
South Jersey Transportation Planning Organization

2006 Road Safety Audit

**Jimmie Leeds Road (CR 561 & 633)
Galloway Township,
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, recent and planned future development along the roadway, and local cooperation and control. 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. Jimmie Leeds Road (CR 561 & 633), between Pitney Road (CR 634) and Pomona Avenue (CR 575) (MP 1.54-4.49) and CR 633 (MP 0.64-1.68), in Galloway Township, Atlantic County.
2. 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.
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 sections of the five roadways.

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 issues, 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 of the data, the audit team can conduct a productive and comprehensive evaluation of the roads being studied. A multi-disciplinary team conducts the field view. 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 has or will impact traffic in the future?
- 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 Jimmie Leeds Road (CR 561); charts of four-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 Galloway Township Police Departments and spoke to Cpl. Troy Midgette to explain the purposes and process involved in the audit. Cpl. Midgette was already somewhat aware of the safety audit process. Since most of the scheduled team members had already participated in the FY 2005 audit, and all stakeholders received the information package, the workshop and field views were scheduled to take place on the same day.

JIMMIE LEEDS ROAD (CR 561)

Jimmie Leeds Road (CR 561 & CR 633) is under the jurisdictional control of Atlantic County. It is designated as a south-north road. The section being audited extends between Pitney Road (CR 634) on the southern end of the study area and Pomona Avenue (CR 575) at the northern end of the study area. The road is classified as an urban minor arterial. The total length of the study area is 3.99 miles.

Jimmie Leeds Road is basically a two-lane road with paved shoulders, with exclusive left-turn and/or right-turn lanes added at various intersections and driveways. The width of the shoulder varies along the roadway, but in most cases is less than five feet wide and in some areas even narrower. Beginning at Pitney Road where left-turn lanes are provided for both directions of travel and traveling north:

- there is a right-turn lane for northbound traffic at the driveway for CVS;
- a left-turn lane for northbound traffic at 2nd Avenue;
- a right-turn lane for northbound traffic and a left-turn lane for southbound traffic at Wrangleboro Road (signalized);
- a left-turn lane for southbound traffic at Great Creek Road (signalized);
- a right-turn lane for northbound traffic and a left-turn lane for southbound traffic at the driveway to the Costal Gas station;
- a very minimal shared through and left-turn lane for northbound traffic and a right-turn lane for southbound traffic at the GSP traffic signal;
- there are several right-turn lanes for southbound traffic into development driveways between Laurel Avenue and Chris Gaupp Drive;
- a left-turn lane for northbound traffic at Ash Avenue;

- a left-turn lane and right-turn lane for northbound traffic and a left-turn lane for southbound traffic at Chris Gaupp Avenue (signalized);
- a left-turn lane for northbound traffic at Maple Avenue; and,
- left-turn lanes for both directions of traffic at Pomona Avenue (signalized).

Jimmie Leeds Road has recently been resurfaced between Nectar Avenue and Yam Avenue for a distance of approximately 8/10 of a mile.

All four corners of the Pitney Road intersection are commercially developed. The curbline development remains basically commercial to 8th Avenue, including the Galloway Township municipal complex. Between 8th Avenue and 4th Avenue, the curbline development is mixed business-residential. North of 4th Avenue, development is mostly residential, but more sparse with the houses and businesses set back farther from the road. North of the GSP, the northbound side, with the exception of several homes, is entirely wooded between the GSP and Pomona Avenue. The driveway to the Atlantic Medical Center is on the northbound side opposite Chris Gaupp Drive, but the facility is not readily visible from Jimmie Leeds Road. The southbound side remains sparsely developed, but there are several developments under construction including an 88-single family home development and the Royal Suites Care Center. The major traffic generators along the road are Stockton State College, Atlantic Medical Center and the Galloway Township municipal complex. No major planned future development along the road was mentioned during the audit. Much of the traffic along the road is going to and from the ramp to the GSP that intersects the road at a signalized intersection.

There are six signalized intersections in the study area, at Pitney Road, at Wrangleboro Road, at Great Creek Road, at GSP, at Chris Gaupp Drive/ Driveway to Atlantic Medical Center, and at Pomona Avenue.

It was ascertained from local members of the audit team that:

- The traffic signal at Pitney Road is being upgraded to provide left turn intervals for all of the approaches to the intersection and enhanced pedestrian provisions.
- A traffic signal will be installed at 6th Avenue.

- A three-lane cross section (two-way, center left-turn lane) is being considered for the section of road between Pitney Road and 6th Avenue.
- The driveways to the municipal complex may be relocated to better accommodate traffic flow.
- The intersection at the GSP is being widened to a three-lane cross-section providing an exclusive left-turn lane for northbound traffic.
- Initial discussions are taking place regarding future improvements for College Drive.

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"=200', 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

The County requested that an eight-hour traffic count be conducted at the GSP intersection. A-Tech Engineering conducted the count on March 8, 2006.

4. Traffic Signal

The County submitted traffic signal plans for the intersection of Jimmie Leeds Road and Chris Gaupp Drive.

5. Crash Data

SJTPO staff forwarded to ORA the crash reports from the Galloway Township Police Department for the years 2002, 2003, 2004, and 2005 (the first 9 months). For the 45-month period, a total of 422 crashes were plotted for the study section of road. One hundred and

three (103) crashes occurred in 2002, 128 in 2003, 112 in 2004, and 79 in 2005 (nine months).

The types of crashes are characterized as follows:

0 – fatal crashes

113 – injury crashes

309 - non-injury crashes

72 – right-angle type crashes – Four at Pitney Road, three at the driveway to WAWA, three at the driveway to Downtown Plaza, three at 8th Avenue, four at 2nd Avenue, five at Chris Gaupp Drive, six at Redwood Avenue-College Entrance, and six at Pomona Road. There were no other concentrations.

229 – same-direction type crashes – Twenty-five (25) at Pitney Road, seven at 8th Avenue, five at the municipal complex driveway, three at Camel Back-Key, eight at 4th Avenue, eight at 2nd Avenue, 17 at Wrangleboro Road, 18 at Great Creek Road, eight at Ridgewood Avenue, 46 at the GSP signal, six at southbound GSP, four at Laurel Avenue, 25 at Chris Gaupp Dr., five at Redwood-College entrance, and 22 at Pomona Road. There were no other concentrations.

45 – left-turn type crashes – Five at Pitney Road, and nine at the GSP signal. There were no other concentrations.

38 – fixed-object type crashes – Five at 4th Avenue, four in the vicinity of 2nd Avenue, and four at Chris Gaupp Drive. There were no other concentrations.

1 – head on type crash – at Willow Avenue.

13 – struck animal - Five in the vicinity of Ash Avenue. There were no other concentrations.

24 – other type crashes – There were no concentrations.

A review of the information on the individual crash reports revealed the following information. Where possible, the data was compared to statewide averages for county roads. Possible reasons for the differences are also noted for some of the crash summary information.

- ♦ The month with the highest number of crashes was October. The month with the least number of crashes was December. Note – October, November and December crashes for 2005 were not provided.
- ♦ The highest frequency of crashes occurred on Tuesday and Wednesday. The least number of crashes occurred on Saturday and Sunday. (Road is a major commuter route.)
- ♦ The highest frequency of crashes occurred between 3:00-6:00 PM. (Peak commuting period.)
- ♦ The percentage of crashes during hours of darkness (20%) is less than the statewide average for county roads (approximately 30%).
- ♦ The percentage of crashes for wet surface conditions (33%) is greater than the statewide average for county roads (approximately 24%). (possible indication of a slippery road surface)
- ♦ The percentage of crashes with snowy or icy surface conditions (3%) is consistent with the statewide average for county roads (approximately 5%).
- ♦ The percentage of crashes with injuries (26%) is consistent with the statewide average for county roads (approximately 30%).
- ♦ The percentage of right-angle type crashes (17%) is slightly less than the statewide average for county roads (approximately 21%).
- ♦ The percentage of same directional crashes (54%) is much greater than the statewide average for county roads (approximately 29%). (an indication of congestion and capacity issues)
- ♦ The percentage of left-turn crashes (10%) is greater than the statewide average for county roads (approximately 6%).

- ♦ The percentage of sideswipe type crashes (0%) is less than the statewide average for county roads (approximately 12%). (possibly due to primarily single lane conditions)
- ♦ The percentage of fixed-object type crashes (9%) is consistent with the statewide average for county roads (approximately 12%).
- ♦ The percentage of struck animal type crashes (3%) is consistent with the statewide average for county roads (approximately 4%).
- ♦ The percentage of other type crashes (5%) is consistent with the statewide average for county roads (approximately 4%).

6. **Other Information**

Additional materials reviewed by ORA prior to the formal audit process included videotapes taken by A-TECH Engineering, Inc. of both directions of travel for the entire study area.

Materials listed above are included in the Appendix.

Audit

On March 15, 2006, the Safety Audit Team met in the Galloway Township municipal complex on Jimmie Leeds Road 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 Pomona Road intersection to begin the audit. Atlantic County provided a van for the team. Team members are listed below.

SAFETY AUDIT TEAM FOR JIMMIE LEEDS ROAD

| Name | Agency |
|------------------|-------------------------------------|
| Raymond Reeve | Office of Highway Safety |
| James Mason | Atlantic County Engineering |
| Edward Newman | Atlantic County Engineering |
| John Masi | Atlantic County Engineering |
| Troy Midgette | Galloway Township Police Department |
| Timothy Chelius | SJTPO |
| Nancy Allen | NJDOT |
| Tina Deng | NJDOT |
| John Everest | Atlantic County Planning |
| Norman Deitch | Orth-Rodgers & Associates, Inc. |
| George Strathern | Orth-Rodgers & Associates, Inc. |

The team began at Pomona Road and walked south before breaking for lunch. After lunch, the team resumed the audit and walked south to Pitney Road.

During the field views, team members identified features on the roadway and its surrounding environment that could contribute to the occurrence or relative severity of roadway crashes. At the intersections and mid-block locations, the Audit Team identified safety deficiencies and inappropriate traffic signs, as well as other items that were felt to be inconsistent 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.

The next section of the report summarizes the findings from the daytime and nighttime audits of CR 561 and CR 663, Jimmie Leeds Road between Pitney Road (CR 634) and Pomona Avenue (CR 575) in Galloway Township.

Findings

The findings from the Jimmie Leeds Road (CR 561 & CR 633) safety audit are presented on the following pages in the approximate order of their location along the roadway beginning at Pomona Avenue and traveling south to Pitney Road.

| SAFETY ISSUE | | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|--|---|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 1 | Pomona Avenue signalized intersection – both directions of Jimmie Leeds Road have lead green interval. | Install supplemental R10-5 – “LEFT TURN YIELD ON GREEN (SYMBOL) BALL” signs on mast arms facing both directions of Jimmie Leeds Road. | X | | | X | | |
| 2 | Pomona Avenue – no mast arm mounted street name signs. | Install mast arm mounted street name signs. | X | | | X | | |
| 3 | Northbound approaching Pomona Avenue – guide sign indicating Whitehorse Pike to left and Port Republic to the right. Sign is worn, installed less than 7 feet to bottom of sign and lacks tape line between two lines of legend. | Replace with new sign with tape line and installed at appropriate height. | X | | | X | | |
| 4 | Northbound side - “JCT 575” sign assembly approaching Pomona Avenue is worn. | Install new sign assembly. | X | | | X | | |
| 5 | Southbound side “SPEED LIMIT 45 MPH” installed approximately 1,000 feet south of Pomona Avenue is worn. | Install new “SPEED LIMIT 45 MPH” sign. | X | | | X | | |
| 6 | Northbound side at Xanthus Avenue- edge of shoulder drop off. | Re-grade area to eliminate drop off. | | X | | | X | |
| 7 | Vine Avenue - no luminaries at the intersection. | Consideration should be given to installing luminaries at the intersection. | | X | | | X | |
| 8 | Northbound side – just north of Duerer Road – chain link fence installed at edge of shoulder. Shoulder only approximately three feet wide. Fence appears to be on county R.O.W. | Contact property owner regarding removal of fence. | | X | | | X | |
| 9 | At Duerer Road – stop sign facing Duerer Road approach is twisted so that it is visible to southbound Jimmie Leeds Road traffic. | Re-install stop sign so that it is less visible to Jimmie Leeds Road traffic. | X | | | X | | |

| SAFETY ISSUE | | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|--|--|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 10 | At Duerer Road – guide signs for Duerer Road traffic installed on the southbound side of Jimmie Leeds Road are visible to Jimmie Leeds Road traffic. | Re-install guide signs so that they are less visible to southbound Jimmie Leeds Road traffic. | X | | | X | | |
| 11 | Guide signs for southbound Jimmie Leeds Road traffic at Duerer Road visible to Duerer Road traffic. | Re-install guide signs farther north of intersection. | X | | | X | | |
| 12 | Northbound side – at Duerer Road - route marker assembly indicating CR 663 straight and CR 561 to the right is worn. | Install new route marker assembly. | X | | | X | | |
| 13 | Southbound side – just north of Spruce Avenue, “SPEED LIMIT 45 MPH” sign is worn. | Install new “SPEED LIMIT 45 MPH” sign. | X | | | X | | |
| 14 | Northbound side – at Spruce Avenue – shoulder worn and rutted by vehicles passing to the right of left turning vehicles. | Repair shoulder area. | X | | | X | | |
| 15 | Northbound side – JCT 633 sign assembly just north of Redwood Avenue- Entrance to Richard Stockton College is worn. | Install new “JCT 633” sign assembly. | X | | | X | | |
| 16 | Right turn ramp from Richard Stockton College driveway onto Jimmie Leeds Road has one “DO NOT ENTER” sign facing southbound Jimmie Leeds Road traffic. | Additional “ONE WAY” and “DO NOT ENTER” signs should be installed at the ramp to prevent wrong way movements onto the ramp. | X | | | X | | |
| 17 | “STOP” sign on the Richard Stockton College driveway (left turn move) installed at less than 7 feet high. Also, sign may not be reflectorized. | Replace existing “STOP” sign with new sign installed at appropriate height. Install large double arrow sign on top of ‘T’ facing the driveway. | X | | | X | | |

| SAFETY ISSUE | | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|--|--|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 18 | Northbound side - triangular island forming right turn slip ramp into Richard Stockton College has telephone pole in gore. | Install object marker or guide sign in gore for better delineation. Enhance pavement markings at gore by cross hatching or re-installing markings to form larger painted gore. | | X | | | X | |
| 19 | Northbound side – 25 MPH advisory ramp speed sign at beginning of deceleration lane to college driveway is oversized and installed too low. | Replace existing sign with new standard size sign installed at the appropriate height. | X | | | X | | |
| 20 | Northbound side - “RIGHT LANE MUST TURN RIGHT” sign installed at the beginning of deceleration lane for the college is installed too low. There is not a second sign along the deceleration lane. | Raise existing sign to appropriate height. Install second “RIGHT LANE MUST TURN RIGHT” sign along the deceleration lane. | X | | | X | | |
| 21 | Northbound side – deceleration lane to college lacks any painted arrows or “ONLY”. Edge line along Jimmie Leeds Road extends too far north along the deceleration lane. | Install two right turn arrows along deceleration lane. Remove edge line to beginning of deceleration lane. | X | | | X | | |
| 22 | Northbound side at Popular Avenue – large double arrow sign installed facing Popular Avenue which is a dead-end. Sign not needed. | Remove large double arrow sign. | X | | | X | | |
| 23 | Approximately 500 feet south of entrance to college – in front of # 102 on the southbound side there is some type of home made inlet and on the northbound side what appears to be a homemade drainage system with an open trench. | Contact the property owner regarding the removal of the inlet, elimination of the trench and repair of the area. | | X | | | X | |
| 24 | Orange Tree Avenue – no luminaries at intersection. | Consideration should be given to installing luminaries at intersection. | X | | | X | | |

| | SAFETY ISSUE | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|----|--|---|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 25 | Northbound side - at Orange Tree Avenue shoulder worn and rutted by vehicles passing to the right of left-turning vehicles. | Repair shoulder area. | X | | | X | | |
| 26 | Southbound at Nectar Avenue – existing warning sign, “EMERGENCY VEHICLES”, is a non-standard sign which does not convey a clear message to the motorist. | Remove sign and post. | X | | | X | | |
| 27 | Northbound side - at Nectar Avenue shoulder worn and rutted by vehicles passing to the right of left turning vehicles. | Repair shoulder area. | X | | | X | | |
| 28 | Nectar Avenue southeast corner – trees within sight triangle restricting sight distance. | Contact property owner regarding removal or selective trimming of trees. | | X | | | X | |
| 29 | Southbound side just south of Nectar Avenue – trees which may be within county R.O.W. growing between fence and edge of road. Local team members state that when trees bloom they obstruct sight distance. | Investigate limits of R.O.W. and take appropriate action to have trees removed. | | X | | | X | |
| 30 | Maple Avenue northwest corner - trees and fence on the adjoining property restricting sight distance. | Consideration should be given to contacting property owners regarding maintaining sight triangle. | | X | | | X | |
| 31 | Northbound side - “LEFT LANE MUST TURN LEFT” signs at Maple Avenue installed below height of 7 feet. | Re-install signs at appropriate height. | X | | | X | | |

| | SAFETY ISSUE | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|----|--|---|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 32 | Southbound Jimmie Leeds Road traffic at Chris Gaupp Road has lead left turn interval but no supplemental sign. No mast arm mounted street name signs at intersection. Chris Gaupp Road eastbound approach has exclusive left turn lane with painted arrow but lacks "ONLY" markings. Also, no pedestrian indications at the intersection. Local team members stated that pedestrian activity at the intersection has increased since the construction of the Sunrise Plaza strip mall. | Install supplemental "LEFT TURN YIELD ON GREEN (SYMBOL) BALL" sign facing southbound Jimmie Leeds Road. Install mast arm mounted street name signs at the intersection. Consideration should be given to installing pedestrian indications at the intersection. | | X | | | X | |
| 33 | Sunrise Plaza strip mall driveway onto Jimmie Leeds Road has a small finger island constructed with the apparent intent of prohibiting left turns from the driveway. There are no signs on the driveway. | Install R4-7 (KEEP RIGHT) signs on both ends of the finger island. Install R5-1 (DO NOT ENTER) sign facing into the mall and R3-2 (NO LEFT TURN) signs facing driveway traffic. | X | | | X | | |
| 34 | Southbound side – at driveway to Health Center of Galloway – there is a deceleration lane into the Health Center. However, an edge line has been painted between the southbound through lane and the right turn deceleration lane into the Center discouraging motorist from using the deceleration lane. Also at the driveway a R5-1 (DO NOT ENTER) sign is installed on the end of the triangular island in the driveway where a R4-7 (KEEP RIGHT) should be. Additionally the stop sign on the driveway is visible to Jimmie Leeds Road traffic and has a R3-2 (NO LEFT TURN) installed below it. | Remove edge line between deceleration lane and through lane. Replace the R 5-1 (DO NOT ENTER) sign with R4-7 (KEEP RIGHT) sign. Relocate STOP sign so that it is less visible to Jimmie Leeds Road traffic and relocate R3-2 (NO LEFT TURN) sign installed below the existing stop sign to another location perhaps on to the northbound side of Jimmie Leeds Road. | X | | | X | | |

| SAFETY ISSUE | | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|--|--|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 35 | Southbound side – approximately 50 feet south of driveway to Health Center of Galloway there is a R3-2 (NO LEFT TURN) sign which was installed for a construction entrance and sign is no longer needed. | Remove sign. | X | | | X | | |
| 36 | Southbound side – south of Chris Gaupp Drive there is a “SOUTH 561” route marker assembly installed too low. Approximately 4 feet from the route marker, a 2x6 is sticking up out of the ground. | Re-install route marker assembly at appropriate height. Remove 2x6. | X | | | X | | |
| 37 | Northbound side – Bacharach Institute for Rehabilitation financial offices has one-way driveways. Signs are installed too low and are worn. | Contact property owner regarding the proper signing of the one way driveways. | X | | | X | | |
| 38 | Northbound side – approaching Chris Gaupp Drive W3-3 (SIGNAL AHEAD SYMBOL) sign worn and not needed. | Remove sign and post. | X | | | X | | |
| 39 | At driveway, First National Bank of Absecon. Stop sign on driveway installed too low. R5-1 (DO NOT ENTER) and R5-2 (WRONG WAY) signs on driveway are worn and installed too low. | Contact property owner regarding reinstalling stop sign at appropriate height and replacing R5-1 and R5-2 signs at appropriate height. | X | | | X | | |
| 40 | Southbound side – at Laurel Avenue full width shoulder area probably intended as a deceleration lane for right turning traffic. However, edge line painted to Laurel Ave curb line discouraging use by motorist. | Remove edge line across full width shoulder to permit use as deceleration lane onto Laurel Ave. | X | | | X | | |
| 41 | Southbound – north of GSP, there is a W3-3 (SIGNAL AHEAD) sign installed too low and it is worn. | Install new W3-3 at appropriate height. | X | | | X | | |
| 42 | Southbound side north of GSP – side road symbol warning sign depicting the GSP intersection which is signalized. | Remove side road symbol warning sign. Consideration should be given to installing GSP route markers at this location. | X | | | X | | |

| SAFETY ISSUE | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|---|--------------------------|--------|------|--------------------------|--------|------|
| | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 43 | GSP intersection – At the pre-audit meeting and during and after the audit, local team members emphasized that their observations are that much of the crash data along the road can be directly attributed to the congestion resulting from the large volume of traffic utilizing the road to get to and from the GSP, particularly to the southbound GSP. The number of same directional type crashes and the subsequent field views of the road seem to confirm their observation. The general consensus was that the lack of a full interchange (presently southbound off ramp and northbound on ramp) at Exit 44 (Pomona Avenue) of the GSP was causing motorists to use Jimmie Leeds Road to get to the GSP. If a full interchange were built at Exit 44, traffic on Jimmie Leeds Road would be greatly reduced. An eight-hour traffic count was taken at the intersection on March 8, 2006. During those 8 hours, 4,927 vehicles exited the GSP ramp onto Jimmie Leeds Road. Thirty-seven percent (2,242 vehicles) of northbound traffic on Jimmie Leeds Road turned left onto the GSP ramp. During the PM peak hour, 42% turned left onto the ramp. Thirty-four percent (1,894 vehicles) of southbound Jimmie Leeds Road traffic turned right onto the GSP ramp. Forty-two percent (2,692 vehicles) of the traffic southbound on Jimmie Leeds Road just south of the GSP turned right onto Jimmie Leeds Road from the GSP ramp. | | X | | | | X |

| SAFETY ISSUE | | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|---|--|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 44 | Stop signs along the approaches of the following roads at Jimmie Leeds Road are worn: Yam Avenue, Xanthus Avenue, Willow Avenue, Upas Avenue, Redwood Avenue, Orange Tree Avenue, and Ridgewood Avenue. | Replace stop signs at the intersections. | X | | | X | | |
| 45 | Northbound side – just north of Ridgewood Avenue, there is a lane use control symbol sign for the GSP intersection indicating left lane for left and through traffic and right lane for through traffic. The sign is well in advance of the formation of two lanes. | Install “AHEAD” plate under lane use control sign. | X | | | X | | |
| 46 | Southbound side – shoulder drop off just north of Costal gas station driveway. | Re-grade shoulder area to eliminate drop off. | X | | | X | | |
| 47 | Southbound side – guide sign opposite driveway to Costal gas station has legend “WRANGLEBORO ROAD” and “HIGH SCHOOL” with horizontal arrow to left appears like it is pointing you into the driveway to the gas station. | Replace with sign which indicates “Next Left”. | X | | | X | | |
| 48 | Northbound side – there is a W3-3 (SIGNAL AHEAD) sign in front of Coastal gas station and another approximately 500 feet to the north. | Remove W3-3 sign and post in front of the Coastal gas station. | X | | | X | | |
| 49 | Great Creek Road – mast arm mounted street name signs appear small. | Replace existing mast arm signs with signs with 8” C letters. | X | | | X | | |
| 50 | Southbound side – “SPEED LIMIT 45 MPH” installed south of Great Creek Road is worn. | Install new “SPEED LIMIT 45 MPH” sign. | X | | | X | | |
| 51 | Southbound side - mile marker "3" sign and post knocked down, leaning against tree. | Reinstall sign and post. | X | | | X | | |

| SAFETY ISSUE | | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|--|--|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 52 | At Wrangleboro Road – near left over-the-road signal head facing southbound traffic is located at the edge of roadway. | Revise signal so that this indication is located closer to the centerline of the road. Local team members stated that a fourth leg is being added to the intersection for a veterinary hospital. Perhaps revisions necessary to accommodate the fourth leg can be coordinated with the revisions needed to better position the previously mentioned signal indication. | | X | | | | X |
| 53 | Wrangleboro Road – pole mounted street name signs appear small. | Replace with mast arm signs with 8" C letters. | X | | | X | | |
| 54 | Northbound side – south of Wrangleboro Road – sign for "HIGH SCHOOL" and "SHOPS AT GALLOWAY ONE MILE" are too small. | Remove signs or replace with appropriately sized signs. | X | | | X | | |
| 55 | Southbound side – southwest corner of 2 nd Avenue inlet without curb. | Install transition curb on both sides of inlet, or modify inlet. | | X | | | X | |
| 56 | Southbound side – shoulder drop off opposite #225E. | Grade along edge of road to eliminate drop off. | X | | | X | | |
| 57 | Northbound side – at 4 th Avenue – very minimal shoulder and large arrow sign (facing 4 th Avenue) installed just off of shoulder with fire hydrant and ditch behind sign. | Install delineators to better define edge of road and to discourage vehicles from passing to the right of left turning vehicles. | X | | | | X | |
| 58 | Northbound side – curve symbol sign to the left installed south of 4 th Avenue is worn. | Replace curve symbol sign with new sign. | X | | | X | | |
| 59 | Southbound side - "JCT 654" sign assembly located south of Key-Camel Back Drive is worn. | Replace with new sign assembly. | X | | | X | | |
| 60 | Southbound side "654" with arrow to right sign assembly located just north of 6 th Avenue is worn. | Replace with new sign assembly. | X | | | X | | |

| SAFETY ISSUE | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|---|--------------------------|--------|------|--------------------------|--------|------|
| | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 61 | Southbound side – approaching Pitney Road “SIGNAL AHEAD” sign is defaced. | X | | | X | | |
| 62 | Local team members commented that there are pedestrians crossing Jimmie Leeds Road from the municipal complex and the Downtown Plaza. | | X | | | X | |
| 63 | Jimmie Leeds Road is to be revised to a three-lane cross-section between Pitney Road and 6 th Avenue. | X | | | X | | |
| 64 | Northbound side - “JCT 657” sign assembly obstructing visibility of side road symbol sign located south of 6 th Avenue. | X | | | X | | |

NIGHTTIME FIELD VIEW IDENTIFIED THE FOLLOWING SAFETY ISSUES

| | | | | | | | | |
|----|---|---|---|---|--|---|---|--|
| 65 | General comment – Pavement markings along the road with the exception of the section that was resurfaced are generally worn. | Re-paint pavement markings. When roadway is resurfaced consideration be given to installing raised pavement markings along entire length. | | X | | | X | |
| 66 | Pomona Avenue – significant side glow from signal facing Pomona Avenue. | Attempt to minimize side glow by re-aiming signals and/or adjusting ray directors. | X | | | X | | |
| 67 | At GSP – flex delineator posts outlining the triangular island on the ramp approach are damaged and knocked down. | Replace damaged and missing flex posts. | X | | | X | | |

| SAFETY ISSUE | | REMEDIAL ACTION | LEVEL OF EFFORT REQUIRED | | | POTENTIAL SAFETY BENEFIT | | |
|--------------|--|---|--------------------------|--------|------|--------------------------|--------|------|
| | | | LOW | MEDIUM | HIGH | LOW | MEDIUM | HIGH |
| 68 | Southbound – curve north of 4 th Avenue needs another chevron sign installed south of the southern most chevron sign on that curve. Sign to face southbound traffic. | Install chevron sign. | X | | | X | | |
| 69 | Both approaches to 6 th Avenue have side road symbol warning signs. It is felt that installing a supplemental street nameplate below the sign would help identify the intersection to the motorist. | Install street name plated below signs. | X | | | X | | |
| 70 | Southbound on Jimmie Leeds Road - “NO PASSING ZONE” permant sign installed on left side of road north of Pitney Road and facing southbound traffic is not needed. | Remove sign. | X | | | X | | |
| 71 | Northbound side - “SIGNAL AHEAD” sign closest to GSP intersection is worn. | Replace sign. | X | | | X | | |

Recommendations

As stated earlier, the intent of the road safety audit process is to conduct a formal examination of highway features and the 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 #43 (the installation of pole mounted signal heads at the GSP) and item #52 (revising the traffic signal to better locate a signal head). Those improvements discussed in the body of the report, which are scheduled and planned by the County, will also contribute to the safety of the road and those which may qualify for short term quick fix funding should also be considered.

As evidenced by the over representation of same directional type crashes, much of the crash experience on the road is probably congestion related. While there are six signalized intersections along the road, a traffic signal plan was only provided for one intersection. The

field views revealed that with the exception of the signal at the GSP all of the installations look fairly modern. Signal timings were not provided for any of the intersections and it is suggested that perhaps the crash experience along the road could be reduced if the signals were coordinated and had time of day programs. Again, not knowing the existing timings this is speculation.

The construction of full-width shoulders along the entire length of the road, permitting vehicles to pass to the right of left turning vehicles, would be a long term improvement which would probably help to reduce the number of same directional crashes along the road. This type of improvement is beyond the scope intended to be implemented as a result of this audit. This is also true of the construction of a full interchange at Exit 44 of the GSP described in the findings of the report.

Unfortunately, with many roads and many of the audits we have conducted, there is no easy quick fix solution to many of the crash patterns. 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.

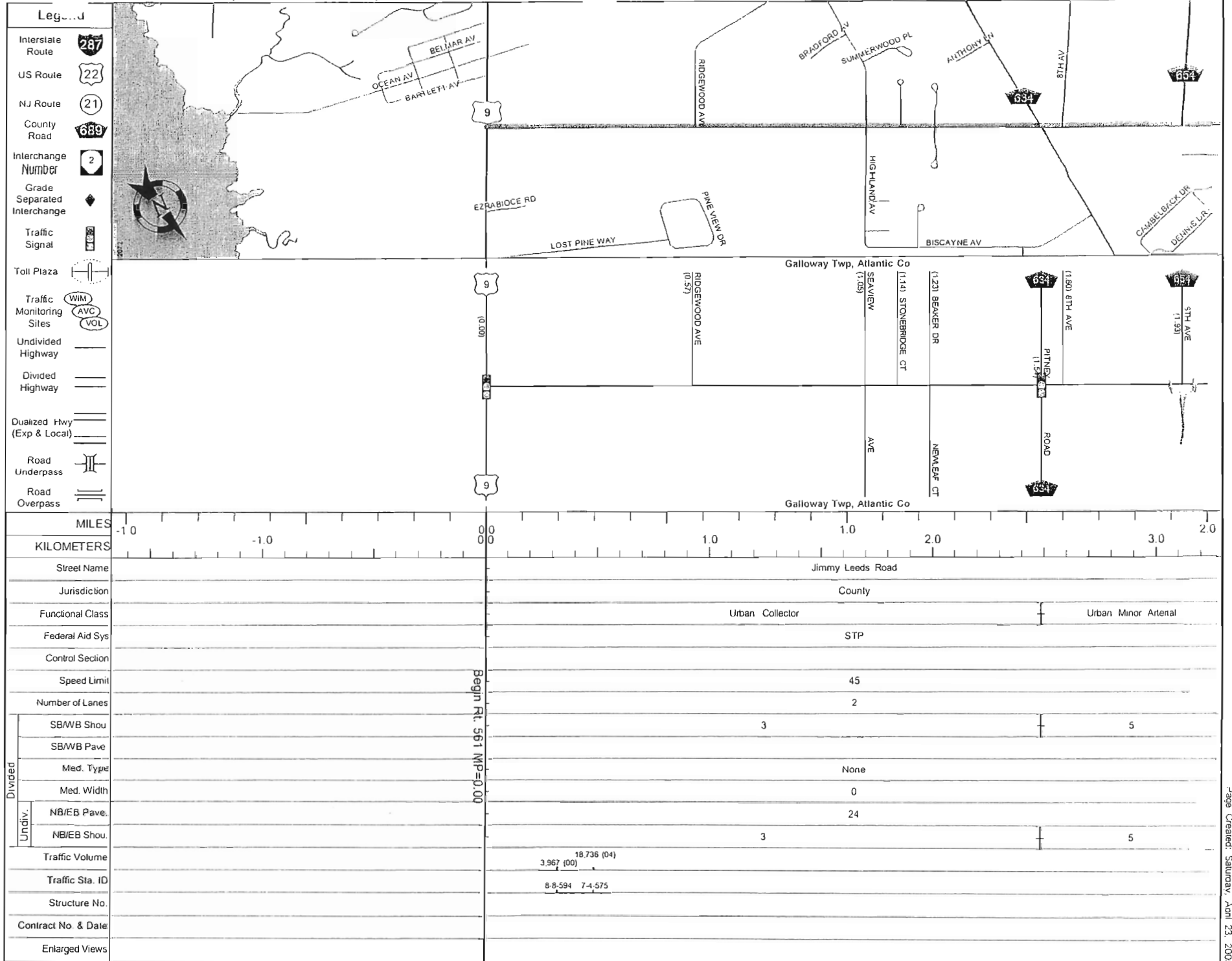
The opinions found in the findings of this Safety Audit report are those of the Safety Audit Team, as a whole, and not necessarily the opinions of the SJTPO or the individual team members.

Appendix

- Straight line diagram of Jimmie Leeds Road
- Straight-line plan on which are plotted crashes
- Crash Data Summary Sheets
- Traffic count
- Crash Data Charts
- Photographs
- Checklists

ROUTE 561 (South to North)

Mile Posts: 0 - 2.000



SRI = 00000561__

Date last inventoried: April 2004

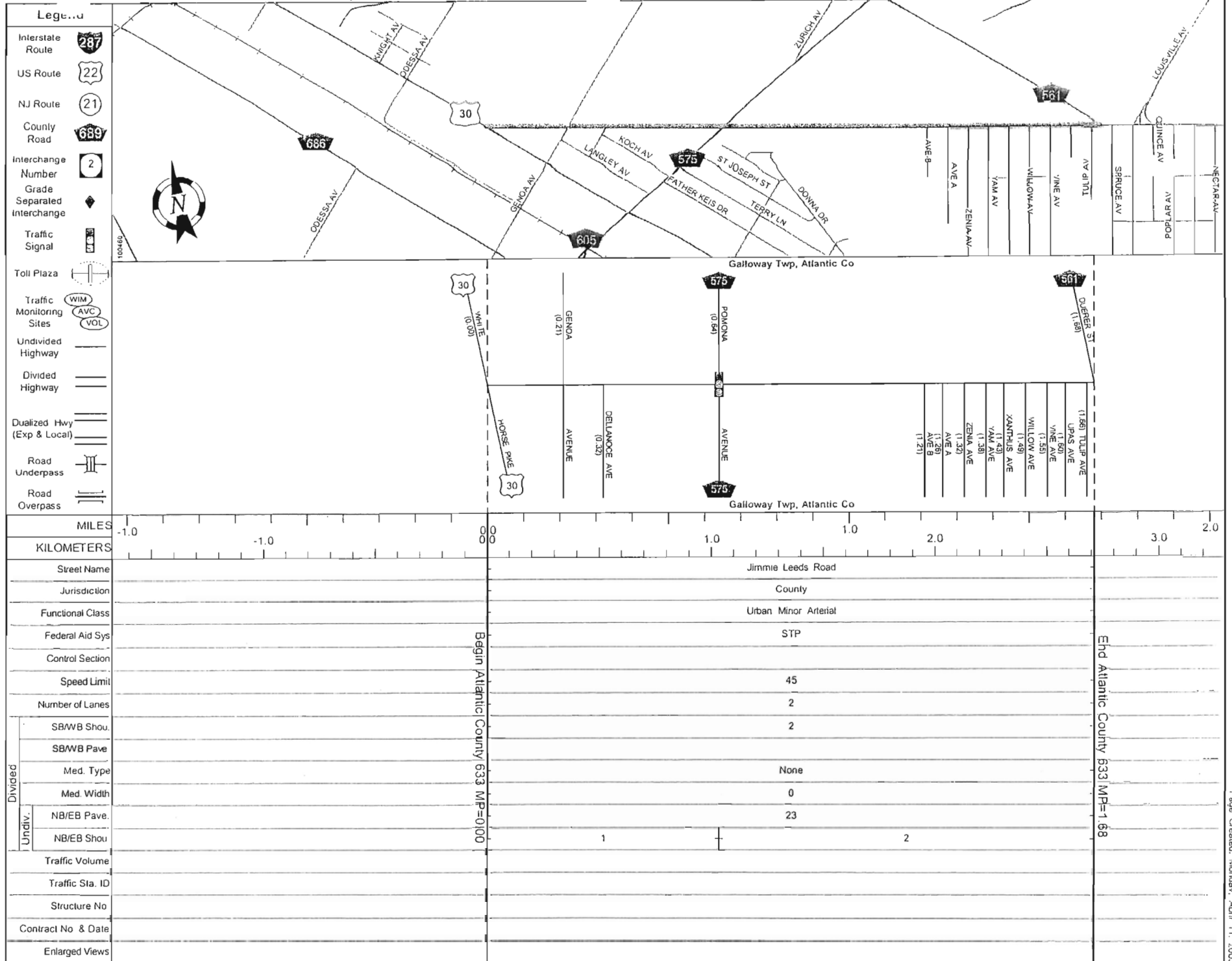
Mile Posts: 2 1 - 5.000



Date last inventoried: April 2004

ATLANTIC COUNTY 633 (West to East)

Mile Posts: 0 1 - 1.680



SRI = 01000633__

Date last inventoried: August 2001

JIMMIE LEEDS ROAD (CR 561 & 633)
GALLOWAY
CRASH SUMMARY 2002-2005 (9 months)
TOTAL- 422 CRASHES
Month

| | | | | | | | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Jan. | Feb. | Mar. | Apr. | May | June | July | Aug. | Sept. | Oct. | Nov. | Dec. |
| <u>26</u> | <u>28</u> | <u>41</u> | <u>42</u> | <u>40</u> | <u>33</u> | <u>30</u> | <u>42</u> | <u>40</u> | <u>45</u> | <u>31</u> | <u>24</u> |

| Time of Day | | | | Day of Week | |
|-----------------|-----------|-----------------|-----------|-------------|-----------|
| AM | Number of | PM | Number of | | Number of |
| Midnight - Noon | Crashes | Noon - Midnight | Crashes | | Crashes |
| Midnight – 1:00 | 3 | 12:00-1300 | 32 | Monday | 66 |
| 1:00 – 2:00 | 2 | 1300-1400 | 30 | Tuesday | 77 |
| 2:00 – 3:00 | 3 | 1400-1500 | 38 | Wednesday | 76 |
| 3:00 – 4:00 | 4 | 1500-1600 | 47 | Thursday | 68 |
| 4:00 – 5:00 | 0 | 1600-1700 | 44 | Friday | 62 |
| 5:00 – 6:00 | 2 | 1700-1800 | 49 | Saturday | 37 |
| 6:00 – 7:00 | 5 | 1800-1900 | 26 | Sunday | 29 |
| 7:00 – 8:00 | 11 | 1900-2000 | 19 | | |
| 8:00 – 9:00 | 21 | 2000-2100 | 10 | UNKNOWN | 7 |
| 9:00 – 10:00 | 11 | 2100-2200 | 9 | | |
| 10:00 – 11:00 | 15 | 2200-2300 | 7 | | |
| 11:00 – 12 Noon | 23 | 2300-2400 | 7 | | |
| UNKNOWN | | | 3 | | |

DAY 335

NIGHT 87

DRY 267 WET 141 SNOWY 5 ICY 6 OTHERS 4

CLEAR 302 RAIN 109 SNOW 5 FOG 3 OTHERS 3

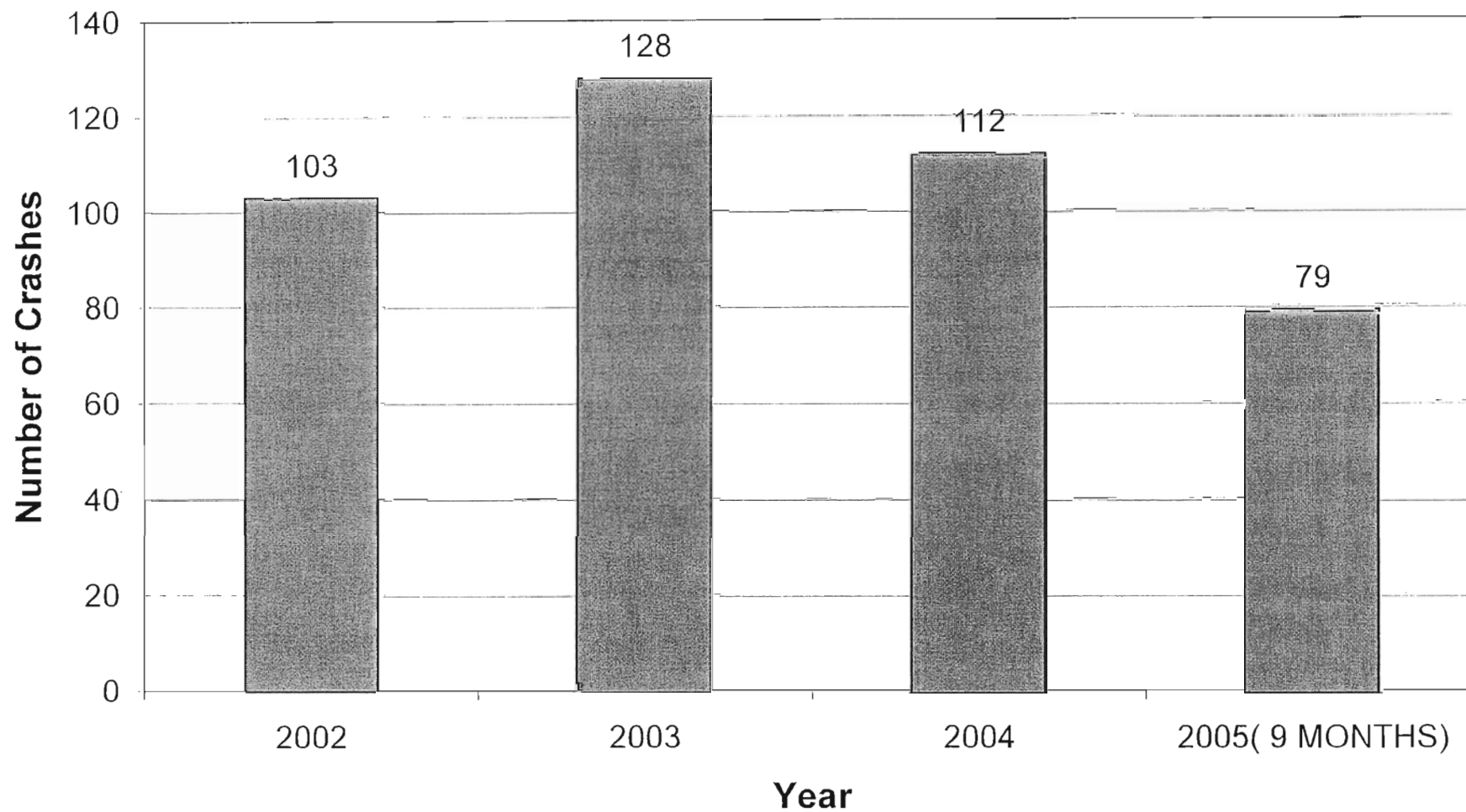
INJURY 113 NON-INJURY 309 FATAL 0

| | | | | |
|-------------|----------------|-----------|------------|------------|
| Right Angle | Same Direction | Left Turn | Right Turn | Side Swipe |
| 72 | 229 | 45 | 0 | 0 |

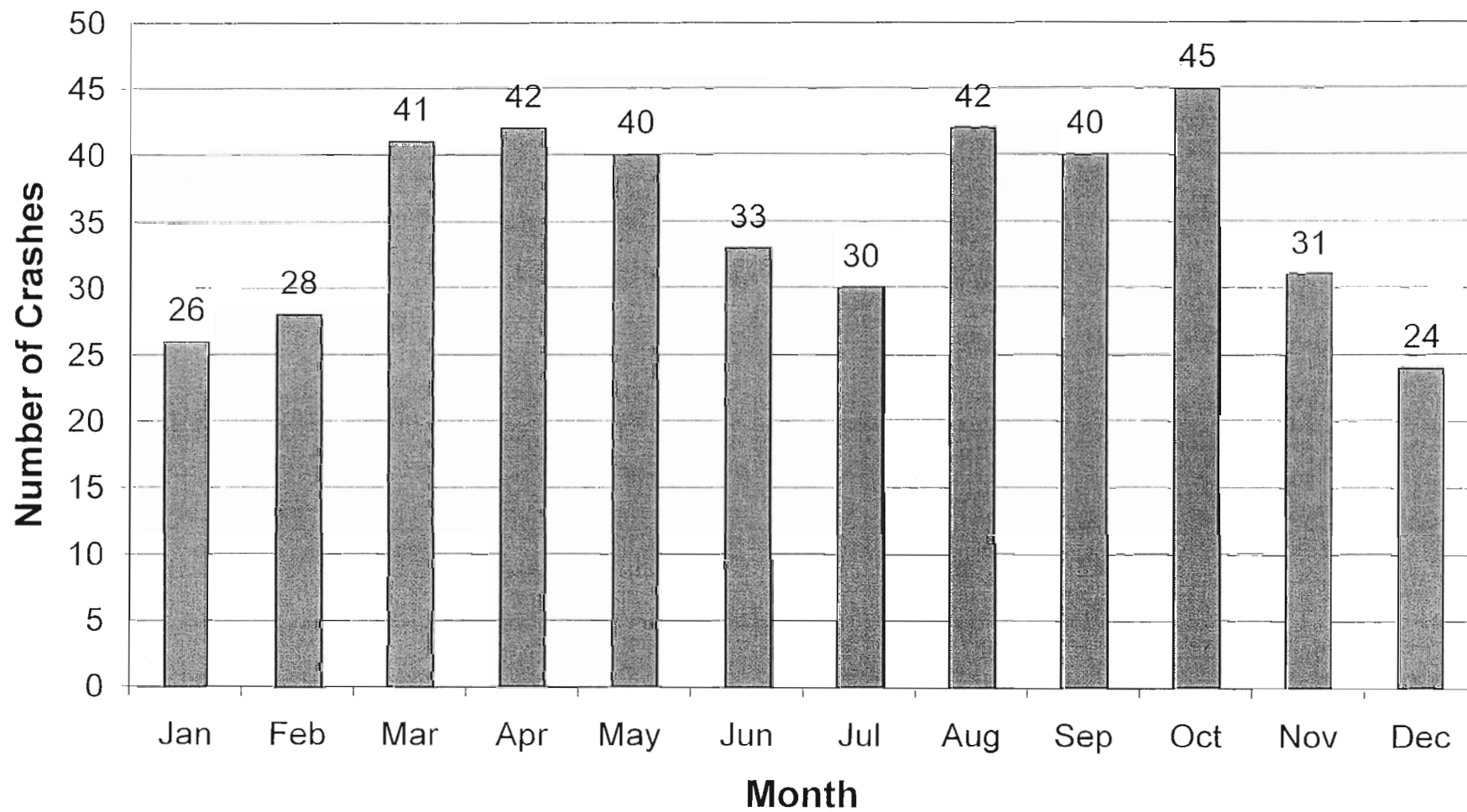
| | | | | |
|--------------|---------|-------|-------------|------|
| Fixed Object | Head On | Other | Struck Deer | Bike |
| 38 | 1 | 24 | 13 | |

Jimmie Leeds Rd (CR 561 & 633)

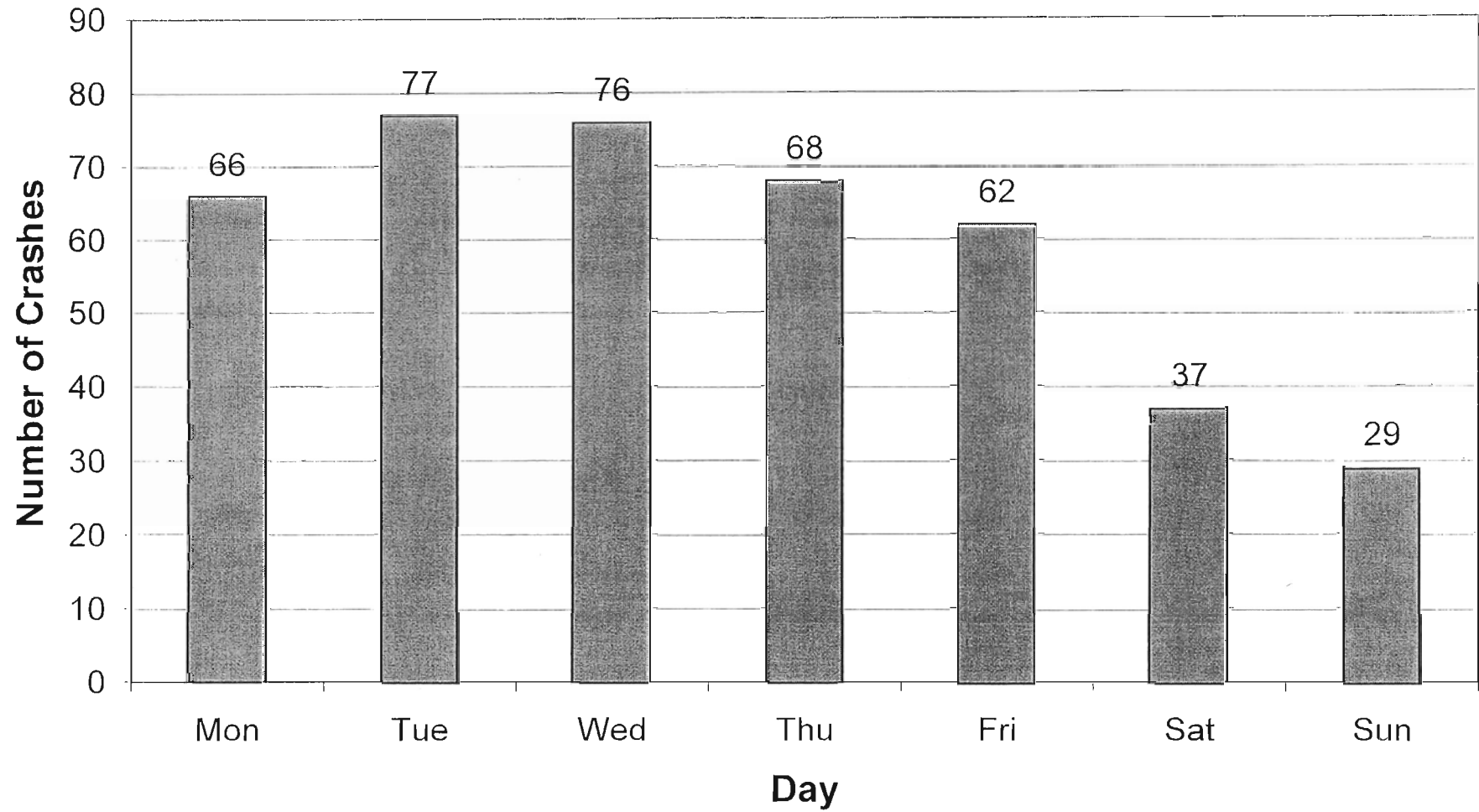
4 Year Trend



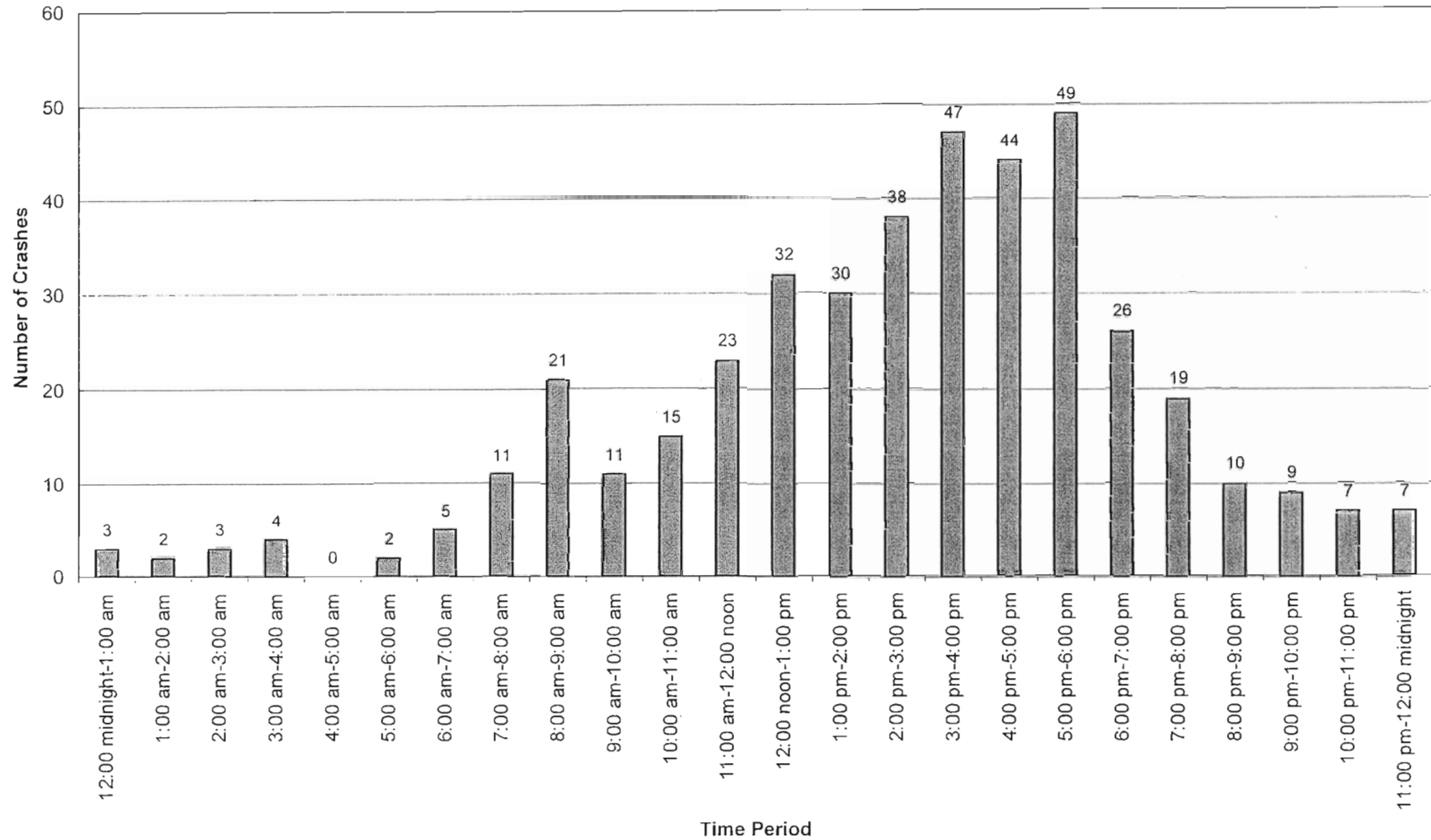
Jimmie Leeds Rd (CR 561 & 633) **Crash Occurrence by Month**



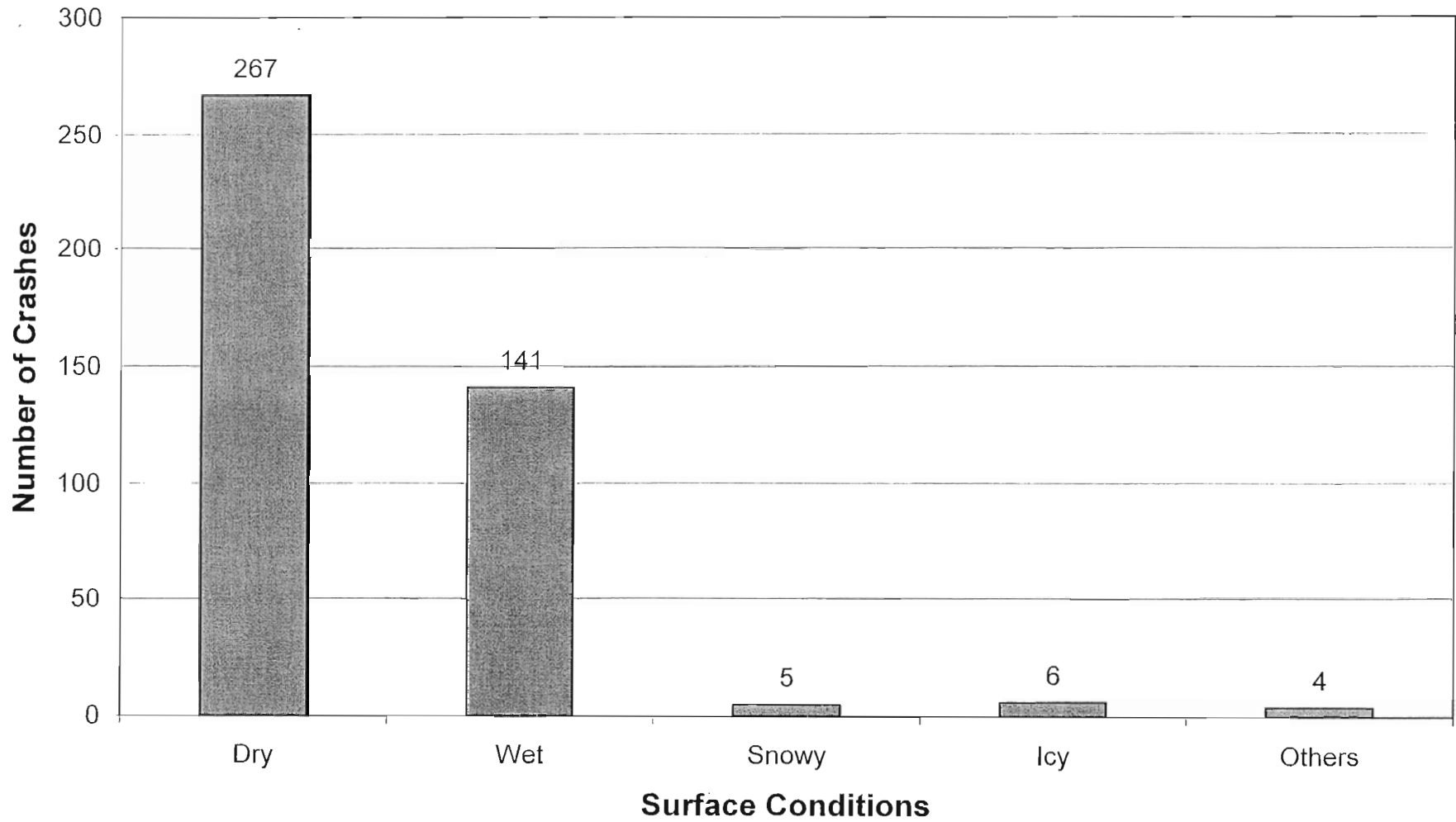
Jimmie Leeds Rd (CR 561 & 633) **Crash Occurrence by Day of Week**



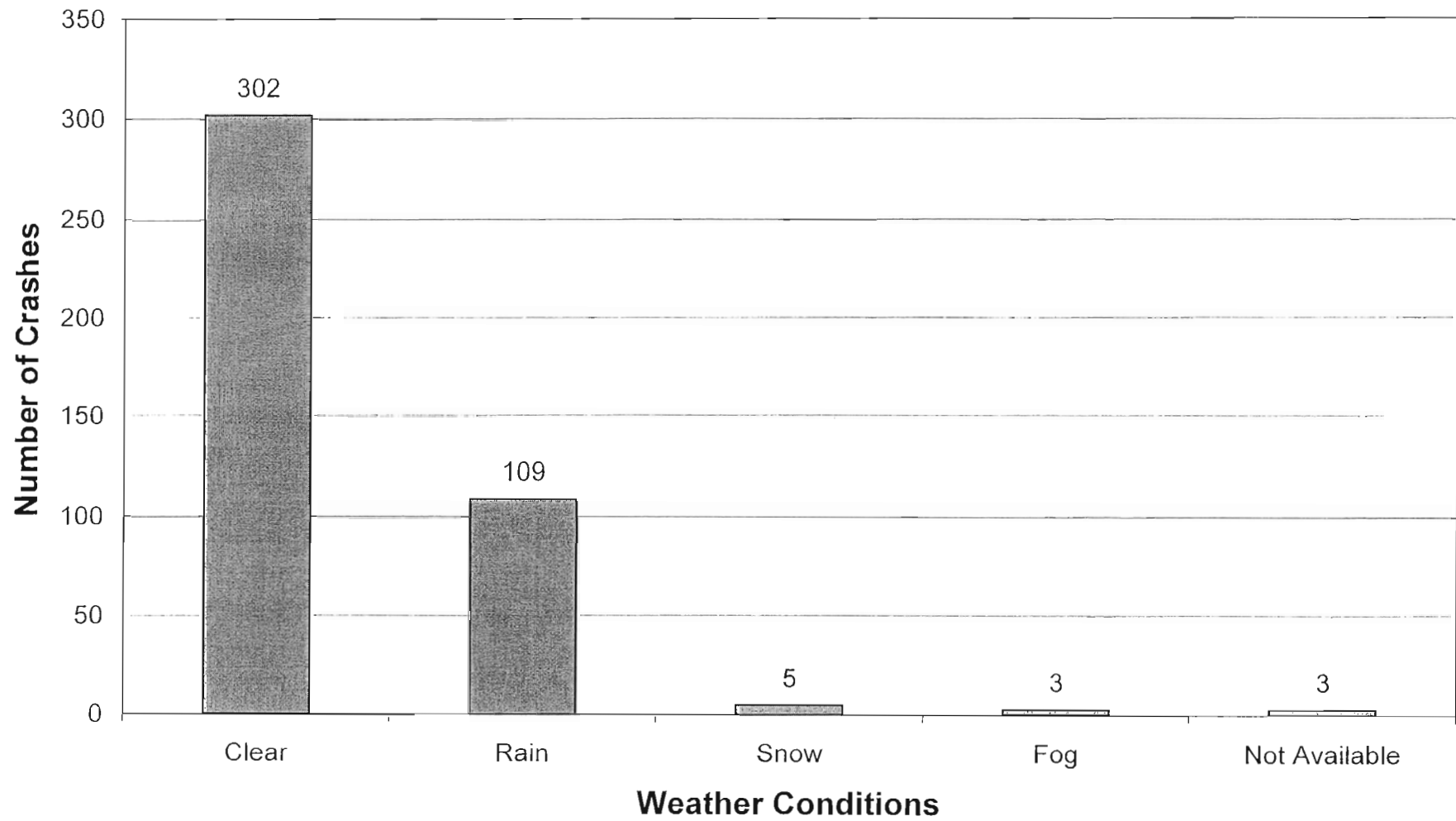
Jimmie Leeds Rd (CR 561 & 633)
Crash Occurrence by Time of Day



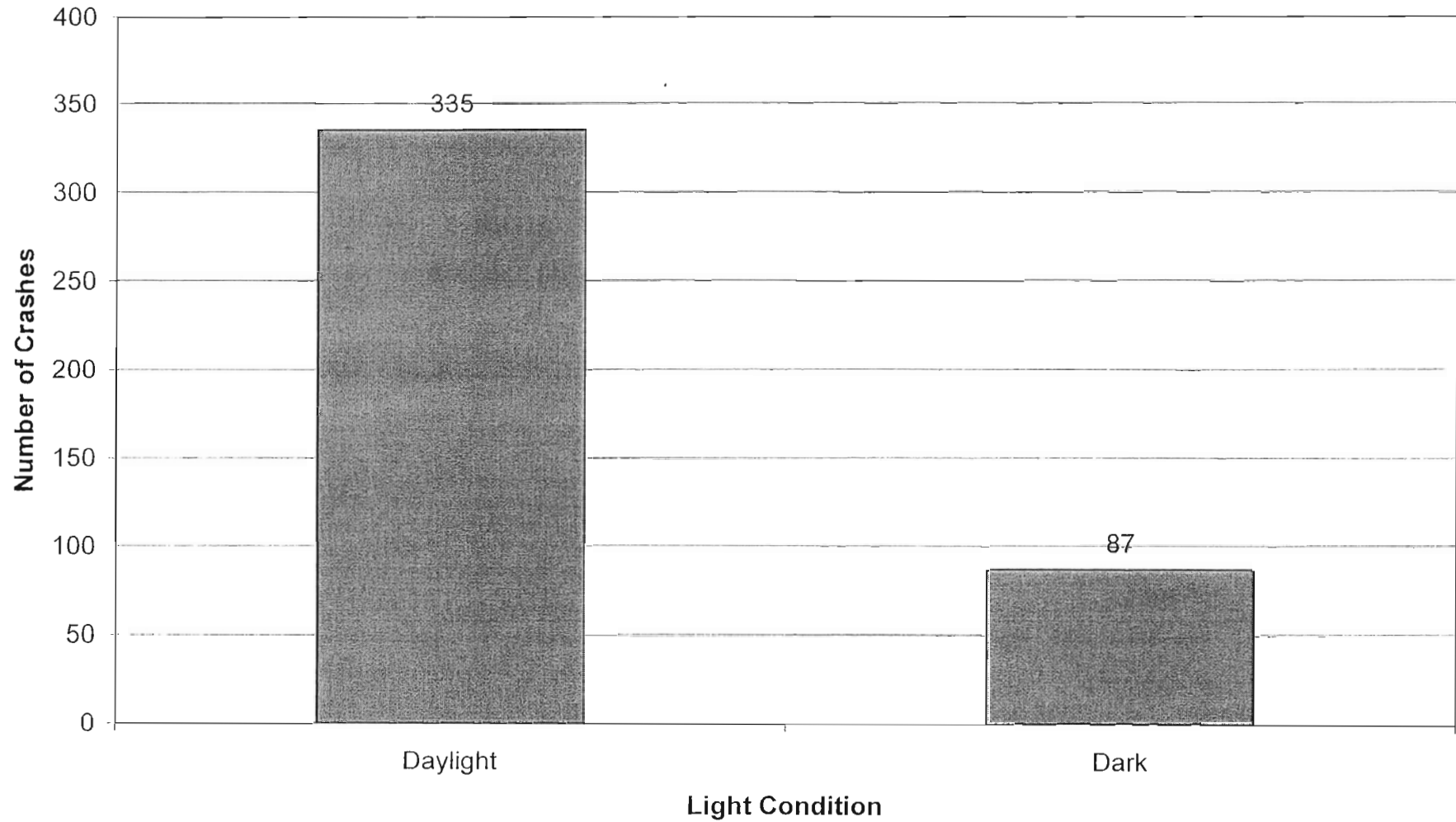
Jimmie Leeds Rd (CR 561 & 633)
Crash Occurrence by Surface Conditions



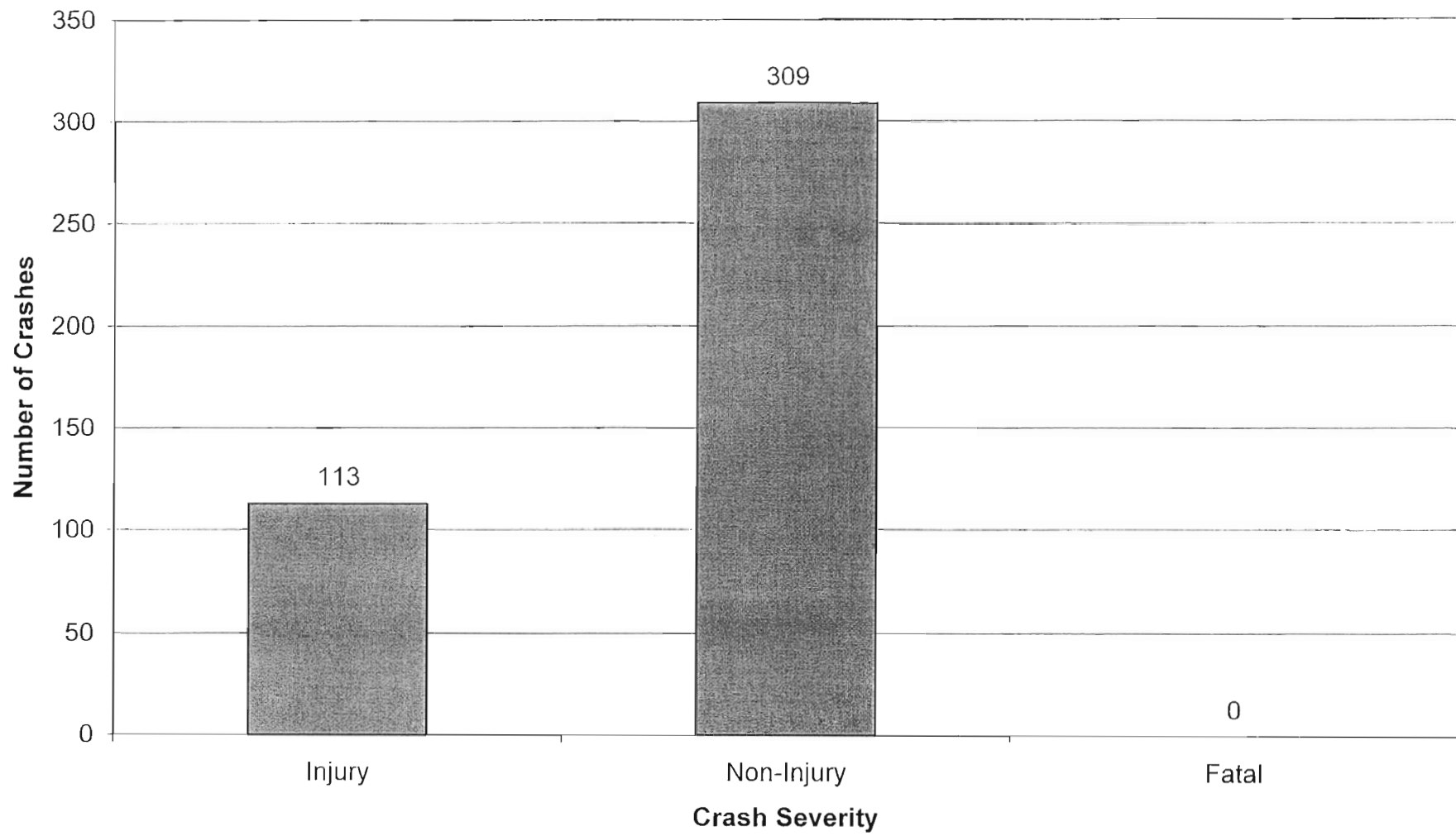
Jimmie Leeds Rd (CR 561 & 633)
Crash Occurrence by Weather Conditions



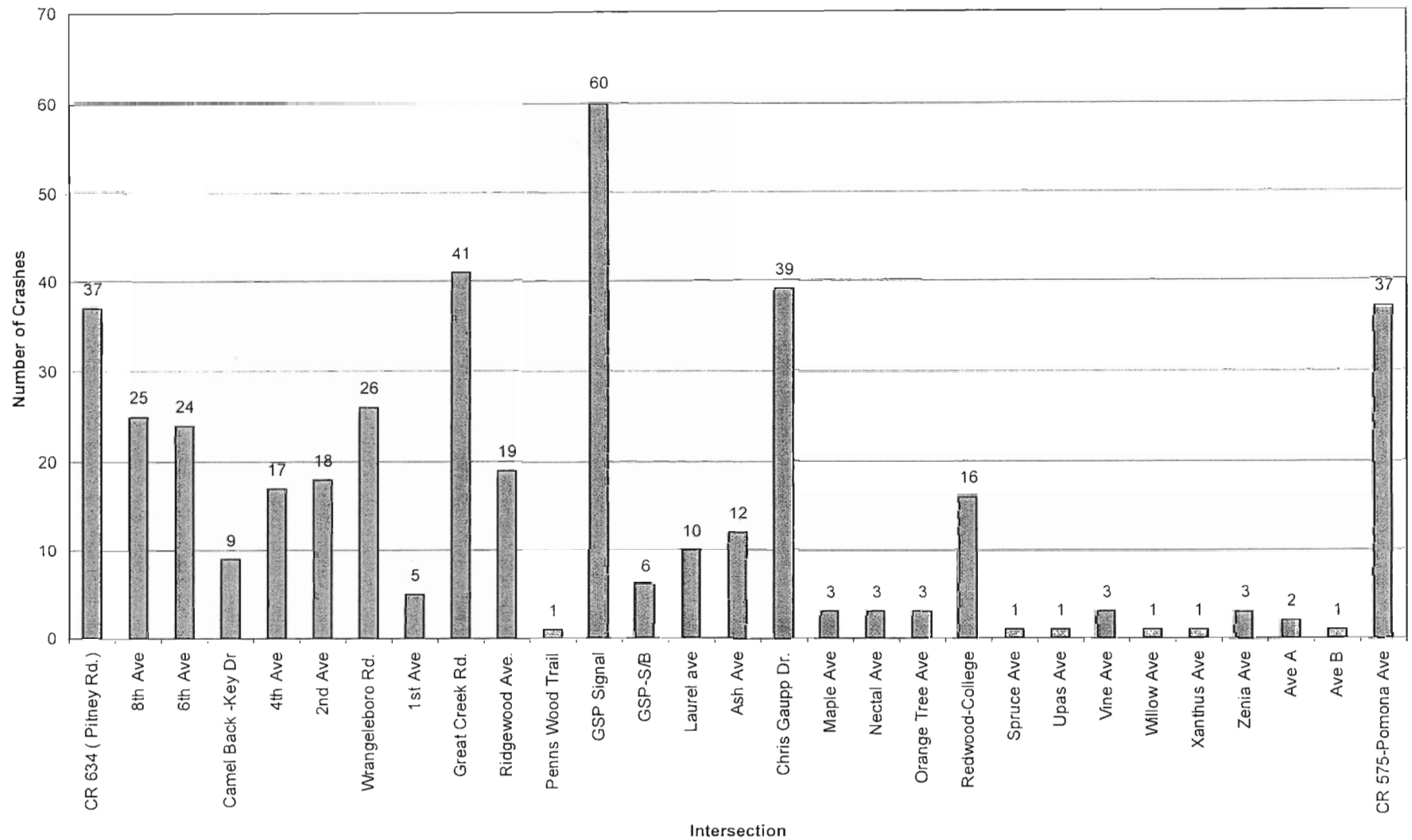
Jimmie Leeds Rd (CR 561 & 633)
Crash Occurrence by Light Condition



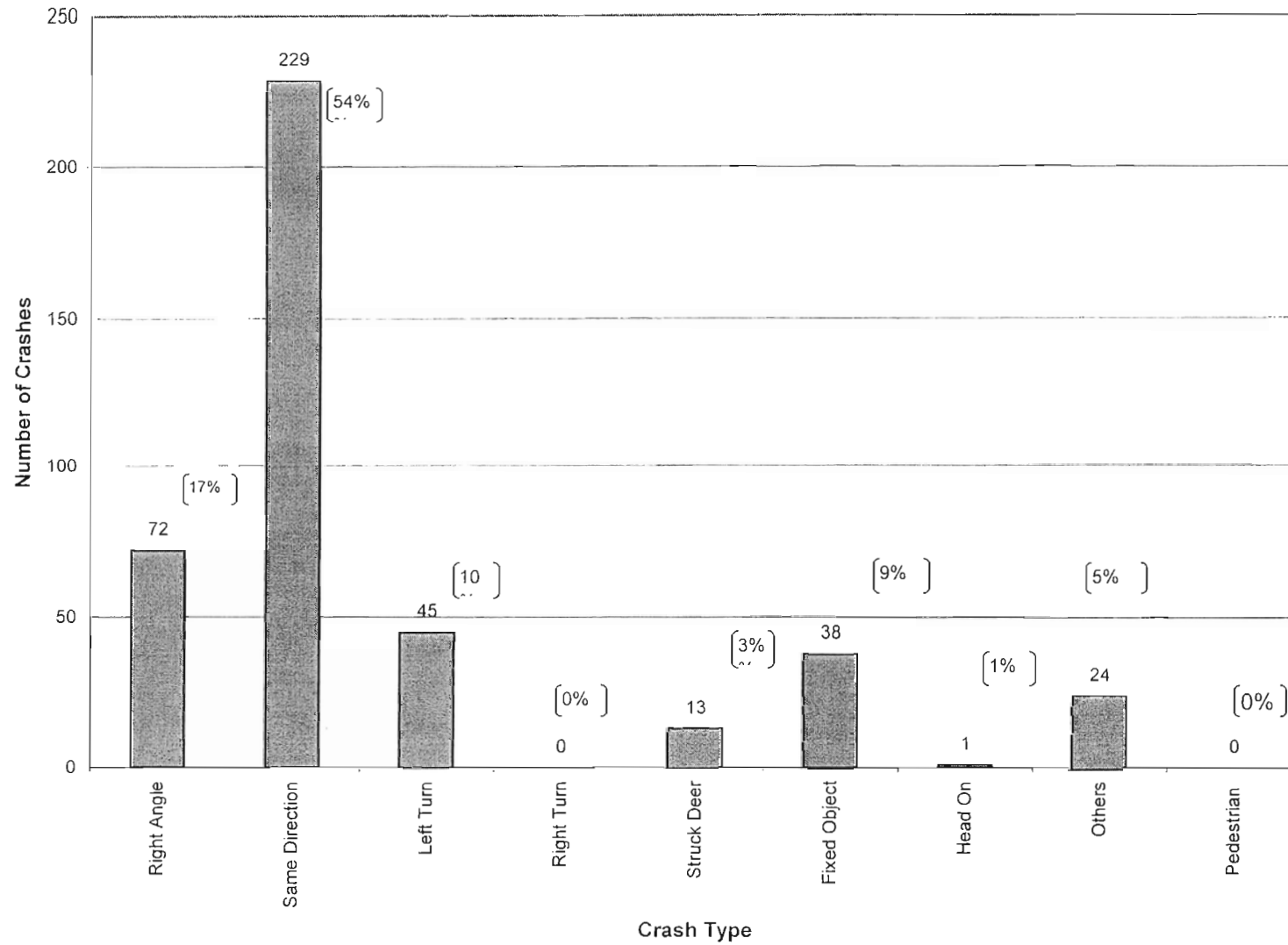
Jimmie Leeds Rd (CR 561 & 633)
Crash Severity



Jimmie Leeds Rd (CR 561 & 633)
Spot Location of Crashes (Proximity to Nearest Intersection)



Jimmie Leeds Rd (CR 561 & 633)
Crash Type



NEW JERSEY DEPARTMENT OF TRANSPORTATION TRAFFIC COUNT SUMMARY

Total Counts

PROJECT NO: 1292-011B
 ROUTE / m.p.: RT 561 / 3.52
 MUNICIPALITY: Galloway Two
 COUNTY: Atlantic
 DATE(S): 03/08/06
 DAY OF WEEK: Wednesday
 TIME(S): 10am-6pm
 WEATHER: Sunny
 COMMENT:

SRI NO:
 N-S STREET: Jimmie Leads Road
 E-W STREET: GSP access ramp
 MUN. CODE: 11
 CO. CODE: 01
 COUNTED FOR: NJDOT
 PERSON:
 COUNTED BY: A-TECH Engineering Inc
 ENUMER.: AR.ED

To: Ash Avenue
 Jimmie Leads Road
 GSP access ramp
 To: US 30 White Horse Pike
 Jimmie Leads Road
 To: Penns Wood Trail



| TIME PERIOD | Jimmie Leads Road | | | | APPROACH | Jimmie Leads Road | | | | APPROACH | GSP access ramp | | | | APPROACH | Jimmie Leads Road | | | | APPROACH | GRAND TOTAL |
|--------------|-------------------|-----|-----|----|----------|-------------------|----|-----|-----|----------|-----------------|-----|----|-----|----------|-------------------|----|----|----|----------|-------------|
| | U | LT | TH | RT | | U | LT | TH | RT | | U | LT | TH | RT | | U | LT | TH | RT | | |
| 6:00-6:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15-6:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:30-6:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45-7:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HOURLY TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:00-7:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:15-7:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:30-7:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7:45-8:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HOURLY TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:00-8:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:15-8:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:30-8:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8:45-9:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HOURLY TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:00-9:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:15-9:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:30-9:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9:45-10:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HOURLY TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10:00-10:15 | 0 | 35 | 49 | 0 | 84 | 0 | 0 | 50 | 27 | 77 | 0 | 14 | 0 | 23 | 37 | 0 | 0 | 0 | 0 | 0 | 198 |
| 10:15-10:30 | 0 | 83 | 101 | 0 | 184 | 0 | 0 | 74 | 50 | 124 | 0 | 52 | 0 | 43 | 95 | 0 | 0 | 0 | 0 | 0 | 403 |
| 10:30-10:45 | 0 | 45 | 106 | 0 | 151 | 0 | 0 | 98 | 51 | 149 | 0 | 57 | 0 | 32 | 89 | 0 | 0 | 0 | 0 | 0 | 389 |
| 10:45-11:00 | 0 | 50 | 38 | 0 | 148 | 0 | 0 | 101 | 51 | 152 | 0 | 69 | 0 | 40 | 109 | 0 | 0 | 0 | 0 | 0 | 409 |
| HOURLY TOTAL | 0 | 213 | 354 | 0 | 567 | 0 | 0 | 323 | 179 | 502 | 0 | 192 | 0 | 138 | 330 | 0 | 0 | 0 | 0 | 0 | 1399 |
| 11:00-11:15 | 0 | 56 | 90 | 0 | 146 | 0 | 0 | 104 | 52 | 156 | 0 | 62 | 0 | 48 | 130 | 0 | 0 | 0 | 0 | 0 | 432 |
| 11:15-11:30 | 0 | 57 | 97 | 0 | 164 | 0 | 0 | 94 | 66 | 160 | 0 | 53 | 0 | 52 | 105 | 0 | 0 | 0 | 0 | 0 | 429 |
| 11:30-11:45 | 0 | 58 | 81 | 0 | 139 | 0 | 0 | 123 | 27 | 150 | 0 | 61 | 0 | 26 | 87 | 0 | 0 | 0 | 0 | 0 | 376 |
| 11:45-12:00 | 0 | 74 | 127 | 0 | 201 | 0 | 0 | 121 | 31 | 152 | 0 | 44 | 0 | 52 | 96 | 0 | 0 | 0 | 0 | 0 | 449 |
| HOURLY TOTAL | 0 | 255 | 395 | 0 | 650 | 0 | 0 | 442 | 176 | 618 | 0 | 240 | 0 | 178 | 418 | 0 | 0 | 0 | 0 | 0 | 1686 |
| 12:00-12:15 | 0 | 30 | 129 | 0 | 209 | 0 | 0 | 136 | 32 | 168 | 0 | 36 | 0 | 59 | 95 | 0 | 0 | 0 | 0 | 0 | 472 |
| 12:15-12:30 | 0 | 54 | 101 | 0 | 155 | 0 | 0 | 102 | 49 | 151 | 0 | 65 | 0 | 68 | 133 | 0 | 0 | 0 | 0 | 0 | 439 |
| 12:30-12:45 | 0 | 56 | 138 | 0 | 194 | 0 | 0 | 117 | 53 | 170 | 0 | 83 | 0 | 54 | 137 | 0 | 0 | 0 | 0 | 0 | 501 |
| 12:45-1:00 | 0 | 52 | 130 | 0 | 182 | 0 | 0 | 118 | 58 | 176 | 0 | 51 | 0 | 59 | 110 | 0 | 0 | 0 | 0 | 0 | 468 |
| HOURLY TOTAL | 0 | 242 | 498 | 0 | 740 | 0 | 0 | 473 | 192 | 665 | 0 | 235 | 0 | 240 | 475 | 0 | 0 | 0 | 0 | 0 | 1880 |
| 1:00-1:15 | 0 | 54 | 121 | 0 | 175 | 0 | 0 | 141 | 44 | 185 | 0 | 49 | 0 | 68 | 117 | 0 | 0 | 0 | 0 | 0 | 477 |
| 1:15-1:30 | 0 | 48 | 109 | 0 | 157 | 0 | 0 | 119 | 47 | 166 | 0 | 51 | 0 | 80 | 111 | 0 | 0 | 0 | 0 | 0 | 434 |
| 1:30-1:45 | 0 | 57 | 118 | 0 | 175 | 0 | 0 | 102 | 40 | 142 | 0 | 59 | 0 | 54 | 113 | 0 | 0 | 0 | 0 | 0 | 430 |
| 1:45-2:00 | 0 | 44 | 112 | 0 | 158 | 0 | 0 | 128 | 44 | 172 | 0 | 62 | 0 | 72 | 134 | 0 | 0 | 0 | 0 | 0 | 462 |
| HOURLY TOTAL | 0 | 203 | 460 | 0 | 663 | 0 | 0 | 490 | 175 | 665 | 0 | 221 | 0 | 254 | 475 | 0 | 0 | 0 | 0 | 0 | 1803 |
| 2:00-2:15 | 0 | 46 | 122 | 0 | 168 | 0 | 0 | 150 | 58 | 208 | 0 | 61 | 0 | 70 | 131 | 0 | 0 | 0 | 0 | 0 | 507 |
| 2:15-2:30 | 0 | 56 | 118 | 0 | 174 | 0 | 0 | 132 | 73 | 206 | 0 | 65 | 0 | 72 | 137 | 0 | 0 | 0 | 0 | 0 | 517 |
| 2:30-2:45 | 0 | 33 | 128 | 0 | 211 | 0 | 0 | 135 | 67 | 202 | 0 | 65 | 0 | 103 | 168 | 0 | 0 | 0 | 0 | 0 | 581 |
| 2:45-3:00 | 0 | 22 | 129 | 0 | 211 | 0 | 0 | 157 | 41 | 198 | 0 | 74 | 0 | 97 | 171 | 0 | 0 | 0 | 0 | 0 | 580 |
| HOURLY TOTAL | 0 | 267 | 497 | 0 | 764 | 0 | 0 | 575 | 239 | 814 | 0 | 265 | 0 | 342 | 607 | 0 | 0 | 0 | 0 | 0 | 2185 |
| 3:00-3:15 | 0 | 83 | 128 | 0 | 211 | 0 | 0 | 132 | 73 | 205 | 0 | 79 | 0 | 97 | 176 | 0 | 0 | 0 | 0 | 0 | 592 |
| 3:15-3:30 | 0 | 69 | 134 | 0 | 203 | 0 | 0 | 138 | 68 | 206 | 0 | 94 | 0 | 115 | 209 | 0 | 0 | 0 | 0 | 0 | 618 |
| 3:30-3:45 | 0 | 93 | 110 | 0 | 203 | 0 | 0 | 137 | 83 | 220 | 0 | 57 | 0 | 105 | 162 | 0 | 0 | 0 | 0 | 0 | 585 |
| 3:45-4:00 | 0 | 85 | 123 | 0 | 208 | 0 | 0 | 159 | 65 | 224 | 0 | 68 | 0 | 121 | 189 | 0 | 0 | 0 | 0 | 0 | 621 |
| HOURLY TOTAL | 0 | 330 | 495 | 0 | 825 | 0 | 0 | 566 | 289 | 855 | 0 | 298 | 0 | 438 | 736 | 0 | 0 | 0 | 0 | 0 | 2416 |
| 4:00-4:15 | 0 | 69 | 116 | 0 | 205 | 0 | 0 | 154 | 74 | 228 | 0 | 77 | 0 | 90 | 167 | 0 | 0 | 0 | 0 | 0 | 600 |
| 4:15-4:30 | 0 | 64 | 104 | 0 | 188 | 0 | 0 | 123 | 88 | 211 | 0 | 82 | 0 | 132 | 214 | 0 | 0 | 0 | 0 | 0 | 613 |
| 4:30-4:45 | 0 | 84 | 125 | 0 | 209 | 0 | 0 | 135 | 88 | 223 | 0 | 83 | 0 | 137 | 220 | 0 | 0 | 0 | 0 | 0 | 652 |
| 4:45-5:00 | 0 | 97 | 139 | 0 | 236 | 0 | 0 | 147 | 74 | 221 | 0 | 96 | 0 | 164 | 260 | 0 | 0 | 0 | 0 | 0 | 717 |
| HOURLY TOTAL | 0 | 354 | 484 | 0 | 838 | 0 | 0 | 559 | 324 | 883 | 0 | 338 | 0 | 523 | 861 | 0 | 0 | 0 | 0 | 0 | 2582 |
| 5:00-5:15 | 0 | 97 | 118 | 0 | 213 | 0 | 0 | 161 | 93 | 254 | 0 | 95 | 0 | 143 | 238 | 0 | 0 | 0 | 0 | 0 | 705 |
| 5:15-5:30 | 0 | 96 | 153 | 0 | 249 | 0 | 0 | 180 | 88 | 268 | 0 | 131 | 0 | 164 | 295 | 0 | 0 | 0 | 0 | 0 | 812 |
| 5:30-5:45 | 0 | 98 | 156 | 0 | 254 | 0 | 0 | 166 | 85 | 251 | 0 | 105 | 0 | 150 | 255 | 0 | 0 | 0 | 0 | 0 | 760 |
| 5:45-6:00 | 0 | 87 | 127 | 0 | 214 | 0 | 0 | 161 | 54 | 215 | 0 | 115 | 0 | 122 | 237 | 0 | 0 | 0 | 0 | 0 | 666 |
| HOURLY TOTAL | 0 | 378 | 552 | 0 | 930 | 0 | 0 | 668 | 320 | 988 | 0 | 446 | 0 | 579 | 1025 | 0 | 0 | 0 | 0 | 0 | 2943 |
| 6:00-6:15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:15-6:30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:30-6:45 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6:45-7:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| HOURLY TOTAL | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |





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? | | |

Intersections

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? | | |