	RTE 218 AT I-91 SB RAMPS	L	NONE	Copper Underground	Naztec V41
164-250	B	RTE 218 AT I-91 HOV RAMPS	L	NONE	Copper Underground	Naztec V41
164-251	B	RTE 218 AT I-91 NB RAMPS	L	NONE	Copper Underground	Naztec V41
L = Loop, V = Video (Non recording)						

East Windsor, Route 5 (Main Street/Prospect Hill Road)

Route 5 (Main Street/Prospect Hill Road) corridor is a north/south principal arterial through the town of East Windsor. The corridor includes eleven (11) signalized intersections beginning at Abbe Road (Int. 046-214) and ending at Cinema Drive (Int. 046-225). This corridor is 3.4 miles long, has one travel lane in each direction south of Thompson Road (Int. 046-201), and two travel lanes in in each direction from Thompson Road to Walmart (Int. 046-228). This corridor does not have a median, sidewalks, or bike lanes. The average two-way peak hour volumes are approximately 1,450, 1,050, and 1,950 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limit is 45 mph. Route 5 is considered a diversion route for I-91 when the highway experiences significant delays and queues.

The corridor is divided into three Subsystems A, B, and C. Each of the subsystems have common operating environments including roadway functionality, geographic surroundings, traffic signal phasing, motor vehicle volumes, bus, and pedestrian activity. The corridor's functional use varies from time of day, day of week, and subsystems of intersections. Traffic volumes increase for morning peak, lower for midday and off-peak, and increase again during the p.m. peak. Throughout this corridor there are auto dealerships, local businesses, schools, and industrial properties. The Walmart, I-91 Exit 44 Ramps (Int. 046-209), and Thompson Road intersections in Subsystem B create complex traffic patterns for vehicles traveling through the corridor or travel to the area. The northern two intersections in Subsystem C, Big Y (Int. 046-226) and Cinema Drive, experience lighter traffic traveling to the area than the other two subsystems. The a.m. traffic volumes are higher in the southbound direction and the p.m. traffic volumes are higher in the northbound direction.

The corridor users are predominantly motor vehicles. There are pedestrian crosswalks/indications (Walk/Don't Walk) provided at Tromley Road (Int. 046-213) to accommodate the school crossings. The pedestrian activity is intermittent throughout this corridor due to no existing sidewalks and bus stops. The corridor is uncongested with lower volume during non-peak hours that is better suited for equitable green to reduce wait times for side streets by not providing preferential time for arterial coordination. In optimizing the traffic signal system timings, Route 5 East Windsor achieved better traffic flow in both directions and improved timings for local operational movements that meet all the user needs and priority movements. Table 2 below shows further details of each signalized intersection throughout this corridor.

Figure 8: East Windsor, Route 5 Location Map

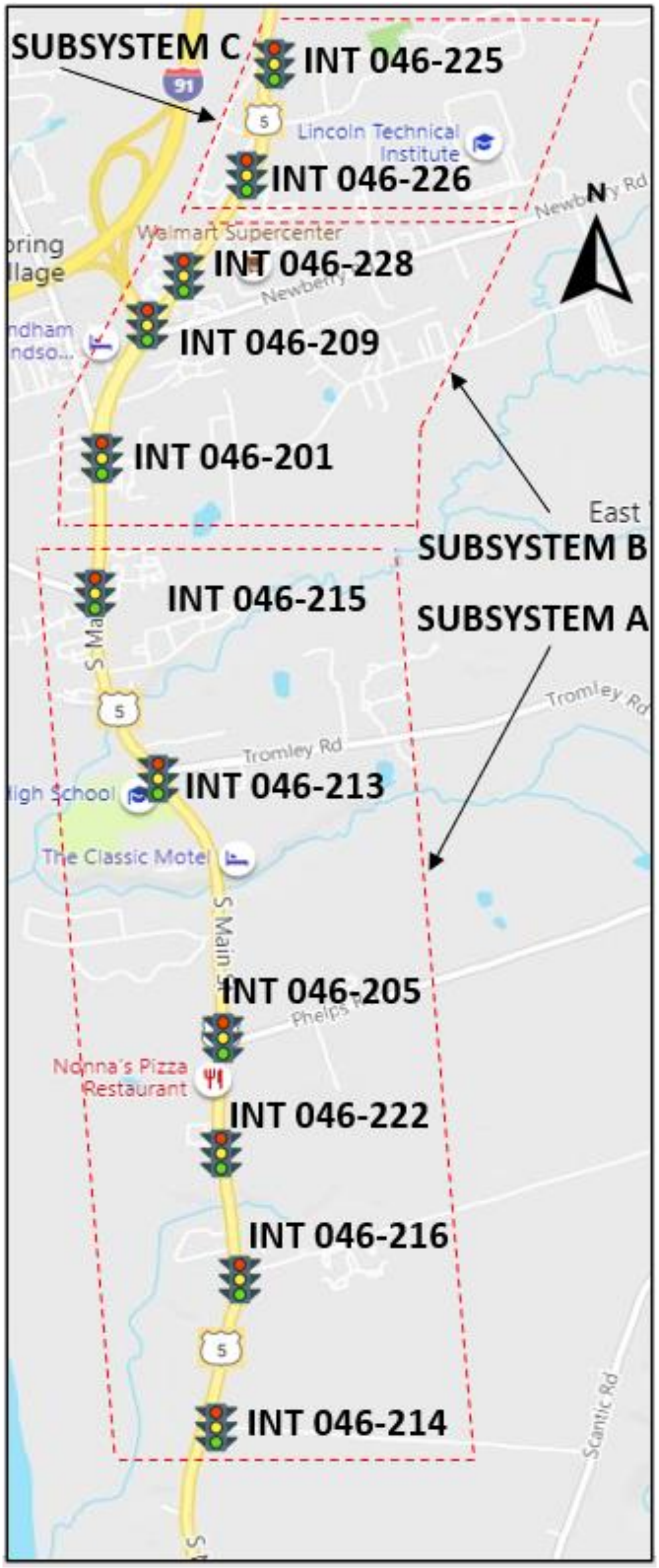


Table 2. East Windsor Details, Route 5 (Main Street/Prospect Hill Road)

East Windsor, Route 5						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
046-214	A	RTE 5 AT ABBE ROAD	V	NONE	Copper Aerial	Naztec V41
046-216	A	RTE 5 AT STOUGHTON ROAD	V	NONE	Copper Aerial	Naztec V41
046-222	A	RTE 5 AT SOUTHERN AUTO SALES	V	NONE	Copper Aerial	Naztec V41
046-205	A	RTE 5 AT RTE 191 (PHELPS RD)	V	NONE	Copper Aerial	Naztec V41
046-213	A	RTE 5 AT TROMLEY ROAD	V	V	Copper Aerial	Naztec V41
046-215	A	RTE 5 AT SOUTH WATER ST	V	NONE	Copper Aerial	Naztec V41
046-201	B	RTE 5 AT THOMPSON ROAD	V	V	Copper Aerial	Naztec V41
046-209	B	RTE 5 AT RTE 91 RAMPS	V	V	Copper Aerial	Naztec V41
046-228	B	RTE 5 AT RTE 5 WENDY’S & WALMART DRIVES	L	L	Copper Aerial	Naztec V41
046-226	C	RTE 5 AT BIG Y MARKET	V	V	Copper Aerial	Naztec V41
046-225	C	RTE 5 AT CINAMA DRIVE	L	L	Copper Aerial	Naztec V41
L = Loop, V = Video (Non recording)						

New Britain, Route 174 (Newington Avenue)

Route 174 (Newington Avenue) corridor is an east/west minor arterial through the eastern part of the city of New Britain. It includes four (4) signalized intersections beginning at Chapman Street (Int. 088-233) and ending at Charles Street & Twin City Plaza (Int. 088-254). This corridor is 0.3 miles long, has one travel lane in each direction with no median, sidewalks exist on both sides of the roadway, and no bike lanes. The average two-way peak hour volumes are approximately 1,150, 940, and 1,470 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limit is 35 mph.

This corridor serves as a local east/west commuter and commercial route that provides access to schools, parks, commercial retail establishments, manufacturing facilities, and residential areas. There are pedestrian crosswalks/indications (Walk/Don't Walk) provided at each of the intersections except at Charles Street & Twin City Plaza. The intersections with pedestrian facilities provided run as side street green where pedestrians cross the road with the side street traffic. A typical pedestrian head for side street green is a green, yellow, and red indication. There is intermittent pedestrian activity occurring at all intersections except at Chapman Street which experiences more active crossings before and after school crossing hours. There are bus stops located along the corridor with intermittent schedules. The corridor is uncongested with lower volume during non-peak hours that is better suited for equitable green to reduce wait times for side streets by not providing preferential time for arterial coordination. In optimizing the traffic signal system timings, Route 174 achieved better traffic flow in both directions with improved timing for local operational movements that meet all the user needs and priority movements. Table 3 below shows further details of each signalized intersection throughout this corridor.

Figure 9: New Britain, Route 174 Location Map

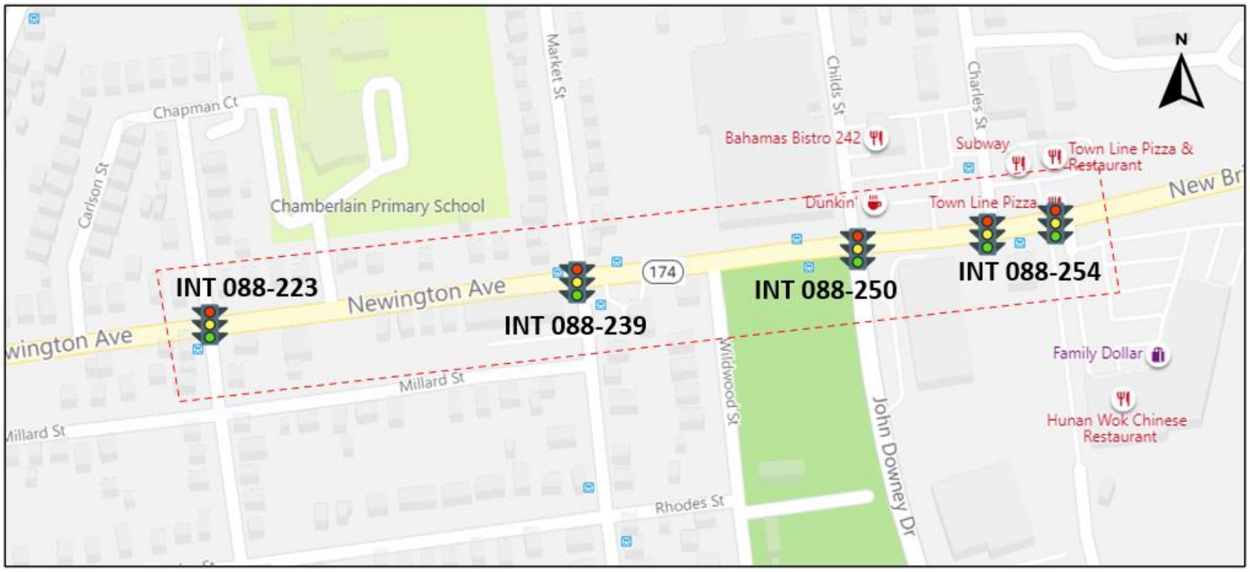


Table 3. New Britain Details, Route 174 (Newington Avenue)

New Britain, Route 174						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
088-223	A	RTE 174 @ CHAPMAN STREET	V	NONE	Copper Aerial	Naztec V41
088-239	A	RTE 174 @ MARKET STREET	V	NONE	Copper Aerial	Naztec V41
088-250	A	RTE 174 @ JOHN DOWNEY DR	V	NONE	Copper Aerial	Naztec V41
088-254	A	RTE 174 @ CHARLES STREET	L, V	NONE	Copper Aerial	Naztec V41
L = Loop, V = Video (Non-recording)						

Rocky Hill/Wethersfield, Route 99 (Silas Deane Highway)

Route 99 (Silas Deane Highway) corridor is a north/south minor arterial through the towns of Rocky Hill and Wethersfield. It includes six (6) signalized intersections beginning at I-91 SB ramps (Int. 118-233) and ending at Wethersfield Shopping Center (Int. 159-246). This corridor is 0.8 miles long, has two travel lanes in each direction with no median, sidewalks exist on both sides of the roadway north of Town Line Road (Int. 118-209), and no bike lanes. The average two-way peak hour volumes are approximately 1,800, 1,500, and 2,100 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limit is 35 mph. Route 99 is considered a diversion route for I-91 when the highway experiences significant delays and queues.

The corridor's functional use varies from time of day, day of week. All the traffic signals are grouped as one coordinated system. The corridor serves as a major commuter route during the weekday mornings and later in the afternoon. The corridor experiences significant commercial activity midday through evening hours and again during the weekend. The intersection of Town Line Road experiences significant northbound left turn traffic and traffic from Town Line Road throughout the weekday and weekends. Traffic flow is approximately equal in each direction with volumes continuing to rise through the day until evening peak.

The corridor users are predominantly motor vehicles. There are pedestrian crosswalks/indications (Walk/Don't Walk) provided at each of the intersections except at I-91 SB Ramps. The pedestrian activity is considered moderate in this corridor except at I-91 SB Ramps which is considered intermittent. There are bus stops located along the corridor with intermittent schedules. The corridor is uncongested with lower volume during non-peak hours that is better suited for equitable green to reduce wait times for side streets by not providing preferential time for arterial coordination. In optimizing the traffic signal system timings, Route 99 in Rocky Hill and Wethersfield achieved better traffic flow in both directions with improved timing for local operational movements that meets all the user needs. Table 4 below shows further details of each signalized intersection throughout this corridor.

Figure 10: Rocky Hill/Wethersfield, Route 99 Location Map

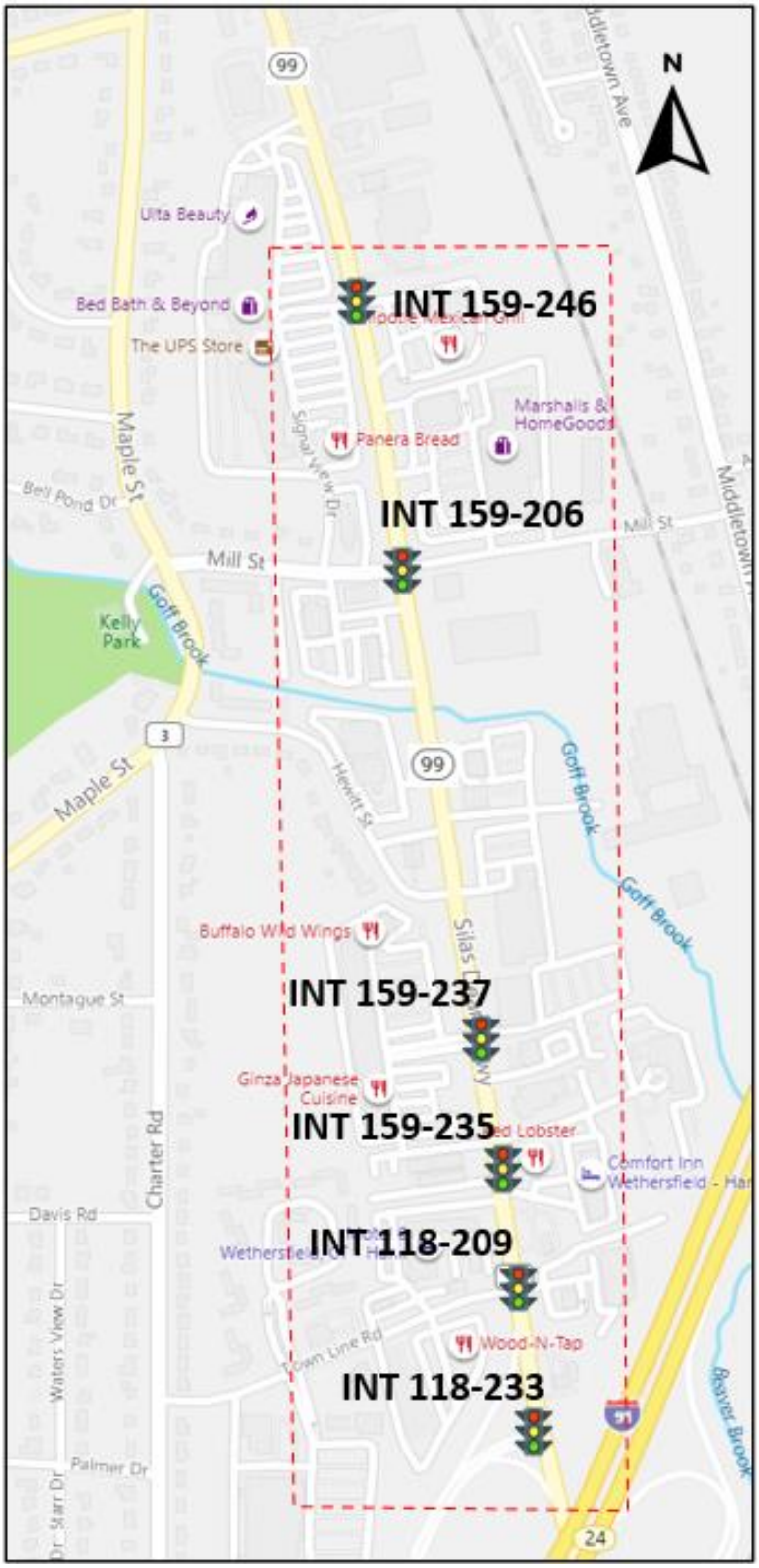


Table 4. Rocky Hill/Wethersfield Details, Route 99 (Silas Deane Highway)

Rocky Hill/Wethersfield, Route 99						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
118-233	A	RTE 99 AT I-91 SB RAMPS	V	NONE	Copper Underground	Cubic V85
118-209	A	RTE 99 AT TOWN LINE ROAD	V	V	Copper Aerial/Underground	Cubic V85
159-235	A	RTE 99 AT EXECUTIVE SQUARE	L	NONE	Copper Underground	Cubic V85
159-237	A	RTE 99 AT GOFF BROOK SHOPS	L	NONE	Copper Aerial/Underground	Cubic V85
159-206	A	RTE 99 AT MILL STREET	V	V	Copper Aerial	Cubic V85
159-246	A	RTE 99 AT WETHERSFIELD SHOP	L	NONE	Copper Aerial/Underground	Cubic V85
L = Loop, V = Video (Non-recording)						

Southington, Route 10 (Queen Street)

Route 10 (Queen Street) corridor is a north/south principal arterial through the town of Southington. The corridor includes twelve (12) signalized intersections beginning at Lazy Lane (Int. 131-265) and ending at River Street (Int. 131-216). This corridor is 1.5 miles long, has two travel lanes in each direction with no median, sidewalks exist on both sides of the roadway, and no bike lanes. The average two-way peak hour volumes are approximately 1,600, 2,000, and 2,300 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limit is 40 mph. Route 10 is considered a diversion route for I-84 when the highway experiences significant delays and queues.

The corridor's functional use varies from time of day, day of week, and areas of intersections with varying hourly traffic volumes. The corridor serves as a major commuter route during the weekday mornings and again later in the afternoon. The vast number of commercial properties and driveways along with I-84 Exit 32 create complex traffic patterns for vehicles traveling through the corridor or destinations within the corridor during weekdays. The timing plans have limitations due to the intersection's proximity to one another and reduced left turning storage bay lengths.

The corridor users are predominantly motor vehicles. Pedestrian crosswalks/indications (Walk/Don't Walk) are provided at Queen Bee Plaza (Int. 131-237), Southington Plaza South Drive (Int. 131-213), and River Street. The pedestrian activity is considered intermittent for this corridor. There are no transit bus stops located along the corridor. Optimizing the traffic signal system timings on Route 10 Southington achieved a better focus on managing throughput and queue congestion from the Lazy Lane to Southington Plaza North Drive (Int. 131-214). The corridor is divided into two Subsystems A and B. Each of the subsystems have common operating environments including roadway functionality, geographic surroundings, traffic signal phasing, motor vehicle volumes, bus, and pedestrian activity. Subsystem A is grouped to improve travel based on need to meet traffic volumes, congestion, short left turn storage bays, and the proximity of intersections. Subsystem B from Aircraft Road (Int. 131-215) to River Street is grouped based on coordination limitations with Subsystem A including changes in the length of left turn bays, turning movement volume, and intersection proximity. The corridor is uncongested with lower volume during non-peak hours that is better suited for equitable green to reduce wait times for side streets by not providing preferential time for arterial coordination. Table 5 below shows further details of each signalized intersection throughout this corridor.

Figure 11: Southington, Route 10 Location Map

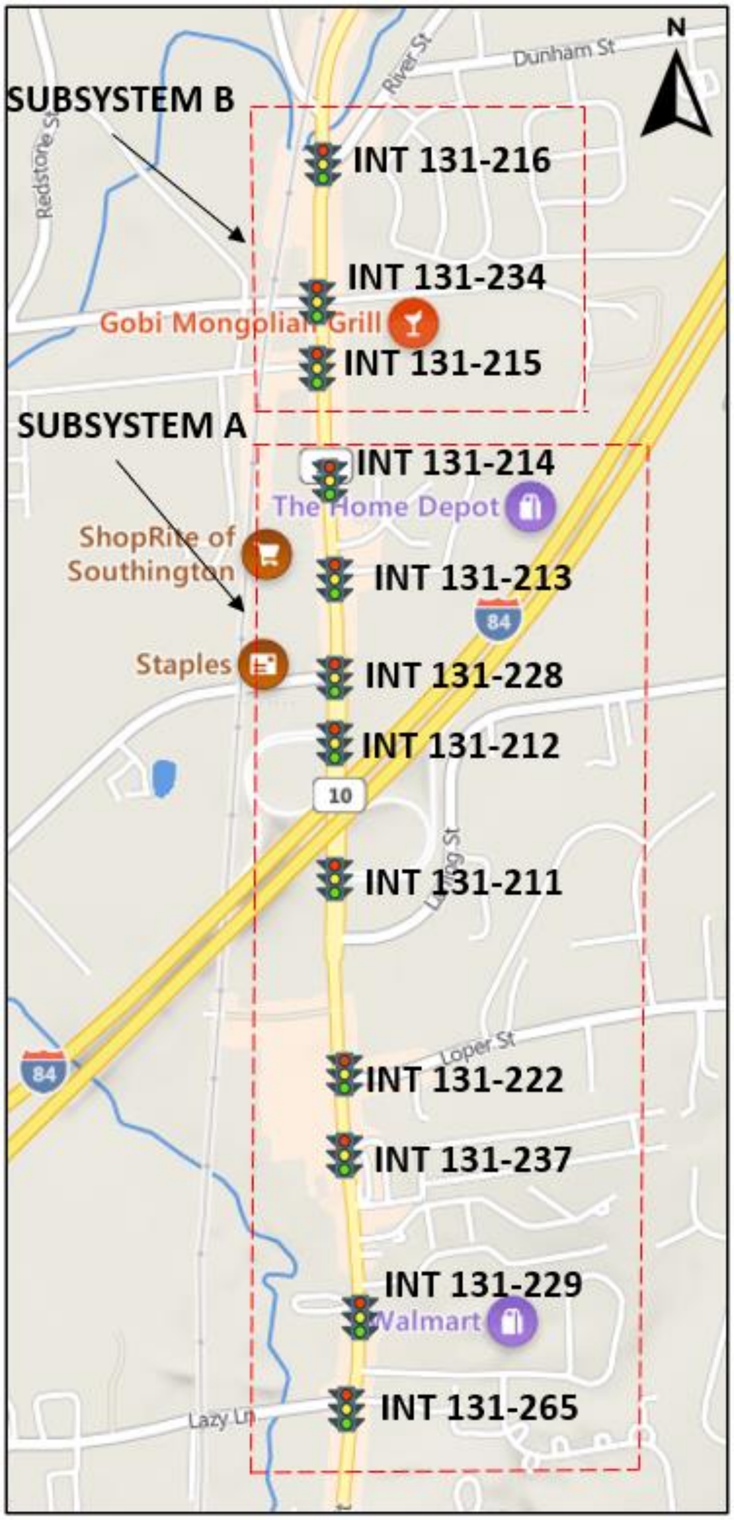


Table 5. Southington Details, Route 10 (Queen Street)

Southington Route 10						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
131-265	A	RTE 10 AT LAZY LANE	V	NONE	Copper Underground	Naztec V41
131-229	A	RTE 10 AT SHOPPING PLAZA	V	NONE	Copper Underground	Naztec V41
131-237	A	RTE 10 AT QUEEN "B" PLAZA	V	NONE	Copper Underground	Naztec V41
131-222	A	RTE 10 AT LOPER STREET	V	NONE	Copper Underground	Naztec V41
131-211	A	RTE 10 AT I-84 E.B. RAMPS	V	NONE	Copper Underground	Naztec V41
131-212	A	RTE 10 AT I-84 W.B. RAMPS	V	NONE	Copper Underground	Naztec V41
131-228	A	RTE 10 AT SPRING STREET	V	NONE	Copper Underground	Naztec V41
131-213	A	RTE 10 AT SOUTHINGTON PLAZA SOUTH	V	NONE	Copper Underground	Naztec V41
131-214	A	RTE 10 AT SOUTHINGTON PLAZA NORTH	V	NONE	Copper Underground	Naztec V41
131-215	B	RTE 10 AT AIRCRAFT ROAD	V	NONE	Copper Underground	Naztec V41
131-234	B	RTE 10 AT WEST QUEEN STREET	V	NONE	Copper Underground	Naztec V41
131-216	B	RTE 10 AT RIVER STREET	V	NONE	Copper Underground	Naztec V41
V = Video (Non-recording)						

Windsor, Route 178 (Park Avenue)

Route 178 (Park Avenue) corridor is an east/west minor arterial through the town of Windsor. It includes two (2) signalized intersections beginning at I-91 NB ramps (Int. 164-257) and ending at I-91 SB ramps (Int. 164-258). This corridor is 0.1 miles long, has two travel lanes in each direction with no median, a sidewalk is present on the south side of the roadway, and no bike lanes. The average two-way peak hour volumes are approximately 1,400, 800, and 1,500 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limit is 40 mph. Route 178 is considered a diversion route for I-91 when the highway experiences significant delays and queues.

This corridor serves travelers from the Interstate to destinations east and west of the area. There are pedestrian crosswalks on the south side of the roadway with no pedestrian indications. There is typically intermittent pedestrian activity in this area. There are no bus stops located along the corridor. The corridor is uncongested with lower volume during non-peak hours that is better suited for equitable green to reduce wait times for side streets by not providing preferential time for arterial coordination. In optimizing the traffic signal system timings, Route 178 Windsor achieved better traffic flow in both directions that improve timing for local operational movements that meet all the user needs. Table 6 below shows further details of each signalized intersection throughout this corridor.

Figure 12: Windsor, Route 178 Location Map

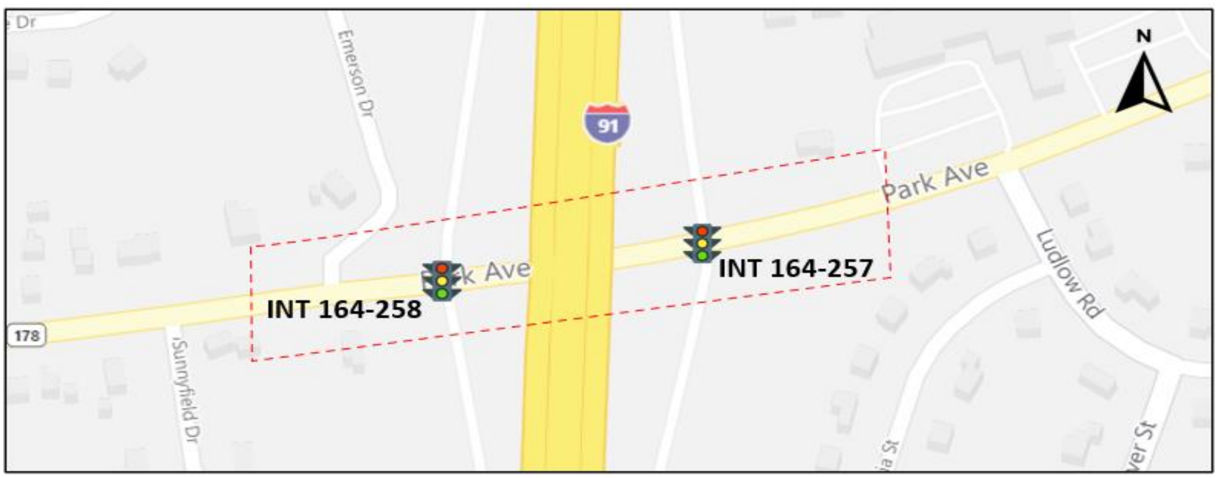


Table 6. Windsor Details, Route 178 (Park Avenue)

Windsor, Route 178						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
164-257	A	RTE 178 AT I-91 NB RAMPS	L	NONE	Copper Underground	Naztec V61
164-258	A	RTE 178 AT I-91 SB RAMPS	L	NONE	Copper Underground	Naztec V61
L = Loop						

Windsor, Route 305 (Bloomfield Avenue)

Route 305 (Bloomfield Avenue) corridor is an east/west minor arterial through the town of Windsor. The corridor includes five (5) signalized intersections beginning at I-91 NB ramps (Int. 164-241) and ending at Mountain Road (Int. 164-209). This corridor is 0.2 miles long, has two travel lanes in each direction with a median, sidewalks exist on both sides of the roadway, and no bike lanes. The average two-way peak hour volumes are approximately 1,600, 1,150, and 1,750 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limit is 35 mph. Route 305 is considered a diversion route for I-91 when the highway experiences significant delays and queues.

This corridor serves travelers from the Interstate to destinations east and west of the area. The intersections on Bloomfield Avenue does not include pedestrian indications except at Mountain Road where crosswalks/indications (Walk/Don’t Walk) are provided for users. There is intermittent pedestrian activity in this area. There are a few bus stops located along the corridor near Mountain Road intersection. There is a significant volume of traffic from the I-91 NB Ramps that travels west on Bloomfield Avenue to the industrial areas. This type of traffic pattern exists throughout the day including a large amount of truck traffic. In optimizing the traffic signal system timings, Route 305 Windsor focused on the I-91 NB Ramp left turn heading west on Route 305. Both I-91 ramps were adjusted with consideration of short wait times and sufficient green times for the interstate ramps. The corridor is uncongested with lower volume during non-peak hours that is better suited for equitable green to reduce wait times for side streets by not providing preferential time for arterial coordination. The changes improved timing for local operational movements that meet all the user needs. Table 7 below shows further details of each signalized intersection throughout this corridor.

Figure 13: Windsor, Route 305 Location Map

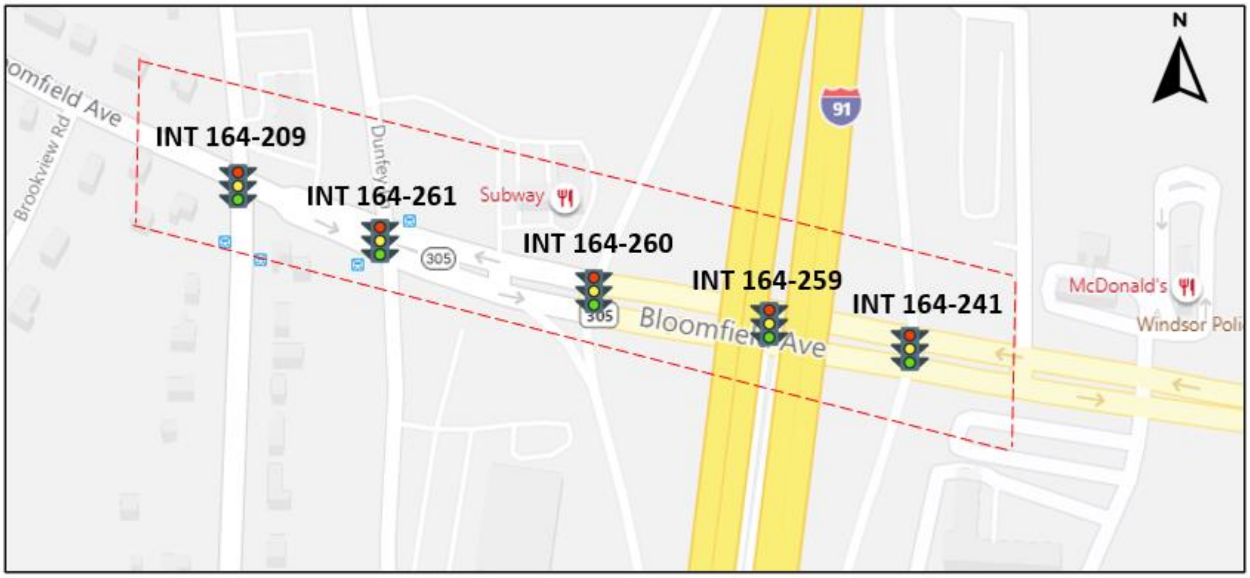


Table 7. Windsor Details, Route 305 (Bloomfield Avenue)

Windsor, Route 305						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
164-241	A	RTE 305 AT I-91 NB RAMPS	V	NONE	Copper Underground	Naztec V41
164-259	A	RTE 305 AT I-91 HOV OFF RAMP	V	NONE	Copper Underground	Naztec V41
164-260	A	RTE 305 AT I-91 SB RAMPS	V	NONE	Copper Underground	Naztec V41
164-261	A	RTE 305 AT DUNFEY LANE	V	NONE	Copper Underground	Naztec V41
164-209	A	RTE 305 AT MOUNTAIN ROAD	V	V	Copper Underground	Naztec V41
V = Video (Non-recording)						

Windsor, Route 75 (Poqunock Avenue)

Route 75 (Poqunock Avenue) corridor is an east/west principal arterial through the town of Windsor. It includes six (6) signalized intersections beginning at Shay Street (Int. 164-284) and ending at Hudson Lane (Int. 164-273). This corridor is 0.5 miles long, has two travel lanes in each direction with no median, a sidewalk is present on the westbound side of the road, and no bike lanes. The average two-way peak hour volumes are approximately 1,950, 1,400, and 2,250 vehicles for a.m., midday, and p.m. peak hours, respectively. The posted speed limit is 35 mph. Route 75 is considered a diversion route for I-91 when the highway experiences significant delays and queues.

This corridor serves travelers from the Interstate to destinations east and west of the area. The Poqunock Avenue intersections do not include pedestrian indications. There is intermittent pedestrian activity in this area. There are bus stops located along the corridor. There is a significant volume of traffic from Day Hill Road (Int. 164-272) that heads east to the I-91 NB Ramps (Int. 164-262) during the afternoon peak. The intersection at Shay Street is the only intersection in the corridor with commercial activity. The focus was on improving traffic flow both directions with consideration of short wait times and sufficient green times for the interstate ramps. The corridor is uncongested with lower volume during non-peak hours that is better suited for equitable green to reduce wait times for side streets by not providing preferential time for arterial coordination. The changes improved timing for local operational movements that meet all the user needs. Table 8 below shows further details of each signalized intersection throughout this corridor.

Figure 14: Windsor, Route 75 Location Map

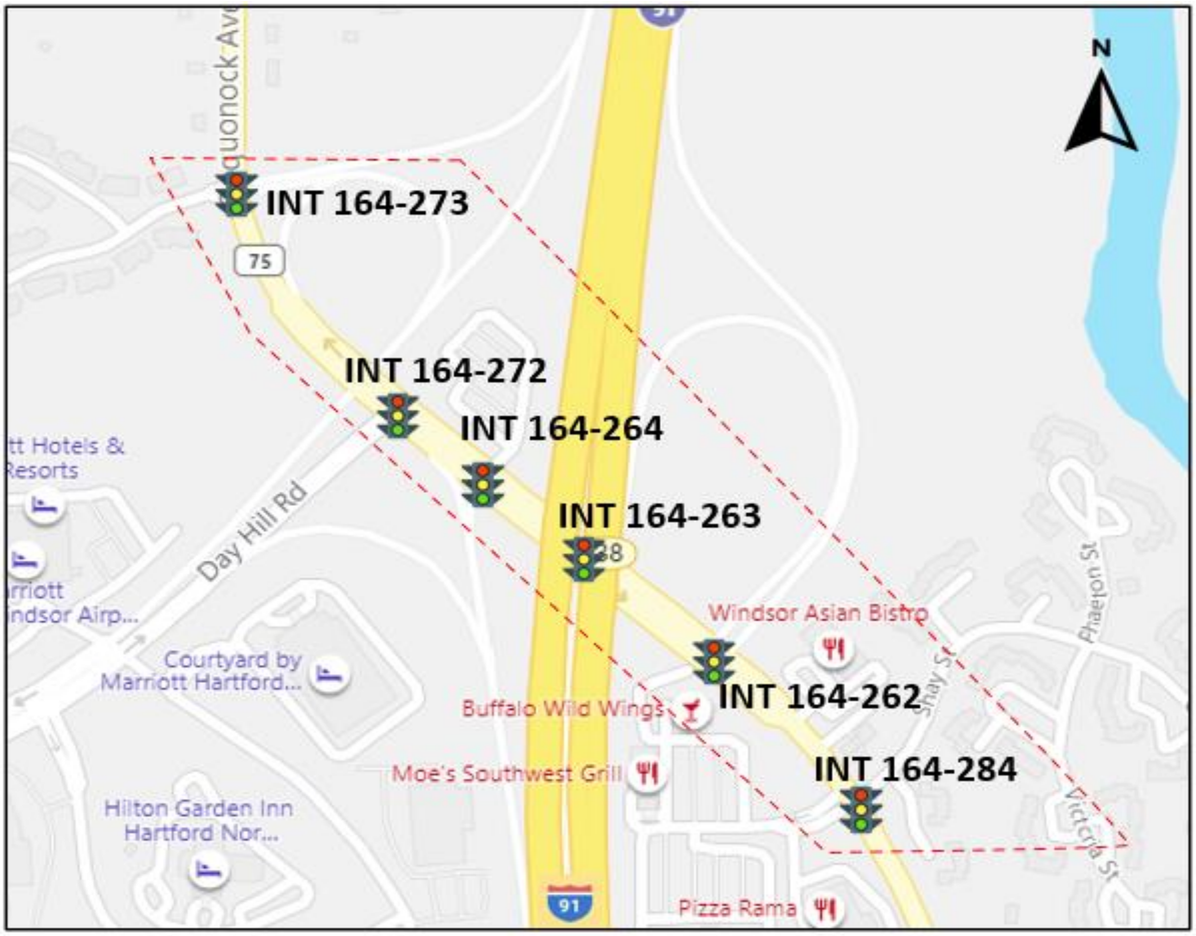


Table 8. Windsor Details, Route 75 (Poqunock Avenue)

Windsor, Route 75						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
164-284	A	RTE 75 AT SHAY STREET	L	NONE	Copper Underground	Naztec V41
164-262	A	RTE 75 AT 91 NB RAMPS	V	NONE	Copper Underground	Naztec V41
164-263	A	RTE 75 AT I-91 HOV RAMP	L	NONE	Copper Underground	Naztec V41
164-264	A	RTE 75 AT I-91 SB RAMP	L	NONE	Copper Underground	Naztec V41
164-272	A	RTE 75 AT DAY HILL ROAD	L	NONE	Copper Underground	Naztec V41
164-273	A	RTE 75 AT HUDSON LANE	V	NONE	Copper Underground	Naztec V41
L = Loop, V = Video (Non-recording)						

Traffic Signal Optimization

Synchro Network Development

A base network was created for each corridor by using computer analysis software (Synchro V11). Existing intersection geometry, posted speed limits, traffic volumes (Appendix C), and signal timings were used in the creation of these models. The models were then calibrated using the "before" travel time run data from Tru-Traffic and SimTraffic to make sure that Synchro V11 was reflecting existing conditions as closely as possible.

Operational Analysis

Building upon the base networks developed and calibrated as described in the previous section, an analysis was performed to optimize cycle lengths and phase splits. The operational analysis focused on improving mobility in the corridor based on the objectives and strategies established for each corridor. Context discussions were held to identify characteristics of each corridor to be considered in the analysis. For example, in some corridors, the user needs, and priorities are to improve traffic flow for uncongested conditions. In other corridors, the user needs, and priorities are to manage queues for congested conditions. Most corridors included user needs and priorities to address both uncongested and congested conditions for various hours of day and day of week time periods.

The operational analysis imbeds NCHRP Report 812 *Signal Timing Manual 2nd Ed.*[v] guidance to include an outcome-based approach utilizing traffic signal system timing objectives and performance measures that ensures all the user needs and priorities are met. The outcome-based approach to signal timing allows the analyst to develop signal timing based on the operating environment, users, user priorities by movement, and local operational objectives. Performance measures are then used to assess how well the objectives are being met. Once the objectives and performance measures are established, timing strategies and timing values can be chosen. The final steps of the process involve implementation and observation (i.e., determining if the timing strategies and values are working), as well as sustaining operations that meet the operational objectives through monitoring and maintenance.

Crash Data

Crash data was downloaded from the UCONN Connecticut Crash Data Repository Website[vi] ctcrash.uconn.edu for each corridor studied in Phase 1 of the project. The crash data period is from 1/1/2017 to 12/31/2019. The data was reviewed for crash patterns that may be reduced or be eliminated by changes to signal coordination timings. For example, rear-end and same direction side swipe type crashes are related to quality of traffic flow and queue management. If these types of conditions were identified, then the crash data was used in developing the timing plans and are noted in the corridor descriptions if applicable. Detailed crash reports for each corridor can be found in Appendix D. It is planned that the crash data provided in Appendix D will be used in a comparative analysis three to five years from the date of timing plan implementation. The comparison of future crash data with the crash data in Appendix D can be used to determine if any crashes related to timing plan changes have been reduced or corrected.

Traffic Signal Timing Development

Development of traffic signal timings were completed through a multi-step process which included the calculation of each intersection's coordination timing parameters (cycle lengths, splits, and offsets) from Monday through Friday during 6 a.m. to 6 p.m. Timings were then refined in the field based on observations and/or complaints. The following sections detail how these calculations were developed and modified for each corridor.

Cycle Length

An optimal cycle length provides sufficient green time to effectively serve all movements at an intersection while providing efficient flow of traffic through a corridor from one intersection into the next. Longer cycle lengths can typically accommodate higher mainline volumes, however, they may cause greater delays for the minor approaches to the intersections. Short cycle lengths can help to reduce the delay for minor approaches but will cause disruption to the flow of traffic. An optimal cycle length balances these two considerations of delay and flow. Additionally, it is important to consider how the selection of a cycle length at an intersection affects operations at adjacent intersections. System-wide coordination can be accomplished by using a similar cycle length throughout the system or grouping of intersections into subsystems. The optimal cycle length is the merging of the following factors:

- System-wide coordination
- Intersection vehicular demand (user through and turning movements priorities)
- Minimum cycle length
- Pedestrian and bicycle user phase activation and volumes
- Overall intersection delay and level of service (LOS)
- Intersection approach/movement delays
- Flow of traffic

A critical movement analysis was performed following the guidance from NCHRP *Signal Timing Manual 2nd Ed* [vii]. Using the peak hour volumes, lane configuration and existing phasing at the intersections, the critical volume was calculated by time of day for each intersection to identify a system cycle length by time of day. Exhibit 5-30 of the NCHRP *Signal Timing Manual 2nd Ed* [viii] recommends cycle length and effective green time per cycle is based on a maximum peak hour volume.

Cycle lengths were evaluated against the items listed above, with consideration given to the performance of existing cycle lengths. Up to five cycle lengths were considered for a 24-hour period including the existing cycle length, the cycle length identified through the critical movement analysis and cycle lengths within 5 to 10 second increments of the existing and critical cycle lengths. Resulting MOEs such as travel time and delay were evaluated in the selection of the cycle length to be implemented.

Splits and Offsets

Splits were calculated based on the minimum and maximum green times plus the clearances (total time of red and yellow) from the traffic signal plans. The existing splits were considered in optimizing green times in Synchro V11. Offsets were initially calculated by using the Tru-Traffic and SimTraffic programs.

Time of Day Schedule

A schedule was developed to operate the proposed timing plans based on patterns for Monday through Friday from 6 a.m. to 6 p.m. Traffic volumes throughout the day were used as the basis for developing the time-of-day schedule. The spikes in the a.m., midday, and p.m. periods of the traffic volumes guided the core hours of operation. The graphical representation of volumes developed in the critical movement analysis were used to identify variations in volumes by time of day and develop the time-of-day schedule for a corridor. The time of day, day of week schedules include coordinating with the programmed hours of flash and determination of time periods for non-coordinated operation. The flash and non-coordination operation aid in meeting the needs of the users for uncongested time periods to reduced wait times for green, improved flow, and/or provide users' equitable green time. The time-of-day schedules were selected to minimize transition time between changes in cycle lengths.

CTDOT Review and Adjustments

Upon completion of the proposed traffic signal timing changes, CTDOT performed a review of the timing plans using pertinent operational objectives and performance measures as well as various technical and engineering tools. CTDOT's review included data collection with field reviews before implementation. CTDOT recognizes the importance of visual observations to gain an understanding of the arterial functionality and the surrounding environment (Context of the corridor). Combining field observations with technology such as data from the controllers, 360-degree video detectors and CCTV, the CTDOT engineers evaluated the timing plans and adjusted as appropriate. Additionally, prior to implementing new timing plans, the engineers use a visual software tool called TSDWIN[ix] to analyze coordination strategies to refine the time space diagrams and confirm the proposed offsets.

Implementation and Field Fine-Tuning

Recommended changes to the existing timing plans were developed by the Consultant and submitted to CTDOT for review. Upon discussion and completion of the recommended changes, new optimized signal timings were downloaded through the remote system communications from central control or implemented by the Traffic Signal Lab. The new timing plans were observed through split monitoring, field observations, and travel time data collection by CTDOT staff after implementation. Fine tuning continued in the weeks following the initial implementation in each corridor to address operational deficiencies that were noted during monitoring of the new timing's operations and address citizen's complaints.

Fine-tuning mainly included adjusting splits and offsets. Movements found needing more split time were addressed based on the tradeoff between improving the movement operations and the impact to the overall coordination along the corridor. Offsets were adjusted along the corridor to improve progression based on the field observations and travel time runs. Any revision made during the fine-tuning process was recorded and revised on the excel coversheets.

Final Data Collection

Upon completion of the field fine tuning, the Consultant collected travel time data using Tru-Traffic and the travel time runs. The travel time runs were used to calculate travel time measurement. Travel time runs include driving a vehicle though the study limits during weekday peak morning and afternoon hours to gather speed, stops, delay, and travel time measurements for both directions of travel. To learn more about the concept of how travel time runs are taken watch the side-by-side video on the CTDOT Green Light website (CTDOT Green Light Main Page). The video demonstrates the before and after travel time runs for corridor Route 218 (Cottage Grove Road/Putnam Highway). Delay and travel time collected for each corridor “after” field fine tuning was compared to the “before” travel runs performed prior to optimization to determine operational improvements for the timing evaluation.

Changes by Corridors in Phase 1:

This section describes the signal timing changes implemented for each corridor by comparing the “before” evaluation timing plans to the “after” evaluation timing plans.

CTDOT used equitable distribution of time for the hours 10 p.m. to 6 a.m. and minimum cycle lengths to reduce wait times. Coordination between intersections is provided where intersection proximity, or other user needs could be addressed by the coordination. Otherwise, the intersections are programmed non-coordinated or flashing operation for late night early morning time periods as needed.

Each corridor has tables to show the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections.

Each traffic signal in a system or subsystem may be required to operate differently after 10 p.m. Therefore, the cycle lengths are listed as “variable” to represent the distinct types of operation. For example, some signals may remain coordinated while other signals operate flash or non-coordinated.

Bloomfield/Windsor, Route 187 & Route 218

Route 187 is a north/south minor arterial in Bloomfield and provides access to Route 218. Route 218 is a critical corridor that connects I-91 users to towns to the west including West Hartford, Simsbury, and Avon. The intersection of Route 187 and Route 218 (Int. 011-211) operates “non-coordinated” to best accommodate the high volume of traffic and number of turning movements. Route 187 subsystem including the signalized intersections at Park Avenue (Int. 011-214) and Walsh Street/Englewood Avenue (Int. 011-212) included changes such as increasing the hours of coordination while the cycle length was optimized based on traffic volumes throughout the day. The Route 218 intersections were combined into a single subsystem to improve flow between intersections and the system. These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as “variable” for the intersections that run “non-coordinated.”

Figure 15: Bloomfield/Windsor, Route 187 & 218 Location Map

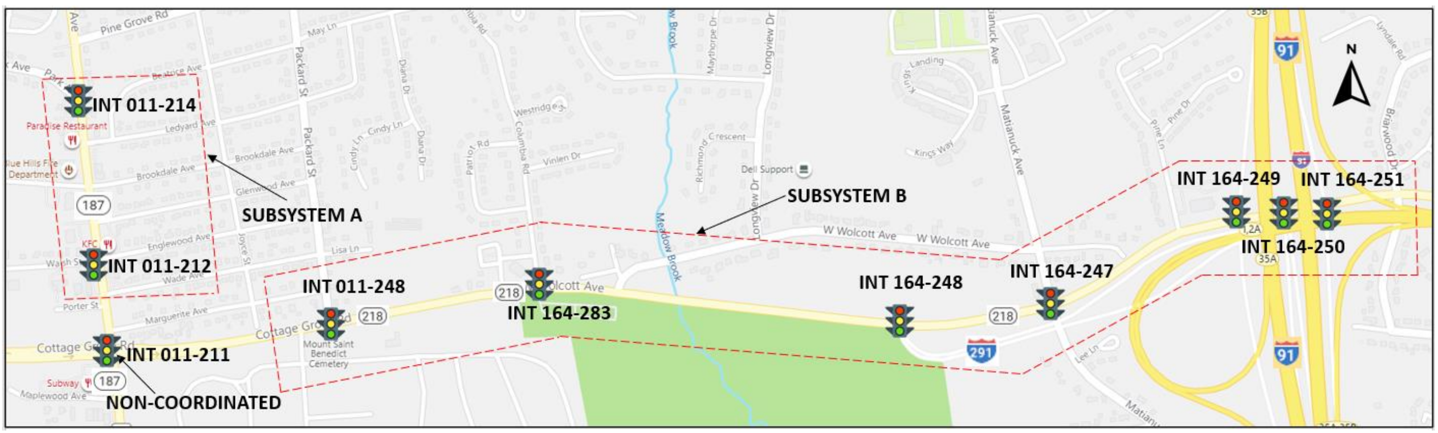


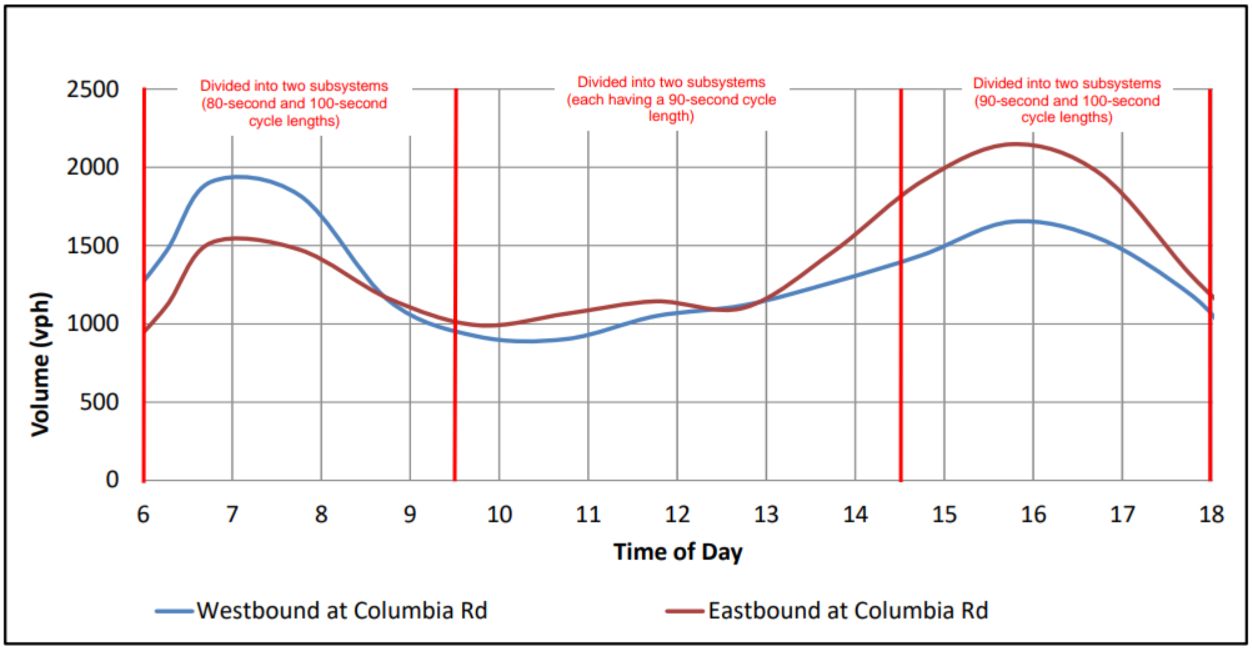
Table 9. Bloomfield/Windsor, Route 187 & 218 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

Before Evaluation Timings (Cycle - Offset)						
Intersection		**Time of Day** (6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22)				
No.	**Description**					
011-214	Park Avenue	80 - 00	Variable	80 - 00	Variable	
011-212	Walsh Street	80 - 46		80 - 04		
011-211	Rte 187 & 218	Variable				
011-248	Packard Street	80 - 00	60 - 06	100 - 31	60 - 06	Variable
164-283	Columbia Road	80 - 28	60 - 32	100 - 49	60 - 32	
164-248	I-291 Ramps	80 - 57	60 - 02	100 - 09	60 - 02	
164-247	Matianuck Ave	80 - 10	60 - 32	100 - 09	60 - 32	
164-249	I-91 SB Ramps	80 - 08	60 - 59	80 - 43	60 - 59	
164-250	I-91 HOV Ramps	80 - 46	60 - 59	80 - 40	60 - 59	
164-251	I-91 NB Ramps	80 - 50	60 - 59	80 - 40	60 - 59	

After Evaluation Timings (Cycle - Offset)						
Intersection		**Time of Day** (6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22)				
No.	**Description**					
011-214	Park Avenue	80 - 44	90 - 27	90 - 26	65 - 28	Variable
011-212	Walsh Street	80 - 00	90 - 00	90 - 00	65 - 00	
011-211	Rte 187 & 218	Variable				
011-248	Packard Street	100 - 93	90 - 00	100 - 13	65 - 00	
164-283	Columbia Road	100 - 58	90 - 40	100 - 79	65 - 25	
164-248	I-291 Ramps	100 - 06	90 - 07	100 - 46	65 - 50	
164-247	Matianuck Ave	100 - 11	90 - 11	100 - 43	65 - 16	
164-249	I-91 SB Ramps	100 - 00	90 - 00	100 - 00	65 - 53	
164-250	I-91 HOV Ramps	100 - 00	90 - 00	100 - 00	65 - 53	
164-251	I-91 NB Ramps	100 - 00	90 - 00	100 - 00	65 - 53	

Figure 16: Bloomfield/Windsor, Route 187 & 218 Critical Volume Chart



East Windsor, Route 5

Route 5 in East Windsor is a north/south principal arterial corridor that intersects with State Routes 510, 191 and Interchange 91 ramps. The southbound direction peaks in the a.m. and the northbound direction peaks in the p.m. The coordination improvements consisted of selecting the optimal cycle length, revising the breakdown of subsystems, and decreasing the overall number of patterns throughout the day. The a.m. and midday timing patterns were combined to accommodate an increase in traffic volumes and take advantage of the 90 second cycle length which allows for greater flow on this corridor. The corridor was noticed to operate more effectively as three subsystems with varying cycle lengths during the p.m. peak hours of 2:30 p.m. to 10:00 p.m. The intersection of South Water Street (Int. 046-215) was switched from Subsystem B to Subsystem A to improve flow between South Water and Tromley Road (Int. 046-213). These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as “variable” for the intersections that run “non-coordinated.”

Figure 17: East Windsor, Route 5 Location Map

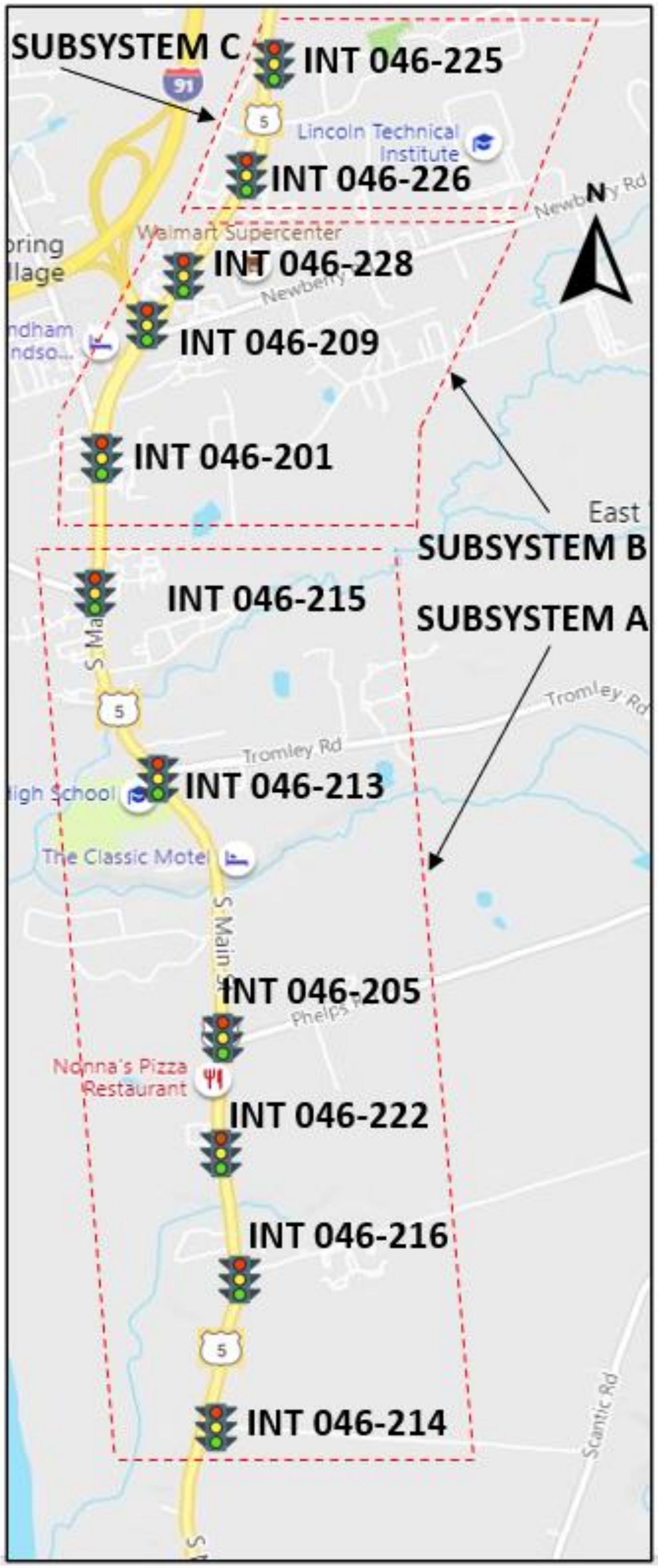


Table 10. East Windsor, Route 5 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

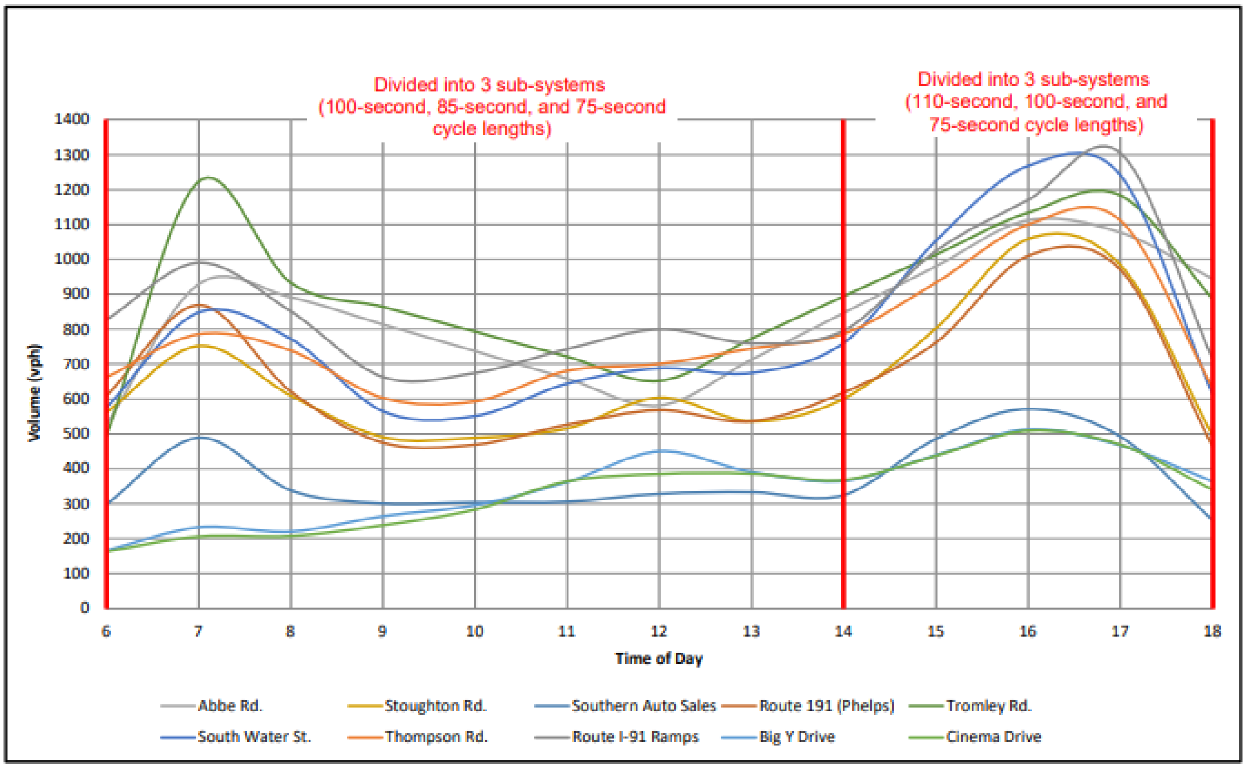
Before Evaluation Timings (Cycle - Offset)

No.	Description	Time of Day				
046-214	Abbe Road	90 - 80	75 - 49	100 - 53	60 - 46	Variable
046-216	Stoughton Road	90 - 78	75 - 08	100 - 81	60 - 09	Variable
046-222	Southern Auto Sales	90 - 61	75 - 00	100 - 90	60 - 08	Variable
046-205	Rte 191 (Phelps Road)	90 - 45	75 - 38	100 - 75	60 - 32	Variable
046-213	Tromley Road	90 - 85	75 - 00	100 - 31	60 - 30	Variable
046-215	South Water Street	90 - 42	85 - 38	100 - 85	60 - 30	Variable
046-201	Thompson Road	90 - 75	85 - 64	100 - 72	60 - 56	Variable
046-209	I-91 Ramps	90 - 29	85 - 23	100 - 10	60 - 23	Variable
046-228	Rte 5 Wendy's,Wal-Mart	90 - 40	85 - 28	100 - 28	60 - 28	Variable
046-226	Prospect and Market	90 - 44	85 - 84	100 - 80	60 - 71	Vari-able
046-225	Rte 5 and Cinema Drive	90 - 22	85 - 73	100 - 83	60 - 03	Vari-able

After Evaluation Timings (Cycle - Offset)

No.	Description	Time of Day			
046-214	Abbe Road	85 - 80	100 - 10	70 - 10	Variable
046-216	Stoughton Road	85 - 49	100 - 49	70 - 49	Variable
046-222	Southern Auto Sales	85 - 57	100 - 46	70 - 46	Variable
046-205	Rte 191 (Phelps Road)	85 - 84	100 - 00	70 - 07	Variable
046-213	Tromley Road	85 - 55	100 - 69	70 - 69	Variable
046-215	South Water Street	85 - 00	100 - 38	70 - 38	Variable
046-201	Thompson Road	100 - 36	110 - 20	85 - 40	Variable
046-209	I-91 Ramps	100 - 91	110 - 64	85 - 82	Variable
046-228	Rte 5 Wendy's,Wal-Mart	100 - 19	110 - 81	85 - 00	Variable
046-226	Prospect and Market	75 - 00	75 - 24	60 - 24	Variable
046-225	Rte 5 and Cinema Drive	75 - 00	75 - 00	60 - 00	Variable

Figure 18: East Windsor, Route 5 Critical Volume Chart



New Britain, Route 174

Route 174 in New Britain is an east/west minor arterial that connects Newington and the Berlin Turnpike with New Britain and the Routes 9 and 72 interchange ramps. The volumes are balanced for eastbound and westbound directions except for an increase in volume in the westbound direction during the a.m. and p.m. hours. The surge in volume for the westbound in the a.m. can be attributed to the school buses and parent drop off for the Chamberlain Elementary School at Chapman Court (Int. 088-223). The coordination improvements consisted of selecting the optimal cycle length and adjusting the hours of each pattern to best fit traffic patterns. These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as “variable” for the intersections that run “non-coordinated.”

Figure 19: New Britain, Route 174 Location Map

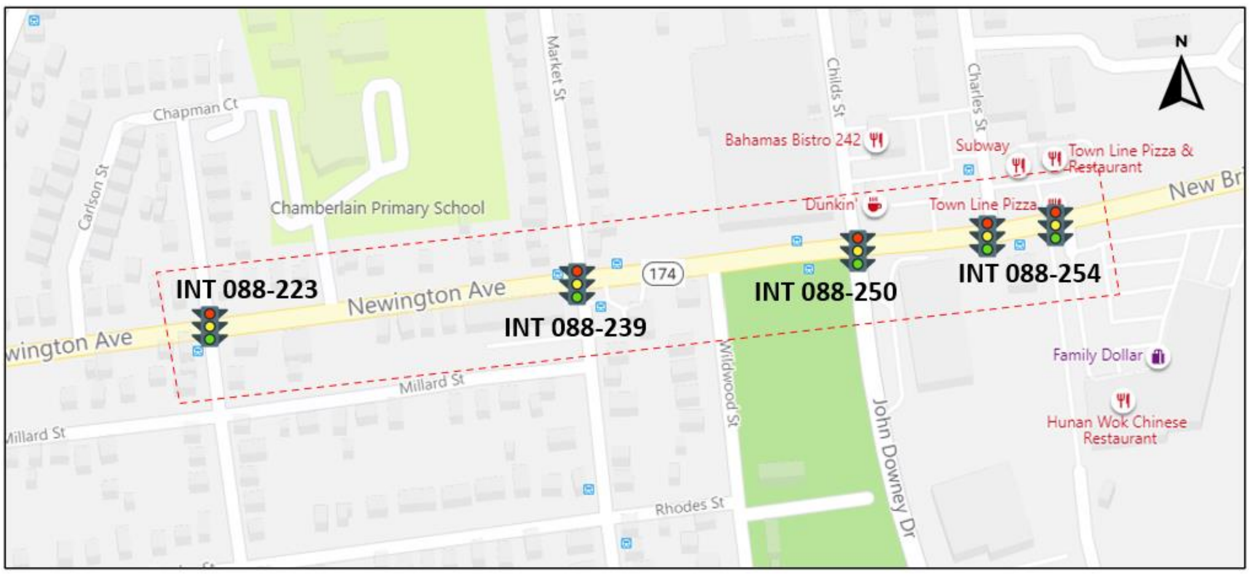


Table 11. New Britain, Route 174 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

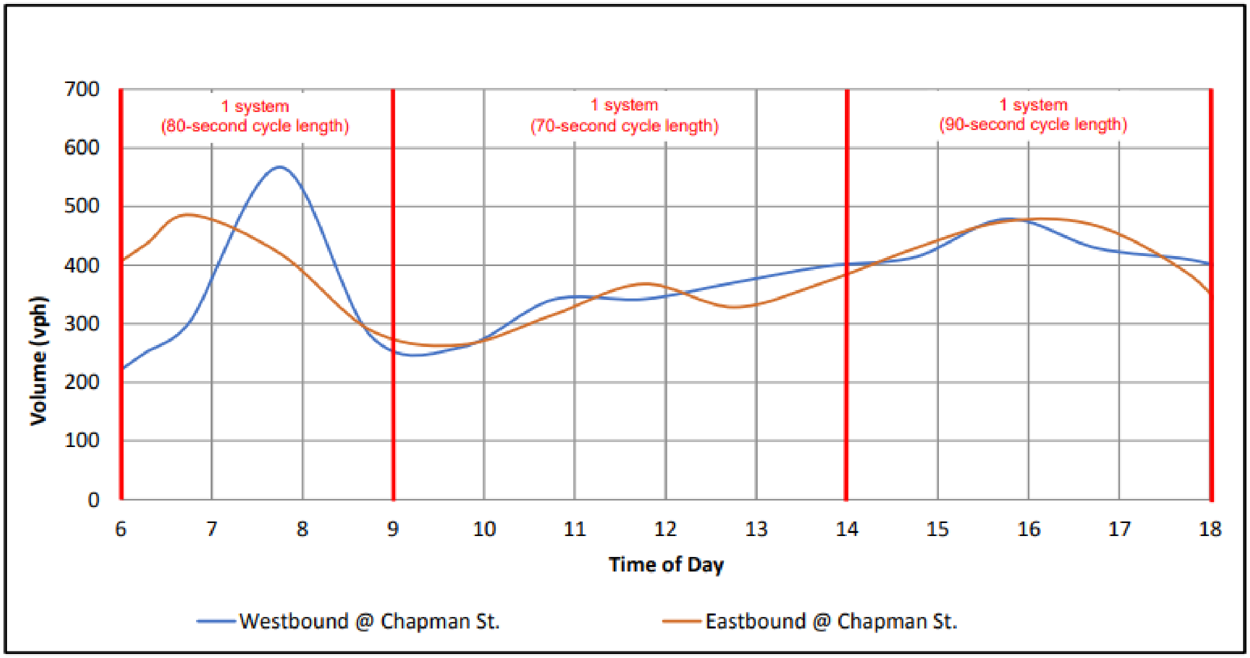
Before Evaluation Timings (Cycle - Offset)

Intersection No.	Intersection Description	Time of Day (6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22)				
088-223	Chapman Street	80 - 69	70 - 50	70 - 50	60-50	Variable
088-239	Market Street	80 - 06	70 - 15	70 - 15	60-10	Variable
088-250	John Downey Dr	80 - 10	70 - 10	70 - 10	60-10	Variable
088-254	Charles & Shops	80 - 10	70 - 10	70 - 10	60-05	Variable

After Evaluation Timings (Cycle - Offset)

Intersection No.	Intersection Description	Time of Day (6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22)				
088-223	Chapman Street	80 - 69	70 - 37	90 - 00	60-29	Variable
088-239	Market Street	80 - 06	70 - 00	90 - 00	60-00	Variable
088-250	John Downey Dr	80 - 10	70 - 10	90 - 10	60-10	Variable
088-254	Charles & Shops	80 - 10	70 - 10	90 - 10	60-10	Variable

Figure 20: New Britain, Route 174 Critical Volume Chart



Rocky Hill/Wethersfield, Route 99

Route 99 in Rocky Hill and Wethersfield has seen an increase in traffic volumes in recent years. The changes implemented to improve traffic flow include an increase in cycle lengths to increase overall capacity and a reduction in the number of patterns throughout the day. The intersections between I-91 SB Ramps (Int. 118-233) and Goff Brook Shops (Int. 159-237) included simultaneous green lights to improve flow for the closely spaced intersections. The midday and p.m. traffic volumes were found to be similar and were accommodated by a single combined pattern. The a.m. peak period and evening 6:30 p.m. to 10:00 p.m. period volumes were found to be best accommodated by 100 second cycle lengths. These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as “variable” for the intersections that run “non-coordinated.”

Figure 21: Rocky Hill/Wethersfield, Route 99 Location Map

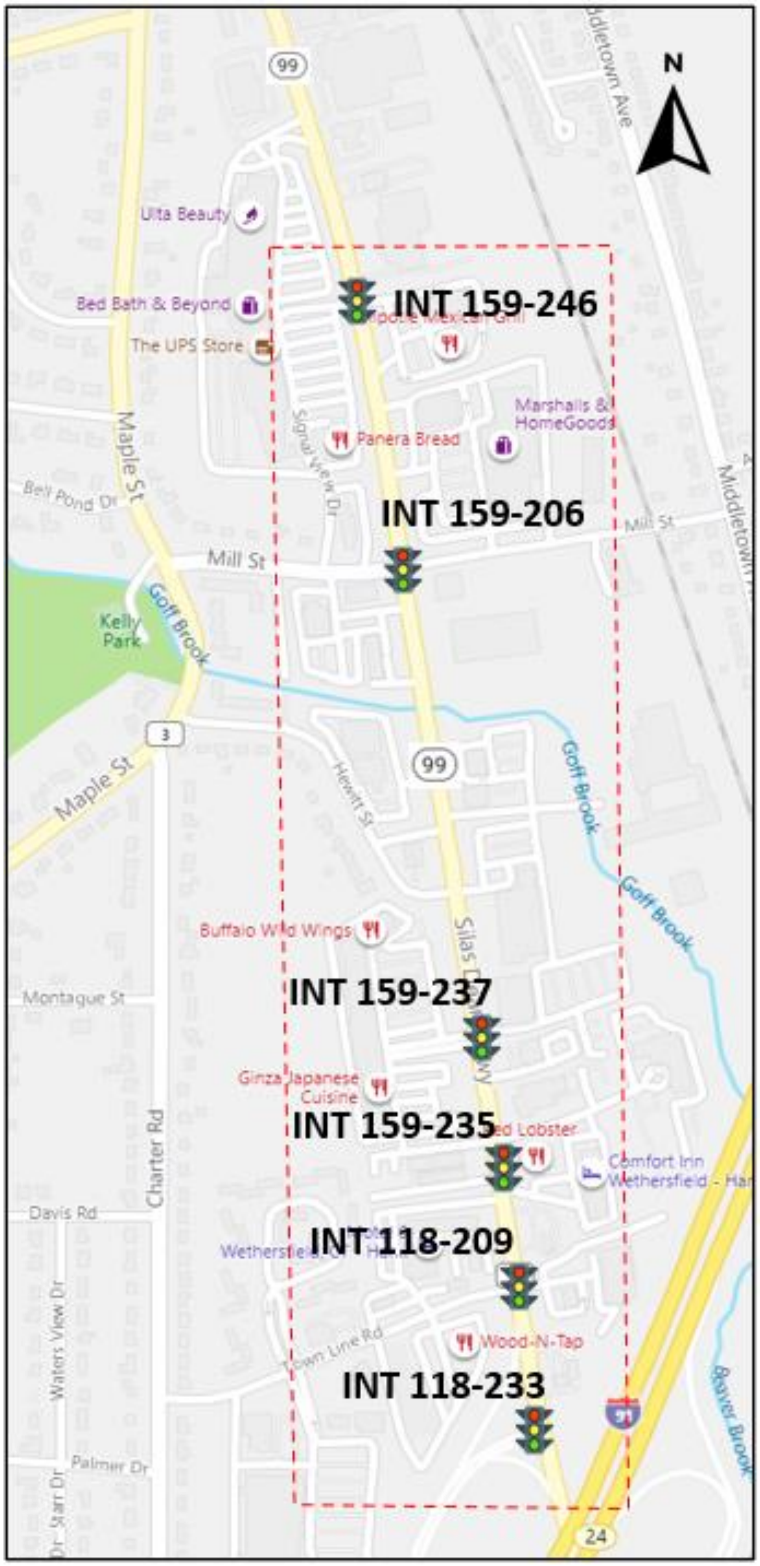


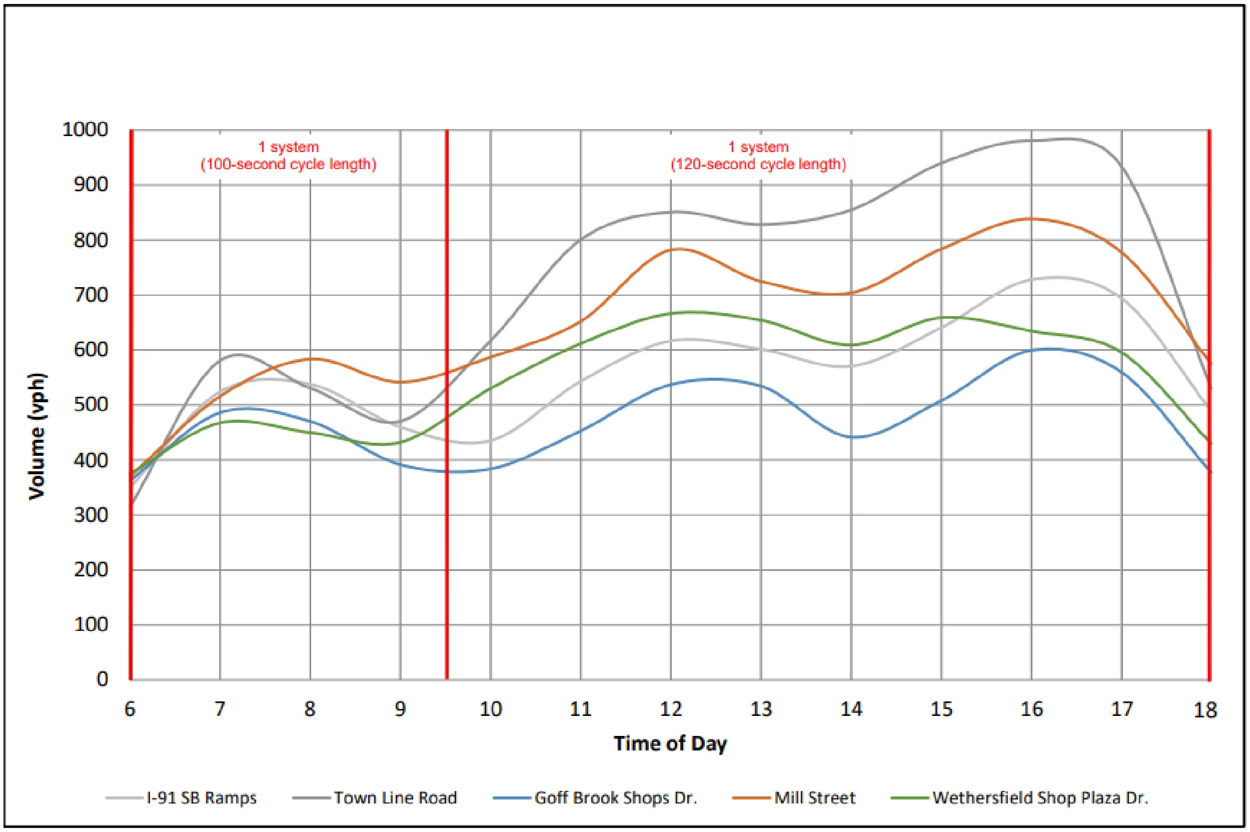
Table 12. Rocky Hill/Wethersfield, Route 99 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

Before Evaluation Timings (Cycle - Offset)								
Intersection		**Time of Day**						
No.	**Description**	6 7 8 9	10 11	12 13 14 15	16 17 18	19 20	21	22
118-233	I-91 SB Ramps	80 - 50	65-30	75 - 00	90 - 60	75-00	65-30	Variable
118-209	Town Line Road	80 - 50	65-30	75 - 00	90 - 55	75-00	65-30	
159-235	Executive Square	80 - 50	65-30	75 - 00	90 - 55	75-00	65-30	
159-237	Goff Brook Shops	80 - 50	65-30	75 - 00	90 - 55	75-00	65-30	
159-206	Mill Street	80 - 10	65-30	75 - 40	90 - 10	75-40	65-30	
159-246	Wethersfield Shop	80 - 20	65-30	75 - 55	90 - 15	75-55	65-30	

After Evaluation Timings (Cycle - Offset)						
Intersection		**Time of Day**				
No.	**Description**	6 7 8 9	10 11 12 13 14 15 16 17 18	19 20 21	22	
118-233	I-91 SB Ramps	100 - 00	120 - 00	80 - 00	Variable	
118-209	Town Line Road	100 - 00	120 - 00	80 - 00		
159-235	Executive Square	100 - 00	120 - 00	80 - 00		
159-237	Goff Brook Shops	100 - 00	120 - 00	80 - 00		
159-206	Mill Street	100 - 32	120 - 55	80 - 27		
159-246	Wethersfield Shop	100 - 64	120 - 49	80 - 56		

Figure 22: Rocky Hill/Wethersfield, Route 99 Critical Volume Chart



Southington, Route 10

Route 10 in Southington has seen a significant level of development in recent years, adding volume and expanding hours of peak traffic over longer duration. The changes implemented to improve traffic flow include an increase in cycle lengths to increase overall capacity and expanding the hours of peak flow timing patterns. The a.m. and midday traffic volumes were found to be best accommodated by a single pattern. This allows a higher capacity on the artery and eliminates an additional timing plan. The a.m./midday cycle length of 90 seconds was found to be an optimal timing for the northern three intersections throughout the day so was kept through the p.m. peak period as well. For the southern nine intersections, the afternoon peak period cycle length was increased from 85 seconds to 100 seconds to increase capacity and the hours of operation were expanded by two hours. As traffic volumes drop by 9 p.m., the coordination was dropped in favor of non-coordinated operation that allows signals to run variable cycle lengths and respond more quickly to fluctuations in approach volumes. These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as “variable” for the intersections that run “non-coordinated.”

Figure 23: Southington, Route 10 Location Map

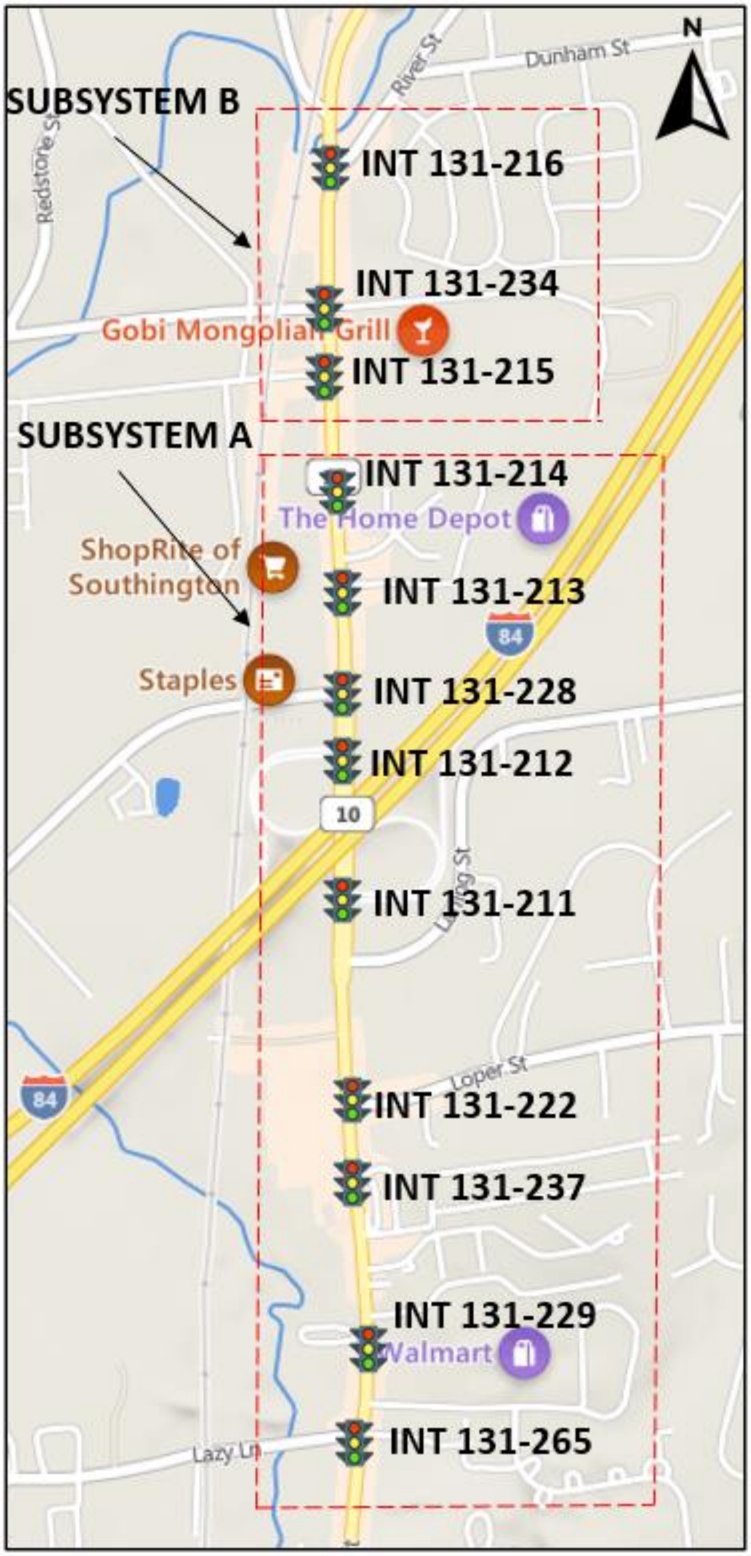


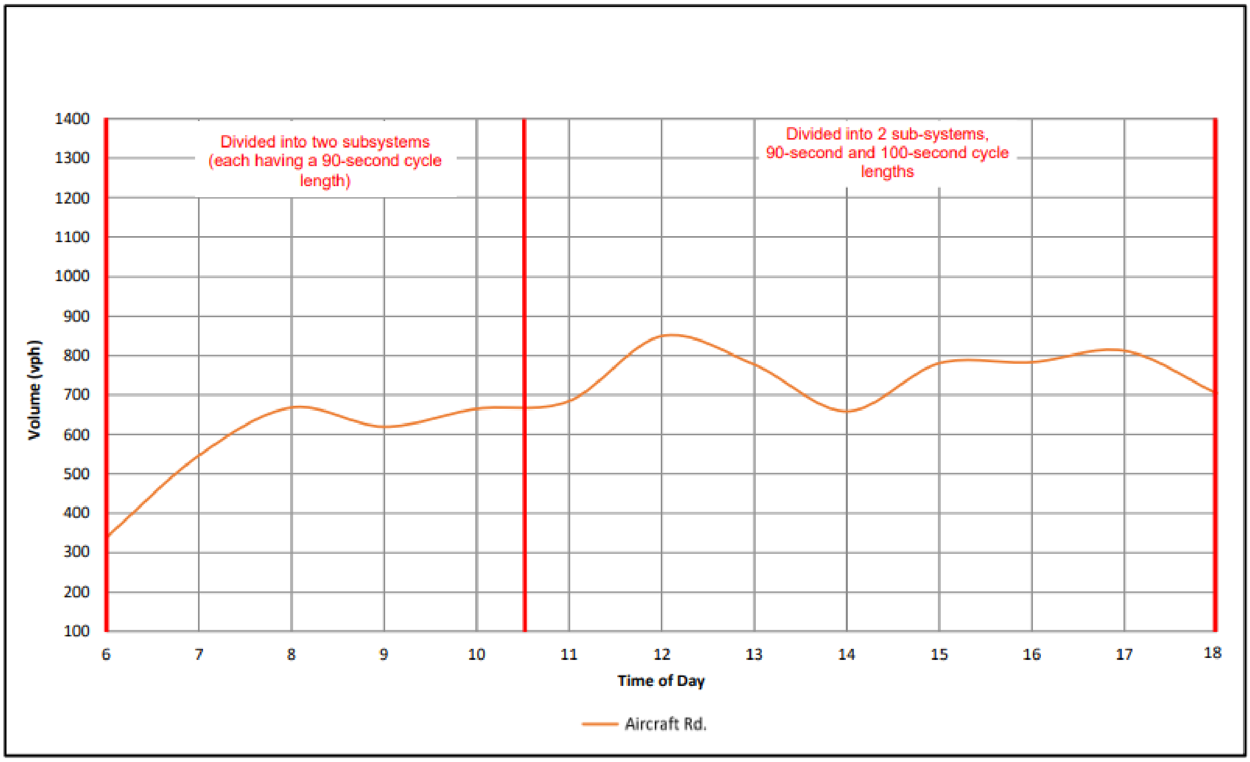
Table 13. Southington, Route 10 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

Before Evaluation Timings (Cycle - Offset)						
Intersection		**Time of Day**				
No.	**Description**	6 7 8 9	9 10 11 12 13 14	14 15 16 17 18	18 19 20 21 22	22
131-265	Lazy Lane	75 - 43	70 - 44	85 - 24	70 - 44	Variable
131-229	Shopping Plaza	75 - 43	70 - 44	85 - 24	70 - 44	
131-237	Queen "B" Plaza	75 - 72	70 - 17	85 - 31	70 - 17	
131-222	Loper St	75 - 73	70 - 12	85 - 21	70 - 12	
131-211	I-84 E.B. Ramps	75 - 09	70 - 05	85 - 11	70 - 05	
131-212	I-84 W.B. Ramps	75 - 22	70 - 34	85 - 45	70 - 34	
131-228	Spring Street	75 - 34	70 - 39	85 - 48	70 - 39	
131-213	Southington Plaza S	75 - 52	70 - 44	85 - 72	70 - 44	
131-214	Southington Plaza N	75 - 53	70 - 46	85 - 67	70 - 46	
131-215	Aircraft Rd	75 - 60	70 - 51	85 - 59	70 - 51	
131-234	West Queen St	75 - 13	70 - 49	85 - 59	70 - 49	
131-216	River St	75 - 14	70 - 32	85 - 68	70 - 32	

After Evaluation Timings (Cycle - Offset)					
Intersection		**Time of Day**			
No.	**Description**	6 7 8 9 10	11 12 13 14 15 16 17 18 19	19 20 21	21 22
131-265	Lazy Lane	90 - 00	100 - 77	80-00	Variable
131-229	Shopping Plaza	90 - 00	100 - 77	80-00	
131-237	Queen "B" Plaza	90 - 17	100 - 60	80-30	
131-222	Loper St	90 - 17	100 - 60	80-30	
131-211	I-84 E.B. Ramps	90 - 54	100 - 00	80-67	
131-212	I-84 W.B. Ramps	90 - 54	100 - 00	80-67	
131-228	Spring Street	90 - 54	100 - 00	80-67	
131-213	Southington Plaza S	90 - 54	100 - 00	80-67	
131-214	Southington Plaza N	90 - 54	100 - 00	80-67	
131-215	Aircraft Rd	90 - 20		70-57	
131-234	West Queen St	90 - 20		70-57	
131-216	River St	90 - 38		70-60	

Figure 24: Southington, Route 10 Critical Volume Chart



Windsor, Route 178

Route 178 is a four lane minor arterial oriented east/west in Windsor. Route 178 is bridged by I-91 at Exit 36 with intersections spaced 500 feet apart at the I-91 NB (Int. 164-257) and I-91 SB (Int. 164-258) ramps. The signals include protected-permitted left-turn phasing onto the freeway. The cycle lengths were increased in consideration of traffic volumes and to improve progression of Route 178 east/west through traffic. The hours of operation for the existing two coordinated patterns were retained. These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as “variable” for the intersections that run “non-coordinated.”

Figure 25: Windsor, Route 178 Location Map

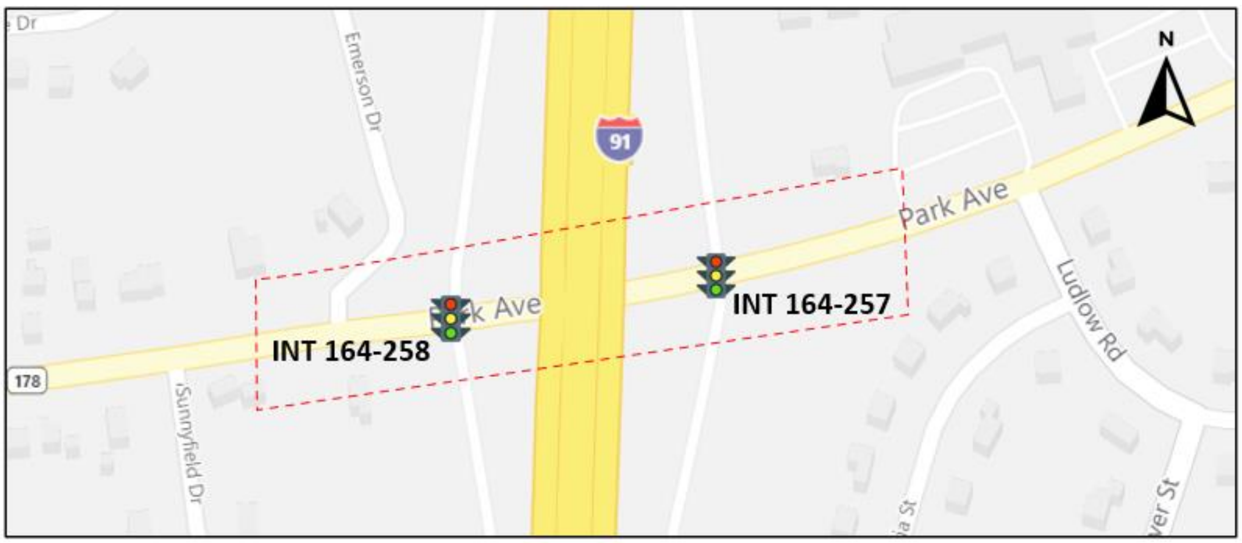


Table 14. Windsor, Route 178 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

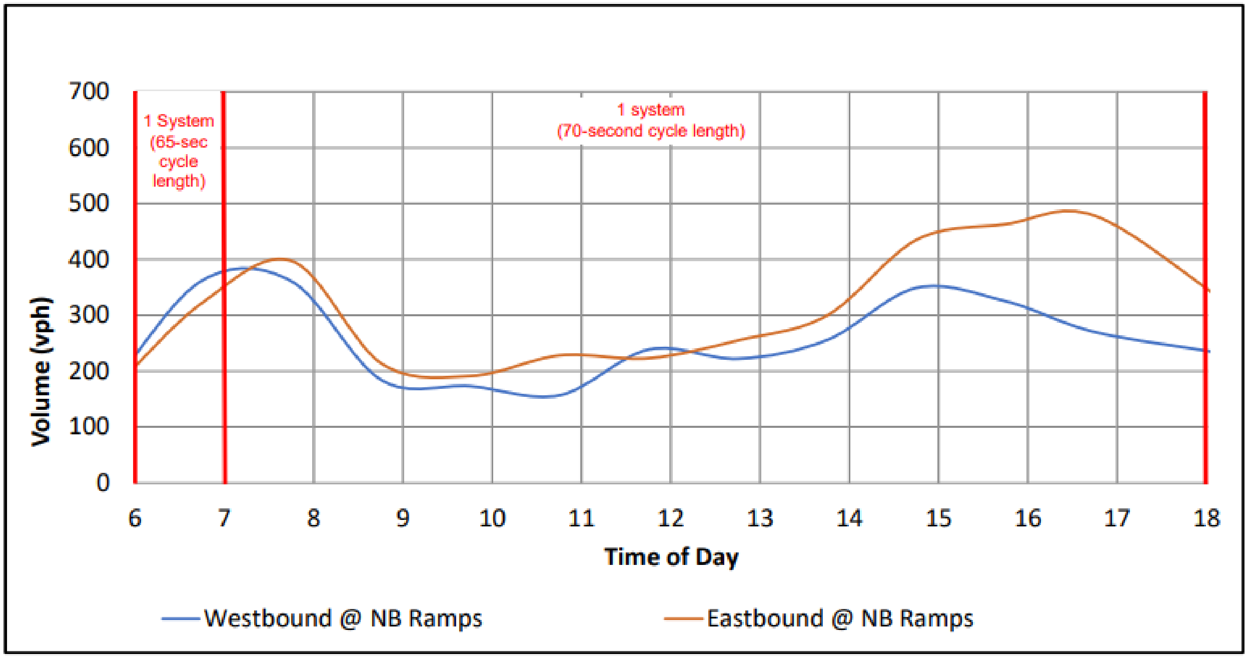
Before Evaluation Timings (Cycle - Offset)

Intersection No.	Intersection Description	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
164-257	I-91 NB Ramps	50-00	60 - 00								50 - 00							Variable
164-258	I-91 SB Ramps	50-00	60 - 00								50 - 00							Variable

After Evaluation Timings (Cycle - Offset)

Intersection No.	Intersection Description	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
164-257	I-91 NB Ramps	65-00	70 - 00											65 - 00				Variable
164-258	I-91 SB Ramps	65-00	70 - 00											65 - 00				Variable

Figure 26: Windsor, Route 178 Critical Volume Chart



Windsor, Route 305

Route 305 in Windsor starts at the I-91 NB ramps (Int. 164-241) and continues west to the intersection of Mountain Road (Int. 164-209). The cycle lengths were optimized based on traffic volumes and to facilitate coordination between intersections. The offsets were revised to increase simultaneous green lights balancing progression in both directions. The 80 second and 65 second cycle lengths were found to best accommodate volumes and optimize progression. These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as "variable" for the intersections that run "non-coordinated."

Figure 27: Windsor, Route 305 Location Map

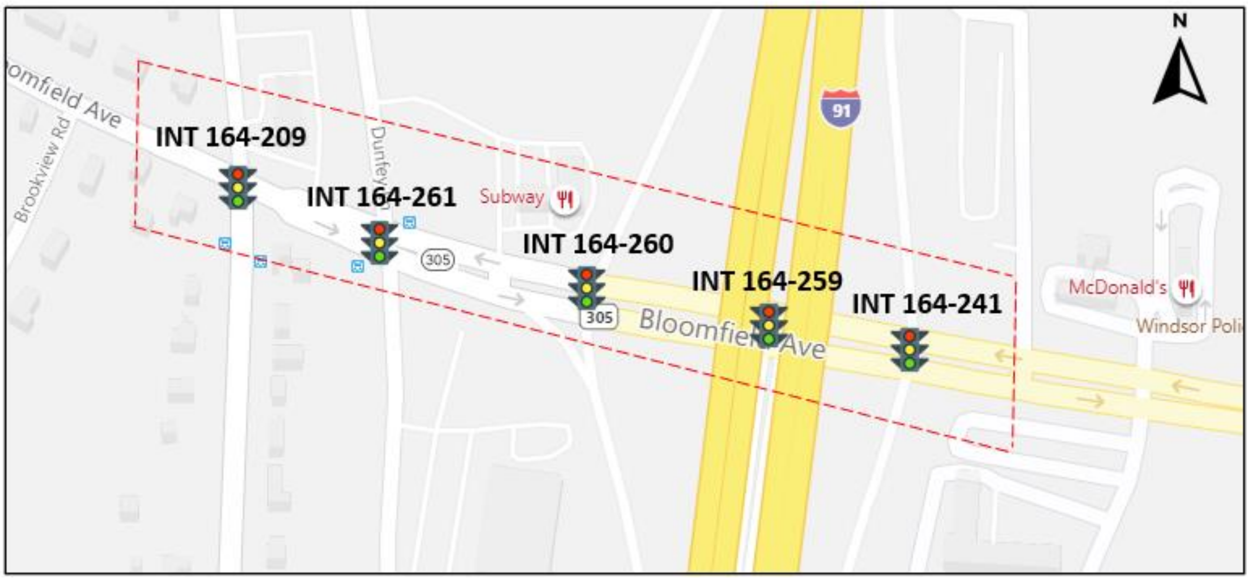


Table 15. Windsor, Route 305 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

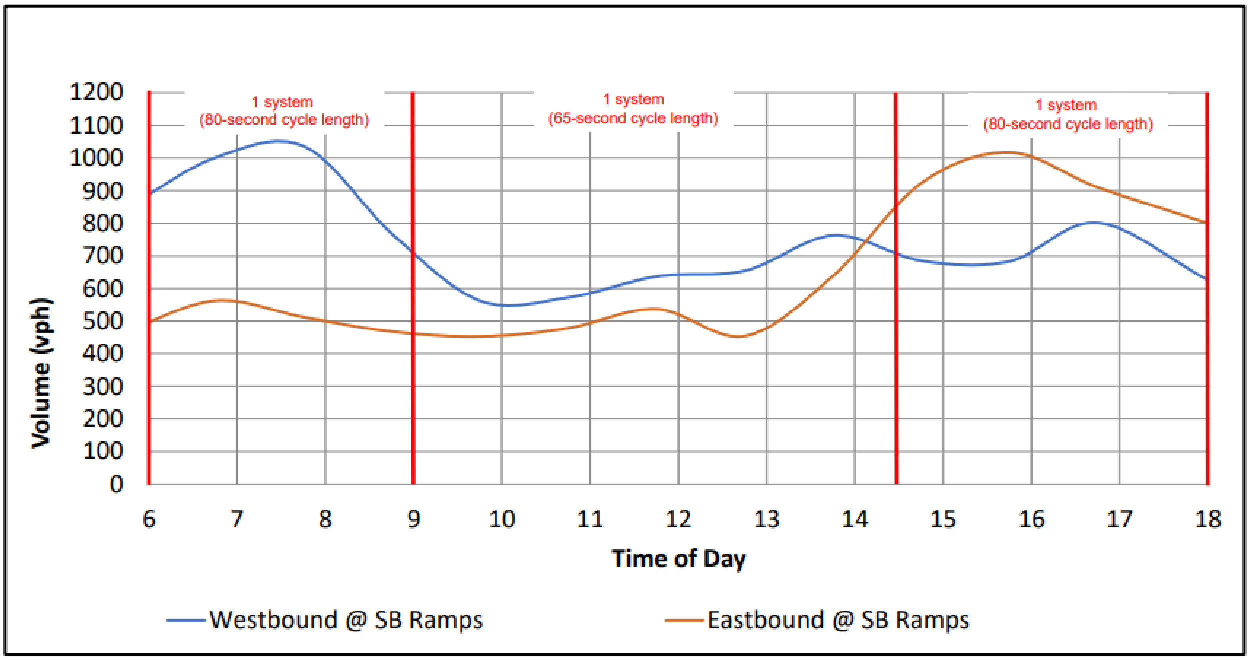
Before Evaluation Timings (Cycle - Offset)

Intersection No.	Intersection Description	Time of Day (6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22)				
164-241	I-91 NB Ramps	80 - 49	60 - 25	90 - 79	60 - 25	Variable
164-259	I-91 HOV Off Ramp	80 - 27	60 - 09	90 - 55	60 - 09	Variable
164-260	I-91 SB Ramps	80 - 32	60 - 08	90 - 53	60 - 08	Variable
164-261	Dunfey Lane	80 - 31	60 - 08	90 - 60	60 - 08	Variable
164-209	Mountain Road	80 - 35	60 - 08	90 - 62	60 - 08	Variable

After Evaluation Timings (Cycle - Offset)

Intersection No.	Intersection Description	Time of Day (6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22)				
164-241	I-91 NB Ramps	80 - 22	65 - 16	80 - 22	65 - 65	Variable
164-259	I-91 HOV Off Ramp	80 - 00	65 - 00	80 - 00	65 - 16	Variable
164-260	I-91 SB Ramps	80 - 00	65 - 00	80 - 00	65 - 00	Variable
164-261	Dunfey Lane	80 - 00	65 - 00	80 - 00	65 - 00	Variable
164-209	Mountain Road	80 - 00	65 - 00	80 - 00	65 - 00	Variable

Figure 28: Windsor, Route 305 Critical Volume Chart



Windsor, Route 75

Route 75 in Windsor is a principal arterial providing access to and from I-91 for adjacent industrial and commercial areas as well as downtown Windsor and Bradley International Airport. Optimization included a reduction in the overall number of patterns run throughout the day, improving offsets to increase progression in the higher volume direction, and slightly increasing cycle length during the p.m. peak to improve capacity. These changes improved operations and increased coordination throughout the day. The following table shows the before and after coordination schedules applicable to Monday through Friday operations from 6:00 a.m. to 10:00 p.m. These schedules contain a separate block for each pattern. Each block shows the coordinated cycle length followed by the offset (in seconds) for each of the corresponding intersections. The cycle length is listed as "variable" for the intersections that run "non-coordinated."

Figure 29: Windsor, Route 75 Location Map

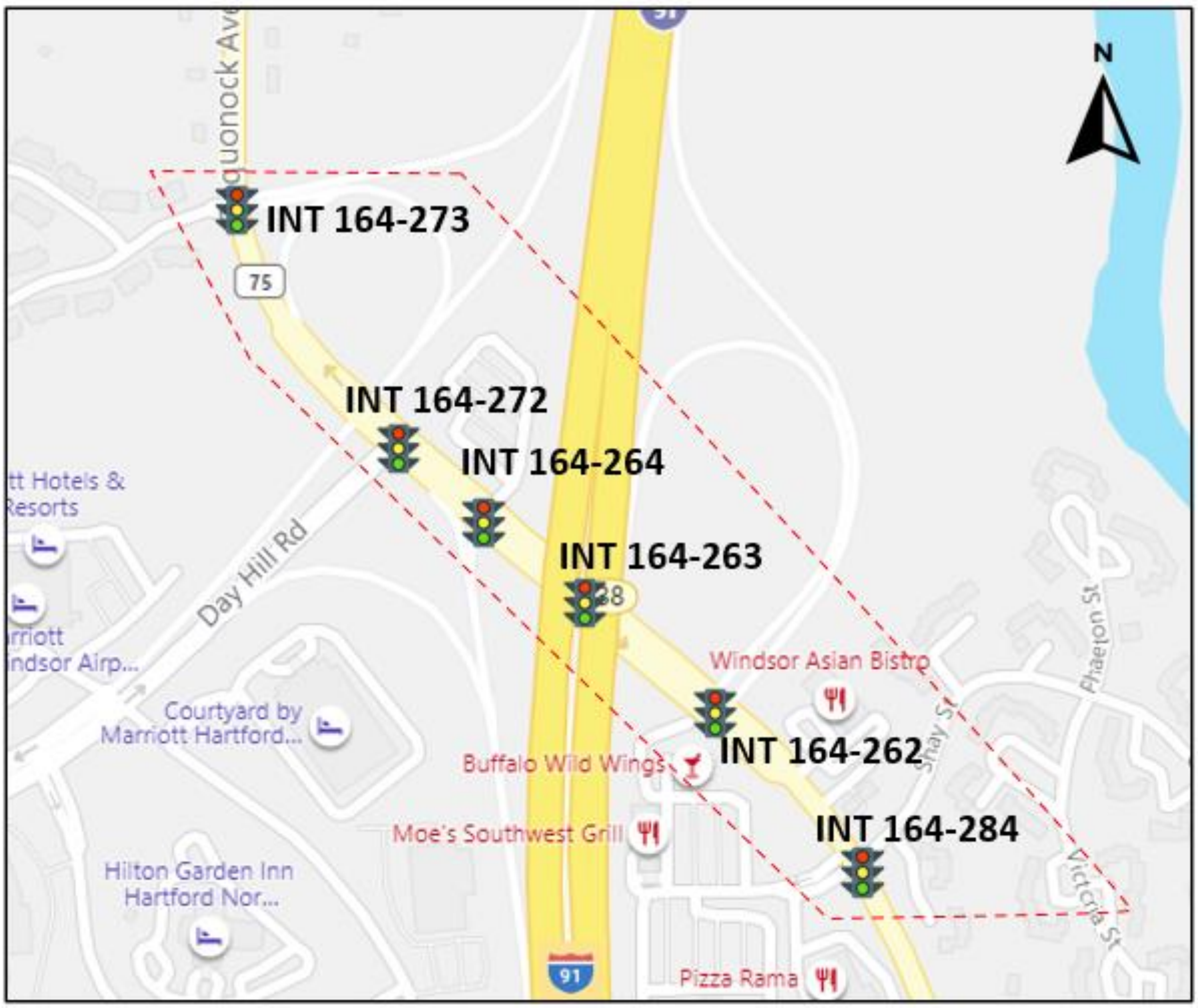


Table 16. Windsor, Route 75 Changes to Cycle Lengths and Offsets

Monday – Friday 6 a.m. – 10 p.m.

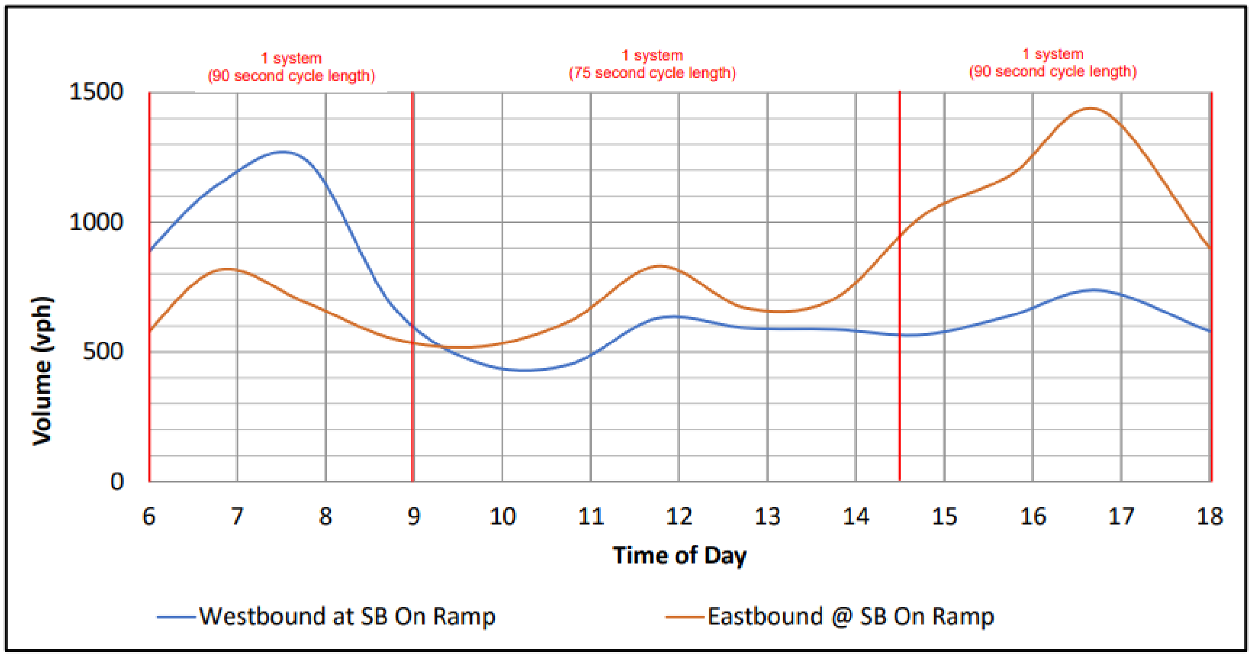
Before Evaluation Timings (Cycle - Offset)

Intersection		Time of Day						
No.	Description	6	7–9	9–15	15–18	18–20	20–22	22
164-284	Conestoga Street	Variable	90 - 07	75 - 20	80 - 59	75-20	Variable	Variable
164-262	I-91 NB Ramps	Variable	90 - 52	75 - 65	80 - 01	75-65	60-42	Variable
164-263	I-91 HOV Ramp	Variable	90 - 75	75 - 69	80 - 24	75-69	60-18	Variable
164-264	I-91 SB Ramp	Variable	90 - 68	75 - 00	80 - 18	75-00	60-13	Variable
164-272	Day Hill Road	Variable	90 - 52	75 - 02	80 - 57	75-02	60-26	Variable
164-273	Griswold Village	Variable	90 - 06	75 - 21	80 - 40	75-21	60-40	Variable

After Evaluation Timings (Cycle - Offset)

Intersection		Time of Day				
No.	Description	6–9	9–14	14–18	18–22	22
164-284	Conestoga Street	90 - 40	75 - 57	90 - 69	65 - 23	Variable
164-262	I-91 NB Ramps	90 - 52	75 - 65	90 - 00	65 - 43	Variable
164-263	I-91 HOV Ramp	90 - 87	75 - 69	90 - 34	65 - 28	Variable
164-264	I-91 SB Ramp	90 - 68	75 - 00	90 - 28	65 - 18	Variable
164-272	Day Hill Road	90 - 58	75 - 02	90 - 67	65 - 39	Variable
164-273	Griswold Village	90 - 06	75 - 21	90 - 50	65 - 06	Variable

Figure 30: Windsor, Route 75 Critical Volume Chart



Post Implementation Assessment

Upon complete of field fine-tuning, the Consultant conducted travel time runs using Tru-Traffic to report the results of the timing changes. Videos of the travel runs were also collected to view any specific issues that were encountered. The post-implementation travel times were then compared to the initial travel time runs to calculate the improvements. Results are presented by corridor in the following sections of this report.

Corridor Performance Evaluation

The study corridors were evaluated to determine the effectiveness of the timing changes. The corridor evaluations consisted of comparing performance measures from “Before” and “After” studies conducted prior to and post implementation of new signal timings. This chapter provides details on the methodology used to evaluate corridor performance and the results of those evaluations.

Performance Evaluation Data

Travel time study data were used to calculate a variety of performance measures. Corridor performance results were based on data from “Before” and “After” travel time studies conducted for each study corridor. The corridor travel time studies occurred during multiple periods throughout the weekdays (Monday through Friday) for “Before” and “After” conditions of implementing the new signal timing plans. The periods for the travel time studies were:

- a.m. peak period – 7:00 a.m. to 8:30 a.m. (Weekday) – All study corridors
- midday period – 11:30 a.m. to 1:00 p.m. (Weekday) – All study corridors
- p.m. peak period – 4:00 p.m. to 6:00 p.m. (Weekday) – All study corridors
- Saturday midday period – 11:00 a.m. to 3:00 p.m. -Varies by corridor

The “Before” travel time studies were conducted in February 2020 prior to implementation of new signal timings. The “After” travel time studies were conducted in September/October 2021 after implementation and fine-tuning of new signal timings. The travel time studies were conducted with a pilot vehicle traveling each study corridor for a minimum of three travel time runs for each period “Before” and “After” conditions. During these studies, travel time data was collected with Tru-Traffic software. Tru-Traffic, accompanied with a GPS device, is used to track a vehicle’s position while it travels along a corridor. It records the position of the vehicle every second and uses that information, along with inputs on the locations of intersections, to calculate performance measures along the corridor such as number of stops and travel time.

Performance Measures

The following performance measures were identified to be reported for this project *See Appendix A:

- **Travel Time** – The time to travel from one end of a study corridor to the other.
- **Corridor Performance**
    - Delay – The amount of time corridor through traffic is slowed or stopped by traffic signals on a trip from one end of a study corridor to the other.
    - Fuel Consumption – The estimated amount of fuel consumed by through traffic on a trip from one end of a study corridor to the other.
    - Emissions – The estimated emissions produced by through traffic on a trip from one end of a study corridor to the other.
    - Stops – The number stops experienced by through traffic on a study corridor on a trip from one end of a study corridor to the other.

User Savings Analysis

This travel time performance measure was reported as the change in travel time between "Before" and "After" conditions by comparing the average time to travel from one end of a study corridor to the other end during the study periods. Travel time was extracted from the travel time run data in Tru-Traffic for each period of "Before" and "After" conditions. "Time" is of value to all people. A reduction in travel time, delay, and fuel consumption lower costs to motorists. These direct savings were tracked and quantified to determine community savings. Corridor performance measures of delay, stops, fuel consumption, and emissions were calculated using output from Tru-Traffic travel time runs, year 2019 local demographics, and formulas developed by Indiana Department of Transportation (INDOT) & Purdue University[x]. Each of the corridor performance measures was reported as the change between "Before" and "After" conditions.

Summary of Performance Measures and User Savings

Travel Time Results

Table 17. Travel Time Comparison from "Before" to "After" Conditions

Corridor	Time Period	Travel Time Change (Min:Sec)		
		NB/EB	SB/WB	Total
Bloomfield/Windsor, Route 187, and Route 218	a.m.	-0:55	-0:05	-1:00
	midday	0:35	0:10	0:45
	p.m.	0:04	-0:17	-0:13
East Windsor, Route 5	a.m.	-0:01	-1:13	-1:14
	midday	-1:31	-0:43	-2:14
	p.m.	0:26	-0:10	0:16
New Britain, Route 174	a.m.	-0:06	-0:02	-0:08
	midday	-0:27	-0:16	-0:43
	p.m.	0:13	-0:18	-0:05
Rocky Hill/Wethersfield, Route 99	a.m.	-0:31	0:04	-0:27
	midday	-0:17	-1:17	-1:34
	p.m.	-0:25	-0:14	-0:39
Southington, Route 10 (Queen Street)	a.m.	-0:13	-0:33	-0:46
	midday	-0:07	-0:52	-0:59
	p.m.	0:15	-1:02	-0:47
Windsor, Route 178	a.m.	0:03	-0:08	-0:05
	midday	-0:01	-0:03	-0:04
	p.m.	-0:05	-0:04	-0:09
Windsor, Route 305	a.m.	-0:01	-0:11	-0:12
	midday	0:02	-0:08	-0:06
	p.m.	-0:04	-0:05	-0:09
Windsor, Route 75	a.m.	-0:34	0:01	-0:33
	midday	-0:18	0:07	-0:11
	p.m.	-0:06	-0:13	-0:19

It should be noted in Table 17, negative time values represent a decrease in travel time during the "After" condition as compared to the "Before" condition; Positive time values represent an increase in travel time during the "After" condition.

Corridor Performance Results

The total benefits to corridor performance from "Before" to "After" conditions are summarized in Table 18 below. The corridor performance results show sizable reductions for motorist delay, fuel consumption, stops, and emissions. The reductions to delay and fuel for the optimization of these eight (8) corridors are estimated to save Connecticut motorists over 37,700 hours of delay and $1.18 million in user (time and fuel) costs per year. More detailed corridor performance measures, including a breakdown by study period, are provided in Appendix E.

Table 18. Corridor Performance Results

Corridor	Annual Savings (From "Before" to "After" Conditions)				
	Delay (Veh-hours)	Fuel (Gallons)	Stops (Veh-stops)	Emissions (kg)	User Savings ($)
Bloomfield/Windsor, Route 187, and Route 218	2,900	2,500	570,000	22,000	$88,000
East Windsor, Route 5	7,000	6,100	1,140,000	53,000	$218,000
New Britain, Route 174	2,100	1,900	230,000	16,000	$67,000
Rocky Hill/Wethersfield, Route 99	9,700	8,400	780,000	74,000	$302,000
Route 10, Southington	10,100	8,800	760,000	77,000	$316,000
Windsor, Route 178	900	800	160,000	7,000	$29,000
Windsor, Route 305	1,700	1,500	540,000	13,000	$55,000
Windsor, Route 75	3,300	2,900	570,000	25,000	$102,000
Total	**37,700**	**32,900**	**4,750,000**	**287,000**	**$1,180,000**

Note: User savings in Table 18 are based on reductions in delay, fuel, and local demographic information. Values including in parentheses shall be considered to have a negative effect.

Table 19. Corridor Average Travel Speed Increase

Corridor	Avg. Speed Before (mph)	Avg. Speed After (mph)	Increase in Travel Speed %
Bloomfield/Windsor, Route 187, and Route 218	22.2	23.2	5%
East Windsor, Route 5	31.8	34.5	8%
New Britain, Route 174	24.1	28.5	18%
Rocky Hill/Wethersfield, Route 99	23.5	29.3	25%
Southington, Route 10	23.0	25.2	10%
Windsor, Route 178	24.8	32.0	29%
Windsor, Route 305	23.3	25.6	10%
Windsor, Route 75	22.0	26.1	19%

Study Benefit-to-Cost Comparison

The total user savings cost for Phase 1 is $1,180,000 annually. The benefits over the next five years are expected to be $5.9 million. The costs of the timing plan evaluation Phase 1 corridors are estimated to be approximately $100,000 per year. This yields benefit-to-cost ratio of 12:1.

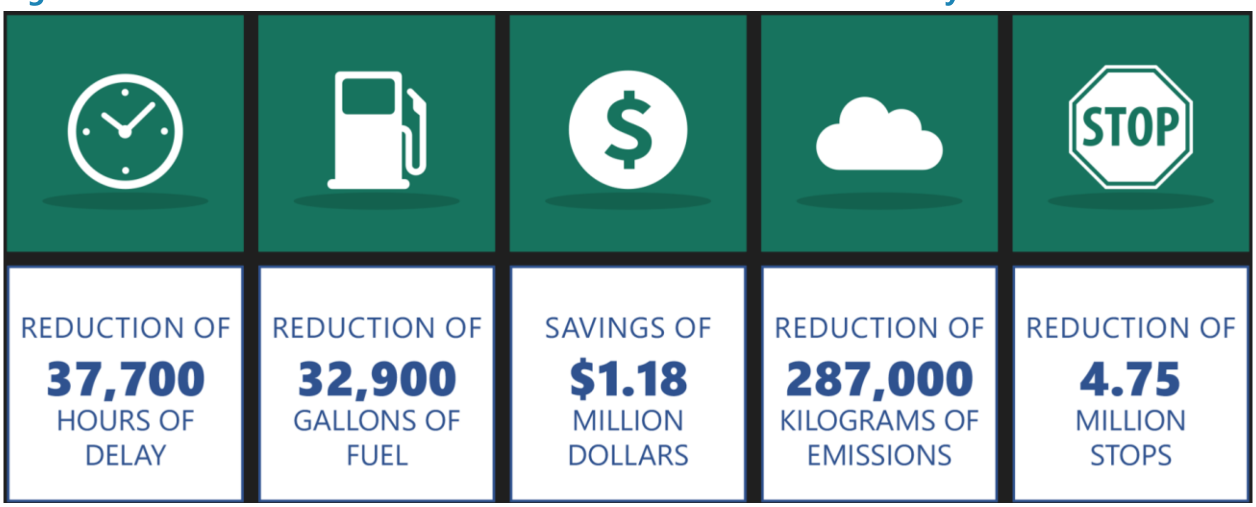
These benefits are measured and published on CTDOT Green Light Web Page

Summary/Conclusion

The evaluation of the CTSS coordination timing resulted in a wide range of transportation, economic, and environmental improvements that increase user quality of life. The project offers better flow to improve safety, a reduction in congestion, fuel savings and improved air quality for the CRCOG corridors.

It is determined that significant cost savings are achieved in all eight (8) study corridors. On average, travel speeds were increased from an average of 24.6 mph to 28.7 mph, an increase of 17%. The number of stops were reduced by 4.75 million per year and travel times were reduced by an average of 16%. The Phase 1 reductions to delay and fuel are estimated to save Connecticut motorists over 37,700 hours of delay and $1.18 million in user (time and fuel) costs per year. More detailed corridor performance measures, including a breakdown by study period, are provided in the appendices. Figure 31 below summarizes Phase 1 performance measures improvements.

Figure 31: Phase 1 Corridors Performance Measures Results Summary



Note: Performance measures were summarized for times of the day when travel time studies were completed. This means that benefits derived from the timing plan evaluation effort are only reported for those hours during the day in which travel time studies were conducted. For the remaining hours of the day and weekends, it is expected that additional benefits are realized that are not reported in this study since travel studies were not collected during those times of day.

References

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Appendix A
Phase 1 Intersection List

Bloomfield/Windsor, Route 187 & Route 218						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
011-214	A	RTE 187 AT PARK AVENUE	V	V	Copper Aerial	Naztec V41
011-212	A	RTE 187 AT WALSH STREET	V	L	Copper Aerial/Underground	Naztec V41
011-211	N/A	RTE 187 AT RTE 218	V	V	Copper Underground	Naztec V41
011-248	B	RTE 218 AT PACKARD ST.	L	NONE	Copper Underground	Naztec V41
164-283	B	RTE 218 AT COLUMBIA RD.	V	NONE	Copper Underground	Naztec V41
164-248	B	RTE 218 AT I-291 RAMPS	L	NONE	Copper Underground	Naztec V41
164-247	B	RTE 218 AT MATIANUCK AVENUE	L	NONE	Copper Underground	Naztec V41
164-249	B	RTE 218 AT I-91 SB RAMPS	L	NONE	Copper Underground	Naztec V41
164-250	B	RTE 218 AT I-91 HOV RAMPS	L	NONE	Copper Underground	Naztec V41
164-251	B	RTE 218 AT I-91 NB RAMPS	L	NONE	Copper Underground	Naztec V41
L = Loop, V = Video (Non recording)						

East Windsor, Route 5						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
046-214	A	RTE 5 AT ABBE ROAD	V	NONE	Copper Aerial	Naztec V41
046-216	A	RTE 5 AT STOUGHTON ROAD	V	NONE	Copper Aerial	Naztec V41
046-222	A	RTE 5 AT SOUTHERN AUTO SALES	V	NONE	Copper Aerial	Naztec V41
046-205	A	RTE 5 AT RTE 191 (PHELPS RD)	V	NONE	Copper Aerial	Naztec V41
046-213	A	RTE 5 AT TROMLEY ROAD	V	V	Copper Aerial	Naztec V41
046-215	A	RTE 5 AT SOUTH WATER ST	V	NONE	Copper Aerial	Naztec V41
046-201	B	RTE 5 AT THOMPSON ROAD	V	V	Copper Aerial	Naztec V41
046-209	B	RTE 5 AT RTE 91 RAMPS	V	V	Copper Aerial	Naztec V41
046-228	B	RTE 5 AT RTE 5 WENDY'S & WALMART DRIVES	L	L	Copper Aerial	Naztec V41
046-226	C	RTE 5 AT BIG Y MARKET	V	V	Copper Aerial	Naztec V41
046-225	C	RTE 5 AT CINAMA DRIVE	L	L	Copper Aerial	Naztec V41
L = Loop, V = Video (Non recording)						

New Britain, Route 174						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
088-223	A	RTE 174 @ CHAPMAN STREET	V	NONE	Copper Aerial	Naztec V41
088-239	A	RTE 174 @ MARKET STREET	V	NONE	Copper Aerial	Naztec V41
088-250	A	RTE 174 @ JOHN DOWNEY DR	V	NONE	Copper Aerial	Naztec V41
088-254	A	RTE 174 @ CHARLES STREET	L, V	NONE	Copper Aerial	Naztec V41
L = Loop, V = Video (Non-recording)						

Rocky Hill/Wethersfield, Route 99						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
118-233	A	RTE 99 AT I-91 SB RAMPS	V	NONE	Copper Underground	Cubic V85
118-209	A	RTE 99 AT TOWN LINE ROAD	V	V	Copper Aerial/Underground	Cubic V85
159-235	A	RTE 99 AT EXECUTIVE SQUARE	L	NONE	Copper Underground	Cubic V85
159-237	A	RTE 99 AT GOFF BROOK SHOPS	L	NONE	Copper Aerial/Underground	Cubic V85
159-206	A	RTE 99 AT MILL STREET	V	V	Copper Aerial	Cubic V85
159-246	A	RTE 99 AT WETHERSFIELD SHOP	L	NONE	Copper Aerial/Underground	Cubic V85
L = Loop, V = Video (Non-recording)						

Southington Route 10						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
131-265	A	RTE 10 AT LAZY LANE	V	NONE	Copper Underground	Naztec V41
131-229	A	RTE 10 AT SHOPPING PLAZA	V	NONE	Copper Underground	Naztec V41
131-237	A	RTE 10 AT QUEEN "B" PLAZA	V	NONE	Copper Underground	Naztec V41
131-222	A	RTE 10 AT LOPER STREET	V	NONE	Copper Underground	Naztec V41
131-211	A	RTE 10 AT I-84 E.B. RAMPS	V	NONE	Copper Underground	Naztec V41
131-212	A	RTE 10 AT I-84 W.B. RAMPS	V	NONE	Copper Underground	Naztec V41
131-228	A	RTE 10 AT SPRING STREET	V	NONE	Copper Underground	Naztec V41
131-213	A	RTE 10 AT SOUTHINGTON PLAZA SOUTH	V	NONE	Copper Underground	Naztec V41
131-214	A	RTE 10 AT SOUTHINGTON PLAZA NORTH	V	NONE	Copper Underground	Naztec V41
131-215	B	RTE 10 AT AIRCRAFT ROAD	V	NONE	Copper Underground	Naztec V41
131-234	B	RTE 10 AT WEST QUEEN STREET	V	NONE	Copper Underground	Naztec V41
131-216	B	RTE 10 AT RIVER STREET	V	NONE	Copper Underground	Naztec V41
V = Video (Non-recording)						

Windsor, Route 178						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
164-257	A	RTE 178 AT I-91 NB RAMPS	L	NONE	Copper Underground	Naztec V61
164-258	A	RTE 178 AT I-91 SB RAMPS	L	NONE	Copper Underground	Naztec V61
L = Loop						

Windsor, Route 305						
Intersection #	Subsystem	Location	Detection	Artery Detection	Field Communications	Controller
164-241	A	RTE 305 AT I-91 NB RAMPS	V	NONE	Copper Underground	Naztec V41
164-259	A	RTE 305 AT I-91 HOV OFF RAMP	V	NONE	Copper Underground	Naztec V41
164-260	A	RTE 305 AT I-91 SB RAMPS	V	NONE	Copper Underground	Naztec V41
164-261	A	RTE 305 AT DUNFEY LANE	V	NONE	Copper Underground	Naztec V41
164-209	A	RTE 305 AT MOUNTAIN ROAD	V	V	Copper Underground	Naztec V41
V = Video (Non-recording)						

Windsor, Route 75						
Intersection #	**Subsystem**	**Location**	**Detection**	**Artery Detection**	**Field Communications**	**Controller**
164-284	A	RTE 75 AT SHAY STREET	L	NONE	Copper Underground	Naztec V41
164-262	A	RTE 75 AT 91 NB RAMPS	V	NONE	Copper Underground	Naztec V41
164-263	A	RTE 75 AT I-91 HOV RAMP	L	NONE	Copper Underground	Naztec V41
164-264	A	RTE 75 AT I-91 SB RAMP	L	NONE	Copper Underground	Naztec V41
164-272	A	RTE 75 AT DAY HILL ROAD	L	NONE	Copper Underground	Naztec V41
164-273	A	RTE 75 AT HUDSON LANE	V	NONE	Copper Underground	Naztec V41
L = Loop, V = Video (Non-recording)						

Appendix B
Phase 1 Travel Time Runs Comparison

Route 187 (Blue Hills Ave.) Bloomfield from Walsh St to Park Ave. & Route 218 (Cottage Grove Rd/Putnam Ave.), Bloomfield/Windsor from Packard St. to I-91 Northbound Ramps										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total ΔTT (sec)**	Avg # of Stops Before	Avg # of Stops After
AM	EB	19.5	25.5	6.0	31%	143	88	-55	3.7	2.8
	SB	20.8	24.4	3.6	17%	78	73	-5	3.7	3.3
MID	NB	23.9	19.8	-4.1	-17%	96	131	35	3.3	5.0
	SB	23.0	23.4	0.4	2%	52	62	10	3.3	4.0
PM	NB	23.2	23.4	0.2	1%	110	114	4	2.3	3.5
	SB	22.7	22.6	-0.1	0%	77	60	-17	4.0	3.8
Average:		**22.2**	**23.2**	**1.0**	**5%**	**93**	**88**	**-28**	**3.4**	**3.7**

Route 5 (S. Main St), East Windsor from Abbe Road to Big Y Drive										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total ΔTT (sec)**	Avg # of Stops Before	Avg # of Stops After
AM	NB	33.7	32.7	-1.0	-3%	369	368	-1	2.4	2.0
	SB	33.2	37.8	4.6	14%	372	299	-73	1.7	1.0
MID	NB	28.2	35.2	7.0	25%	449	358	-91	3.7	1.5
	SB	30.1	35.4	5.3	18%	407	364	-43	2.7	0.5
PM	NB	32.2	29.2	-3.0	-9%	382	408	26	2.0	2.5
	SB	33.1	36.4	3.3	10%	373	363	-10	2.7	0.3
Average:		**31.8**	**34.5**	**2.7**	**8%**	**392**	**360**	**-192**	**2.5**	**1.3**

Route 174 (Newington Ave.), New Britain from Chapman Street to Twin City Plaza										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total** ΔTT (sec)	Avg # of Stops Before	Avg # of Stops After
AM	EB	24.9	28.4	3.5	14%	55	49	-6	0.3	0.4
	SB	28.4	32.1	3.7	13%	47	45	-2	0.3	0.2
MID	NB	20.6	33.7	13.1	64%	66	39	-27	1.0	0.0
	SB	21.0	26.2	5.2	25%	68	52	-16	0.7	0.5
PM	NB	25.9	20.3	-5.6	-22%	52	65	13	0.7	1.0
	SB	23.5	30.3	6.8	29%	61	43	-18	0.7	0.0
Average:		**24.1**	**28.5**	**4.5**	**18%**	**58**	**49**	**-56**	**0.6**	**0.4**

Route 99 (Silas Deane Hwy.), Rocky Hill/Wethersfield from I-91 SB Ramps to CVS & Wethersfield Shopping Plaza										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total** ΔTT (sec)	Avg # of Stops Before	Avg # of Stops After
AM	EB	25.2	34.7	3.5	14%	113	82	-31	0.7	1.0
	SB	26.3	25.4	3.7	13%	108	112	4	1.0	1.3
MID	NB	20.2	22.9	13.1	64%	141	124	-17	2.0	1.7
	SB	16.1	28.4	5.2	25%	177	100	-77	2.3	0.3
PM	NB	24.1	30.6	-5.6	-22%	118	93	-25	1.7	0.0
	SB	29.0	33.8	6.8	29%	98	84	-14	0.0	0.0
Average:		**23.5**	**29.3**	**4.5**	**25%**	**126**	**99**	**-160**	**1.3**	**0.7**

Route 10 (Queen St.), Southington from Lazy Lane to River Street										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total ΔTT (sec)**	Avg # of Stops Before	Avg # of Stops After
AM	NB	29.2	31.8	2.5	9%	186	173	-13	1.3	0.7
	SB	25.0	29.8	4.8	19%	209	176	-33	2.7	1.3
MID	NB	20.7	20.3	-0.3	-2%	254	247	-7	2.0	2.3
	SB	19.5	24.8	5.3	27%	260	208	-52	2.3	2.0
PM	NB	23.2	21.7	-1.5	-6%	221	236	15	2.0	2.0
	SB	20.4	23.1	2.7	13%	290	228	-62	3.7	2.3
Average:		**23.0**	**25.2**	**2.2**	**10%**	**237**	**211**	**-152**	**2.3**	**1.8**

Route 178 (Park Ave.), Windsor from I-91 Southbound Ramps to I-91 Northbound Ramps										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total ΔTT (sec)**	Avg # of Stops Before	Avg # of Stops After
AM	EB	27.9	28.7	0.8	3%	12	15	3	0.0	0.3
	SB	22.6	38.1	15.5	69%	16	8	-8	0.3	0.0
MID	NB	25.3	31.4	6.1	24%	13	12	-1	0.3	0.3
	SB	27.4	31.7	4.3	16%	13	10	-3	0.3	0.0
PM	NB	20.8	27.5	6.7	32%	17	12	-5	0.3	0.0
	SB	24.5	34.4	9.9	40%	13	9	-4	0.3	0.0
Average:		**24.8**	**32.0**	**7.2**	**29%**	**14**	**11**	**-18**	**2.5**	**0.1**

Route 305 (Bloomfield Ave.), Windsor from Mountain Road to I-91 NB Ramps										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total ΔTT (sec)**	Avg # of Stops Before	Avg # of Stops After
AM	EB	25.9	26.3	0.4	2%	34	33	-1	0.7	0.8
	SB	17.0	22.4	5.4	32%	52	41	-11	1.3	0.5
MID	NB	25.5	25.5	0.0	0%	38	40	2	1.0	0.6
	SB	20.1	27.1	7.0	35%	42	34	-8	1.0	0.2
PM	NB	29.9	28.4	-1.5	-5%	36	32	-4	0.7	0.7
	SB	21.6	23.8	2.2	10%	43	38	-5	1.0	0.3
Average:		**23.3**	**25.6**	**2.3**	**10%**	**41**	**36**	**-27**	**1.0**	**0.5**

Route 75 (Poquonock Ave.), Windsor from Hudson Lane to Shay Street										
Period	Direction	Avg Speed Before (mph)	Avg Speed After (mph)	Δ Avg Speed (mph)	% change in Avg Speed	Travel Time (TT) Before (sec)	Travel Time (TT) After (sec)	**Total ΔTT (sec)**	Avg # of Stops Before	Avg # of Stops After
AM	NB	18.2	28.7	10.5	58%	94	60	-34	1.3	0.3
	SB	23.0	21.7	-1.3	-6%	80	81	1	1.5	0.8
MID	NB	25.8	32.7	6.9	27%	70	52	-18	0.7	0.3
	SB	22.5	22.2	-0.3	-1%	75	82	7	1.7	1.0
PM	NB	24.2	27.5	3.3	14%	69	63	-6	0.7	0.8
	SB	18.0	23.6	5.6	31%	95	82	-13	1.7	1.3
Average:		**22.0**	**26.1**	**4.1**	**19%**	**81**	**70**	**-63**	**1.3**	**0.8**

Appendix C
Phase 1 Traffic Volumes

DESIGNER/DRAFTER: A. AHUJA CHECKED BY: J. KEISER	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	SIGNATURE/BLOCK: OFFICE OF ENGINEERING APPROVED BY:	PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION	TOWN: WINDSOR BLOOMFIELD	DRAWING TITLE: 2018 - 2020 TRAFFIC VOLUMES AM PEAK HOUR	PROJECT NO. 0171-0421 DRAWING NO. TMC-42 SHEET NO. 1

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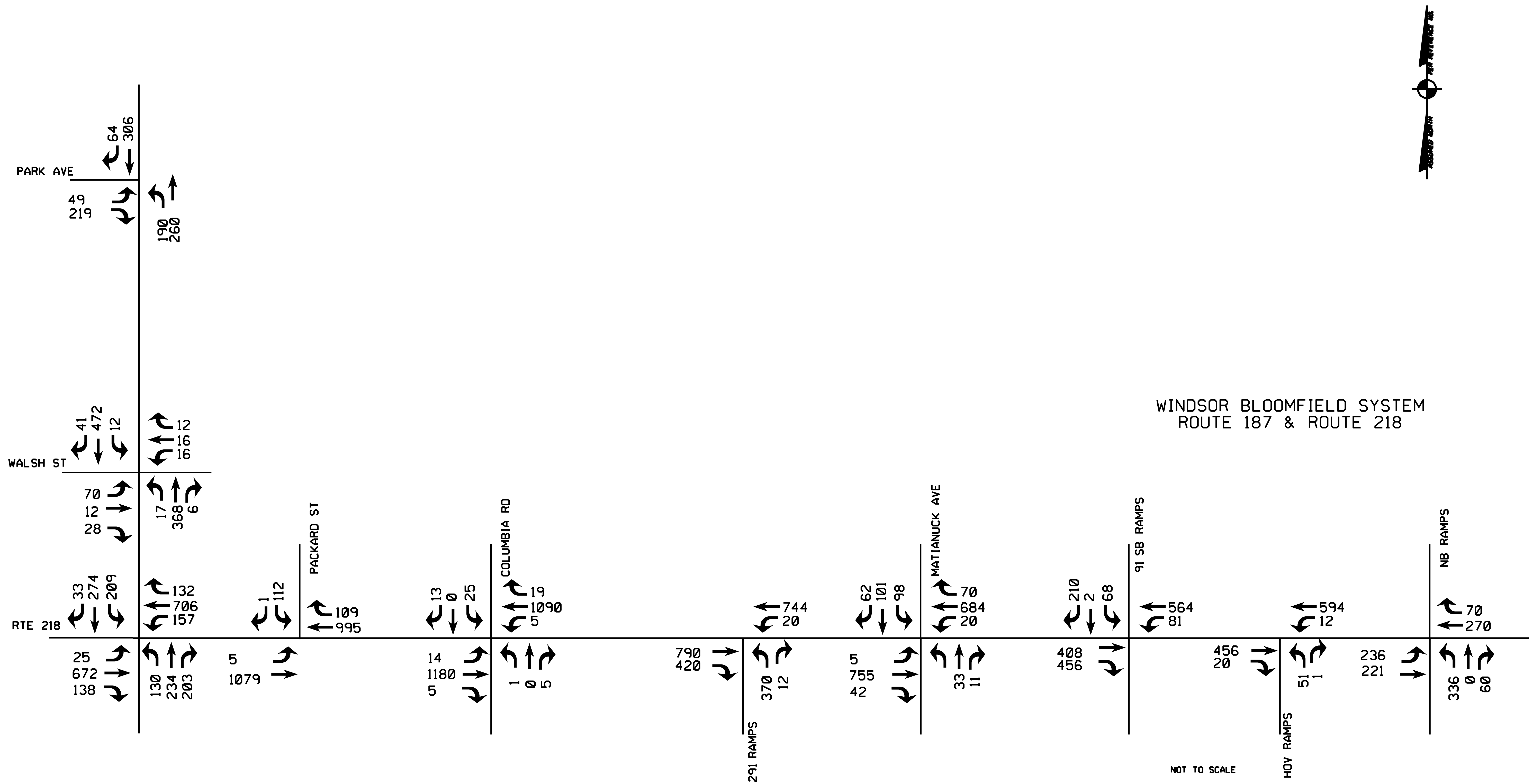

WINDSOR BLOOMFIELD SYSTEM
ROUTE 187 & ROUTE 218

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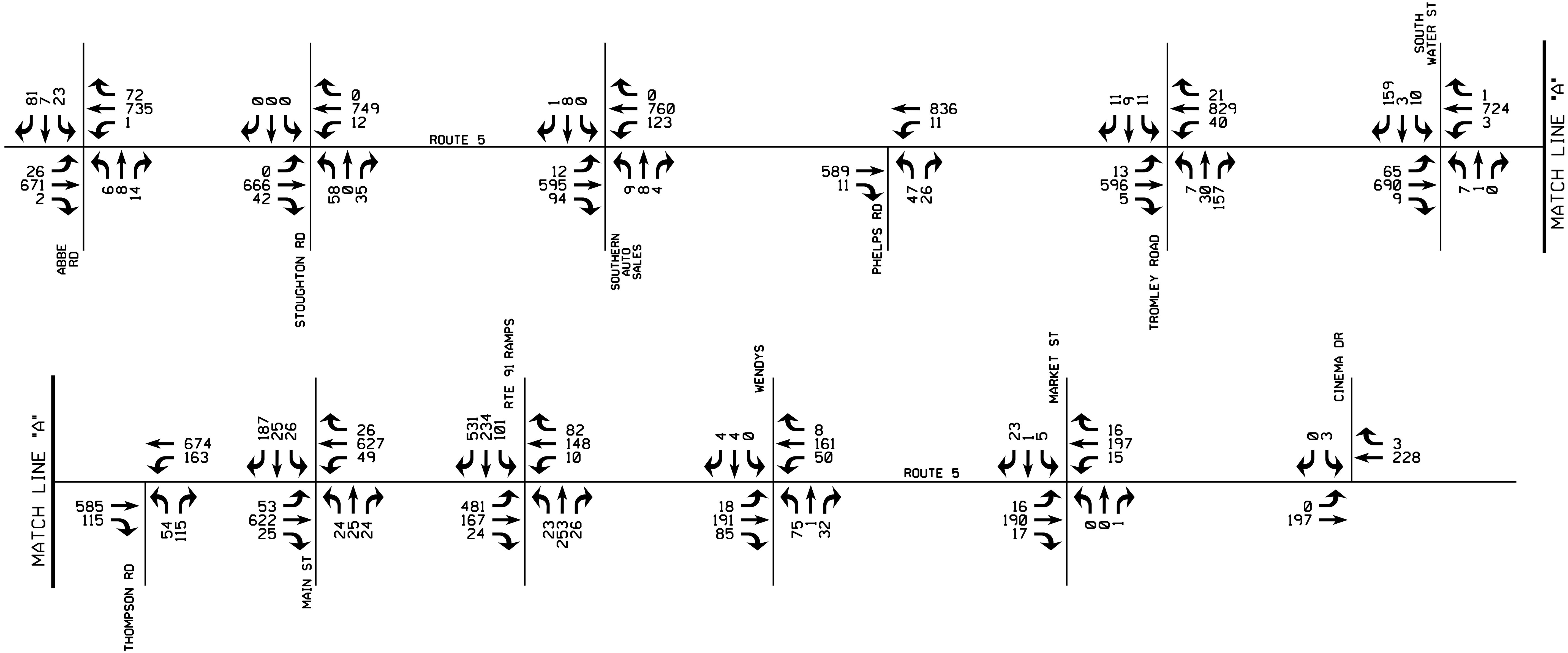

EAST WINDSOR ROUTE 5 SYSTEM

NOT TO SCALE

PRELIMINARY ENGINEERING

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DESIGNER/DRAFTER: N. JONES

CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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APPROVED BY:

PROJECT TITLE: CRCOG REGION SIGNAL COORDINATION

TOWN: EAST WINDSOR

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PROJECT NO. 0171-0421

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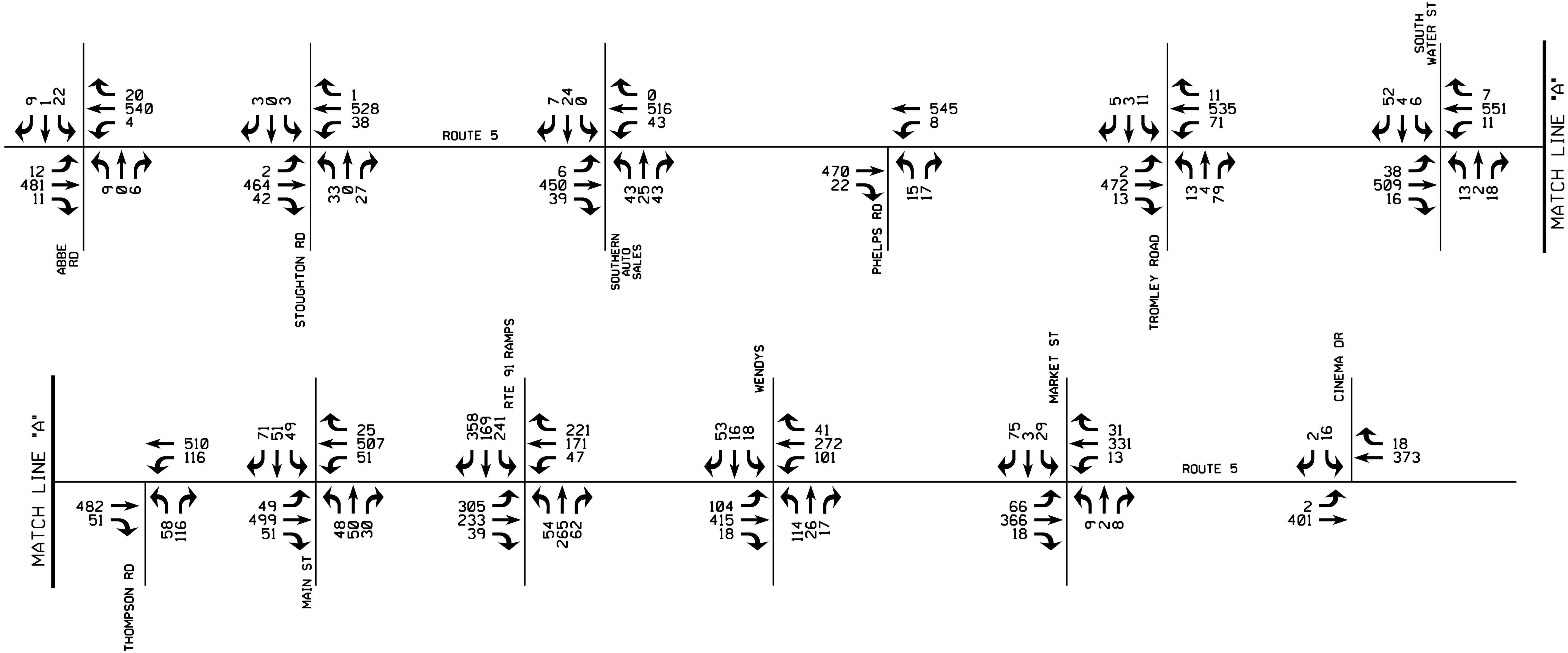

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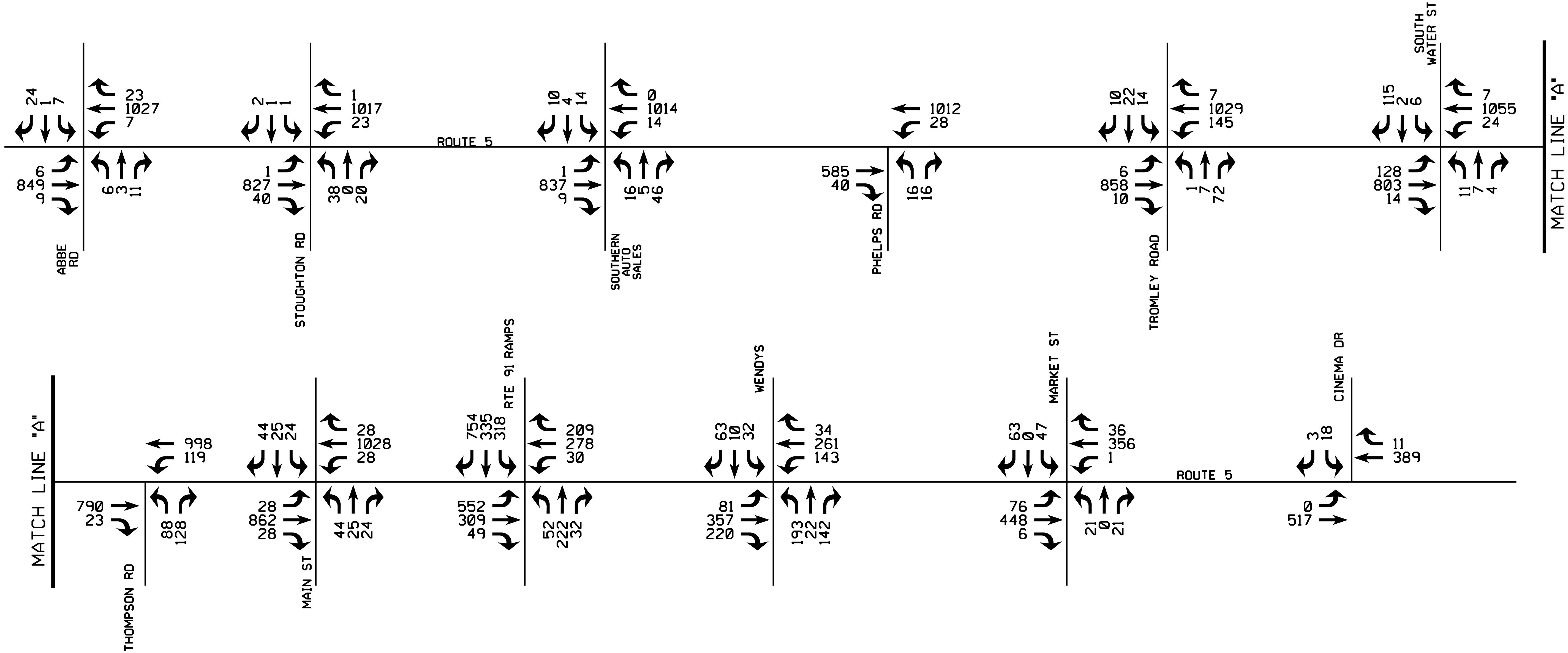

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CHECKED BY: J. KEISER

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APPROVED BY:

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CRCOG REGION SIGNAL COORDINATION

TOWN:
EAST WINDSOR

DRAWING TITLE:
2018 - 2020 TRAFFIC VOLUMES
PM PEAK HOUR

PROJECT NO. 0171-0421

DRAWING NO. TMC-04

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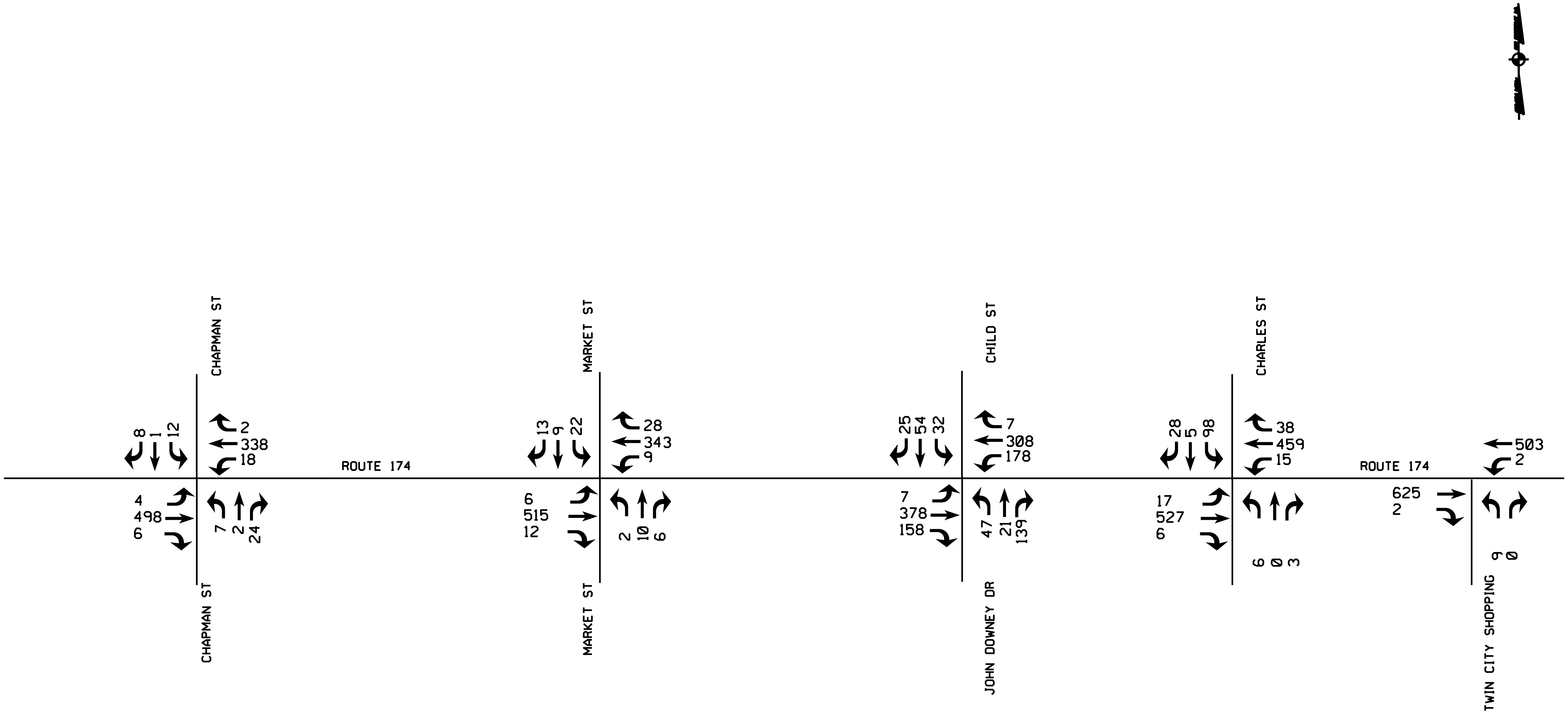

NEW BRITIAN ROUTE 173 SYSTEM

NOT TO SCALE

PRELIMINARY ENGINEERING

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CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

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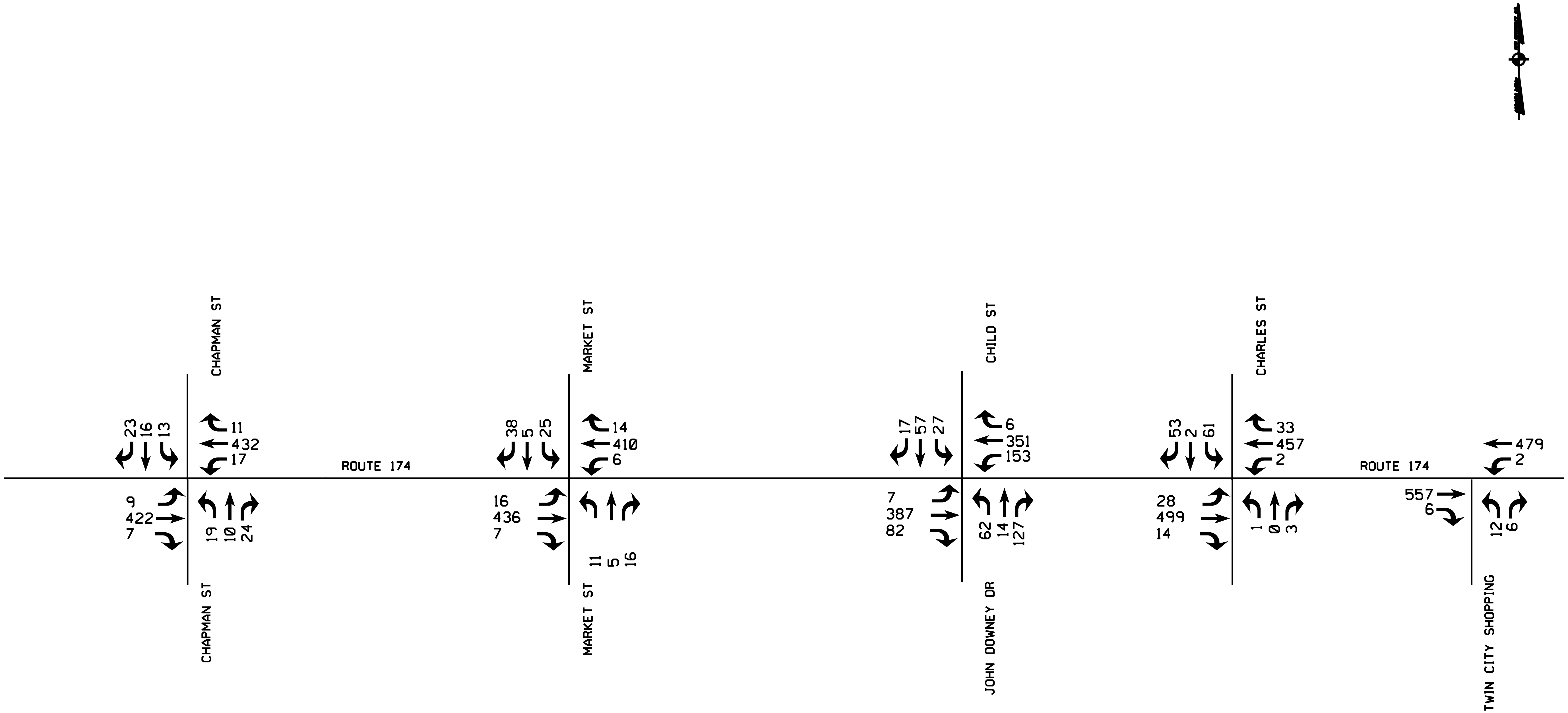

NEW BRITIAN ROUTE 173 SYSTEM

NOT TO SCALE

PRELIMINARY ENGINEERING

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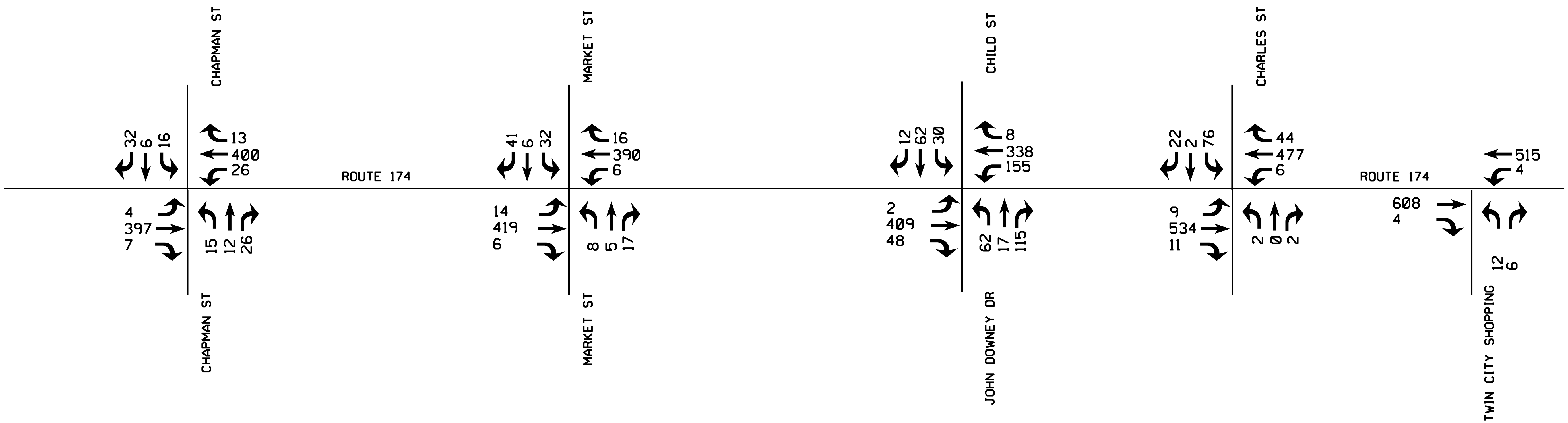

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NOT TO SCALE

PRELIMINARY ENGINEERING

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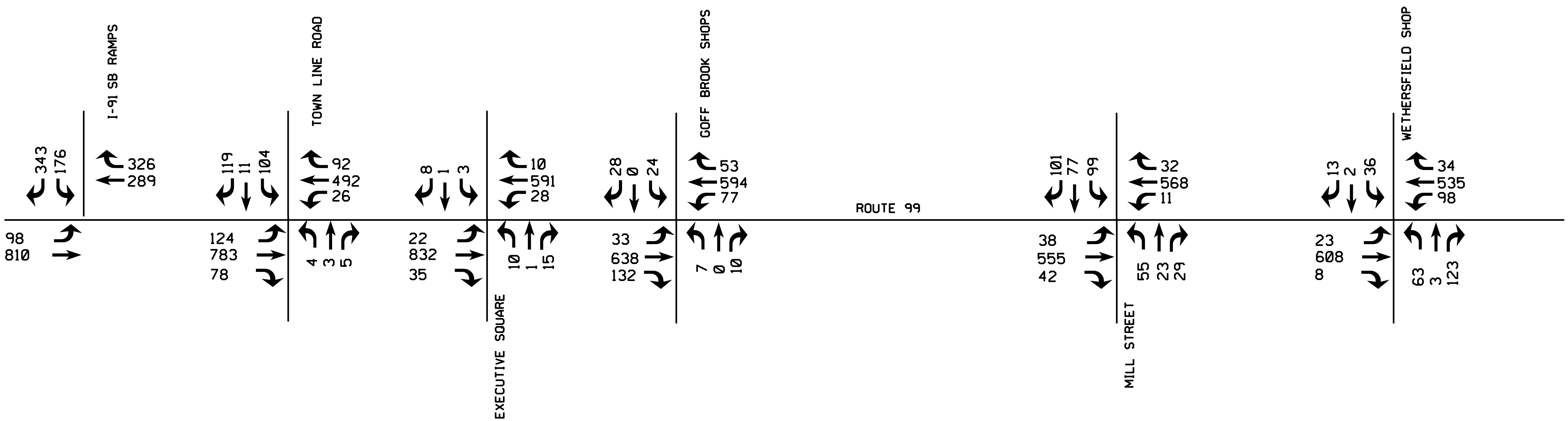
CHECKED BY: J. KEISER		APPROVED BY:		DRAWING TITLE: 2018-2020 TRAFFIC VOLUMES PM PEAK HOUR	DRAWING NO.
REV. DATE REVISION DESCRIPTION SHEET NO.	Plotted Date:$DATE$	Filename: $FILEA$			SHEET NO.



ROCKY HILL/WETHERSFIELD SYSTEM
ROUTE 99

NOT TO SCALE

PRELIMINARY ENGINEERING

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: $DATE$

DESIGNER/DRAFTER: N. JONES
CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILE$

SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE:
CRCOG REGION SIGNAL COORDINATION

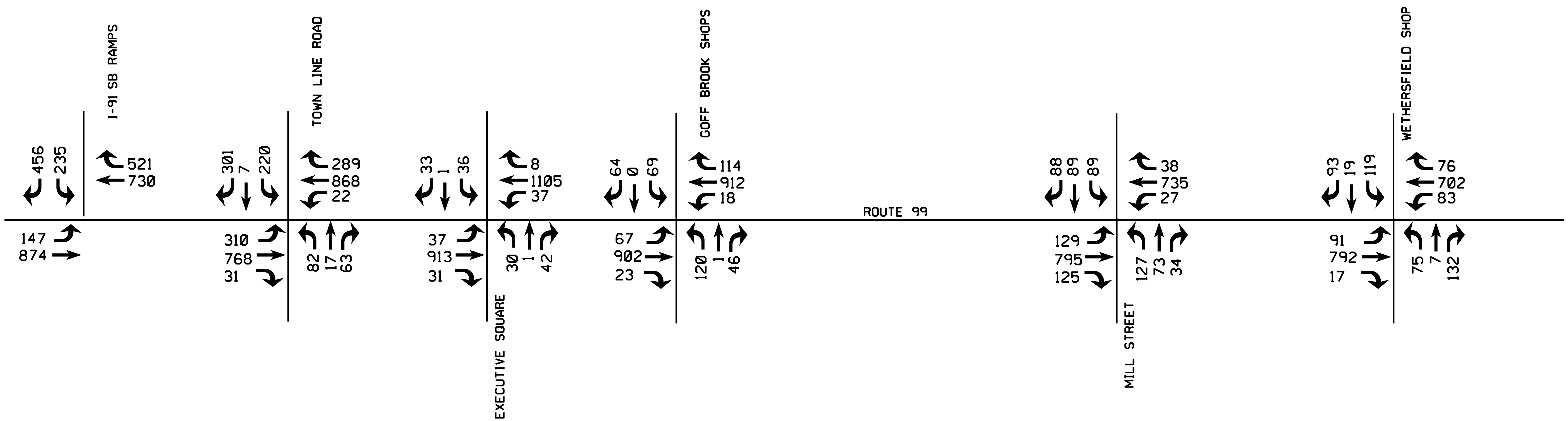
TOWN:
ROCKY HILL
WETHERSFIELD

DRAWING TITLE:
2018 - 2020 TRAFFIC VOLUMES
AM PEAK HOUR

PROJECT NO.
0171-0421

DRAWING NO.
TMC-04

SHEET NO.



ROCKY HILL/WETHERSFIELD SYSTEM
ROUTE 99

NOT TO SCALE

PRELIMINARY ENGINEERING

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date@DATE$

DESIGNER/DRAFTER: N. JONES
CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION
Filename: $FILE$

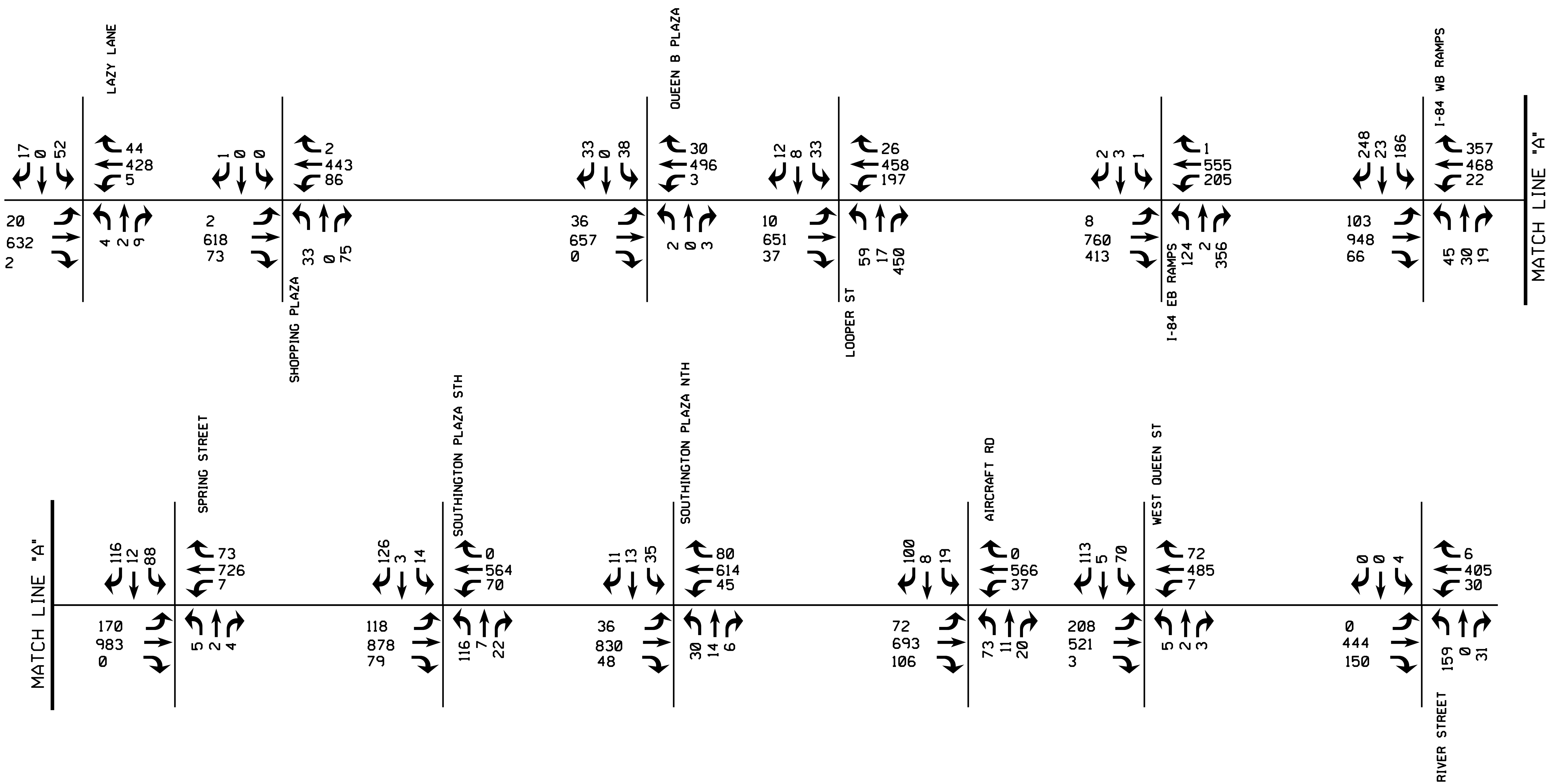
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE:
CRCOG REGION SIGNAL COORDINATION

TOWN:
ROCKY HILL
WETHERSFIELD

DRAWING TITLE:
2018 - 2020 TRAFFIC VOLUMES
PM PEAK HOUR

PROJECT NO. 0171-0421
DRAWING NO. TMC-04
SHEET NO.



SOUTHINGTON ROUTE 10 SYSTEM

NOT TO SCALE

REV. | DATE | REVISION DESCRIPTION | SHEET NO. | Plotted Date@DATE$

DESIGNER/DRAFTER: A. AHUJA
CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILE$

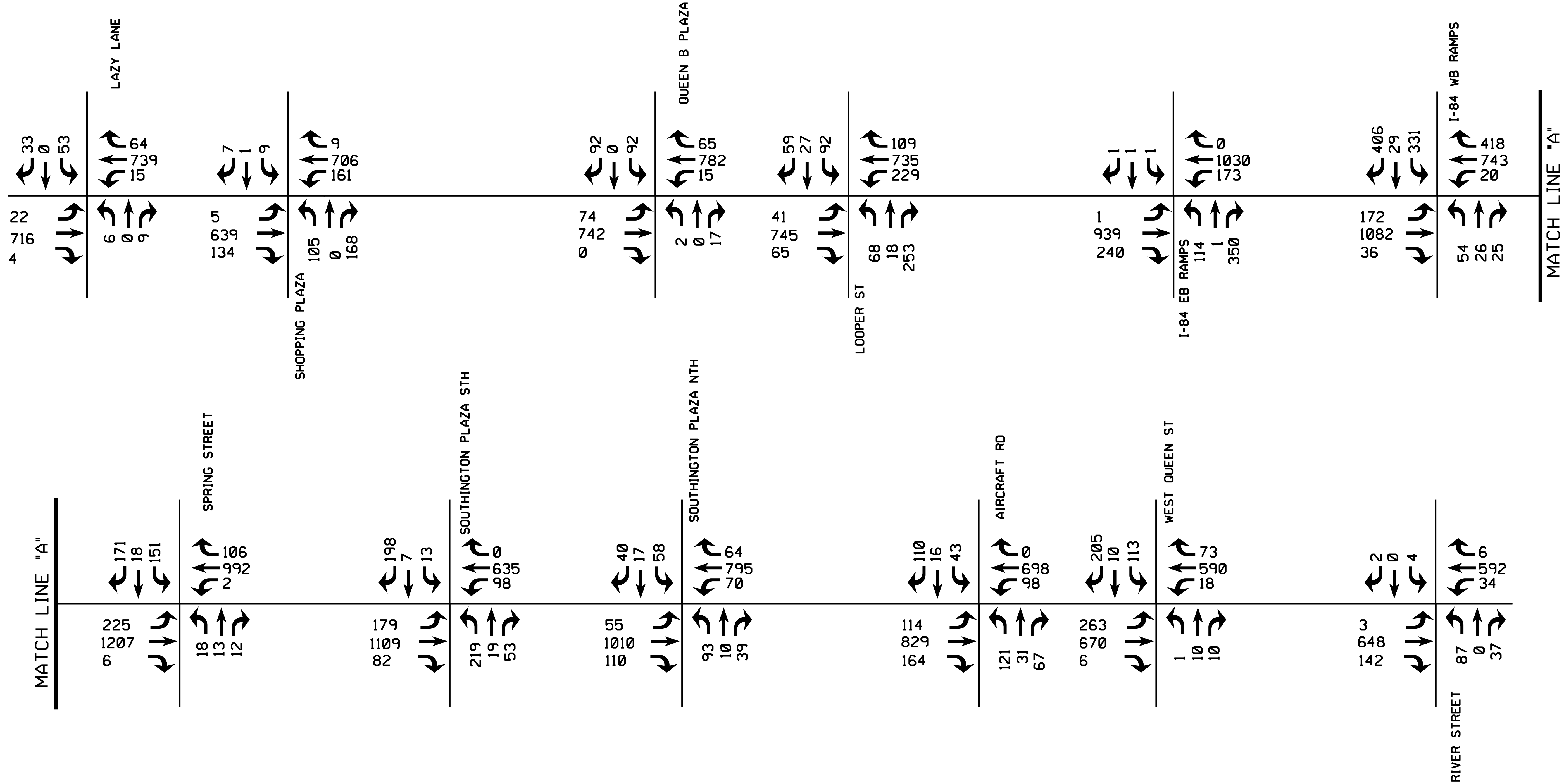
SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION

TOWN: SOUTHINGTON

DRAWING TITLE: 2019 - 2020 TRAFFIC VOLUMES AM PEAK HOUR

PROJECT NO. 0171-0421
DRAWING NO. TMC-30
SHEET NO. 1



SOUTHINGTON ROUTE 10 SYSTEM

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date:$DATE$

DESIGNER/DRAFTER: A. AHUJA
CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILE$

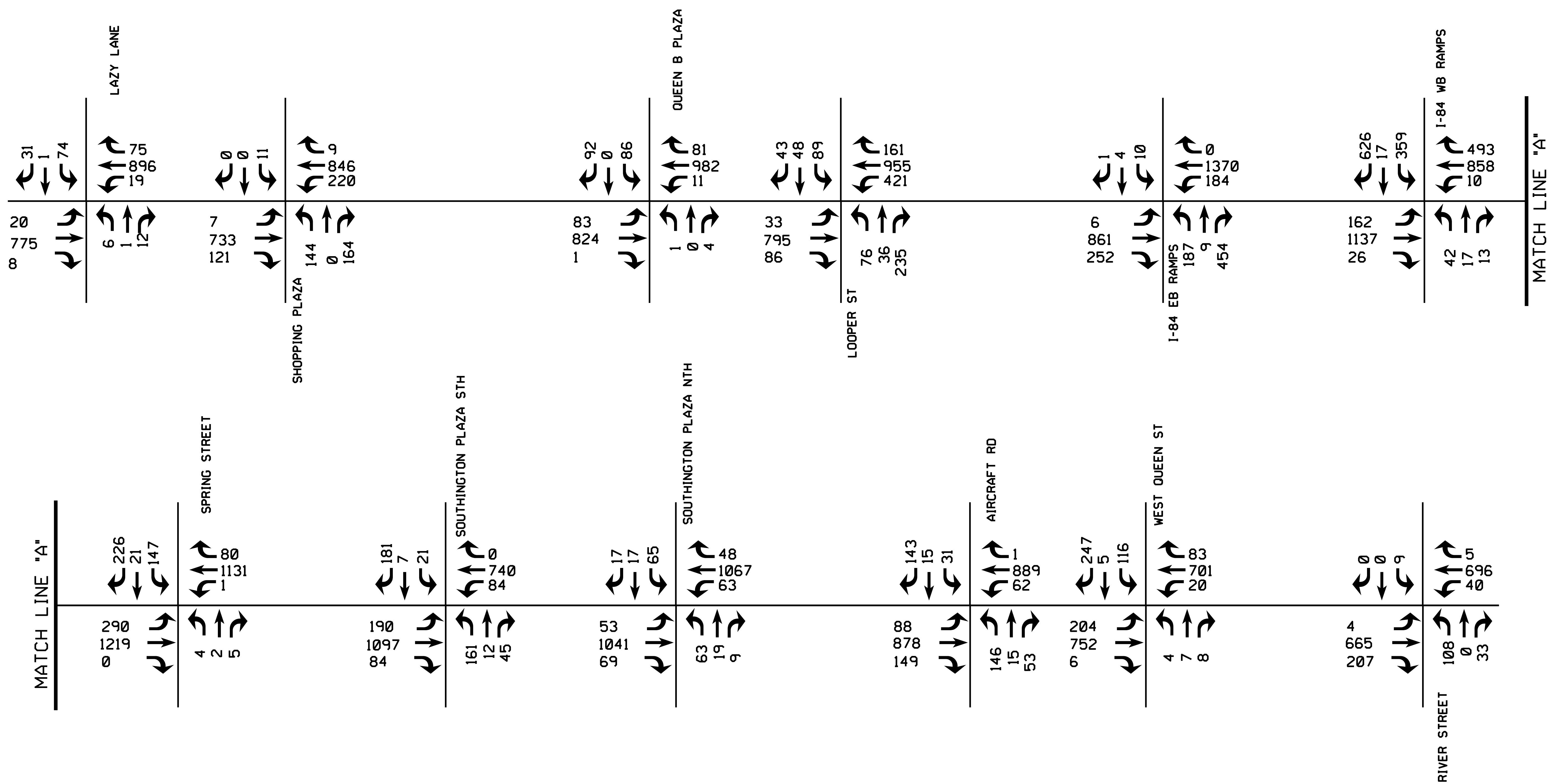
SIGNATURE/BLOCK: OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION

TOWN: SOUTHINGTON

DRAWING TITLE: 2019 - 2020 TRAFFIC VOLUMES MIDDAY PEAK HOUR

PROJECT NO. 0171-0421
DRAWING NO. TMC-30
SHEET NO. 2



SOUTHINGTON ROUTE 10 SYSTEM

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: $DATE$

DESIGNER/DRAFTER: A. AHUJA
CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILE$

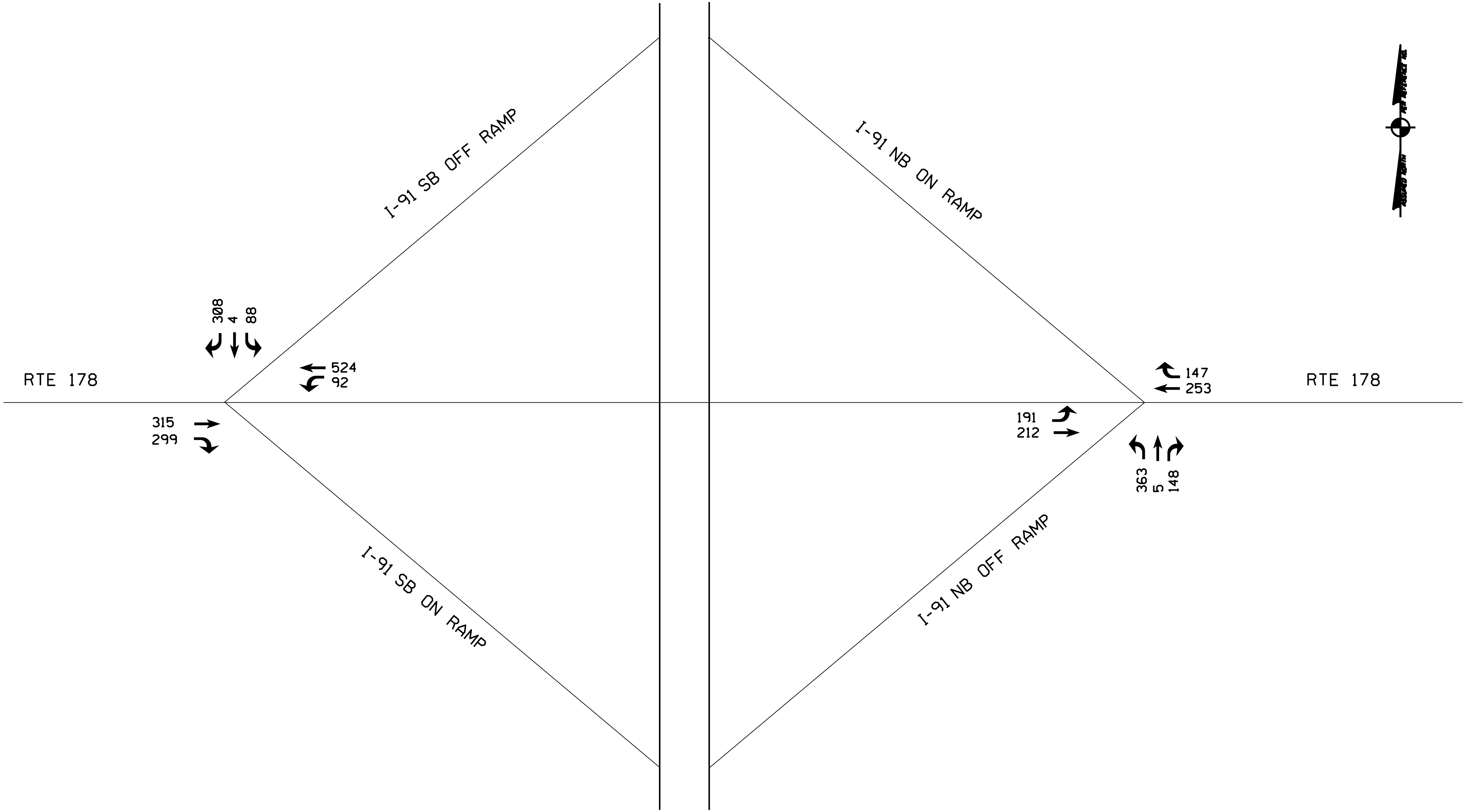
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE:
CRCOG REGIONAL SIGNAL COORDINATION

TOWN:
SOUTHINGTON

DRAWING TITLE:
2019 - 2020 TRAFFIC VOLUMES
PM PEAK HOUR

PROJECT NO. 0171-0421
DRAWING NO. TMC-30
SHEET NO. 3

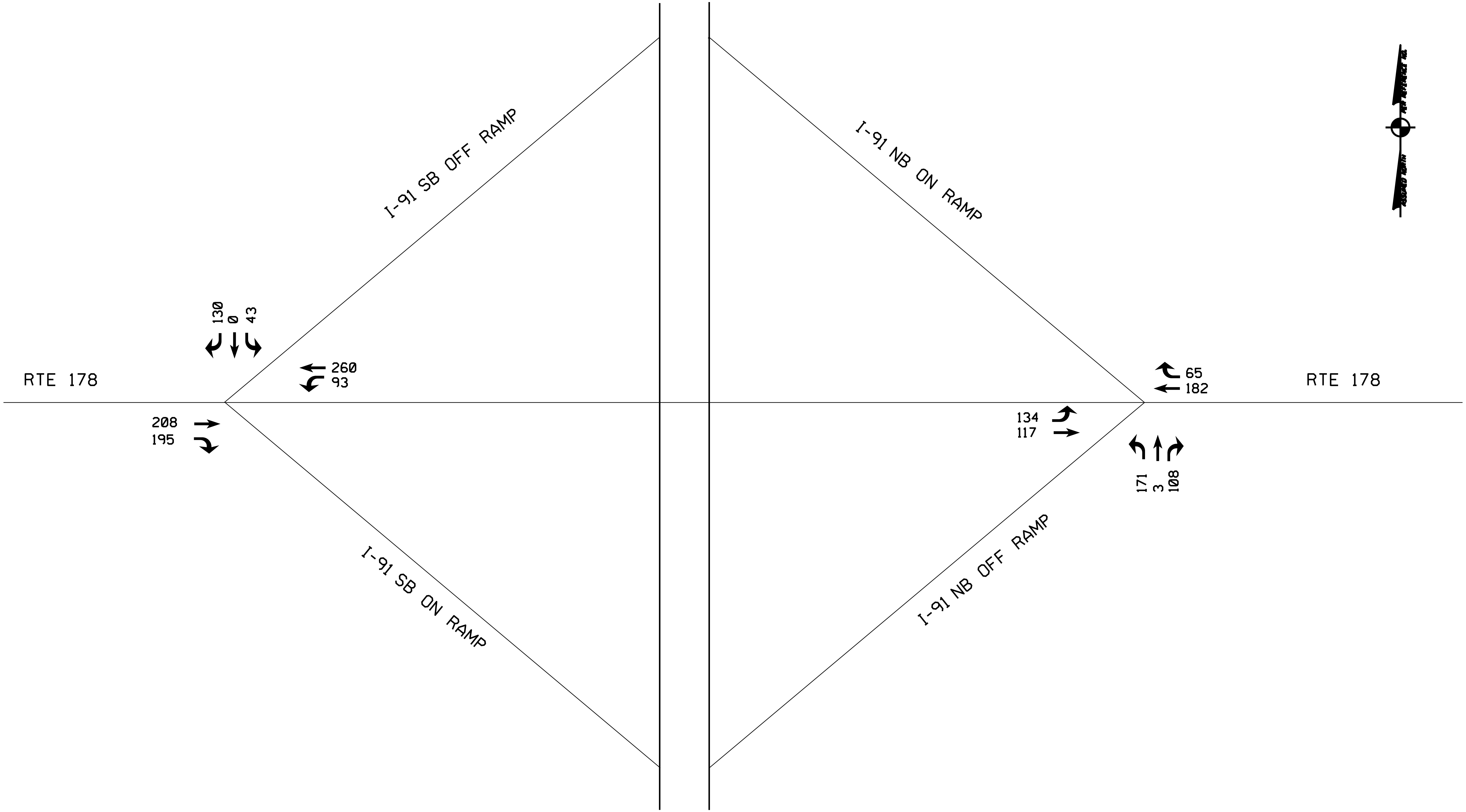


WINDSOR ROUTE 178 SYSTEM

NOT TO SCALE

DESIGNER/DRAFTER: A. AHUJA CHECKED BY: J. KEISER	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION Filename: $FILEA$	SIGNATURE/BLOCK: OFFICE OF ENGINEERING APPROVED BY:	PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION	TOWN: WINDSOR DRAWING TITLE: 2020 TRAFFIC VOLUMES AM PEAK HOUR	PROJECT NO. 0171-0421 DRAWING NO. TMC-39 SHEET NO. 1

REV.	DATE	REVISION DESCRIPTION	SHEET NO.	Plotted Date: $DATE$



WINDSOR ROUTE 178 SYSTEM

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: $DATE$

DESIGNER/DRAFTER: A. AHUJA

CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILE$

SIGNATURE/BLOCK:

OFFICE OF ENGINEERING

APPROVED BY:

PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION

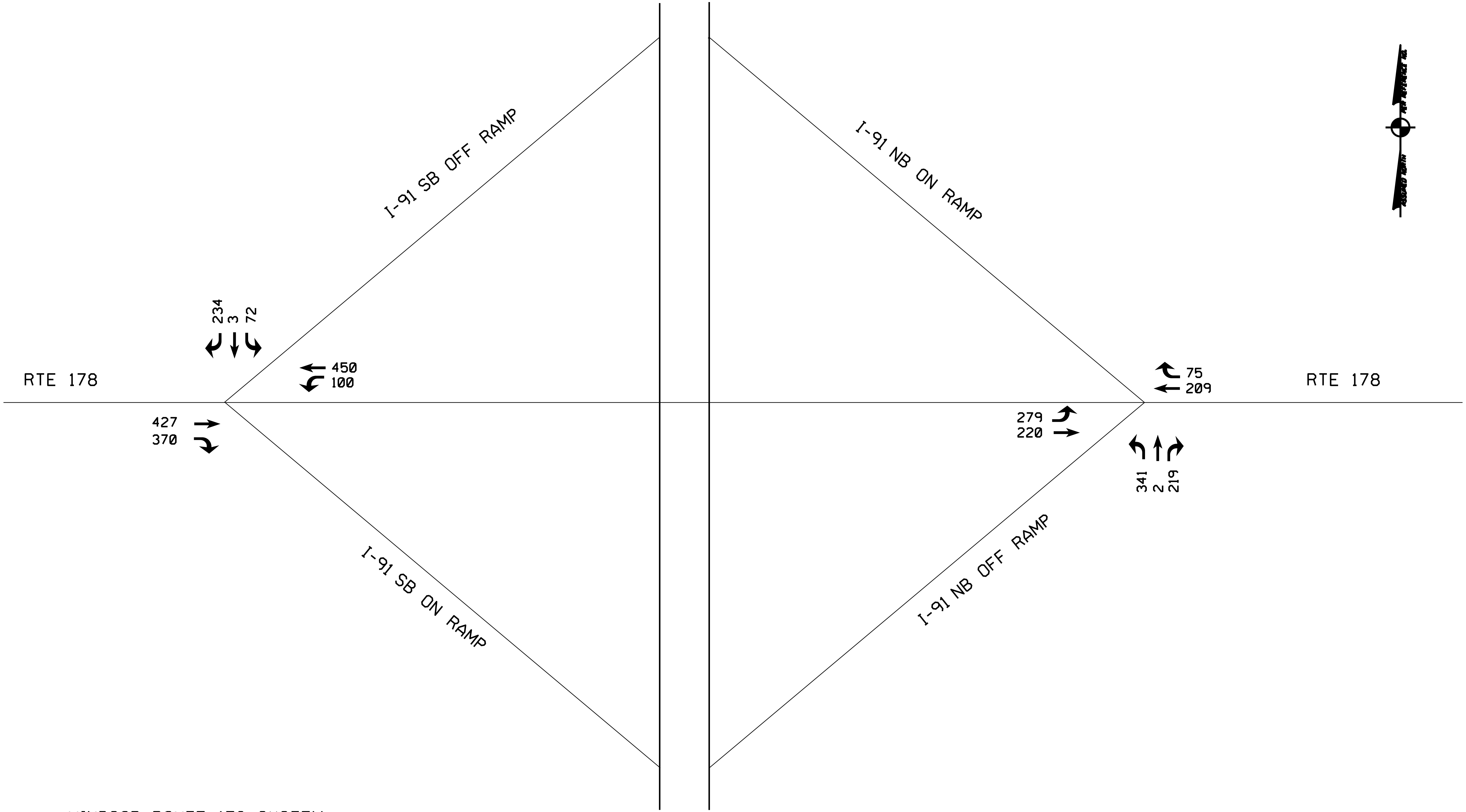
TOWN: WINDSOR

DRAWING TITLE: 2020 TRAFFIC VOLUMES MIDDAY PEAK HOUR

PROJECT NO. 0171-0421

DRAWING NO. TMC-39

SHEET NO. 2



WINDSOR ROUTE 178 SYSTEM

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date:$DATE$

DESIGNER/DRAFTER: A. AHUJA
CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILEA$

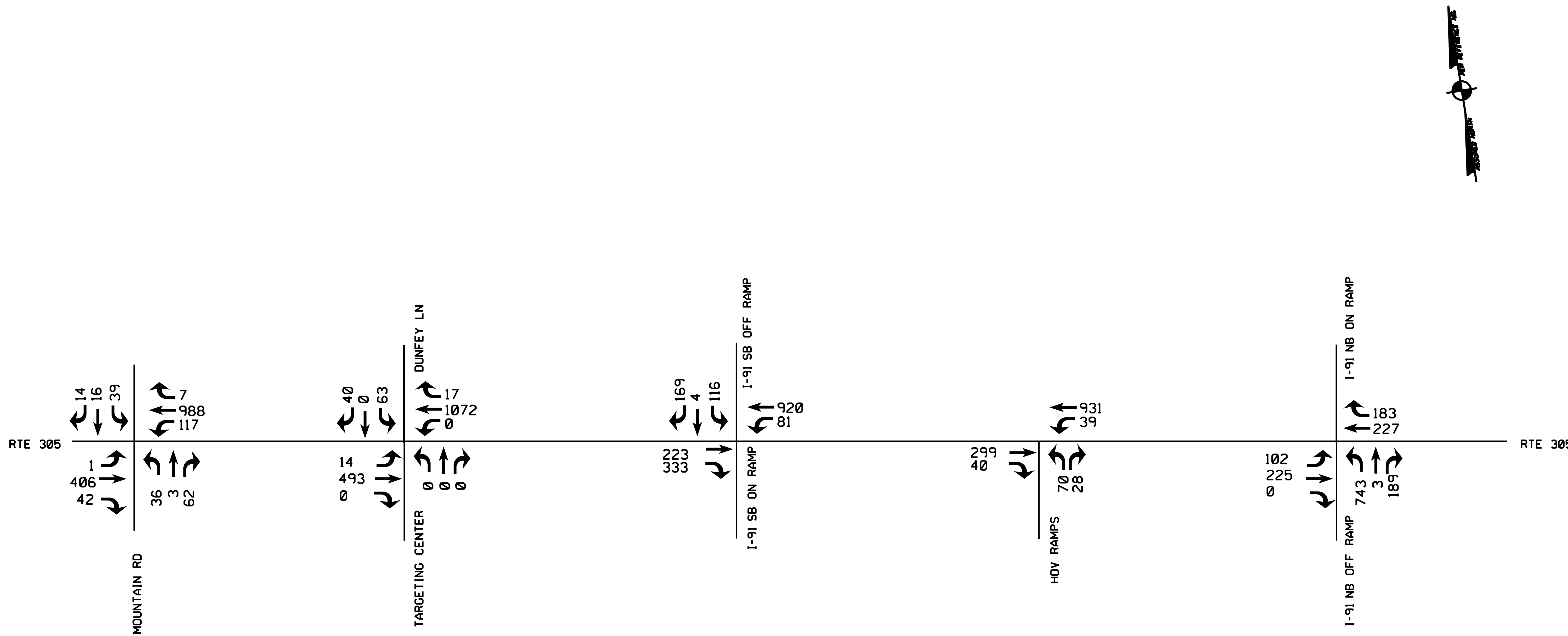
SIGNATURE/BLOCK:
OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION

TOWN: WINDSOR

DRAWING TITLE: 2020 TRAFFIC VOLUMES PM PEAK HOUR

PROJECT NO. 0171-0421
DRAWING NO. TMC-39
SHEET NO. 3



WINDSOR ROUTE 305 SYSTEM

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date $DATE$

DESIGNER/DRAFTER: A. AHUJA

CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILEA$

SIGNATURE/ BLOCK: OFFICE OF ENGINEERING

APPROVED BY:

PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION

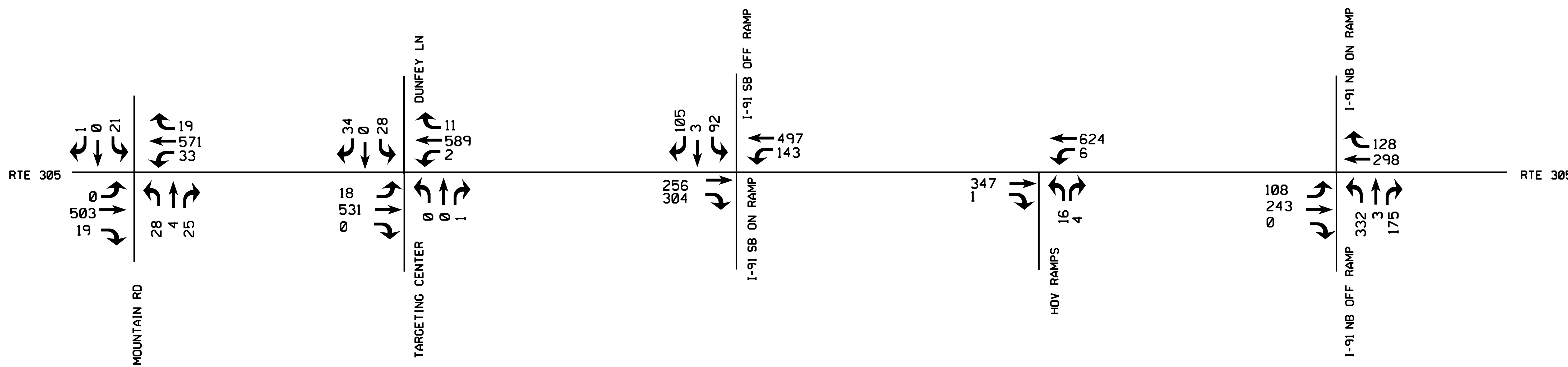
TOWN: WINDSOR

DRAWING TITLE: 2018 - 2020 TRAFFIC VOLUMES AM PEAK HOUR

PROJECT NO. 0171-0421

DRAWING NO. TMC-40

SHEET NO. 1



NOT TO SCALE

WINDSOR ROUTE 305 SYSTEM

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: $DATE$

DESIGNER/DRAFTER: A. AHUJA

CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILE$

SIGNATURE/BLOCK:

OFFICE OF ENGINEERING

APPROVED BY:

PROJECT TITLE:

CRCOG REGIONAL SIGNAL COORDINATION

TOWN:

WINDSOR

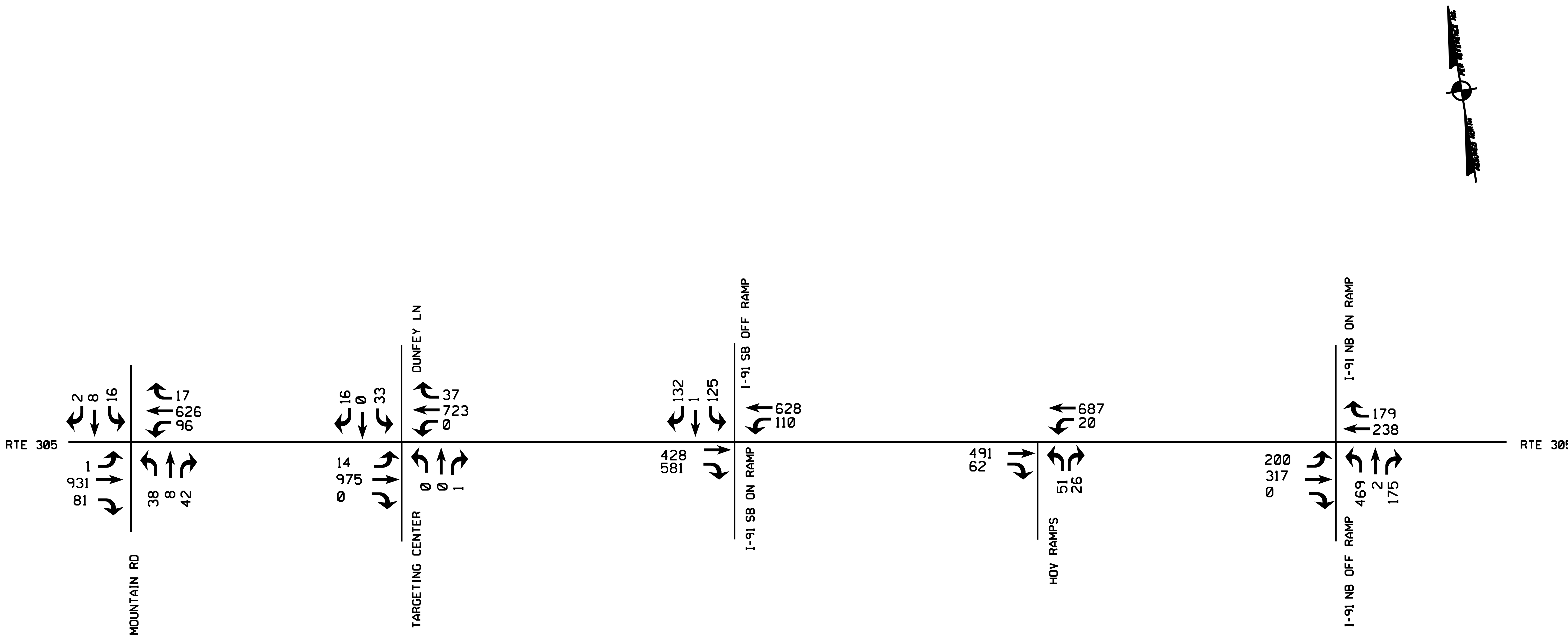
DRAWING TITLE:

2018 - 2020 TRAFFIC VOLUMES
MIDDAY PEAK HOUR

PROJECT NO.
0171-0421

DRAWING NO.
TMC-40

SHEET NO.
2



NOT TO SCALE

WINDSOR ROUTE 305 SYSTEM

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: $DATE$

DESIGNER/DRAFTER: A. AHUJA
CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILE$

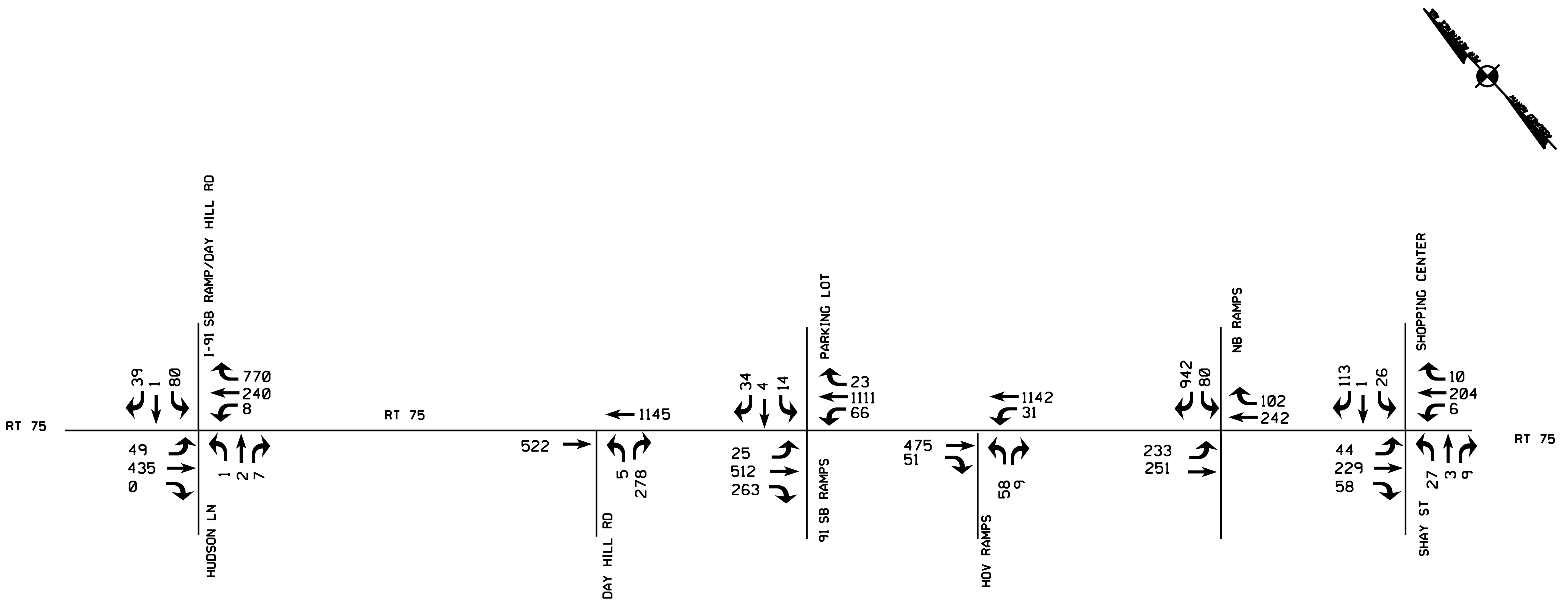
SIGNATURE/ BLOCK:
OFFICE OF ENGINEERING
APPROVED BY:

PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION

TOWN: WINDSOR

DRAWING TITLE: 2018 - 2020 TRAFFIC VOLUMES PM PEAK HOUR

PROJECT NO. 0171-0421
DRAWING NO. TMC-40
SHEET NO. 3



NOT TO SCALE

WINDSOR ROUTE 75 SYSTEM

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date$DATE$

DESIGNER/DRAFTER: A. AHUJA

CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILEA$

SIGNATURE/ BLOCK:

OFFICE OF ENGINEERING

APPROVED BY:

PROJECT TITLE:

CRCOG REGIONAL SIGNAL COORDINATION

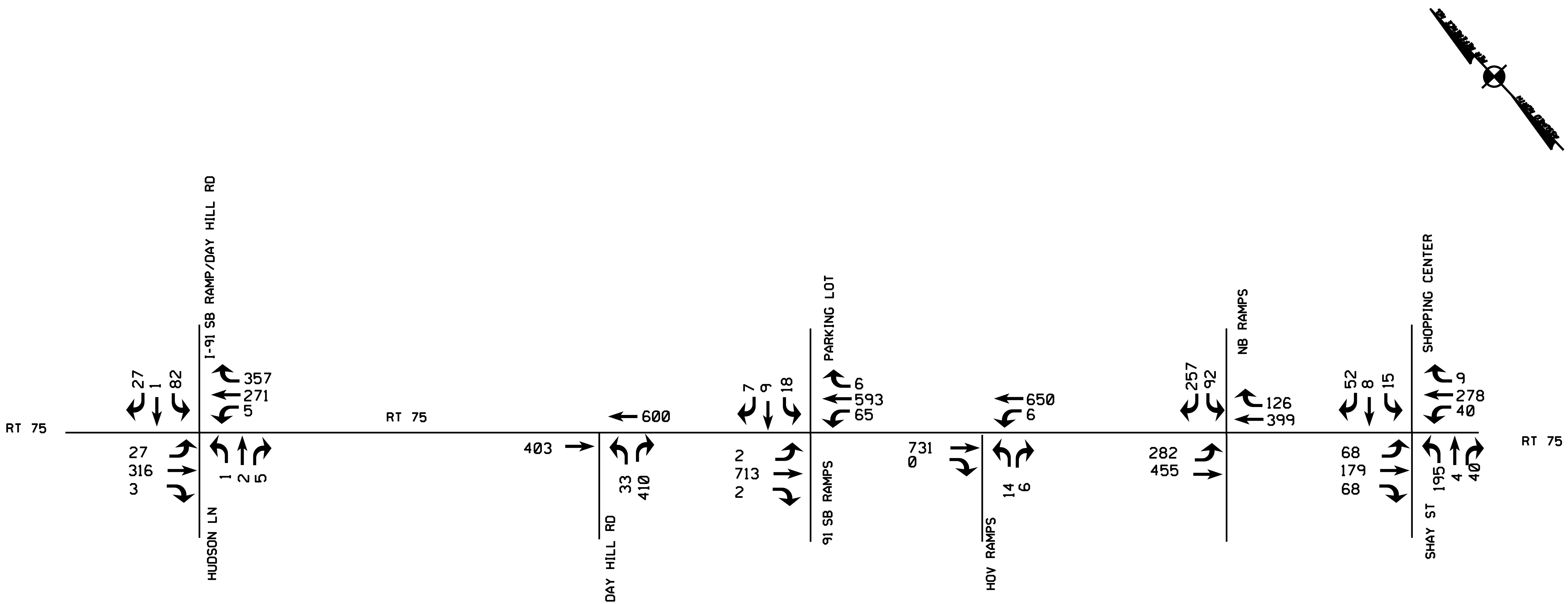
TOWN: WINDSOR

DRAWING TITLE: 2018 - 2020 TRAFFIC VOLUMES AM PEAK HOUR

PROJECT NO. 0171-0421

DRAWING NO. TMC-41

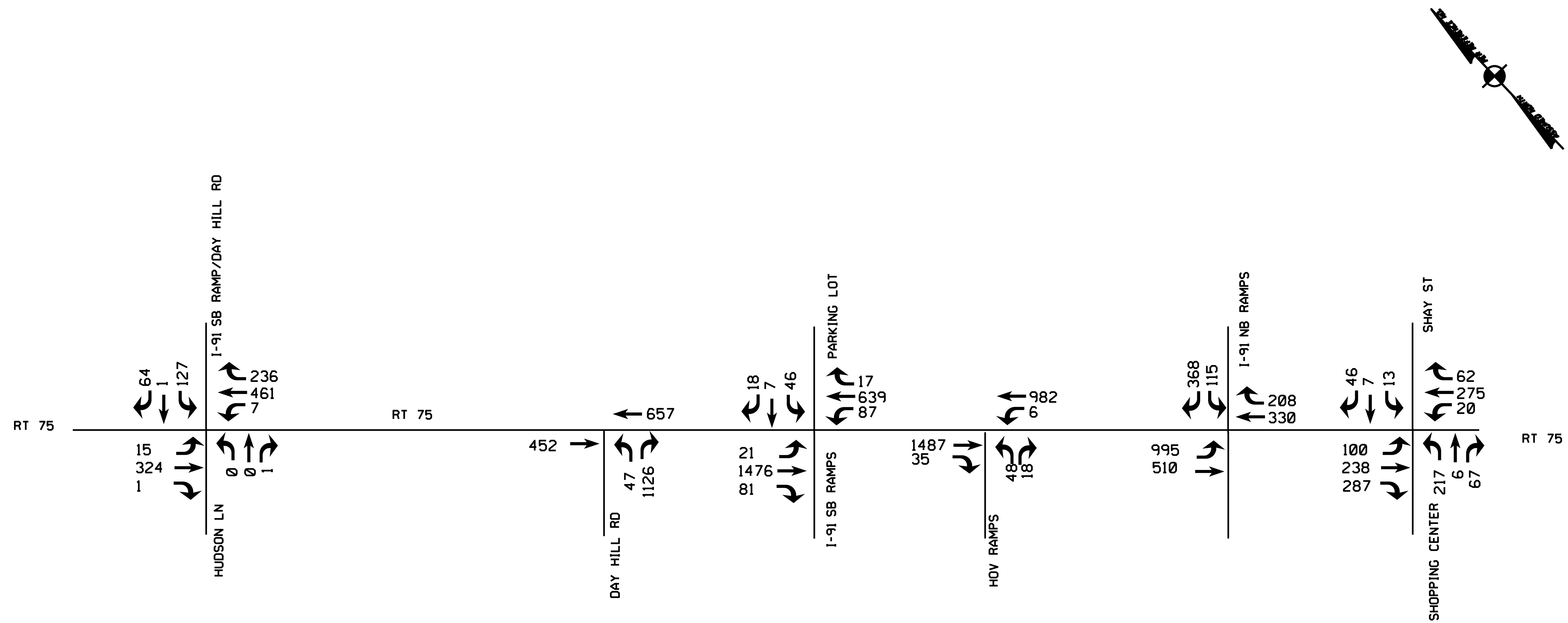
SHEET NO. 1



WINDSOR ROUTE 75 SYSTEM

NOT TO SCALE

DESIGNER/DRAFTER: A. AHUJA CHECKED BY: J. KEISER	STATE OF CONNECTICUT DEPARTMENT OF TRANSPORTATION	SIGNATURE/BLOCK: OFFICE OF ENGINEERING APPROVED BY:	PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION	TOWN: WINDSOR	PROJECT NO. 0171-0421	DRAWING NO. TMC-41
REV. DATE REVISION DESCRIPTION SHEET NO.	Plotted Date:$DATE$	Filename: $FILEA$		DRAWING TITLE: 2018 - 2020 TRAFFIC VOLUMES MIDDAY PEAK HOUR	SHEET NO. 2	



WINDSOR ROUTE 75 SYSTEM

NOT TO SCALE

REV.	DATE	REVISION DESCRIPTION	SHEET NO.

Plotted Date: $DATE$

DESIGNER/DRAFTER: A. AHUJA

CHECKED BY: J. KEISER

STATE OF CONNECTICUT
DEPARTMENT OF TRANSPORTATION

Filename: $FILEA$

SIGNATURE/BLOCK:

OFFICE OF ENGINEERING

APPROVED BY:

PROJECT TITLE: CRCOG REGIONAL SIGNAL COORDINATION

TOWN: WINDSOR

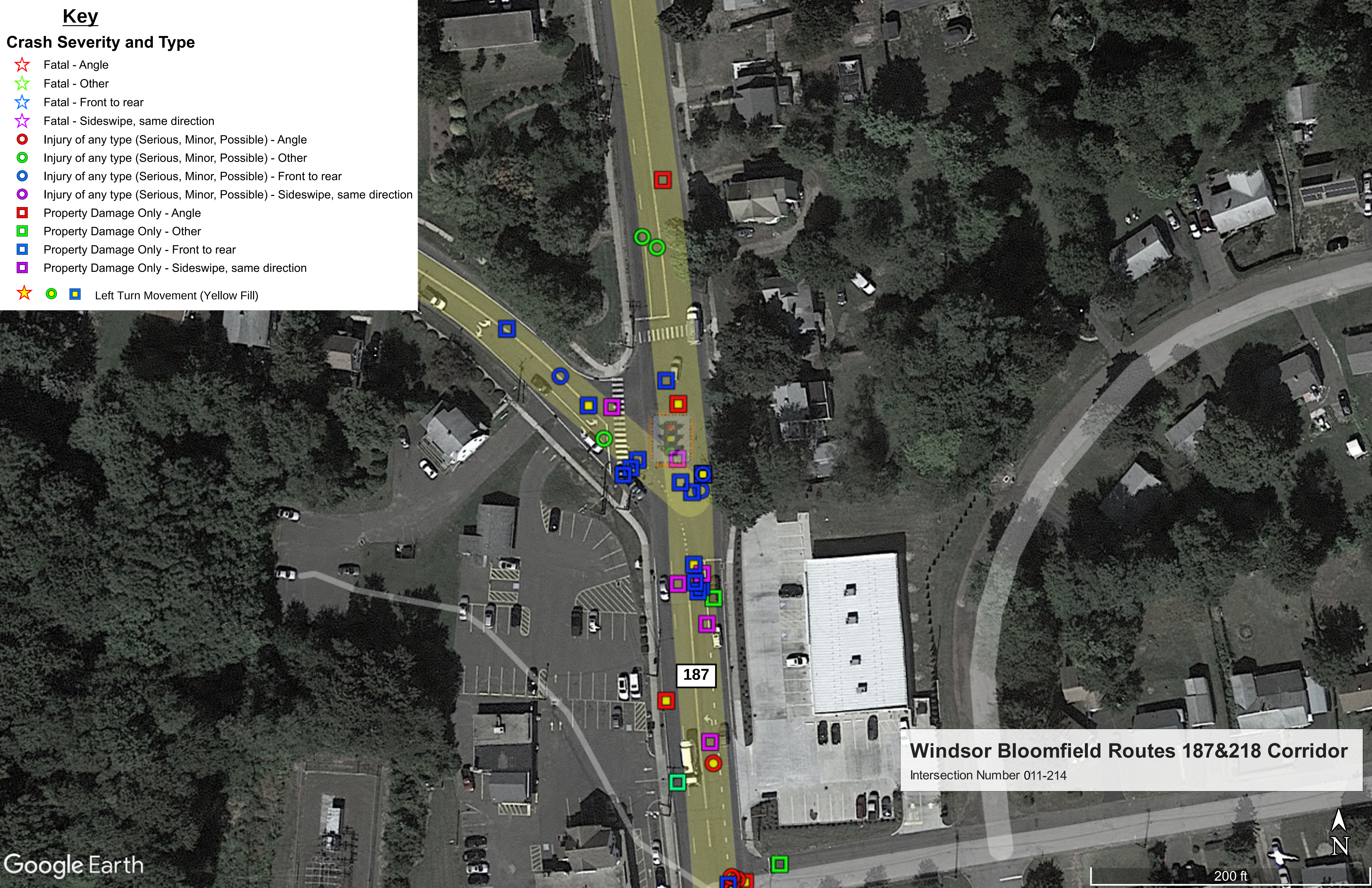
DRAWING TITLE: 2018 - 2020 TRAFFIC VOLUMES PM PEAK HOUR

PROJECT NO. 0171-0421

DRAWING NO. TMC-41

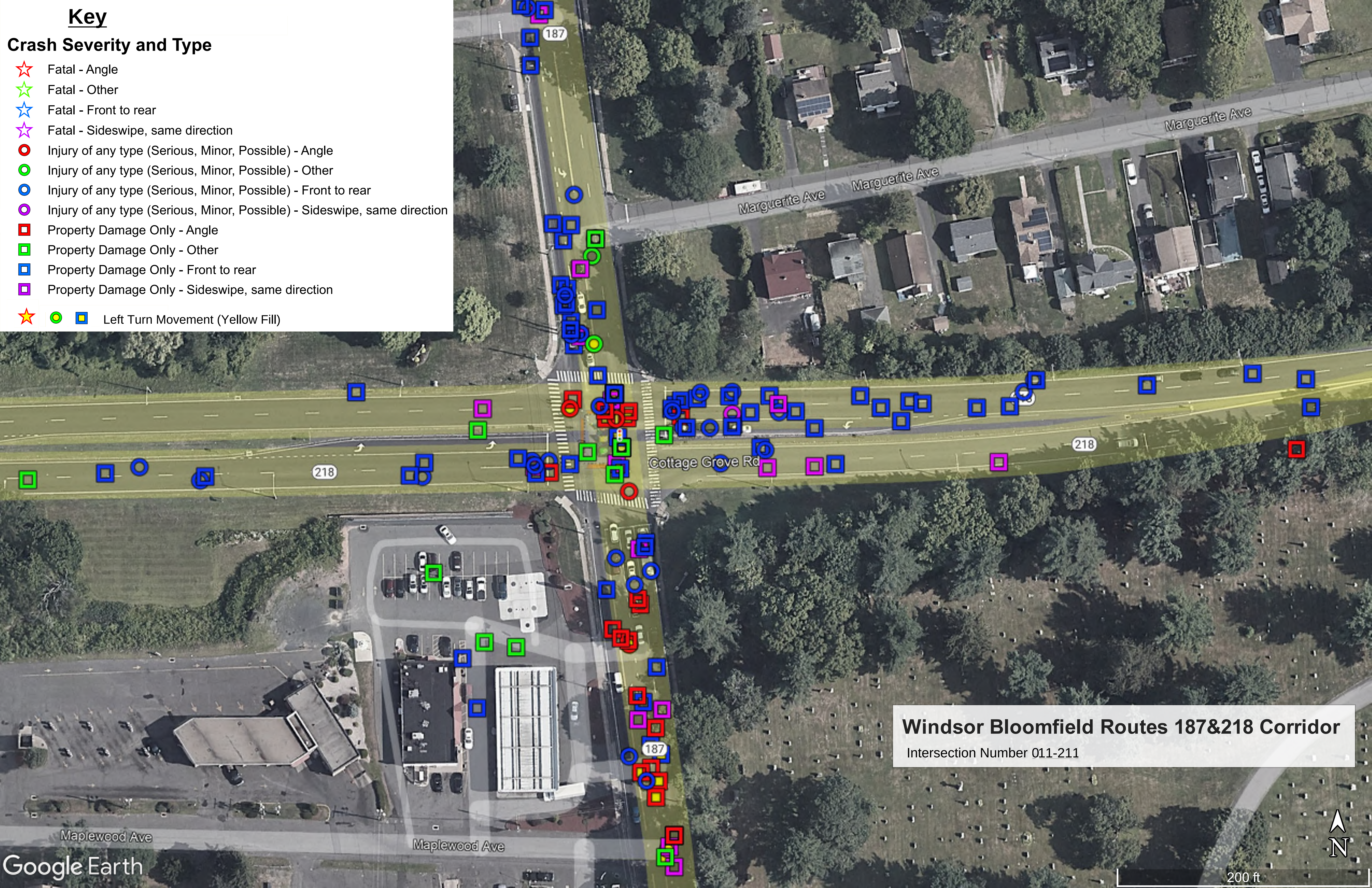
SHEET NO. 3

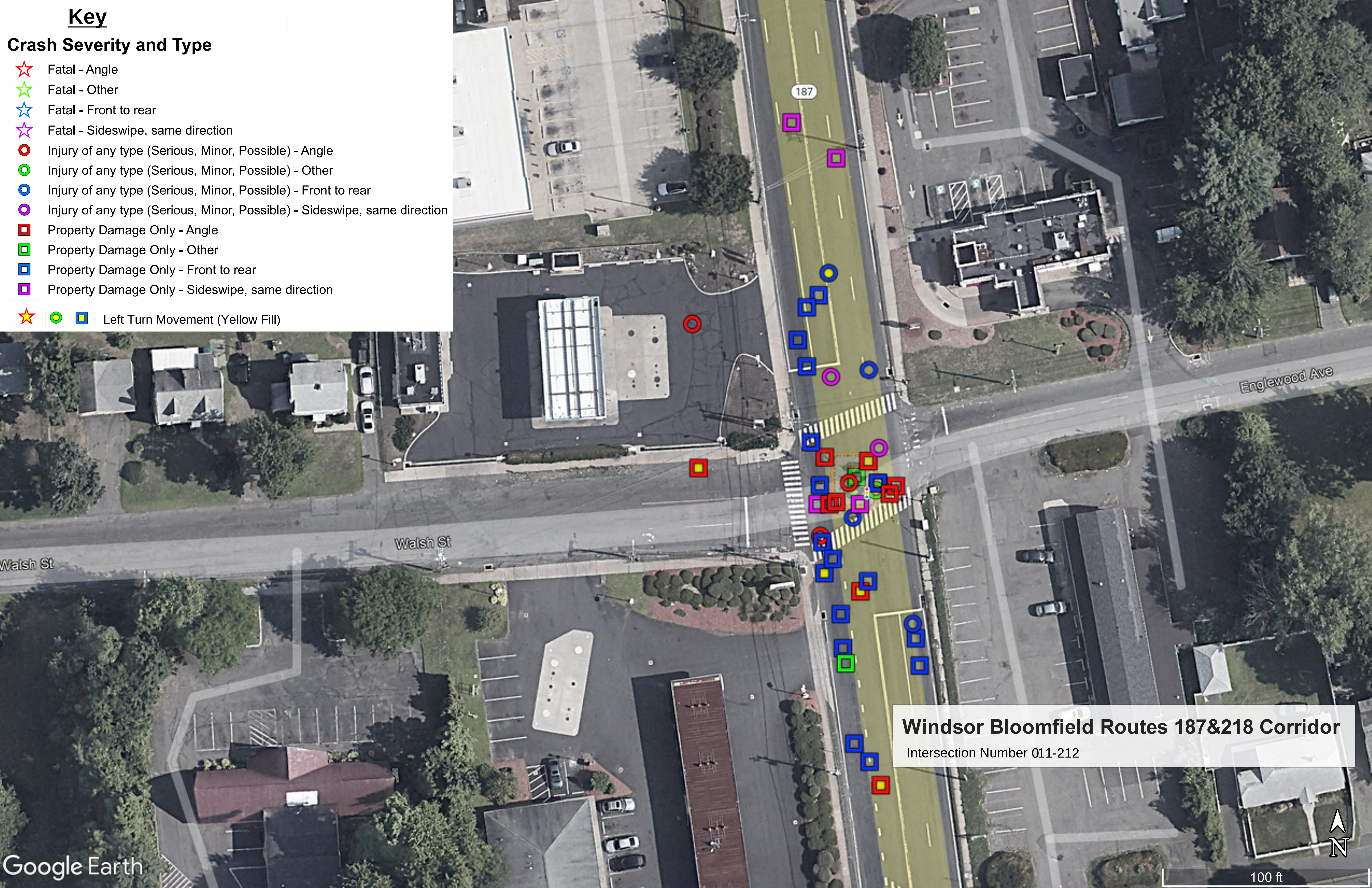
Appendix D
Phase 1 Crash Diagrams

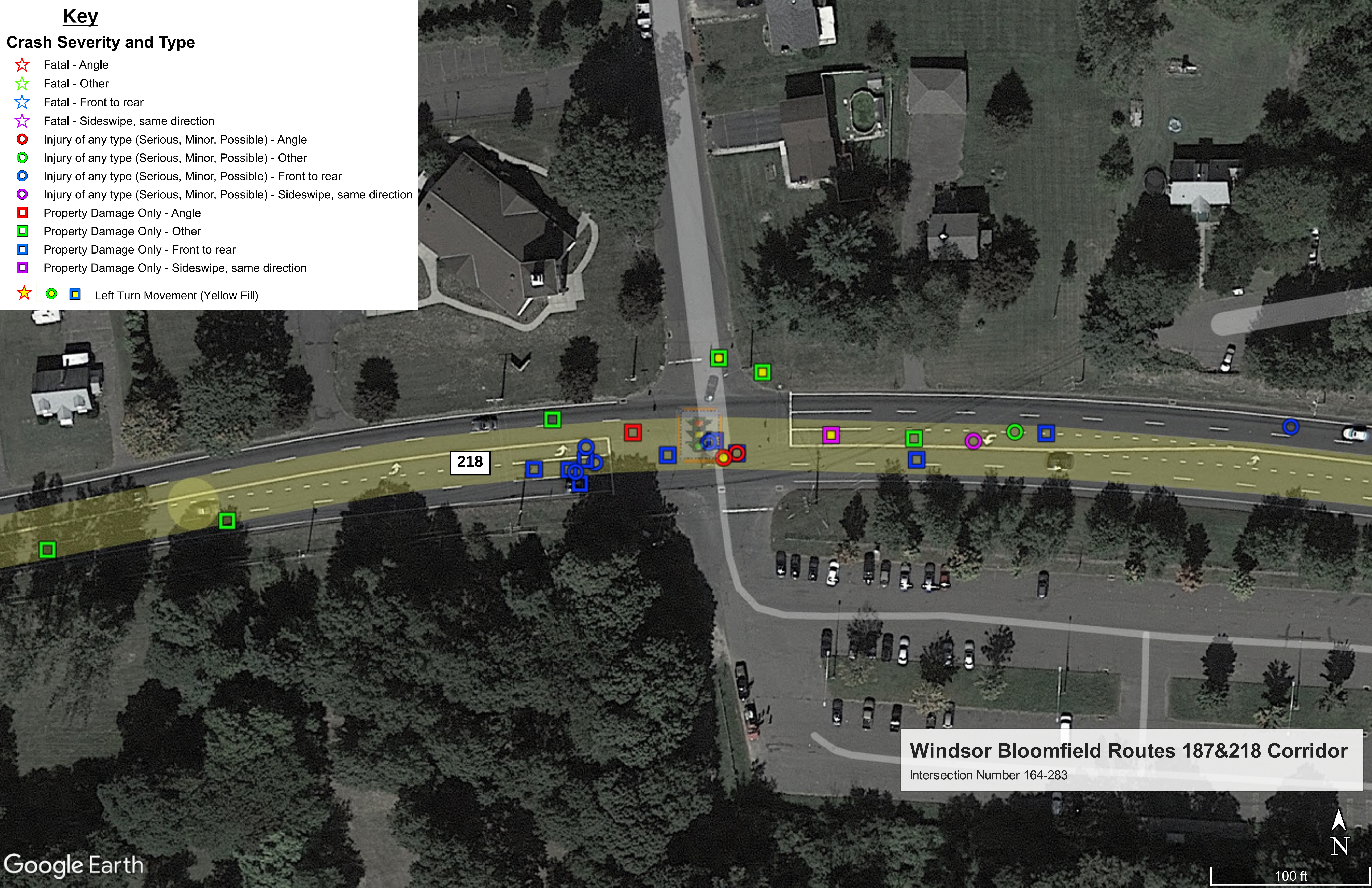


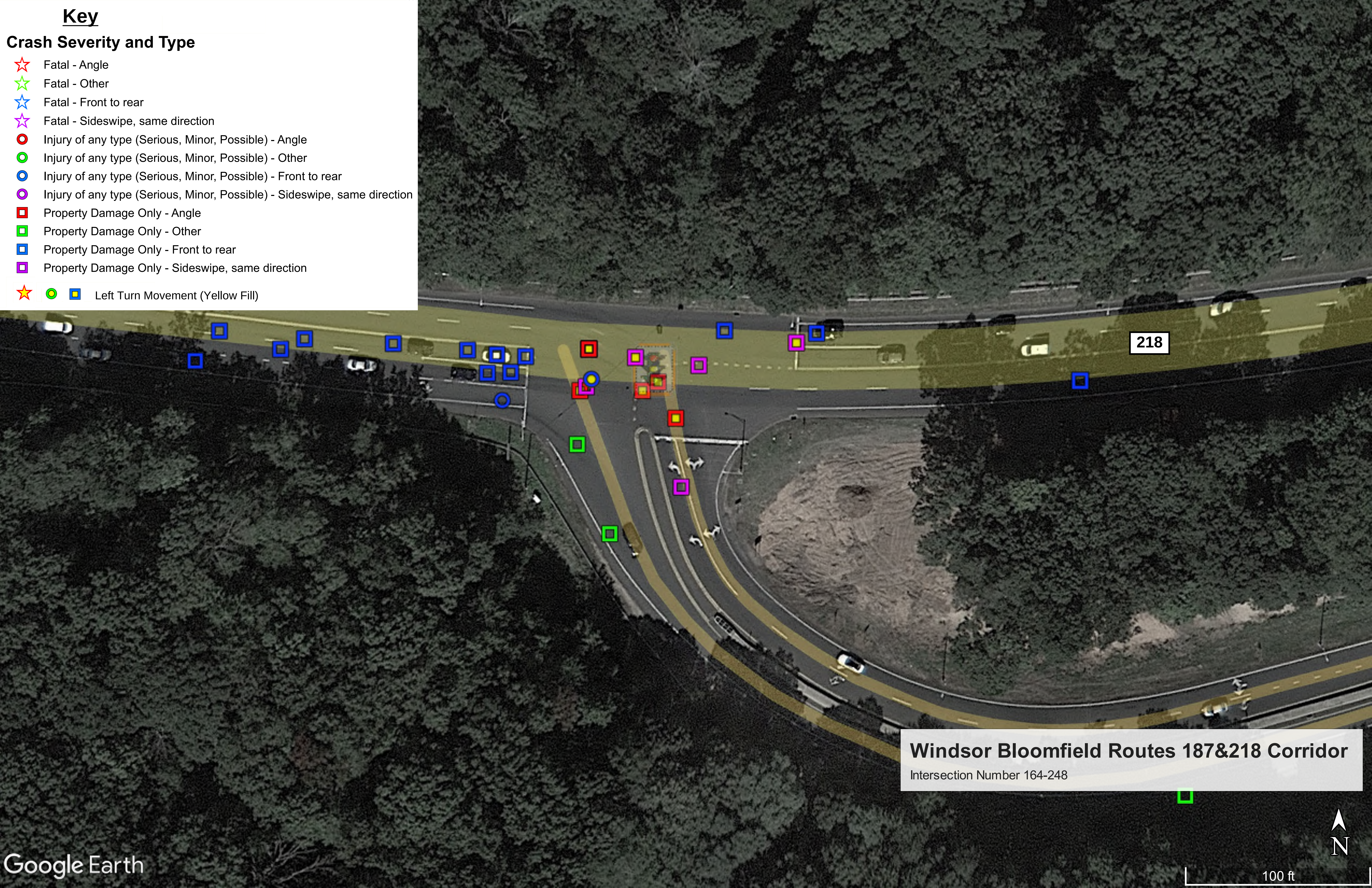
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
187
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 011-214
Google Earth
N
200 ft

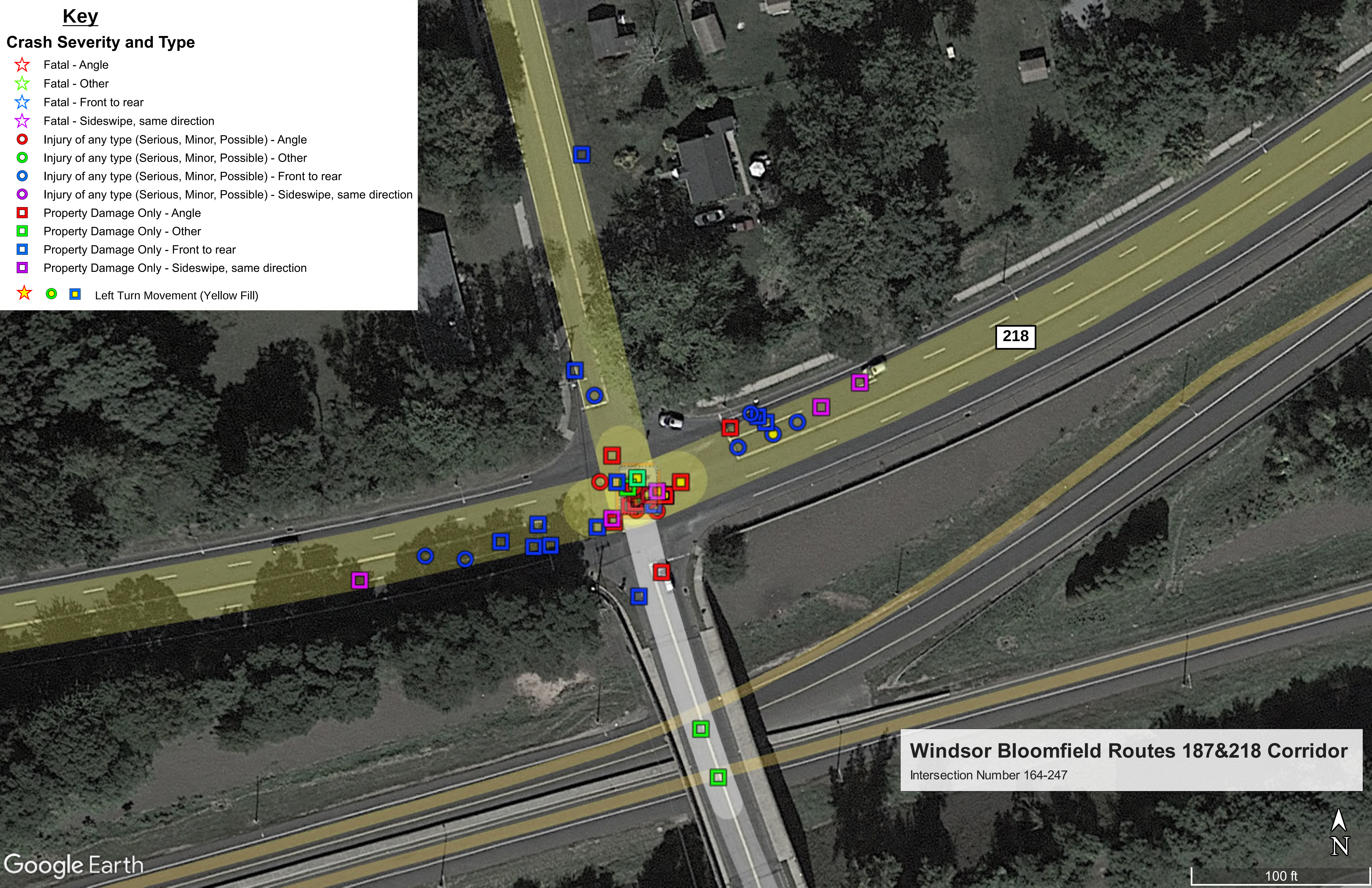

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Marguerite Ave
Marguerite Ave
Joyce St
218
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 011-248
Google Earth
N
200 ft

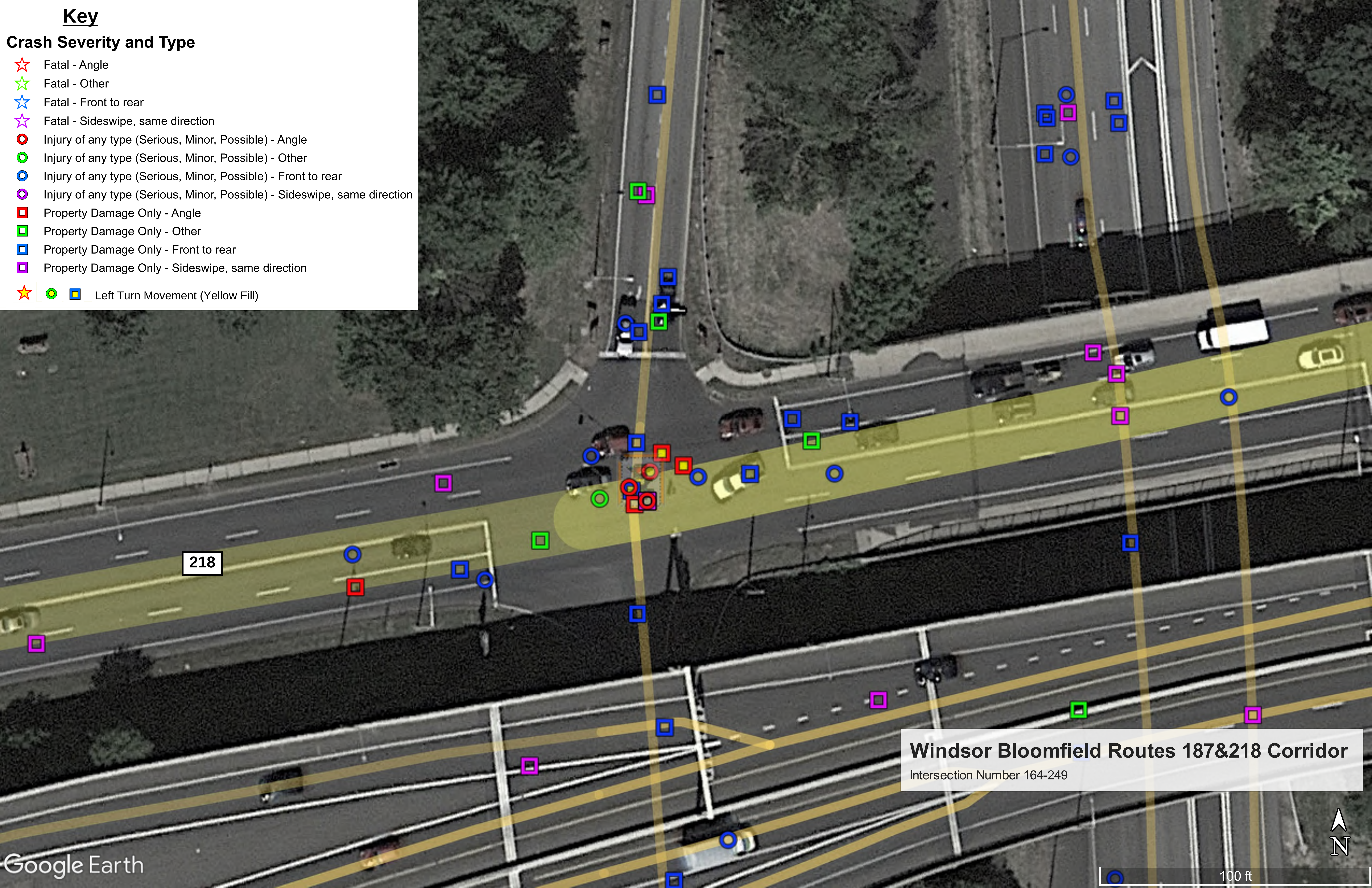

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
187
Marguerite Ave
Marguerite Ave
Marguerite Ave
218
218
Cottage Grove Rd
187
Maplewood Ave
Maplewood Ave
Google Earth
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 011-211
N
200 ft

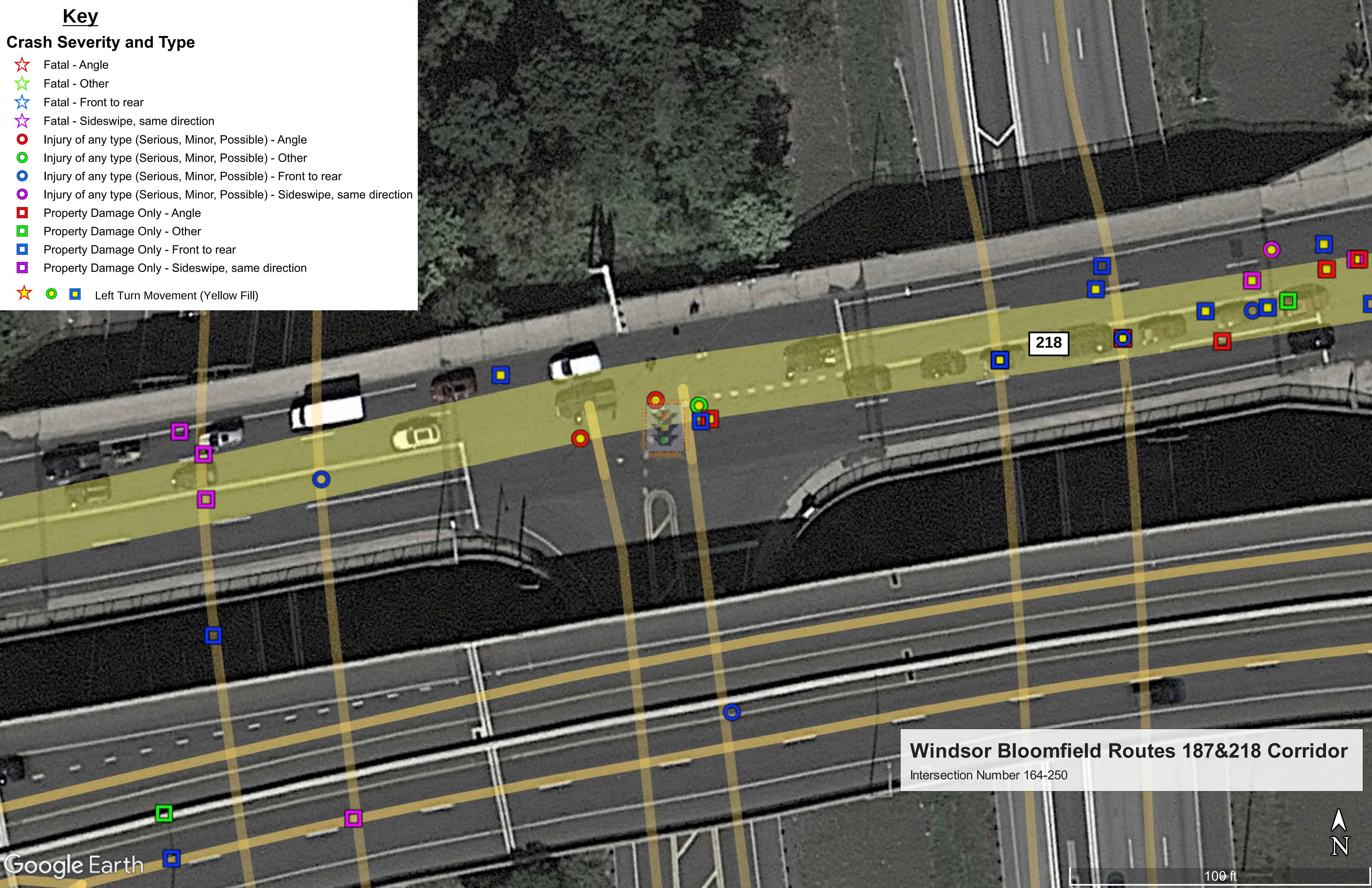

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
187
Englewood Ave
Walsh St
Walsh St
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 011-212
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
218
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 164-283
N
100 ft
Google Earth

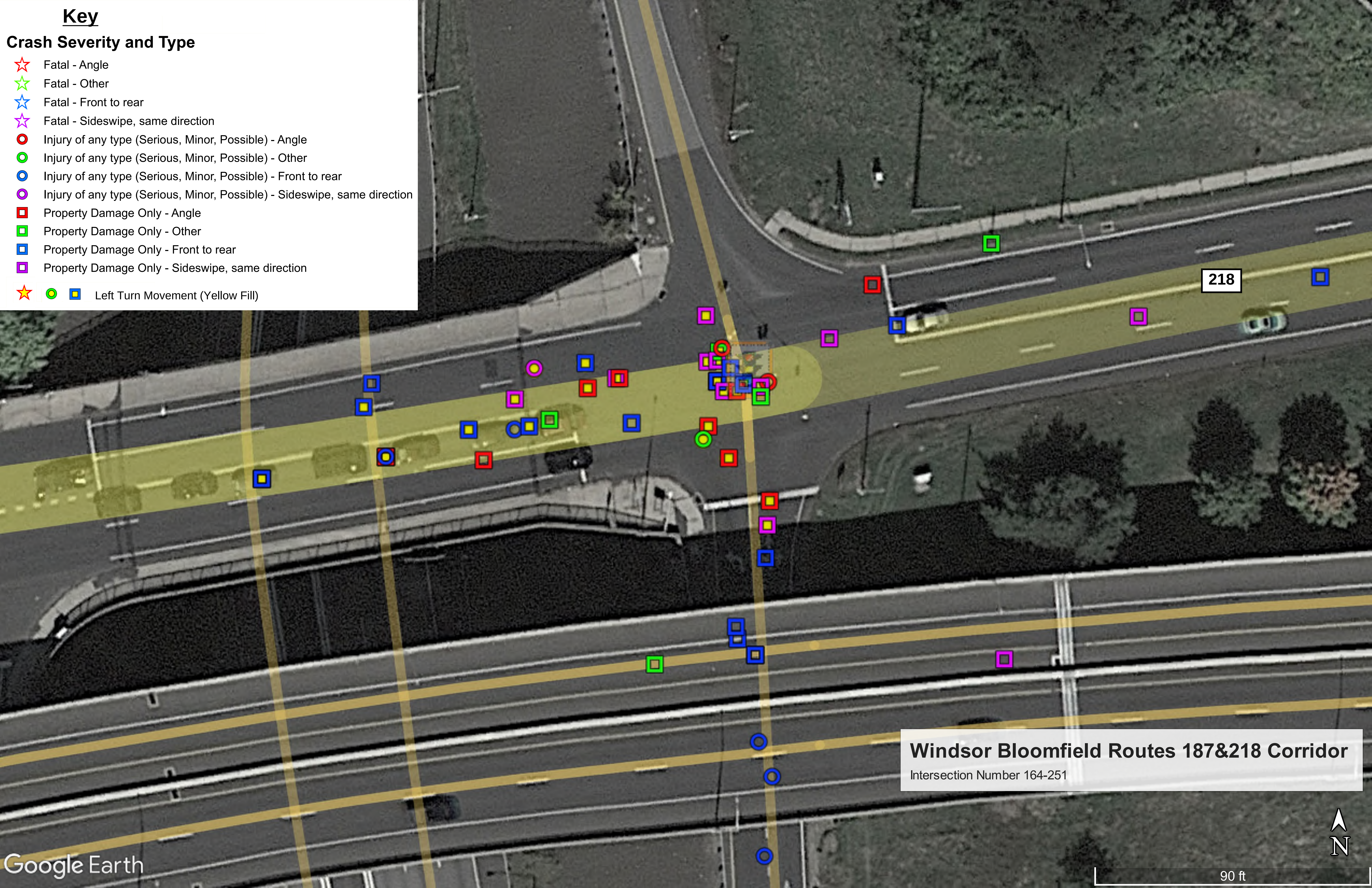

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
218
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 164-248
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
218
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 164-247
Google Earth
N
100 ft


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
218
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 164-249
N
100 ft
Google Earth

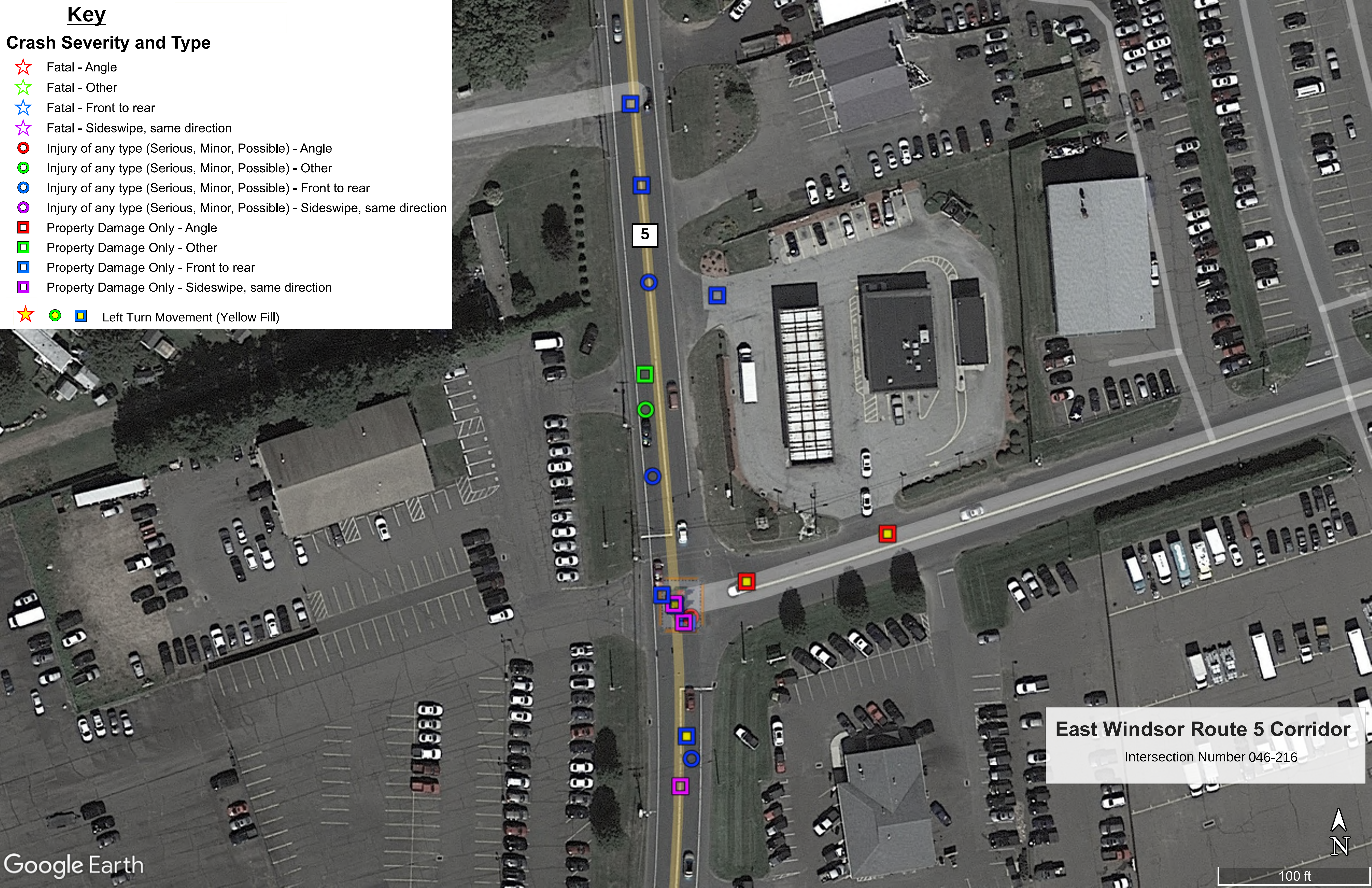


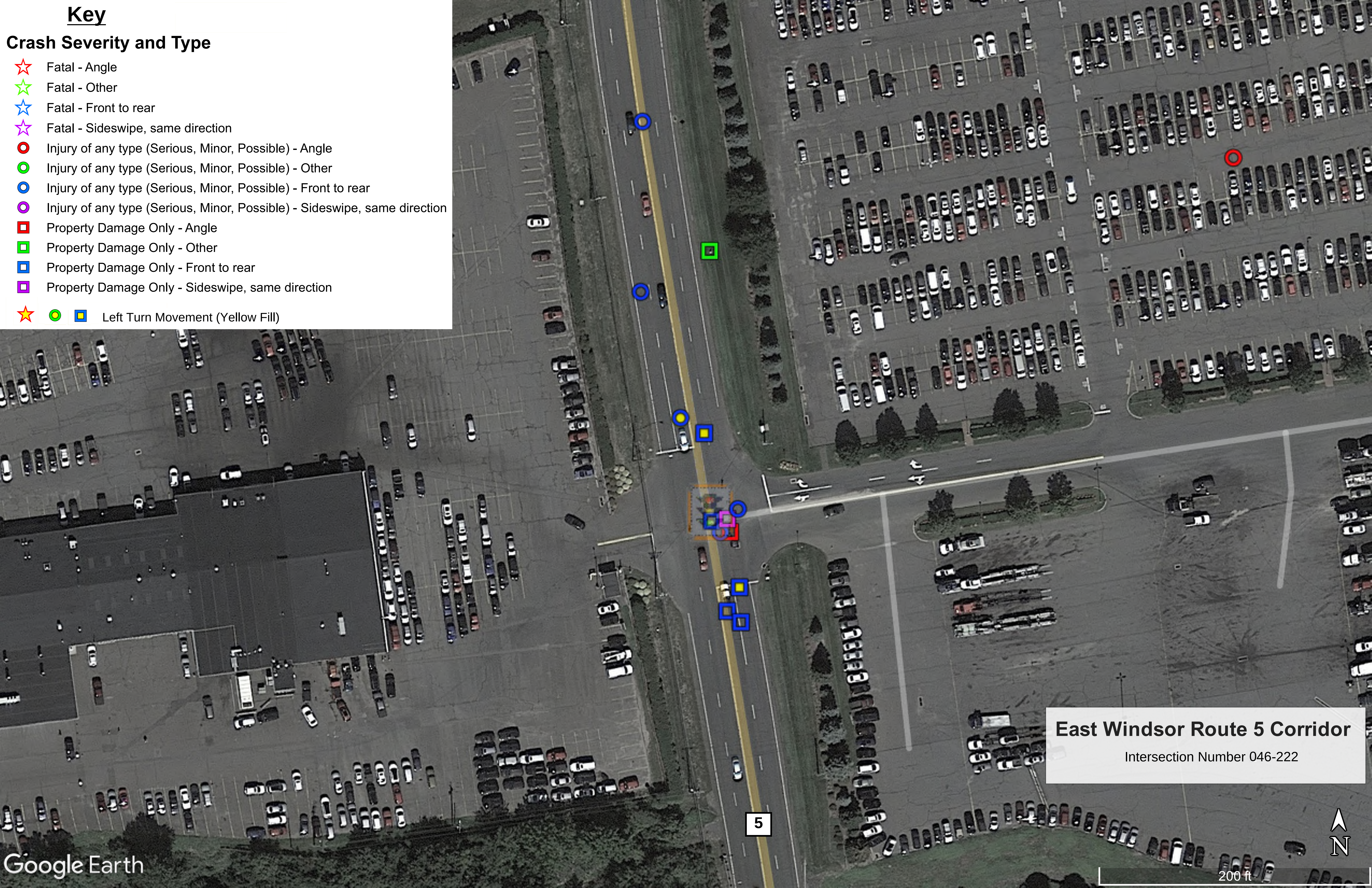
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
218
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 164-250
N
100 ft
Google Earth

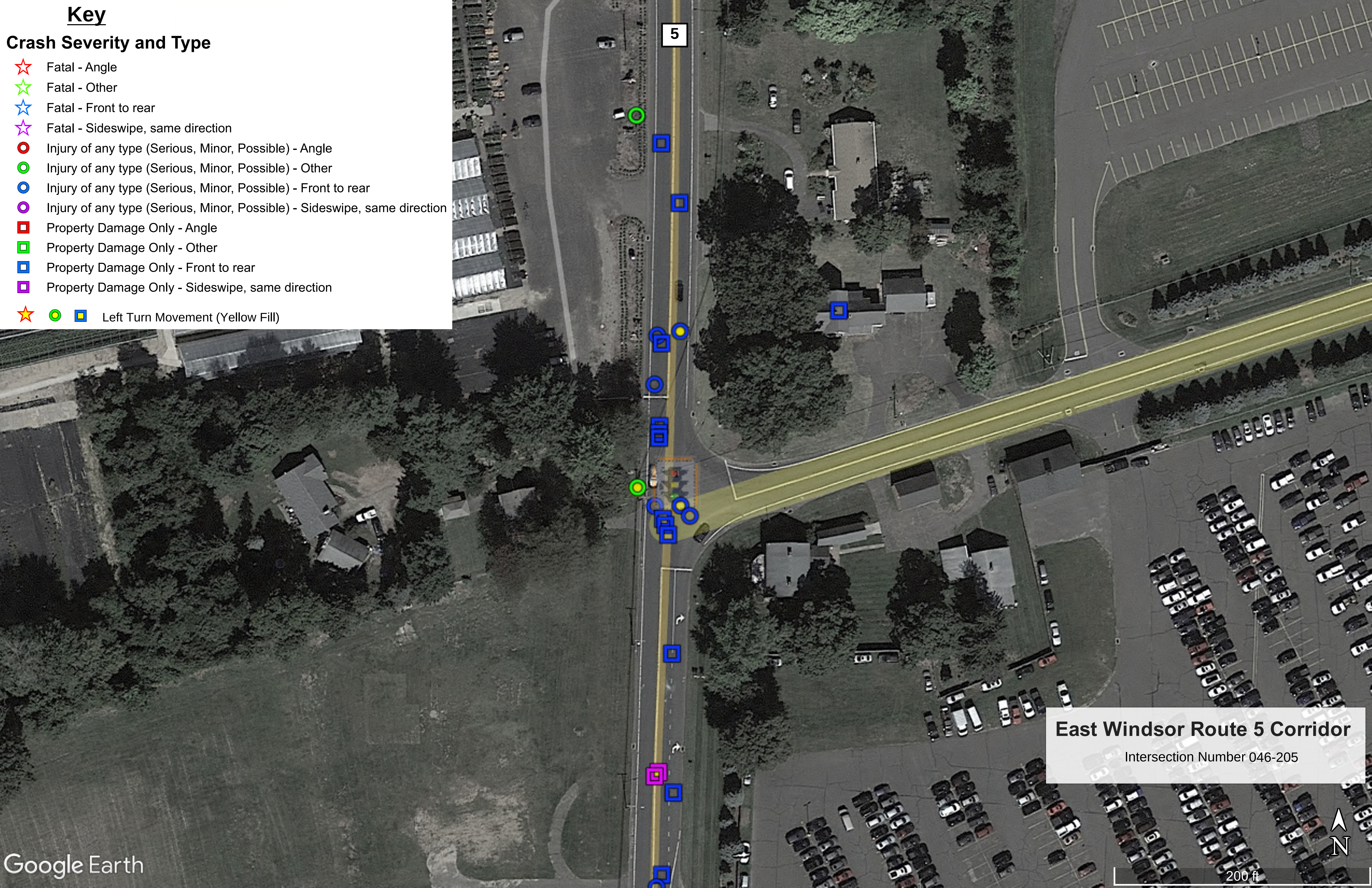


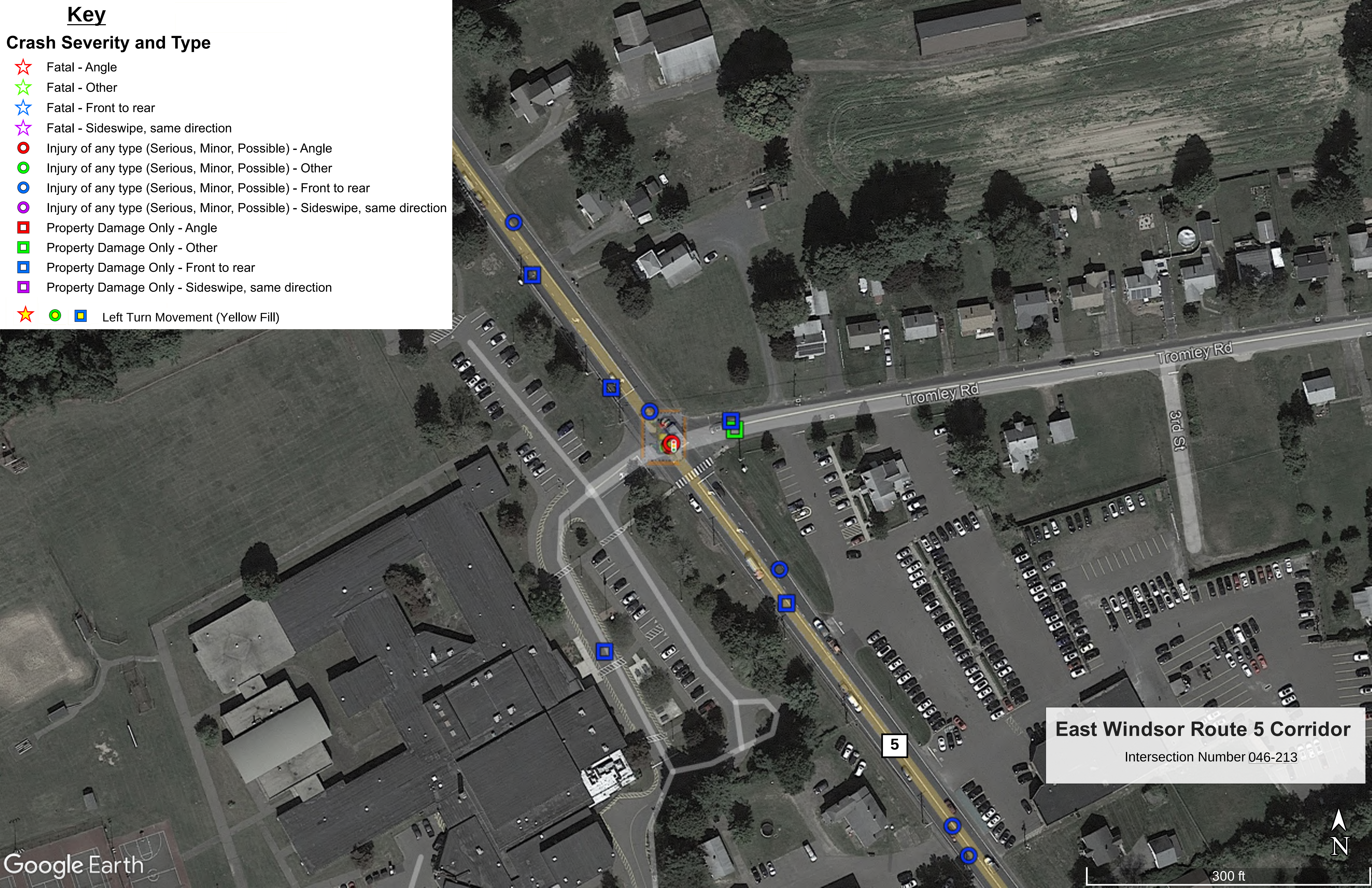
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
218
Windsor Bloomfield Routes 187&218 Corridor
Intersection Number 164-251
N
90 ft
Google Earth

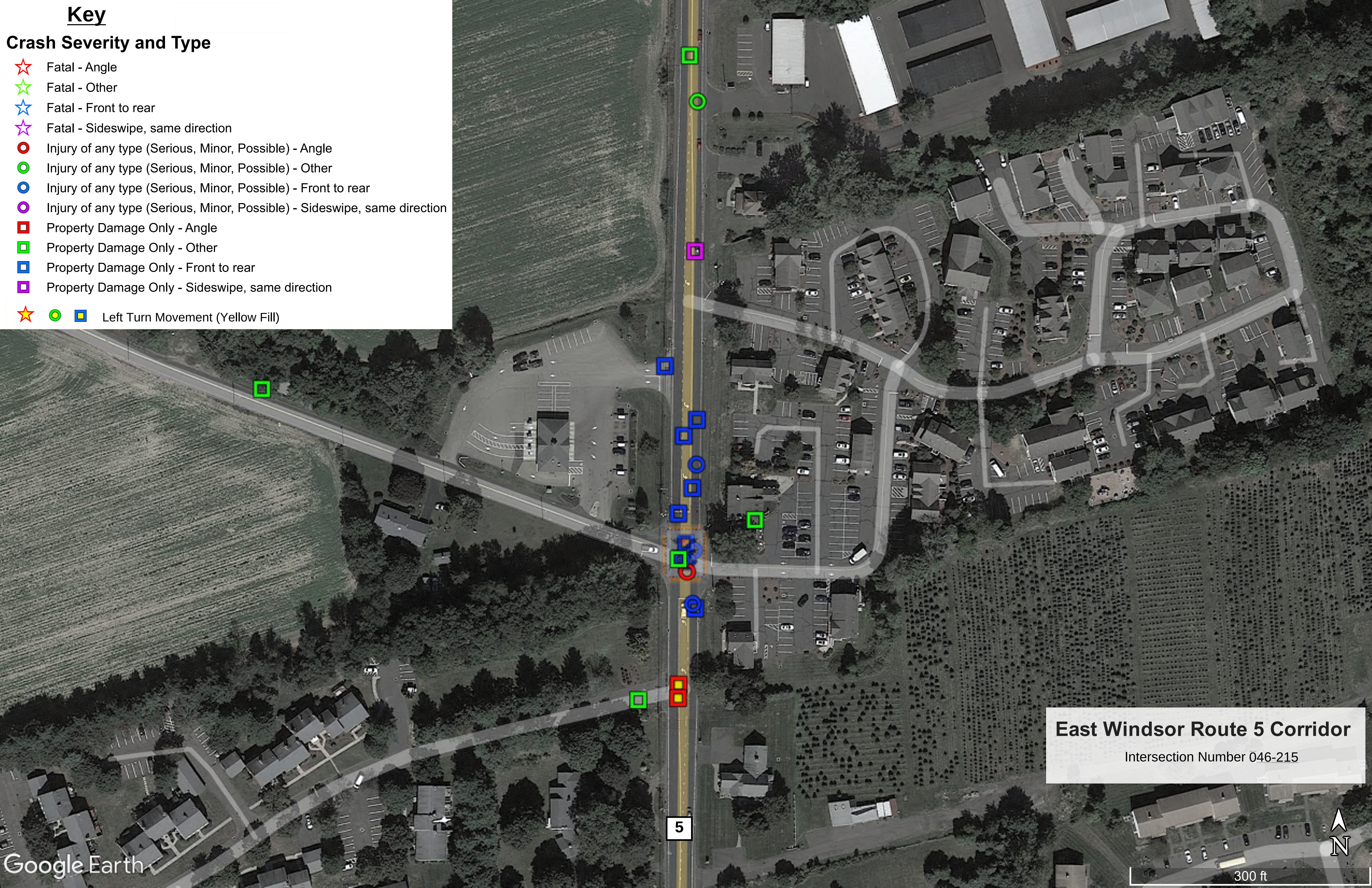
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
5
East Windsor Route 5 Corridor
Intersection Number 046-214
Google Earth
N
200 ft

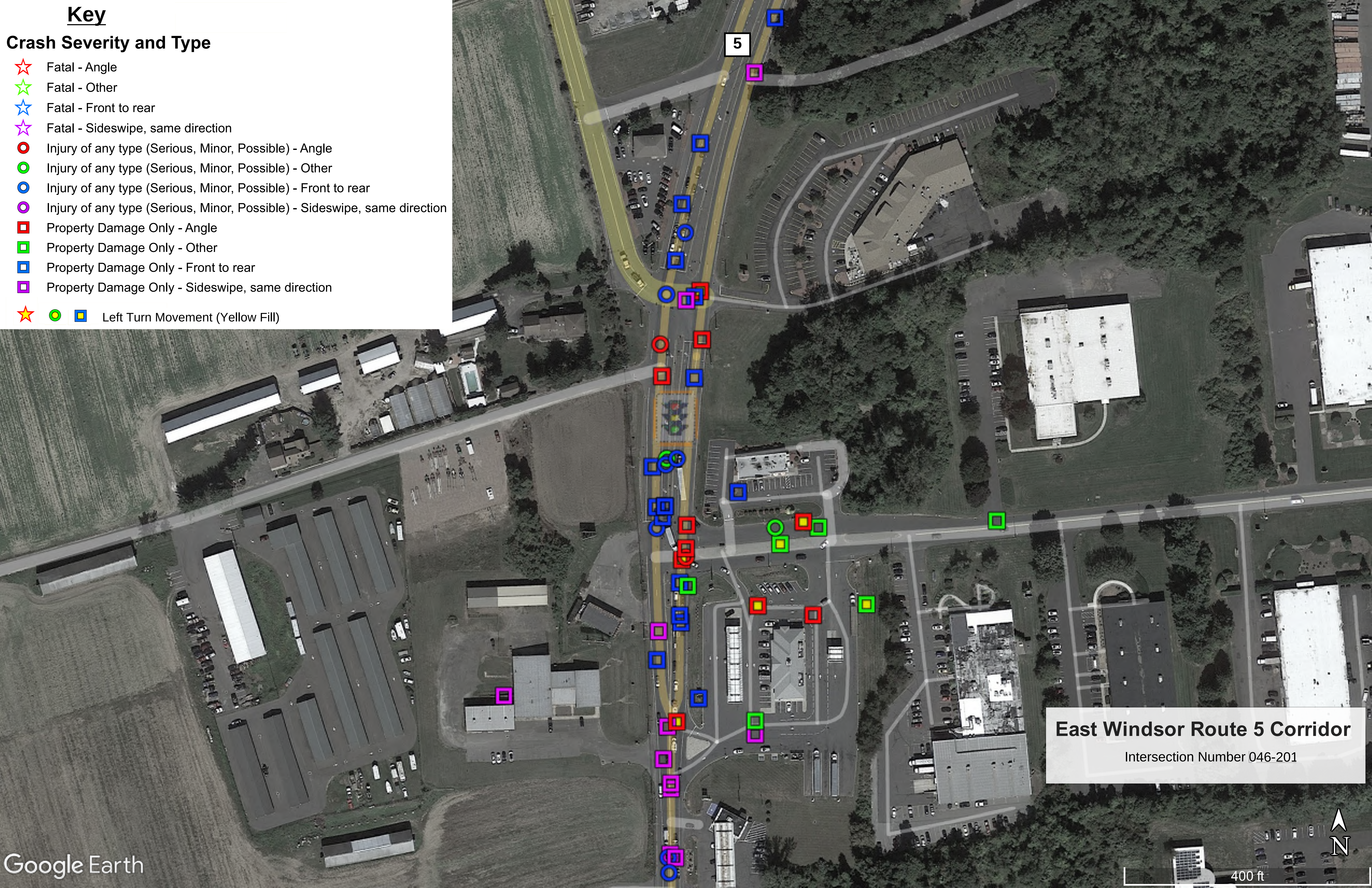

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
5
East Windsor Route 5 Corridor
Intersection Number 046-216
N
100 ft
Google Earth

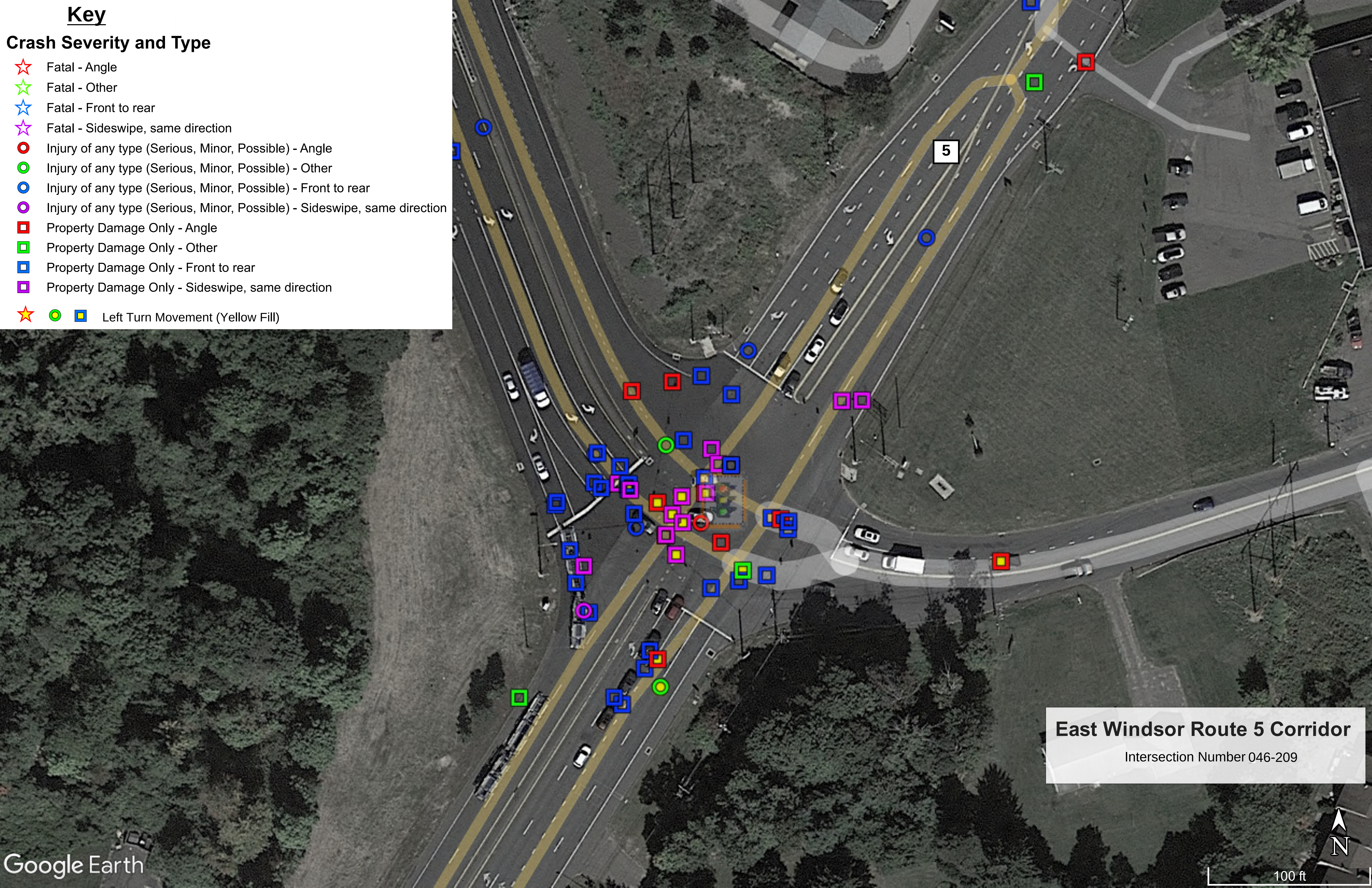

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
East Windsor Route 5 Corridor
Intersection Number 046-222
5
Google Earth
N
200 ft

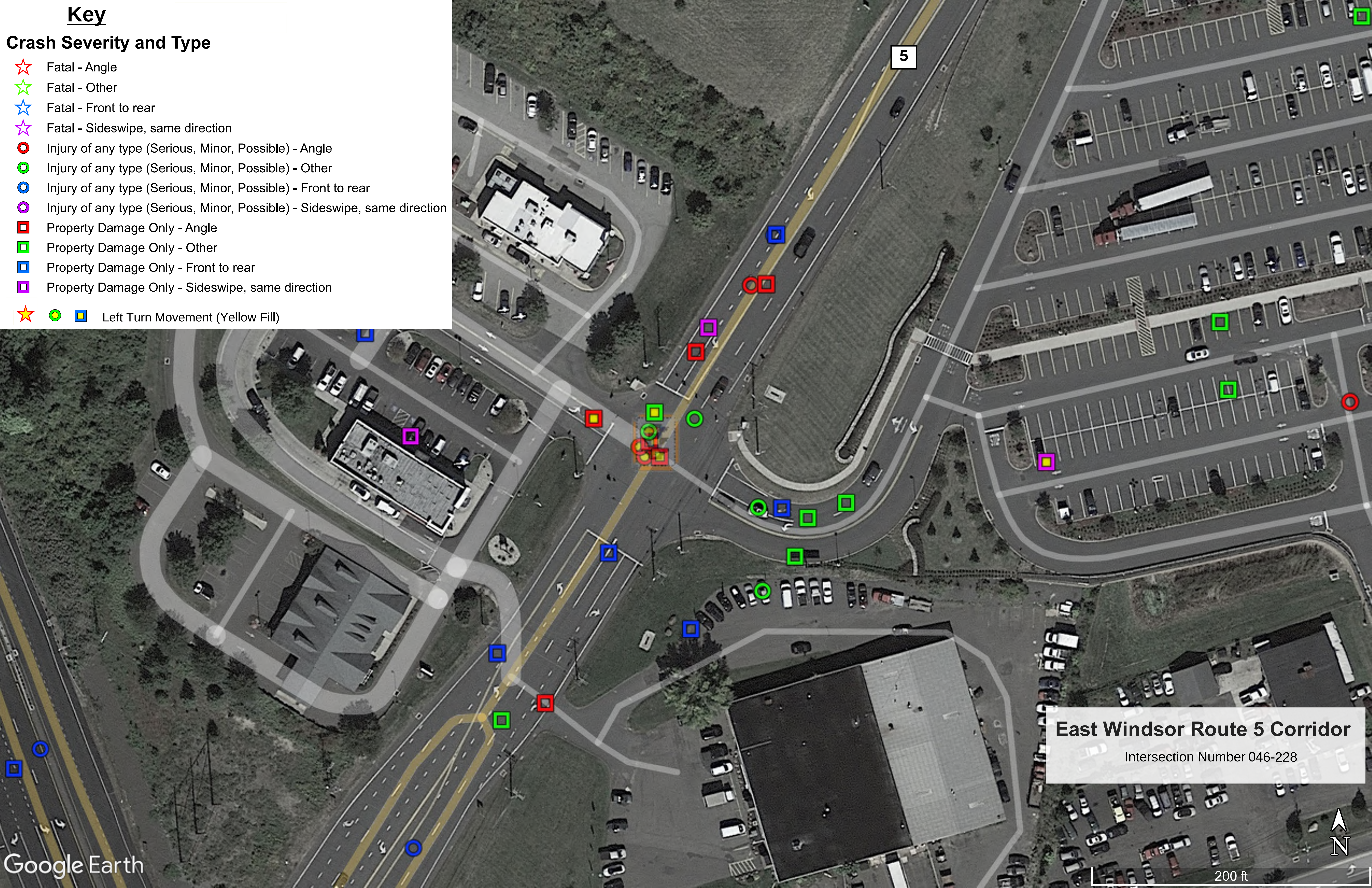

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
5
East Windsor Route 5 Corridor
Intersection Number 046-205
N
200 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Tromley Rd
Tromley Rd
3rd St
5
East Windsor Route 5 Corridor
Intersection Number 046-213
N
300 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
East Windsor Route 5 Corridor
Intersection Number 046-215
5
Google Earth
N
300 ft

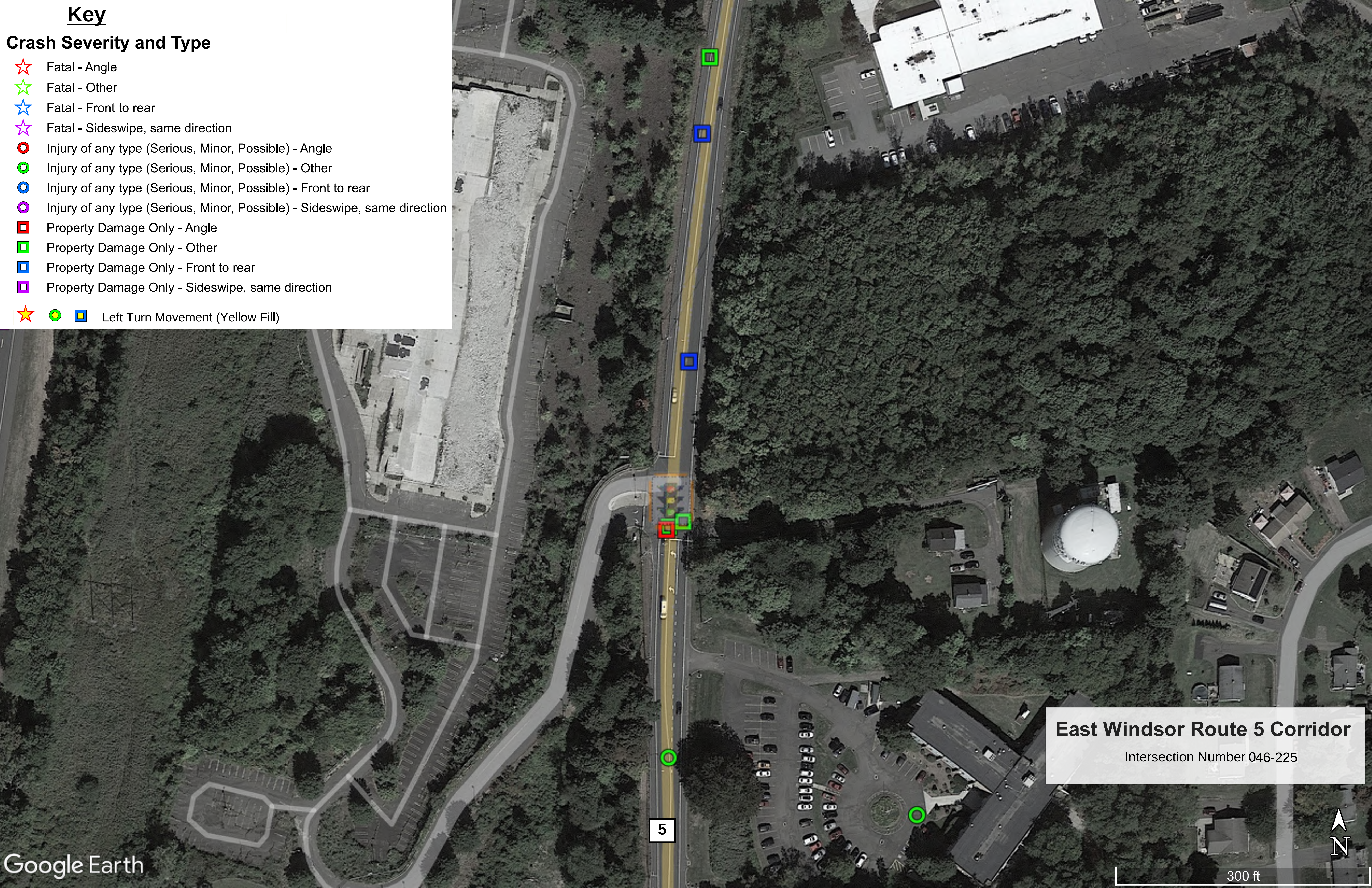

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
5
East Windsor Route 5 Corridor
Intersection Number 046-201
Google Earth
N
400 ft


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
5
East Windsor Route 5 Corridor
Intersection Number 046-209
Google Earth
N
100 ft

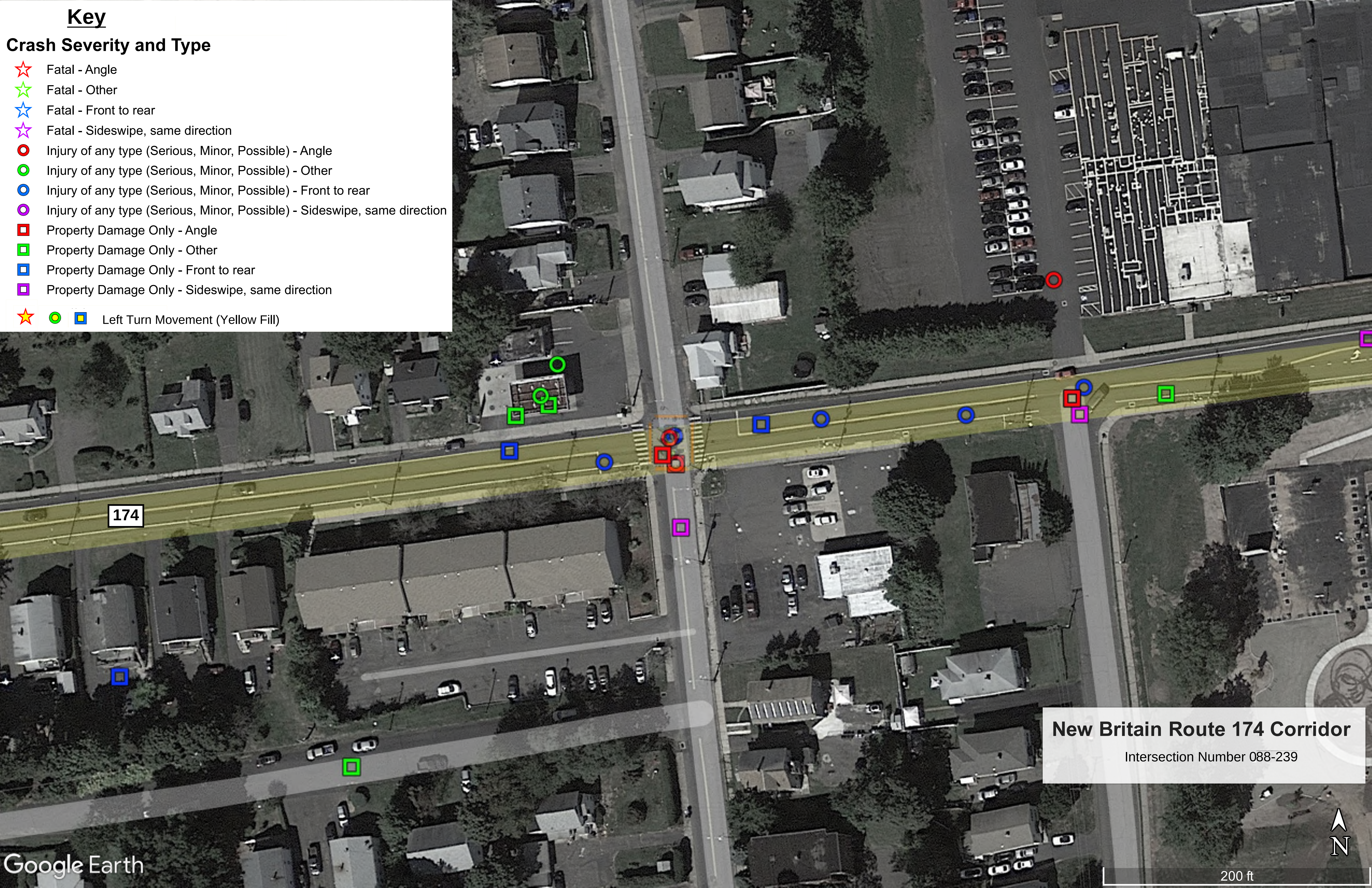


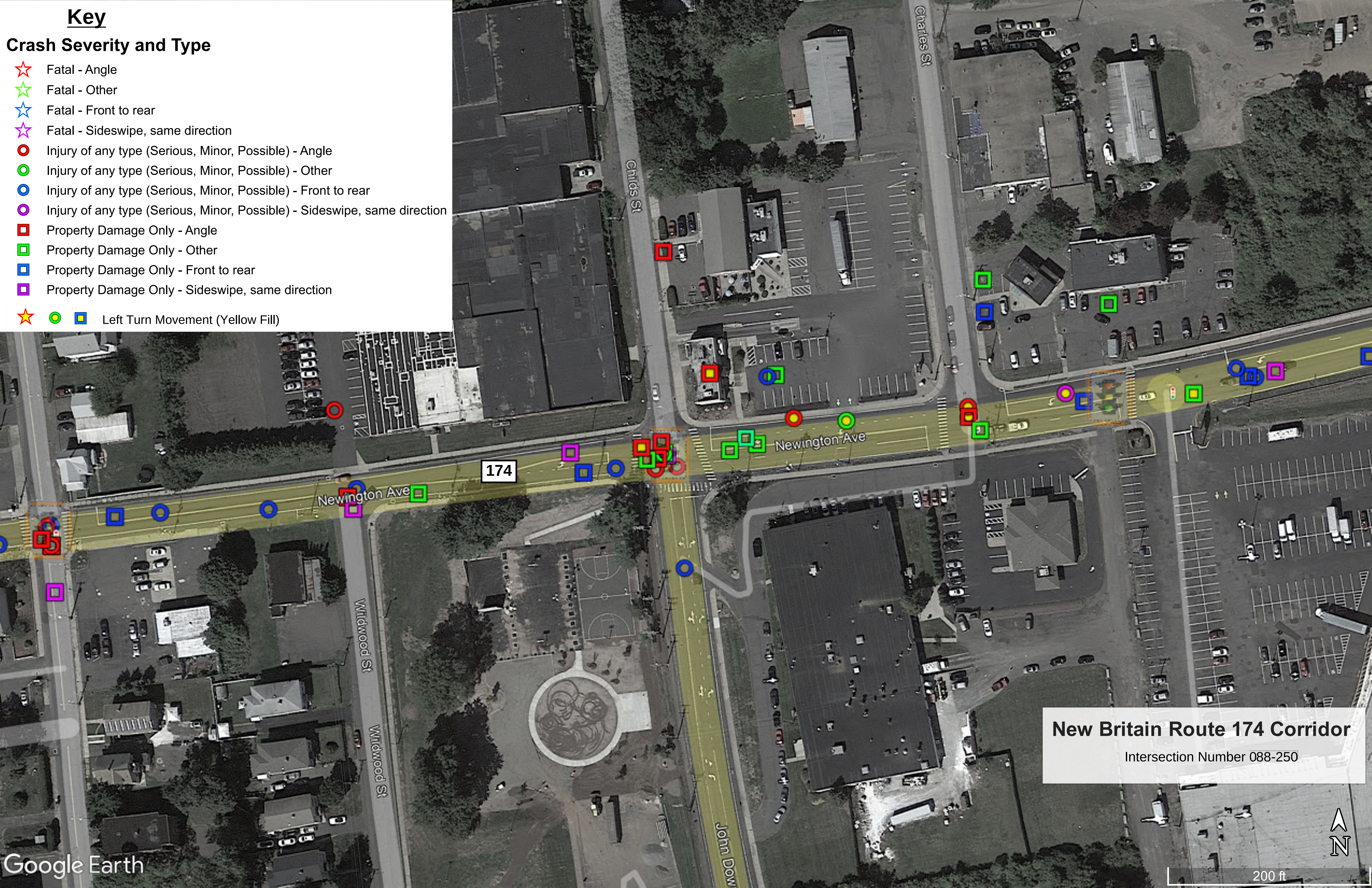
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
5
East Windsor Route 5 Corridor
Intersection Number 046-228
200 ft
N
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
5
East Windsor Route 5 Corridor
Intersection Number 046-226
N
300 ft
Google Earth

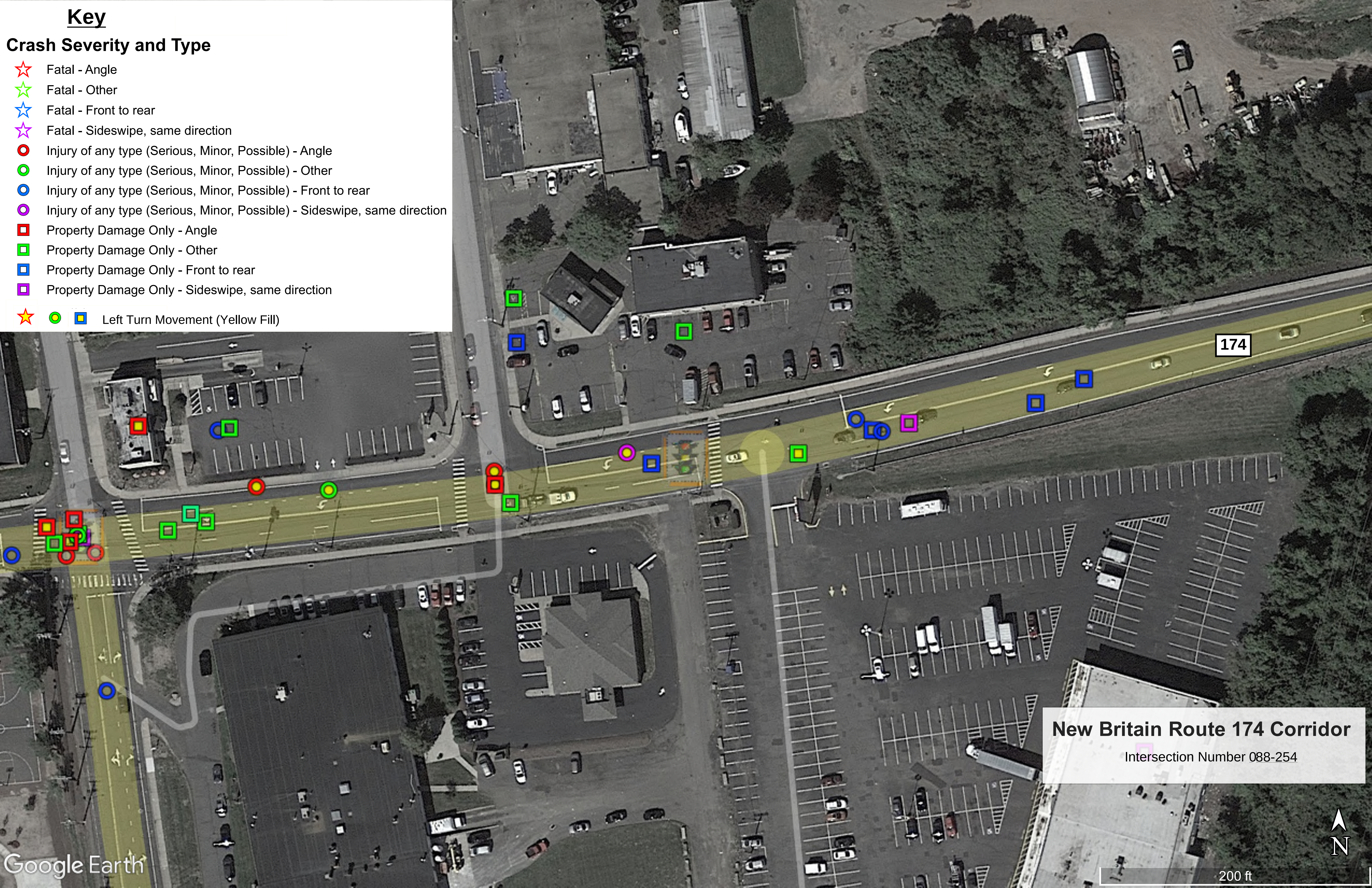

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
East Windsor Route 5 Corridor
Intersection Number 046-225
5
Google Earth
N
300 ft

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
174
New Britain Route 174 Corridor
Intersection Number 088-223
Google Earth
N
200 ft

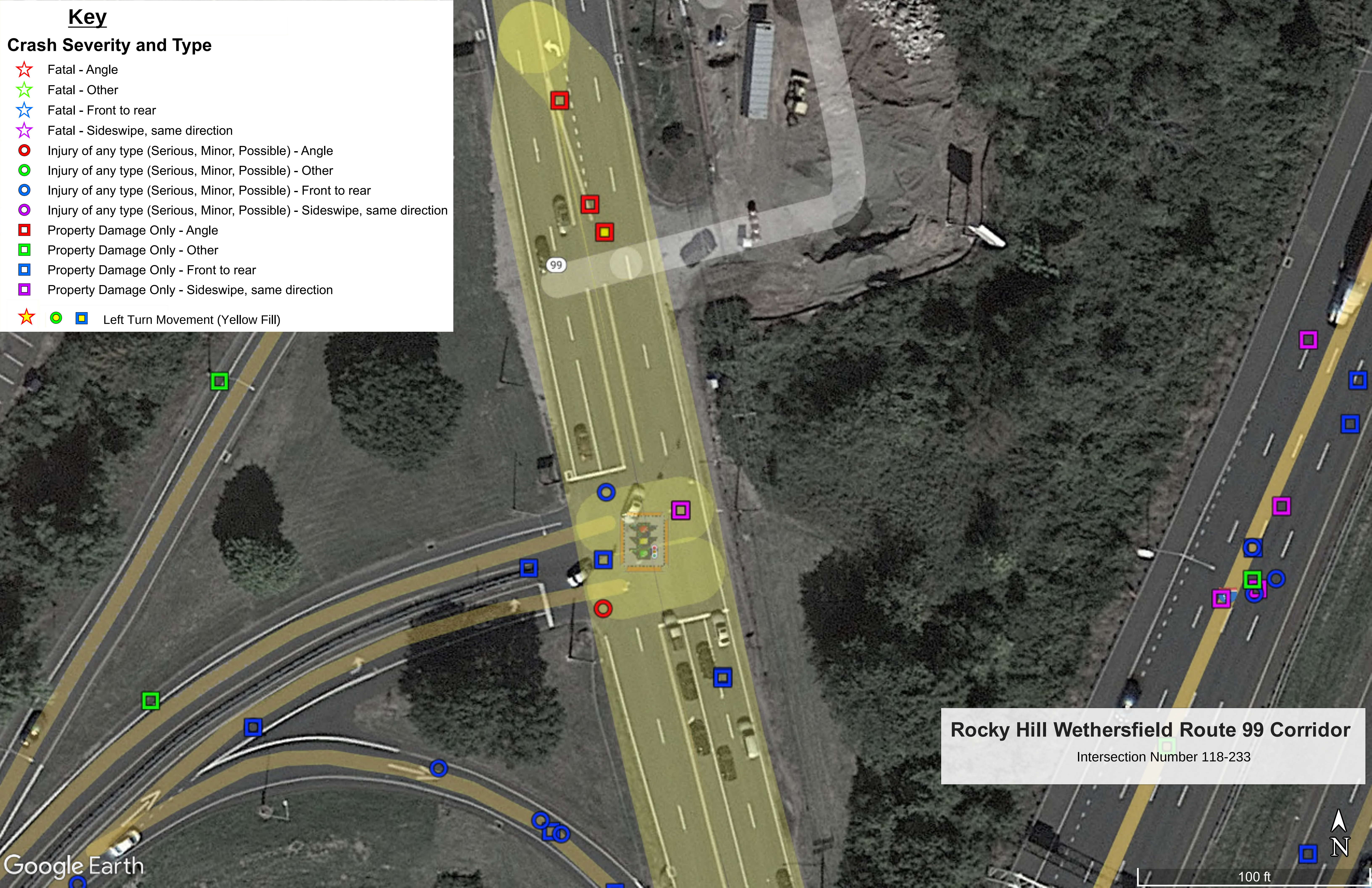

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
174
New Britain Route 174 Corridor
Intersection Number 088-239
Google Earth
N
200 ft

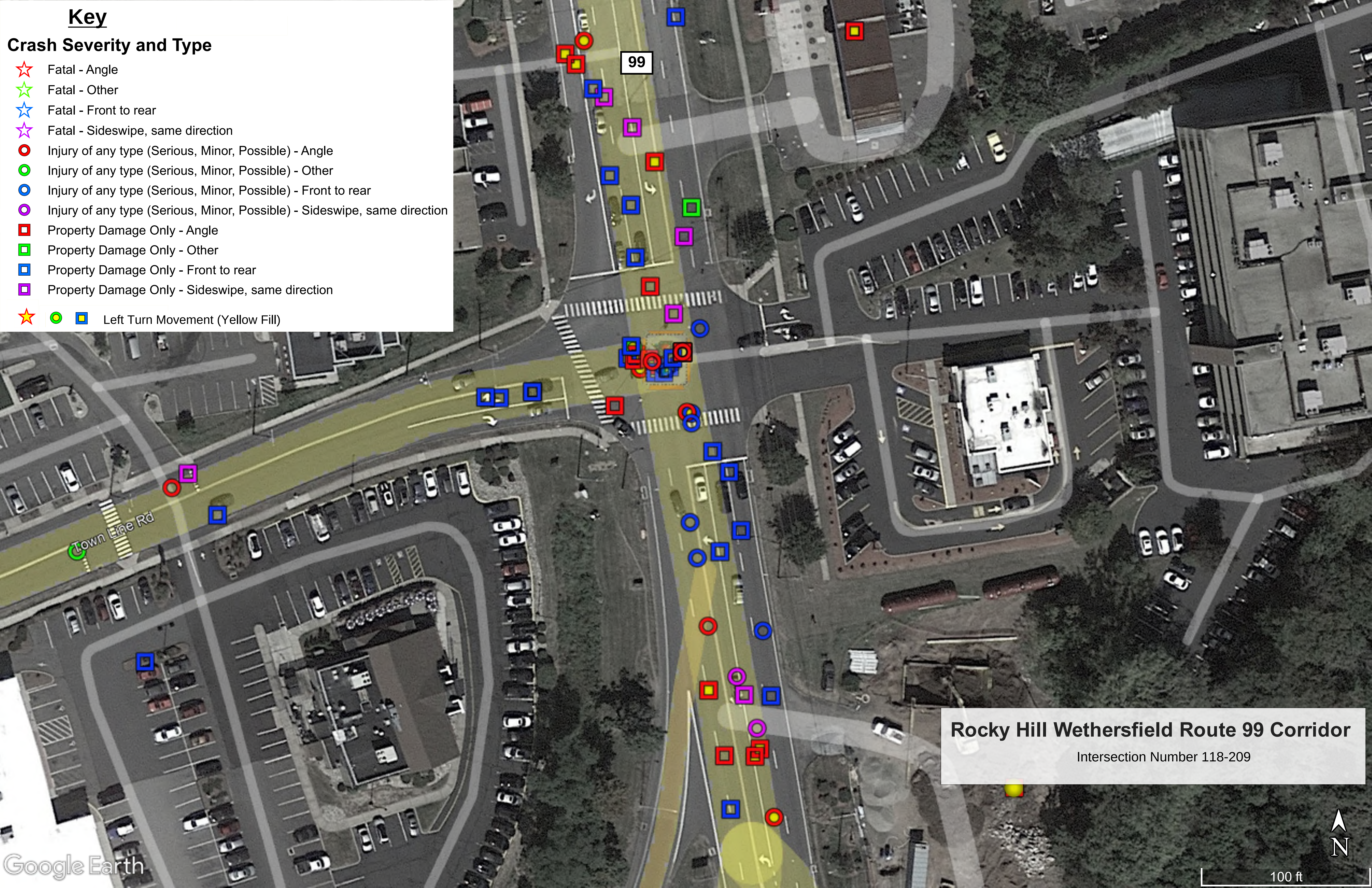


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Charles St
Childs St
174
Newington Ave
Newington Ave
Wildwood St
Wildwood St
John Dow
New Britain Route 174 Corridor
Intersection Number 088-250
N
200 ft
Google Earth



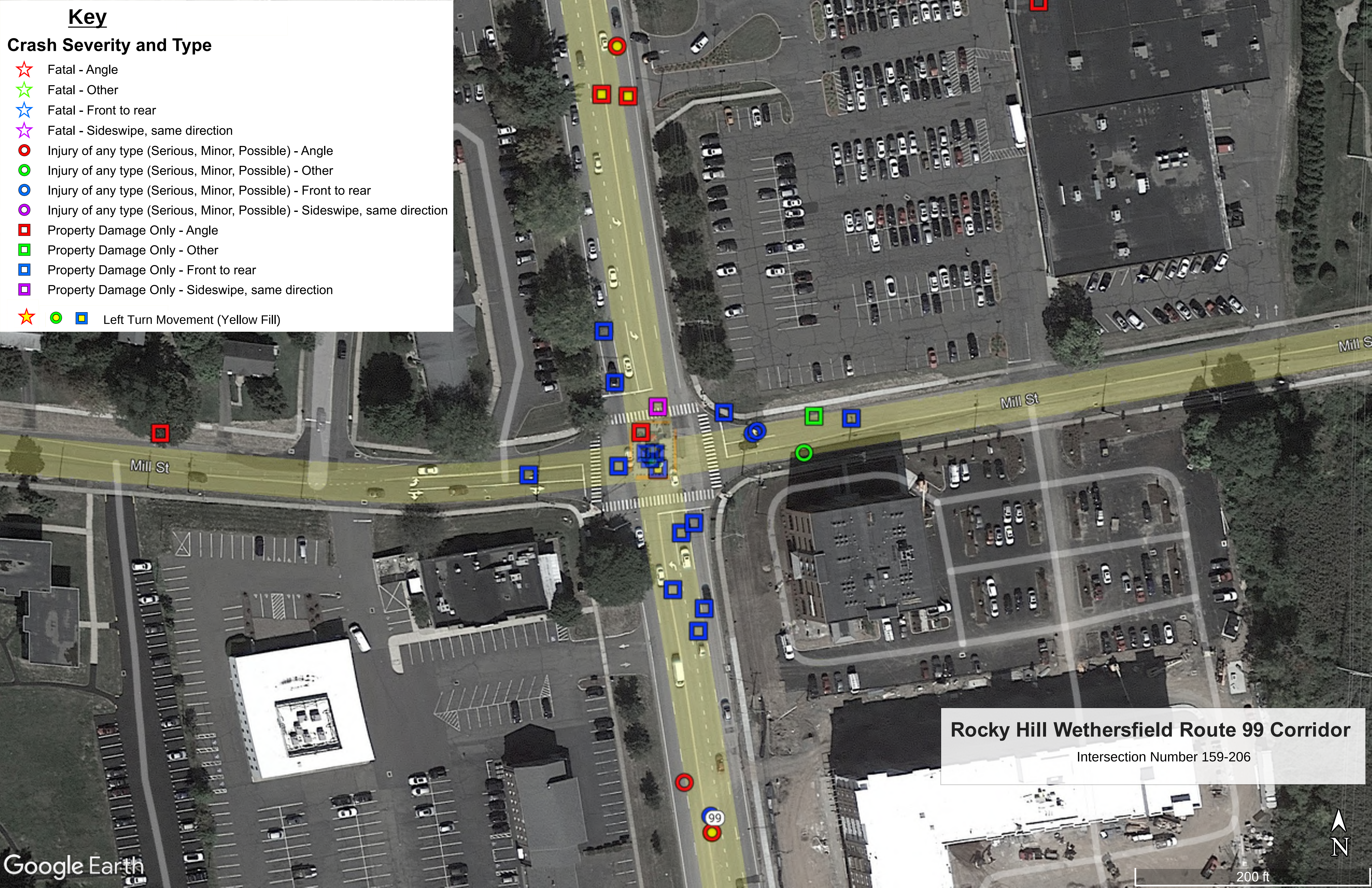
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
174
New Britain Route 174 Corridor
Intersection Number 088-254
200 ft
N
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
99
Rocky Hill Wethersfield Route 99 Corridor
Intersection Number 118-233
N
100 ft
Google Earth

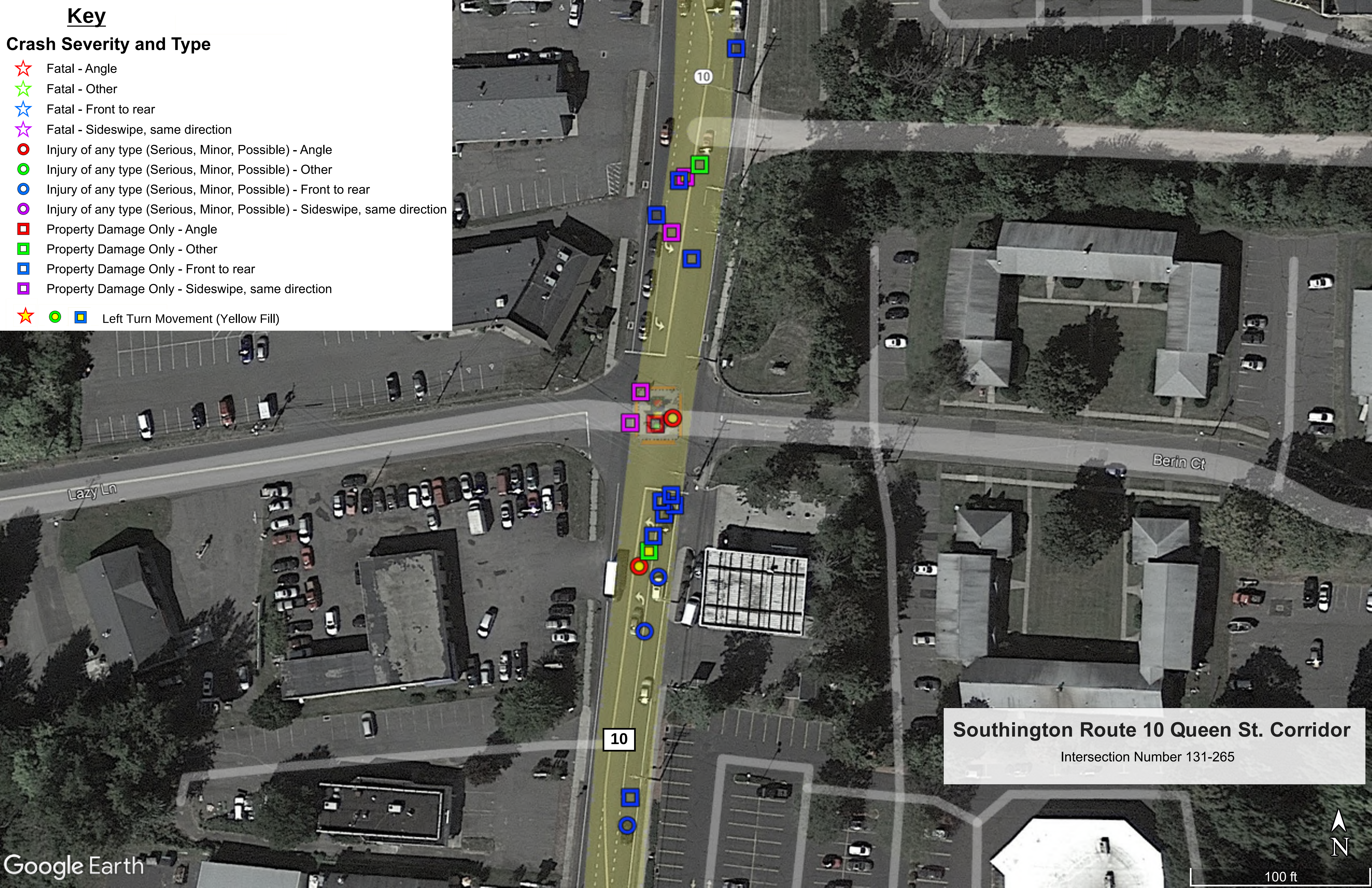

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
99
Town Line Rd
Rocky Hill Wethersfield Route 99 Corridor
Intersection Number 118-209
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
99
Executive Square
Rocky Hill Wethersfield Route 99 Corridor
Intersection Number 159-235
Google Earth
N
200 ft

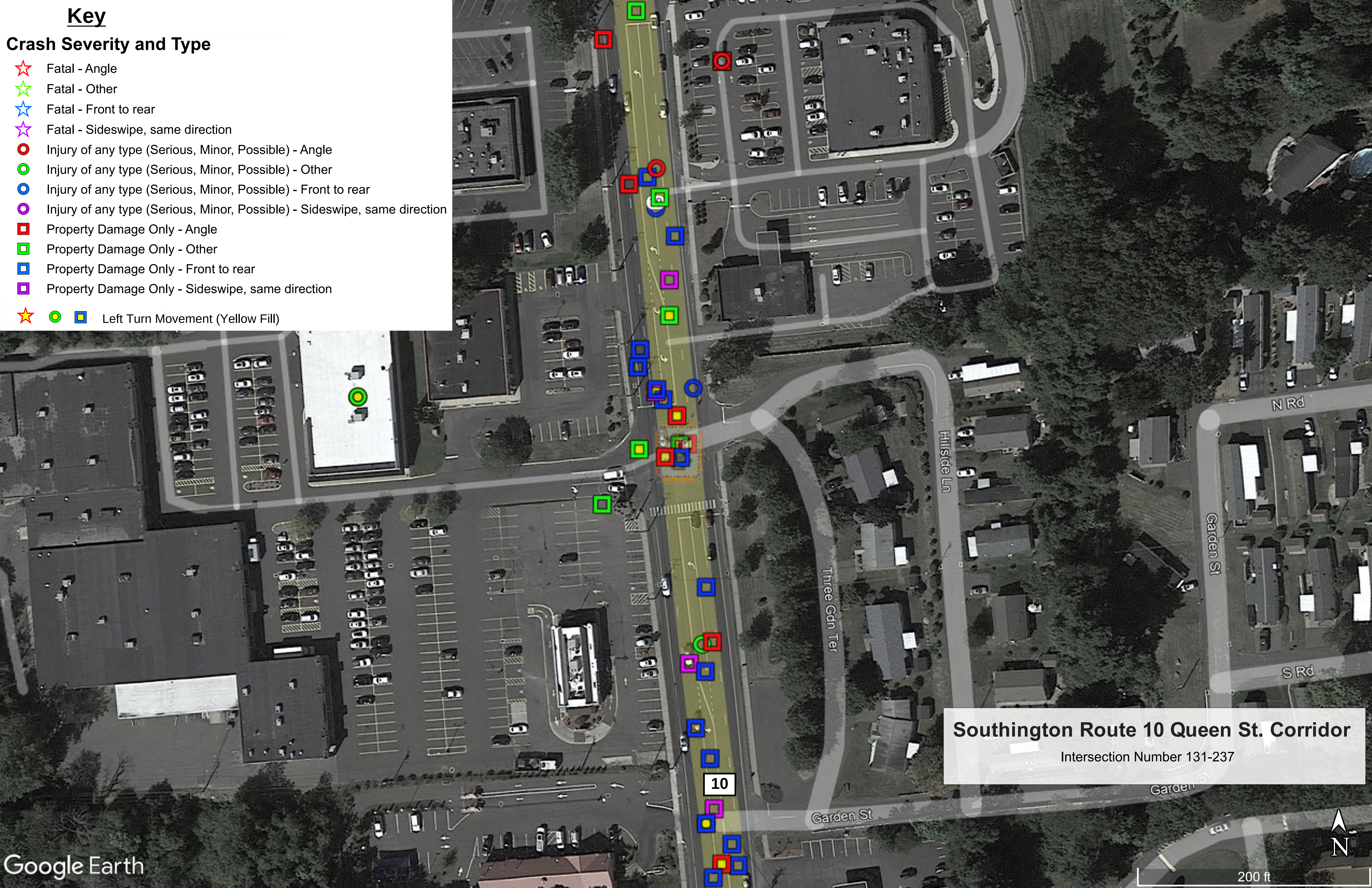

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
99
99
Rocky Hill Wethersfield Route 99 Corridor
Intersection Number 159-237
Google Earth
N
200 ft

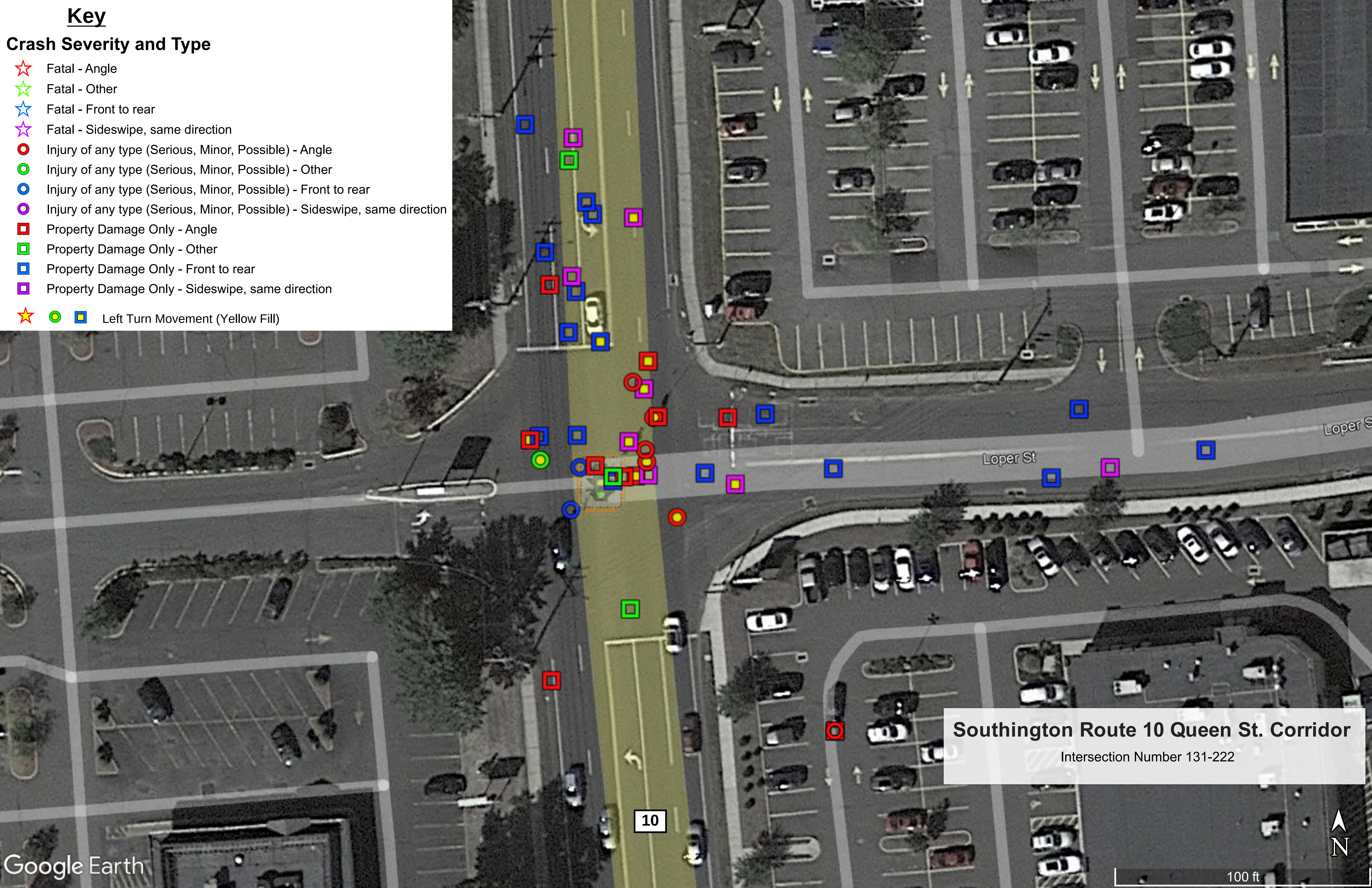

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Mill St
Mill St
Mill St
99
Rocky Hill Wethersfield Route 99 Corridor
Intersection Number 159-206
Google Earth
N
200 ft


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
99
Signal View Dr
99
Rocky Hill Wethersfield Route 99 Corridor
Intersection Number 159-246
Google Earth
N
200 ft

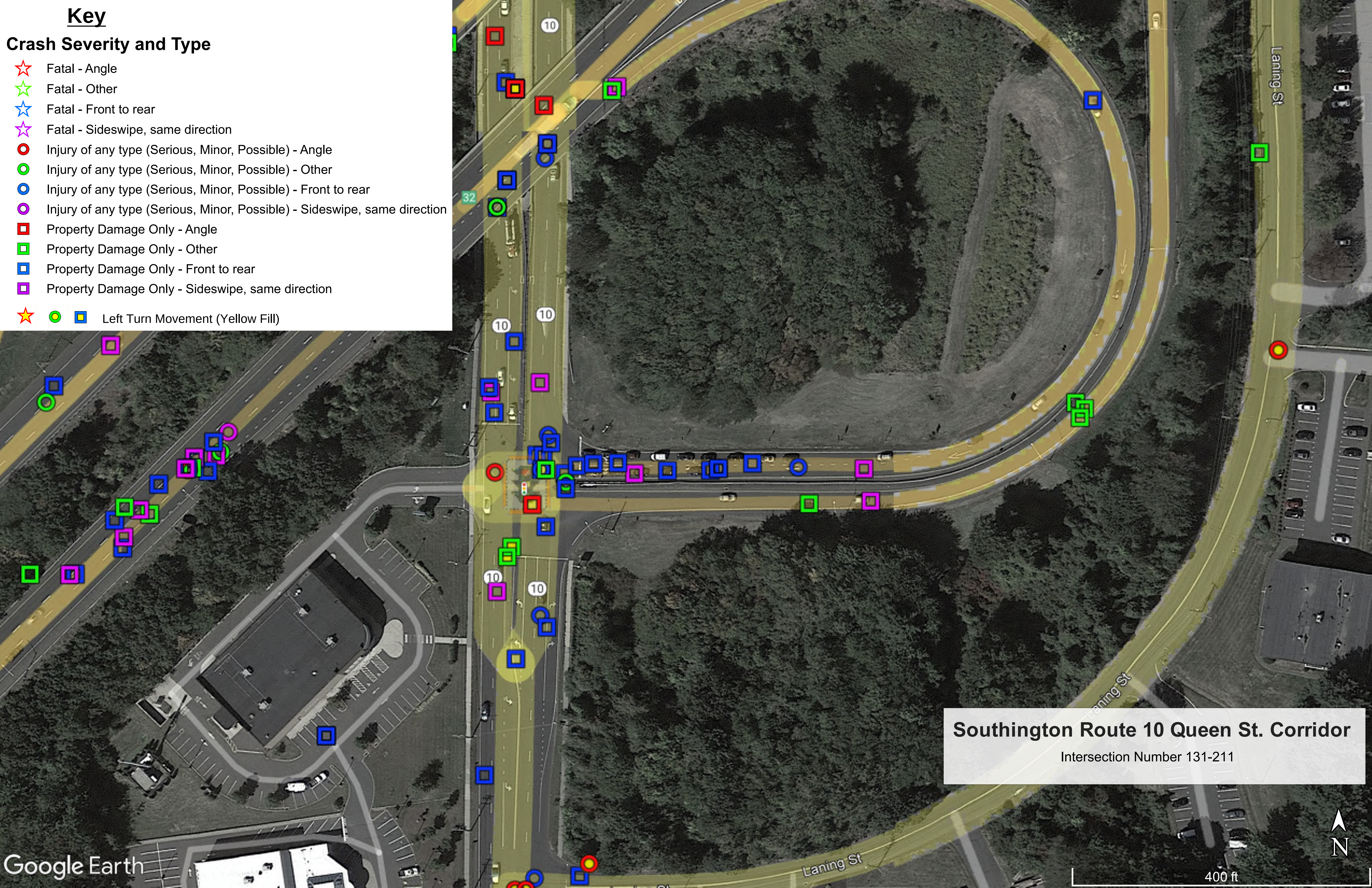

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
10
Lazy Ln
Berin Ct
10
Southington Route 10 Queen St. Corridor
Intersection Number 131-265
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
10
Southington Route 10 Queen St. Corridor
Intersection Number 131-229
Google Earth
N
200 ft

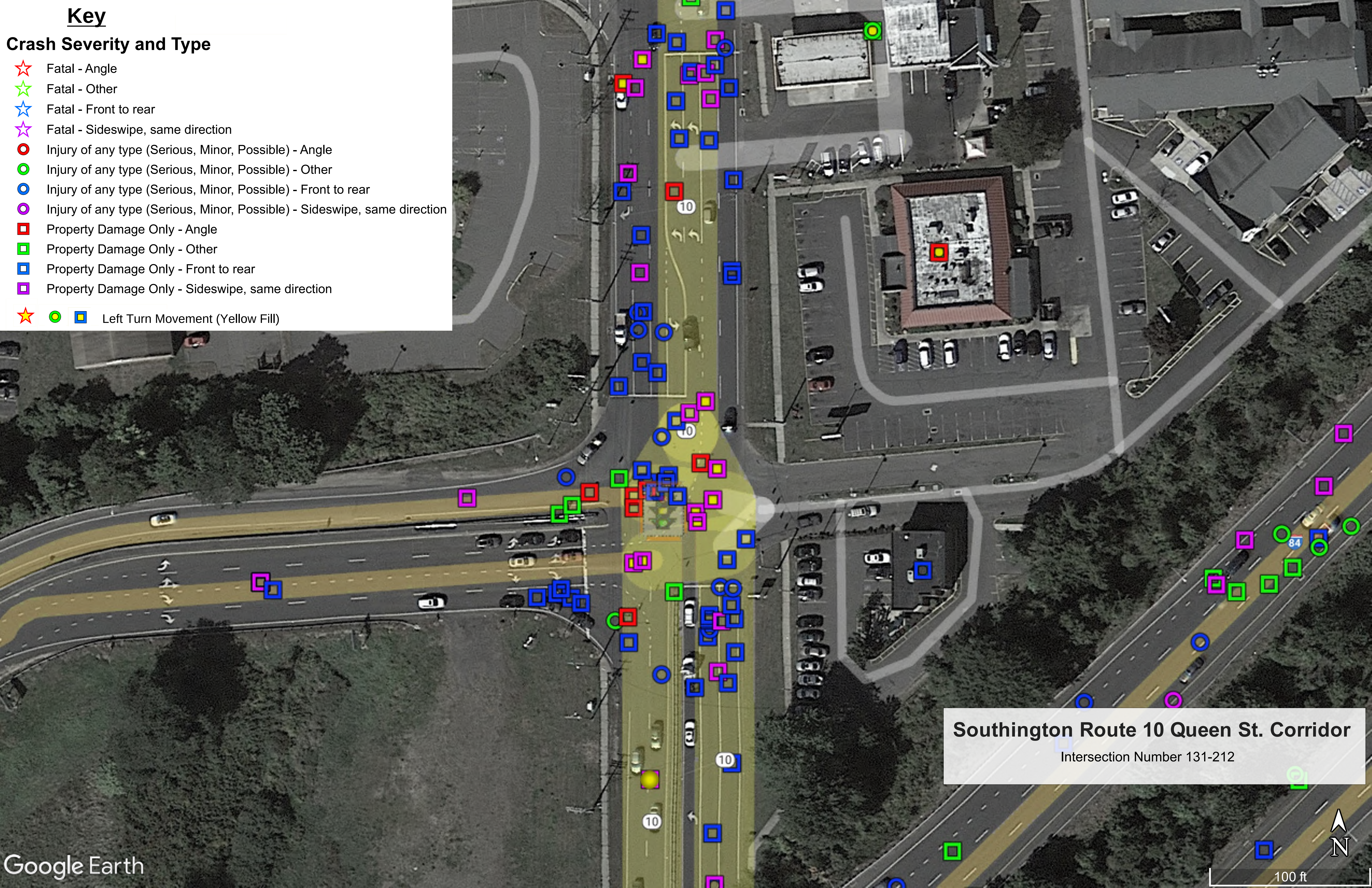

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
N Rd
Hillside Ln
Garden St
Three Gdn Ter
S Rd
Garden St
10
Southington Route 10 Queen St. Corridor
Intersection Number 131-237
Google Earth
N
200 ft

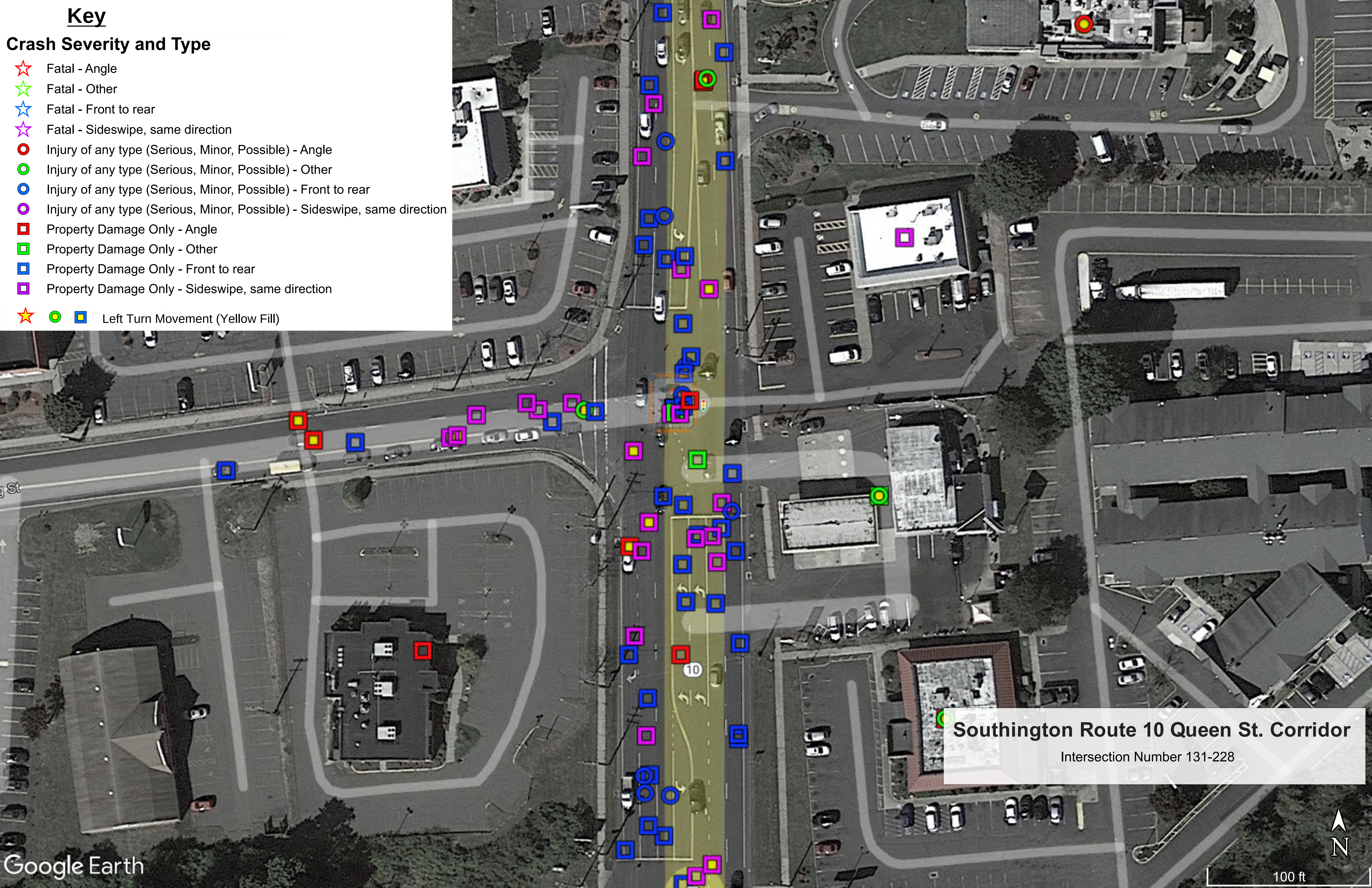


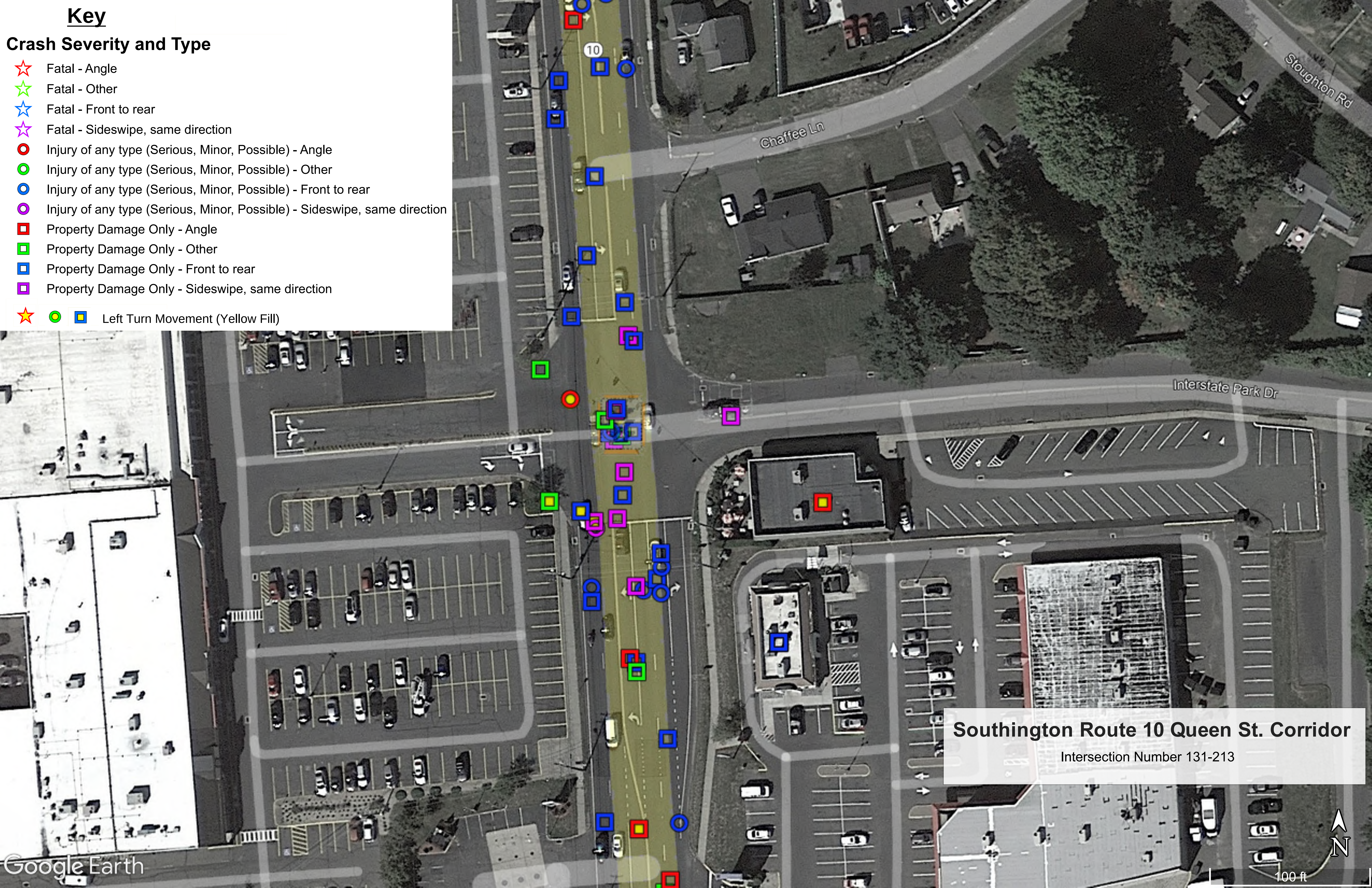
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Loper St
Loper St
10
Southington Route 10 Queen St. Corridor
Intersection Number 131-222
N
100 ft
Google Earth

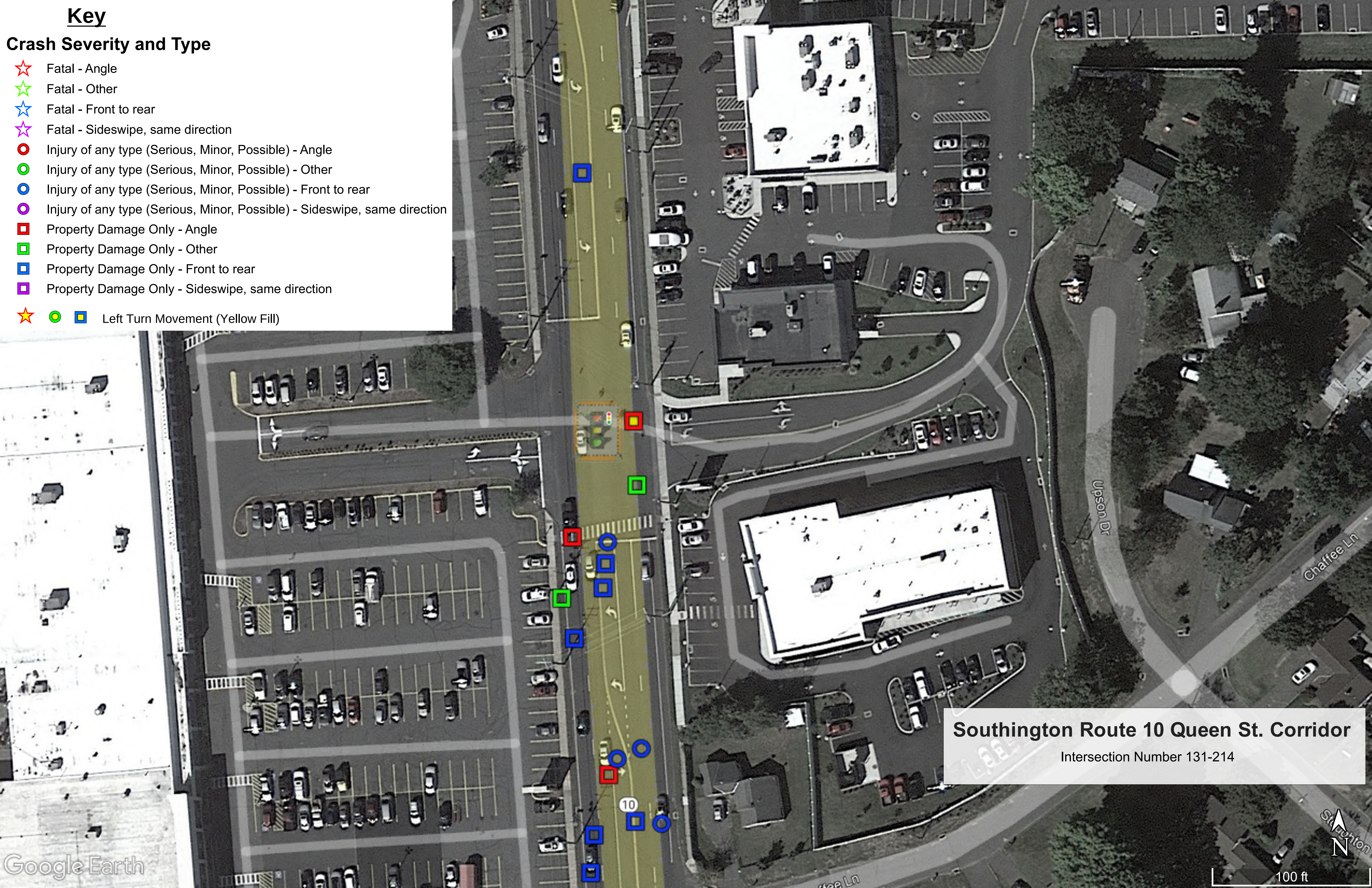


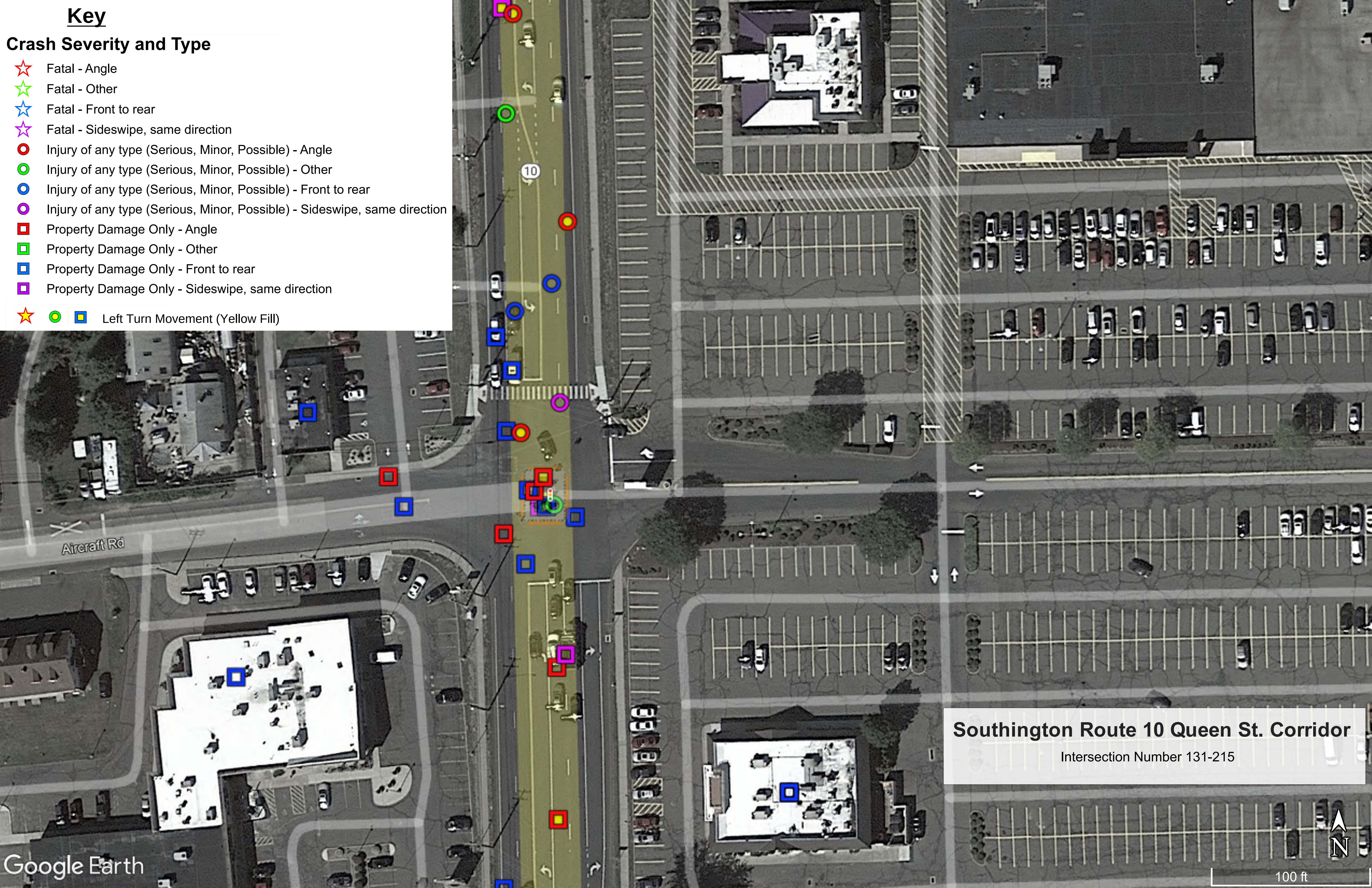
Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
10
32
Laning St
Laning St
Laning St
Southington Route 10 Queen St. Corridor
Intersection Number 131-211
N
400 ft
Google Earth

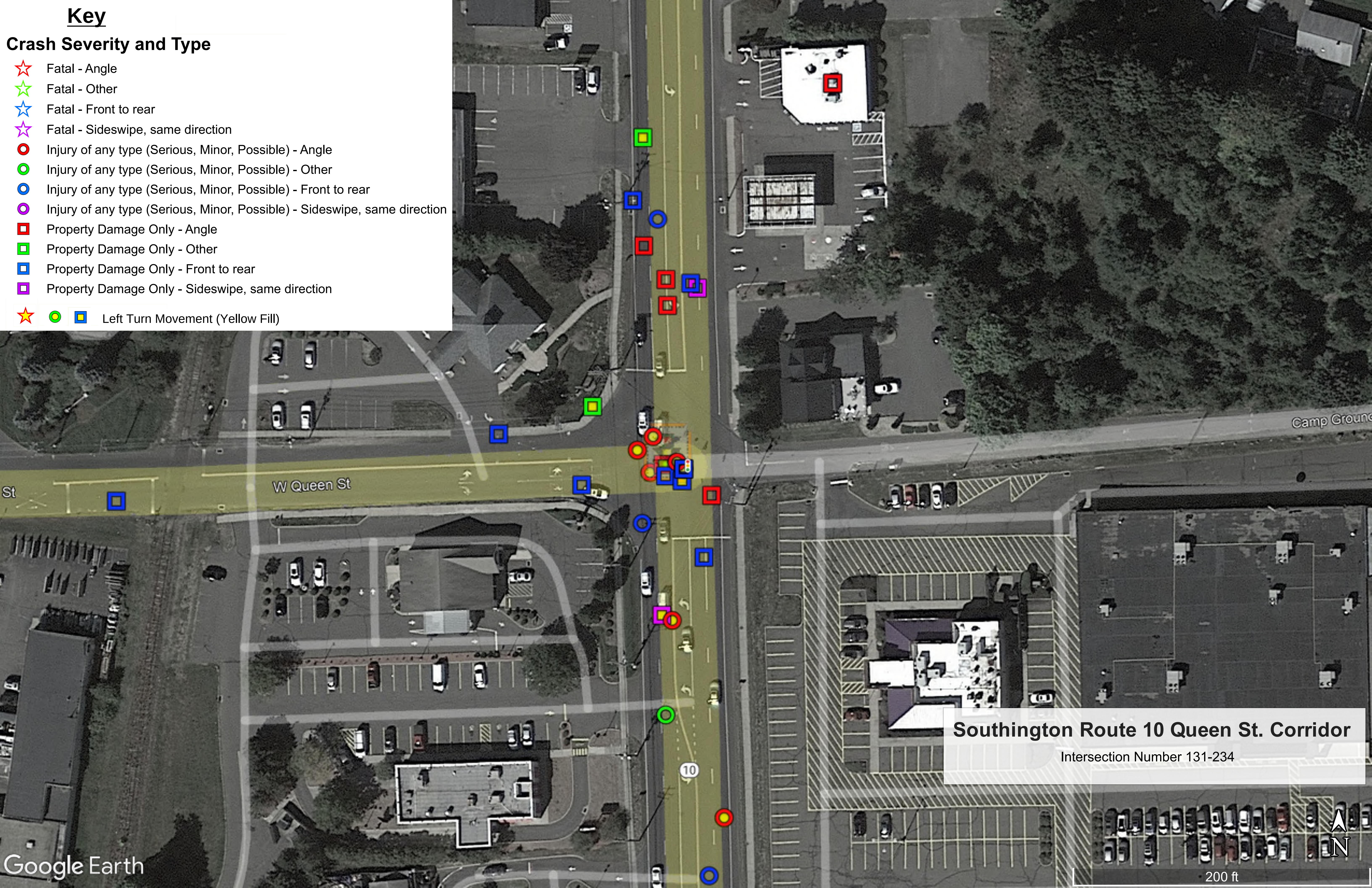

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
10
84
Southington Route 10 Queen St. Corridor
Intersection Number 131-212
100 ft
N
Google Earth

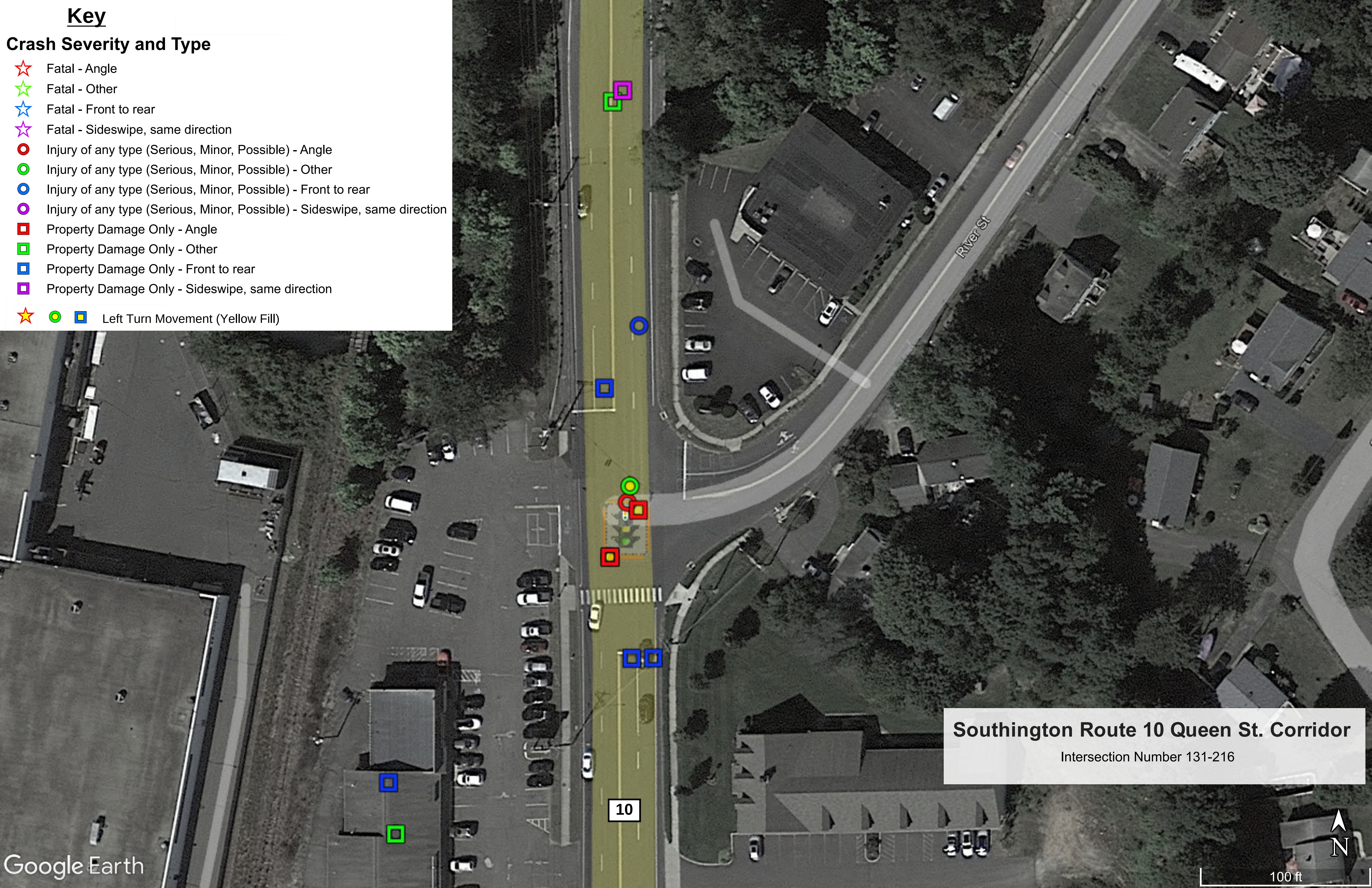

Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Southington Route 10 Queen St. Corridor
Intersection Number 131-228
10
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
10
Chaffee Ln
Stoughton Rd
Interstate Park Dr
Southington Route 10 Queen St. Corridor
Intersection Number 131-213
Google Earth
N
100 ft


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Southington Route 10 Queen St. Corridor
Intersection Number 131-214
Upson Dr
Chaffee Ln
10
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
10
Aircraft Rd
Southington Route 10 Queen St. Corridor
Intersection Number 131-215
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
W Queen St
Camp Ground
10
Southington Route 10 Queen St. Corridor
Intersection Number 131-234
Google Earth
N
200 ft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Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
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Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
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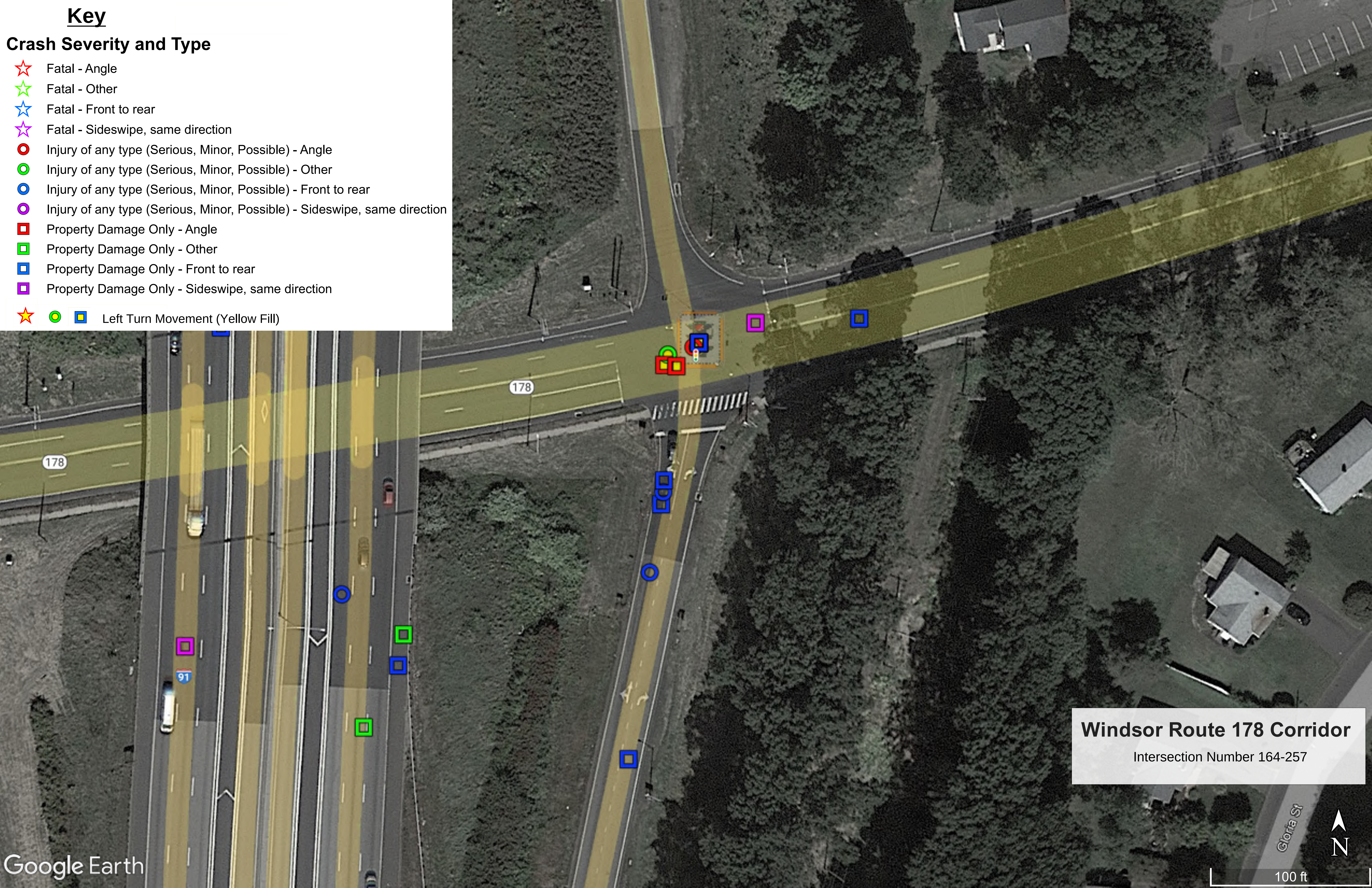
River St
10
Southington Route 10 Queen St. Corridor
Intersection Number 131-216
Google Earth
N
100 ft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Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
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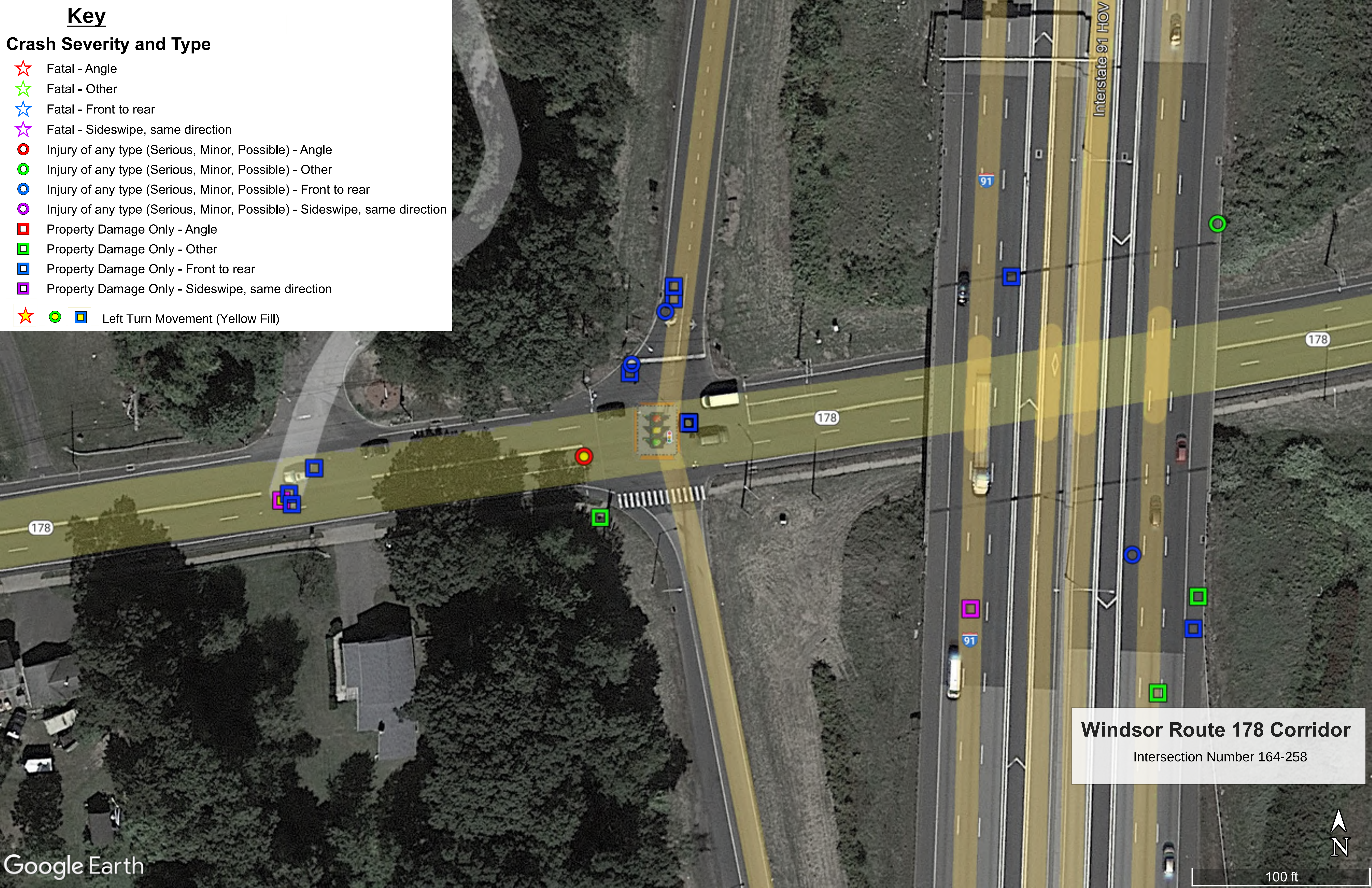
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
178
178
91
Windsor Route 178 Corridor
Intersection Number 164-257
Gloria St
N
100 ft
Google Earth



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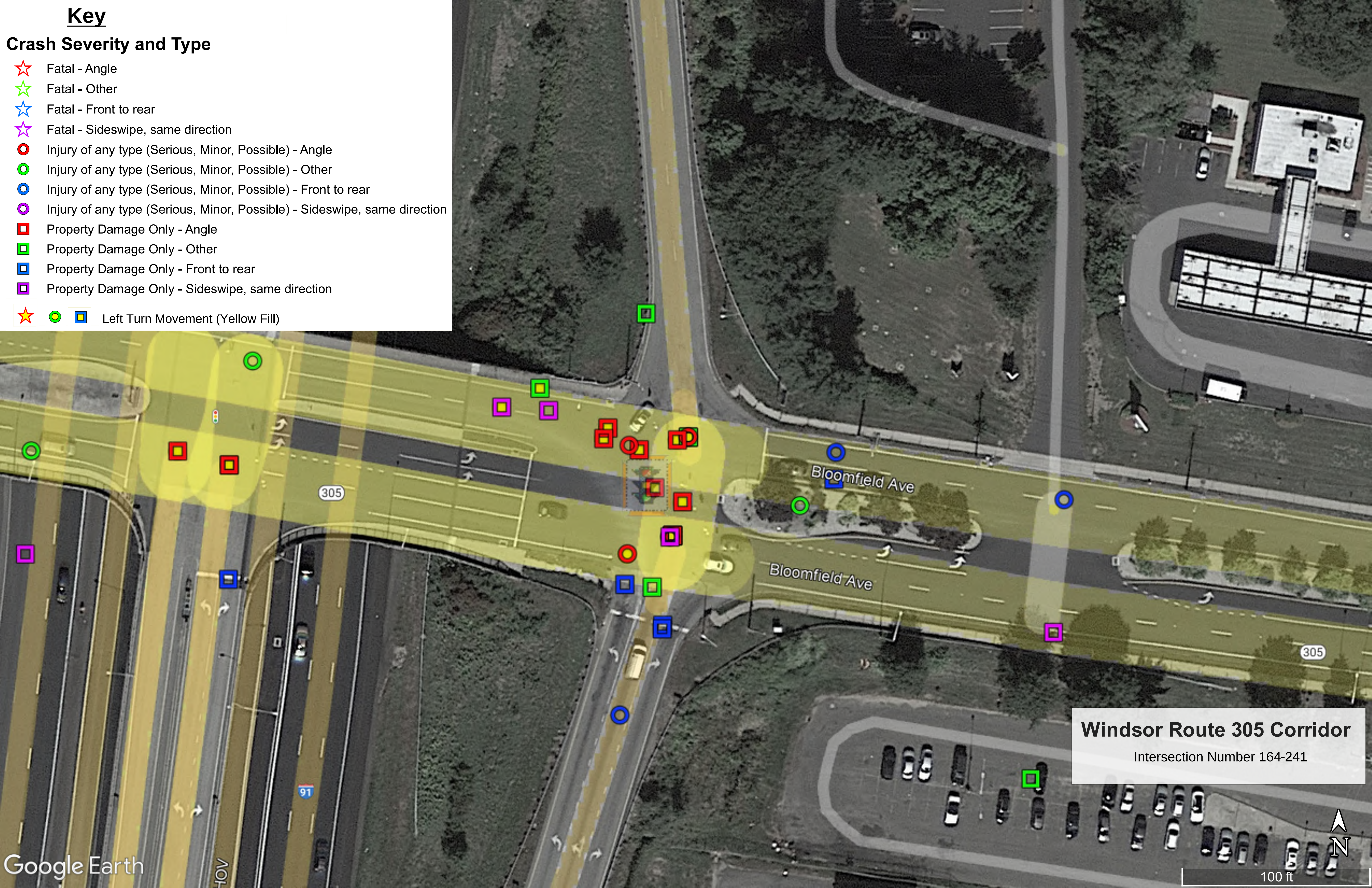
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Interstate 91 HOV
91
178
Windsor Route 178 Corridor
Intersection Number 164-258
N
100 ft
Google Earth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Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
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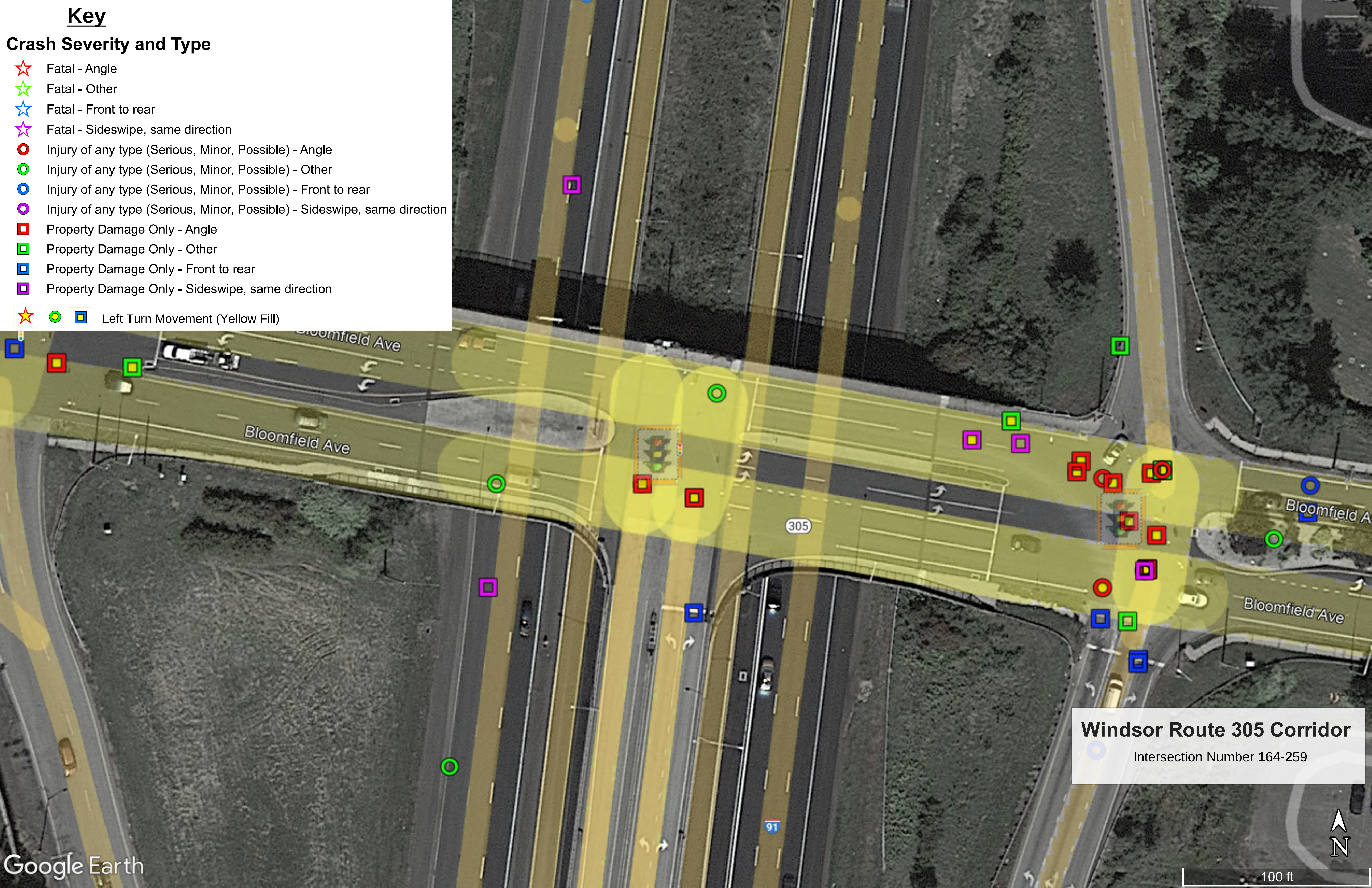
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Bloomfield Ave
Bloomfield Ave
305
305
91
HOV
Windsor Route 305 Corridor
Intersection Number 164-241
N
100 ft
Google Earth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Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
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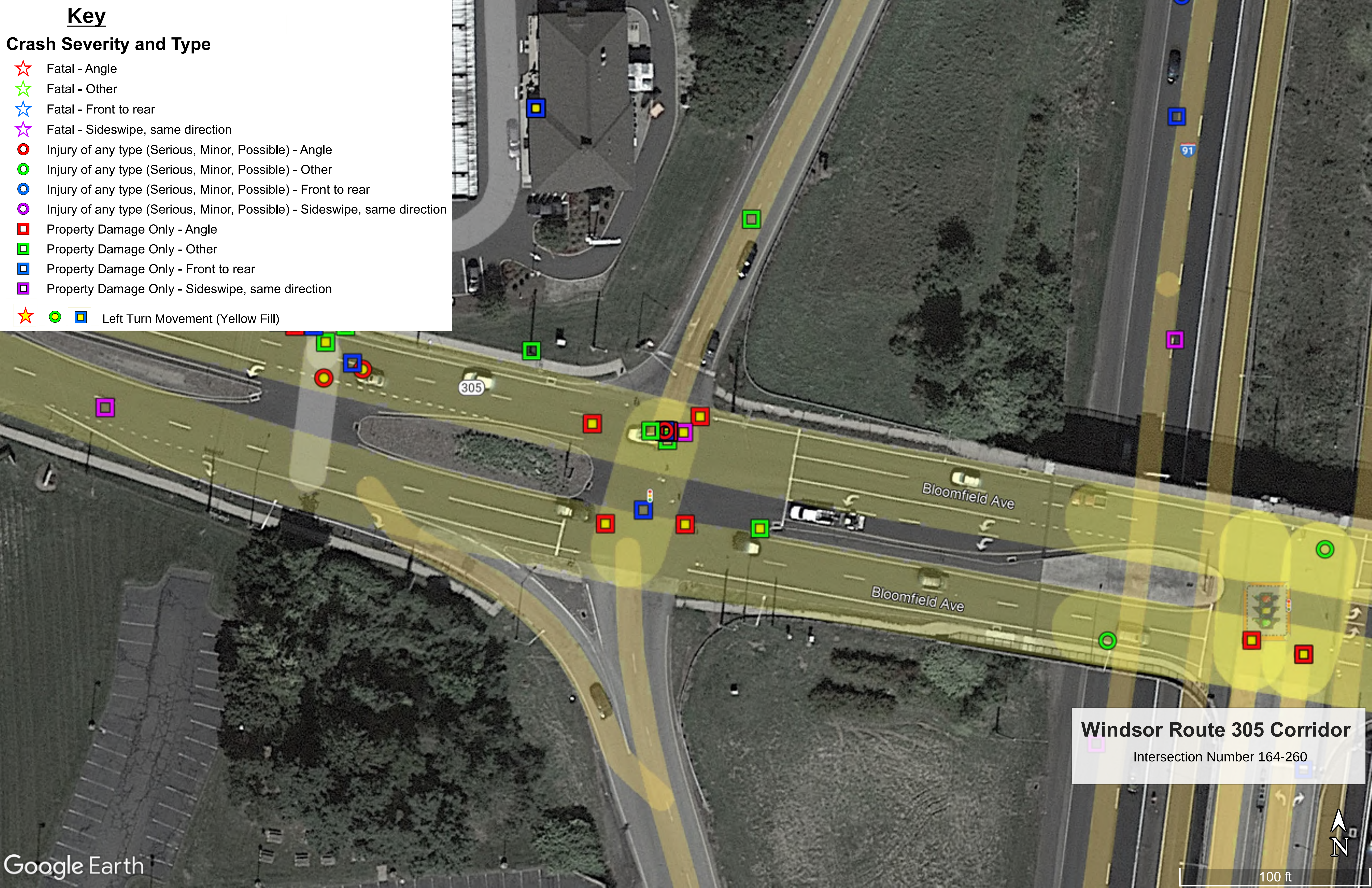
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Bloomfield Ave
Bloomfield Ave
Bloomfield Ave
Bloomfield Ave
305
91
Windsor Route 305 Corridor
Intersection Number 164-259
N
100 ft
Google Earth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Fatal - Other
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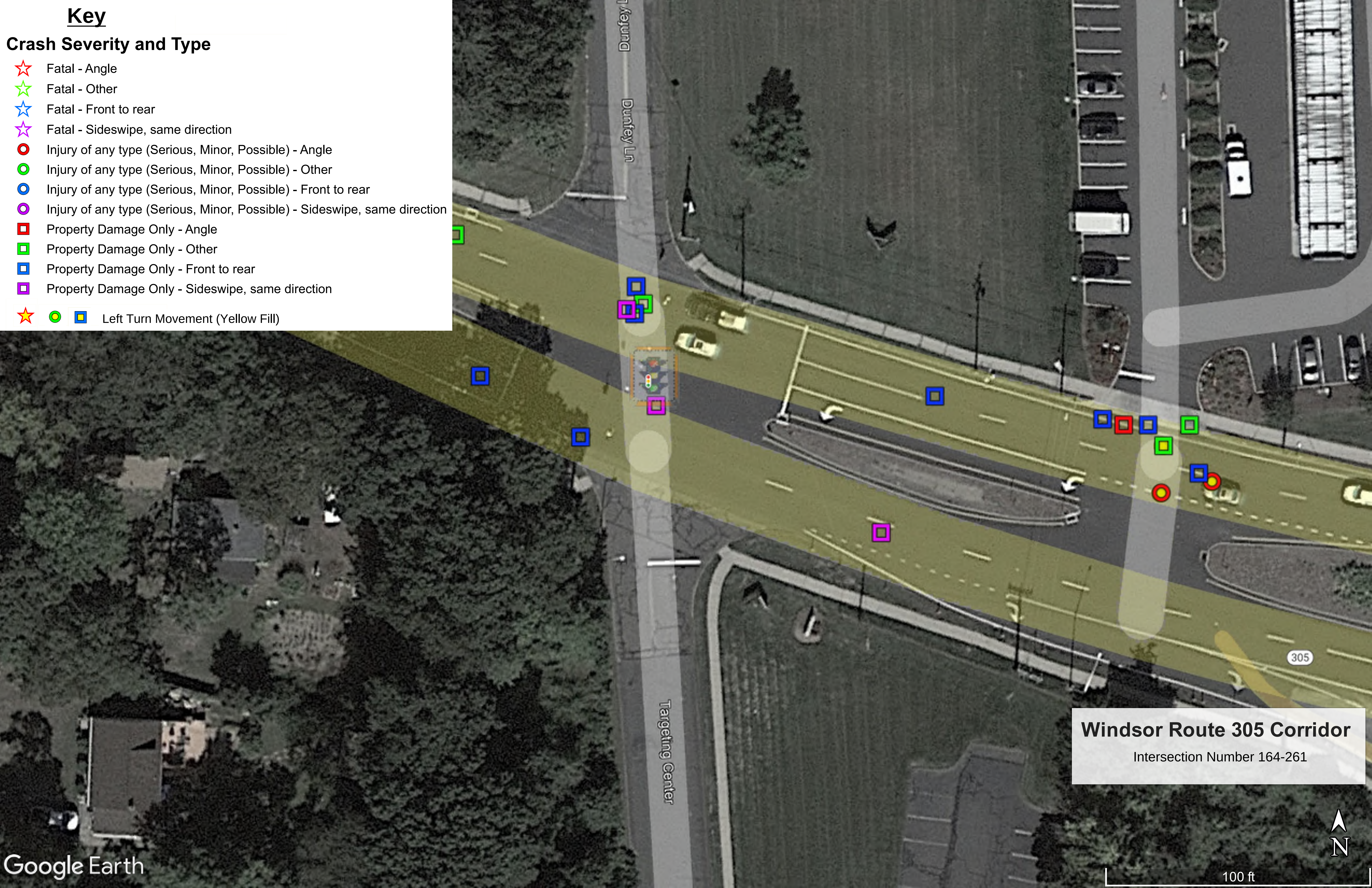
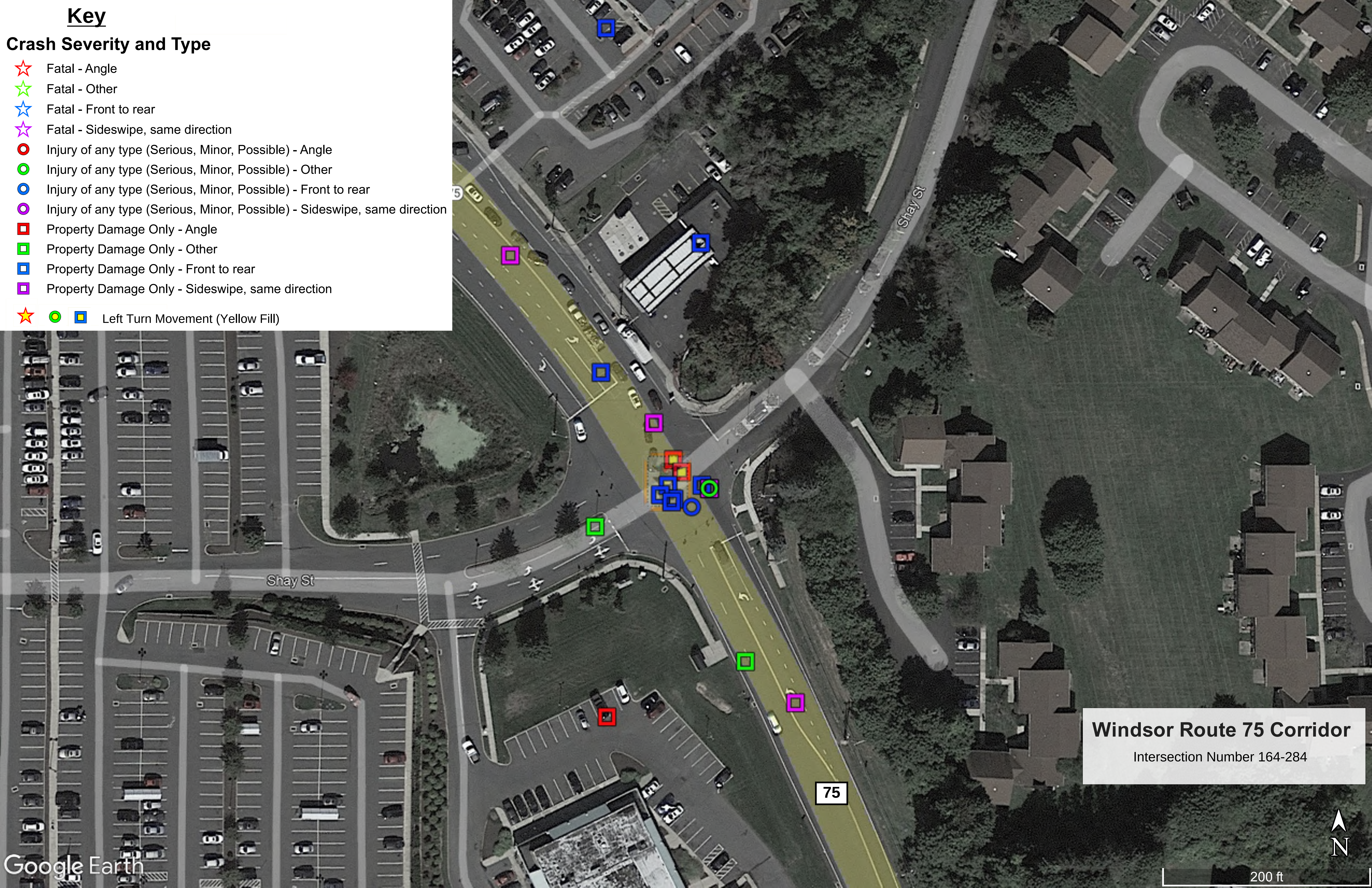
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
305
91
Bloomfield Ave
Bloomfield Ave
Windsor Route 305 Corridor
Intersection Number 164-260
Google Earth
100 ft
N



Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Dunfey Ln
Targeting Center
305
Windsor Route 305 Corridor
Intersection Number 164-261
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Mountain Rd
Dunfey Ln
305
Windsor Route 305 Corridor
Intersection Number 164-209
N
100 ft
Google Earth


Key
Crash Severity and Type
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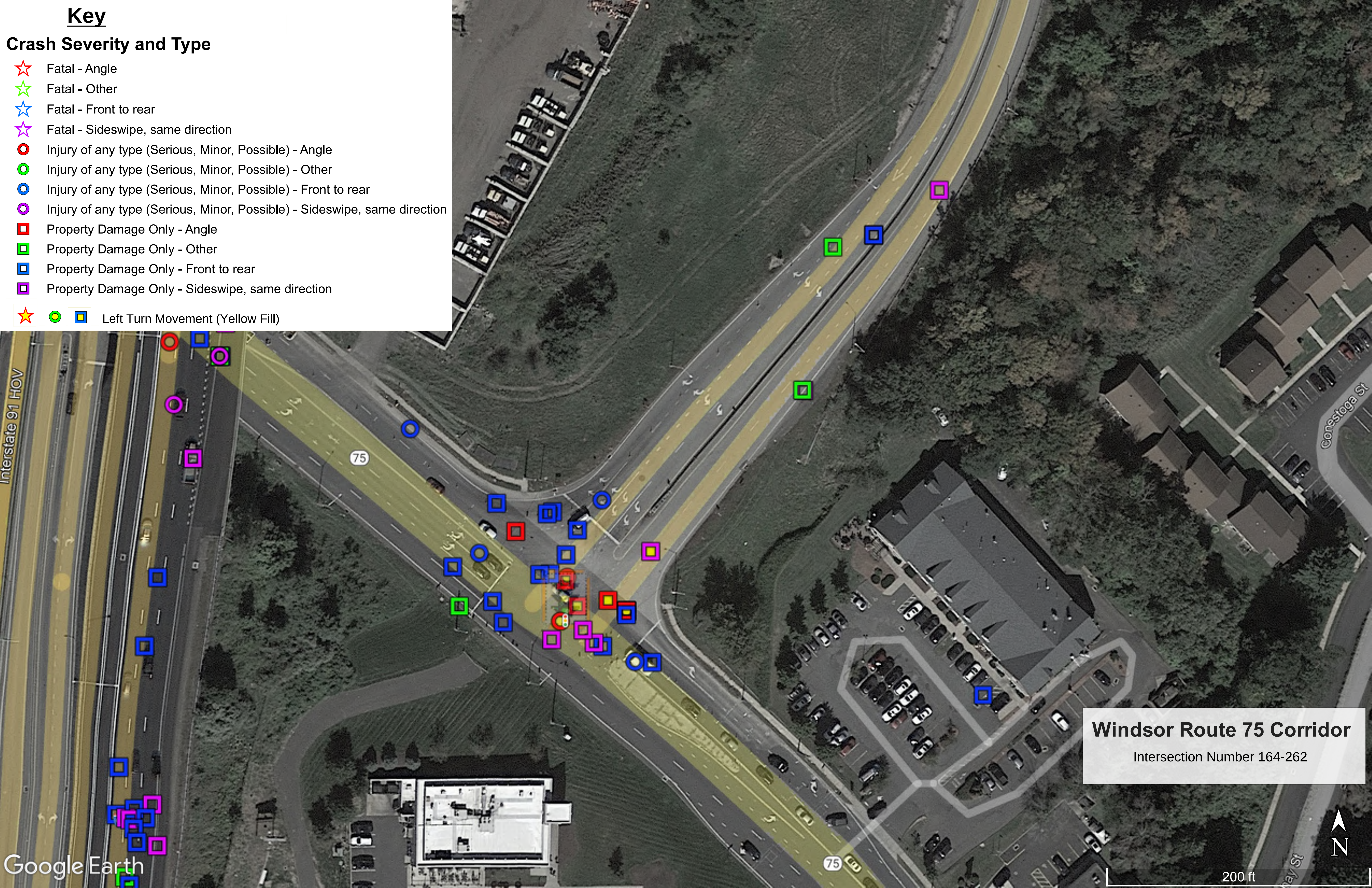
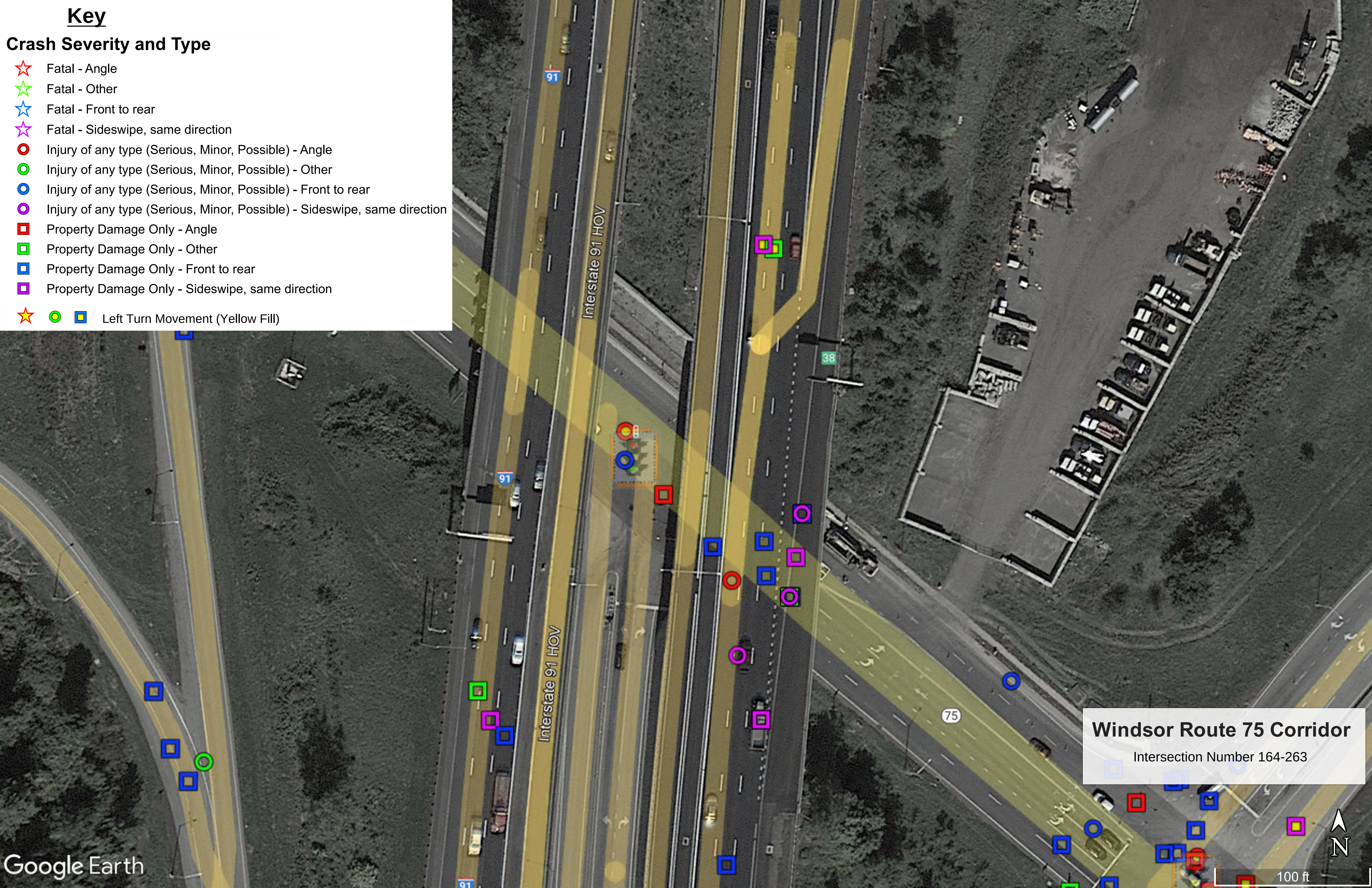
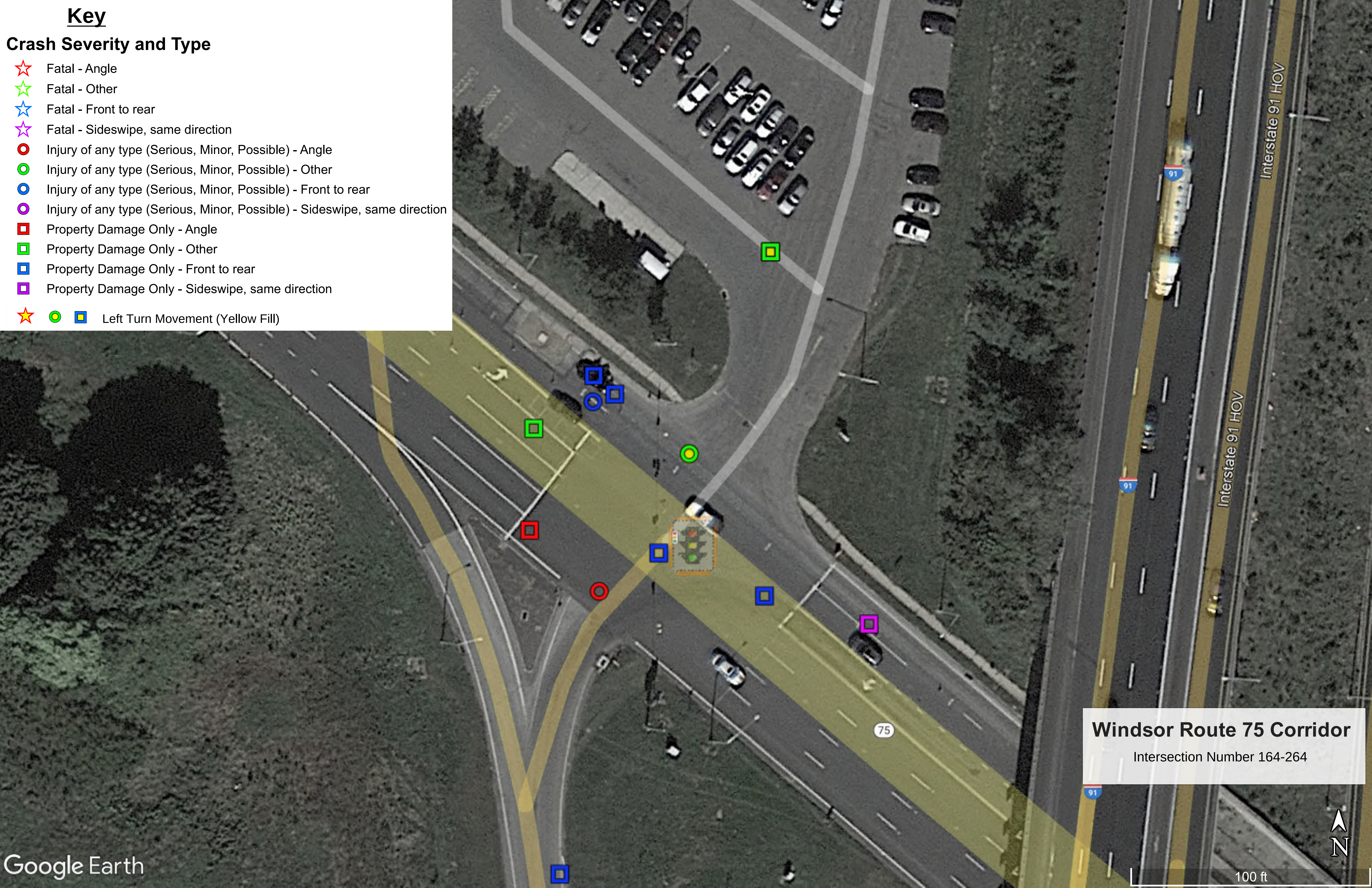
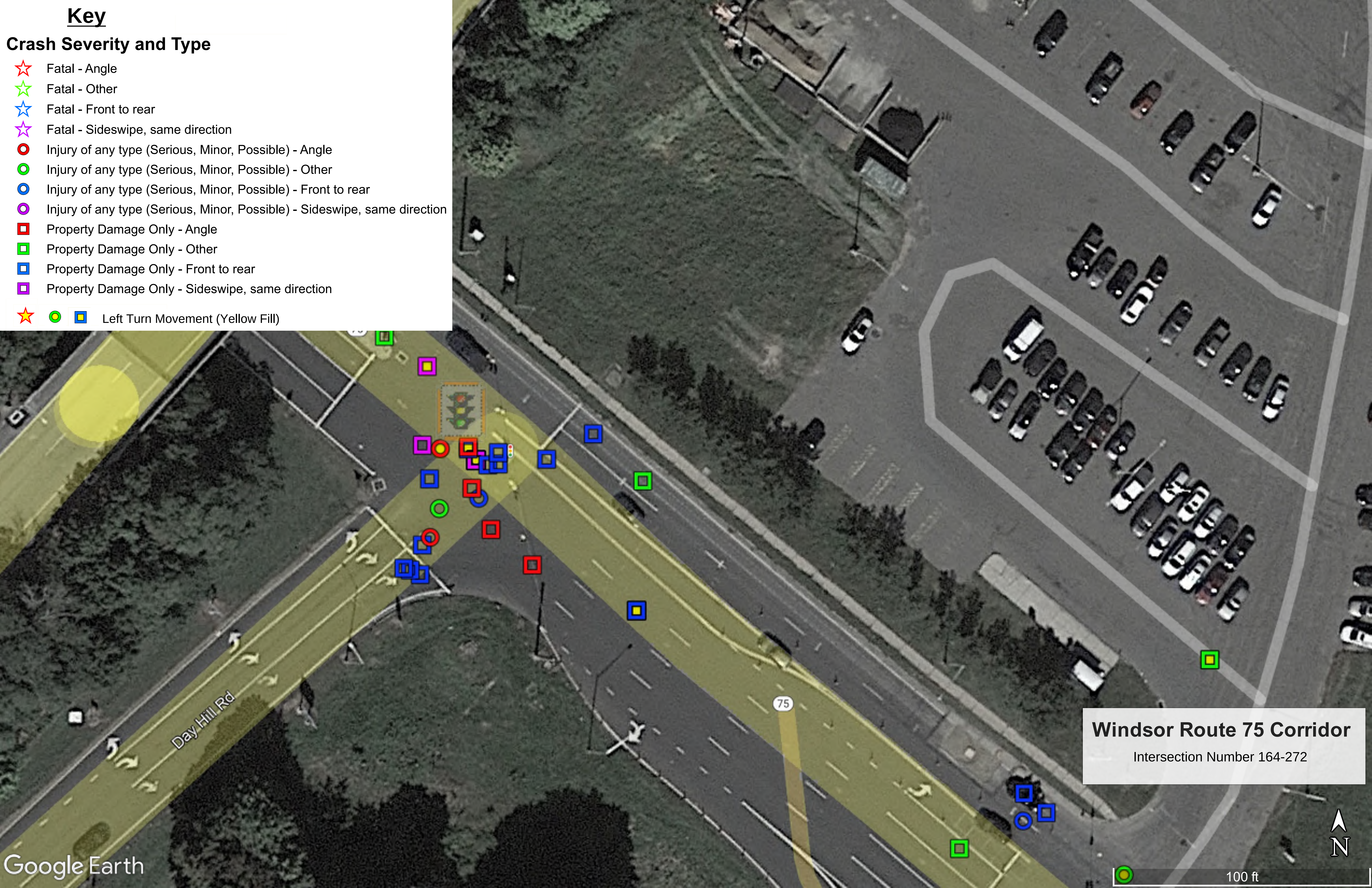
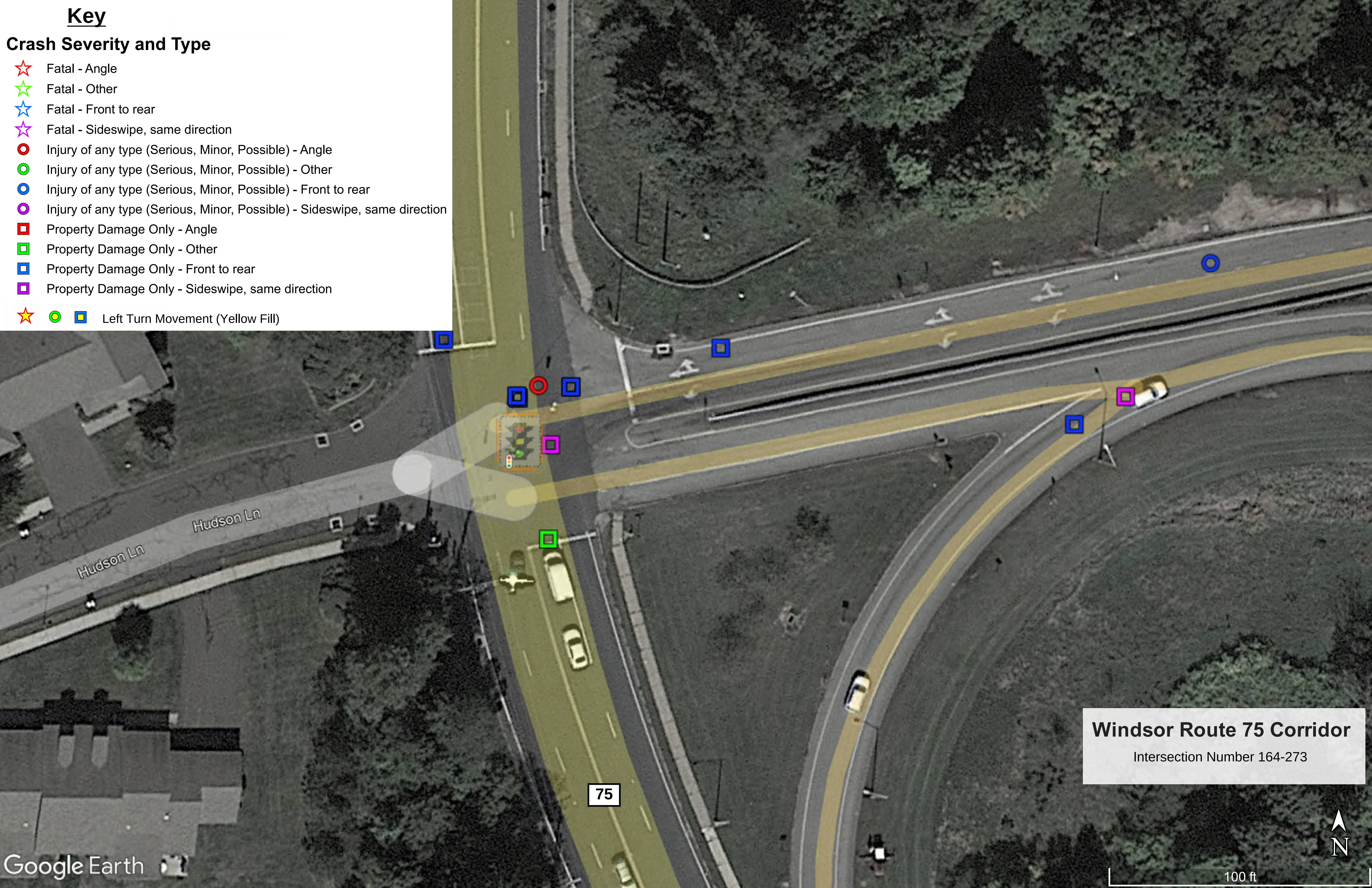
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Shay St
Shay St
75
Windsor Route 75 Corridor
Intersection Number 164-284
N
200 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Interstate 91 HOV
75
Conestoga St
Windsor Route 75 Corridor
Intersection Number 164-262
N
200 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Interstate 91 HOV
Interstate 91 HOV
91
91
38
75
Windsor Route 75 Corridor
Intersection Number 164-263
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Interstate 91 HOV
Interstate 91 HOV
91
91
91
75
Windsor Route 75 Corridor
Intersection Number 164-264
N
100 ft
Google Earth


Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Day Hill Rd
75
Windsor Route 75 Corridor
Intersection Number 164-272
N
100 ft
Google Earth



Key
Crash Severity and Type
Fatal - Angle
Fatal - Other
Fatal - Front to rear
Fatal - Sideswipe, same direction
Injury of any type (Serious, Minor, Possible) - Angle
Injury of any type (Serious, Minor, Possible) - Other
Injury of any type (Serious, Minor, Possible) - Front to rear
Injury of any type (Serious, Minor, Possible) - Sideswipe, same direction
Property Damage Only - Angle
Property Damage Only - Other
Property Damage Only - Front to rear
Property Damage Only - Sideswipe, same direction
Left Turn Movement (Yellow Fill)
Hudson Ln
Hudson Ln
75
Windsor Route 75 Corridor
Intersection Number 164-273
N
100 ft
Google Earth

Appendix E
Phase 1 User Cost Analysis

Bloomfield/Windsor Routes 187 & 218
Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	EB	-55	-0.9	1110	3%	97%	1.14	1.5	-16.96	$ 16.33	$ 461.32	14.754	129.8	-999
	WB	-5	-0.4	1130	3%	97%	1.14	1.5	-1.57	$ 1.51	$ 42.69	1.365	12.0	-452
MID	EB	35	1.7	920	3%	97%	1.14	1.5	8.94	$ (8.61)	$ (243.32)	-7.782	-68.5	1564
	WB	10	0.7	800	3%	97%	1.14	1.5	2.22	$ (2.14)	$ (60.45)	-1.933	-17.0	560
PM	EB	4	1.2	1430	3%	97%	1.14	1.5	1.59	$ (1.53)	$ (43.22)	-1.382	-12.2	1716
	WB	-17	-0.2	1070	3%	97%	1.14	1.5	-5.05	$ 4.86	$ 137.45	4.396	38.7	-214
								TOTALS PER DAY:	-10.83	$ 10.42	$ 294.47	9.418	82.8	2175

ΔTT= Change in Travel Time

Yearly Totals		
2,816	Delay Savings (Vehicle Hours)	(say 2800)
$ 2,709	Travel Time Savings (Truck)	
$ 76,562	Travel Time Savings (Car)	
+ $ 8,595	Fuel Savings	
$ 87,866	Combined Savings	(say 88000)
2,449	Reduction in Fuel Use (Gallons)	(say 2400)
21,528	Reduction in CO_2 Emission (kg)	(say 22000)
565,500	Savings Number of Stops	(say 570000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$\ \$18.71}{\text{hr}}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$\ \$27.51}{\text{hr}}$$

$$FUEL = \Delta TT * Vol * \frac{0.87\text{ gal}}{\text{hr}}$$

$$CO_2 = FUEL * \frac{19.4\text{ lbs}}{\text{gal}}$$

Notes and References:
*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp
*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)
*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0
*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.
*Annual Calculations based on 260 commuter days per year.
*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT

East Windsor Route 5
Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	NB	-1	-0.4	560	3%	97%	1.14	1.5	-0.16	$ 0.15	$ 4.23	0.135	1.2	224
	SB	-73	-0.7	620	3%	97%	1.14	1.5	-12.57	$ 12.10	$ 342.01	10.938	96.3	434
MID	NB	-91	-2.2	460	3%	97%	1.14	1.5	-11.63	$ 11.20	$ 316.32	10.116	89.0	1012
	SB	-43	-2.2	490	3%	97%	1.14	1.5	-5.85	$ 5.64	$ 159.22	5.092	44.8	1078
PM	NB	26	0.5	790	3%	97%	1.14	1.5	5.71	$ (5.49)	$ (155.21)	-4.964	-43.7	-395
	SB	-10	-2.4	840	3%	97%	1.14	1.5	-2.33	$ 2.25	$ 63.47	2.030	17.9	2016
								TOTALS PER DAY:	-26.83	$ 25.85	$ 730.04	23.347	205.5	4369

ΔTT= Change in Travel Time

Yearly Totals		
6,976	Delay Savings (Vehicle Hours)	(say 7000)
$ 6,721	Travel Time Savings (Truck)	
$ 189,810	Travel Time Savings (Car)	
+ $ 21,306	Fuel Savings	
$ 217,838	Combined Savings	(say 218000)
6,070	Reduction in Fuel Use (Gallons)	(say 6100)
53,430	Reduction in CO_2 Emission (kg)	(say 53000)
1,135,940	Savings Number of Stops	(say 1140000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$ \ \$18.71}{hr}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$ \ \$27.51}{hr}$$

$$FUEL = \Delta TT * Vol * \frac{0.87 \text{ gal}}{hr}$$

$$CO_2 = FUEL * \frac{19.4 \text{ lbs}}{gal}$$

Notes and References:
*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp
*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)
*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0
*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.
*Annual Calculations based on 260 commuter days per year.
*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT

New Britain Route 174
Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	EB	-6	0.1	610	3%	97%	1.14	1.5	-1.02	$ 0.98	$ 27.66	0.885	7.8	-61
	WB	-2	-0.1	540	3%	97%	1.14	1.5	-0.30	$ 0.29	$ 8.16	0.261	2.3	54
MID	EB	-27	-1	510	3%	97%	1.14	1.5	-3.83	$ 3.68	$ 104.05	3.328	29.3	510
	WB	-16	-0.2	430	3%	97%	1.14	1.5	-1.91	$ 1.84	$ 51.99	1.663	14.6	86
PM	EB	13	0.3	720	3%	97%	1.14	1.5	2.60	$ (2.50)	$ (70.73)	-2.262	-19.9	-216
	WB	-18	-0.7	750	3%	97%	1.14	1.5	-3.75	$ 3.61	$ 102.01	3.263	28.7	525
								TOTALS PER DAY:	-8.21	$ 7.90	$ 223.14	7.138	62.8	898

ΔTT= Change in Travel Time

	Yearly Totals	
2,135	Delay Savings (Vehicle Hours)	(say 2100)
$ 2,054	Travel Time Savings (Truck)	
$ 58,016	Travel Time Savings (Car)	
+ $ 6,514	Fuel Savings	
$ 66,585	Combined Savings	(say 67000)
1,856	Reduction in Fuel Use (Gallons)	(say 1900)
16,328	Reduction in CO_2 Emission (kg)	(say 16000)
233,480	Savings Number of Stops	(say 230000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$ \ \$18.71}{hr}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$ \ \$27.51}{hr}$$

$$FUEL = \Delta TT * Vol * \frac{0.87 \text{ gal}}{hr}$$

$$CO_2 = FUEL * \frac{19.4 \text{ lbs}}{\text{gal}}$$

Notes and References:

*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp

*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)

*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0

*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.

*Annual Calculations based on 260 commuter days per year.

*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT

Rocky Hill/Wethersfield Route 99
Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	NB	-31	0.3	840	3%	97%	1.14	1.5	-7.23	$ 6.96	$ 196.77	6.293	55.4	-252
	SB	4	0.3	640	3%	97%	1.14	1.5	0.71	$ (0.68)	$ (19.34)	-0.619	-5.4	-192
MID	NB	-17	-0.3	790	3%	97%	1.14	1.5	-3.73	$ 3.59	$ 101.48	3.246	28.6	237
	SB	-77	-2	740	3%	97%	1.14	1.5	-15.83	$ 15.24	$ 430.57	13.770	121.2	1480
PM	NB	-25	-1.7	1010	3%	97%	1.14	1.5	-7.01	$ 6.75	$ 190.80	6.102	53.7	1717
	SB	-14	0	1060	3%	97%	1.14	1.5	-4.12	$ 3.97	$ 112.14	3.586	31.6	0
								TOTALS PER DAY:	-37.21	$ 35.83	$ 1,012.42	32.378	285.1	2990

ΔTT= Change in Travel Time

Yearly Totals			
	9,675	Delay Savings (Vehicle Hours)	(say 9700)
$	9,316	Travel Time Savings (Truck)	
$	263,229	Travel Time Savings (Car)	
+ $	29,548	Fuel Savings	
$	302,093	Combined Savings	(say 302000)
	8,418	Reduction in Fuel Use (Gallons)	(say 8400)
	74,126	Reduction in CO_2 Emission (kg)	(say 74000)
	777,400	Savings Number of Stops	(say 780000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$\ \$18.71}{\text{hr}}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$\ \$27.51}{\text{hr}}$$

$$FUEL = \Delta TT * Vol * \frac{0.87\ \text{gal}}{\text{hr}}$$

$$CO_2 = FUEL * \frac{19.4\ \text{lbs}}{\text{gal}}$$

Notes and References:
*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp
*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)
*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0
*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.
*Annual Calculations based on 260 commuter days per year.
*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT

Southington Route 10 Corridor

Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	NB	-13	-0.6	870	3%	97%	1.14	1.5	-3.14	$ 3.02	$ 85.46	2.733	24.0	522
	SB	-33	-1.4	630	3%	97%	1.14	1.5	-5.78	$ 5.56	$ 157.10	5.024	44.2	882
MID	NB	-7	0.3	1050	3%	97%	1.14	1.5	-2.04	$ 1.97	$ 55.54	1.776	15.6	-315
	SB	-52	-0.3	910	3%	97%	1.14	1.5	-13.14	$ 12.66	$ 357.57	11.436	100.6	273
PM	NB	15	0	1070	3%	97%	1.14	1.5	4.46	$ (4.29)	$ (121.28)	-3.879	-34.1	0
	SB	-62	-1.4	1120	3%	97%	1.14	1.5	-19.29	$ 18.57	$ 524.72	16.781	147.7	1568
TOTALS PER DAY:									-38.93	$ 37.49	$ 1,059.11	33.871	298.0	2930

ΔTT= Change in Travel Time

	Yearly Totals		
	10,122	Delay Savings (Vehicle Hours)	(say 10100)
$	9,747	Travel Time Savings (Truck)	
$	275,369	Travel Time Savings (Car)	
+ $	30,911	Fuel Savings	
$	316,027	Combined Savings	(say 316000)
	8,806	Reduction in Fuel Use (Gallons)	(say 8800)
	77,480	Reduction in CO_2 Emission (kg)	(say 77000)
	761,800	Savings Number of Stops	(say 760000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$18.71}{\text{hr}}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$27.51}{\text{hr}}$$

$$FUEL = \Delta TT * Vol * \frac{0.87 \text{ gal}}{\text{hr}}$$

$$CO_2 = FUEL * \frac{19.4 \text{ lbs}}{\text{gal}}$$

Notes and References:

*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp
*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)
*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0
*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.
*Annual Calculations based on 260 commuter days per year.
*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT

Windsor Route 178

Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	EB	3	0.3	620	3%	97%	1.14	1.5	0.52	$ (0.50)	$ (14.06)	-0.450	-4.0	-186
	WB	-8	-0.3	830	3%	97%	1.14	1.5	-1.84	$ 1.78	$ 50.18	1.605	14.1	249
MID	EB	-1	0	400	3%	97%	1.14	1.5	-0.11	$ 0.11	$ 3.02	0.097	0.9	0
	WB	-3	-0.3	390	3%	97%	1.14	1.5	-0.33	$ 0.31	$ 8.84	0.283	2.5	117
PM	EB	-5	-0.3	800	3%	97%	1.14	1.5	-1.11	$ 1.07	$ 30.23	0.967	8.5	240
	WB	-4	-0.3	680	3%	97%	1.14	1.5	-0.76	$ 0.73	$ 20.55	0.657	5.8	204
								TOTALS PER DAY:	-3.63	$ 3.50	$ 98.76	3.159	27.8	624

ΔTT= Change in Travel Time

Yearly Totals			
	944	Delay Savings (Vehicle Hours)	(say 900)
$	910	Travel Time Savings (Truck)	
$	25,678	Travel Time Savings (Car)	
+ $	2,883	Fuel Savings	
$	29,471	Combined Savings	(say 29000)
	821	Reduction in Fuel Use (Gallons)	(say 800)
	7,228	Reduction in CO_2 Emission (kg)	(say 7000)
	162,240	Savings Number of Stops	(say 160000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$18.71}{hr}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$27.51}{hr}$$

$$FUEL = \Delta TT * Vol * \frac{0.87 \text{ gal}}{hr}$$

$$CO_2 = FUEL * \frac{19.4 \text{ lbs}}{gal}$$

Notes and References:

*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp

*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)

*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0

*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.

*Annual Calculations based on 260 commuter days per year.

*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT

Windsor Route 305

Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	EB	-1	0.1	510	3%	97%	1.14	1.5	-0.14	$ 0.14	$ 3.85	0.123	1.1	-51
	WB	-11	-0.8	1110	3%	97%	1.14	1.5	-3.39	$ 3.27	$ 92.26	2.951	26.0	888
MID	EB	2	-0.4	550	3%	97%	1.14	1.5	0.31	$ (0.29)	$ (8.31)	-0.266	-2.3	220
	WB	-8	-0.8	620	3%	97%	1.14	1.5	-1.38	$ 1.33	$ 37.48	1.199	10.6	496
PM	EB	-4	0	990	3%	97%	1.14	1.5	-1.10	$ 1.06	$ 29.92	0.957	8.4	0
	WB	-5	-0.7	740	3%	97%	1.14	1.5	-1.03	$ 0.99	$ 27.96	0.894	7.9	518
								TOTALS PER DAY:	**-6.73**	**$ 6.50**	**$ 183.16**	**5.858**	**51.7**	**2071**

ΔTT= Change in Travel Time

	Yearly Totals		
	1,750	Delay Savings (Vehicle Hours)	(say 1700)
$	1,690	Travel Time Savings (Truck)	
$	47,622	Travel Time Savings (Car)	
+ $	5,346	Fuel Savings	
$	54,658	Combined Savings	(say 55000)
	1,523	Reduction in Fuel Use (Gallons)	(say 1500)
	13,442	Reduction in CO_2 Emission (kg)	(say 13000)
	538,460	Savings Number of Stops	(say 540000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$18.71}{\text{hr}}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$27.51}{\text{hr}}$$

$$FUEL = \Delta TT * Vol * \frac{0.87 \text{ gal}}{\text{hr}}$$

$$CO_2 = FUEL * \frac{19.4 \text{ lbs}}{\text{gal}}$$

Notes and References:
*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp
*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)
*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0
*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.
*Annual Calculations based on 260 commuter days per year.
*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT

Windsor Route 75

Travel Time Run System Evaluation - Comparison of Before and After Travel Time Run

Period	Direction	ΔTT (sec)	Δ Stops per vehicle	Total Traffic Volumes (veh/hour)	% Trucks	% Passenger Vehicles	PPVt	PPVc	Daily Δ Delay (veh/hours)	Daily Truck Travel Time Savings	Daily Car Travel Time Savings	Daily Fuel Consumption Savings (gallons)	Daily Reduced CO_2 Emission (kg)	Daily Reduced # Stops
AM	EB	-34	-1	550	3%	97%	1.14	1.5	-5.19	$ 5.00	$ 141.31	4.519	39.8	550
	WB	1	-0.7	1180	3%	97%	1.14	1.5	0.33	$ (0.32)	$ (8.92)	-0.285	-2.5	826
MID	EB	-18	-0.4	740	3%	97%	1.14	1.5	-3.70	$ 3.56	$ 100.65	3.219	28.3	296
	WB	7	-0.7	580	3%	97%	1.14	1.5	1.13	$ (1.09)	$ (30.68)	-0.981	-8.6	406
PM	EB	-6	0.1	1580	3%	97%	1.14	1.5	-2.63	$ 2.54	$ 71.64	2.291	20.2	-158
	WB	-13	-0.4	700	3%	97%	1.14	1.5	-2.53	$ 2.43	$ 68.76	2.199	19.4	280
								TOTALS PER DAY:	-12.59	$ 12.12	$ 342.76	10.962	96.6	2200

ΔTT= Change in Travel Time

Yearly Totals			
	3,273	Delay Savings (Vehicle Hours)	(say 3300)
$	3,151	Travel Time Savings (Truck)	
$	89,118	Travel Time Savings (Car)	
+ $	10,004	Fuel Savings	
$	102,273	Combined Savings	(say 102000)
	2,850	Reduction in Fuel Use (Gallons)	(say 2900)
	25,116	Reduction in CO_2 Emission (kg)	(say 25000)
	572,000	Savings Number of Stops	(say 570000)

$$\Delta TT = TT_{Base(section)} - TT_{Objective(section)}$$

$$USER_c = \Delta TT * Vol * \%C * PPV_c * \frac{\$18.71}{\text{hr}}$$

$$USER_t = \Delta TT * Vol * \%T * PPV_t * \frac{\$27.51}{\text{hr}}$$

$$FUEL = \Delta TT * Vol * \frac{0.87\ \text{gal}}{\text{hr}}$$

$$CO_2 = FUEL * \frac{19.4\ \text{lbs}}{\text{gal}}$$

Notes and References:

*Formulas from : https://docs.lib.purdue.edu/cgi/viewcontent.cgi?article=2598&context=jtrp

*Cost Reference: https://ftp.dot.state.tx.us/pub/txdot-info/cst/ruc-methodology-memo.pdf
Table 1 on Page 2 (2018)

*Vehicle percentages from : https://tminfo-dot.ct.gov/TMINFO/top?year=2015,town=131,station=216,dataset=0

*Total savings represent annual savings during the periods of travel time run data collection only (1 hour of AM peak traffic, 1 hour of Mid-Day peak traffic, and 1 hour of PM peak traffic). Savings outside these times are not reported.

*Annual Calculations based on 260 commuter days per year.

*Average price per gallon for gasoline in CT = $3.51 (December 2021) https://gasprices.aaa.com/?state=CT