South Jersey Transportation Planning Organization

2006 Road Safety Audit

Tilton Road (CR 563)
Northfield/Egg Harbor Townships, Atlantic County

Prepared By:

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In Association with:

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Introduction

Orth-Rodgers & Associates, Inc. (ORA) was selected by the South Jersey Transportation Planning Organization (SJTPO) to conduct their 2006 Road Safety Audit (RSA) program. The sections of roadway to be studied were selected by SJTPO based on a number of factors considered important to the safety and future development of the roadways. Among the factors considered were crash data, traffic volume growth, local cooperation and control, and recent and planned future development along the roadway. Except at the intersection of a state highway with the study roadway, state highways were excluded from the process. County and local officials cooperated with the SJTPO in identifying roads that meet these parameters.

Five roadway sections were chosen for the 2006 audits. Two of the roadways are located in Atlantic County, one is in Cumberland County, one in Cape May County, and one in Salem County. The five roadway sections are:

1. Tilton Road (CR 563) between Shore Road (CR 585) and the Black Horse Pike (US 40-322) (MP 3.70-6.27), in the Townships of Northfield and Egg Harbor, Atlantic County.

2. Jimmie Leeds Road (CR 561 & 633), between Pitney Road (CR 634) and Pomona Road (CR 575) (MP 1.54-4.49) and CR 633 (MP 0.64-1.68), in Galloway Township, Atlantic County.

3. Main Road (CR 555) between Sherman Avenue (CR 552) and E. Chestnut Avenue (MP 13.70-16.05) in the City of Vineland, Cumberland County.

4. Bayshore Road (CR 603) from Route US 9-Sandman Boulevard (a.k.a. Ferry Road) to Fishing Creek Road (CR 639) (MP 1.74-3.80) in Lower Township, Cape May County.

5. Broad Street (CR 607) between N. Virginia Avenue (US 130) and Maple Avenue (CR 634) (MP 0.00-1.93) in the Township of Carneys Point and the Borough of Penns Grove, Salem County.

Each studied roadway will have a separate report, but will share basically the same introduction, background section, format and some text.

Safety audits serve to address the safe operation of the roadways and to ensure a high level of safety for all road users. The process of a safety audit is two-fold: 1) to conduct a formal examination of highway features and the surrounding environment that increases the potential for crashes; and, 2) to identify countermeasures that will reduce or eliminate the probability of such crashes. According to the Federal Highway Administration (FHWA), the formal definition of a road safety audit is as follows:

"A Road Safety Audit is the formal examination of an existing or future roadway or traffic project by an independent team of trained specialists."[1]

To accomplish these goals, the audit team assesses the safety performance history as well as the future crash potential of a roadway and prepares a report that documents the safety deficiencies and appropriate countermeasures.

The purpose of the 2006 audit is to identify potential safety deficiencies along the selected section of five roads. There are three primary parts of the audit: 1) the data collection and analysis phase; 2) the field view (conducted by the team); and, 3) the preparation of the report and findings.

The **data collection phase** is performed prior to the audit team conducting a field view of the entire roadway. The data is intended to assist the team in identifying potential safety problems, as well as to provide a factual and historic component of the study. Traffic count and crash data are collected, and a capacity analysis of major intersections is performed. The traffic counts are used to assist in analyzing solutions for the intersections, as well as aid in identifying the most congested sections of the roads. The crash data assists the team in identifying specific areas and/or conditions that warrant close scrutiny that might have otherwise been overlooked. The capacity analysis of intersections identifies how well the intersections are operating and when

1 Federal Highway Administration, Road Safety Audits and Road Safety Audit Reviews, EDL #12345 FHWA XX-03-999

and where improvements may be needed. Based on an analysis of all data, the audit team can conduct a productive and comprehensive evaluation of the roads being studied. The field **view** is conducted by a multi-disciplinary team. In this case the team walked the entire length of the study area, discussing observations and taking notes for inclusion in the report. The team leader then prepared a **draft report** that documented the audits findings and recommended actions. The draft report was distributed to the team members for their review and comments. A final report was then prepared by the team leader incorporating the agreed upon draft report comments.

BACKGROUND INFORMATION

A meeting was held on October 11, 2005 at the SJTPO offices with representatives of all four counties, SJTPO and ORA to discuss the implementation of the 2005 safety audit findings and to gather information on the 2006 roadways to be audited. At that meeting ORA sought to obtain background information on the selected 2006 sections of roadways from the counties by asking such questions as:

- Why was the road chosen for the audit?
- What problems exist on the road?
- What areas should be given special attention?
- Has the roadway changed in the last three years?
- Are there any projects pending or anticipated for the roadway and their status?
- Have any of the traffic control devices or regulations been changed in the last three years (i.e., signals, speed limits, etc.)?
- Was there any development on the road in the last three years, or any proposed development on the road or in the area that will impact traffic?
- Are any recent traffic counts available?
- Have any recent traffic studies been conducted on the road?
- What plans, if any, are available for the road?
- At what locations should new traffic counts, either turning movement or ATR's be conducted?

The same questions were again asked at the workshop on the day of the audit to ensure that no available data was missing. Since Atlantic County had already participated in two previous road safety audits, ORA did not schedule a general kick-off meeting. Additionally, a pre-audit information package was prepared and distributed in advance of the workshop and field view. The package included a brief explanation of what a safety audit is, why safety audits are conducted, and the process involved. It also included a line diagram plot showing the crash data for Tilton Road (CR 583); charts of three-year crash trends, crash occurrence by month, by day of the week, by time of day, by surface condition, by light condition, by crash severity, by crash type, and by closest intersection. All team members were asked to review the information package prior to attending the workshop and audit. Also, prior to the audit ORA had contacted the Northfield and Egg Harbor Township Police Departments and explained the purposes and process involved in the audit to the ranking officers assigning their representative to the team. Since most of the scheduled team members had already participated in either the FY 2004 or FY 2005 audits, and all stakeholders should have received the information package, the workshop and field views were scheduled to take place on the same day.

TILTON ROAD (CR 563)

Tilton Road (CR 563) is under the jurisdictional control of Atlantic County. It is designated as a south-north road. The section being audited extends between Shore Road (CR 585)-Mill Road (CR 662) on the southern end of the study area and Route US 40-322 at the northern end of the study area. This section of road between Shore Road (CR 585)-Mill Road (CR 662) and Route US 9 is classified as an urban minor arterial with the remainder of the road classified as an urban principal arterial. The total length of the study area is 2.57 miles.

With the exception of left-turn lanes at the Shore Road-Mill Road and Zion Road intersections, Tilton Road is marked as a two-lane road without shoulders between Shore Road-Mill Road and Route US 9. North of Route US 9, a there is short four-lane section that becomes a five-lane section to just south of Hingston Avenue. From Hingston Avenue north, the lane configuration varies until the road transitions back to four lanes as it passes under the GSP overpass.

The curb line development from Shore Road-Mill Road to Willow Drive is principally residential in nature. From Willow Road north the development is mostly commercial and retail being more densely developed north of Route US 9. There are several significant traffic generators along the road including the Heathcroft Shopping Plaza, Tilton Shopping Center, and the Island Gym Plaza. No major planned future development along the road was mentioned during the audit.

There are seven signalized intersections in the study area, one at the southern end of the study area at Shore Road-Mill Road, at Zion Road, at Route US 9, at Burton Avenue, at Hingston Avenue, at Fire Road, and at Route US 40-322.

The following sections describe the various tasks undertaken by ORA in partnership with the Safety Audit Team and summarize the findings from the audit process in a manner that will allow the responsible agencies and personnel to prioritize implementation of safety enhancements.

Pre-Audit Data Collection and Analysis

Prior to the audit activities on site, ORA collected and reviewed traffic data and other related materials in order to assist the team in conducting the audit. A description of the materials that were reviewed is provided below.

1. **Aerial Photos**

   Aerial photographs of the study section, scaled at approximately 1"=300', were printed and used as reference at the audit meeting.

2. **Straight Line Plan**

   Straight line plans, 1"=400', were developed of the study section of the road. The crash data was shown on these plans for use at the audit and for the final report.

3. **Traffic Volume Data**

   No traffic count data was requested for the road.

4. **Traffic Signal**

   The County submitted traffic signal plans and timings for the intersections of Tilton Road and Shore Road/Mill Road, Burton Ave, Cressen Ave, Hingston Ave and Fire Road. Only at Shore Road/ Mill Road and Cressen Avenue did the plans reflect the actual as built conditions. Either the signal display was different, the lane configuration was different or both were different from what was shown on the plans. The signalized locations are discussed in detail in the findings of the report.

5. **Crash Data**

   SJTPO forwarded to ORA the crash reports from the Northfield Township Police Department for the years 2002, 2003, 2004, and crash reports from the Egg Harbor

Township Police Department for the years 2002, 2003, 2004 and 2005 (the first 9 months). Summary sheets were prepared for the three-year, nine-month period. For the three-year, nine-month period, a total of 310 crashes were plotted for the study section of road. Eighty-four (84) crashes occurred in Northfield Township and 226 in Egg Harbor Township. Eighty-seven (87) crashes occurred in 2002, 104 in 2003, 85 in 2004, and 34 in the first nine months of 2005 (Egg Harbor only).

Of the 310 crashes 124 occurred in the vicinity of Fire road and 50 in the vicinity of Hingston Avenue.

The type of crashes are characterized as follows:

0 – Fatal crashes

76 – Injury crashes

234 – Non-injury crashes

73 – Right-angle type crashes-Three at Burton Ave, three at driveway to Wendy's, six at driveway to Island Gym Plaza, three at Cressen Ave, ten at Hingston Ave, twenty at Fire Road, three at driveway to Sunoco station on Fire Road, and three at ramp from GSP. No other concentrations.

179 – Same-direction type crashes- Twelve at Rt US 9, four at Cressen Avenue, twenty five at Hingston Ave, eighty six at Fire Road, and eighteen at Rt US 40-322. No other concentrations.

27 – Left-turn type crashes. Three at RT US 9 and three at Hingston Ave. No other concentrations.

14 – Right-turn type crashes- no concentration.

3 – Fixed-object type crashes

7 – Other type crashes

2 – Pedestrian type crashes

A review of the crashes established the following:

- The critical months for crashes were June and December.
- The highest frequency of crashes occurred on weekdays with Friday having the highest frequency of crashes.
- The highest frequency of crashes occurred between 4:00 PM and 5:00 PM.
- The percentage of crashes during hours of darkness (15%) is approximately half the statewide average for county roads (approximately 30%).
- The percentage of crashes for wet surface conditions (23%) is consistent with the statewide average for county roads (approximately 24%).
- The percentage of crashes with snowy or icy surface conditions (1%) is less than the statewide average for county roads (approximately 5%).
- The percentage of crashes with injuries (24%) is somewhat less than the statewide average for county roads (approximately 30%).
- The percentage of right-angle type crashes (24%) is consistent with the statewide average for county roads (approximately 21%).
- The percentage of same directional crashes (58%) is much greater than the statewide average for county roads (approximately 29%).
- The percentage of left-turn crashes (9%) is greater than the statewide average for county roads (approximately 6%).
- The percentage of sideswipe type crashes (0%) is significantly less than the statewide average for county roads (approximately 12%).
- The percentage of fixed-object type crashes (1.6%) is significantly less than the statewide average for county roads (approximately 12%).

6. Other Information

Additional materials reviewed by ORA prior to the formal audit process included videotapes taken by A-TECH Engineering, Inc.

Materials listed above are included in the Appendix.

Audit

On December 14, 2005, the Safety Audit Team met in the Atlantic County Engineer's office on the corner of Route US 9 and Dolphin Avenue to formally conduct the audit. The meeting commenced at 9:00 AM with brief statements by ORA representatives who reiterated the importance of RSAs and outlined the objectives of the safety audit. There were brief introductions by team members followed by an extensive review and discussion of materials described in the previous section. The team then drove to the Tilton Road and Shore Road-Mill Road intersection to begin the audit. Atlantic County provided a van for the team. Team members are listed below.

SAFETY AUDIT TEAM FOR HOOK ROAD

Name	**Agency**
John Peterson	Atlantic County Planning
James Mason	Atlantic County Engineering
Edward Newman	Atlantic County Engineering
John Masi	Atlantic County Engineering
Norman Deitch	Orth-Rodgers & Associates, Inc.
Bill Schiavi	SJTPO
George Strathern	Orth-Rodgers & Associates, Inc.
Eric Dettinger	Northfield Township Police Department
Timothy Chelius	SJTPO
Wayne Mathis	NJDOT

The team began at Shore Road-Mill Road walked to Cressen Avenue before breaking for lunch. After lunch, the team resumed the audit and walked north to Route US 40-322.

During the walk, team members identified features on the roadway and its surrounding environment that could contribute to the occurrence or relative severity of roadway crashes. At each intersection and mid-block location, the Audit Team identified safety deficiencies and inappropriate traffic signs, as well as other items that are not consistent with effective road

function and use. A variety of safety improvement measures were discussed with field notes and digital photographs being taken by team members.

At the completion of the audit, the team leader recapped the findings of the audit with the team. The team leader informed the team members on the next step in the audit process; ORA will prepare a draft report summarizing the findings from the audit process and forward the report to all team members for their review and comments.

Timothy Chelius, Norm Deitch and George Strathern conducted a night audit on February 28, 2006. The goal was to check the retroreflectivity of the street signs, pavement markings, and condition of the raised pavement markers (RPMs). In addition, the need for street lighting was checked and lights adjacent to the roadway on private property were checked to ensure that they did not create bright areas that could distract drivers. The team also looked for issues that would only be apparent during hours of darkness, such as clearly defined roadway alignment, signal indication visibility conflicts, ineffective street lighting, etc. The observations and results of the nighttime audit are listed in Item # 48 of the findings.

The next section of the report summarizes the findings from the roadway inspection.

Findings

The findings from the Tilton Road (CR 563) safety audit are presented on the following pages in the approximate order of their location along the roadway beginning at Shore Road-Mill Road and traveling north to Route US 40-322.

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
1	General comment - Sign installation. Many of the signs along the road are installed as "bendaway" rather than "breakaway." Many installed as "breakaway" are installed incorrectly with the snub too far out of the ground or on the wrong side of the post.	Consideration should be given to inventorying the method of sign installation along the entire road and taking steps to properly install all signs as "breakaway" in accordance with the most current NJDOT standards and the MUTCD.		X			X	
2	General comment - All of the signals within the audited section of road either had no street name mastarm mounted signs or those that had signs the letter size on the sign appeared too small.	Install mastarm mounted street name signs at all signalized intersections using 8" C for upper case letters and 6" C lower case letter.	X			X		
3	Traffic signal at Mill Road/Shore Road - the signal phasing provides an exclusive green interval for southbound Tilton Road traffic. At this intersection this signal phasing requires that at least one of the signals facing the approach have a left turn green arrow on with the green ball.	Revise signal installation to conform to current MUTCD requirement.		X		X		
4	Traffic signal at Mill Road/Shore Road - signal phasing provides protected/ permitted left turn movement from the Shore Road approaches. Although not required, it is common practice to install supplementary sign with this type of signal phasing.	Install R10-12 (LEFT TURN YIELD ON GREEN (symbolic green ball) signs on mastarms. Signs to face Shore Road traffic.	X			X		
5	Tilton Road northbound side - most of the section between Shore Road/ Mill Road intersection and Northfield Plaza has no sidewalk. It was suggested that the entire area should have sidewalk.	Consideration should be given to installing missing section of sidewalk.			X		X	

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
6	Tilton Road southbound side - there is only one rather worn guide sign in advance of the Shore Road/ Mill Road intersection directing motorists to Margate, Ocean City, Summers Point and Linwood. At this five-legged intersection, the advanced signing is necessary so that motorists are advised as to what lane they must be in prior to the intersection to get to their desired destination. Proper signing will minimize lane changing and confusing at the intersection.	Additional guide signs directing motorists to Margate, Ocean City and other shore destinations should be installed in advanced of the intersection.	X			X		
7	Northbound side - missing section of sidewalk between Wabash Avenue and Northfield Plaza.	Consideration should be given to installing the missing section of sidewalk.			X		X	
8	Northeast and southeast corners of Wabash Avenue - inlets are not bicycle safe.	Replace inlets with bicycle safe inlets.	X			X		
9	Both Tilton Road approaches to Wabash Avenue – existing warning signs for bicycle crossing, pedestrian crossing and school crossing. Signing does not conform to current MUTCD standards.	Install new signing in accordance with the current MUTCD standards.	X			X		
10	Southbound side - approximately 100 feet south of Willow Drive, "Slippery When Wet" sign. County members of team confirm condition corrected, sign no longer required.	Remove sign and post.	X			X		
11	Northbound side approaching Zion Road, there are two "Left Lane Must Turn Left" signs. The sign the farthest from the intersection is installed before the beginning of the left turn lane.	Remove "Left Lane Must Turn Left" sign farthest from the intersection. Optional - re-locate sign to southeast corner of the intersection.	X			X		
12	STOP sign along the Willow Drive approach is worn.	Install new sign.	X			X		
13	Zion Road - no handicap ramps on any of the corners.	Install handicap ramps on all corners.		X		X		

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
14	Zion Road - southeast and northwest corners of the intersection have inlets that are not bicycle safe.	Replace with bicycle safe inlets.	X			X		
15	Zion Road - signs for pedestrian pushbuttons read: "Push Button for Green Light" or "Push Button, Wait for Green Light" depending on which corner you are on. Intersection has "WALK-DON'T WALK" pedestrian signals.	All push button signs should be replaced with R10-4b signs.	X			X		
16	Northfield Road approaches - STOP lines along both Northfield Road approaches extend almost to the curbline of Tilton Road.	Grind out existing STOP lines. Install new STOP lines farther from the extended curbline to accommodate a real or imaginary crosswalk across the approaches.	X			X		
17	Southbound side - north of Northfield Avenue- existing signal ahead sign not needed.	Remove sign and post.	X			X		
18	Southbound side about 200 feet north of Northfield- existing Speed Limit 35 sign is worn.	Install new Speed Limit 35 sign.	X			X		
19	Northbound side - Jeffries and Keates Funeral Home is located on the southeast corner of Infield Avenue. Their driveway, which is located approximately 100 feet south of Infield Avenue, has a channelizing island that comes out even with the edge of the curbing on Tilton Road.	Contact property owner regarding cutting back nose of island four or five feet behind Tilton Road curbline.	X			X		
20	Sidewalk area in front of Jeffries and Keates Funeral Home is located directly against the curb. Utility poles are positioned in center of sidewalk.	Contact property owner regarding feasibility of relocating sidewalk back from curb or at a minimum construct sections of sidewalk behind utility poles to enable handicapped persons to get around poles without going off of sidewalk.		X			X	

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
21	Infield Avenue – no STOP lines on approaches.	Install STOP lines parallel with the alignment of the Tilton Road curb.	X			X		
22	Infield Avenue - northeast corner, no curbing on corner. Strip mall with angle parking that must back out onto Tilton Road.	Consideration should be given to installing curb on corner radius. Elimination of angle parking a long-term goal.			X	X		
23	Southbound side - # 1335 - angle parking that must back out onto Tilton Road.	Elimination of angle parking a long-term goal.			X	X		
24	Southbound side - McDonald's exit driveway onto Tilton has a STOP line on the Tilton Road side of the sidewalk.	Contact property owner regarding grinding off the existing stop line and installing new stop line on parking lot side of sidewalk.	X			X		
25	The intersection of Tilton Road and Rt. US 9 and its approaches were not audited as it is being reconstructed in the near future by the NJDOT. Northbound left turn movement that is now permitted will be prohibited.							
26	Southbound side - south of RT. US 9-route marker assemble " RT 563'-"SOUTH" worn and installed too low.	Install new county shield and "SOUTH" plate at appropriate height.	X			X		
27	Maple Avenue - southeast corner - Sage Jewelers - angle parking. Vehicles parked in northernmost parking stall restrict corner sight distance across that corner from the Maple Avenue approach and actually blocks sidewalk area. There may be other parking options available on site for customers.	Contact property owner regarding elimination or modification of some angle parking stalls.		X			X	
28	Roosevelt Avenue – STOP sign is worn and is installed on a slight skew so it is visible from northbound Tilton Road.	Install new STOP sign. Face sign so it is less visible to Tilton Road traffic, if possible.	X			X		
29	Roosevelt Avenue - southeast corner - store with angle parking that must back out onto Tilton Avenue.	Elimination of angle parking a long-term goal.			X	X		

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
30	Burton Avenue intersection is signalized. Push button signs read "PUSH BUTTON FOR GREEN LIGHT" when there are "WALK-DON'T WALK" signals at the intersection.	Replace pedestrian push button signs with R10-4b signs.	X			X		
31	Burton Avenue – Pavement markings at the intersection are worn and need to be replaced.	Re-paint all pavement markings at the intersection.	X			X		
32	Local police representative indicated that the Burton Avenue signal is operating on fixed time.	Request maintenance to repair signal to semi-actuated mode of operation.	X			X		
33	Easterly approach of Burton Avenue – "No Turn on Red" sign is worn.	Install new sign.	X			X		
34	Burton Avenue – northeast and northwest corners – handicap ramps are substandard.	Install new handicapped ramps on northeast and northwest corners.	X			X		
35	Jackson Avenue – inlets on southeast and northeast corners are not bicycle safe.	Replace with bicycle safe inlets.	X			X		
36	Jackson Avenue approach – STOP line is at location where vehicles stopped at it would obstruct pedestrian crossings.	Do not repaint STOP line.	X			X		
37	Jackson Avenue approach - STOP sign worn.	Install new STOP sign.	X			X		
38	Left turn from southbound Tilton Road onto RT. US 9 is prohibited. Southbound Tilton Road traffic is guided to use Jackson Avenue to get to RT. US 9 north. Existing signing is worn and minimal.	Install new and additional guide signs directing traffic to northbound RT. US 9.		X			X	
39	General comment for the entire five-lane section of road – Needs additional signing for the common two-way center left-turn lane along the roadway at each beginning and ending.	Install additional signing for center lane along entire five-lane section.		X				X

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
40	Southbound left-turn lane at Jackson Avenue does not have painted left turn arrows	Since there are two-way left-turn lanes on either side of this turn slot, install left turn arrows in the left-turn slot.	X			X		
41	Southbound side - north of Jackson Avenue. Trailblazers for US 9 installed on back-to-back signposts.	Remove existing signs and posts. Install new signs and post as recommended in item #37.	X			X		
42	Northbound side – center median in driveway just north of Arby's has no signs on ends directing traffic to keep right. No centerline markings along driveway between end of island and painted STOP line. STOP signs on driveway installed too low	Contact property owner regarding need for a "Keep Right" sign on the end of median. Re-install STOP signs at height of 7 feet to bottom of sign. Paint approximately 15 feet of double yellow centerline between end of center median and painted stop line.	X			X		
43	Island Gym Plaza on southeast corner of Cressen Avenue has two driveways onto Tilton Road and two onto Cressen Avenue. There were seven right angle type crashes at the two driveways onto Tilton Road. After much discussion no members of the team offered recommendations for this location.							
44	Cressen Avenue - there are no handicapped ramps or crosswalks at the intersection.	Install handicapped ramps and crosswalks at the intersection.		X		X		
45	Northbound side - Max Gurwicz & Sons property - depressed curb cut at PC of driveway to Denny's restaurant.	Eliminate depressed curb cut.		X		X		

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
46	Hingston Avenue - There is a pedestrian trail worn from the intersection to the shopping center with WAWA on the northeast corner of the intersection. There are no handicapped ramps on the northeast and northwest corners of the intersection. There are neither painted crosswalks at the intersection nor any "WALK-DON'T WALK" signals at the intersection. Twenty-six crashes occurred at the intersection including 10 southbound same direction type crashes and 10 northbound same direction type crashes.	• Traffic signal installation should be revised to include "WALK-DON'T WALK" pedestrian signals, and possible other revisions to address the crash experience at the intersection. • Traffic count should be conducted at the intersection to develop new signal timing. • Missing handicapped ramps and crosswalks should be installed at the intersection.			X			X
47	Southbound side just south of Fire Road - Tilton Road transitions from three lanes to two lanes with the curb transitioning in so that vehicles which do not transition will strike the curb or may jump curb and strike objects behind curb.	Install W1-8 chevron alignment warning signs along the length of the transition. Long-term solution would be to provide longer transition length and transitioning curb after vehicle transition completed.	X					X

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
48	Fire Road - 119 crashes occurred at this intersection including 52 same directional type crashes involving southbound vehicles and 25 same directional type crashes involving northbound vehicles. The pavement markings along the southbound approach to the intersection go from two lanes, as you pass under the GSP overpass, to four lanes at the northern most driveway to the Days Inn (exclusive left turn lane to Days Inn and three through lanes), to five lanes just south of the Days Inn driveway (four through lanes and lane for GSP on ramp) to four lanes at the intersection (three through and exclusive right). The third through lane is dropped after passing through the intersection.	Same directional type crashes at a signalized intersection are often the most difficult to eliminate. • The traffic signal at the intersection should be revised to provide additional signal heads facing the Tilton Road approaches including over the- road near left signal. • A traffic count should be conducted at the intersection to develop new signal timing. • Additional revisions should be accomplished to better accommodate pedestrians at the intersection.			X			X
49	Tilton Road southbound - pavement markings between the GSP overpass and Fire Road which were described in the previous item are unusual and may be contributing to the number of same direction type crashes. Signing for lane drop into the GSP ramp appears inadequate.	A scaled plan of the section of Tilton Road between Fire Road and the GSP overpass should be developed and the existing pavement marking and signing be evaluated for possible improvements.			X			X
50	Tilton Road under the GSP - no provisions for pedestrians crossing under the GSP overpass. Local representatives of the team state that a significant number of pedestrians and bicyclist cross under the parkway to get to the Shore Mall either to shop or for employment. A worn dirt trail on the southbound side of Tilton Road confirms their statement.	A scaled plan of the Tilton Road approaches to the overpass and the section under the overpass should be developed and evaluated for possible revisions to accommodate pedestrians. A long-term solution would be the widening of the underpass or the construction of a pedestrian tunnel under the overpass.			X			X

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
51	Northbound side – Speed Limit 40 MPH sign north of Fire Road worn and damaged.	Replace Speed Limit 40 MPH sign.	X			X		
52	Tilton Road center median terminates in vicinity of northernmost driveway to Days Inn. "No Left Turn" sign installed on end of median facing northbound traffic. There is no left turn movement.	Replace existing No Left Turn Sign on the end of median with no "U-Turn" sign.	X			X		
NIGHTIME FIELD VIEW IDENTIFIED THE FOLLOWING SAFETY ISSUES4.								
53	Pavement markings along almost all of the studied section of road are worn.	Re-install all pavement markings		X			X	
54	Two lane section between Shore Road and Rt US 9- no edge lines, wide travel lanes, motorist wander width of travel lane.	Install edge line approximately 12 feet from centerline ,narrowing and defining travel portion of road	X				X	
55	Spot lights shining on north side of Sage Jewelers building distracting to motorist.	Re-aim or remove spotlights.	X			X		
56	Sign Speed limit 35 MPH on northbound side just north of Wabash lacks reflectivity.	Replace with new sign.	X			X		
57	County road 651 route marker assemblies on the southeast corner of Fire Road lack reflectivity.	Replace route marker assemblies.	X			X		
58	JCT 40-322 sign assembly on northbound side north of GSP overpass lack reflectivity.	Replace sign assembly.	X			X		
59	"Yield" sign on the driveway to Shore Mall installed beyond the motorist's natural yield point.	Relocate "Yield" sign farther back from intersection to natural yield point. Relocate "No Left Turn" sign on right side of driveway to accommodate new "Yield" sign location.	X			X		
60	Southbound side Speed Limit 40 MPH just south of Fire Road lacks reflectivity.	Replace with new sign.	X			X		

	SAFETY ISSUE	REMEDIAL ACTION	LEVEL OF EFFORT REQUIRED			POTENTIAL SAFETY BENEFIT		
			LOW	MEDIUM	HIGH	LOW	MEDIUM	HIGH
61	Southbound side- approaching Cressen Avenue- un-conventional lane use control signs. Signs reserving the left lane for left turn only , the center lane for straight thru traffic and the right lane for straight through traffic. Signs do not have the word "ONLY" under either of the straight thru arrows as required by the MUTCD.	Replace with conventional lane use control arrow signs with the word "ONLY" or with "LEFT LANE MUST TURN LEFT SIGN" signs.	X			X		
62	Southbound side-the advance lane use control signing for the exclusive right turn lane at RT US 9 is also un-conventional with the straight thru arrow on those signs also missing the word "ONLY".	The contract plans for the improvement of the Rt US 9 intersection should be reviewed to ensure that it addresses this matter.	X			X		
63	Southbound side-" no Left Turn" symbol sign on the driveway to the Tilton Inn – post is leaning and sign twisted so that it is clearly visible to southbound traffic.	Install new post and sign.	X			X		
64	Southbound side-Telephone pole on triangular island at driveway to Pizza Hut.	Install object marker in front of pole and a second in front on next pole to the south. Object markers to face southbound Tilton Road traffic.	X				X	
65	There is no street lighting in the area immediately south of the GSP overpass where the number of lane changes and pedestrians or bicyclist may enter the travel way to cross under the overpass.	Consideration be given to conducting a lighting survey and installing additional lighting in this area. Perhaps even the underpass warrants lighting.		X			X	

Recommendations

As stated earlier, the intent of the road safety audit process is to conduct a formal examination of highway features and surrounding environment that increase the potential for crashes and identify countermeasures that will reduce (or eliminate) the probability of such crashes. The safety issues identified during the conduct of this audit and included in this report have been organized to provide the convenience and flexibility necessary to allow the implementation of the safety improvements as time and budget limitations allow. To the extent possible, the findings have been separated into line items so that the improvements can be implemented independently as appropriate. Clearly, consolidating a number of the safety recommendations will reduce the overall cost of improvements. We recommend that the appropriate management staff review the findings and decide which items can be completed in the immediate future (within one year). Many of the deficiencies can be corrected in the short term if the roadway owners dedicate both the time and financial resources to the task. The Level of Effort (an estimate of expenditures and man hours) indicated on the finding sheets of the report represent the team's best effort at categorizing each item.

The findings of the report with the greatest potential for reducing the crash experience along the road appear to be item #46 (revising the traffic signal at Hingston Avenue) item #48 (revising the traffic signal at Fire Road), and item #49 (revising the signing and pavement markings along Tilton Road between the GSP overpass and Fire Road. Item #47 (installation of chevron warning signs) should be addressed at the earliest opportunity. Although any solution appears to be costly finding a way to accommodate pedestrians currently walking under the GSP overpass (item #50) should also be given priority.

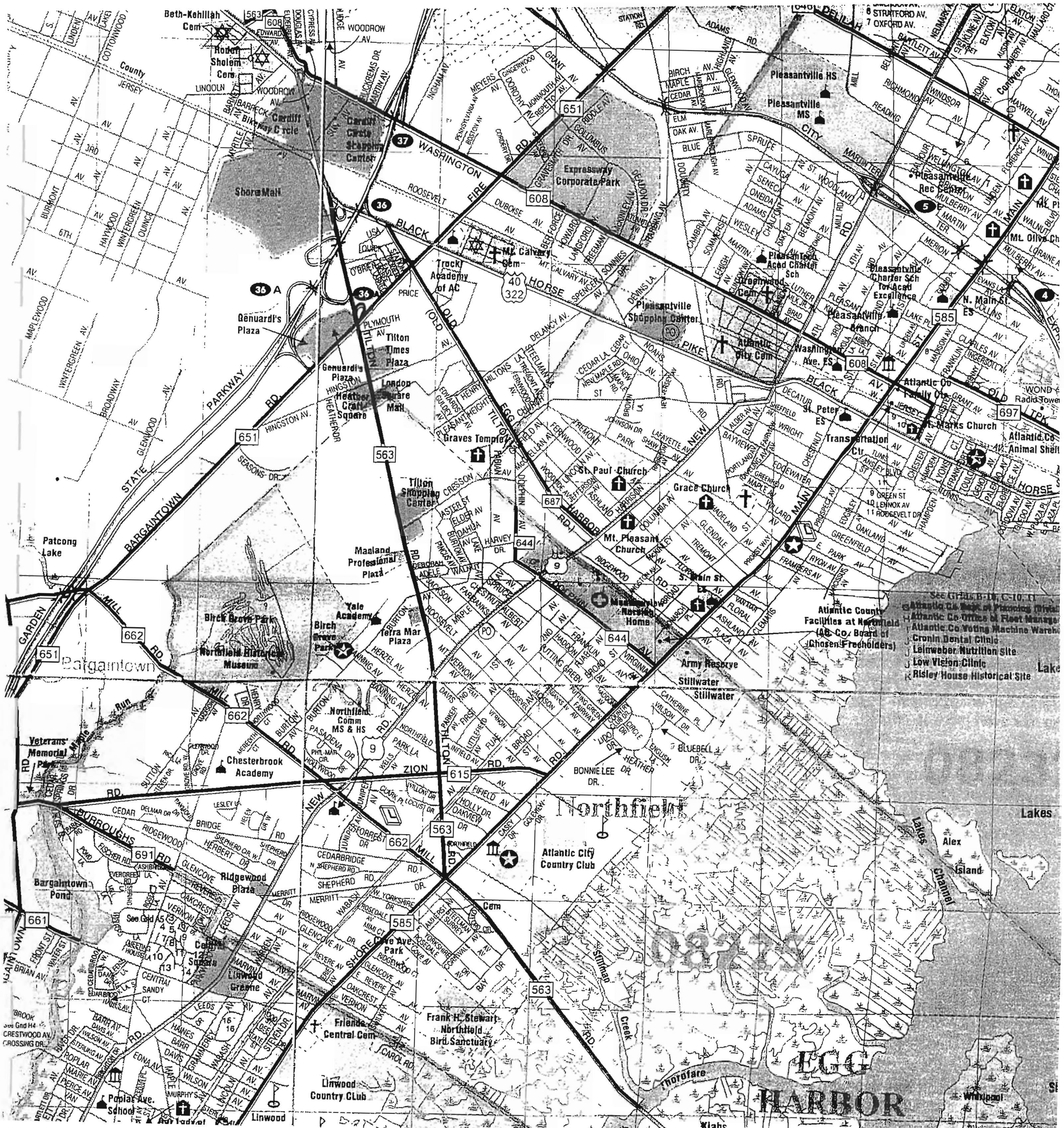
As with all traffic safety studies, some of the crash experience on the roadway has no obvious or practical solutions.

While the safety audit focuses on roadway features, enforcement is still a crucial component of safety on a road. Enforcement discourages the motorist from becoming lax in obeying or observing the traffic regulations along the road. Just as resources must be allocated to the physical improvements of the road, they must also be allocated to enforcement to maintain the safe operation of the road.

The opinions found in the findings of this Safety Audit report are those of the Safety Audit Team, as a whole, and not necessarily the opinions of the SJTPO or the individual team members.

Appendix

- Map of Tilton Road
- Straight-line plan on which are plotted crashes, existing traffic control devices, and traffic volumes.
- Crash Data Summary Sheets
- Crash Data Charts
- Photographs
- Checklists



Beth-Kehillah Cem
Rodef Sholem Cem
Cardiff Circle
Cardiff Circle Shopping Center
Shore Mall
WASHINGTON
ROOSEVELT
BLACK HORSE PIKE
Expressway Corporate Park
Mt. Calvary Cem
Trocki Academy of AC
Genuardi's Plaza
Tilton Times Plaza
London Square Mall
Heather Croft Square
Graves Temple
Tilton Shopping Center
Mainland Professional Plaza
Yale Academy
Birch Grove Park
Birch Grove Park
Northfield Historical Museum
Terra Mar Plaza
Patcong Lake
Bargaintown
GARDEN STATE PARKWAY
BARGAINTOWN RD.
MILL RD.
Pleasantville HS
Pleasantville MS
Pleasantville Rec Center
Pleasantville Aced Charter Sch
Pleasantville Charter Sch for Acad Excellence
Greenwood Cem
Pleasantville Shopping Center
Atlantic City Cem
Washington Ave. ES
Pleasantville Branch
N. Main St. ES
Atlantic Co Family Ctr
St. Peter ES
St. Marks Church
Atlantic Co Animal Shelter
Transportation Ctr
ML Olive Ch
St. Paul Church
Grace Church
Mt. Pleasant Church
S. Main St. ES
Atlantic County Facilities at Northfield
Cronin Dental Clinic
Leinweber Nutrition Site
Low Vision Clinic
Risley House Historical Site
Army Reserve
Stillwater
Northfield Comm MS & HS
Veterans' Memorial Park
Chesterbrook Academy
ZION RD.
Northfield
Atlantic City Country Club
Bargaintown Pond
Ridgewood Plaza
Central Square
Linwood Greene
Cove Ave. Park
Friends Central Cem
Frank H. Stewart Northfield Bird Sanctuary
Linwood Country Club
Poplar Ave. School
Lakes Channel
Alex Island
EGG HARBOR
Thorofare
Whirlpool
Lakes
08225

TILTON ROAD (CR 563)
NORTHFIELD-EGG HARBOR
CRASH SUMMARY 2002-2004
AND EGG HARBOR FIRST 9 MO. OF 2005
TOTAL- 310 CRASHES
Month

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
13	22	20	22	38	48	27	24	10	16	23	47

Time of Day				Day of Week	
AM Midnight - Noon	**Number of Crashes**	**PM Noon - Midnight**	**Number of Crashes**		**Number of Crashes**
Midnight – 1:00	3	12:00-1300	29	Monday	50
1:00 – 2:00	0	1300-1400	27	Tuesday	43
2:00 – 3:00	0	1400-1500	34	Wednesday	43
3:00 – 4:00	1	1500-1600	26	Thursday	48
4:00 – 5:00	0	1600-1700	39	Friday	56
5:00 – 6:00	0	1700-1800	24	Saturday	33
6:00 – 7:00	1	1800-1900	22	Sunday	30
7:00 – 8:00	9	1900-2000	6		
8:00 – 9:00	6	2000-2100	9	Unknown	4
9:00 – 10:00	11	2100-2200	8		
10:00 – 11:00	19	2200-2300	5		
11:00 – 12 Noon	25	2300-2400	3		
		Unknown	**3**		

DAY 260
NIGHT 47
UNKNOWN 33

DRY 234 WET 72 SNOWY 3 ICY 1 OTHERS

CLEAR 252 RAIN 54 SNOW 4 FOG_____

INJURY 76 NON-INJURY 234 FATAL 0

Right Angle	Same Direction	Left Turn	Right Turn	Side Swipe
73	179	27	14	

Fixed Object	Head On	Other	Pedestrian	Bike
5		7	2	

Parking Related _____

TILTON ROAD (CR 563)
EGG HARBOR TOWNSHIP
CRASH SUMMARY 2002-2004, 2005 THRU SEPT
TOTAL - 226 CRASHES
Month

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
10	16	18	15	29	33	21	15	10	9	17	33

Time of Day				Day of Week	
AM Midnight - Noon	**Number of Crashes**	**PM Noon - Midnight**	**Number of Crashes**		**Number of Crashes**
Midnight – 1:00	3	12:00-1300	24	Monday	36
1:00 – 2:00		1300-1400	22	Tuesday	33
2:00 – 3:00		1400-1500	25	Wednesday	29
3:00 – 4:00	1	1500-1600	15	Thursday	37
4:00 – 5:00		1600-1700	26	Friday	39
5:00 – 6:00	2	1700-1800	17	Saturday	23
6:00 – 7:00		1800-1900	18	Sunday	24
7:00 – 8:00	7	1900-2000	4		
8:00 – 9:00	5	2000-2100	8		
9:00 – 10:00	9	2100-2200	6		
10:00 – 11:00	13	2200-2300	4		
11:00 – 12 Noon	14	2300-2400	2		
		UNKNOWN	1	UNKNOWN	4

DAY 184
NIGHT 39
UNKNOWN 3

DRY 171 WET 52 SNOWY 3 ICY__ OTHERS_0
CLEAR 185 RAIN 38 SNOW 3 FOG_____

INJURY 42 NON-INJURY 184 FATAL 0

Right Angle	Same Direction	Left Turn	Right Turn	Side Swipe
43	148	13	12	

Fixed Object	Head On	Other	Pedestrian	Bike
3		4		2

Parking Related _____

TILTON ROAD (CR 563)
NORTHFIELD TOWNSHIP
CRASH SUMMARY 2002-2004
TOTAL- 84 CRASHES
Month

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
3	6	2	7	9	15	6	9	0	7	6	14

Time of Day				Day of Week	
AM Midnight - Noon	**Number of Crashes**	**PM Noon - Midnight**	**Number of Crashes**		**Number of Crashes**
Midnight – 1:00		12:00-1300	5	Monday	14
1:00 – 2:00		1300-1400	5	Tuesday	10
2:00 – 3:00		1400-1500	9	Wednesday	14
3:00 – 4:00		1500-1600	11	Thursday	11
4:00 – 5:00		1600-1700	13	Friday	17
5:00 – 6:00		1700-1800	7	Saturday	10
6:00 – 7:00	1	1800-1900	4	Sunday	6
7:00 – 8:00	2	1900-2000	2		
8:00 – 9:00	1	2000-2100	1		
9:00 – 10:00	2	2100-2200	2	UNKNOWN	2
10:00 – 11:00	6	2200-2300	1		
11:00 – 12 Noon	9	2300-2400	1		
		Unknown	2		

DAY 76
NIGHT 8

DRY 63 WET 20 SNOWY ___ ICY 1 OTHERS

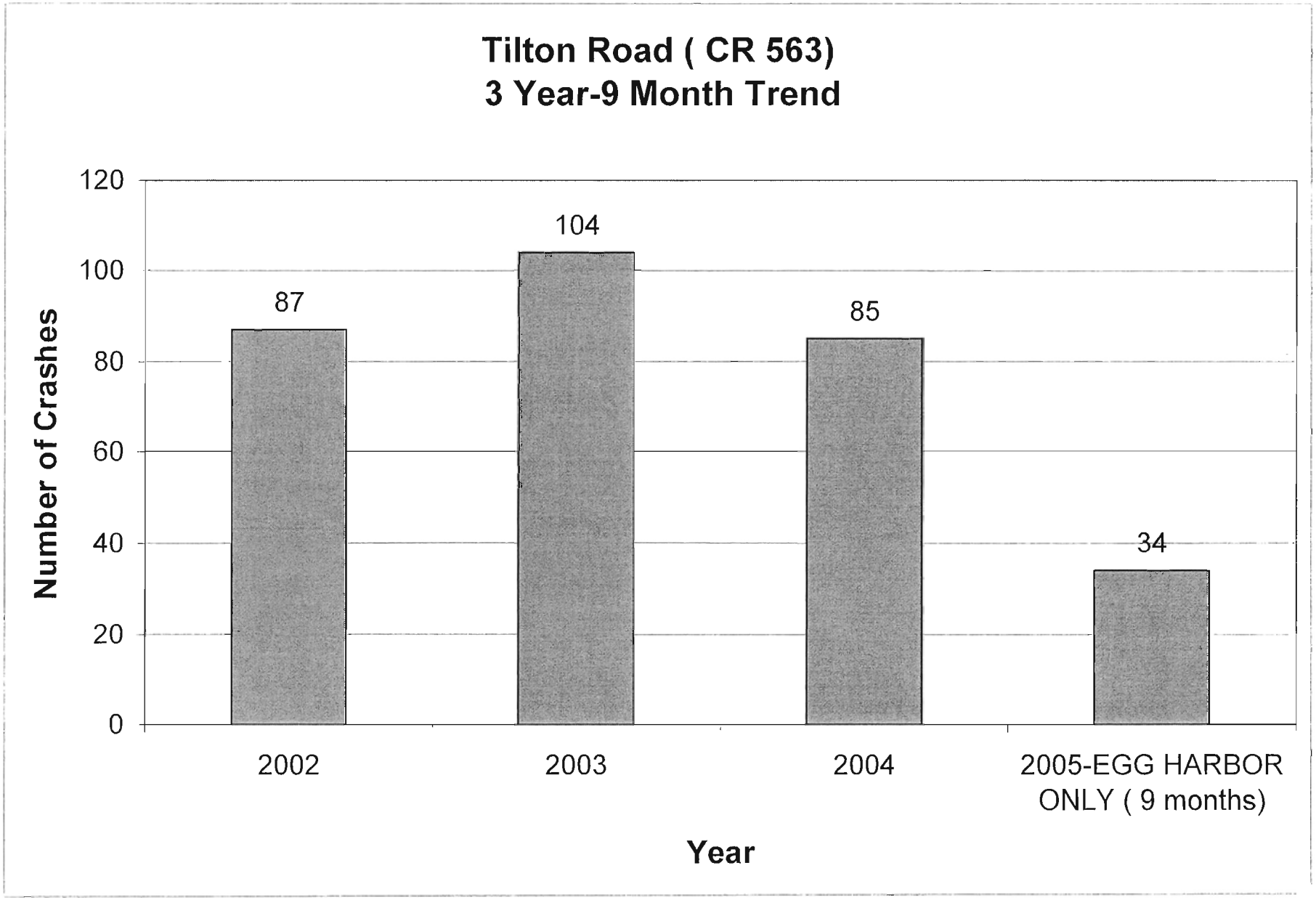
CLEAR 67 RAIN 16 SNOW 1 FOG_____

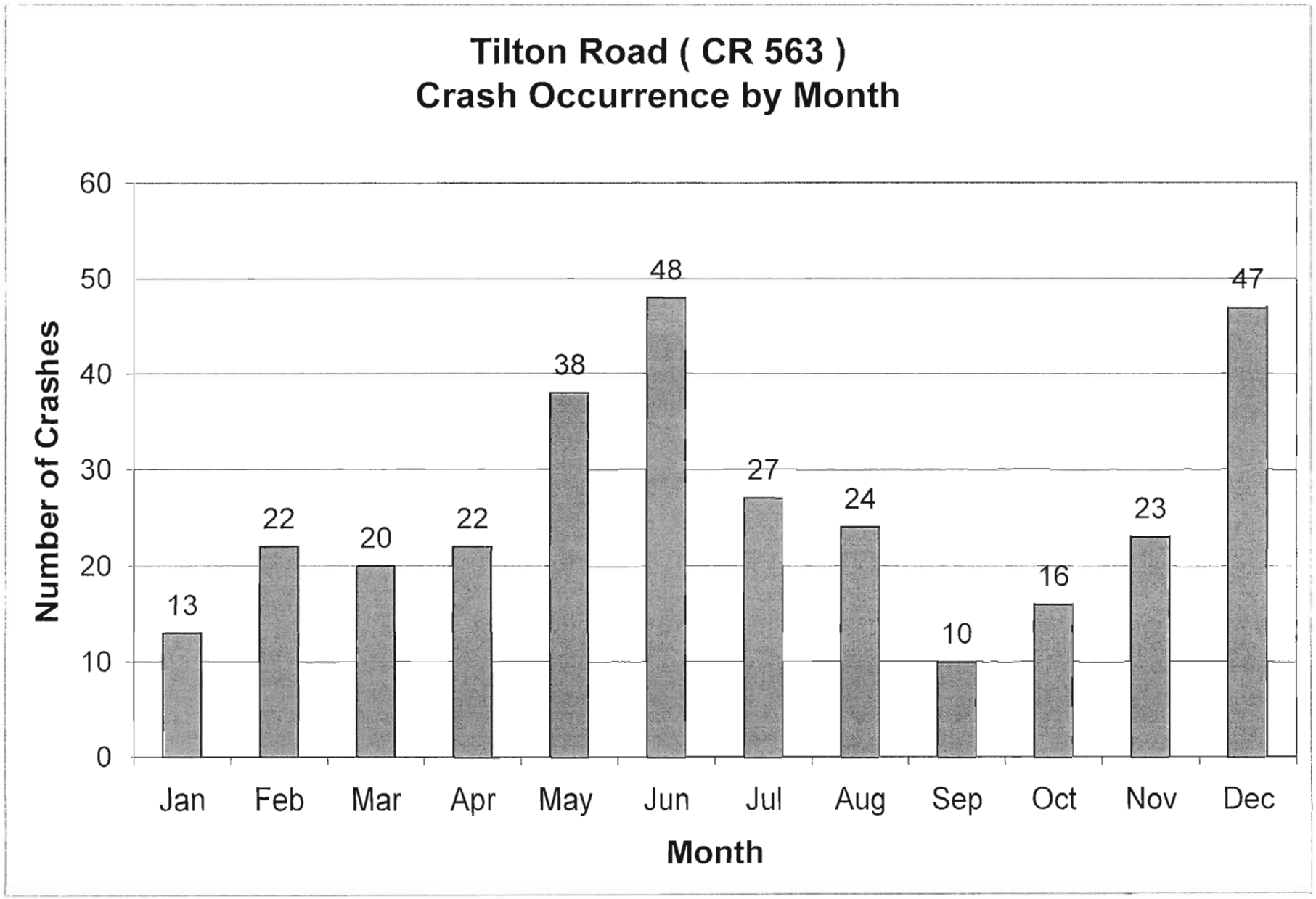
INJURY 34 NON-INJURY 50 FATAL 0

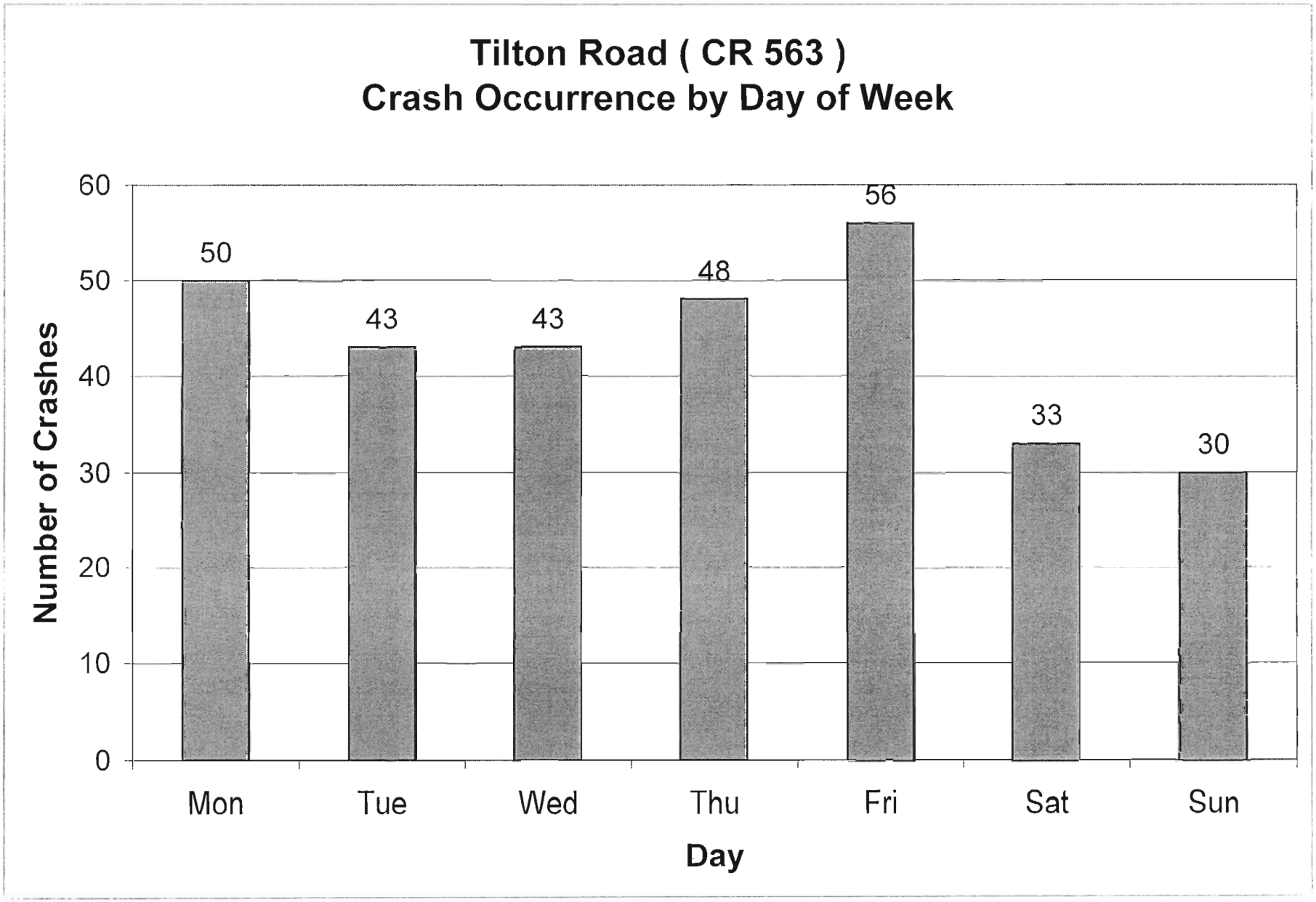
Right Angle	Same Direction	Left Turn	Right Turn	Side Swipe
30	31	14	2	

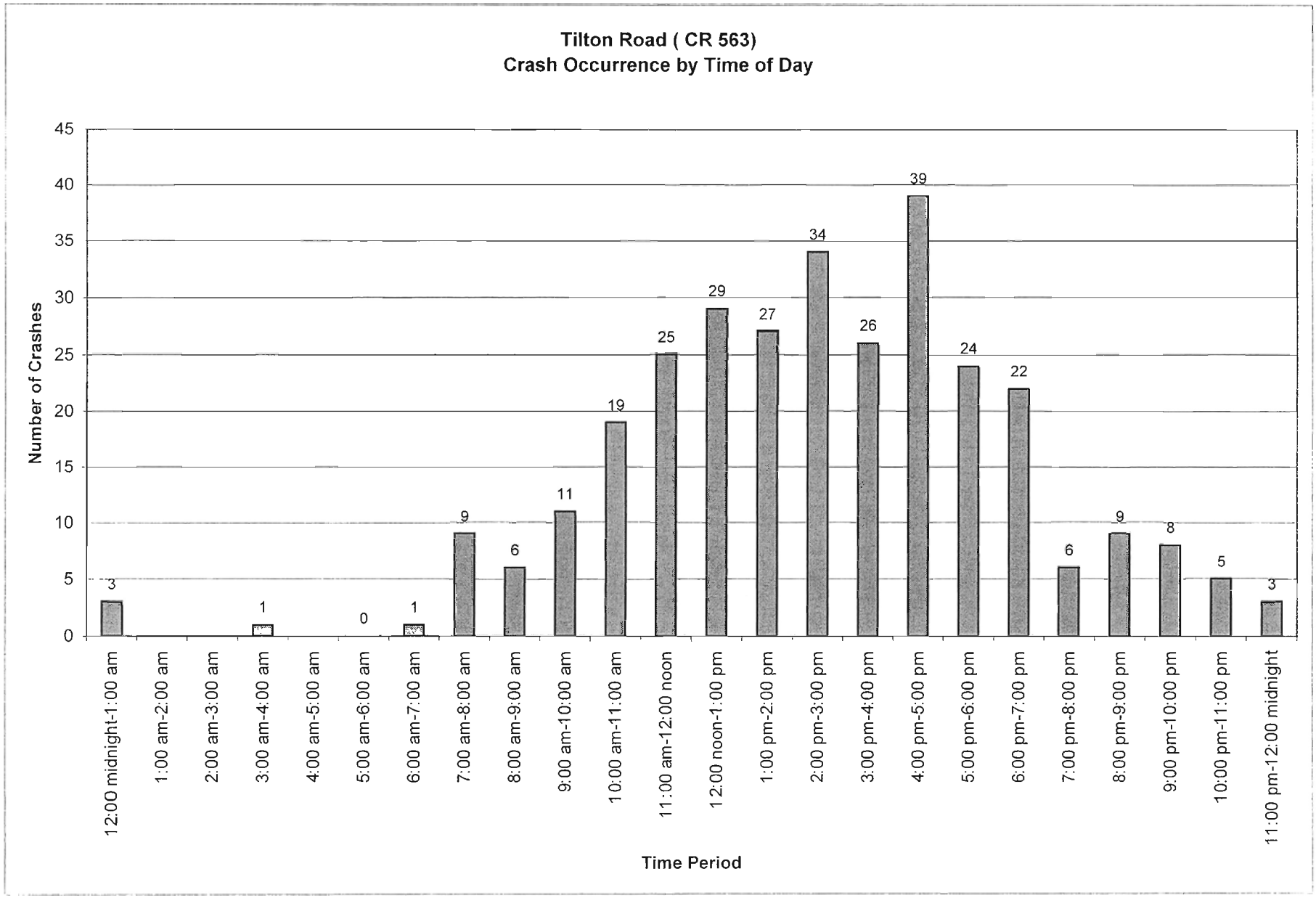
Fixed Object	Head On	Other	Pedestrian	Bike
2		3	2	

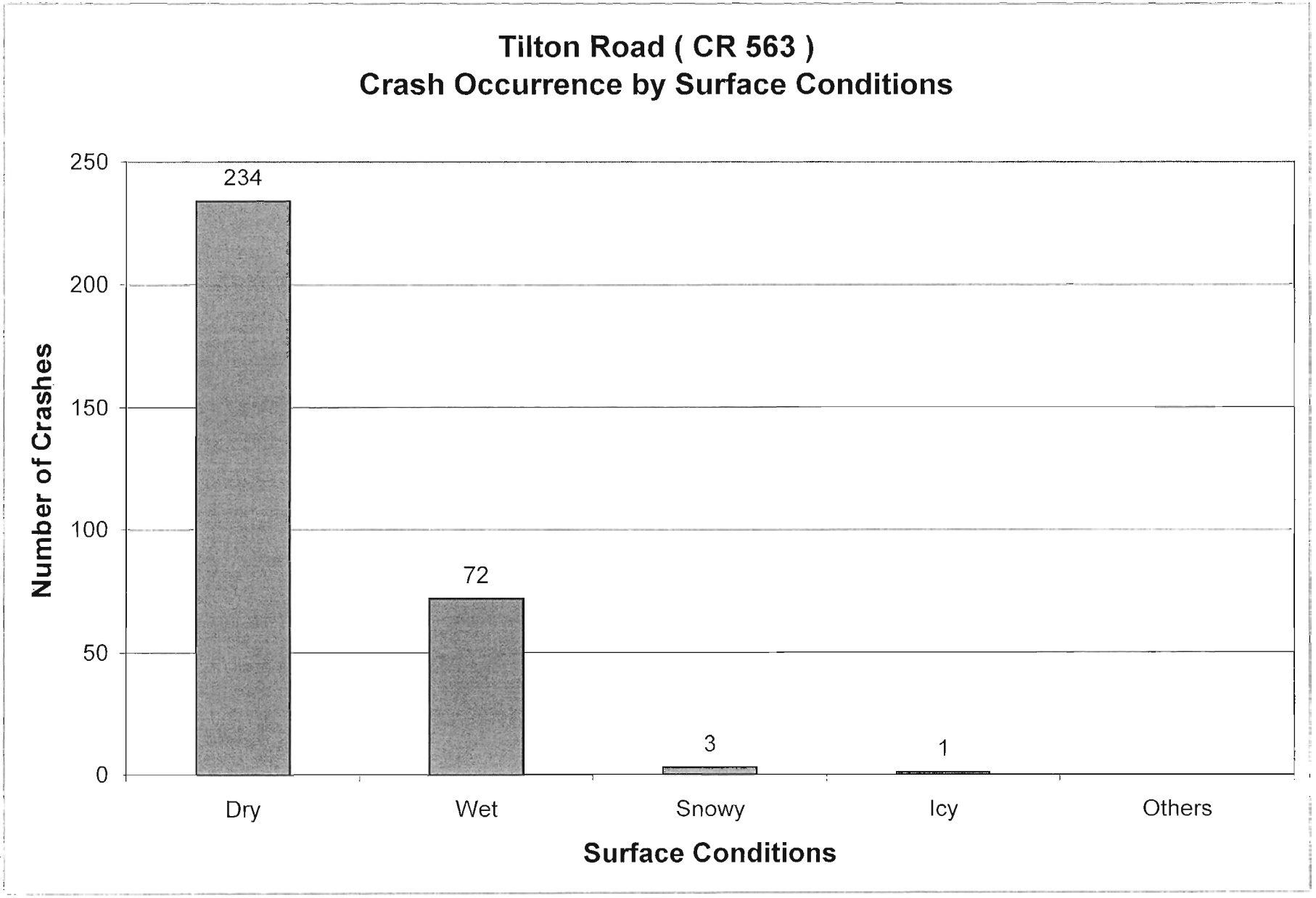
Parking Related _____

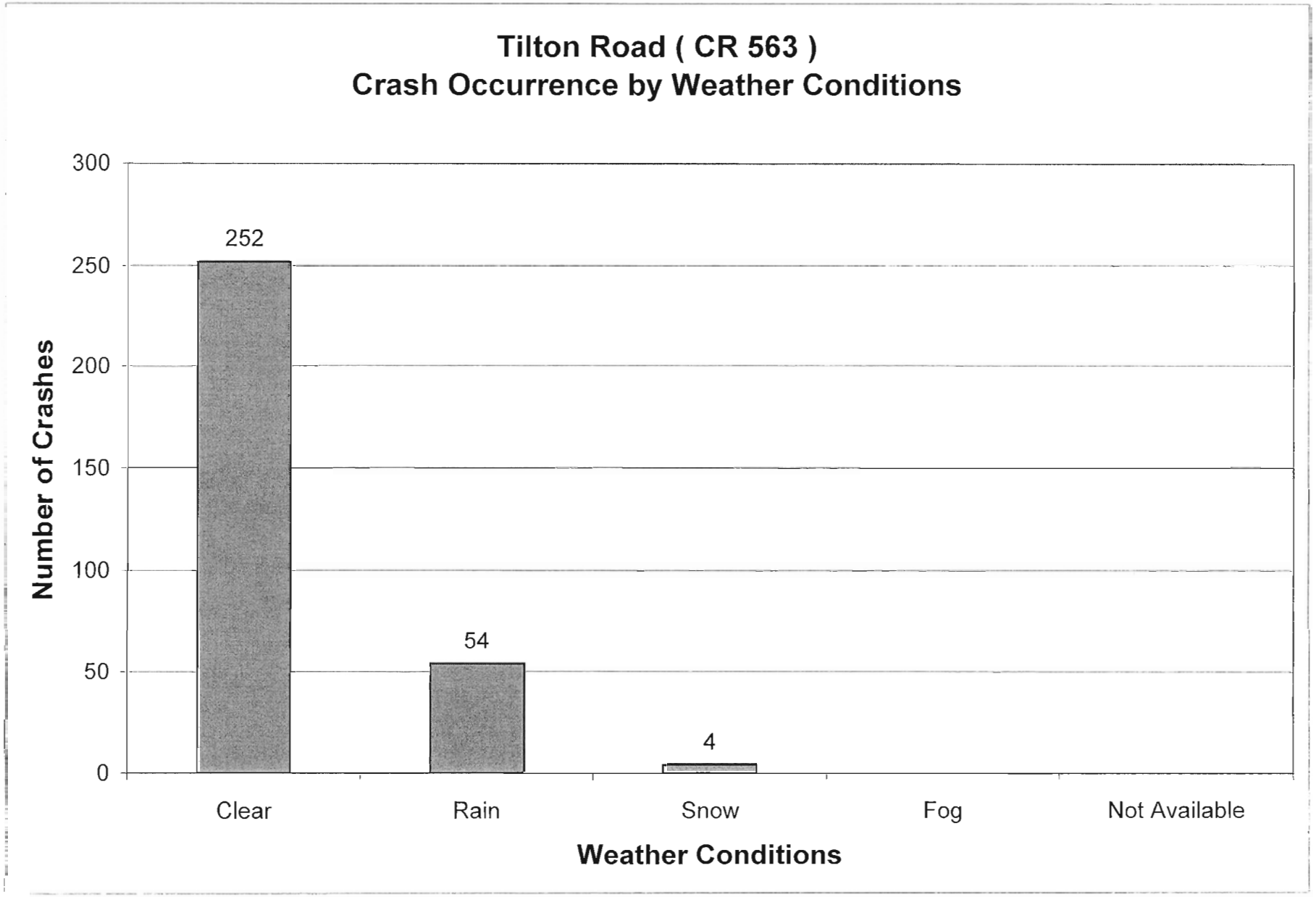

Tilton Road (CR 563)
3 Year-9 Month Trend
Number of Crashes
120
100
80
60
40
20
0
87
104
85
34
2002
2003
2004
2005-EGG HARBOR ONLY (9 months)
Year

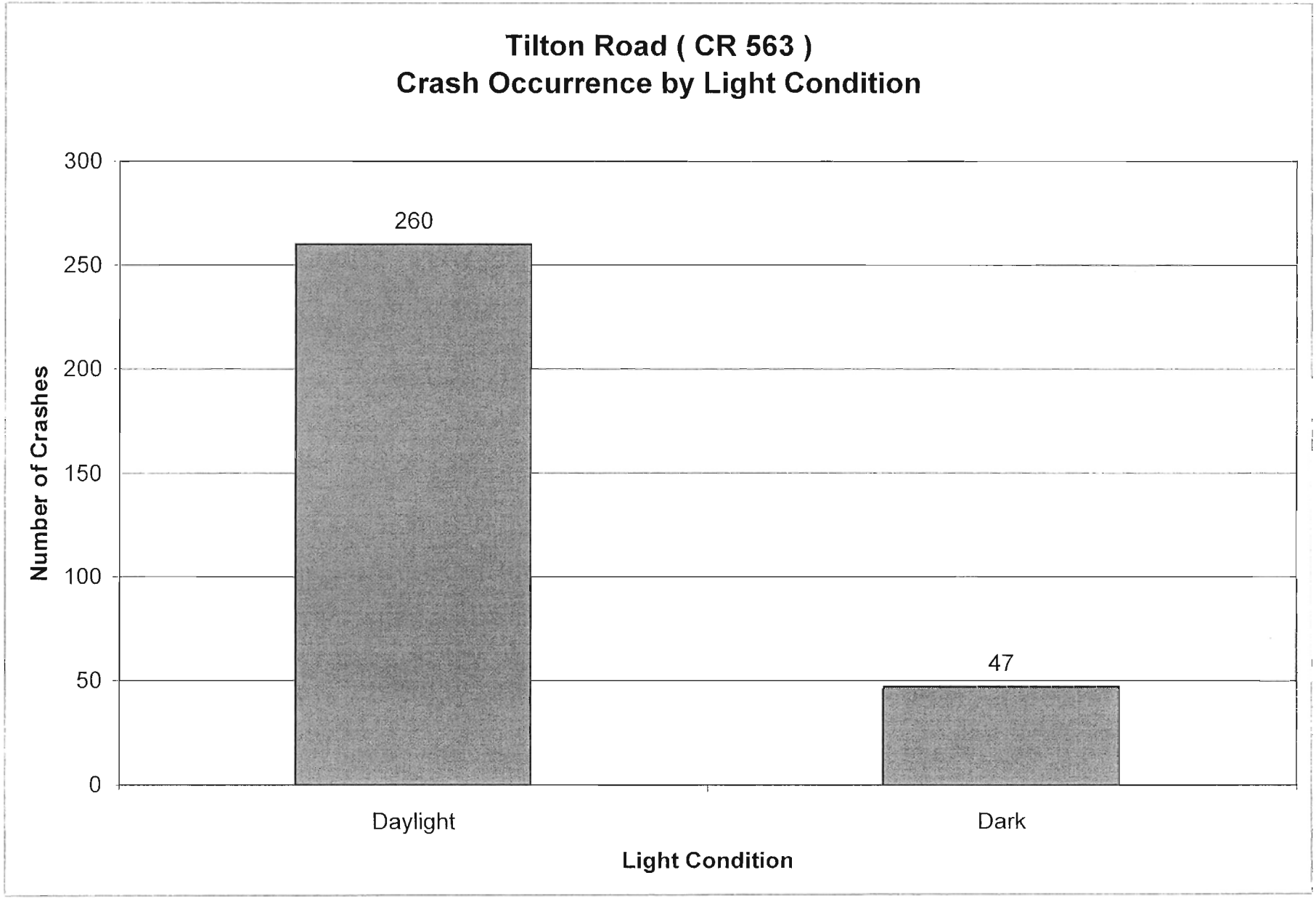

Tilton Road (CR 563)
Crash Occurrence by Month
Number of Crashes
60
50
40
30
20
10
0
13
22
20
22
38
48
27
24
10
16
23
47
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec
Month

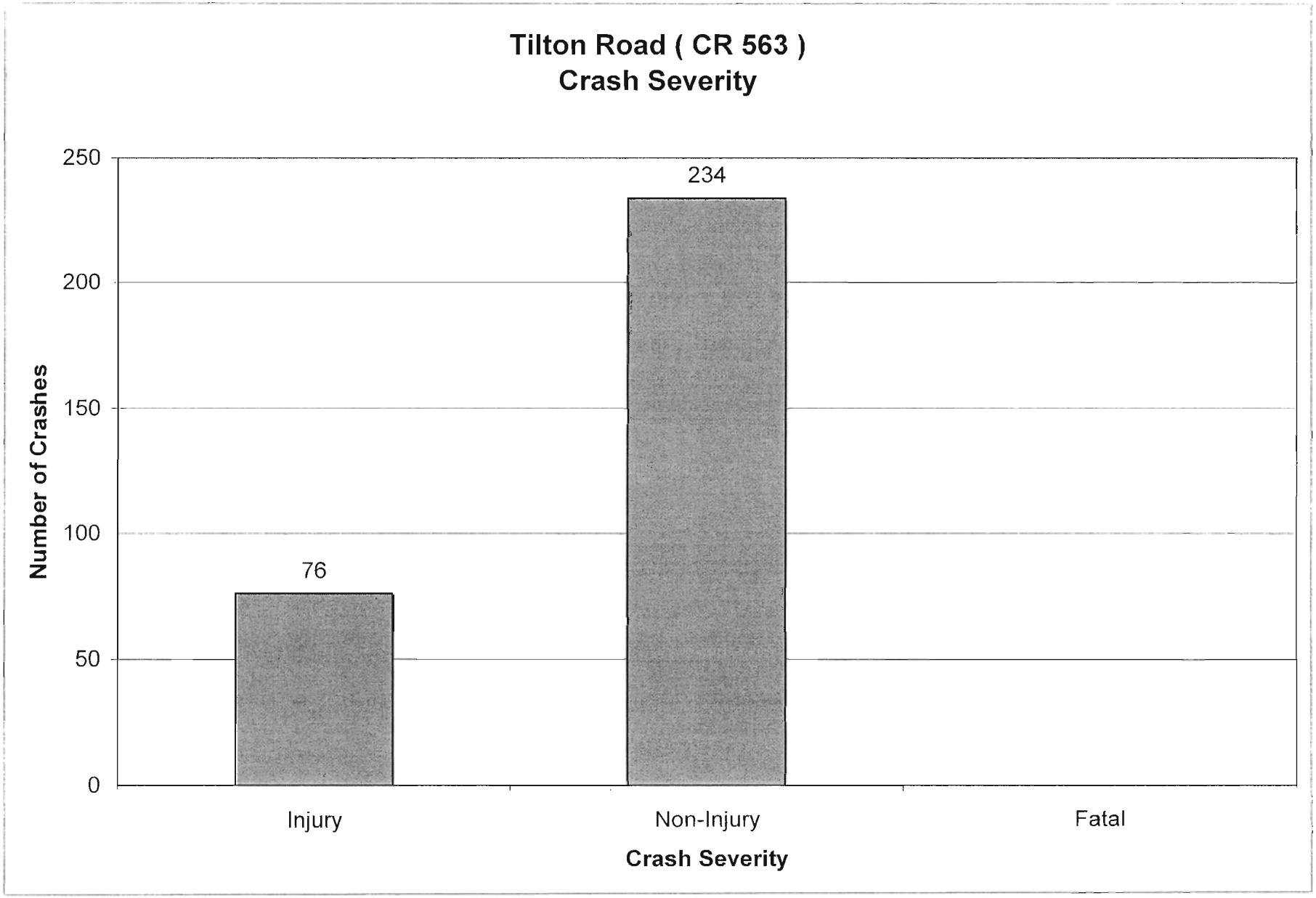

Tilton Road (CR 563)
Crash Occurrence by Day of Week
Number of Crashes
60
50
40
30
20
10
0
50
43
43
48
56
33
30
Mon
Tue
Wed
Thu
Fri
Sat
Sun
Day

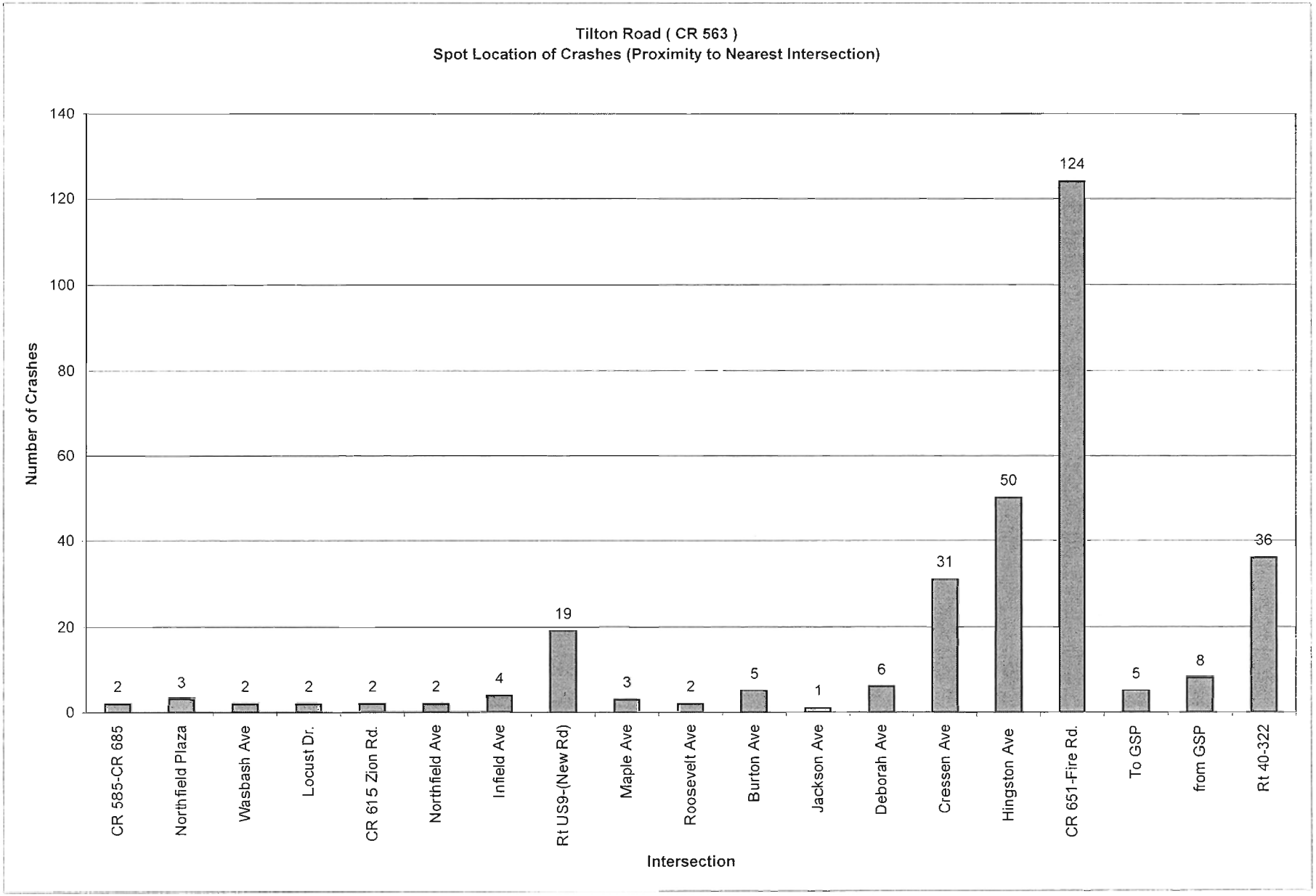

Tilton Road (CR 563)
Crash Occurrence by Time of Day
Number of Crashes
45
40
35
30
25
20
15
10
5
0
3
0
1
9
6
11
19
25
29
27
34
26
39
24
22
6
9
8
5
3
12:00 midnight-1:00 am
1:00 am-2:00 am
2:00 am-3:00 am
3:00 am-4:00 am
4:00 am-5:00 am
5:00 am-6:00 am
6:00 am-7:00 am
7:00 am-8:00 am
8:00 am-9:00 am
9:00 am-10:00 am
10:00 am-11:00 am
11:00 am-12:00 noon
12:00 noon-1:00 pm
1:00 pm-2:00 pm
2:00 pm-3:00 pm
3:00 pm-4:00 pm
4:00 pm-5:00 pm
5:00 pm-6:00 pm
6:00 pm-7:00 pm
7:00 pm-8:00 pm
8:00 pm-9:00 pm
9:00 pm-10:00 pm
10:00 pm-11:00 pm
11:00 pm-12:00 midnight
Time Period

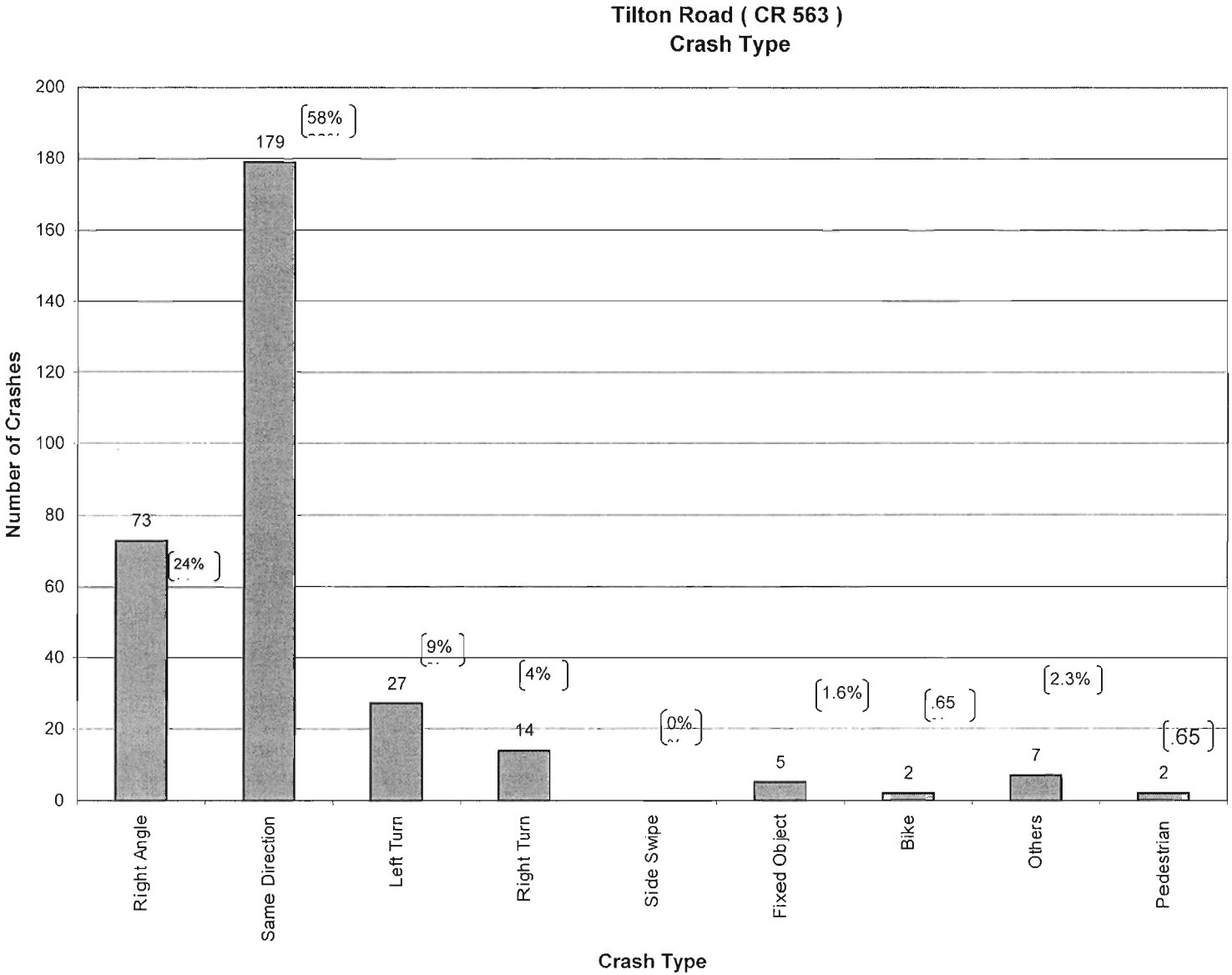

Tilton Road (CR 563)
Crash Occurrence by Surface Conditions
Number of Crashes
250
200
150
100
50
0
234
72
3
1
Dry
Wet
Snowy
Icy
Others
Surface Conditions


Tilton Road (CR 563)
Crash Occurrence by Weather Conditions
Number of Crashes
300
250
200
150
100
50
0
252
54
4
Clear
Rain
Snow
Fog
Not Available
Weather Conditions


Tilton Road (CR 563)
Crash Occurrence by Light Condition
300
250
200
150
100
50
0
Number of Crashes
260
47
Daylight
Dark
Light Condition


Tilton Road (CR 563)
Crash Severity
250
200
150
100
50
0
Number of Crashes
234
76
Injury
Non-Injury
Fatal
Crash Severity


Tilton Road (CR 563)
Spot Location of Crashes (Proximity to Nearest Intersection)
Number of Crashes
140
120
100
80
60
40
20
0
2
3
2
2
2
2
4
19
3
2
5
1
6
31
50
124
5
8
36
CR 585-CR 685
Northfield Plaza
Wasbash Ave
Locust Dr.
CR 615 Zion Rd.
Northfield Ave
Infield Ave
Rt US9-(New Rd)
Maple Ave
Roosevelt Ave
Burton Ave
Jackson Ave
Deborah Ave
Cressen Ave
Hingston Ave
CR 651-Fire Rd.
To GSP
from GSP
Rt 40-322
Intersection


Tilton Road (CR 563)
Crash Type
Number of Crashes
200
180
160
140
120
100
80
60
40
20
0
73
24%
179
58%
27
9%
14
4%
0%
5
1.6%
2
.65
7
2.3%
2
.65
Right Angle
Same Direction
Left Turn
Right Turn
Side Swipe
Fixed Object
Bike
Others
Pedestrian
Crash Type

DSCF0002.JPG

DSCF0004.JPG

DSCF0006.JPG

DSCF0008.JPG

Field Views: Tilton Road (CR 563)

DSCF0009.JPG

DSCF0012.JPG

DSCF0013.JPG

DSCF0015.JPG

Field Views: Tilton Road (CR 563)

DSCF0016.JPG

DSCF0017.JPG

DSCF0018.JPG

DSCF0019.JPG

Field Views: Tilton Road (CR 563)

DSCF0020.JPG

DSCF0021.JPG

DSCF0023.JPG

DSCF0024.JPG

Field Views: Tilton Road (CR 563)

DSCF0025.JPG

DSCF0026.JPG

Field Views: Tilton Road (CR 563)

Route _____ **Date** _____

Safety Audit Stage 5 — Operation/Existing Roads

Checklist 5-1 — *General Topics*

Item	Issues to be Considered	Check	Comments
1 Landscaping	Is landscaping in accordance with guidelines (e.g., clearances, sight distance)?		
	Are required clearances and sight distances not likely to be restricted following future plant growth (landscaping and natural)?		
2 Parking	Are provisions for parking satisfactory in relation to traffic operations and safety?		
3 Temporary works	Are all locations free of construction or maintenance equipment, and any signing or temporary traffic control devices that are no longer required?		
4 Headlight glare	Have any problems due to headlight glare (e.g., two-way service road close to main traffic lanes) been addressed?		

Checklist 5-2 *Alignment and Cross Section*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
1 Visibility, sight distances	Is sight distance adequate for the speed of traffic using the route?		
	Is adequate sight distance provided for intersections, crossings (e.g., pedestrian, cyclist, cattle, railway) etc.?		
2 Design speed	Is the horizontal and vertical alignment suitable for the (85th percentile) traffic speed? If not:		
	(a) Are warning signs installed?		
	(b) Are advisory speed signs installed?		
	Are the posted advisory speeds for curves appropriate?		

Checklist 5-2 *Alignment and Cross Section*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
3 Overtaking	Are adequate passing opportunities provided?		
4 Readability by drivers	Are there any sections of roadway which may cause confusion e.g.:		
	(a) Is alignment of roadway clearly defined?		
	(b) Has disused pavement (if any) been removed or treated?		
	(c) Have old pavement markings been removed properly?		
	(d) Do streetlight and tree lines conform with the road alignment?		

Checklist 5-2 *Alignment and Cross Section*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
5 Widths	Are all traffic lanes and roadway widths, including bridges, adequate?		
6 Shoulders	Are shoulder widths appropriate (e.g. for broken down or emergency vehicles)?		
	Are shoulders traversable for all vehicles and road users?		
	Is the shoulder cross slope sufficient to provide proper drainage?		
7 Side slopes	Are the side slopes and table drains safe for run off vehicles to traverse?		

Checklist 5-3 *Intersections*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
1 Location	Are intersections located safely with respect to horizontal and vertical alignment?		
2 Warning	Where intersections occur at the end of high speed environments (e.g., at approaches to towns), are there traffic control devices to alert drivers?		
3 Controls	Are pavement markings and intersection control signing satisfactory?		
4 Layout	Is the alignment of curbs, traffic islands and medians satisfactory?		
	Is the intersection layout obvious to all users?		
	Are turning radii and tapers appropriate?		

Checklist 5-3 *Intersections*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
5 Visibility, sight distances	Is sight distance adequate for all movements and all users?		

Checklist 5-4 *Auxiliary Lanes and Turn Lanes*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
1 Tapers	Are starting and finishing tapers located and aligned correctly?		
2 Shoulders	Are appropriate shoulder widths provided at merges in accordance with design guidelines?		
3 Signs	Is signing and marking installed in accordance with standards?		
4 Turning traffic	Is there advance warning of the approaching auxiliary lane?		

Checklist 5-4 *Auxiliary Lanes and Turn Lanes*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
5 Visibility, sight distances	Have right turn movements within the length of the auxiliary lane been avoided?		
	Has stopping sight distance been provided to the rear of turning vehicles?		
	Has stopping sight distance been provided for entering and leaving vehicles?		

Checklist 5-5 *Non-Motorized Traffic*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
1 Paths	Are there appropriate travel paths and crossing points for pedestrians and cyclists?		
2 Barriers and fencing	Where necessary, is fencing installed to guide pedestrians and cyclists to crossings or overpasses?		
	Is fencing of your design (e.g., avoid solid horizontal rails)?		
	Where necessary, is crash barrier installed to separate vehicle, pedestrian and cyclist flows?		
3 Bus stops	Are bus stops appropriately located with adequate clearance from the traffic lane for safety and visibility?		
4 Elderly and disabled	Are there adequate provisions for the elderly, the disabled, children, wheelchairs and baby carriages (e.g., holding rails, curb and median crossings, ramps)?		
	Where necessary, are hand rails provided (e.g., on bridges, ramps), and are they adequate?		

Checklist 5-5 *Non-Motorized Traffic*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
Elderly and disabled (cont.)	Distance between stop line and pedestrian crossing at signalized intersections (for visibility of pedestrians from truck driver's seat).		
	Signal timing - cycle length - pedestrian clearance time - are pedestrian buttons operable?		
5 Cyclists	Is the pavement width adequate for the number of cyclists using the route?		
	Is the bicycle route continuous, i.e., free of squeeze points or gaps?		
	Are bicycle safe grates provided at drainage pits where necessary?		

Checklist 5-6 *Signs and Lighting*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
1 Lighting	Is appropriate lighting installed at intersections, roundabouts, pedestrian and bicycle crossings, pedestrian refuges, etc?		
	Is all lighting operating satisfactorily?		
	Are the appropriate types of poles used for all locations and correctly installed (e.g. slip base at correct height, rigid poles protected if within clear zone)?		
	Are all locations free of any lighting which may conflict visually with traffic signals or signs?		
	Has lighting for signs, particularly overhead signs, been provided where necessary?		
2 Signs	Are all necessary regulatory, warning and direction signs (including detours) in place? Are they conspicuous?		
	Are there any redundant signs?		

Checklist 5-6 *Signs and Lighting*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
Signs (cont.)	Are traffic signs in their correct locations, and properly positioned with respect to lateral clearance and height?		
	Are the correct signs used for each situation, and is each sign necessary?		
	Are signs placed so as not to restrict sight distance, particularly for vehicles?		
	Are all signs effective for all likely conditions (e.g. day, night, rain, fog, rising or setting sun, oncoming headlights, poor lighting)?		
	Do sign supports conform to guidelines?		
3 Marking and delineation	Have retroreflective markers been installed? Where colored markers are used, have they been installed correctly?		
	Is all necessary pavement marking installed?		
	Are pavement markings (center lines, edge lines, transverse lines) clearly visible and effective for all likely conditions (e.g. day, night, rain, fog, rising or setting sun, oncoming headlights, light colored pavement surface, poor lighting)?		

Checklist 5-6 *Signs and Lighting*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
Marking and delineation (cont.)	On light colored pavement surfaces (e.g. concrete) are RRPMs used to simulate traffic lanes?		
	Has raised profile edge marking been provided where necessary (e.g. fatigue zones)?		
	Is delineation adequate and in accordance with guidelines (e.g. post-mounted delineators, RRPMs, chevron alignment markers)?		
	Is delineation effective for all likely conditions (e.g. day, night, rain, fog, rising or setting sun, oncoming headlights)?		
	If chevron alignment markers are installed, have the correct types of markers been used?		
	Are vehicle paths through intersections delineated where required?		
	On truck routes, are reflective devices appropriate to driver's eye height?		

Checklist 5-7 *Traffic Signals*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
1 Operation	Are traffic signals operating correctly? Is the number and location of signal displays appropriate?		
2 Visibility	Are traffic signals clearly visible to approaching motorists?		
	Is the end of likely vehicle queues visible to motorists so that they may stop safely?		
	Have any visibility problems caused by the rising or setting sun been addressed?		
	Are signal displays shielded so that they can be seen only by the motorists for whom they are intended?		
	Where signal displays are not visible from an adequate distance, are signal warning signs and/or flashing lights installed?		
3 Other provisions	Where necessary, are there provisions for visually impaired pedestrians (e.g., audio-tactile push buttons, tactile markings)? Are they working?		
	Where necessary, are there provisions for elderly or disabled pedestrians (e.g., extended green phase, phase displacement)?		

Checklist 5-8 *Physical Objects*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
1 Clear zone	Is a clear zone provided in accordance with the guidelines?		
	Is the appropriate treatment or protection provided for any objects within the clear zone (e.g., slip-base or frangible poles, crash barrier, crash cushions, sloping culvert, headwalls)?		

Checklist 5-8 *Physical Objects*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
2 Crash barriers	Are safety barriers installed at all necessary locations, including on bridges, in accordance with guidelines?		
	Are the crash barrier systems suitable for the purpose?		
	Is the length of crash barrier at each installation adequate? Are the crash barriers correctly installed?		
	Are Guard Rail Energy Absorbing Terminals (GREAT) or crash cushions installed where necessary (e.g., off ramp, bridge piers)?		

Checklist 5-8 ***Physical Objects***

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
Crash barriers (cont.)	Where works are subject to stage construction, are temporary barriers installed in accordance to guidelines?		
	Is there a safe run off area behind breakaway terminals?		
3 Fencing	Is pedestrian fencing where needed?		
	Is fencing in the clear zone free of separate horizontal rails?		
	Is there adequate delineation/visibility of barriers and fences at night?		

Checklist 5-9 *Delineation*

Project _____

Audit Team Members _____

Date _____

Item	Issues to be Considered	Check	Comments
1 Line markings	Are all line markings (center line, edge line, transverse lines) in good condition?		
2 Guide posts	Are guide posts correctly placed, clean, and visible?		
3 Raised and Recessed Pavement Markings	Are RPM's in good condition?		
4 Chevron Alignment Markers	Are Chevron Alignment Markers placed correctly, and used only according to standards?		

Checklist 5-10 *Pavement*

Project

Audit Team Members

Date

Item	Issues to be Considered	Check	Comments
1 Pavement defects	Is the pavement free of defects (e.g., excessive roughness or rutting, potholes, etc.) which could result in safety problems (e.g., loss of steering control)?		
2 Skid resistance	Does the pavement appear to have adequate skid resistance, particularly on curves, steep grades and approaches to intersection? Has skid resistance testing been carried out where necessary?		
3 Ponding	Is the pavement free of areas where ponding or sheet flow of water may occur with resultant safety problems?		
4 Loose screenings	Is the pavement free of loose screenings?		