

# Route 7 Corridor Assessment and Implementation Plan

City of Norwalk and Town of Wilton, CT



## Existing Conditions Report

Prepared for:  
South Western Regional Planning Agency

**SWRPA**

*South Western Regional Planning Agency*

Prepared by  
Urban Engineers, Inc.

In Association with  
Fitzgerald and Halliday, Inc.

May, 2012





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## I. Introduction

### A. Project History

Route 7 is an essential travel corridor that serves both local and regional travelers as well as many community needs. It provides connectivity among several urbanized areas as well as suburban communities and beyond.

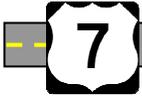
The segment of Route 7 between Norwalk and Danbury has been studied for decades, with a variety of efforts to add highway capacity and to improve commuter rail operations and mobility. Route 7 has experienced significant traffic growth through the years and significant development along its entire length; with the most concentrated development evidenced in this study's area - the southern end of the corridor in southern Wilton and northern Norwalk. A Route 7 Expressway, known locally as "Super 7", was considered and dismissed years ago by the Connecticut Department of Transportation. In addition, shorter by-pass roads were contemplated from the end of the limited-access portion of Route 7 that currently terminates at Grist Mill Road to various "landing points" in the vicinity of Kent Road and Route 33 in Wilton. These proposals were all dismissed due to potential environmental and community impacts and strong public opposition. Subsequently, a series of more localized roadway widening and intersection improvements has been implemented, are currently just completing construction, or are planned for the roadway.

Two of these high-priority roadway projects have been indefinitely put on hold as a result of funding constraints. These include:

- **State Project # 102-269** for the Route 7 and 15 interchange – The purpose of this project was to construct a full-directional interchange between U.S. Route 7 and Route 15 (Merritt Parkway), while maintaining access for Main Avenue to and from Route 15.
- **State Project # 102-305** for the segment of Route 7 between Route 33 and Grist Mill Road - The purpose of this project was to improve traffic flow from the Route 7 Expressway terminus to the intersection of Route 7 and Route 33 without building a short bypass of this section. Overall, the project would have widened the existing roadway to provide two lanes of traffic in each direction with an additional operational lane at major intersections.

As a result of the cancellation of these two projects, many multimodal operational and safety needs in this corridor will go unaddressed for too long. This study is intended to develop near, mid-term, and future long-term improvement opportunities to address these issues. This study will also identify order-of-magnitude cost estimates, phasing criteria and priorities, as well as funding opportunities to implement the various recommendations of the study.

This memorandum documents the existing and future conditions within the study area. It addresses the existing transportation system conditions, existing land use and environmental considerations, and future development potential. Additionally, because of the long history of projects and studies in the project area, a review of past projects and studies that have continued relevance to the improved conditions in the study area has been included and will be used in the next part of the project: Alternatives Development.



## **B. Corridor Characteristics**

The project area (south to north) begins at New Canaan Ave (RT 123) between Route 7 and Main Avenue in Norwalk, CT. The primary routes of analysis include Route 7 and Main Avenue (RT 719) which run parallel to each other until meeting at Route 7/Grist Mill Road/Main Avenue intersection. Glover Avenue also runs parallel to these two routes and provides access to the Merritt 7 Corporate Park. Route 7 crosses the Norwalk and Wilton municipal boundary just north of Foxboro Drive and continues north until a "T" intersection with Route 33 (Westport Road). The project area terminates at the Route 7/Route 33 intersection with Wolfpit Road (RT 106). A map of the study corridor is provided in **Figure 1**.

The Route 7 expressway section of the corridor is a 55-mph two-lane roadway classified as urban principal expressway until the expressway terminates at Grist Mill Road. Main Ave is a two-lane, urban minor arterial that begins at New Canaan Ave and continues until meeting Route 7 at Grist Mill Road. Moving south to north, most intersections on Main Ave are lacking left-turn pockets until the Merrittview intersection just south of the Route 15 interchange. From Merrittview until Route 7 most intersections have left-turn pockets on Main Ave, including multiple intersections providing access to the Merritt 7 Corporate Park.

Moving north from the Route 7/Grist Mill Road/Main Ave intersection, Route 7 continues as a two-lane, urban principal arterial with a mix of intersections with and without left-turn pockets on Route 7. Just south of the Route 7 and Route 33 "T" intersection to north of Grumman Hill Road the southbound side of Route 7 is a single lane. Route 7 and Route 33 move northwest as a combined roadway through Wolfpit Road as the northerly project terminus.

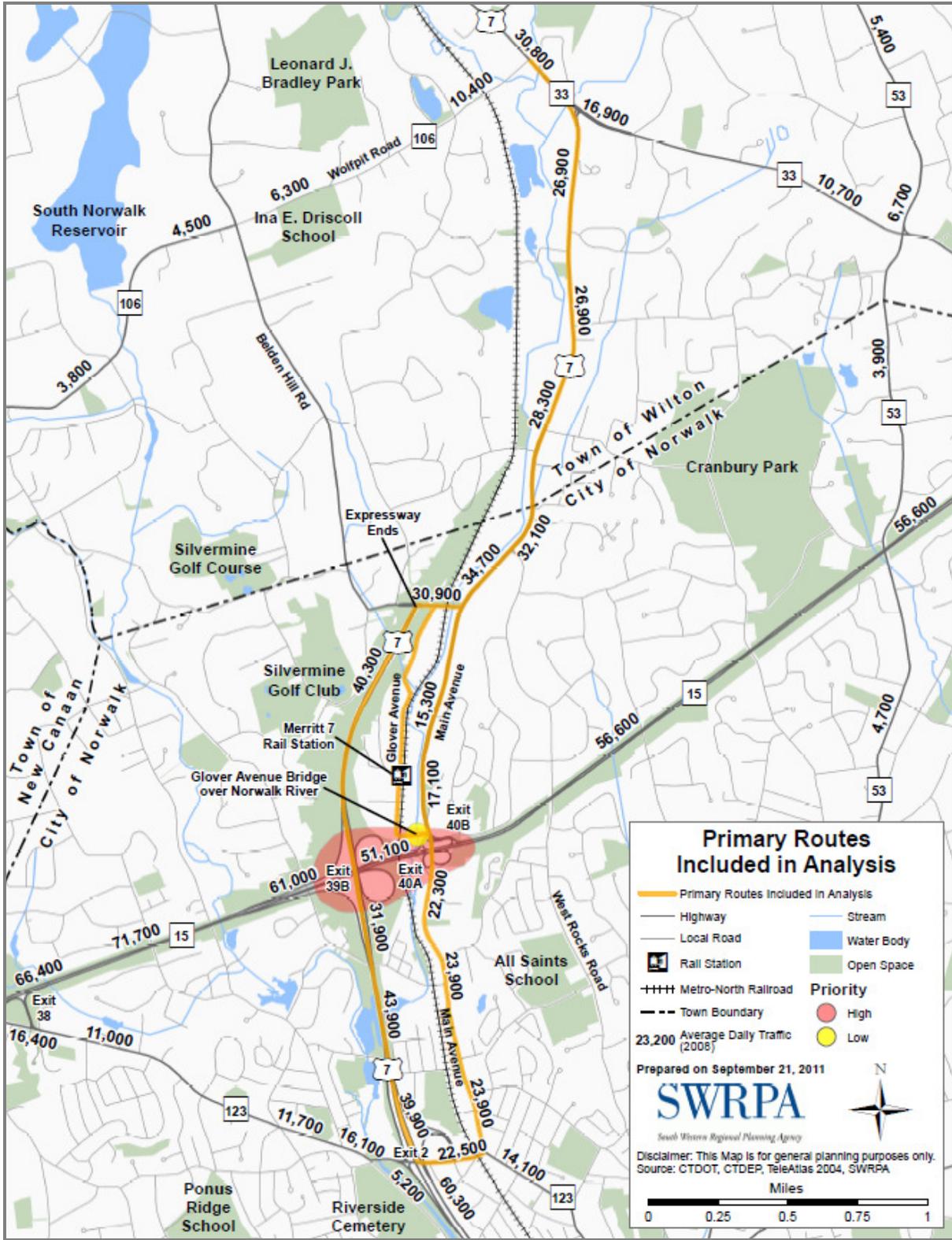


Figure 1: Map of the Project Area

### C. *Project Approach*

The project approach for conducting the existing conditions analysis included four steps: Data Synthesis, Corridor Evaluation, Evaluation Matrix, and Corridor Needs.

**Data Synthesis:** The first step in the evaluation of existing condition started with a review of previous work to determine the availability and suitability of existing data to identify missing data to be collected. This step also included traffic counts, field observations, and travel time studies.

**Corridor Evaluation:** The second step in the evaluation of existing condition included an evaluation of the following corridor aspects: Historical/Locally Identified Issues, Traffic Operations, Safety, Access, Pedestrian and Bicycle, Transit, Land Use and Planned Developments, and Environment.

**Evaluation Matrix:** The third step was to create a matrix to evaluate and rank key locations in the corridor based on issues that can be grouped and evaluated together including Historical/Locally Identified Issues, Traffic Operations, Safety, Access, Pedestrian and Land Use/Planned Development. The result of the matrix is a ranking of the intersections and key mid-block sections to be evaluated as focus areas.

**Corridor Needs:** The last step in the evaluation of existing condition is to investigate the identified high-priority focus areas from the evaluation matrix for specific needs and identify potential short-term and long-term improvements that can be investigated in more detail in the alternatives development task of the study. Additionally, this section includes identification of general needs for the corridor. These are needs that are not focused at a specific location or section of roadway.



## II. Data Synthesis

### A. Data Review

As a part of the Existing Conditions task, available information from local, state, and regional transportation projects and plans in the corridor, including transportation, land use, environmental data, and forecasts were reviewed and synthesized. **Table 1** contains the list of available studies reviewed and intersection-specific data for the entire project area. The Division of Traffic Engineering for CTDOT provided the most recent signal plans available and the closed loop (coordinated) system timings for the entire project area.

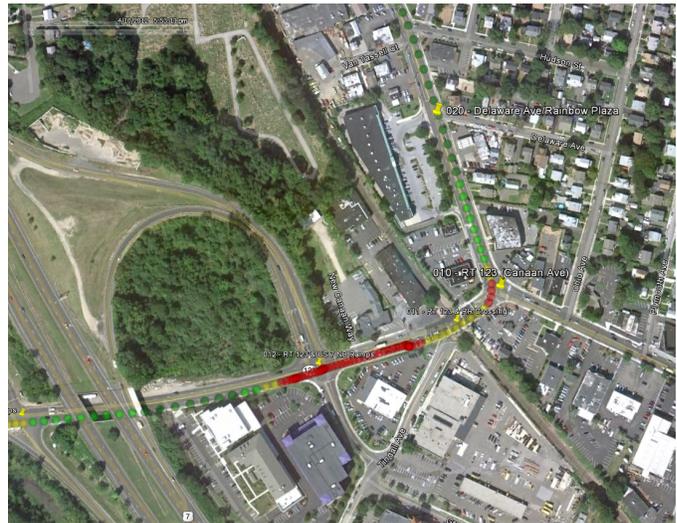
The 2009 counts conducted as part of the Route 7 Transportation and Land Use Study provided a significant amount of recent turning movement count data for the project area north of Grist Mill Road on Route 7. Conversely, south of Grist Mill Road there was little turning movement count data available. CTDOT average daily traffic (ADT) data is available for most of the corridor with 2012 supplemental data in the Merritt 7 Corporate Park area. **Table 1** also has Level of Service (LOS), average delay per vehicle, and volume to capacity (v/c) ratio results that were noted during the data review process.

The data review also included crash analysis using CTDOT historical crash data resources such as Traffic Crash Viewing System (TAVS), Traffic Crash Surveillance Report (TASR), and the Suggested List of Surveillance Study Sites (SLOSSS), as well as local input from municipal officials. A compilation of available data allowed "hot spots" to be determined and investigated further to identify issues that may be negatively impacting safety.

### B. Data Collection

The data collection focus areas were based on a combination of missing data and problem locations determined during the data review. The data collection effort took part during the week of April 9, 2012 and included the following tasks:

- Turning Movement Counts
- Travel Time Data
- General Data/Observations
  - Intersection Sketches
  - Field Signal Timings
  - Intersection Video



**Figure 2: Travel Time Data**



Data Collection

Main Rd	Synchro Int ID	Intersecting Street	Signal #	MP	Signal Plan (Year)	Previous Count	2012 Urban Count	Volume Change from Previous to 2012 Count	ADT	Available Synchro Analysis Results		
										Overall LOS (AM/PM)	Worst App. (AM/PM)	
RT 33 / RT 7	230	Wolfpit Rd	161-215	6.29	2011	11/4/2009 - FHI			CTDOT 2010	Not in Results	-	
	220	RT 33	161-202	6.03	2011	11/4/2009 - FHI			CTDOT 2010	E/E	WBL-208 / EBT-179	
RT 7 (Main Ave)	210	Grumman Hill Rd	161-206	5.25	2008	11/4/2009 - FHI			CTDOT 2010	C/B	WBL-151 / EBT-37	
	200	Wilton Corp Park Main	161-205	5.12	2007	11/4/2009 - FHI				A/A	-	
	190	Kensett Ave	161-212	4.85	2008	11/4/2009 - FHI			CTDOT 2008	B/B	-	
	180	Kent Rd	161-209	4.76	2008	11/4/2009 - FHI				A/B	-	
	170	Gateway Shopping Center	161-204	4.61	2008				CTDOT 2008			
	160	Foxboro Dr	102-314	4.52	2005	11/4/2009 - FHI			CTDOT 2010	A/A	-	
RT 7	150	West Rock Rd	102-228	4.38	2012	3/31/2011 - Tighe	AM Turns Only	- 4.9%	CTDOT 2010	C/F	WB-49 / WBL-423	
	142	US 7 & Grist Mill Rd	102-285	3.96	2003	6/24/03 - Widening	Full	+ 3.4%	CTDOT 2010			
Main Ave	141	US 7 & Glover Ave	102-304	4.01	2003	6/24/03 - Widening	Turns Only		CTDOT 2010			
	140	US 7	102-284	2.02/4.10	2010	11/4/2009 - FHI	Full	- 11.4%	CTDOT 2010	F/F (248/281)	EB-493 / EB 462	
	130	Merritt 101	102-303	1.70	2002				Merritt 7 ATR 2012			
	120	Merritt 201/301 & Valley View Rd	102-270	1.61	2002				Merritt 7 ATR 2012			
	110	Merritt 401/501	102-286	1.50	2003				Merritt 7 ATR 2012			
	100	Merritt 601	102-310	1.36	2002		Turns Only		Merritt 7 ATR 2012			
	90	Xerox Driveway	102-311	1.28	2002		Full		CTDOT 2010			
	80	Glover Ave/Creeping Hemlock Dr	102-227	1.18	2003	2007 Ramp Data	Full		CTDOT 2010			
	70	Merrittview	102-280	0.98	2003		Full					
	60	Linden St	102-282	0.71	2003							
	50	Perry Ave	102-225	0.62	2007	2005 - Westport - N				PM - LOS D - w/c=1.12	-	
	40	Broad St	102-281	0.30	2006	2005 - Westport - N			CTDOT 2008	PM - LOS A - w/c=0.78	-	
	30	Ward St	102-223	0.22	2002	2005 - Westport - N	AM Only		CTDOT 2008	PM - LOS E - w/c=1.15	-	
	20	Delaware Ave/Rainbow Plaza	102-294	0.10	2002							
	RT 123	10	RT 123 (Canaan Ave)	102-222	0.00	2010	2005 - Westport - N	Full	- 25.3%	CTDOT 2008	PM - LOS D - w/c=1.19	-
		13	RT 123 & US 7 SB Ramps	102-301		2002		Turns Only		CTDOT 2010		
	12	RT 123 & US 7 NB Ramps	102-202		2001		Full		CTDOT 2010			

- Missing Recent Turning Movement Count Data

Available Studies Reviewed

Source	Report	Data Period	Report Notes/Comments/Summary
FHI 2009	Crash Summary, Norwalk Town Line to Northern Project Limits	2005-2008	General Tally of all crash categories, no segments
TAVS	Crash Reports (Brief), US 7, SR 123 and SR 719 corridors	2005-2008	No side-street or detailed info
FHI 2009	Travel Time Analysis, Both directions, From Grist Mill Rd to Northern Project Limits	2009	Time, Speed, Speed Limits for all segments
FHI 2009	Pedestrian Facility Inventory, Grist Mill Rd to Northern Project Limits	2009	Brief description of ped facilities at each intersection
CTDOT 2008	High Definition photos along entire US 7, SR 123 and SR 719 corridors	2008	Taken from Digital Hwy Photo/Video Log
SWRPA 2006	Regional Plan 2006-2015	Varies	Population growth to date, general area description, density maps, transportation plans, etc.
Vollmer Associates	Central Norwalk Transportation Management Plan	2006	South of study area, various recommendations to improve LOS of intersections and ped safety
2Plus, Inc.	Merritt 7 Report	2007	Study of business owners/employees and transportation needs within study area
JZTI	Norwalk Circulator Study	2009	South of study area, various traffic analyses and recommendations
City of Norwalk?	Norwalk Connectivity Master Plan 2012	2012	South of study area, explanation of existing and future transportation trends and plans for improvement
FHI	Norwalk Ped & Bike Transportation Plan 2012	Varies	Pedestrian and Bicycle recommendations for the area, including crosswalk, paths, signs, etc.
City of Norwalk	Mid-Harbor Planning Study	2005	Southeast of study area, plan to bolster mid-harbor area via transportation, land use, ped accommodations.
FHI	Norwalk Ped & Bike Corridor Priority	2011	List of ped and bike recommendations for area
FHI	Norwalk River Valley Trail Routing Study	2012	North of study area, ped connectivity plan along Norwalk River
City of Norwalk?	Norwalk Wall Street Area Planning	?	South of study area, various transportation and land use recommendations
Vollmer Associates	Westport North Main Corridor Study 2006	2005	Overlapping intersections in study area along SR 719, crash analysis and TMC's, land use recommendations
CTDOT?	Proposed Interchange 7/15 schematic	N/A	Route 7/Route 15 interchange concept for completing missing moves
VHB	Route 7 Corridor Travel Options Implementation	2000	Recommendations for Bus and Rail improvements, east of study area
SWRPA 2010	Wilton Access Management Study	2010	Driveway and curb cut recommendations from Norwalk-Wilton Town Line to northern project limits
Wilton PZC	Wilton Plan of Conservation and Development 2010	Varies	Land use, population change through 2007, density map, Super 7 issues, transportation plan
Tighe & Bond	iPark STC Application	2011	AM and PM turning movement count volumes at RT 7 and West Rocks Rd
Tighe & Bond	Traffic Count Summary - Merritt 7	2012	ATR data at nine access points for Merritt 7 Corporate Park
CTDOT	Meeting Summary - Pedestrian Amenities on S.R. 719 (near Merritt 7 Corporate Park)	2012	Meeting summary (CTDOT, Norwalk DPW, and Merritt 7 Manager) on increased pedestrian accommodations
CTDOT	Route 7-15 TFD (RT 15 Ramp Volumes)	2006	AM and PM Ramp volumes at RT 15, RT 7, Creeping Hemlock Rd, Glover Ave for 2007, 2010, 2030 No Build

Table 1: Previous Studies and Available Data



## Turning Movement Counts

Development of a simulation model for the project area requires turning movement counts, as well as other information, and based on the data review the southern part of the corridor was missing the most data. With limited time and resources for the data collection effort, the following locations were targeted for turning movement counts:

- RT 123 & SB RT 7 Ramps
- RT 123 & NB RT 7 Ramps/Grand Street
- RT 123 & Main Avenue
- Main Avenue & Ward Street (AM only)
- Main Avenue & Merrittview Driveway
- Main Avenue & Glover Ave/  
Creeping Hemlock Rd
- Main Avenue & 801 The Towers Driveway
- Main Avenue & Merritt 601
- RT 7 & Main Avenue/DMV
- RT 7 & Glover Ave
- RT 7 & Grist Mill Rd
- RT 7 & West Rocks Rd (AM only)

For these locations, turning movement count data was collected during the AM peak period (7:00-9:00 AM) and PM peak period (3:30-6:30 PM). System peak hours were determined for the network and found to be 7:45-8:45 AM and 5:00-6:00 PM. **Appendix A** contains the turning movement count data and peak hour volumes figures for the AM and PM peak hours.

## Travel Time Data

To assist in creating a calibrated existing conditions model, travel time and delay studies were performed during the time periods of the intersection turning movement counts. Travel time data was collected utilizing a GPS unit and a laptop enabled with Tru-Traffic software. Location and speed data is recorded every second and travel time data is then compared to simulated travel times in the existing conditions model to assist in the calibration process. Video was recorded for each travel time run to supplement the GPS data and provide further insight during the model calibration process. Travel time runs included various sections and attempted to capture key movements. The sections generally began at RT 123 at the southern end of the corridor and ended at Wolfpit Road at the northern end of the corridor.

In addition to overall travel times through the corridor, GPS-based travel times provided other useful information such as free flow speeds, mid-block congestion, visual queuing understanding, and interruptions of the corridor green band. The field collected travel time and delay study data along with a travel time summary table are included in **Appendix A**.

## General Data/Observations

During the data collection effort, general data throughout the study area was collected including pictures, intersection videos, intersection sketches, field signal timings, queuing data, and field observations. Relevant general data is included in **Appendix B**.



### III. Corridor Evaluation

#### A. Historical/Locally Identified Issues

The data review of available project area studies and meetings with local officials identified the following locations as key areas with operational, safety, pedestrian, or pedestrian/bicycle concerns:

**Table 2: City of Norwalk**

Int ID	Name	Main Concern
10	RT 123 & Main Ave	Dunkin Donuts entrance
40	Main Ave & Broad Street	Mid-block at Walgreens entrance
50	Main Ave & Perry Ave	CVS entrance
60	Main Ave & Linden Street	McDonalds entrance
80	Main Ave & Glover Ave	RT 15 (Merritt Pkwy) interchange and pedestrian accommodations
140-142	RT 7 & Main Ave/Grist Mill Rd	Congestion
150	RT 7 & West Rocks Rd	Congestion

Norwalk officials also indicated the need for the completion of sidewalks at the following locations: East side of Main Avenue between Homestead Hotel and Merritt 601, to/from Merritt 7 Rail Station, and Grist Mill Road to Norwalk River Valley Trail.

**Table 3: Town of Wilton**

Int ID	Name	Main Concern
170	Gateway Shopping Center	SB Lefts near Fawn Ridge Ln
190	Kennsett Ave	Dunkin Donuts entrance
200	Wilton Corp Park	Unsignalized entrances
210	Grumman Hill Rd	Needs left turn pockets
220	Mid-block Grumman to RT 33	Turns to/from business on RT 7
220	RT 33	SB merge and lane-drop
230	Mid-block RT 33 to Wolfpit Rd	Orem's Diner access

Wilton officials commented that the emergency vehicle preemption systems (EVPS) receptors on signals are misaligned and not functioning. **Appendix C** contains the meeting summaries



from the municipal meetings with Norwalk and Wilton representatives that took place on April 27, 2012 and April 30, 2012, respectively.

## **B. Traffic Analysis**

### **Field Observations:**

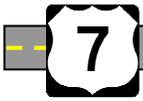
Starting at the southern end of the corridor, RT 123 (New Canaan Ave) provides full access to/from Route 7; therefore, carrying additional traffic volume from the missing moves at the Route 15/Route 7 partial interchange to the north. The Danbury Branch Rail Line that runs through RT 123 causes extended queuing along eastbound RT 123 and southbound Main Avenue. Moving north on Main Avenue the cross-section is a two-lane roadway without left-turn pockets at the intersections and many curb cuts and access points for businesses on Main Avenue. This causes weaving and lane change issues due to drivers "sliding" around left-turning vehicles waiting for a suitable gap.

Main Avenue operates fairly well at the RT 15 (Merritt Parkway) interchange, but there is some queuing on Glover Avenue during the PM Peak. A police officer is connected into the controller during the PM peak from approximately 4:00 to 6:30 PM. Traffic flows very well along Main Ave. in the Merritt 7 Corporate Park area until hitting congestion at the Route 7/Main Avenue/DMV intersection.



**Figure 3: Grist Mill Road**

Significant congestion occurs approaching Grist Mill Road in both the northbound and southbound directions on Route 7. In the northbound direction, there is a significant left-turn volume towards Belden Hill Road and this queues back past the approximate 500-foot storage lane which causes drivers to slow down and increase delay for the northbound right-turning vehicles. In the southbound direction on Route 7 approaching the DMV intersection, queuing extends well past West Rocks Road and appears to be mostly due to the westbound lane configuration towards Grist Mill Road and Belden Hill Rd area.



The westbound lane configuration on Grist Mill Road causes all vehicles staying on Route 7 southbound to stay in the left/through lane between Main Ave and Glover Ave. The right/through lane in this area is empty even though southbound queuing extends through West Rocks Road and further north. The gas station and Starbucks shopping center located north and west of the Route 7/Main Ave/DMV intersection also contribute to the overall congestion in this area.

Moving north, there are left-turn pockets at signalized intersections, but some minor congestion approaching the Gateway Shopping Center. This congestion appears to be more related to geometry and sight distance as opposed to sidestreet volume. Traffic flows well until the Grumman Hill Road intersection, which appears to be due to congestion caused by no left-turn pockets at the intersection.

Between Grumman Hill Road and Route 33 there is only one (1) southbound travel lane and any left-turning vehicles in this direction hold up traffic due to minimal shoulder width leaving no area for vehicles to "slide" around. The northbound approach from Route 7 to Route 33 usually had a large queue, but generally cleared every cycle. The eastbound approach to the Route 7/Route 33 intersection generally queued up to mid-block near Orem's Diner and occasionally back through Wolfpit Road and Sharp Hill Road. The northbound lead-left phase at Route 7/Route 33 and Wolfpit Road did not gap out when vehicles were not present.

Detailed field observations document is included in **Appendix B**.

#### **Synchro 7/SimTraffic Model:**

The operational analysis was performed utilizing Synchro 7 and its simulation component SimTraffic. The base Synchro model for each peak period is setup with input data including geometric information, signal phasing and timing, volume information, truck percentage, and peak hour factors and run in SimTraffic for multiple, separate one-hour simulations to account for the variability in traffic that occurs on a daily basis.

Calibration is an iterative process where differences between field and model data are identified and resolved based on further investigation of the field data. Specific model parameters have an impact on the simulation and can generate a more realistic driver behavior including lane alignment through an intersection, turning speeds, lane change distances, headway factors, and entering blocked intersections. Adjustment of these parameters helps bridge the gap between field and model data to enable model calibration.

The two key measures of effectiveness (MOEs) in determining a calibrated simulation model are (1) visual queuing generally corresponding to field observations, and (2) simulated travel times within 20% of field travel times. Queuing notes are taken in the field during the travel time runs and supplemented by video footage taken during every travel time run. During the calibration process, an approximate average and maximum queue is determined for key, generally congested, locations throughout the project area. Several random seeds are viewed and engineering judgment is used to determine if queuing is within an acceptable range corresponding to field conditions. This is the qualitative part of the calibration process, and the quantitative part is comparing field travel time runs to simulation travel time results.

Field travel time runs were completed along Route 7, Main Avenue, and RT 123 (New Canaan Ave). **Figure 4** shows the travel time sections used for the travel time calibration.



The first travel time section began at RT 7 ramps from RT 123 and ran through Grist Mill Road and terminated at Sharp Hill Road just north of Wolfpit Road. This section was mainly used for the calibration of the Grist Mill Road area, and the Route 33 and Wolfpit Road area.

The second travel time section was along RT 123 beginning at Riverside Ave and ending at Ward Street. This section was used for calibration of RT 123. The third section was Main Avenue between Linden Street and the Merritt 601 building driveway, and was used to calibrate Glover Ave/RT 15 Ramps area.

The comparison of field travel times to calibrated SimTraffic travel times are located in **Tables 4 and 5** for the AM and PM peak hours, respectively. The SimTraffic results are an average of five random simulations.

**Table 4: AM Travel Time Comparison**

Section	Direction	Travel Time (min)		
		Model	Field	Delta
1	NB	8.7	8.0	8%
	SB	11.7	12.1	-3%
2	NB	2.6	2.7	-3%
	SB	2.4	2.1	16%
3	NB	2.1	2.4	-16%
	SB	1.1	1.1	5%

**Table 5: PM Travel Time Comparison**

Section	Direction	Travel Time (min)		
		Model	Field	Delta
1	NB	9.8	8.1	17%
	SB	13.6	15.3	-13%
2	NB	3.6	3.2	11%
	SB	2.2	1.8	17%
3	NB	2.0	1.7	13%
	SB	1.7	1.8	-5%

The travel time results comparison show the model within 20% of field travel time runs. Because visual queuing were also within acceptable ranges, the model could proceed to the final step of calibration, which is to process LOS and delay results and check to make sure results approximately match field conditions.



**Figure 4: Travel Time Run Locations**



**Tables 6 and 7** show the calibrated SimTraffic LOS and delay results for the AM and PM peak hour models, respectively, at key locations in the corridor. **Appendix D** contains the full SimTraffic results for all intersections in the Synchro 7/SimTraffic model.

**Table 6: AM Peak Hour Existing Calibrated SimTraffic Results**

ID #	Intersection	Sidestreet		Main Ave/RT 7		Overall
		EB	WB	NB	SB	
230	RT 7 (EB/WB) & Wolfpit Rd	C (21)	B (12)	C (24)	-	B (18)
220	RT 7 & RT 33	E (76)	C (21)	D (52)	-	D (53)
150	US 7 & West Rocks Rd	C (20)	D (43)	B (18)	D (38)	C (28)
140	US 7 (EB) & Main Ave	C (32)	D (54)	C (30)	F (134)	E (71)
141	US 7 (EB/WB) & Glover Ave	B (17)	C (22)	C (33)	-	B (19)
142	US 7 & Grist Mill Rd	C (30)	C (22)	F (115)	-	E (72)
90	Main Ave & Xerox (Towers 801)	B (16)	-	A (3)	A (3)	A (3)
80	Main Ave & Glover Ave/RT 15 Ramps	D (43)	D (37)	D (40)	C (23)	D (37)
70	Main Ave & Merrittview	B (19)	B (19)	A (7)	A (5)	A (7)
10	Main Ave & RT 123	A (2)	-	C (24)	C (22)	B (17)
11	RT 123 & RR Crossing	D (41)	-	-	-	D (41)
12	RT 123 & RT 7 NB Ramps	B (11)	D (41)	D (37)	C (28)	C (32)
13	RT 123 & RT 7 SB Ramps	C (29)	B (11)	-	C (31)	B (17)

**Table 6** shows the AM LOS results and shows long eastbound delay at the Route 7 and Route 33 intersection; which corresponds with field observations. The results also show there is significant delay of around two minutes approaching Grist Mill Road in the northbound and southbound directions, which corresponds with field observations and historically identified issues. The southbound delay at Main Ave & RT 123 (Int. #10) was expected to be higher in the SimTraffic model, but the additional queuing in the field at this approach appeared to occur during rail crossing events which are not modeled in the Synchro 7/SimTraffic model.



**Table 7: PM Peak Hour Existing Calibrated SimTraffic Results**

ID #	Intersection	Sidestreet		Main Ave/RT 7		Overall
		EB	WB	NB	SB	
230	RT 7 (EB/WB) & Wolfpit Rd	C (34)	B (14)	D (37)	-	C (26)
220	RT 7 & RT 33	F (83)	E (72)	D (42)	-	E (65)
150	US 7 & West Rocks Rd	F (102)	F (446)	B (19)	E (63)	F (83)
140	US 7 (EB) & Main Ave	E (76)	D (43)	E (60)	F (131)	F (92)
141	US 7 (EB/WB) & Glover Ave	D (38)	C (23)	E (60)	-	C (35)
142	US 7 & Grist Mill Rd	C (22)	B (18)	F (224)	-	F (111)
90	Main Ave & Xerox (Towers 801)	C (22)	-	A (4)	A (7)	A (8)
80	Main Ave & Glover Ave/RT 15 Ramps	F (140)	D (48)	B (16)	D (41)	D (53)
70	Main Ave & Merrittview	D (46)	C (25)	B (11)	B (11)	B (17)
10	Main Ave & RT 123	A (3)	-	B (16)	B (15)	B (11)
11	RT 123 & RR Crossing	E (69)	-	-	-	E (69)
12	RT 123 & RT 7 NB Ramps	E (58)	C (25)	D (37)	C (29)	C (34)
13	RT 123 & RT 7 SB Ramps	B (17)	B (10)	-	C (28)	B (14)

**Table 7** shows the PM LOS results. The results indicate there remains eastbound issues at Route 7 and Route 33 in the PM peak that occasionally queue back to Wolfpit Road. During the PM peak the area surrounding Grist Mill Road on Route 7 has significant delays up to four to seven minutes on select approaches. Delay in the southbound direction extended well past West Rocks Road, and northbound queuing extended to approximately the horizontal curve point of tangent approaching the Route 7 and Grist Mill Road intersection.

**Table 7** shows a LOS F for the eastbound Glover Ave approach at Main Ave and Glover Ave/RT 15 Ramps during the PM peak. The model included field signal timings when the police officer was "plugged" into the controller, and field observed queuing crossing over the Danbury rail crossing coincided with the SimTraffic model. Lastly, LOS E results in the eastbound direction on RT 123 between RT 7 NB Ramps and Main Avenue correspond with field observations in this area of constant queuing between the Danbury rail crossing and RT 7 NB Ramps.

**Key Problem Areas:**

Based on the field observations and operations analysis, the following is a list of key problem areas from a traffic operations standpoint listed in order of impact/significance:

1. Route 7 southbound approaching Grist Mill Road/Main Avenue/DMV
2. Route 7 northbound approaching Grist Mill Road
3. Route 7 southbound approaching Route 7/Route 33/Westport Road
4. Main Avenue southbound approaching Route 123/Main Street
5. Route 123 eastbound approaching Main Avenue/Main Street
6. Grumman Hill Road intersection

### C. Safety

A crash analysis was performed for Route 7 and Route 716 (Main Avenue) in the project area in an effort to identify issues that may be negatively impacting safety. Due to the large number of signalized intersections (27) and mid-block locations in the project area, safety "hot spot" locations would have to be identified for more detailed investigation including crash diagrams and qualitative analysis. To accomplish this, a threepronged strategy comparing CTDOT Traffic Crash Viewing System (TAVS), CTDOT Suggested List of Surveillance Study Sites (SLOSSS), and local input from township officials was used to help identify the safety "hot spots".

The TAVS program allows the user to display and print various information about traffic crashes that occur on state-maintained roadways. Post-processing spreadsheets were used on the raw TAVS data to produce an excel graph showing the number of crashes at each intersection and mid-block locations. An intersection was generally defined as +/- 0.02 miles from the milepost the signal is located on, and mid-block locations were broken down into multiples of 0.10 miles between signals (e.g., Grumman Hill Road to RT 33 is 0.78 miles which turned into seven, 0.11 miles mid-block sections). If a mid-block location was less than 0.05 miles in length then it would be considered part of the neighboring signals (e.g., between Route 7/Grist Mill Road and Route 7/Glover Ave).

The SLOSSS Report is a list of Traffic Crash Surveillance Report (TASR) locations that experienced abnormally high crash rates for the corresponding 3-year period. SLOSSS objective is to determine locations whose actual crash rate is greater than its critical crash rate; therefore, having the greatest potential for crash reduction with safety improvements. In addition to these two quantitative measures, local officials from Norwalk and Wilton were asked for their input on locations they felt were high priority in regards to safety (**Appendix C** contains meeting summaries).

**Figures 5 and 6** show the following eleven (11) selected safety "hot spot" locations based on the TAVS data, SLOSSS Report, and local input:

1. Main Avenue & Route 123 (New Canaan Avenue)
2. Main Avenue & Ward Street
3. Main Avenue & Perry Avenue
4. Route 7 & Grist Mill Road
5. Route 7 & Glover Avenue
6. Route 7 & Main Avenue/DMV
7. Between Route 7 (MP 4.13) & West Rocks Road (MP 4.35)
8. Route 7 & West Rocks Road
9. Route 7 & Gateway Shopping Center
10. Route 7 & Kensett Avenue
11. Route 7 & Grumman Hill Road



**TAVS Crash Records by Milepost for 2006-2008**  
**Main Avenue (RT 719)**

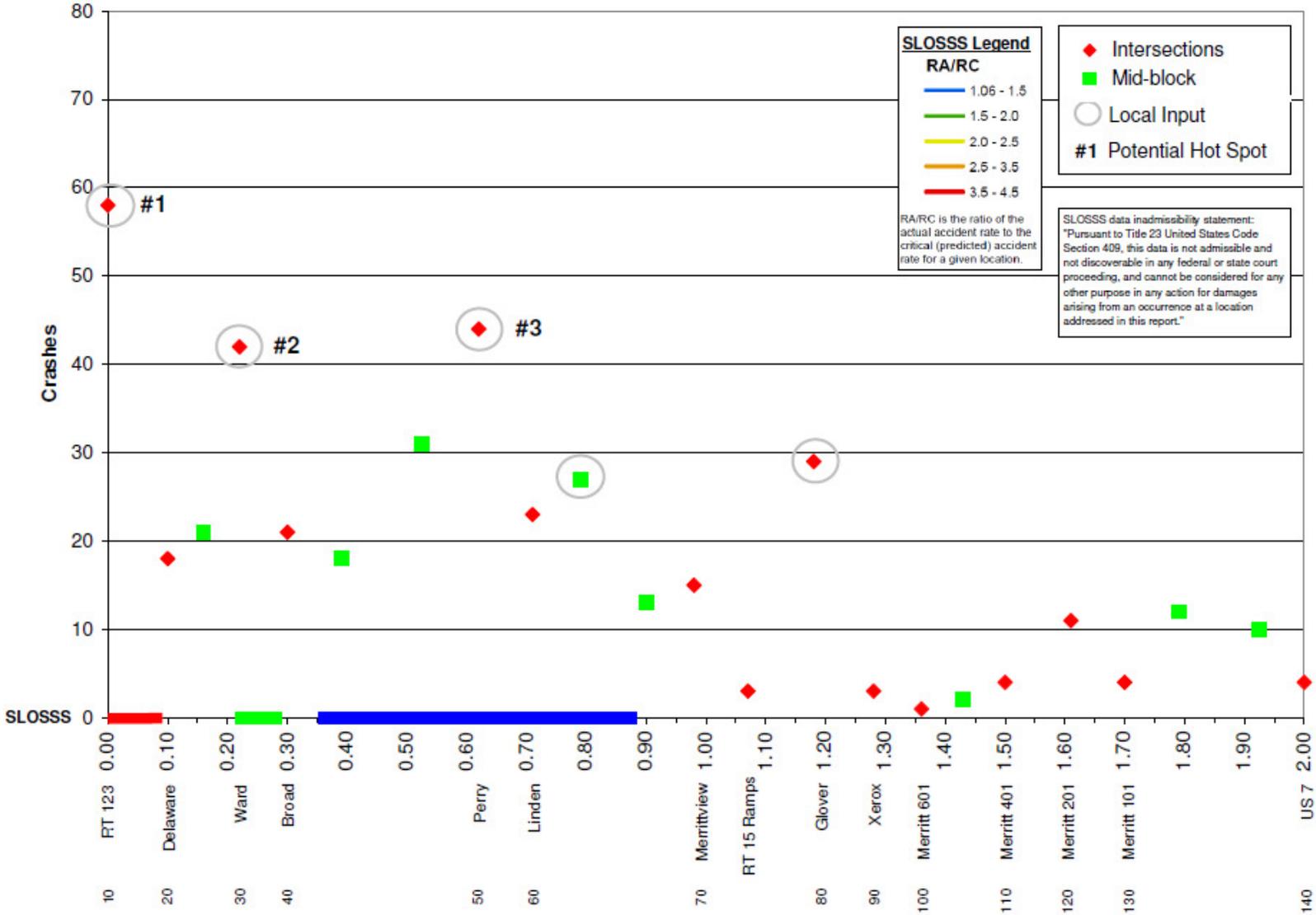


Figure 5: TAVS Main Avenue Graph

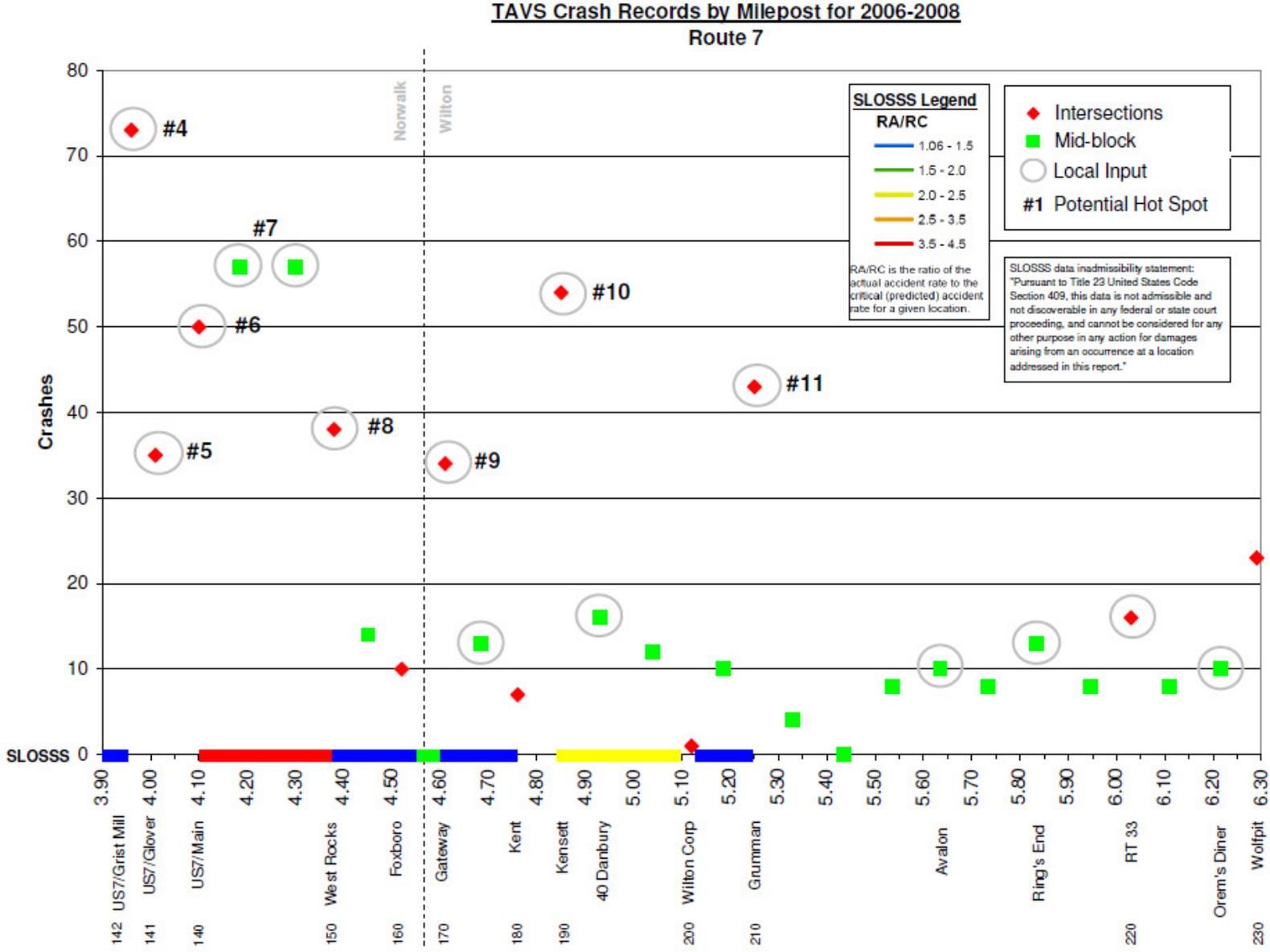
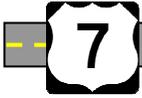


Figure 6: TAVS Route 7 Graph



## D. Access

Access patterns, in particular the location and spacing of driveways, have a strong influence on traffic flow and safety. As vehicles turn onto and off of a roadway to access businesses, offices, and residences, they create conflict points or locations where vehicles can cross paths. The frequency and spacing of driveways and related number of conflict points in turn creates locations where vehicles slow down to make turns or avoid other vehicles. This can result in congestion and safety issues.

Access issues were identified with field observation, discussion with municipal staff, and review of available traffic and transportation reports. In addition, the findings of two access management studies for the study area are reviewed. Access management is the process of overseeing access to land development while simultaneously preserving the flow of traffic on the surrounding roadway system in terms of safety and capacity. Its focus is on safety of travel and minimizing conflict points which also helps to maintain the smooth flow of traffic.

### Norwalk

In Norwalk, development along Route 7 (Main Avenue) is a dense urban environment where few vacant properties remain. There is a plethora of driveways; at least one serving each property. While there are some retail plazas or complexes within which multiple businesses are served by one or two driveways, there are also a limited number of locations where there are interconnections among developments. The following are locations that have access issues that are discussed in further detail in **Section V: Corridor Needs**:

- Main Avenue from Route 123 to Delaware Avenue
- Main Avenue north of Linden Street
- Route 7 from Main Avenue/DMV to West Rocks Road
- Route 7 at the i.park facility on West Rocks Road

A 1996 access management plan for Route 7 included recommendations for changes to the local land use regulations to promote better access design during site development and a curb-cut plan. The curb-cut plan shows recommendations for improvements to the design of individual driveways in the study corridor. The plan also made a general recommendation for a driveway spacing standard of 150 to 200 feet apart, based on the development patterns at the time, the lack of undeveloped land, and the assumption that the standard would most commonly be applied to redevelopment of an existing parcel.

### Wilton

Route 7 in the study area is a densely developed suburban environment with numerous businesses, offices, and other development. In Wilton, Route 7 from the junction with Route 33 to the Town line has a plethora of curb-cuts but also some stretches of undeveloped land with no current access points onto the roadway.

Similar to the Norwalk access management plan, the 2010 Wilton plan included recommendations for changes to the local land use regulations to promote better access design during site development and a curb-cut plan. The curb-cut plan for Wilton most frequently made recommendations for individual driveways for closures, realignments, driveway consolidation, right-in/right-out only redesign, landscaping, narrowing driveways, shared driveways, and



internal connections. The following are locations that have access issues that will be discussed in further detail in **Section V: Corridor Needs**:

- 116 Danbury Road - Avalon Wilton Apartments
- 129 Danbury Road - Ring's End Lumber
- 10 Westport Ave - Commercial Park

### ***E. Pedestrian/Bicycle***

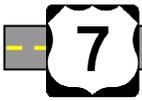
**Bicycling:** The Connecticut 2009 Bicycle Map classifies state highways in terms of suitability for bicycling. The suitability is based on the shoulder width as well as the traffic volumes of various segments of the roadway. Route 7 in the project area has a classification of “less suitable for bicycling” on the 2009 map. Less suitable locations are those where the shoulder width is three feet or less and the traffic volumes are above 5,000 vehicles per day. The Route 7 corridor in the study area also has stretches of congestion, and dense development. This higher density results in numerous driveways that create potential conflicts between bicyclists and vehicles. Vehicle turning movements across the bicycle travel lanes are dangerous for bicyclists as well as pedestrians, who motorists often don’t observe. In summary, the study corridor is not conducive to bicycle travel.

A bicycle and pedestrian plan was completed for the Route 7 corridor in Wilton in January, 2012 (Norwalk Pedestrian & Bikeway Transportation Plan, January, 2012, Fitzgerald & Halliday, Inc.). The plan identified priorities for bicycle and pedestrian facilities in the study corridor (along with all of central Norwalk). The plan classified travel corridor in tiers in terms of need for improvements. The Main Avenue corridor is classified as a Tier 1 corridor. Tier 1 corridors were classified as such based upon meeting one or more of the following factors:

- Multiple pedestrian crashes,
- Multiple bicycle crashes, and
- No sidewalk on either side of the roadway within ¼ mile of a school or transit center.

The plan noted that Main Avenue, due to four lanes of traffic and shoulders that are less than three feet wide in most locations, would not accommodate a bicycle lane. Traffic volumes and speed on this segment of the corridor also prohibit shared use bicycle lanes or sharrows (shared lane roadways that are marked by bicycle pavement markings and signed with “Share the Road” signage). As such, neither was recommended for Main Avenue from Route 123 to the City line. Nonetheless, sharrows were noted as the most feasible of any option for bicyclists in the study area.

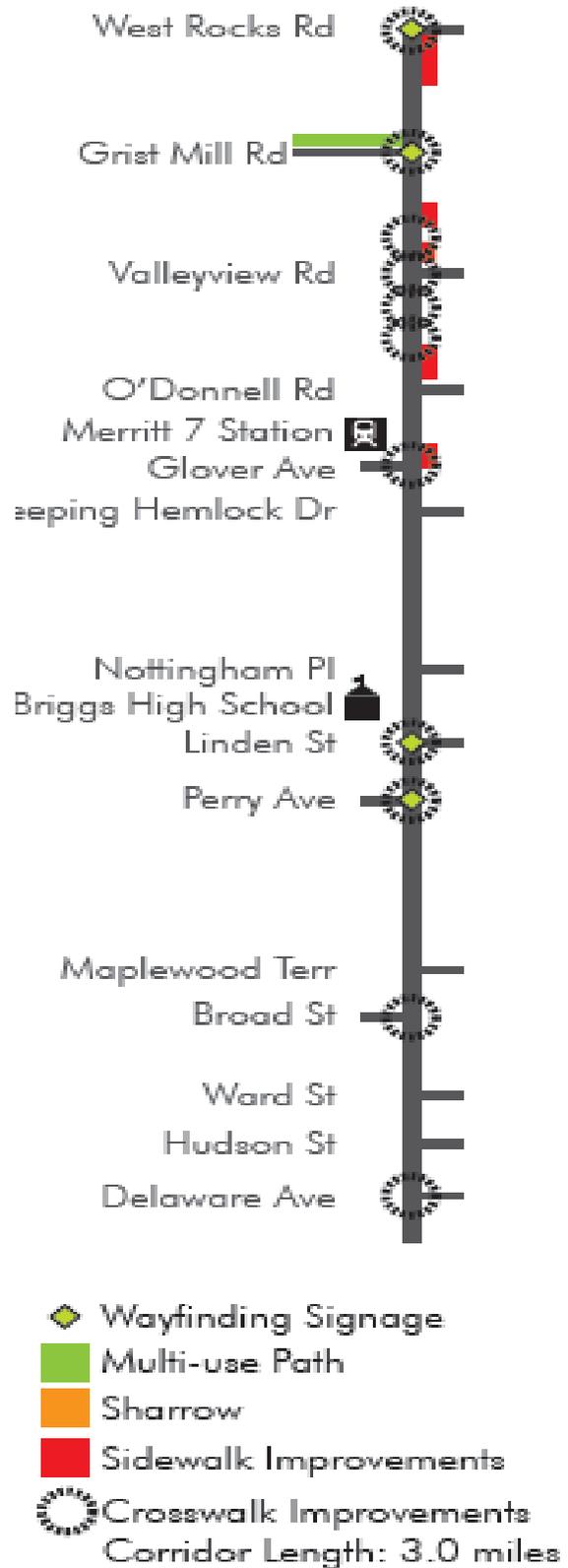
**Sidewalks and Crosswalks:** In general, there are sidewalks on both sides of Route 7 in the southern portion of the study corridor diminishing to an absence of sidewalks in the northern end of the study corridor. Sidewalks are present from Route 123 to Foxboro Drive in Norwalk. They are mostly absent from Foxboro Road northerly to Route 33 in Wilton. Those that exist in Norwalk vary in condition, surface materials and continuity. They are frequently interrupted by driveways of varied width.



Crosswalks occur in a limited number of locations and in no instances are there crosswalks to serve every leg of an intersection. There are no crosswalks at some key intersections and pedestrian destinations where they can be expected to want to cross Main Avenue. Local officials in Norwalk expressed a strong desire for completion of sidewalk connectivity and eliminating gaps in the system.

The pedestrian and bike transportation plan noted above made numerous recommendations to improve the walking environment on Main Avenue (**Figure 7**). It classified Route 7 as a high priority area for improvements due in large part to demand for pedestrian access and the presence of the Merritt 7 rail station.

**Greenways and Trails:** A portion of the Norwalk River Valley Trail is under development in the study corridor. One segment of existing trail occurs between Route 123 and Broad Street. This is the only greenway or off-road trail in the study corridor. The Norwalk Pedestrian & Bikeway Transportation Plan included Improvement concepts for eight segments of the Norwalk River Valley Trail including one segment from Broad Street to Grist Mill Road. The proposed trail along this segment would connect the existing trail at Broad Street to Grist Mill Road, a nearly two-mile long segment. This 8-10 foot wide trail would be located on the west side of Route 7 and, for the most part, would follow an existing utility corridor. This trail would cross below the Merritt Parkway adjacent to Perry Lane and would require a tunnel to be constructed through one of the Parkway bridges. The features and amenities that have been planned for the trail include an asphalt surface, timber guardrails, chain link fence, boardwalk structures, and bridges.



**Figure 7: Pedestrian and Bicycle Transportation Plan**



## F. Transit

There are a number of transit providers and routes that serve the Route 7 corridor. These include the Norwalk Transit District lines, employer shuttles, paratransit service, and the Danbury Branch Rail Line. The Norwalk Transit District offers the following service in the study area:

- The 7-Link regional bus service which travels from Norwalk to Danbury (with shared operating responsibility with the Housatonic Area Regional Transit (HART)),
- The local fixed-route bus service – Wheels Route 3 travels from downtown Norwalk as far north as the Department of Motor Vehicles on Main Avenue and also travels into/through the Merritt 7 rail station site,
- The local bus service on evenings and Sundays runs from Burnell Avenue to the Wal-Mart on Main Avenue, and
- The commuter shuttle travels on Main Avenue to the Merritt 7 Station and also along Glover Avenue.



Monthly ridership on the Route 7 Link service has risen by 12% between July of 2011 and April of 2012. Average daily ridership has risen from 227 to 255 passengers in this time period. Monthly ridership on the commuter shuttle to Merritt 7 has risen 7% between July 2011 and April 2012, with a total of 52,257 passengers between January and the end of April, 2012.

**Figure 8: NTD Wheels bus at new pulse point**

Private employer shuttles also serve north-south trips along Route 7 while paratransit buses provide service to the individual locations requested by the users.

The Danbury Branch of the New Haven Metro-North Rail Line parallels the Route 7 corridor. It provides service from Danbury to Downtown Norwalk (South Norwalk Station). In total, there are 11 round trips between Danbury and South Norwalk on weekdays and six round trips on weekends. In general, the Danbury Branch Line schedule provides four peak hour direction trains (southbound in the morning and northbound in the evening) with headways of about 30-45



minutes. Off peak trains are less frequent with headways ranging from 1 ½ hours to almost 4 hours. As a result, this service is primarily designed to serve peak hour commuters in the peak direction.

### ***G. Existing Land Use and Development Potential***

As noted elsewhere, the Route 7 corridor in southern Wilton and northern Norwalk is a densely developed area. Development is somewhat more suburban in character in Wilton and more urban and intense in Norwalk. A wide variety of land uses occur all along the corridor with offices and retail uses most common. Notable clusters of uses from north to south include:

#### **Wilton**

- Undeveloped land owned by the State of Connecticut at the junction of Routes 7 and 33,
- Residentially zoned and/or occupied land on the east side of Route 7 south of Route 33, and
- Undeveloped land in the vicinity of Arrowhead Road, some of which is preserved open space.

#### **Norwalk**

- Big-box, strip commercial, and hotel development near West Rocks Road,
- Residential subdivisions (most without direct access to Route 7) east of Route 7 between Route 15 and Route 123,
- Office complexes on the west side of Route 7 near the Merritt 7 rail station, and
- Large cemetery surrounded by an older residential neighborhood at Broad Street.

Given the current density of development in the study corridor, the primary opportunities for new development are in the Wilton portion of the study area. In Norwalk, land use change can be expected to result primarily from infill and redevelopment of existing sites. As new development occurs, there are opportunities to address issues of access management, connectivity, and multi-modal access during the development application and approval process.

The proximity of the Norwalk River and associated floodplains will constrain some development. An additional consideration will be not only the proximity of actual development to the river, but the amount of impervious surfaces being proposed and potential impacts to stormwater flows to the river, its floodplains, and nearby wetlands.

A list of the planned and programmed development or redevelopment projects in the study corridor was compiled based on discussions with the planning offices in Wilton and Norwalk and review of STC permits in the pipeline or recently granted. Planned and programmed developments are those which have a reasonable expectation of being built in the next 5 years. In addition, the future land use plans for Wilton and Norwalk were reviewed to gain some insight into each community's goals for future development patterns in the study area. Such developments in each community include:

## Norwalk

- I Park, with office high-tech workspace leasing at 761 Main Avenue, was recently approved for a 12,000 square foot addition.
- An office building of 82,700 square feet has been proposed on Glover Avenue at the northwest corner of the interchange between Route 7 and the Merritt parkway.
- 345 Main Avenue: this former medical office building will be redeveloped.



**Figure 9: I-Park site on Wilton-Norwalk town line**

- Two new hotels are expected to be built; one across the street (379 Main Avenue) from the Stop N Shop complex at 380 Main street, and the second off of Perry Avenue and slightly north of Route 7 at Linden Avenue.
- Redevelopment of the former Elin Company site at 268 Main Avenue for non-residential mixed-use.

The City of Norwalk Plan of Conservation and Development (2008, Chan Krieger Sieniewicz) indicates that the Route 7 corridor should remain in its current character and mix of uses in the future. The area is envisioned as predominantly commercial with a mix of retail and office uses. It also recommends implementation of the Norwalk Valley River trail through the study area.

## Wilton

- Redevelopment/new occupant for 10-20 Westport Avenue (Route 33) is leasing 230,000 square feet of office space.
- Avalon multi-family rental housing development recently completed at 116 Danbury Road; 100 units of which 30 are affordable units.
- The existing storage company opposite and just south of the new Avalon homes at 116 Danbury Road is expected to remain and potentially be upgraded in the near-term with longer-term redevelopment for corporate office or research use.
- A new hotel is a possibility adjacent to the I-Park development at the Town line with Norwalk.

The Wilton *2010 Plan of Conservation and Development* (Planimetrics) indicates that this area of Wilton should retain its current character and serve as a transition zone between the town core and village center to the north and the urban character of Norwalk to the south. The area is shown on the 2010 Future land use map as retail on the east side of Route 7 and medium density residential on the west side of Route 7.

These developments could have significant impacts to the traffic volumes along Route 7 and will only add to the existing congestion and safety issues documented here.



## ***H. Environmental***

Given the urban and suburban environment, there are few environmental resources of concern in the study corridor. The most notable resource is the Norwalk River which virtually parallels most of the corridor length just to the west of Route 7. At Linden Street the river moves further west and is situated on the west side of the highway portion of 7. There are areas of floodway as well as 100-year and 500-year floodplains associated with the Norwalk River along its length. All three lie adjacent to existing development in numerous locales. There are pockets of wetlands, also mostly associated with the Norwalk River, adjacent to Route 7 from its Junction with Route 33 south to Grumman Hill Road. There are no other wetlands of note in the corridor. There are no other notable environmental resources in the study area. The ELINCO building mid-way between Broad and Perry on East side of Main Ave is a brownfield site.

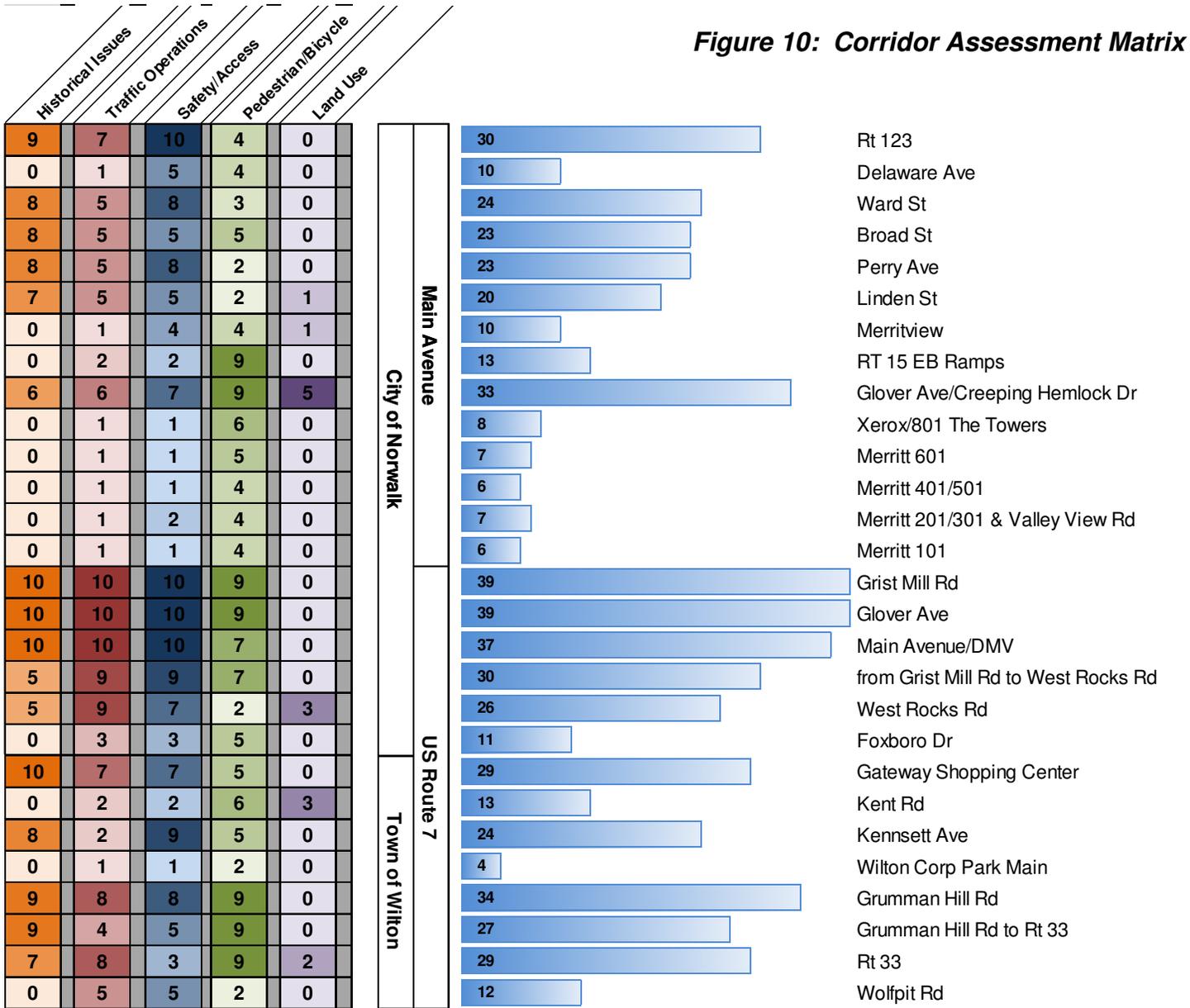


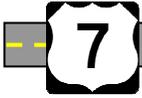
## IV. Evaluation Matrix

In order to assess the corridor from a qualitative standpoint, and prioritize focus areas for further study, each intersection was examined and ranked on a scale of 1 – 10 with 1 being least significant and 10 being most significant. This assessment was performed for the following criteria:

- **Historical Issues:** Locations that were identified by multiple local stakeholders and previous studies as being problematic were assigned a score of 10. Locations without identified issues scored a zero.
- **Traffic Operations:** The most congested locations along the corridor were assigned a score of 10, and free flowing areas scored 1 or 0.
- **Safety and Access:** Locations identified by the crash data base systems were assigned as score of 10. Those not identifies were given a score of 1.
- **Pedestrian and Bicycle Facilities:** Locations with full pedestrian facilities, including actuated pedestrian signals, crosswalks and sidewalks were scored as a 0. Those intersections without any pedestrian facilities scored 10. All locations were scored along this scale.
- **Land use:** Locations with planned new developments were scored based on their potential impact on the adjacent intersections.

The results of this assessment are summarized in **Figure 10: Corridor Assessment Matrix**.





## V. Corridor Needs

The needs for the corridor were separated into two categories: Focus Areas and General Corridor Needs. The focus areas are locations (intersections or sections of the roadway) that were identified as the most critical problem areas based on the results of the evaluation matrix. The general corridor needs includes identified needs from a corridor-wide perspective.

### A. Focus Areas

The selected focus areas were determined using the criteria in the Evaluation Matrix and are listed in order of their ranking in the evaluation matrix:

1. SR 719 (Main Avenue) & Route 123 (New Canaan Avenue)
2. SR 719 (Main Avenue) & Ward Street
3. SR 719 (Main Avenue) & Perry Avenue
4. US Route 7 & US Route 7 (Grist Mill Road)
5. US Route 7 (Grist Mill Road) & Glover Avenue
6. US Route 7 (Grist Mill Road) & Main Avenue/DMV
7. US Route 7 (Main Avenue) between US Route 7 (Grist Mill Road) (MP 4.13) and West Rocks Road (MP 4.35)
8. US Route 7 (Main Avenue) & West Rocks Road
9. US Route 7 & Gateway Shopping Center Exit
10. U.S. Route 7 (Norwalk-Danbury Road) & Kennsett Avenue
11. U.S. Route 7 (Norwalk-Danbury Road) & Grumman Hill Road

Each focus area is discussed in detail with respect to access, traffic operations, bike/ped, and safety. Following the detail analysis, potential short-term and long-term improvement recommendations and issues to evaluate are identified.

### Focus Area 1: SR 719 (Main Avenue) & Route 123 (New Canaan Avenue)

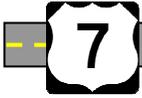
**Figure 11**, below, shows the signalized intersection of SR 719 (Main Avenue) and Route 123 (New Canaan Ave). The northbound Main Street approach is skewed with a dedicated left-turn lane and a dedicated thru lane. The southbound Main Avenue approach has a dedicated right-turn lane and a dedicated thru lane. The eastbound Route 123 approach has a dedicated left-turn lane and a shared right- or left-turn lane, and also has a positive approach grade where traffic is metered by a railroad crossing signal, approximately 200 feet to the west of the intersection.



**Figure 11: Intersection of SR 719 (Main Ave) and Route 123 (New Canaan Ave)**

On the northwest corner of the intersection is a drive-thru Dunkin' Donuts with driveways within 100 feet of the intersection on both legs. The close proximity of the access points to the intersection contributes to congestion, driver confusion, visibility and blind spot issues, left-turn weaving, left-turn queuing, and potentially unsafe roadway entrances for motorists, as well as for pedestrians. On the east side of the intersection is a vacant lot (previously a diner restaurant) with angled parking spaces. The southwest corner of the intersection contains a car dealership with low volume driveways approximately 150 feet from the intersection on both legs.

The traffic operations, as viewed in the field, showed congestion generally attributable to the Danbury Rail Line at-grade crossing, access to the Dunkin' Donuts on the southbound approach, and a heavy westbound left-turn movement onto the Route 7 SB ramps (0.3 miles to west). On the eastbound approach traffic generally moves slowly across the rail tracks, and the internal clearance time between the tracks and the Route 123/Main Avenue intersection limits the amount of green time eastbound drivers receive at the rail signal. The eastbound RT 123 traffic



is also held up by a significant amount of vehicles accessing the Dunkin Donuts, which results in queuing in the northbound left lane on Main Avenue.

In the westbound direction there is a large left-turn volume onto Route 7 southbound, and this left-turning traffic queues back from the Route 123/Route 7 SB Ramps intersection back through the Route 123/Main Avenue intersection towards Delaware Ave and Ward Street. This westbound queuing was more pronounced during the AM peak period.

The Synchro 7/SimTraffic analysis results show eastbound queuing and delay at LOS E for the eastbound approaches at the RT 123/Rail Line signal and the RT 123/RT 7 NB Ramps intersection in the PM peak. As for the southbound and westbound delay stemming from the heavy westbound left onto Route 7 southbound, the SimTraffic results show increased LOS for the southbound RT 123/Main Avenue and westbound RT 123/RT 7 NB Ramp approaches in the AM peak compared to the PM peak. Section 3b contains overall LOS and delay results for the AM and PM peak hour Synchro 7/SimTraffic models, while the detailed results are provided in **Appendix D**.

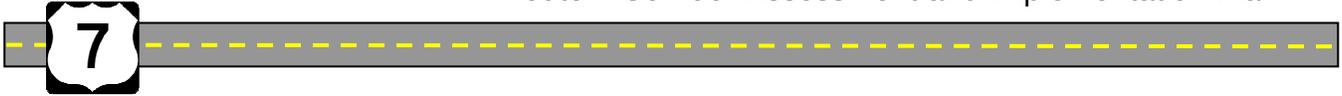
From a pedestrian perspective the sidewalks are complete on all sides of the intersections, and crosswalks are located on the northbound and eastbound approaches. The southbound leg does not have a crosswalk, and this is most likely due to the dual left-turn lanes on the eastbound approach. Pedestrian push buttons are present on the northwest and southwest corners of the intersection, but are missing from the southeast side.

Over the three-year period from 2006-2008, there were a total of eighty-eight (88) crashes recorded at this intersection, as shown in **Figure 12**. Thirty-seven (37) of the crashes were angle collisions, twenty-five (25) were rear-end collisions, twenty-two (22) were sideswipe collisions, three (3) were backing collisions, and one (1) was a vehicle hitting a fixed object. The high occurrence of angle (42%) and rear-end crashes (29%) can likely be attributed to the congestion at the intersection and the close proximity of the Dunkin Donuts driveway on the north leg of the intersection. The significant presence of sideswipe (25%) is likely a result of drivers trying to “get around” stopped or turning traffic. The intersection geometry may also be a contributing factor to the sideswipes. Most of the reported crashes (85%) occurred during daylight and 80% occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not seem to be a significant contributing cause of crashes at this location.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### Short-Term Strategies

- Analyze the signal timing to determine if there are opportunities to improve traffic flow and reduce delay and congestion.
- Consider adding “tracks” through intersection to aid motorists in staying in their lanes helping to reduce the likelihood for sideswipe crashes. This could be coupled with the addition of "Stay in Lane" signage.



- Evaluate traffic flow along Route 123 from Route 7 southbound entrance ramp through Main Avenue.
- Evaluate modifications and/or restrictions to access points in close proximity to the intersection.

**Long-Term Strategies**

- Consider changes to how traffic accesses Route 7 reducing the need for the heavy volume traffic using the intersection.
- Evaluate modifications to the geometric design of the intersection to facilitate smoother movement of traffic
- Evaluate the possibility of reducing the cross-section of Main Avenue to add a center turn lane to assist in removing turning vehicles from thru-traffic.

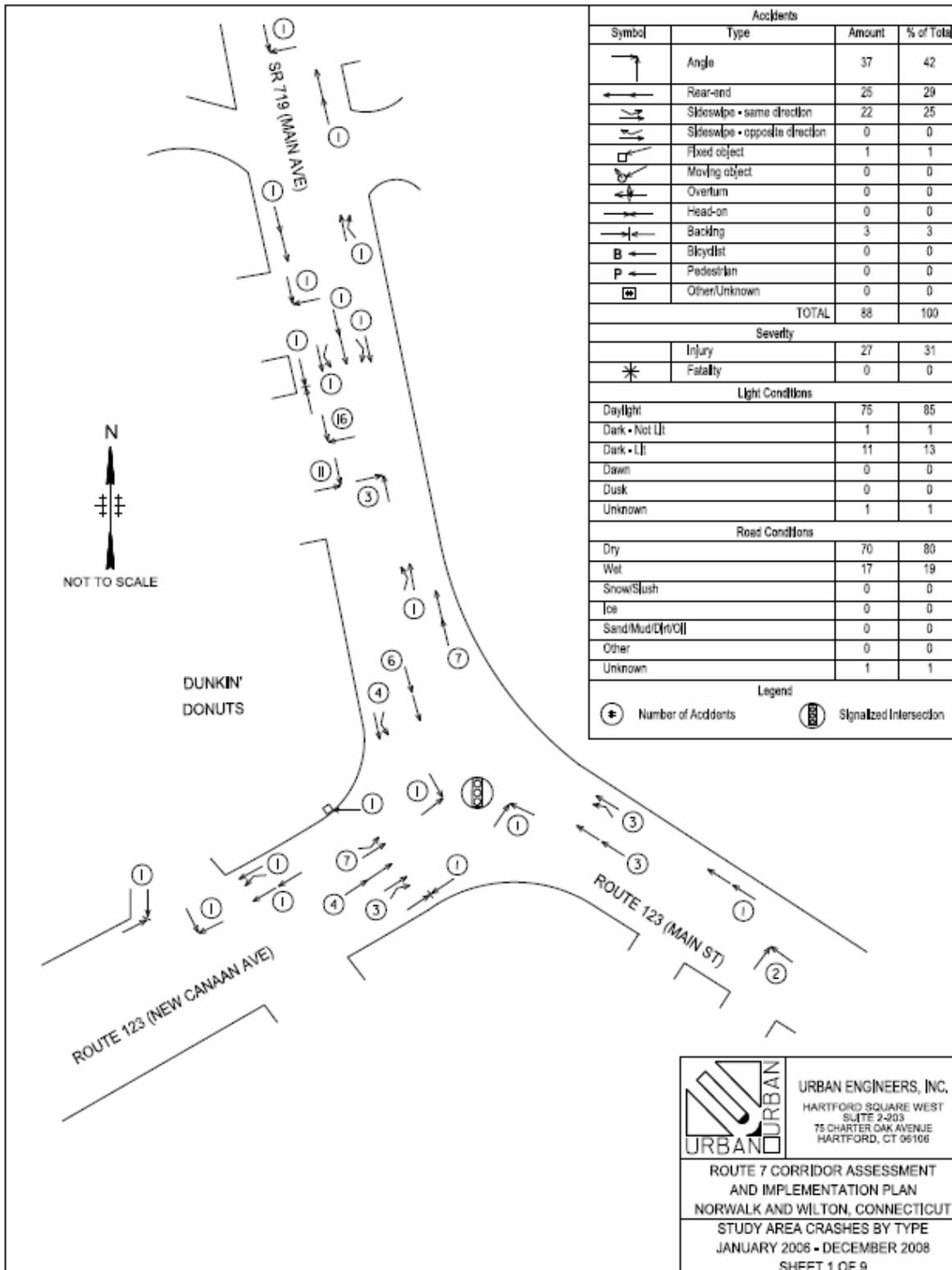


Figure 12: Crashes at intersection of SR 719 and Route 123 (New Canaan Ave)



## Focus Area 2: SR 719 (Main Avenue) & Ward Street

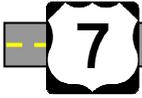
**Figure 13** shows the intersection of SR 719 (Main Avenue) and Ward Street, which is a signalized T-intersection where Ward Street is the sidestreet leg. The northbound and southbound Main Avenue approaches have two thru-lanes in each direction and narrow (less than 1-foot wide) shoulders. The westbound Ward Street approach has been re-striped as two (2) approximately 11.5-foot lanes with dedicated left- and right-turn lanes. In the northbound direction vehicles are permitted to turn right on red.



**Figure 13: Intersection of SR 719 (Main Ave) and Ward St**

The western side of the intersection has a number of shops including a Chinese food restaurant and beauty salon whose patrons park directly off Main Avenue as well as a shopping center with an entrance approximately 200 feet north of the intersection. With the shops having parking directly off the street, there is potential for conflicts with entrances/exits for motorists and unsafe conditions for pedestrians, specifically with motorists backing out of the parking areas. On the southeast corner of the intersection is a Bank of America with driveways within 100 to 200 feet of the intersection. On the northeast corner of the intersection is a florist and drapery company that both have driveways within 100 feet of the intersection.

The traffic operations as viewed in the field showed minimal to no congestion on the northbound and westbound approaches and sporadic congestion on the southbound approach based on the arrival of left-turning vehicles onto Ward Street. Congestion was also consistently noticed at the mid-block Walgreens entrance just to the north. This is a full access point with the exception of



restricting lefts exiting the Walgreens. The significant amount of vehicles entering this access point causes congestion in both the northbound and southbound directions with vehicles weaving around other vehicles waiting to enter the Walgreens access point.

Traffic volumes were collected only during the AM peak, therefore the Synchro 7/SimTraffic analysis was not conducted for the PM peak. The AM results showed minimal delay on all approaches, and since the mid-block locations were not included in the model the additional delay and queuing caused by the Walgreens entrance was not reflected in the model. Section 3b contains overall LOS and delay results for the AM and PM peak hour Synchro 7/SimTraffic models, while the detailed results are provided in **Appendix D**.

From a pedestrian perspective, the sidewalks are complete on the east side of Main Avenue, and on the west side there is a fragmented asphalt sidewalk that extends from the Walgreens south to where the street-front parking begins opposing Ward Street. The southbound and westbound legs of the intersection have painted crosswalks, although the crosswalk on the southbound approach is placed essentially in the middle of the intersection. Pedestrian push buttons are located on both sides of Main Avenue to cross the southbound crosswalk.

Over the three-year period from 2006-2008, there were a total of forty-two (42) crashes recorded at this intersection, as is shown in **Figure 14**. Sixteen (16) of the crashes were rear-end collisions, fifteen (15) were angle collisions, seven (7) were sideswipe collisions, two (2) were backing collisions, and two (2) involved a pedestrian. The high amount of rear-end collisions (38%), specifically on the southbound approach is likely due to the lack of a dedicated left-turn lane onto Ward Street, although. Most of all reported crashes (69%) occurred during daylight and 74% occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not seem to be the cause of crashes at this location. It should be noted that 45% of crashes involved an injury; which is a relatively high percentage.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### Short-Term Strategies

- Install pedestrian signal heads and ensure that the timing for pedestrian crossing is appropriate.
- Install "Yield to Pedestrians in Crosswalks" signing.
- Analyze the signal timing and existing traffic volumes to determine if the timing is appropriate for existing conditions.
- Consider relocating the crosswalk on the southbound approach to be perpendicular to the approach and also away from the middle of the intersection.
- Install "No Left Turn" sign at Walgreens strip mall driveway in northbound direction. Northbound traffic wanting to access the strip mall would turn at the Broad St signal.

### Longer-Term Strategies

- Evaluate options to create an entrance and/or exit from Walgreens across from Ward Street.
- Evaluate a reduced cross-section, in combination with other changes that reduces traffic volumes in the corridor, to remove left turns from the thru traffic

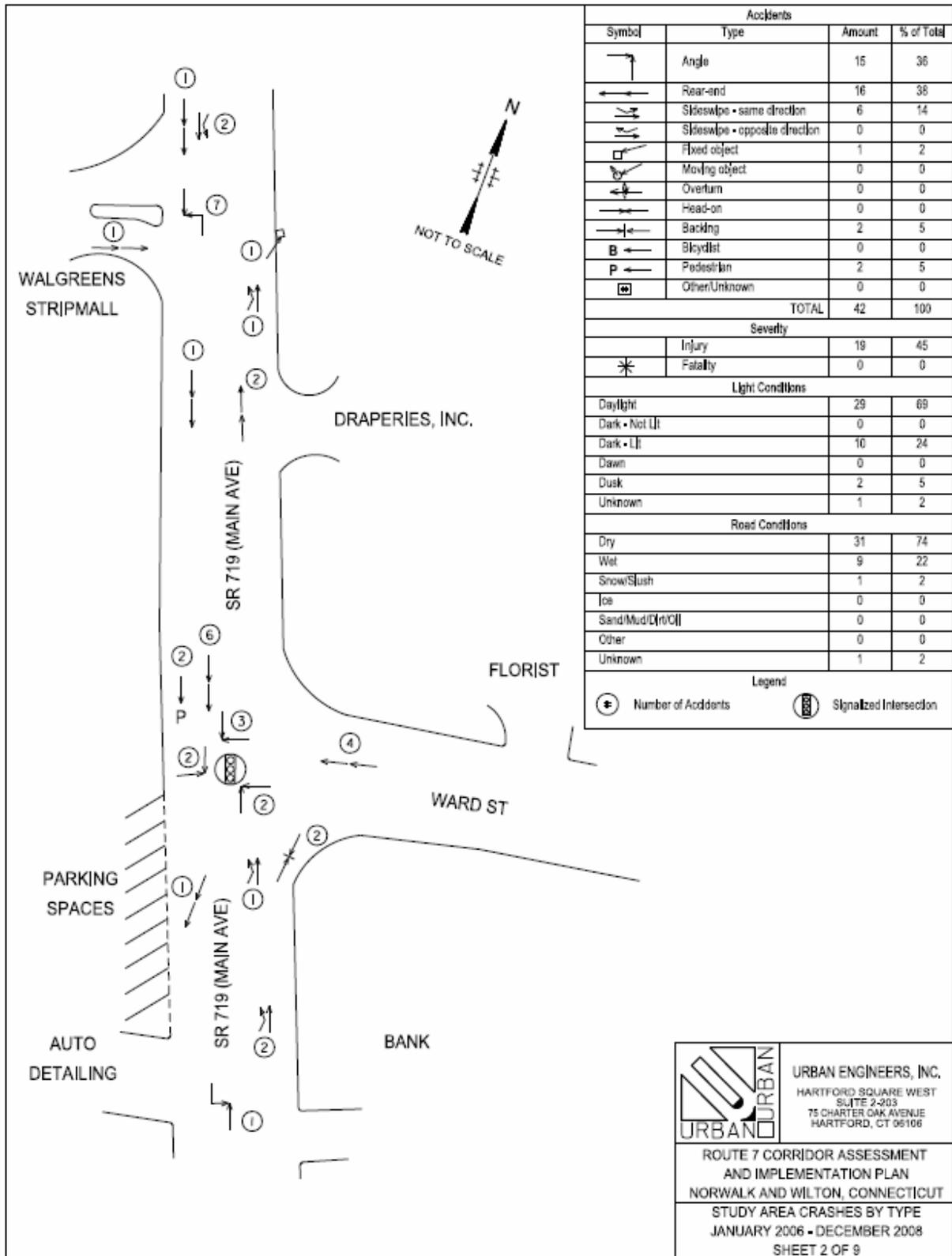
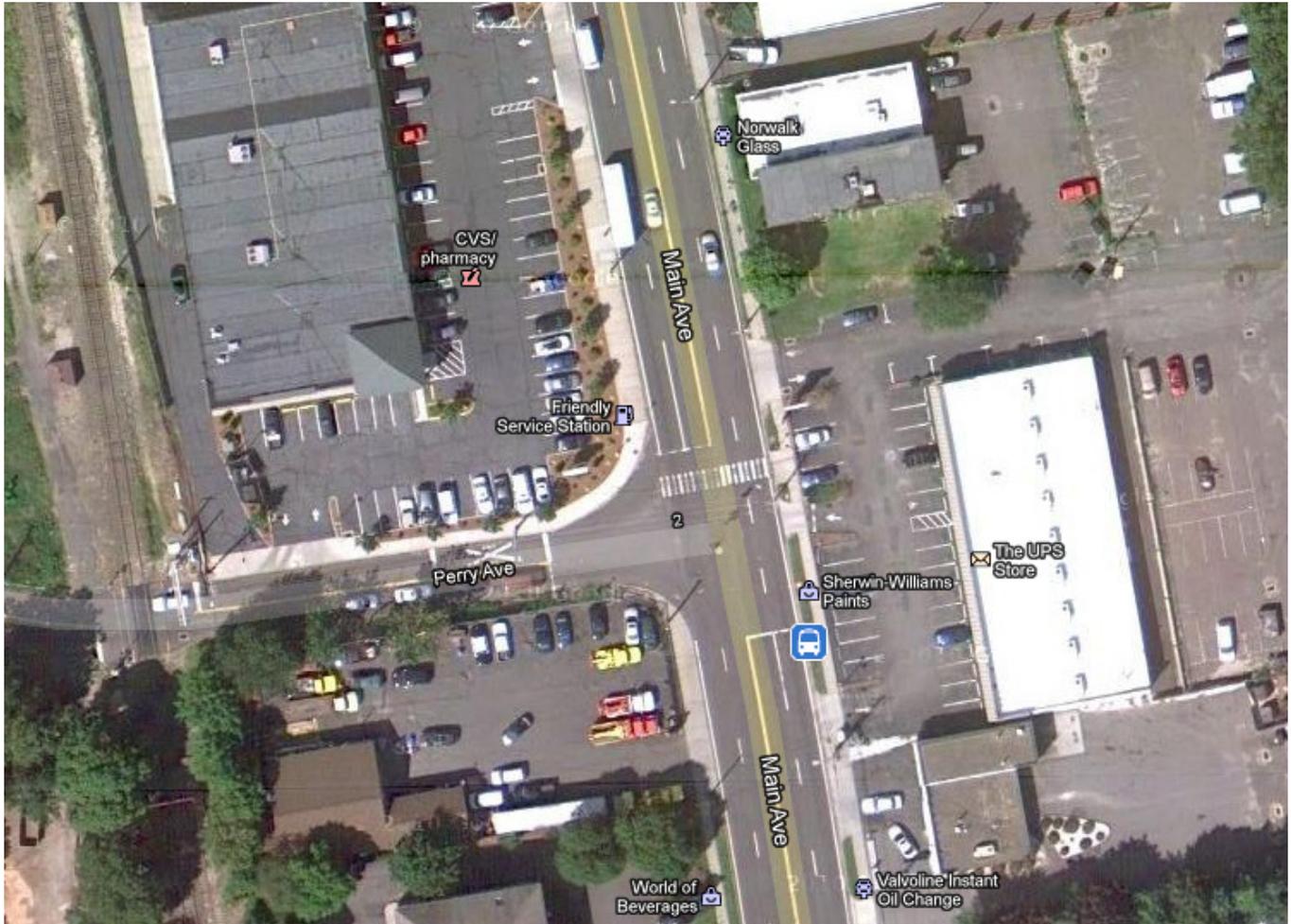


Figure 14: Crashes at intersection of SR 719 (Main Ave) and Ward St



### Focus Area 3: SR 719 (Main Avenue) & Perry Avenue

**Figure 15** shows the signalized T-intersection of SR 719 (Main Ave) and Perry Avenue. The eastbound approach to the intersection has a positive grade approaching the intersection with a at-grade railroad crossing approximately 250 feet from the intersection. There are no dedicated turn lanes on Main Avenue at this intersection. All turns are shared with thru lanes and there are no shoulders. The southbound right turns are permitted to turn right on red.



**Figure 15: Intersection of SR 719 (Main Ave) and Perry Ave**

On the northwest corner of the intersection is a CVS pharmacy with driveways approximately 200 feet from the intersection on both legs. This potentially creates unsafe roadway entrances for motorists along Main Avenue. The close proximity of the Linden Street intersection to the north (350 feet) and mid-block entrance to the CVS contributes to slower travel speeds, Main Avenue turning vehicle queuing, and weaving to avoid the turning vehicle queues. On the east side of the intersection is Perry Plaza which includes shops such as a UPS store with an exit-only driveway at the intersection and a two-way driveway approximately 100 feet on either side of the intersection. On the southwest corner of the intersection is an auto body shop with an



entrance approximately 75 feet south of the intersection. This business is not a large traffic generator, but still presents a safety concern for turning traffic very close to the intersection.

The traffic operations during the AM peak period generally operated well with minimal queuing and delay. During the PM peak period the traffic was slow moving, congestion occurred between Perry Ave and Linden Street, and weaving occurred to avoid left-turn queuing on Main Avenue. This appeared to be due to the closely spaced Linden Street and Perry Ave with the mid-block access to CVS. The signal timing and coordination between Linden Street and Perry Street did not seem to be optimal as during the travel time runs there were constant stops at both Perry Ave and Linden Ave during the same travel time run.

With no traffic volume available for this intersection, Synchro 7/SimTraffic analysis was not completed.

From a pedestrian perspective the sidewalks are complete on all sides of the intersection with the exception of the south side of Perry Ave between the intersection and the Rail Line crossing. The only crosswalk is on the southbound leg which includes pedestrian push buttons and pedestrian signal heads. It appears the curb on the northwest corner has been modified and it should be noted that the “piano key” crosswalk markings are missing in this area.

Over the three-year period from 2006-2008, there were a total of forty-four (44) crashes recorded at this intersection as seen in **Figure 16**. Seventeen (17) of the crashes were rear-end collisions, fifteen (15) were angle crashes, nine (9) were sideswipe collisions, two (2) involved a vehicle hitting a fixed object, and one (1) was a head-on collision. The most common collision at the CVS entrance is an angle collision between eastbound motorists and southbound motorists. The most common collision at Perry Ave and the southern strip mall entrance is a rear-end collision. Most of all reported crashes (77%) occurred during daylight and 80% occurred when the roadway was dry. This indicates that lighting and pavement conditions do not seem to be the cause of crashes at this location.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### Short-Term Strategies

- Analyze the signal timings and existing traffic volumes at both Perry Ave and Linden Street to determine if the timing is appropriate for existing conditions and that there is coordination between the intersections.
- Restrict exiting traffic from the CVS to right turn only. Traffic exiting CVS wanting to travel north on Main Avenue can access Perry Avenue from the parking lot. The proposed changes to Perry Avenue may assist/support this recommendation.

### Short-Term/Longer-Term Strategies

- Restrict or modify access along the northbound side of Main Ave (Perry Plaza) to reduce the number of access points and turning movements.

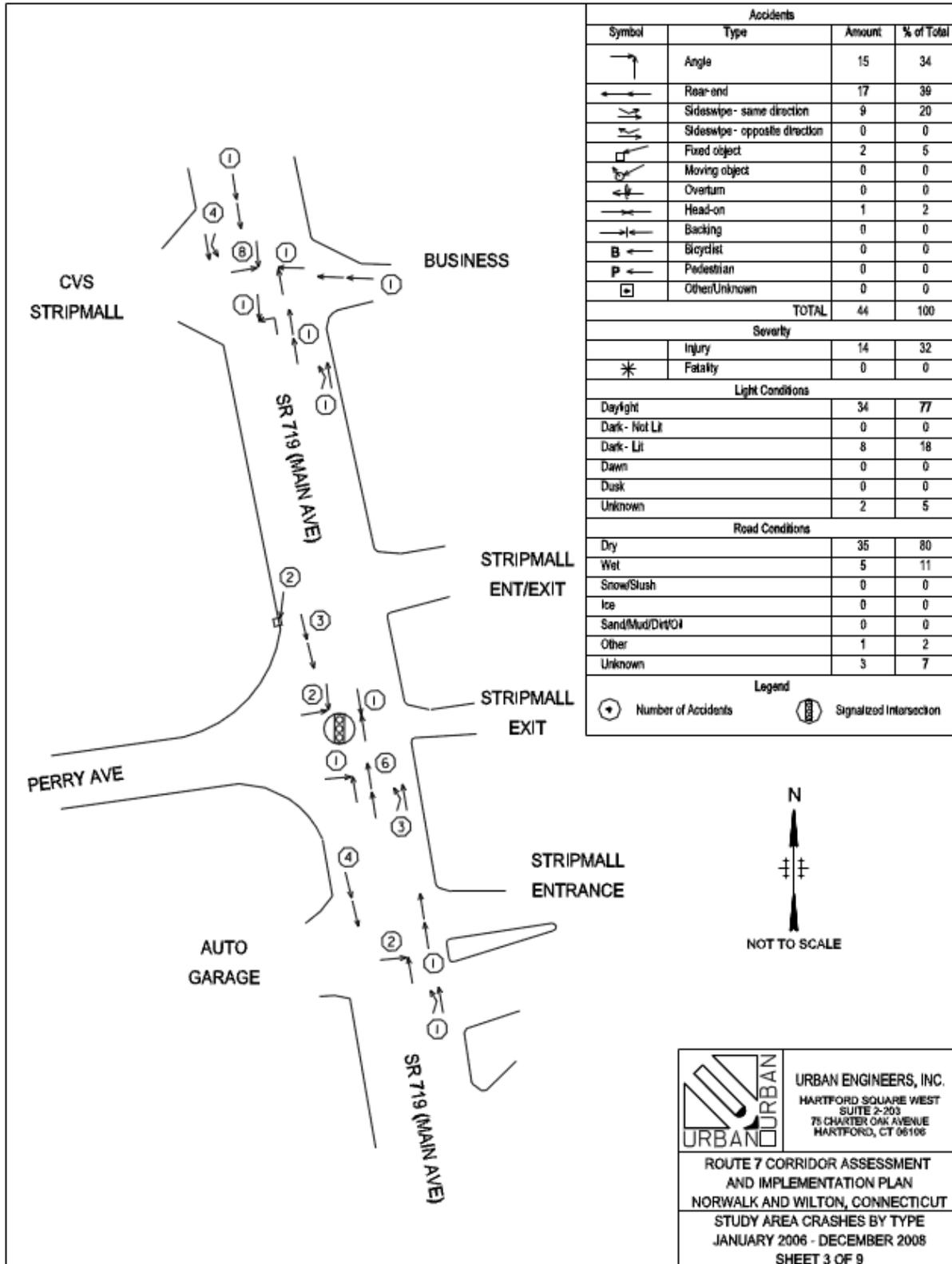
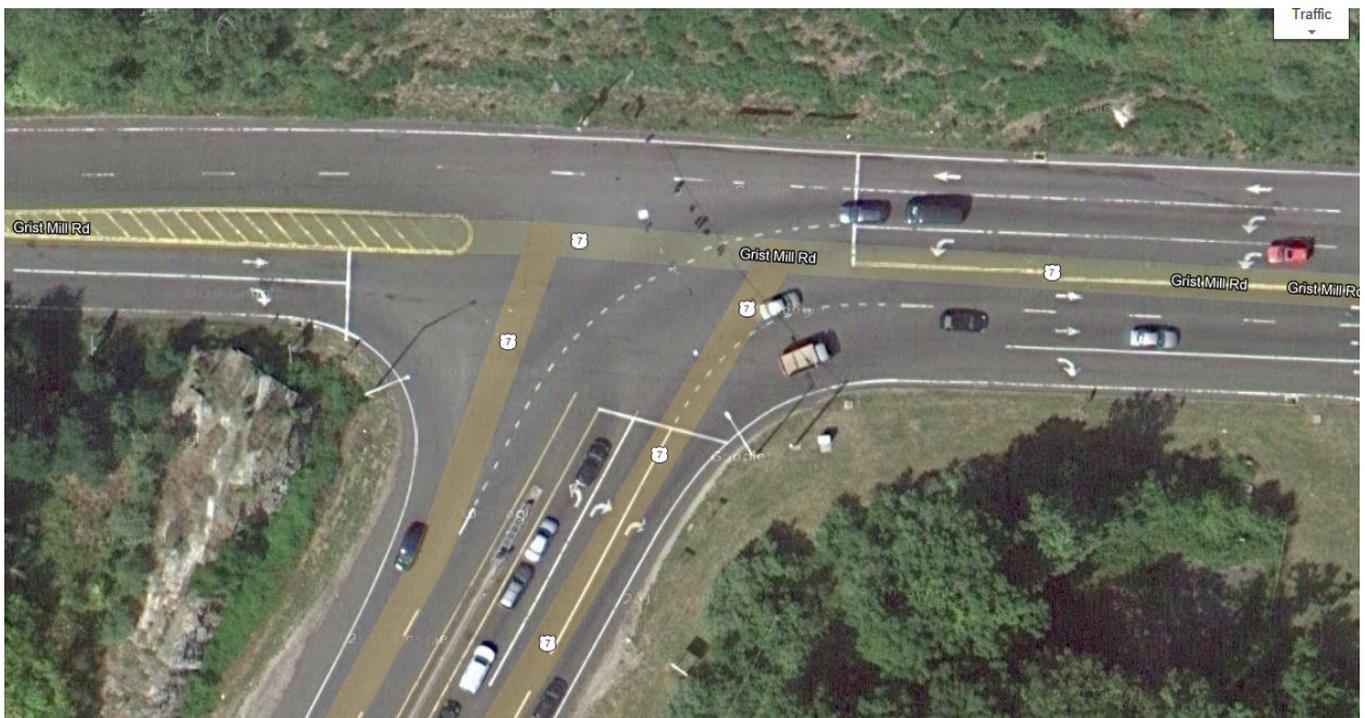


Figure 16: Crashes at intersection of SR 719 (Main Ave) and Perry Ave



#### Focus Area 4: US Route 7 & US Route 7 (Grist Mill Road)

**Figure 17** shows the intersection of US Route 7 and Grist Mill Road, where the US Route 7 freeway comes to an end and US Route 7 continues eastbound towards Main Avenue and the Norwalk Motor Vehicle Department (DMV). The limited-access freeway is two lanes in each direction with wide shoulders and a wide grass median. At the intersection, the northbound approach has one left-turn lane and dual right-turn lanes. The westbound approach has dual left-turn lanes and one thru lane, while the eastbound approach has a thru lane and a right-turn lane. Once US Route 7 (Grist Mill Road) makes the easterly turn towards the DMV there is little to no shoulder and no median. Major queuing occurs on the northbound and westbound approaches during peak periods. There are no driveways within the immediate area of this intersection.



**Figure 17: Intersection of US Route 7 and US Route 7 (Grist Mill Rd)**

The traffic operations during both peak periods included heavy queuing on the northbound Route 7 approach which is a combination of a heavy left-turn move towards Grist Mill Road and Belden Hill Road, with minimal green time, and a very heavy right-turn movement for all vehicles destined to continue on Route 7 northbound. The northbound right movement can be affected by the eastbound queuing that spills back from the Route 7 (Grist Mill Road) and Main Avenue/DMV intersection.

The SimTraffic analysis results show the northbound approach has a very poor LOS F with an average delay of approximately two minutes and four minutes in the AM and PM peak hours, respectively. Section 3b contains overall LOS and delay results for the AM and PM peak hour Synchro 7/SimTraffic models, while the detailed results are provided in **Appendix D**.



From a pedestrian perspective there are no sidewalks, no crosswalks, and no pedestrian signal heads. A bicycle and pedestrian plan was completed for the Route 7 corridor in Norwalk in January, 2012 (*Norwalk Pedestrian & Bikeway Transportation Plan, January, 2012, Fitzgerald & Halliday, Inc.*), where a multiuse path was recommended for a segment of Grist Mill Road at Route 7.

Over the three-year period from 2006-2008, there were a total of seventy-three (73) crashes recorded at this intersection, as shown on **Figure 20**. Forty-three (43) of the crashes were rear-end collisions, ten (10) involved vehicles hitting fixed objects, eight (8) were sideswipe collisions, seven (7) were angle collisions, two (2) were backing collisions, one (1) was an overturn due to loss of control, one (1) was a moving object collision, and one (1) was an unclassified collision. The long queues in the northbound and westbound directions likely contribute to the high number of rear-end crashes. Since fixed object collisions were the second most frequent type of crash at this intersection, the geometry of the intersection might also be a contributing factor. Most of all reported crashes (77%) occurred during daylight and 73% occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not seem to be the cause of crashes at this location.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

#### **Short-Term Strategies**

- Evaluate striping changes on Grist Mill to improve usage of the dual left-turn lane from Grist Mill to southbound Route 7.
- Analyze the signal timing and existing traffic volumes to determine if the timing is appropriate for existing conditions and/or consider modifying timings to reduce queuing.

#### **Longer-Term Strategies**

- Extend the northbound left-turn pocket on Route 7 so that left-turning vehicles do not block traffic heading east/north on Route 7.
- Evaluate the benefits of second northbound left-turn lane.
- Evaluate roadway and operational changes to improve capacity between Grist Mill and Main Avenue.
- Evaluate the need for pedestrian and bicycle accommodations at this intersection.



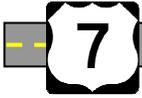
### Focus Area 5: US Route 7 (Grist Mill Road) & Glover Avenue

**Figure 18** shows that US Route 7 (Grist Mill Road) and Glover Avenue meet at a signalized T-intersection. This signalized intersection is less than 250 feet east of the US Route 7 and US Route 7 (Grist Mill Road) intersection and less than 450 west of the US Route 7 (Grist Mill Road) and Main Avenue/DMV intersection and as a result contributes to congestion in this section US Route 7. The eastbound approach has two thru lanes and one dedicated right-turn lane. The westbound approach has two thru lanes and one dedicated left-turn lane. The northbound approach has one dedicated left-turn lane and one shared left/right/turn lane. There is significant queuing that occurs in the eastbound and westbound directions on Route 7 (Grist Mill Road) that stems from the neighboring intersections and frequently extends into this intersection.



**Figure 18: Intersection of US Route 7 (Grist Mill Rd) and Glover Ave**

The traffic operations during both peak periods included heavy queuing on the eastbound and westbound Route 7 approaches. The northbound Glover Ave approach was generally clear during the AM peak with minor queuing during the PM peak. Vehicles were consistently noted using the dedicated turn lanes on Route 7 to Glover Ave in both directions as through lanes to avoid the extensive queuing. It was also noted in the westbound direction that almost all vehicles destined for Route 7 southbound would occupy the left/through lane at the Route 7/Glover Ave intersection. The right/through lane at this intersection would generally remain empty with the exception of the few vehicles destined for Belden Hill Road or vehicles attempting to avoid the westbound queue and “slide” over into the left-turn lane at Route 7/Route 7(Grist Mill Road) intersection.



Due to the short distances between the two neighboring signals, the SimTraffic analysis results show minimal delay for the eastbound and westbound approaches on Route 7 (Grist Mill Road). Glover Ave is a LOS E in the PM peak which appears accurate when compared to the field conditions. Section 3b contains overall LOS and delay results for the AM and PM peak hour Synchro 7/SimTraffic models, while the detailed results are provided in **Appendix D**.

From a pedestrian perspective the only sidewalks are located on the east side of Glover Ave and terminate where Glover Ave meets Route 7 (Grist Mill Road). There are no crosswalks and no pedestrian signal heads at this intersection.

Over the three-year period from 2006-2008, there were a total of thirty-six (36) crashes recorded at this intersection as shown in **Figure 20**. Nineteen (19) of the crashes were rear-end collisions, seven (7) were sideswipe collisions, seven (7) were angle collisions, and three (3) were unclassified collisions. The long queues and stop-and-go conditions in the northbound and southbound directions are likely a contributing factor to the high number of rear-end crashes. Most of all reported crashes (78%) occurred during daylight and 89% occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not seem to be the cause of crashes at this location.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

#### **Short-Term Strategies**

- Evaluate striping changes on Grist Mill to improve usage of the dual left-turn lane at Grist Mill and Route 7.
- Analyze the signal timing and existing traffic volumes along Grist Mill to determine if the timing is appropriate for existing conditions and/or consider modifying timings to reduce queuing and/or facilitate coordination.

#### **Longer-Term Strategies**

- Evaluate roadway and operational changes to improve capacity between Grist Mill and Main Avenue.
- Evaluate alternative access to/from Glover Avenue to eliminate the need for signalization.



### Focus Area 6: US Route 7 (Grist Mill Road) & Main Avenue/DMV

**Figure 19** shows the intersection of US Route 7 (Grist Mill Road) and Main Avenue (SR 719)/DMV. This intersection is probably the busiest intersection in the corridor as it serves traffic for both US Route 7 and Main Ave. The eastbound approach has one left-turn lane, one shared left/thru lane and a right-turn lane. The southbound approach has a left-turn, thru and right-turn lane, while the northbound approach has a left-turn lane and a thru/right lane. The westbound approach from the DMV has a shared left/thru lane and a shared thru/right turn lane. Major queuing occurs at the southbound and eastbound approaches during peak periods. There is a driveway to a Shell gas station and Starbucks restaurant within 100 feet north of the intersection. The proximity of these driveways to the intersection and the queuing that frequently exists in the southbound lanes contributes to difficulties for vehicles entering and exiting particularly from/to northbound Route 7. The southbound and eastbound approaches both come into the intersection at a downgrade.



**Figure 19: Intersection of US Route 7 (Grist Mill Rd) and Main Ave/DMV**

The traffic operations during both peak periods included heavy queuing on the eastbound and southbound Route 7 approaches. The eastbound dual left is an extremely heavy move where vehicles are continuing on Route 7 northbound from the Route 7 freeway section. Just north of the intersection on Route 7 are the gas station and Starbucks entrances with no left-turn pockets. This appears to cause over-utilization of the outside, northbound through lane, and under-utilization of the inside lane for drivers fearing the left-turn queue.

In the southbound direction the right lane has queuing that extends well past the upstream intersection of West Rocks Road. A key contributing cause of this southbound right lane



queuing is that almost all vehicles destined for Route 7 southbound (freeway section) use the left westbound through lane approaching the Glover Ave intersection. This appears to be partially based on the striping and lane configuration on Route 7 between Glover Ave and Grist Mill Road where an additional left-turn lane opens up at Grist Mill Road west of the Glover Ave intersection which has its own dedicated left-turn lane.

The SimTraffic analysis results show the southbound approach has a very poor LOS F with an average delay of approximately two minutes in the AM and PM peak hours, respectively, between West Rocks Road and Main Avenue/DMV. Section 3b contains overall LOS and delay results for the AM and PM peak hour Synchro 7/SimTraffic models, while the detailed results are provided in **Appendix D**.

From a pedestrian perspective sidewalks are complete on the east side of the intersection in front of the DMV, but no crosswalks are present on any legs of the intersection. Pedestrian push buttons are provided to cross the southbound Route 7 approach, but no pedestrian signals heads are present.

Over the three-year period from 2006-2008, there were a total of forty-nine (49) crashes recorded at this intersection, as shown in **Figure 20**. Twenty-five (25) of the crashes were rear-end collisions, sixteen (16) were sideswipes, four (4) were angle collisions, two (2) involved vehicles hitting a fixed object, one (1) was an overturn due to loss of control, and one (1) collision involved a bicyclist. The long queues in the southbound and eastbound directions likely contribute to the high number of rear-end crashes, similar to the intersection of US Route 7 and Grist Mill Road. The queue spillback from that intersection adds to the safety issues at this intersection since it is the cause of congestion in the southbound approach. Congestion and impatience of motorists wanting to “get-around” stopped/turning traffic likely contributes to both sideswipes and rear-end crashes. Most of all reported crashes (74%) occurred during daylight and 67% occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not seem to be a significant contributing factor to crashes at this location.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### Short-Term Strategies

- Evaluate signing and striping options south of the intersection to improve traffic flow at Route 7 and Grist Mill, thereby helping to alleviate the southbound queue.
- Evaluate modifying/restricting access for northbound traffic to properties along the southbound of Route 7 in close proximity of the intersection.

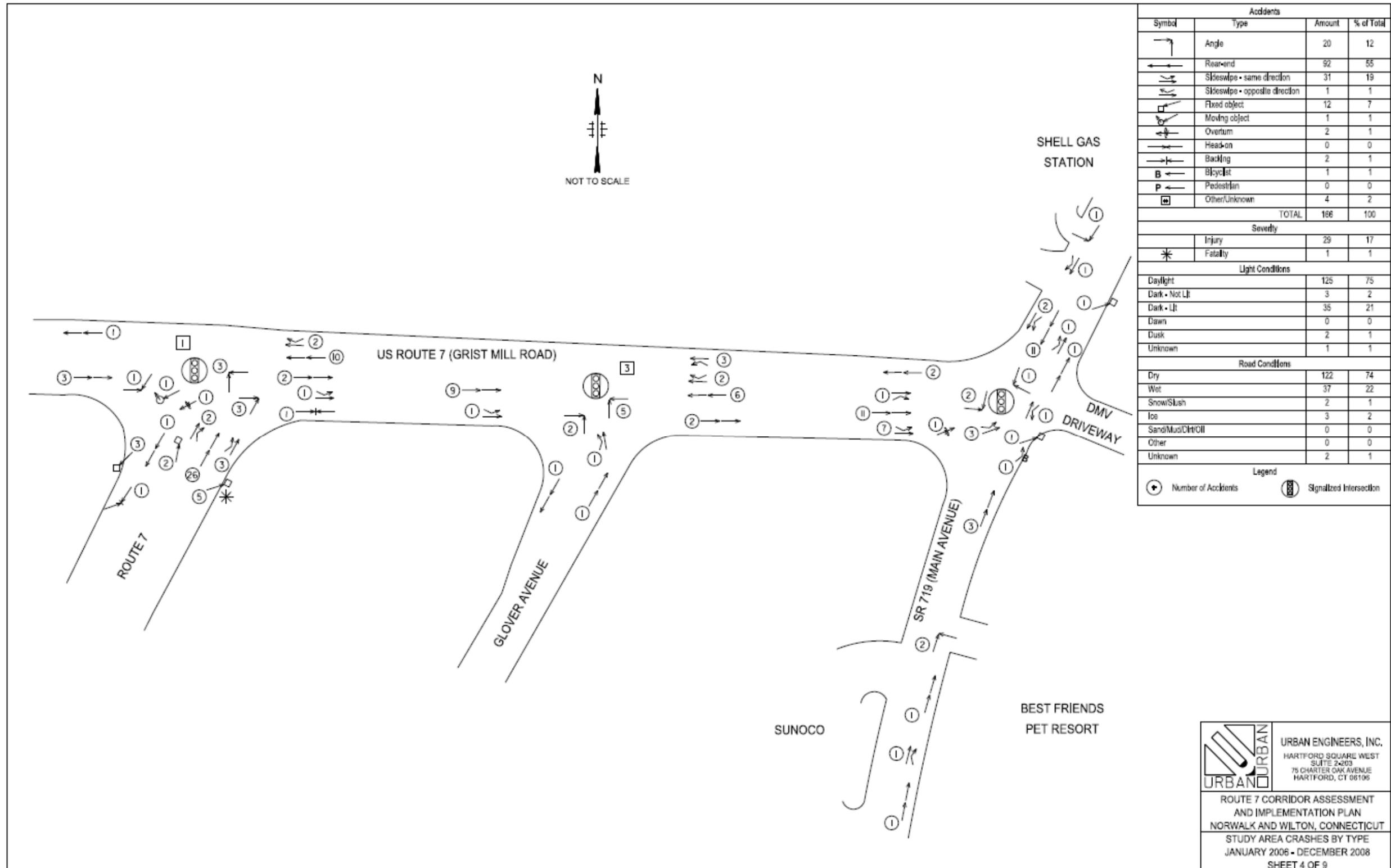


Figure 20: Crashes at intersection of US Route 7 and Grist Mill Rd, US Route 7 and Glover Ave, and US Route 7 and SR 719 (Main Ave)

**Focus Area 7: US Route 7 (Main Avenue) between US Route 7 (Grist Mill Road) (MP 4.13) and West Rocks Road (MP 4.35)**

The mid-block segment between the signalized intersections of Grist Mill Road and West Rocks Road is a four-lane section of US Route 7 (Main Avenue) with no shoulders. It contains strip malls, restaurants, and a gas station as shown in **Figure 21**. The gas station driveways are between 100 and 200 feet north of the Grist Mill Rd intersection on the west side of Route 7. During peak periods, traffic is queued in the southbound direction along the entire mid-block segment, mostly in the right lane. Northbound vehicles attempting to turn left into the gas station remain stopped in a thru lane until a gap is created by drivers in the southbound lanes, which does not occur often. As noted in the previous focus area, this creates a safety concern for rear-end, angle, and sideswipe collisions in both directions. The strip malls on both sides of Route 7 along this segment also create safety concerns due to stopped vehicles and passing attempts.



**Figure 21: US Route 7 between Grist Mill Rd and West Rocks Rd**



The traffic operations during both peak periods included heavy southbound delay stemming from the Route 7 (Grist Mill Rd) intersection that extends through West Rocks Road. The combination of this extensive queuing in the southbound right lane and multiple, frequent curb cuts for businesses creates a situation where northbound left-turning vehicles have an extremely difficult time making turns into business driveways. It appeared most of the drivers familiar with the area would avoid the northbound inside through lane in an attempt to avoid the left-turn queuing. During the PM peak causes northbound queuing to extend from the West Rocks Road intersection nearly back to the DMV. This northbound queuing created a situation similar to the southbound direction where vehicles have a difficult time making a left into the businesses on the east side of Route 7.

The Synchro 7/SimTraffic model did not include mid-block access points due to the limitation of the program; therefore, no simulation results are report for this mid-block section.

From a pedestrian perspective sidewalks are only complete on the east side of Route 7 from the DMV to the Hilton Hotel approximately 600 feet to the north. Frequent curb cuts, very heavy traffic volume, and minimal to no shoulder create an unfriendly environment for pedestrians.

As can be seen in **Figure 22**, there were a total of 114 crashes reported between 2006 and 2008, which translates to an average of 43.8 crashes per 1/10<sup>th</sup> of a mile. Of the 114 crashes, there were sixty (60) angle collisions, thirty-three (33) rear-end collisions, fourteen (14) sideswipes, three (3) involving vehicles hitting a fixed object, two (2) pedestrian crashes, one (1) was a backing collision, and one (1) was an unclassified collision. These statistics are consistent with the roadway conditions and safety concerns mentioned above. The high number of rear-end crashes are also indicative of the high volumes on the roadway and the significant volumes of people stopping or slowing to enter driveways. Sideswipes may also indicate that there are high numbers of motorists attempting to avoid others who are slowing or stopping to enter driveways. Most of all reported crashes occurred during daylight conditions (89%) and dry roadway conditions (66%), indicating that roadway lighting and pavement conditions are not a primary factor.

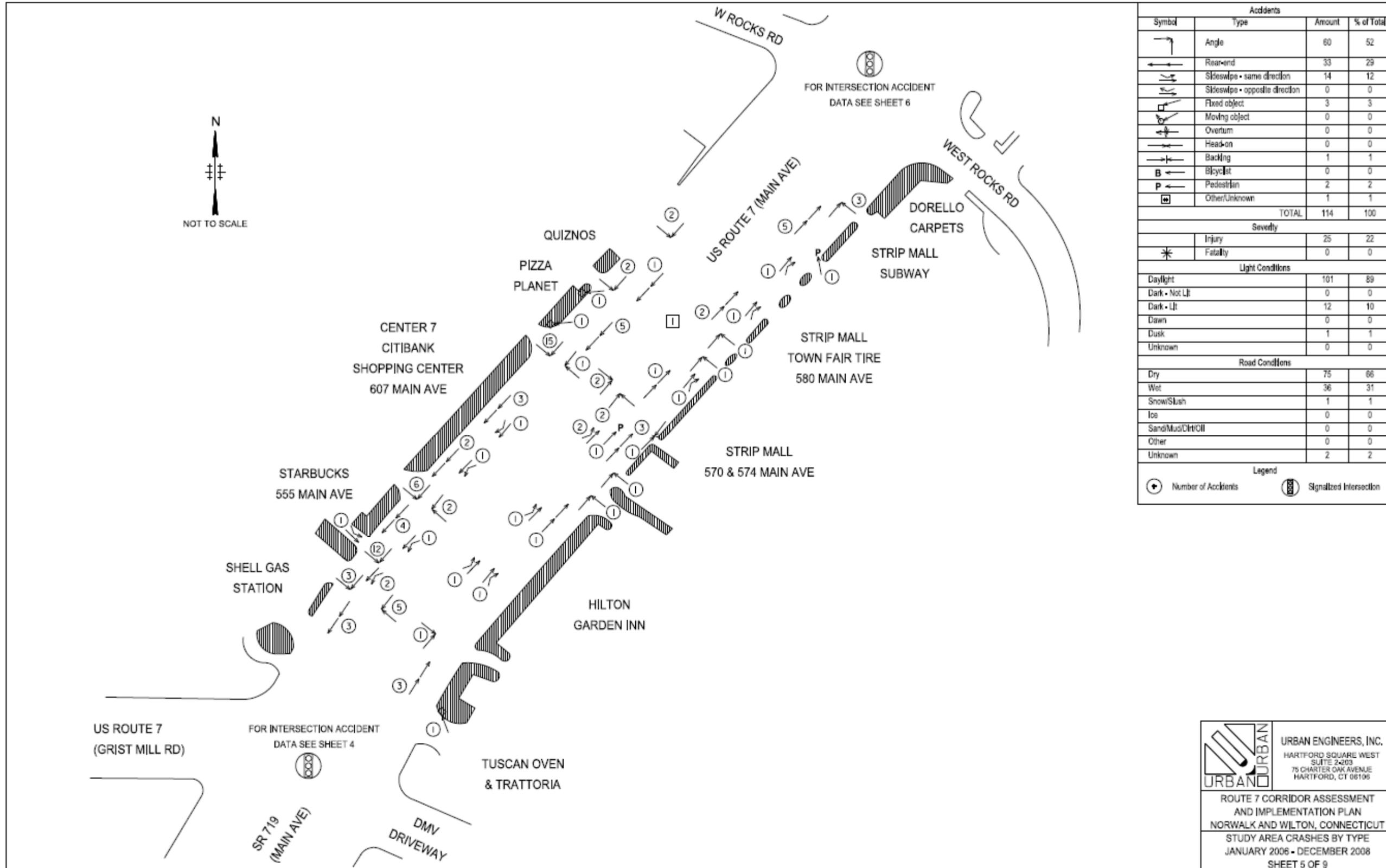
Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### **Short-Term Strategies**

- Evaluate modifying/restricting/consolidating access to properties to reduce the number of left-turning vehicles to/from the access locations, particularly at locations near intersections.

### **Longer-Term Strategies**

- Add right and/or left-turn only lanes or a center left-turn only lane.



Accidents			
Symbol	Type	Amount	% of Total
	Angle	60	52
	Rear-end	33	29
	Slideshow - same direction	14	12
	Slideshow - opposite direction	0	0
	Fixed object	3	3
	Moving object	0	0
	Overturn	0	0
	Head-on	0	0
	Backing	1	1
	Bicyclist	0	0
	Pedestrian	2	2
	Other/Unknown	1	1
TOTAL		114	100
Severity			
	Injury	25	22
	Fatality	0	0
Light Conditions			
	Daylight	101	89
	Dark - Not Lit	0	0
	Dark - Lit	12	10
	Dawn	0	0
	Dusk	1	1
	Unknown	0	0
Road Conditions			
	Dry	75	66
	Wet	36	31
	Snow/Slush	1	1
	Ice	0	0
	Sand/Mud/Dirt/Oil	0	0
	Other	0	0
	Unknown	2	2
Legend			
	Number of Accidents		
	Signalized Intersection		

Figure 22: Crashes along US Route 7 between Grist Mill Rd and West Rocks Rd

**URBAN ENGINEERS, INC.**  
 HARTFORD SQUARE WEST  
 SUITE 2403  
 75 CHARTER OAK AVENUE  
 HARTFORD, CT 06106

ROUTE 7 CORRIDOR ASSESSMENT  
 AND IMPLEMENTATION PLAN  
 NORWALK AND WILTON, CONNECTICUT  
 STUDY AREA CRASHES BY TYPE  
 JANUARY 2006 - DECEMBER 2008  
 SHEET 5 OF 9

## Focus Area 8: US Route 7 (Main Avenue) & West Rocks Road

As shown in **Figure 23**, the intersection of US Route 7 (Main Avenue) and West Rocks Road, US Route 7 approaches the intersection from the south at an upgrade and both US Route 7 from the north and West Rocks Road from the east approach the intersection at a downgrade. Motorists entering the intersection from westbound West Rocks Road also enter the intersection from a tree-lined horizontal curve, potentially making visibility an issue. Both northbound and southbound approaches on US Route 7 have two thru-lanes and one dedicated left-turn lane. The northbound Route 7 approach currently has a short, 75-foot dedicated right-turn lane. The westbound approach of West Rocks Road has been re-striped as a dedicated left lane and shared thru/right lane which is permitted to turn right on red. The eastbound approach of West Rocks Road is a driveway to the i.park facility, which is a large commercial/medical building. Pedestrian crosswalks are located at the westbound and southbound approaches.



**Figure 23: Intersection of US Route 7 and West Rocks Rd**

The traffic operations during both peak periods included heavy queuing on the northbound and southbound Route 7 approaches. The southbound queuing is related to the capacity issues



downstream at Grist Mill Road. The northbound queuing, more so in the PM peak, appears to be related to capacity issues and the access points to Shell gas station and Walmart just north of the intersection. The westbound West Rocks Road approach had significant volume, but generally cleared every cycle.

The SimTraffic analysis results show the southbound Route 7 approach has some spillback queuing and delay from the downstream intersection during the PM peak. The PM peak results also show significant delays greater than two minutes for the West Rocks Road approaches. This is due to the difficulty of modeling an extremely congested area in SimTraffic as the sidestreet vehicles find it difficult to “push” their way into the southbound Route 7 queue. The southbound Route 7 queue in this part of the network extended well past West Rocks Road and back to Gateway Shopping center in the SimTraffic model (consistent with field observations). Section 3b contains overall LOS and delay results for the AM and PM peak hour Synchro 7/SimTraffic models, while the detailed results are provided in **Appendix D**.

From a pedestrian perspective sidewalks are complete on the northeast corner of the intersection at the Shell gas station, and on the bridge structure crossing the Norwalk River on the eastbound West Rocks Road approach. Crosswalks are provided on the southbound and eastbound approaches, but pedestrian push buttons and pedestrian signal heads are only provided crossing the southbound Route 7 approach.

A bicycle and pedestrian plan was completed for the Route 7 corridor in Norwalk in January, 2012 (*Norwalk Pedestrian & Bikeway Transportation Plan, January, 2012, Fitzgerald & Halliday, Inc.*), where a shared-lane marking, or sharrow, was recommended for West Rocks Road near its junction with Route 7 to help guide bicyclist and inform motorist to expect to see bicyclist on the street.

On the southeast corner of the intersection is a carpet store with a driveway on West Rocks Road approximately 50 feet east of the intersection. On the northeast corner of the intersection is a Shell gas station with driveways within 50 feet of both legs of the intersection. These driveways along with others up to 150 feet from the intersection offer access to Wal-Mart, which is set back further from the roadway. The proximity of these driveways to the intersection create numerous opportunities for turning and conflicting traffic and are likely a factor in the high number of crashes occurring at the intersection.

Over the three-year period from 2006-2008, there were a total of thirty-eight (38) crashes recorded at this intersection as shown in **Figure 24**. Nineteen (19) of the crashes were rear-end collisions, nine (9) were angle collisions, six (6) were sideswipes, one (1) was an overturn due to equipment failure, one (1) involved a vehicle hitting a fixed object, one (1) was a backing collision, and one (1) involved a vehicle hitting a moving object. Most of all reported crashes (66%) occurred during daylight and 63% occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not seem to be the cause of crashes at this location, but may need to be investigated further.



Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### **Short-Term Strategies**

- Modify and/or consolidate .access point near the intersection to reduce the number of conflicting/turning moves.
- Evaluate existing access to/from Walmart.
- Analyze the signal timing and existing traffic volumes to determine if the timing can be modified to reduce the queueing.

### **Longer-Term Strategies**

- Improve Kent Road to provide an alternative access to/from i.park.
- Evaluate the feasibility of extending Foxboro Drive into i.park.

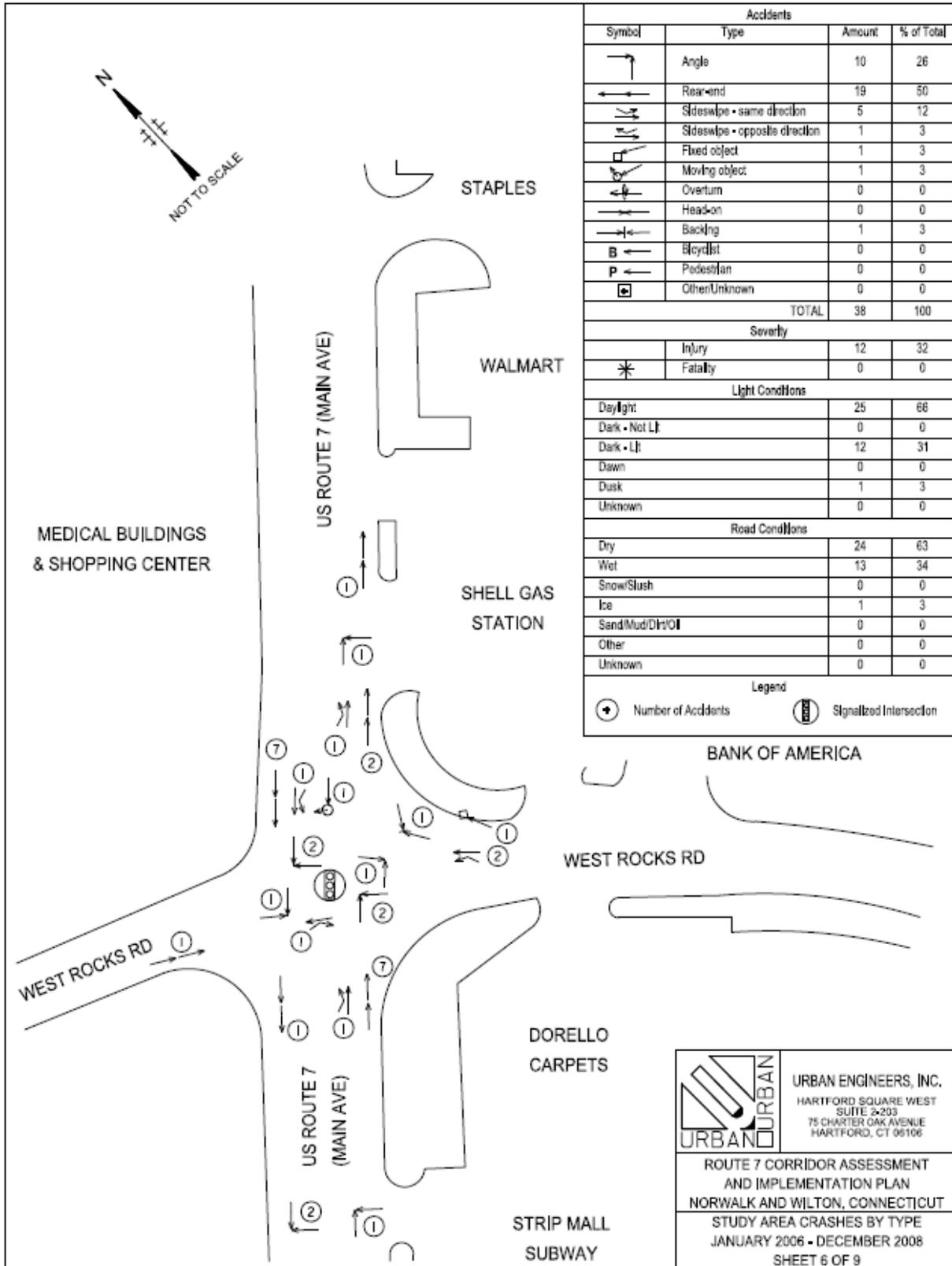


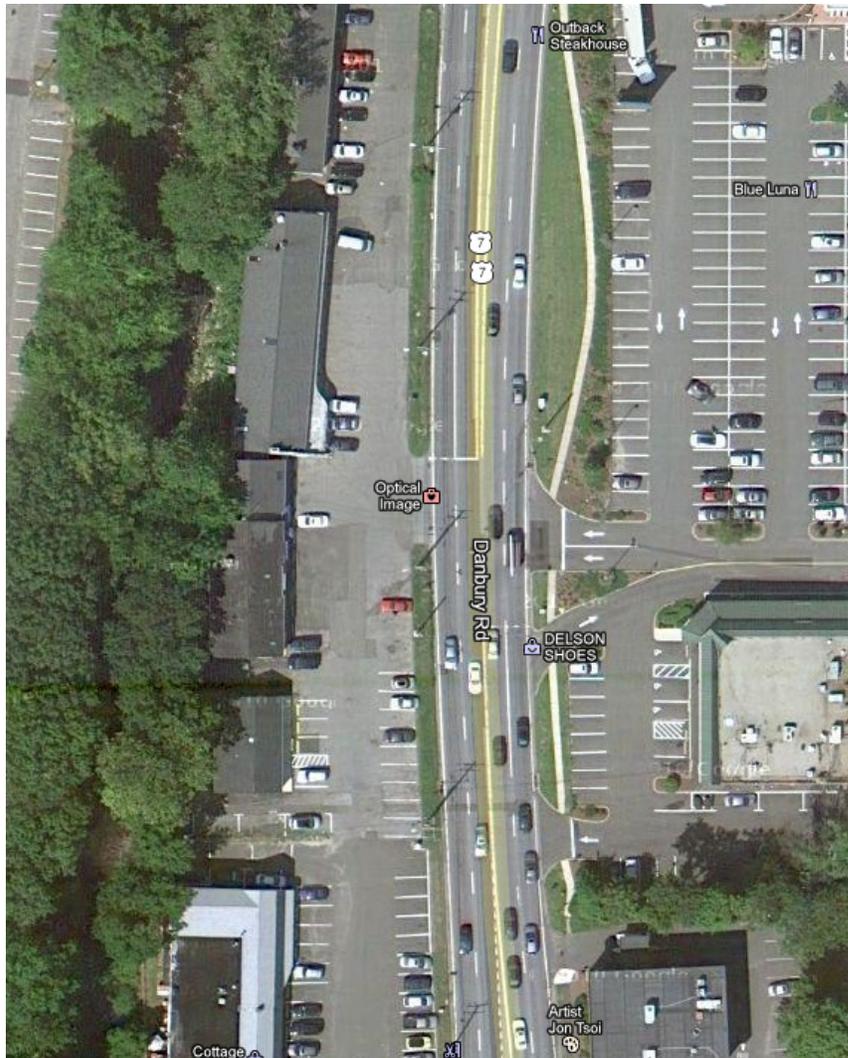
Figure 24: Crashes at the intersection of US Route 7 and West Rocks Rd

### Focus Area 9: US Route 7 & Gateway Shopping Center Exit

At the intersection of US Route 7 (Norwalk-Danbury Road) and the main Gateway Shopping Center exit, US Route 7 approaches the intersection from the south at an upgrade and both US Route 7 from the north and the shopping center drive from the east approach the intersection at a downgrade. Both northbound and southbound approaches on US Route 7 have two shared thru/turn lanes, and left turns are prohibited in the southbound direction. The westbound approach of the shopping center has two shared exit turning lanes where right turns on red are allowed. The eastbound approach driveway to the strip mall has no signing or striping on the intersection approach.

On the east side of the intersection is the Gateway Shopping Center and on the west side is a strip mall including mostly smaller stores. In addition to the exit from the Gateway Shopping Center at the signal, the shopping two other exits: One located at the northern end of the shopping center and one located approximately 100 feet south of the intersection, which appears to be primarily used for deliveries and employees. The only entrance to the shopping center for southbound motorists is 300 feet north of the intersection at an unsignalized location with an approximately 8-foot wide striped area to move out of the Route 7 through lanes. Missing this entrance could cause potential issues if the motorist is unfamiliar with the area.

The southbound traffic operations during the AM peak period generally operated well with minimal queuing and delay. During the PM peak in the southbound direction queuing sporadically extended back to the Gateway Shopping Center. The northbound direction during the AM and PM peak periods had slow moving traffic approaching the signal which could be due to the horizontal curve that begins south of Foxboro Road. During the travel time runs for both peaks, the run stopped at a red light at this intersection, so signal coordination may be an issue as well.



**Figure 25: Intersection of US Route 7 and Gateway Shopping Center**

With no traffic volumes available for this intersection, the Synchro 7/SimTraffic analysis was not conducted.

From a pedestrian perspective sidewalks are complete on the east side of Route 7 along the Gateway Shopping Center, but missing on the west side along the strip mall. There is a pedestrian push button on the northeast corner, but no painted crosswalks.

Over the three-year period from 2006-2008, there were a total of thirty-four (34) crashes recorded at this intersection as seen in **Figure 26**. Sixteen (16) of the crashes were rear-end collisions, ten (10) were sideswipe collisions, seven (6) were angle collisions, and one (1) was an overturn due to loss of control. The high percentage of sideswipe and rear-end crashes is indicative of the numerous access points and lack of lanes to separate turning traffic. Most of all reported crashes (76%) occurred during daylight and (59%) occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not appear to be the primary cause of crashes, although both percentages are slightly lower than other locations throughout the corridor so both the lighting and pavement conditions may need to be investigated further.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### Short-Term Strategies

- Analyze the signal timing and existing traffic volumes to determine if the timing is appropriate for existing conditions.
- Provide a dedicated right-turn lane for northbound motorists into the shopping center. This could help reduce the number of rear-end collisions near the southern entrances to the shopping center.
- Consider modifications to access points.
- Evaluate striping changes to create a dedicated southbound left-turn lane into the Gateway Shopping. As part of this, evaluate operational benefits and impacts.
- Provide pavement markings on the west side of the intersection to delineate turn lanes.

### Longer-Term Strategies

- Evaluate site circulation to determine if a better circulation pattern can be developed to reduce the number of access points and provide potentially safer access to/from the site.

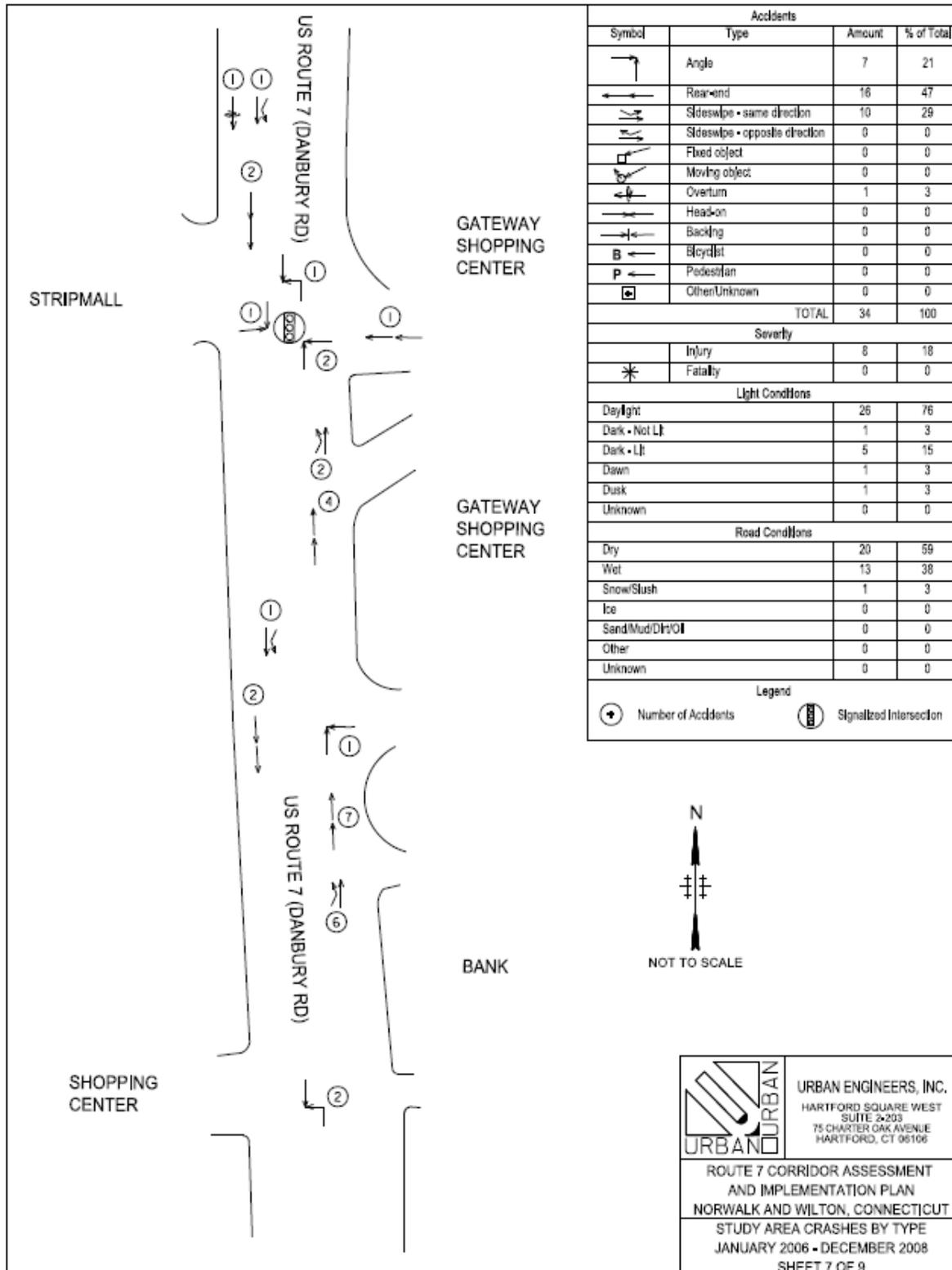


Figure 26: Crashes at the intersection of US Route 7 and Gateway Shopping Center

**Focus Area 10: U.S. Route 7 (Norwalk-Danbury Road) & Kennsett Avenue**

**Figure 27** shows the signalized T-intersection of US Route 7 (Norwalk-Danbury Road) and Kennsett Avenue. US Route 7 approaches the intersection from the south at an upgrade and US Route 7 from the north approaches the intersection at a downgrade. Both northbound and southbound approaches on US Route 7 have two shared thru/turn lanes. The westbound approach of Kennsett Avenue has two lanes with worn striping and no signs indicating lane usage. The westbound approach includes two driveways, one an entrance only to a bank and the other an entrance/exit to a small shopping center. Less than 100 feet in any direction is another driveway to more shops or banks. To the north, a bank driveway is exit only and can be difficult for those attempting to go southbound.



**Figure 27: Intersection of US Route 7 and Kennsett Ave**

On the west side of the intersection are multiple small shopping centers, a bank, and a Dunkin Donuts which creates access issues due to increased activity this business creates and the proximity of the access to the intersection. On the northeast corner is Chase Bank with

driveways less than 100 feet from both legs of the intersection. On the southwest corner is HSBC Bank, also with driveways less than 100 feet from both legs of the intersection.

The traffic operations at this intersection generally operated well for both peaks. Depending on the arrival rate of southbound left-turning vehicles, occasionally a southbound queue in the left lane would be present. The Dunkin Donuts entrance 100 feet to the north caused northbound drivers to queue in the left lane causing other drivers to weave around them. It was also noted that drivers had difficulty exiting this access point heading north on Route 7.

The SimTraffic analysis showed LOS A on Route 7 and LOS C or LOS D on Kennsett Avenue. Section 3b contains overall LOS and delay results for the AM and PM peak hour Synchro 7/SimTraffic models, while the detailed results are provided in **Appendix D**.

From a pedestrian perspective sidewalks are complete on the east side of Route 7, but missing on the west side. Pedestrian push buttons are located on the southeast corner, and the island on the west side of Route 7 directly across Kennsett Ave, but no marked crosswalks are present.

Over the three-year period from 2006-2008, there were a total of fifty-four (54) crashes recorded at this intersection as seen in **Figure 28**. Thirty (30) of the crashes were rear-end collisions, nineteen (19) of the crashes were angle collisions, and five (5) were sideswipes. With the simulation results and field observations indicating that traffic flows relatively well at this location, the high number of rear end crashes is indicative of unexpected turns or stops. Three of the sideswipes occurred in the northbound direction at the entrance to Dunkin Donuts. Most of all reported crashes (87%) occurred during daylight and 65% occurred when the roadway surface was dry. This indicates that lighting and pavement conditions do not appear to be the significant factor in the crashes at this location.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### Short-Term Strategies

- Evaluate the benefit of adding “Be Prepared to Stop” signs.
- Analyze the signal timing at this intersection and Kent Rd to confirm coordination is working as intended.
- Evaluate modifications/turn restrictions to limit the amount of left-turning traffic at unsignalized locations.

### Longer-Term Strategies

- Evaluate creating left-turn lanes at Kensett and/or a shared center turn lane.

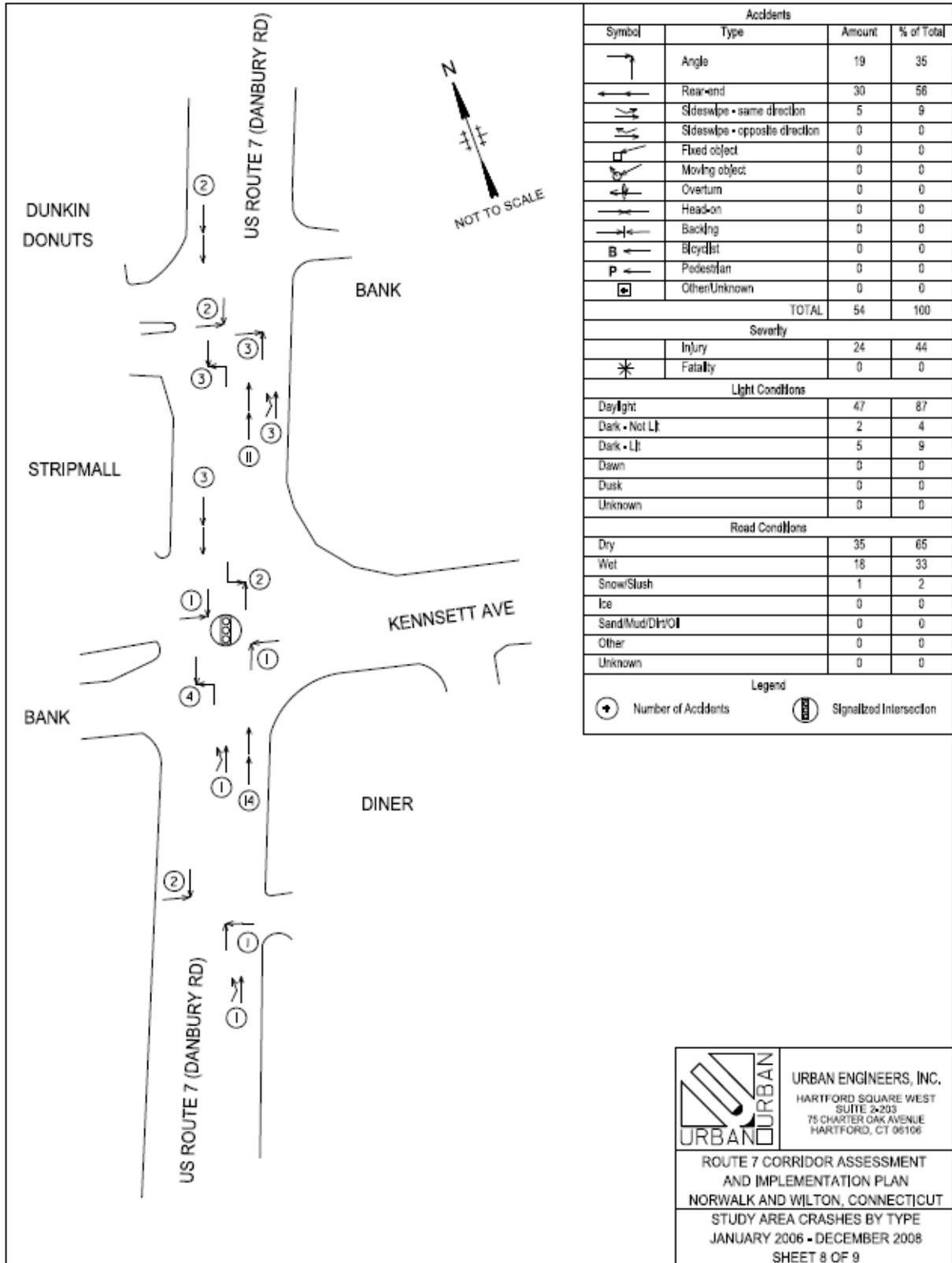


Figure 28: Crashes at the intersection of US Route 7 and Kennsett Ave

### Focus Area 11: U.S. Route 7 & Grumman Hill Road

**Figure 29** shows the signalized intersection of US Route 7 (Norwalk-Danbury Road) and Grumman Hill Road. US Route 7 has a shared thru/left and shared thru/right lane in each direction, and right turn on red is allowed in both directions on Route 7. The westbound approach of Grumman Hill Road has one lane, and the eastbound approach serves as a driveway to ASML and has a shared left/thru lane and a short right-turn lane.



**Figure 29: Intersection of US Route 7 and Grumman Hill Rd**

On the west side of the intersection is ASML, a large production company. On the northeast corner of the intersection is a sporting goods store with a driveway 100 feet north of the intersection. On the southeast corner of the intersection is a building with a driveway on Grumman Hill Rd about 100 feet to the east which does not seem to impact the intersection.

The traffic operations at this intersection were focused around the left-turning traffic occupying the left lane on Route 7. The lack of left-turn lanes at this intersection causes drivers to over-utilize the right/through lane, and drivers that get caught behind left-turning traffic weave around vehicles causing an unsafe situation where sideswipes and rear-end crashes could occur.

The SimTraffic analysis showed LOS C and LOS D for average overall intersection delay, but the bigger concern at this intersection is the safety issues associated with no left-turn lanes.

From a pedestrian perspective there are no sidewalks in the area, no crosswalks on any approaches, but pedestrian push buttons are included on the northwest and northeast corners of the intersection.

Over the three-year period from 2006-2008, there were a total of forty-three (43) crashes recorded at this intersection as seen in **Figure 30**. Twenty-one (21) of the crashes were rear-end collisions, fourteen (14) were angle collisions, five (5) were sideswipes, and three (3) involved a vehicle hitting a fixed object. The types of crashes are indicative of the conditions (lack of turn lanes) that exist at the intersection. Most of all reported crashes (82%) occurred during daylight and 56% occurred when the roadway surface was wet. This indicates that lighting conditions do not seem to be the significant contributing factor in the crashes at this location but pavement conditions might need to be investigated further as the percentage of wet surface crashes is relatively high compared to the rest of the corridor.

Based on access issues, traffic operations, pedestrian/bicycle concerns, and safety/crash analysis, the following measures can be considered to improve multi-modal conditions at this intersection:

### Short-Term Strategies

- Evaluate pavement conditions to determine if wet surface/conditions are a factor.
- Analyze the signal timing and existing traffic volumes to determine if the timing is appropriate for existing conditions.
- If not already present, install advanced signing to warn motorists of the upcoming traffic signal (in southbound direction since this is the first signal after Route 33) and the potential for stopped conditions.

### Longer-Term Strategies

- Create left-turn lanes on Route 7.

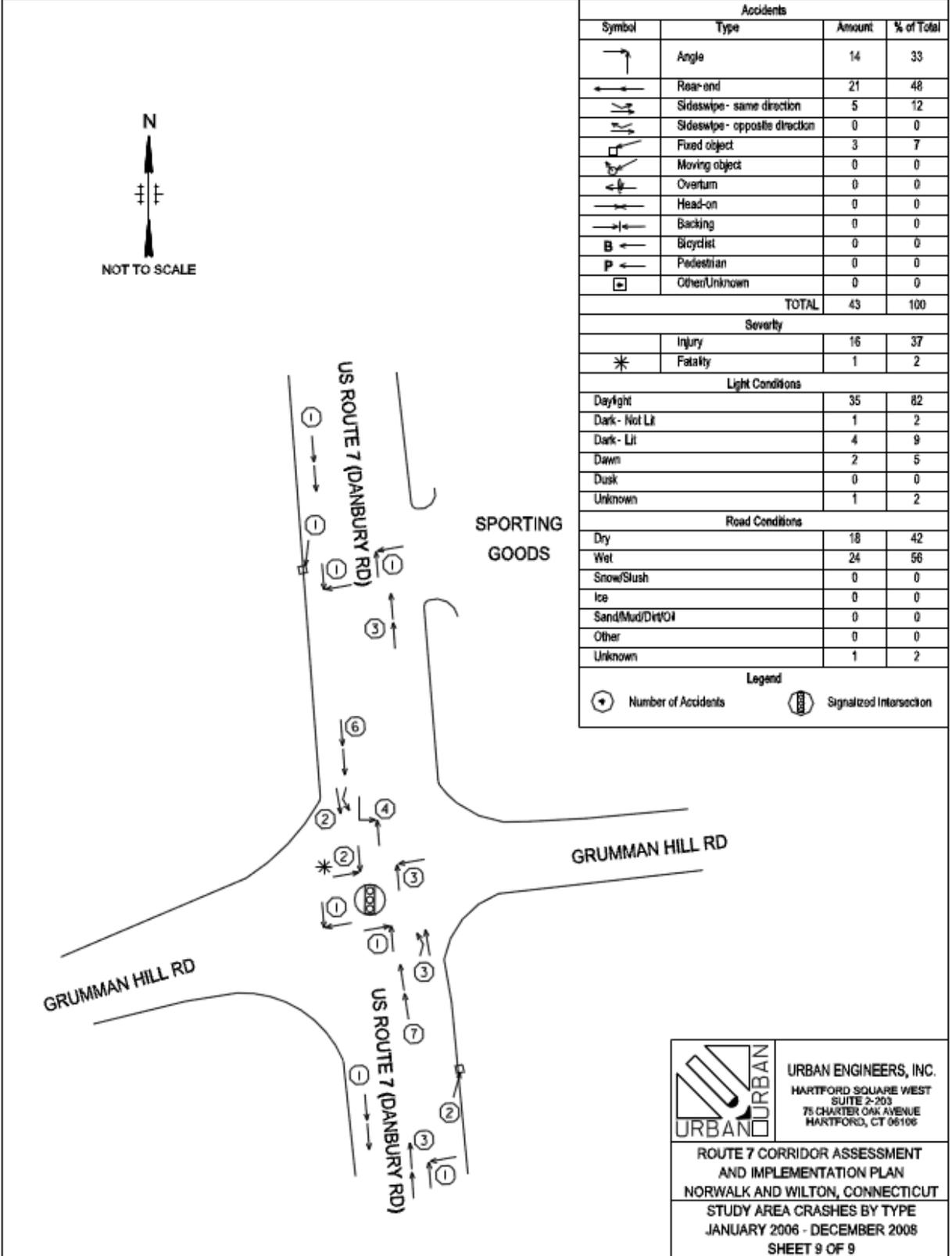


Figure 30: Crashes at the intersection of US Route 7 and Grumman Hill Rd

## **B. General Corridor Needs**

In addition to the focus areas the corridor's general needs include the following:

### **Crosswalks and Pedestrian Signals**

The following locations have no striped crosswalks crossing Main Avenue or Route 7 and need to be evaluated:

- Main Ave & Delaware Ave
- Main Ave & Broad Street
- Main Ave & Glover Ave/Creeping Hemlock Drive
- Main Ave & Xerox Driveway (801 The Towers Driveway)
- Main Ave & Four Merritt 7 Corporate Driveways
- Merritt 7 railroad station
- Route 7 & Gateway Shopping Center
- Route 7 & Kent Road
- Route 7 & Kennsett Ave
- Route 7 & Grumman Hill Road
- Route 7 & Route 33

The Norwalk Pedestrian & Bikeway Transportation Plan recommended the following locations for crosswalks and pedestrian signals

- • West Rocks Road: east leg
- • Grist Mill Road: north, east
- • Valleyview Road: all 4 legs
- • Merritt 7 intersections (3 total excluding Valleyview): north, south, west
- • Glover Avenue: north, west
- • Linden Street: south, east
- • Perry Avenue: west, north
- • Broad Street: north, south, west
- • Delaware Avenue: south, east

### **Sidewalks**

The following locations have incomplete sidewalks in locations where pedestrian activity is present or expected:

- Main Avenue:
  - Broad Street to Delaware Ave
  - Glover Ave to Merritt 601 Driveway
  - To/From Merritt 7 railroad station
- Route 7

- Grist Mill Road to West Rocks Road
- Gateway Shopping Center to Kennsett Ave
- North of Wilton Corporate Park Main Entrance

### **Access**

The following locations in the project area have existing issues that can be improved with access changes:

- Frequent curb cuts for business and no left turning lanes from RT 123 through Linden Street,
- Merritt 7 railroad station and its connection to the corporate complex,
- Grumman Hill Road to Route 33 including multiple access points, driveway striping, and new housing developments, and
- Ingress/egress to the corporate park on 10 Westport Road, Wilton, CT.

In addition to these locations access management plans for Norwalk and Wilton should be followed for any new developments or access modification for existing sites. Driveway location, spacing, and overall design should follow these access management plans in an effort to create the safest condition possible for all users of the area.

### **Operational**

The following operational issues are occurring in the project area:

- Fire and EMS reported that emergency vehicle preemption systems (EVPS) receptors on signals are misaligned and not functioning properly.
- Previous studies have indicated that future volumes will require a second through lane in the southbound direction between Route 33 and Grumman Hill Road. This is also necessary to provide lane continuity and improve safety.
- The Norwalk Valley River Trail is planned to connect south of the Merritt Parkway to Route 33, and this requires a connection under the Merritt Parkway, and movement across the over-capacity Route 7 (Grist Mill Road), both of which pose design and operational issues for key locations in the project area.

### **Transit**

The demand for bus service in all forms appears to be growing steadily in the study corridor. Improvements to the roadway network will need to accommodate both transit vehicles in increasing frequency and/or numbers as well as automobiles. The Merritt 7 Station on Route 7 is a heavily used commuter rail stop in the center of the study corridor. Currently, improved service on the branch line is being programmed and is expected to increase demand for commuter rail in the corridor and subsequently result in higher parking demand at all the stations along the corridor from Norwalk to Danbury, including Merritt 7. Improvements to the station are currently being evaluated and a potential new parking lot for commuters could be located on the east side of Route 7 across the street from the Merritt 7 office complex. Still, there will be a need to accommodate the parking demand in a number of strategic ways, including reducing demand with enhanced transit access to the station via the commuter bus system and system of employer shuttles.