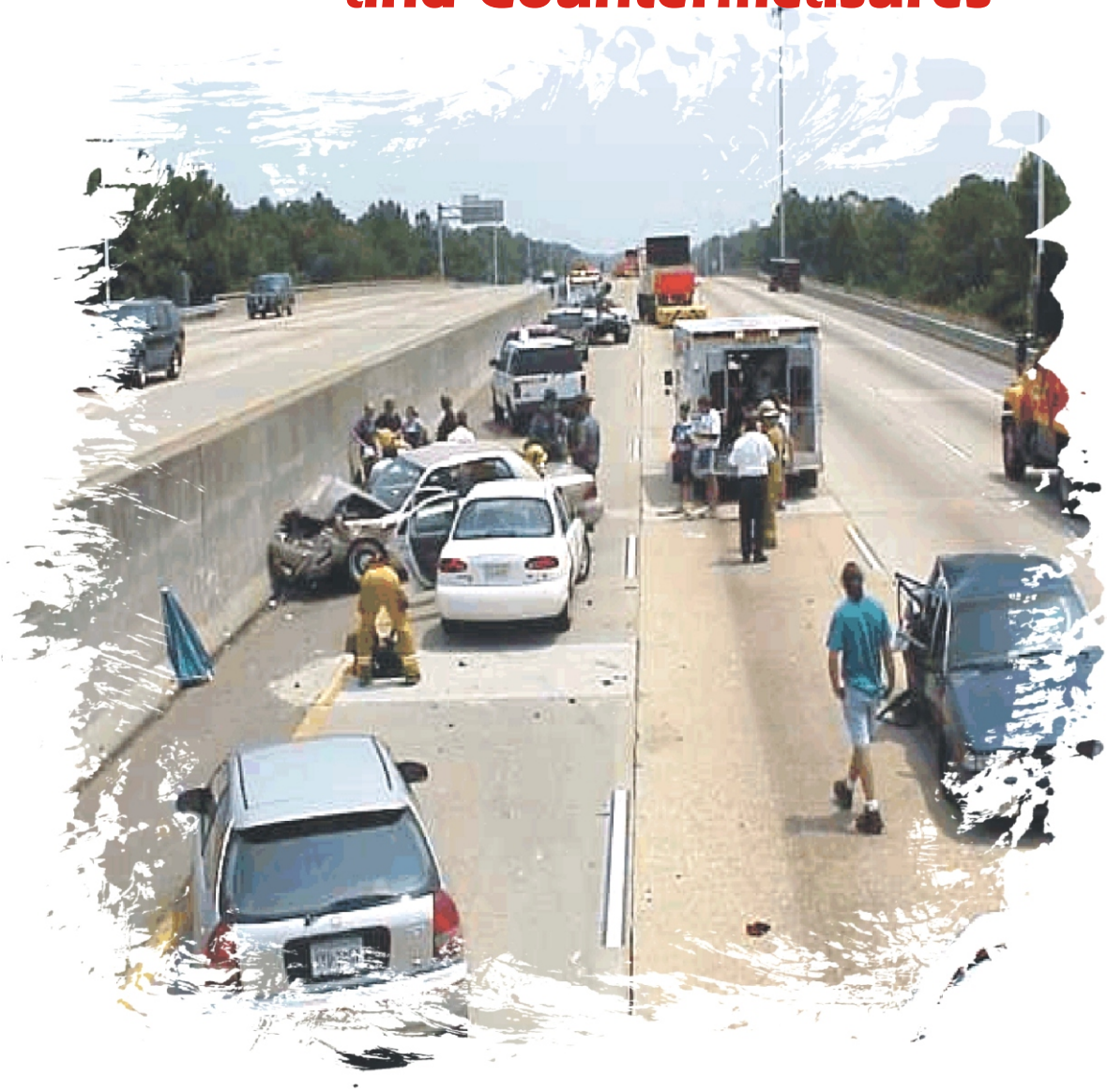
Hampton Roads Regional Safety Study

Part 3: Crash Analysis and Countermeasures



Congestion Management System

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T04-02

FEBRUARY 2004

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HAMPTON ROADS
REGIONAL SAFETY STUDY

PART III: CRASH ANALYSIS AND COUNTERMEASURES

This report was included in the Work Program for Fiscal Year 2003-2004, which was approved by the Commission and the Metropolitan Planning Organization at their meetings of March 19, 2003.

PREPARED BY:

HAMPTON ROADS
PLANNING DISTRICT COMMISSION

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ABSTRACT

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) announced a change in focus regarding highway and transit programs from construction to preservation and emphasized mobility and environmental protection. Subsequent legislation consolidated the twenty-three ISTEA planning factors into seven broad areas, one of which reads, “Increase the safety and security of the transportation system for motorized and nonmotorized users.” This required Metropolitan Planning Organizations to incorporate safety and security as a priority factor in their transportation planning processes and activities.

The HRPDC staff, as part of its Congestion Management System (CMS) program, initiated a comprehensive regional safety study in 2001. The study is designed to assist local communities in understanding the traffic safety issues. This document is the third part of the Hampton Roads Regional Safety Study, and includes a detailed analysis of the regional high-crash locations. Location maps, roadway geometry diagrams, collision diagrams, crash data summaries, observations, and remedies are provided for the top 10 high-crash interstate segments by EPDO crash rate as well as the top intersection by EPDO crash rate and the top intersection by number of crashes (1998 – 2000 data) for each Hampton Roads jurisdiction.

ACKNOWLEDGMENTS

This report was prepared by the Hampton Roads Planning District Commission (HRPDC) in cooperation with the U.S. Department of Transportation (USDOT), the Federal Highway Administration (FHWA), and the Virginia Department of Transportation (VDOT). The contents of this report reflect the views of the staff of the Hampton Roads Area Metropolitan Planning Organization (MPO). The MPO staff is responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the FHWA, VDOT, or HRPDC. This report does not constitute a standard, specification, or regulation. FHWA or VDOT acceptance of this report as evidence of fulfillment of the objectives of this planning study does not constitute endorsement/approval of the need for any recommended improvements nor does it constitute approval of their location and design or a commitment to fund any such improvements. Additional project level environmental impact assessments and/or studies of alternatives may be necessary.

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INTRODUCTION

BACKGROUND

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) produced a change in focus regarding highway and transit programs from construction to preservation and emphasized mobility and environmental protection. The goal was to produce a transportation system that provides safe and efficient mobility and accessibility as well as protection of the human and natural environment. ISTEA was reauthorized in 1998 by a bill titled the Transportation Equity Act for the 21st Century (TEA-21). The legislation consolidated the twenty-three ISTEA planning factors into seven broad areas, one of which reads, "Increase the safety and security of the transportation system for motorized and nonmotorized users." This required MPOs to incorporate safety and security as a priority factor in their transportation planning processes and activities.

The HRPDC staff as part of its Congestion Management System (CMS) program initiated a comprehensive regional safety study in 2001, the first of its kind. The study is designed to assist local communities in understanding the traffic safety issues.
The study is composed of three parts:

1. **Part I** provides general crash data, trends and statistics on a jurisdiction-wide level and for the Hampton Roads as a region. More specifically, data analysis includes number of crashes, number of fatalities, number of injuries, and number of alcohol related crashes for the 1994-2001 period. The analysis also includes a comparison of Hampton Roads crash rates by jurisdiction, and with Virginia and United States data.

2. **Part II** includes a more detailed analysis of the regional crash data to depict locations of crashes throughout the region. Furthermore, crash data is analyzed for the interstate and arterial system network. Number of crashes, rates, and number of injuries and fatalities are compiled and examined to depict high-crash locations by interstate segments and by intersections along the arterial system.

3. **Part III** further analyzes these locations and determines primary causes of crashes at the high-crash locations along the interstate and arterial systems. From the analysis, countermeasures and potential solutions were provided. **This document includes the results of Part III of the regional safety study**.

Results of Part I of the regional safety study were completed and approved in December 2002. Results of Part II were completed and approved in May 2003.

WHY SAFETY NEEDS TO BE ADDRESSED

In the United States

PICTURE 1 – The integration of safety into the planning process is vital to the welfare of motorized and non-motorized users.

- In 2002, there were an estimated 6,316,000 police-reported traffic crashes, in which 42,815 people were killed and 2,926,000 people were injured; 4,348,000 crashes involved property damage only[1].

- In 2002, there were nearly 3 million intersection-related traffic crashes, or about 47% of all reported roadway crashes[2].

- In 2002, there were approximately 9,400 fatalities at intersections, or about 22% of all roadway crash-related deaths, and over a million injury crashes[2].

In Hampton Roads

- There were 31,261 traffic crashes in Hampton Roads in the year 2002, a 7.2% increase for 2001. That is an average of 86 crashes every day of the year, or one crash every 17 minutes.

- There were 17,694 injuries resulting from traffic crashes in Hampton Roads in the year 2002, a 1.4% increase from 2001. That is 48 injuries for every day of the year, or one injury every 30 minutes.

- There were 135 fatalities resulting from traffic crashes in Hampton Roads in the year 2002, down from 151 fatalities in 2001.

Finally, TEA-21 legislation states "each statewide and metropolitan planning process shall provide for consideration of projects and strategies that will increase the safety and security of the transportation system for motorized and non-motorized users." The U.S. Department of Transportation is currently working to incorporate safety into the next Surface Transportation Reauthorization package. U.S. Transportation Secretary Norman Y. Mineta states that the country must build on the lessons of TEA-21 and "address the challenges of maximizing the safety and security of all Americans, even as we enhance their mobility, reduce congestion, and grow the economy." The Department's reauthorization effort will focus on several core principles and values, which includes "making substantial improvements in the safety of the

1 USDOT/NHTSA, Traffic Safety Facts 2002 Overview, National Center for Statistics and Analysis, Washington, D.C.
2 USDOT/NHTSA, Motor Vehicle Traffic Crash Injury and Fatality Estimates, 2002 Early Assessment, April 2003.

Nation's surface transportation system. It is not acceptable that the Nation suffers 41,000 deaths and over 3 million injuries annually on the highway system."

As part of this effort, the National Cooperative Highway Research Program (NCHRP) is preparing a new Highway Safety Manual. This manual will provide practitioners with information and tools to aid with safety considerations in the decision making process for highway planning, design, and operations.

FACTORS THAT CONTRIBUTE TO TRAFFIC CRASHES

According to a United States General Accounting Office highway safety report[3], three categories of factors contribute to crashes: human factors, roadway environment factors, and vehicle factors. Research findings show that a majority of motor vehicle crashes occur as a result of multiple causes. Human factors involve driver actions, such as speeding, tailgating, and violating traffic laws. Human factors also involve the automobile driver's condition, such as inattention, decision errors, age, or being affected by alcohol or drugs. Roadway environment factors include roadway design characteristics, roadside hazards, and roadway conditions. Vehicle factors include any malfunctions in the vehicle or related to the design, such as brake failure, flat tires, or top-heavy vehicles. According to data, experts, and studies, human factors are usually the leading contributor to traffic crashes, followed by roadway environment and vehicle factors.

Many factors that contribute to traffic crashes, such as speeding, tailgating, and driver inattention, are difficult to combat aside from increasing police patrol and enforcement. Even by increasing police personnel, many safety issues remain a difficult challenge to overcome, such as driver error. Some factors that cause crashes, however, can be corrected, such as roadway design, signage, installing traffic signals, and pavement markings. This part of the safety study attempts to address the "correctable" issues pertaining to roadway safety. In particular, it provides general methods and countermeasures as well as specific recommended improvements for intersections and interstate highway sections with high crashes in this region.

STUDY PROCESS

Collisions occur because motor vehicles are in conflict with each other or with departure hazards when driving, crossing or turning in traffic. The purpose of this study is to collect and analyze the crash data in order to determine the cause and develop potential remedies for the problems. This study is the first step for the Hampton Roads MPO to incorporate safety into its Congestion Management System plan.

3 United States General Accounting Office, "Highway Safety: Research Continues on a Variety of Factors That Contribute to Motor Vehicle Crashes" March 2003.

The Hampton Roads Regional Safety Study includes the following components:

- Collect and organize crash data for the regional CMS network.
- Create a regional database with GIS capabilities.
- Analyze and identify high-crash locations for the region.
- Develop and examine solutions to address safety problems.
- Recommend for inclusion in the Transportation Improvement Program for project implementation.

The results of this comprehensive study will enable localities and various agencies in Hampton Roads to address specific safety-related issues including:

- Intersection safety
- Bicycle and pedestrian safety
- Highway/rail grade crossing
- Work zone safety
- Speed
- Human factors
- Red light cameras
- Red light turning
- Traffic control devices
- Seat belt usage
- Enforcement
- Resources

The above elements and issues are covered in detail in both Part II and Part III of the regional safety study.

ORGANIZATION OF PART III REPORT

This report is organized into five sections, including this Introduction. The next section provides an overview and examples of countermeasures and general strategies to reduce the number and severity of crashes in Hampton Roads. The third section provides location maps, roadway geometry diagrams, collision diagrams, crash data summaries, observations, and remedies for the top 10 high-crash interstate segments by EPDO crash rate (1998 – 2000 data) throughout the region. The fourth section provides the same information for the top intersection by EPDO crash rate and the top intersection by number of crashes in each Hampton Roads jurisdiction. The final section includes conclusions and the lessons learned from this study.

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ADDRESSING ROADWAY SAFETY PROBLEMS

A wide range of countermeasures exists to address roadway safety problems from driver education, enhancing safety equipment in vehicles, to improving the roadways themselves. Roadway problems may require major reconstruction to reduce safety hazards but many times significant improvements can be made through low cost countermeasures. Many safety problems contain multiple solutions through a combination of countermeasures, thus it is important to know all of the available options. Resolving safety and infrastructure problems has frequently been limited by available resources, which makes it imperative that community leaders make informed decisions about the best way to reduce crashes.

COUNTERMEASURES

Listed below are examples of countermeasures and general strategies to make roadways safer in Hampton Roads. A literature search was performed to identify effective initiatives, techniques, programs, and best practices in roadway safety. It is important to note that the crash data that was analyzed in Part II of this safety study was for interstates and roadway intersections only. Mid-block collisions (related to driveway access, railroad crossings, etc.) have not been captured in the data analysis; countermeasures for these situations are very important as well and are addressed in this section. Many of the countermeasures described in this section are from the Roadway Safety Foundation's *Roadway Safety Guide*[4]*.*

Motor vehicle crashes commonly occur as a result of:

1. **Roadway Departure**
2. **Road Surface Conditions**
3. **Narrow Roadways and Bridges**
4. **Railroad Crossings**
5. **Work Zones**
6. **Intersections**
7. **Roadway Design Limitations**
8. **Roadway Access Problems**
9. **Pedestrian and Bicycle Traffic**
10. **Driver Actions**
11. **Driver Condition**
12. **Vehicle Design or Malfunctions**
13. **Traffic Congestion**

4 Roadway Safety Foundation, "Roadway Safety Guide", April 21, 2001.

1. Countermeasures for Roadway Departure Crashes

Vehicles that veer off the roadway represent over one-third of all traffic fatalities (approximately 15,000 deaths per year) and approximately 500,000 injuries per year. When a vehicle leaves the road, it often will roll over or crash into roadside obstacles, such as trees, utility poles, embankments, guardrails, ditches, curbs, signs, bridge supports, utility poles, and mailboxes. In rural areas, "run-off-the-road" crashes represent about two-thirds of all traffic fatalities.

Clear Zones – These open areas are adjacent to the road and allow motorists enough room to safely regain control of their vehicles if they run off the road.

Gradual Side Slopes – Steep embankments cause vehicles that leave the roadway to easily overturn. Gradual side slopes allow the drivers to regain control of their vehicles.

Forgiving Devices – Roadway signs and utility poles designed to break away on impact and crash cushions help absorb the energy and lessen the severity of crashes. Barrier walls and guardrails help direct runaway vehicles from potentially dangerous hazards, such as steep drop-offs, water, or wooded areas.

Rumble Strips – Rumble strips help prevent crashes that occur when vehicles run off the road due to driver fatigue or inattention, excessive speed or alcohol, or attempting to evade objects or other vehicles. In 1993, Virginia and other states were experiencing an upward trend in the number of run-off-the-road crashes, which rumble strips are designed to prevent. Since then, the Virginia Department of Transportation (VDOT) has established a policy to install rumble strips on all of its rural interstate highways, and today there are about 1,750 shoulder miles of milled rumble strips in Virginia and every mile of interstate roadway that can accommodate rumble strips has them. In 2001, VDOT earned a National Highway Safety Award from the Federal Highway Administration (FHWA) for demonstrating the effectiveness of milled rumble strips and using them to reduce run-off-the-road crashes by 51.5 percent in Virginia.

PICTURE 2 – Rumble strips along the highway help prevent run-off-the-road crashes.

Signing, Pavement Marking, and Delineation – Clear and visible traffic signs, pavement markings, and reflective devices alert motorists of changes in roadway geometry or other conditions especially during adverse weather or nighttime conditions.

2. Countermeasures for Crashes Involving Road Surface Conditions

The ability of motorists to safely maneuver their vehicles and stop quickly can be hampered by poor road surface conditions, such as pavement edge drop-offs, potholes, road wear, water puddles, ice, and snow.

Increased Surface Friction – Increasing the roadway surface friction provides more traction for vehicles to maneuver and stop.

Temporary Friction Enhancement – During adverse weather, such as a snowstorm, sand and salt can be applied to roadways to increase the roadway friction.

Pavement Improvements – Another effective way to ensure greater smoothness and friction of the road surface is to resurface, rehabilitate, and reconstruct when needed.

Stabilizing Shoulders – Paved shoulders or open shoulders with stable material will help drivers control their vehicles and return safely to the roadway.

PICTURE 3 – Snow and ice can create dangerous roadway conditions for motorists.

Preventive Maintenance – Regular roadway maintenance to repair potholes, ruts, and divots can eliminate erratic maneuvers by motorists. Some drivers swerve to avoid these hazards and create crashes.

Proper Drainage – Proper roadway design and drainage systems to remove water from roadways during rain storms are necessary for motorists to safely maneuver and stop during these conditions.

Advance Transportation Weather Information Systems – In 1996, the University of North Dakota created a weather-reporting system that provides travelers with weather forecasts and road conditions based on specific route numbers, directions, and mile markers. Currently, the state of North Dakota uses this system in which travelers can access the information via cell phone. The information is updated every 3 to 6 hours for local motorists.

3. Countermeasures for Narrow Roadway and Bridge Crashes

Many run-off-the-road crashes and head-on collisions are frequently the result of narrow roads and bridges. In general, wider lanes with shoulders are safer. Shoulders provide buffer space and a place for disabled vehicles to pull over. Narrow lanes and excessive speeds can lead to dangerous head-on collisions on two-way two-lane roadways. Crashes also occur when the width of the bridge is less than the approaching traveling lanes and shoulders, resulting in collisions with the side of the bridge, curbing, or vehicles traveling the opposite direction.

Widening Lanes – Wider lanes provide more room for motorists to maneuver in an emergency without leaving the road surface. It is important to note that in some cases wider lanes are not always safer; for local or neighborhood streets, wider lanes usually encourage higher travel speeds, which can be deadly for pedestrians and bicyclists traveling along that same facility.

Adding or Widening Shoulders – With the addition of new shoulders or widening existing ones, motorists have more room to maneuver on narrow roadways.

Channelization – Providing separate lanes for left or right-turning vehicles can reduce rear-end related crashes.

Pedestrian/Cyclist Facilities for Narrow Roadways – Separating pedestrians and cyclists from motor vehicles with the addition of sidewalks and bike lanes improves roadway safety.

Widening Bridges – Widening bridge lanes to 12 feet is preferable to ensure safety. Additions of shoulders to act as a buffer or a space for disabled vehicles to pull over can further enhance bridge safety. In many cases, widening or replacing narrow bridges is a very expensive option.

Bridge Approach Improvements – Adding safety features such as crash cushions or ensuring that guardrails on the approaching road are attached to bridge guardrails reduces crash severity.

Signing, Pavement Marking, and Delineation for Bridges – Improved signs, pavement markings, and delineation in the bridge approach area provide advance warning for motorists upon entering narrow bridges.

4. Countermeasures for Crashes at Railroad Crossings

According to the Federal Railroad Administration, every 100 minutes a train strikes a vehicle; people involved in a train crash are 30 times more likely to die as compared to a collision with another car, bus, or truck. Railroad crossings, no matter how busy they are, can be incredibly hazardous since trains don't have the ability to stop quickly or steer out of the way. A 150-car freight train that is traveling 50 mph requires over 1 ½ miles to stop.

Education – Providing area schools and the general public information regarding the dangers of railroad crossings can save lives. Often drivers simply ignore the warning signs because they are "in a hurry" and would rather try to "beat the train" than wait.

Advance Warning Devices – Large signs, bells, and flashing lights can warn drivers at railroad crossings that a train is approaching. Rumble strips placed well in advance of the tracks can alert sleepy drivers and increase awareness. Installing and maintaining crossing gates that are in good working order further enhances safety at railroad crossings.

5. Countermeasures for Crashes in Work Zones

Construction, maintenance, and utility areas create conditions that can be extremely hazardous to drivers and highway workers. Nearly 900 people die and 37,000 are injured each year in work zones. In some areas, work zones are poorly marked with warning signs that are difficult to read, especially at night. Sometimes signs portray work that is not actually being done, which leads to drivers disregarding warning signs and leading to potentially tragic consequences.

Education and Enforcement – Educate the public about the dangers of traveling through work zones and use police to issue tickets to those who speed or violate traffic restrictions in these areas.

Adequate Signage and Advance Warning – Provide well placed signs, barrels, cones, and flashing lights to warn motorists that they are approaching a work zone. Also ensure that

pavement markings and lane delineation is clear and visible to all motorists. Utilize variable message signs to alert drivers if traffic is stopped ahead or if a lane is blocked.

PICTURE 4 – Construction areas create conditions that can be extremely hazardous to drivers and highway workers. Adequate signage, warning devices, and barrels and cones help minimize hazards and safely direct traffic.

6. Countermeasures for Intersection Crashes

Intersections comprise a very small part of urban and rural street/highway systems, yet they account for approximately 47% of all reported roadway crashes and 9,410 deaths per year (2002 National Highway Traffic and Safety Administration data). National statistics show that the percentage of traffic crashes at intersections has risen in the past 20 years; however, the percentage of fatal crashes has decreased. This reduction is a direct result of the implementation of improved intersection design/construction, new vehicle designs, and improved availability and use of various passenger restraints. Traffic safety at intersections is still a major concern for many areas; some intersections have not had improvements and often have confusing turn lanes, blind spots, or inadequate signage or traffic signals.

Lighting – Adding or upgrading lighting at intersections will provide motorists with better night visibility.

Level Steep Grades – Leveling out steep grades at intersection legs and through the intersection allows drivers a smooth transition when traveling. Steep grades cause drivers to slow down significantly, which lead to rear-end collisions.

Add Turn Lanes – Adding turn lanes at intersections removes turning vehicles that may slow down quickly and unexpectedly. Turn lanes also separate turning vehicles from through traffic. Turn lanes are not generally recommended for isolated, low-volume locations.

Improve or Add Signals – Some crashes may be the result of left-turn traffic making erratic movements during permitted phases. Solutions may be as simple as providing a left-turn protected phase. Signal heads can be replaced with brighter lights for improved visibility for drivers. Improving signal phasing not only adds more throughput capacity to the intersection, but also reduces driver frustration and red-light running; unfavorable signal phasing may provide

an intolerable time for one approach with heavy traffic. Increased traffic at an intersection may warrant the addition of a traffic signal, which usually enhances safety.

Roundabouts - Modern roundabouts, while commonly used throughout the world, have only recently been widely implemented throughout the United States. Roundabouts improve the safety of low-to-medium volume intersections by reducing the speeds of vehicles entering the intersection as well as the number and severity of conflict points. Before and after studies conducted throughout the United States show that installing roundabouts reduces the number of crashes by 36%, injury crashes by 72%, and fatal crashes by up to 80%.

Guard Against Red-Light Running – Red-light running is a dangerous form of aggressive driving. Red-light running accounts for nearly one million automobile crashes and over 90,000 injuries and is associated with more than 1,100 deaths annually. The cost to the public is an estimated $7 billion per year in medical expenses, lost productivity, and property damage. In response to this problem, the U.S. Department of Transportation and the Federal Highway Administration have created *Stop Red Light Running (Stop RLR)*, a public information and education campaign about the dangers of red-light running. The campaign is centered on two elements: ensuring that signal systems are properly working and aggressively enforcing red-light running violations with stepped-up enforcement or camera system detection. Some Hampton Roads jurisdictions are in the process of incorporating red-light photo enforcement. In a recent Virginia Beach survey, 80% of residents polled supported this enforcement method to reduce red light violations.

PICTURE 3 – Red light cameras are becoming common practice in many states and are drastically reducing traffic violations and saving lives.

Eliminate Obstructions – Trimming trees and other shrubbery away from signs, signals, and other traffic control devices, as well as from the intersection itself, will allow motorists to navigate more safely through intersections.

7. Countermeasures for Crashes Involving Roadway Design Limitations

Many local roadways were not built to serve today's high-volume, high-speed traffic. Their safety is restricted by hazards such as sharp curves, poor signs and markings, and lack of medians to separate oncoming traffic. Fatality rates on these roadways can be five times as high as on the Interstate system. Local governments, which are responsible for over 75% of our entire road network, face an enormous challenge to address these problems with very limited resources.

Geometric Realignment (Horizontal and Vertical) – Improving substandard horizontal or vertical alignments (i.e. sharp curves and crest curves) will provide motorists better sight distance and maneuverability.

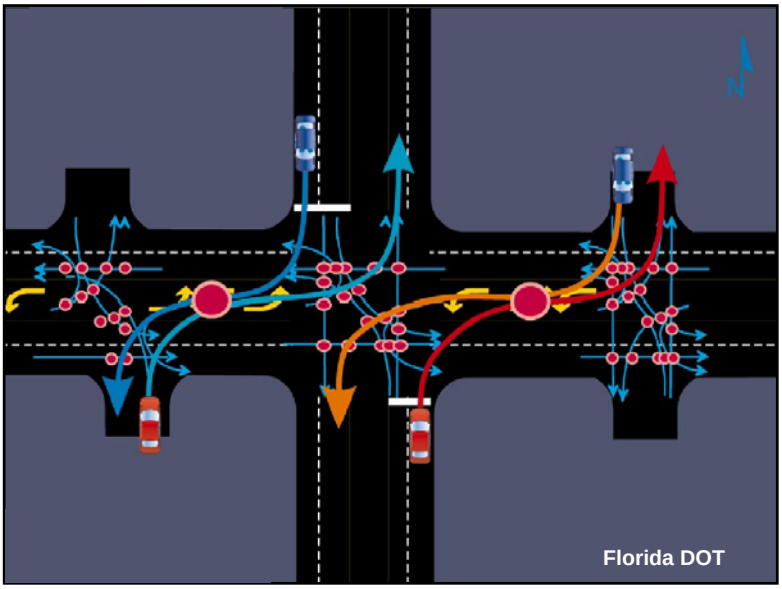
Review Speed Limits – Some roads may have been built with the intention of lower volumes; determining a safe and efficient speed limit will improve traffic safety for that facility.

Add or Upgrade Pavement Markings – Wider pavement markings provide better visibility. Reflective pavement markings with appropriate spacing are effective particularly on rainy nights. Reviewing no-passing zone pavement marking lines is important especially for crashes where vehicles crossed over the center of the road to pass; as traffic increases and conditions change, passing zones may change due to sight distance or access constraints.

Add a Raised-Curb Median – Two-way left turn lanes were a common design in the past to provide continuous access along a roadway with many businesses. The general problem with two-way left turn lanes is that accident rates have dramatically increased as a result of increased traffic over and above their original design. Given the openness of two-way left turn lanes, there are many conflict points that create or lead to traffic crashes. One treatment is to install a raised-curb median. These medians prevent accidents caused by crossover traffic, headlight glare distraction and traffic turning left from through lanes. Raised-curb medians also provide a refuge for pedestrians crossing the roadway. Another benefit of raised-curb medians is vehicular efficiency by removing turning traffic from through lanes, thereby maintaining/increasing roadway operating speeds[5].

8. Countermeasures for Crashes Involving Roadway Access Problems

Increasing congestion, concerns over traffic safety, and the ever-increasing costs of upgrading highways have generated a new interest in access management. Effective access management is necessary in order to provide sufficient access to abutting property, yet ensure safe and smooth traffic operations along the roadway. Some basic elements of access management include fewer direct accesses, greater separation of driveways, and better driveway design and location.



PICTURE 5 – Illustration of potential conflict points for a 4-lane roadway with a center turn lane. Limiting the number of conflict points reduces the potential for crashes.

Limit the Number of Conflict Points – Conflict points are places in the roadway where two vehicles have the potential to cross paths. The more conflict points that occur along a roadway, the higher the potential for vehicular crashes. Raised-curb medians are a way to reduce conflict points from driveways along the roadway through limited and strategically placed median openings. Other strategies involve combining multiple driveways for one location or relocating driveways to side streets to minimize the number of entry and exit points for turning vehicles along the primary roadway.

5 Florida Department of Transportation, "Median Handbook" Systems Planning Office, January 1997.

Separate Conflict Areas – Conflict areas are created by intersections of the primary roadway with side streets and driveways. Providing adequate spacing between intersections allows motorists to react to one intersection at a time.

Reduce the Interference with Through Traffic – Vehicles that enter, exit, and turn across a roadway create interference with through traffic. Providing turning lanes, designing driveways with large turning areas, and restricting turning movements in and out of driveways allows for better separation between turning vehicles and through vehicles.

Provide Sufficient Spacing for Placement of Traffic Signals – Adequate spacing of signalized intersections with optimal signal timings reduces conflict areas and facilitates smooth traffic progression.

Provide Adequate and Easy-Access Parking Areas – Provide easily accessible on- and off-street parking that can accommodate cars and other vehicles. The primary goal is minimize traffic disturbance on the primary roadway through the reduction of the number of driveways for businesses while still providing safe and adequate access.

9. Countermeasures for Crashes Involving Pedestrian and Bicycle Traffic

According to the National Highway Traffic and Safety Administration (NHTSA), over 5,000 pedestrians are killed and about 69,000 are injured in traffic related crashes each year. In addition, over 700 bicyclists are killed and approximately 53,000 are injured each year in traffic incidents.

Increasing Public Education – Distribute material highlighting driving and safety tips in regards to pedestrian and bicycle safety. The long-term goal in public education is to change driving habits and attitudes so that it clearly becomes the norm that pedestrians have the right of way. Finally, encourage helmet use among all bicyclists.

Stepping Up Law Enforcement – Encourage police force to monitor high pedestrian and bicycle areas and enforce penalties for speeding, aggressive driving, red light running, etc., which can lead to casualties.

Engineering Improvements – Design and provide safe roadways for motorists as well as pedestrians and bicyclists. Reduce conflicts between pedestrians and vehicles by installing special signs (i.e. share the road), enhanced roadway shoulders, bike lanes, sidewalks, and understandable pavement markings. Finally, incorporate innovation and technology into intersections, such as pedestrian flags and countdown devices, which enhance safety and alert the pedestrians of the time remaining to cross.

PICTURE 6 – The City of Berkeley, CA, has initiated a pedestrian flag program to enhance pedestrian safety at intersections. These flags help make pedestrians more visible to drivers.

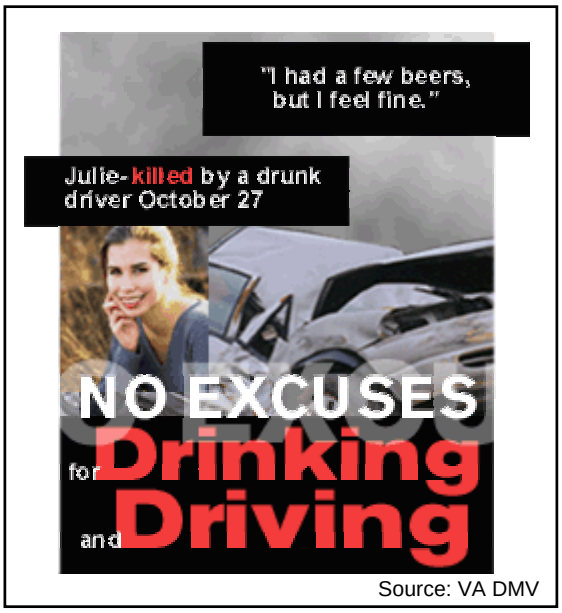
10. Countermeasures for Crashes as a Result of Driver Actions

Commonly, motor vehicle crashes occur as a result of driver actions, such as speeding, tailgating, not wearing a seat belt, aggressive driving, decision errors, and violating traffic laws. Other distractions in the vehicle, such as cell phone use, eating, drinking, talking, and operating dashboard controls also lead to traffic crashes resulting in injuries and fatalities.

Public Awareness and Enforcement – Making the public aware of the dangers involved in operating a vehicle while driving aggressively, using a cell phone, eating, and drinking is the first step in preventing this problem. Some areas have taken further steps to reduce crashes by banning cell phone use while driving. Police enforcement and penalties for not wearing seat belts, driving aggressively, and violating traffic laws are all imperative to ensure the safety for both motorists and pedestrians.

11. Countermeasures for Crashes as a Result of Driver Condition

Factors that contribute to traffic crashes as a result of the driver's condition include drowsiness, age, driving inexperience, health, or being affected by alcohol or drugs. In 2002, traffic crashes involving alcohol accounted for nearly 8% or 2,486 of all crashes that occurred in Hampton Roads. Nationwide, the number of crashes that involved alcohol increased from an estimated 390,000 in 1994 to 438,000 in 2001.



Source: VA DMV

PICTURE 7 – Drivers need to be reminded of the dangers involved in drinking and driving.

Rumble Strips – The installation of rumble strips helps prevent crashes that occur when vehicles run off the road due to driver fatigue or alcohol.

Driver Education – Continuing to educate motorists, particularly elderly citizens and young inexperienced drivers, through driver education classes and schools will improve safety. Today, more teenagers are operating larger vehicles (SUVs) that are difficult to maneuver which results in more crashes; providing adequate time and training prior to driving these vehicles is important. The public also needs to be constantly reminded of the dangers involved when driving under the influence of drugs or alcohol.

Stricter Enforcement – Enacting stiffer laws and penalties for failure to wear a seat belt and driving while intoxicated will cause motorists to think more before they drive.

12. Countermeasures for Crashes as a Result of Vehicle Design or Malfunctions

Constant changes in vehicle design make it necessary to continually monitor roadway safety. Increased truck sizes, higher centers of gravity for vans, pick-ups, and sport utility vehicles (SUV), new headlamps, larger tires, and aerodynamic vehicle designs (i.e. sloped front ends) are often incompatible with the roadway and associated traffic control and safety features. These changes raise concern about the adequacy of current highway designs and standards. Traffic crashes also occur as a result of vehicle malfunctions, such as brake failure and flat tires.

Readdress Vehicle and Roadway Design Standards – The evolution of motor vehicles raises tremendous safety concerns regarding the compatibility of the vehicle and the roadway. Many Interstate highways and two-lane roadways were designed and constructed before safety guidelines were developed. Roadway design standards need to be readdressed to ensure the safe travel of these new vehicles. Along with roadway design, vehicle design needs to be studied as well. Furthermore, regulations must be passed and enforced to ensure that current vehicle designs are in line with the roadways they travel on.

Continue to Monitor and Inspect Vehicles – All motor vehicles must be inspected to minimize malfunctions on the highway. Overweight trucks or trucks that are too tall create safety hazards and must be monitored.

Incident Management Programs – When vehicle malfunctions occur, it is important to have a good incident management program in place. A successful incident management program improves the detection, response, and clearance times and techniques, which in turn reduces congestion and improves motorist safety. It also helps reduce the number and severity of secondary traffic crashes, which are crashes due to the original incident. Hampton Roads must continue to improve its program in order to remove disabled vehicles and road debris as quickly as possible.

13. Countermeasures for Crashes as a Result of Traffic Congestion

Today's growing traffic volumes have increased the potential for traffic crashes. Many roadways that were originally designed to carry low traffic volumes are carrying much higher volumes causing potentially dangerous situations. Oftentimes, funding is not available to make the improvements necessary to improve the performance of the congested roadway. Heavy congestion, particularly on the interstate system, can result in numerous rear-end crashes. It also can create driver frustration and instigate aggressive driving.

Add Capacity – Projects that expand the capacity of the road system and reduce congestion usually reduce the number and severity of crashes.

Encourage Carpools and the Use of Public Transportation – Mass transit and carpools reduce the number of vehicles on the transportation system and enable traffic to flow more freely.

Telecommuting and Staggered Work Hours – Telecommuting and staggered work hours also help reduce traffic congestion and in turn lower the risk of congestion related crashes.

TABLE 1 – Summary of Countermeasures and General Strategies to Reduce Motor Vehicle Crashes

Causes of Motor Vehicle Crashes	Countermeasures & General Strategies						
1. Roadway Departure	Clear Zones	Gradual Side Slopes	Forgiving Devices	Rumble Strips	Clear Signing, Pavement Marking, and Delineation		
2. Road Surface Conditions	Increased Surface Friction	Temporary Friction Enhancement (i.e. salt and sand)	Pavement Improvements	Stabilizing Shoulders	Preventive Maintenance	Proper Drainage	Advanced Transportation Weather Information Systems
3. Narrow Roadways and Bridges	Widening Lanes	Adding or Widening Shoulders	Channelization	Pedestrian/Cyclist Facilities for Narrow Roadways	Widening Bridges	Bridge Approach Improvements	Clear Signing, Pavement Marking, and Delineation for Bridges
4. Railroad Crossings	Education	Advance Warning Devices					
5. Work Zones	Education	Enforcement	Adequate Signage	Advance Warning			
6. Intersections	Add or Upgrade Lighting	Level Steep Grades	Add Turn Lanes	Improve or Add Signals	Roundabouts	Guard Against Red-Light Running	Eliminate Obstructions
7. Roadway Design Limitations	Improve Geometric Realignment (Horizontal & Vertical)	Review Speed Limits	Add or Upgrade Pavement Markings	Add a Raised-Curb Median			
8. Roadway Access Problems	Limit the Number of Conflict Points	Separate Conflict Areas	Reduce the Interference of Through Traffic	Provide Sufficient Spacing for Placement of Traffic Signals	Provide Adequate and Easy-Access Parking Areas		
9. Pedestrian and Bicycle Traffic	Increasing Public Education	Stepping Up Law Enforcement	Engineering Improvements				
10. Driver Actions	Public Awareness	Enforcement					
11. Driver Condition	Rumble Strips	Driver Education	Stricter Enforcement				
12. Vehicle Design or Malfunctions	Readdress Vehicle and Roadway Design Standards	Continue to Monitor and Inspect Vehicles	Incident Management Programs				
13. Traffic Congestion	Add Capacity	Encourage Carpools and Use of Public Transportation	Telecommuting and Staggered Work Hours				

INTERSTATE CRASH ANALYSIS

PICTURE 8 – Nearly 4,000 crashes occur each year on interstates throughout Hampton Roads.

The identification of high-crash locations is an important step in achieving cost-effective reductions in roadway crash losses. This section provides a detailed crash analysis for the top 10 high-crash interstate segments in Hampton Roads by EPDO crash rate (1998 – 2000 data) as determined from Part 2 of the *Hampton Roads Regional Safety Study*[6]. A discussion of EPDO crash rates from Part 2 of this study is included below. In Part 2, all interstates (total of 151 segments) in Hampton Roads were studied. **Map 1** on page 18 shows the location of the top 10 interstate segments. Included in this section are interstate segment roadway geometry diagrams, collision diagrams, and crash data summaries for each location. These details and summaries enabled observations to be made about existing crash problems. From this analysis, remedies and countermeasures for each location are provided. It is important to note that the recommendations listed may only be part of the solution to a host of problems; more in-depth analysis and field observations may be necessary in determining overall solutions.

Crash Severity (EPDO Crash Rate)

The crash severity method is the method that was used for determining high-crash interstate locations since it compares the number of crashes to the number of vehicle-miles of travel along a segment for a given time period (1998 – 2000), while also accounting for the severity of each crash. This method uses EPDO crash rates to address high-crash locations with more serious hazards. Crash severity on interstates is categorized to include crashes with fatalities (FAT), crashes with injuries (INJ), and crashes with property damage only (PDO). Any crash that results in at least one fatality is classified as a fatality crash, while any crash that results in at least one injury but no fatalities is classified as an injury crash. For a given location, the number of crashes at each severity level is multiplied by an arbitrary weighting factor in order to transform crash frequency into an "equivalent" frequency of EPDO crashes. For this study, the equation for calculating the yearly EPDO is:

Yearly EPDO = 12 x (Fatality Crashes per year) + 3 x (Injury Crashes per year) + Property Damage Only Crashes per year

6 Hampton Roads Planning District Commission, *Hampton Roads Regional Safety Study, Part 2: Interstate and Intersection Crash Findings*, Report T03-05, May 2003.

The weighting factors used in this equation are commonly used in calculating EPDO, even though they do vary for different agencies. The EPDO crash rate uses the EPDO calculation from the previous page, but accounts for the amount of travel on each interstate segment. For this study, the EPDO crash rate for interstates is expressed per million vehicle-miles of travel (MVMT) and is computed as follows:

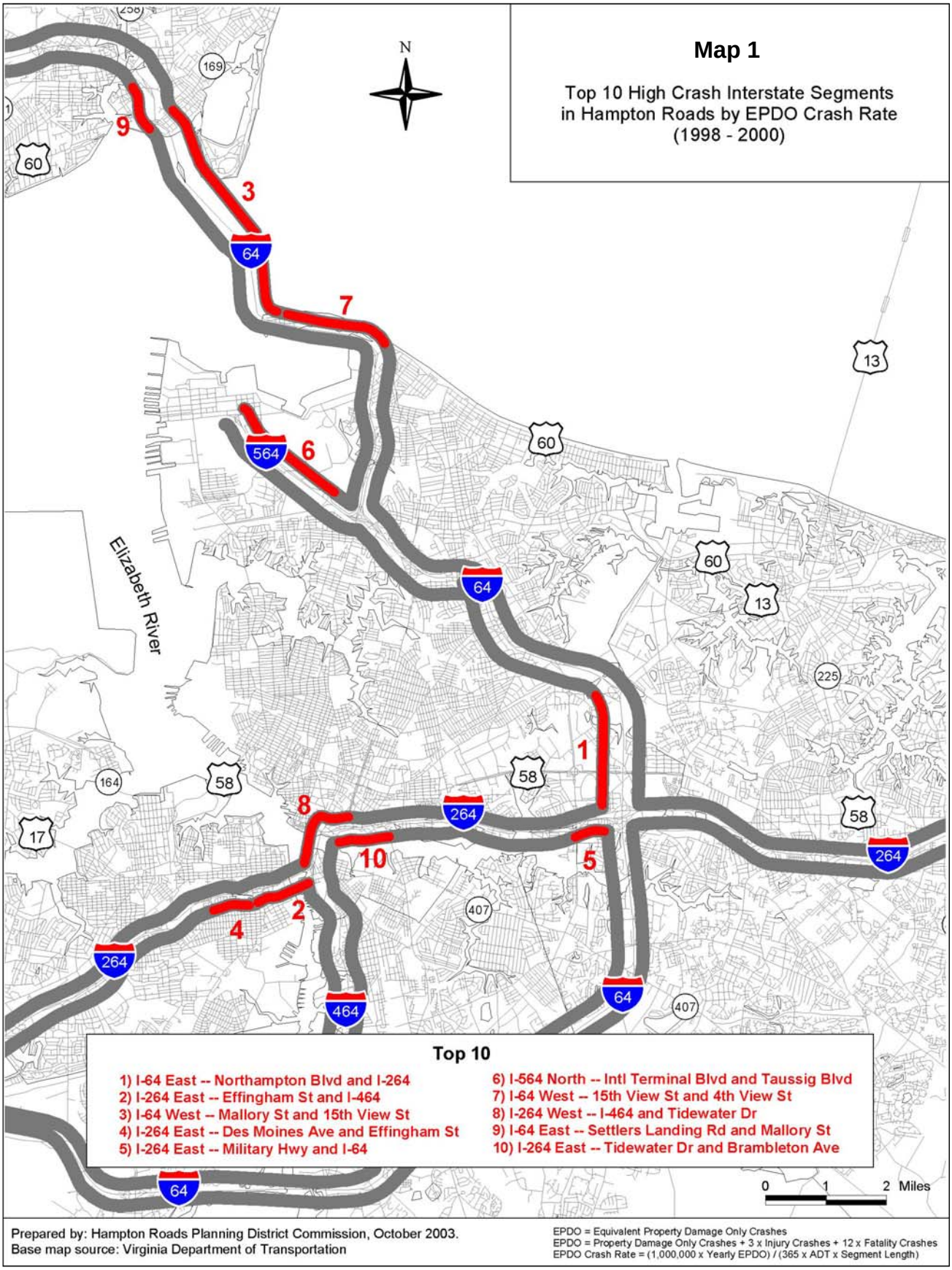
$$\text{EPDO Crash Rate} = \frac{1{,}000{,}000 \times \text{Yearly EPDO}}{365 \times \text{Average Daily Traffic (ADT)} \times \text{Segment Length}}$$

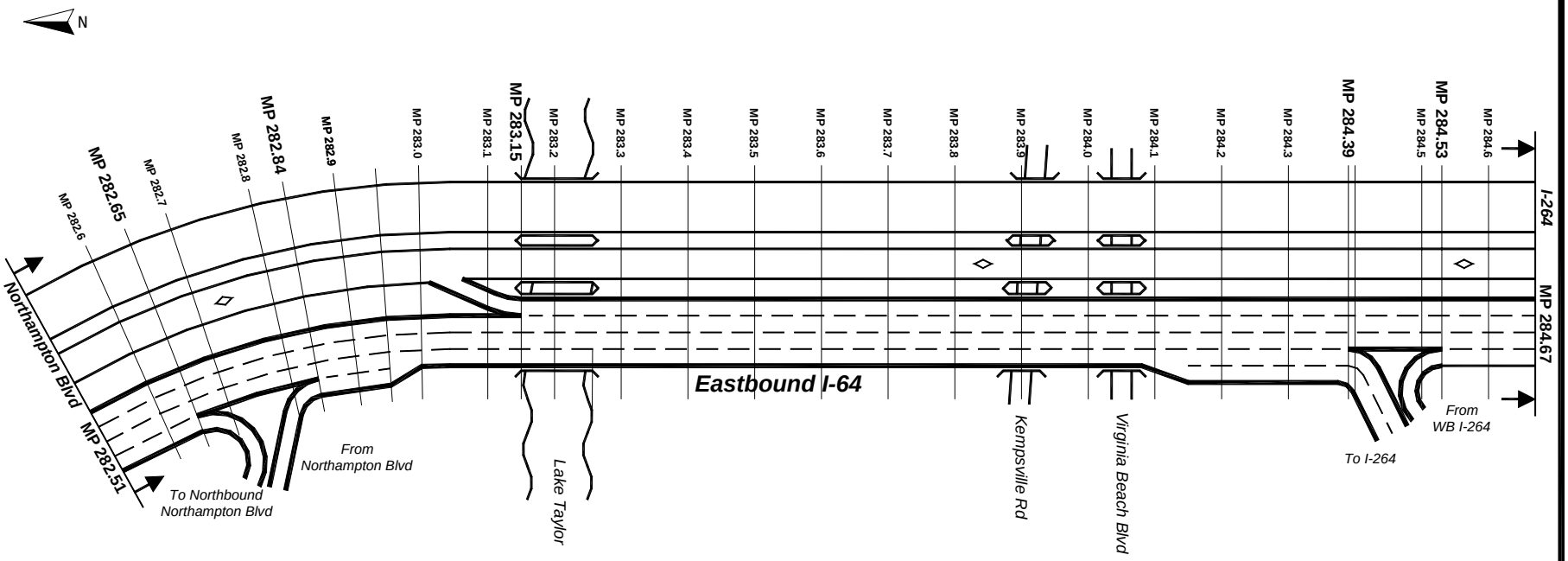
Top 10 High-Crash Interstate Segments in Hampton Roads (1998 – 2000)

The 10 highest crash interstate segments by EPDO Crash Rate per MVMT (1998 – 2000) are listed below in **Table 2**.

TABLE 2 – Top 10 High-Crash Interstate Segments in Hampton Roads (1998 – 2000)

Rank	Interstate	Segment	Daily ADT	PDO Crashes Per Year	INJ Crashes Per Year	FAT Crashes Per Year	Total Crashes Per Year	EPDO Crash Rate per MVMT
1	I-64 East	Northampton Blvd and I-264	63,797	139.0	49.7	0.0	188.7	**5.83**
2	I-264 East	Effingham St and I-464	53,366	36.3	24.3	0.0	60.7	**5.01**
3	I-64 West	Mallory St and 15th View St	42,174	117.7	53.3	0.0	171.0	**4.65**
4	I-264 East	Des Moines Ave and Effingham St	35,737	11.7	10.0	0.0	21.7	**4.44**
5	I-264 East	Military Hwy and I-64	55,409	30.0	12.7	0.0	42.7	**4.31**
6	I-564 North	International Terminal Blvd and Taussig Blvd	22,060	23.0	12.0	0.0	35.0	**3.92**
7	I-64 West	15th View St and Fourth View St	41,288	45.7	19.0	0.3	65.0	**3.89**
8	I-264 West	I-464 and Tidewater Dr	54,169	31.7	18.0	0.0	49.7	**3.67**
9	I-64 East	Settlers Landing Rd and Mallory St	53,138	13.0	7.7	0.0	20.7	**3.44**
10	I-264 East	Tidewater Dr and Brambleton Ave	50,761	17.3	6.0	0.3	23.7	**3.12**


Map 1
Top 10 High Crash Interstate Segments in Hampton Roads by EPDO Crash Rate (1998 - 2000)
N
Elizabeth River
Top 10
1) I-64 East -- Northampton Blvd and I-264
2) I-264 East -- Effingham St and I-464
3) I-64 West -- Mallory St and 15th View St
4) I-264 East -- Des Moines Ave and Effingham St
5) I-264 East -- Military Hwy and I-64
6) I-564 North -- Intl Terminal Blvd and Taussig Blvd
7) I-64 West -- 15th View St and 4th View St
8) I-264 West -- I-464 and Tidewater Dr
9) I-64 East -- Settlers Landing Rd and Mallory St
10) I-264 East -- Tidewater Dr and Brambleton Ave
0 1 2 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x ADT x Segment Length)



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**188.7**
Property Damage Only	**139.0**
Crashes with Injuries	**49.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**76.7**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**5.83**

LEGEND

Overpass

Tunnel Facility

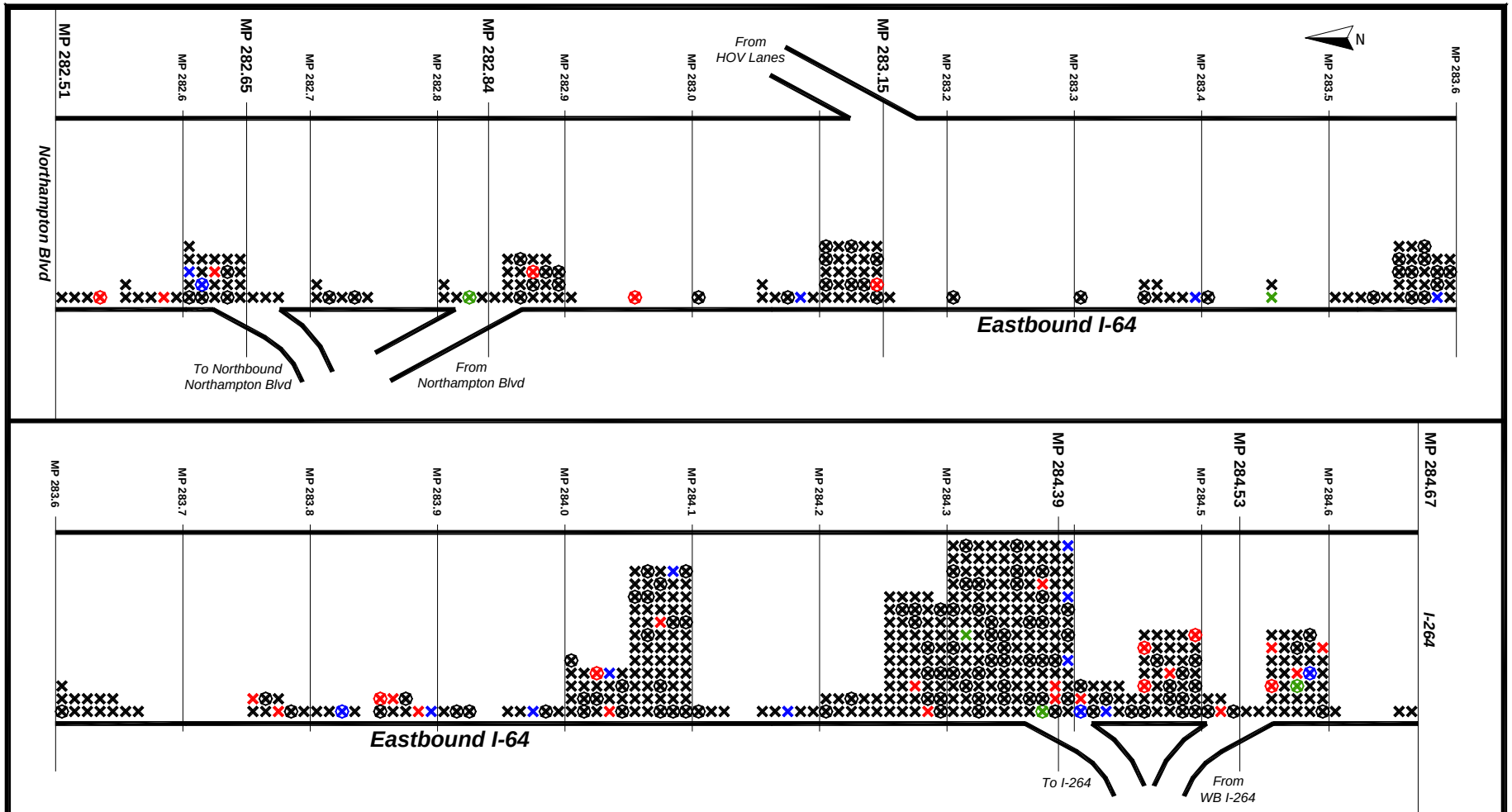
HOV Facility

MP 286.3 Interstate Milepost

ROADWAY GEOMETRY

Eastbound Interstate 64
between Northampton Blvd and I-264

SEGMENT LENGTH	**2.16 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**63,797**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**188.7**
Property Damage Only	**139.0**
Crashes with Injuries	**49.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**76.7**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**5.83**

LEGEND

- Crashes With Property Damage Only
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

MP 286.3 Interstate Milepost

COLLISION DIAGRAM

Eastbound Interstate 64 between Northampton Blvd and I-264

SEGMENT LENGTH	**2.16 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**63,797**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 64 Eastbound

Between Northampton Boulevard and I-264

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	181	166	219	566
PDO Crashes	134	119	164	417
INJ Crashes	47	47	55	149
FAT Crashes	0	0	0	0
Injuries	73	58	99	230
Fatalities	0	0	0	0

Segment Length (Miles)	2.16	
Average No. of Crashes Per Year	189	
Average EPDO	288	
Average EPDO Rate	5.83	
Average Daily Traffic (Eastbound)	63,797	
% of crashes involving heavy vehicles - Segment		4.9%
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	97.5%	92.3%
Drinking without Impared Ability	0.7%	4.9%
Drinking - not known if impaired	0.9%	1.4%
Drinking with Impared Ability	0.9%	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	98.4%	96.4%
Obscured by rain/snow	0.5%	1.1%
Obscured by trees/hills	0.2%	0.2%
Obscured by other vehicles	0.4%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	0.0%	0.3%
Not stated	0.5%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	12.9%	17.3%
9:00am - 2:59pm	35.5%	27.9%
3:00pm - 6:59pm	**43.3%**	32.0%
7:00pm - 5:59am	8.3%	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	17.8%	14.6%
Tuesday	13.4%	13.9%
Wednesday	15.4%	14.3%
Thursday	15.0%	15.0%
Friday	**24.0%**	18.7%
Saturday	5.1%	12.6%
Sunday	9.2%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	82.2%	79.2%
Fog	0.2%	0.3%
Rain/Mist	16.3%	18.8%
Snow/Sleet	1.4%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	7.6%	26.4%
2	**56.0%**	50.4%
3	**26.1%**	16.5%
4	7.2%	4.8%
5+	3.0%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	**77.6%**	53.9%
Head On	0.0%	0.3%
Side Swipe	11.7%	13.3%
Fixed Object	9.4%	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	1.4%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	3.2%	5.3%
Driver Asleep/Handicap	0.4%	3.4%
Driver Under the Influence	1.1%	4.8%
Driver Speeding	5.3%	10.7%
Driver Error	**84.1%**	67.0%
Vehicle Defective	1.4%	2.3%
Weather/Visibility	0.5%	1.1%
Road Defective	0.0%	0.0%
Road Slick	2.5%	3.8%
Not Stated	1.6%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Following too close	**47.2%**	27.8%
Driver Inattention	**14.7%**	22.9%
Exceeded safe speed but not speed limit	9.2%	11.5%
Exceeded speed limit	4.1%	9.5%
Cutting in	3.9%	4.0%
Avoiding other vehicle	2.1%	3.0%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

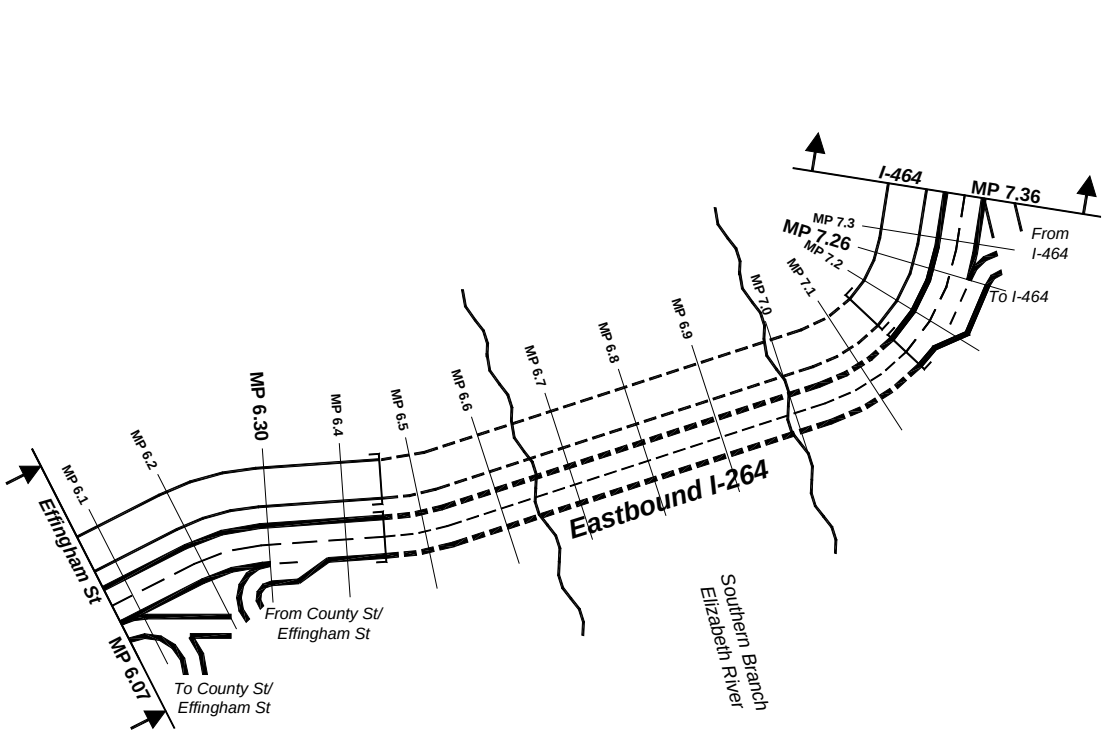
Interstate Segment:	**I-64 EB between Northampton Blvd & I-264**
Jurisdiction:	**Norfolk**
EPDO Rate per Million Vehicle Miles of Travel:	5.83
Regional Rank by EPDO Rate:	1 of 151
Number of Crashes Per Year	188.7
Number of Injuries Per Year	76.7
Number of Fatalities Per Year	0
Segment Average Daily Traffic	63,797

OBSERVATIONS:

- 43% of crashes occurred during the PM peak period (3 – 7 pm), which was higher than the regional average of 32%.
- 24% of crashes occurred on Friday, while the regional average was 18.7%.
- Mostly 2 (56%) and 3 (26.1%) vehicle crashes occurred at this interstate location, which was higher than the regional averages of 50.4% and 16.5%, respectively.
- 77.6% of crashes were the result of rear ends. Regional average was 53.9%. The other significant crash types were sideswipe and fixed object.
- 84% of crashes resulted in drivers making errors and bad judgment. Regional average was 67%.
- It appears that over half of all crashes were the result of following too close and driver inattention.
- A close examination of the collision diagram for this segment of I-64 indicates that 40% of all crashes occurred in approaches to the heavily congested interchange with I-264. Crashes were also frequent at the ramp junctions.

REMEDIES AND COUNTERMEASURES:

- There are currently no capacity improvements planned and programmed for this segment of I-64. One solution would be to extend the Northampton entrance ramp through to the HOV exit ramp at milepost 283.15 to eliminate the bottleneck that currently exists; there will, of course, be high costs associated with this improvement.
- Encourage carpools and vanpools on I-64 HOV lanes.
- Increase employees' use of HOV Express buses traveling between communities in VA Beach and the Norfolk Naval Base.
- Educate the public of the dangers involved in tailgating and not paying attention when traveling on the interstate, particularly during congested time periods.
- Police enforcement of tailgating.
- Improve the incident response and clearance times during peak periods.
- Expedite the Regional Telecommute program that was approved in 2003 as part of the Governor's Congestion Relief Program for Hampton Roads.
- Eliminate fixed objects and debris from the interstate.



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**60.7**
Property Damage Only	**36.3**
Crashes with Injuries	**24.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**42.0**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**5.01**

LEGEND

Overpass

Tunnel Facility

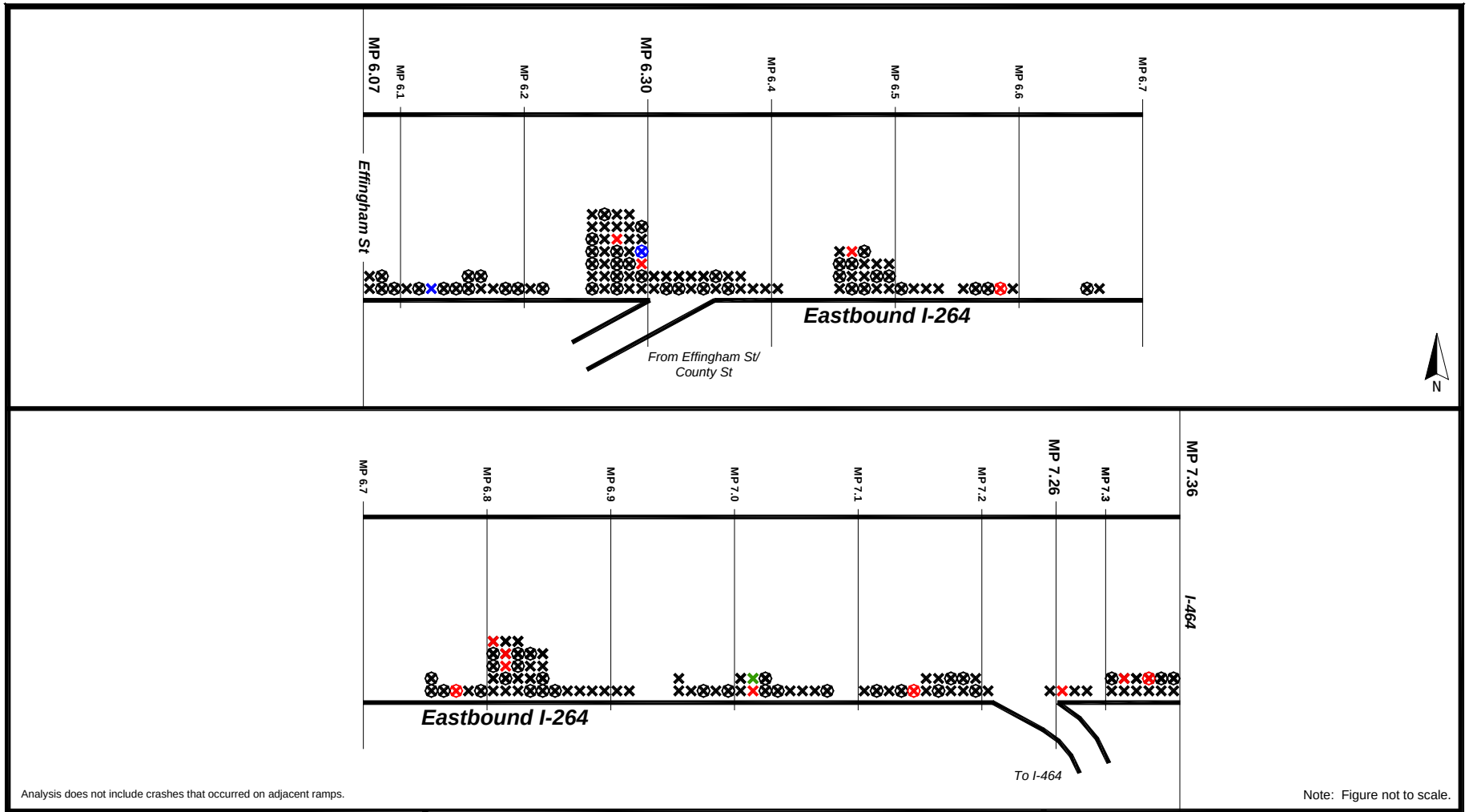
HOV Facility

MP 286.3 Interstate Milepost

ROADWAY GEOMETRY

Eastbound Interstate 264
between Effingham St and I-464

SEGMENT LENGTH	**1.29 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**53,366**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**60.7**
Property Damage Only	**36.3**
Crashes with Injuries	**24.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**42.0**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**5.01**

LEGEND

- Crashes With Property Damage Only — **MP 286.3** Interstate Milepost
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

COLLISION DIAGRAM

Eastbound Interstate 264
between Effingham St and I-464

SEGMENT LENGTH	**1.29 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**53,366**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 264 Eastbound

Between Effingham St and I-464

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	44	56	82	182
PDO Crashes	24	40	45	109
INJ Crashes	20	16	37	73
FAT Crashes	0	0	0	0
Injuries	29	34	63	126
Fatalities	0	0	0	0

Segment Length (Miles)	1.26	
Average No. of Crashes Per Year	60.7	
Average EPDO	109	
Average EPDO Rate	5.01	
Average Daily Traffic (Eastbound)	53,366	
% of crashes involving heavy vehicles - Segment		**8.8%**
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	96.2%	92.3%
Drinking without Impared Ability	1.1%	4.9%
Drinking - not known if impaired	1.6%	1.4%
Drinking with Impared Ability	1.1%	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	98.4%	96.4%
Obscured by rain/snow	0.5%	1.1%
Obscured by trees/hills	0.0%	0.2%
Obscured by other vehicles	0.0%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	0.0%	0.3%
Not stated	1.1%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	**27.5%**	17.3%
9:00am - 2:59pm	31.3%	27.9%
3:00pm - 6:59pm	33.0%	32.0%
7:00pm - 5:59am	8.2%	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	12.1%	14.6%
Tuesday	15.4%	13.9%
Wednesday	16.5%	14.3%
Thursday	**23.6%**	15.0%
Friday	19.8%	18.7%
Saturday	6.6%	12.6%
Sunday	6.0%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	82.4%	79.2%
Fog	0.5%	0.3%
Rain/Mist	16.5%	18.8%
Snow/Sleet	0.5%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	7.7%	26.4%
2	**62.6%**	50.4%
3	20.9%	16.5%
4	7.7%	4.8%
5+	1.1%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	**81.3%**	53.9%
Head On	0.0%	0.3%
Side Swipe	9.3%	13.3%
Fixed Object	8.8%	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	0.5%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	1.6%	5.3%
Driver Asleep/Handicap	0.5%	3.4%
Driver Under the Influence	0.5%	4.8%
Driver Speeding	7.1%	10.7%
Driver Error	**85.7%**	67.0%
Vehicle Defective	0.5%	2.3%
Weather/Visibility	0.0%	1.1%
Road Defective	0.0%	0.0%
Road Slick	1.1%	3.8%
Not Stated	2.7%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Following too close	**42.3%**	27.8%
Driver Inattention	**24.7%**	22.9%
Exceeded safe speed but not speed limit	9.3%	11.5%
Exceeded speed limit	4.4%	9.5%
Cutting in	2.7%	4.0%
Avoiding other vehicle	2.2%	3.0%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

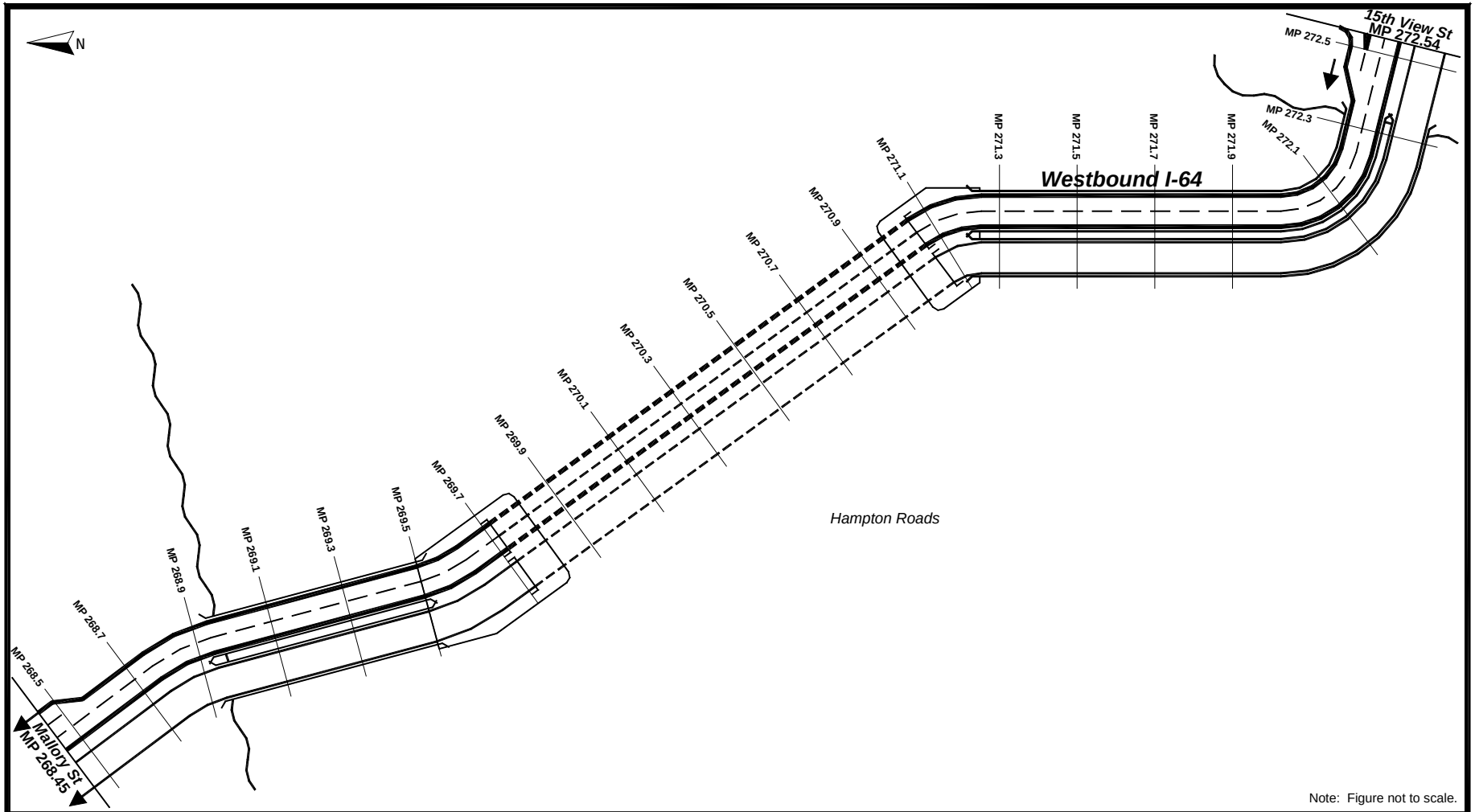
Interstate Segment:	**I-264 EB between Effingham St & I-464**
Jurisdiction:	**Portsmouth**
EPDO Rate per Million Vehicle Miles of Travel:	5.01
Regional Rank by EPDO Rate:	2 of 151
Number of Crashes Per Year	60.7
Number of Injuries Per Year	42.0
Number of Fatalities Per Year	0
Segment Average Daily Traffic	53,366

OBSERVATIONS:

- 8.8% of crashes involved heavy vehicles for this segment, which was higher than the regionwide average of 7.8%.
- 27.5% of crashes occurred during the AM peak period, which was significantly higher than the regional average of 17.3%. The PM peak period comprised one third of all crashes or slightly above the regional average.
- Nearly one fourth of all crashes occurred on Thursday. Regionwide, Friday was the highest in terms of crash frequency.
- Nearly two-thirds of all crashes involved 2 vehicles. Regionwide number was 50.4%.
- 81% of crashes were the result of rear ends. Regional average was 53.9%.
- 85.7% of crashes resulted in drivers making errors and bad judgment. Regional average was 67%. It appears that over half of all crashes were the result of following too close and driver inattention.
- A close examination of the collision diagram including the segment from Des Moines Avenue to I-464 indicates that nearly one half of all crashes occurred inside the Downtown Tunnel while the remainder occurred at ramp junctions and approaches to the Tunnel. This is mainly due to heavy traffic and delay due to backups.

REMEDIES AND COUNTERMEASURES:

- There are currently no capacity improvements planned or programmed for this segment of I-264 including the Downtown Tunnel. Remedies will be primarily based on TDM and TSM strategies.
- TDM strategies include ridesharing, flexible work schedule, telecommute, and improving transit service.
- TSM strategies include incident management, rerouting traffic to uncongested alternative routes, variable message signs relaying real time traffic information to motorists in advance of congested segments, and regulating traffic during the congested peak periods at the ramp junctions approaching the Tunnel. Most of these strategies are currently in place.
- Educate the public of the dangers involved in tailgating and not paying attention when traveling on the interstate, particularly during congested time periods.
- Consider implementing the Value Pricing strategy at the Downtown Tunnel which can reduce congestion significantly by encouraging peak period travelers to shift to off-peak times, to alternate modes, to less congested facilities, and to eliminate certain low-value trips.



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**171.0**
Property Damage Only	**117.7**
Crashes with Injuries	**53.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**83.3**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**4.65**

LEGEND

Overpass

Tunnel Facility

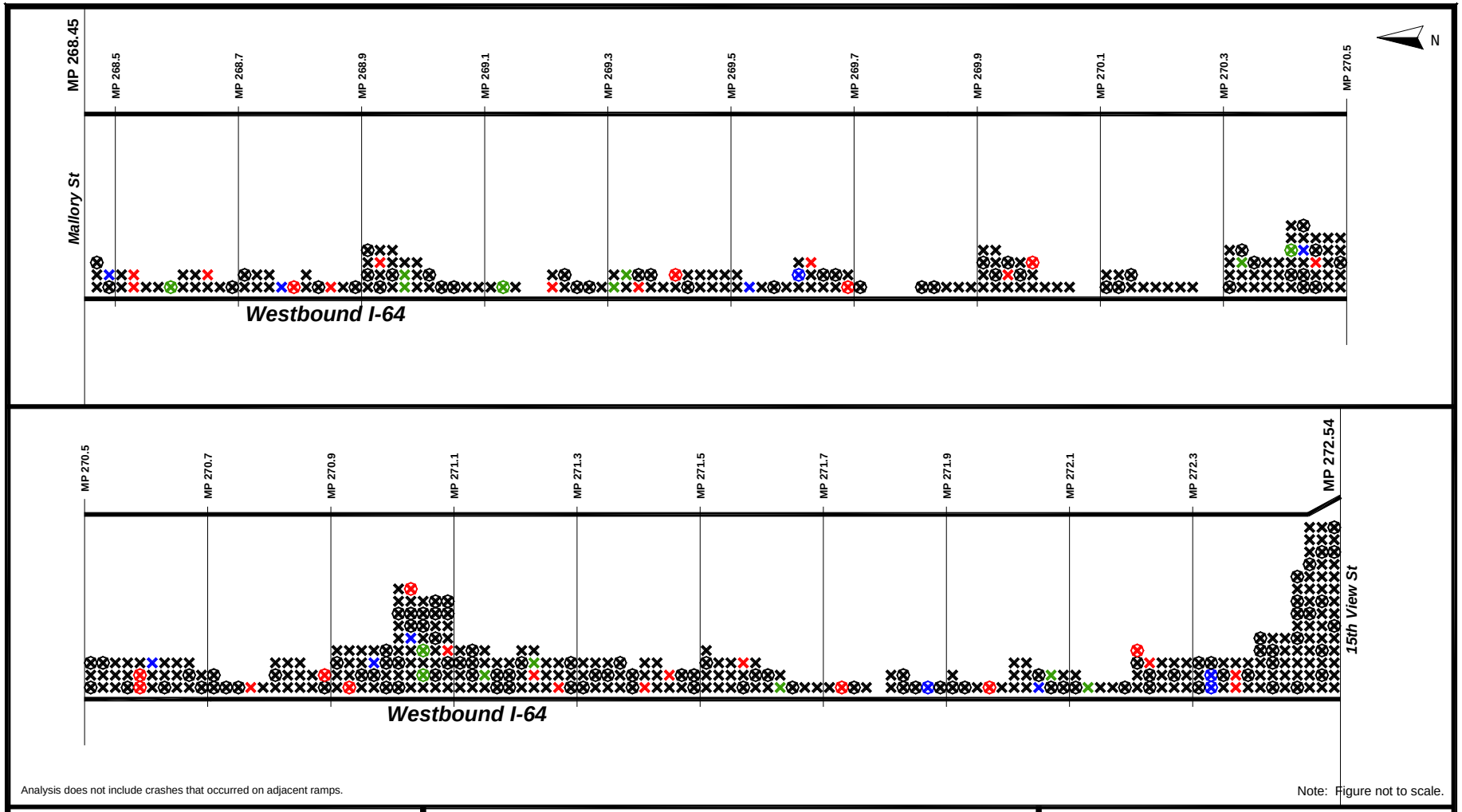
HOV Facility

MP 286.3 Interstate Milepost

ROADWAY GEOMETRY

Westbound Interstate 64
between 15th View St and Mallory St

SEGMENT LENGTH	**4.09 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**42,174**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**171.0**
Property Damage Only	**117.7**
Crashes with Injuries	**53.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**83.3**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**4.65**

LEGEND

- Crashes With Property Damage Only
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

MP 286.3 Interstate Milepost

COLLISION DIAGRAM

Westbound Interstate 64
between 15th View St and Mallory St

SEGMENT LENGTH	**4.09 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**42,174**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 64 Westbound

Between 15th View Street and Mallory Street

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	199	158	156	513
PDO Crashes	130	114	109	353
INJ Crashes	69	44	47	160
FAT Crashes	0	0	0	0
Injuries	111	59	80	250
Fatalities	0	0	0	0

Segment Length (Miles)	4.09
Average No. of Crashes Per Year	171
Average EPDO	278
Average EPDO Rate	4.65
Average Daily Traffic (Westbound)	42,174
% of crashes involving heavy vehicles - Segment	3.7%
- Regionwide	7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	95.7%	92.3%
Drinking without Impared Ability	1.4%	4.9%
Drinking - not known if impaired	0.2%	1.4%
Drinking with Impared Ability	**2.7%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	99.4%	96.4%
Obscured by rain/snow	0.0%	1.1%
Obscured by trees/hills	0.0%	0.2%
Obscured by other vehicles	0.2%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	0.0%	0.3%
Not stated	0.4%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	6.0%	17.3%
9:00am - 2:59pm	**48.0%**	27.9%
3:00pm - 6:59pm	29.2%	32.0%
7:00pm - 5:59am	16.8%	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	13.8%	14.6%
Tuesday	11.5%	13.9%
Wednesday	11.5%	14.3%
Thursday	17.9%	15.0%
Friday	**21.8%**	18.7%
Saturday	9.9%	12.6%
Sunday	13.5%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	89.9%	79.2%
Fog	1.0%	0.3%
Rain/Mist	8.0%	18.8%
Snow/Sleet	1.2%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	9.2%	26.4%
2	45.0%	50.4%
3	**29.2%**	16.5%
4	**10.1%**	4.8%
5+	**6.4%**	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	**81.1%**	53.9%
Head On	0.0%	0.3%
Side Swipe	8.6%	13.3%
Fixed Object	9.6%	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	0.8%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	1.6%	5.3%
Driver Asleep/Handicap	0.8%	3.4%
Driver Under the Influence	2.9%	4.8%
Driver Speeding	6.2%	10.7%
Driver Error	**83.8%**	67.0%
Vehicle Defective	0.6%	2.3%
Weather/Visibility	0.2%	1.1%
Road Defective	0.0%	0.0%
Road Slick	2.1%	3.8%
Not Stated	1.8%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Following too close	**46.8%**	27.8%
Driver Inattention	11.3%	22.9%
Exceeded safe speed but not speed limit	9.4%	11.5%
Exceeded speed limit	6.2%	9.5%
Cutting in	3.1%	4.0%
Avoiding other vehicle	1.2%	3.0%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

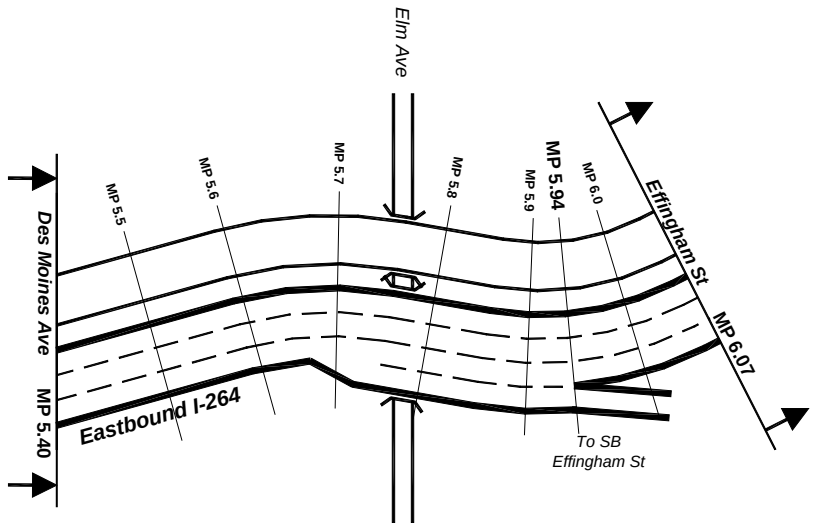
Interstate Segment:	**I-64 WB between 15th View St & Mallory St**
Jurisdiction:	**Norfolk**
EPDO Rate per Million Vehicle Miles of Travel:	4.65
Regional Rank by EPDO Rate:	3 of 151
Number of Crashes Per Year	171.0
Number of Injuries Per Year	83.3
Number of Fatalities Per Year	0
Segment Average Daily Traffic	42,174

OBSERVATIONS:

- Proportion of crashes due to drinking with impaired ability (2.7%) was higher than the regionwide average of 1.4%.
- 48% of crashes occurred during the off-peak period 9:00 am - 3:00 pm. Regionwide number was 28%.
- Over 20% of all crashes occurred on Friday.
- Multi-vehicle crashes (3 or more) represented nearly one-half of the total crashes. Regionwide average number was approximately 24%.
- 81% of crashes were the result of rear ends. Regional average was 53.9%.
- 84% of crashes resulted in drivers making errors and bad judgment. Regional average was 67%. It appears that over half of all crashes were the result of following too close and driver inattention.

REMEDIES AND COUNTERMEASURES:

- The HRBT is heavily congested throughout the day and particularly during the tourist season. There are currently no capacity improvements planned or programmed for this segment of I-64 including the HRBT. Remedies will be primarily based on TDM and TSM strategies.
- An examination of the collision diagram indicates that 35% of the crashes occurred in the Tunnel, 16% at the on-ramp junction from 15th View Street. Congestion is the major cause of all these crashes.
- Implement the regional traveler information program. Improving the real time information to motorists via variable message signs in advance of the HRBT would help divert some of the traffic to the alternate route at MMMBT or off-peak times.
- Educating the travelers to properly maintain their vehicles.
- Promote regional rideshare and other TDM measures through the Traffix program.
- Work with the trucking associations and Ports officials to inform truckers on the height limitations of the HRBT in the WB direction.



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**21.7**
Property Damage Only	**11.7**
Crashes with Injuries	**10.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**14.3**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**4.44**

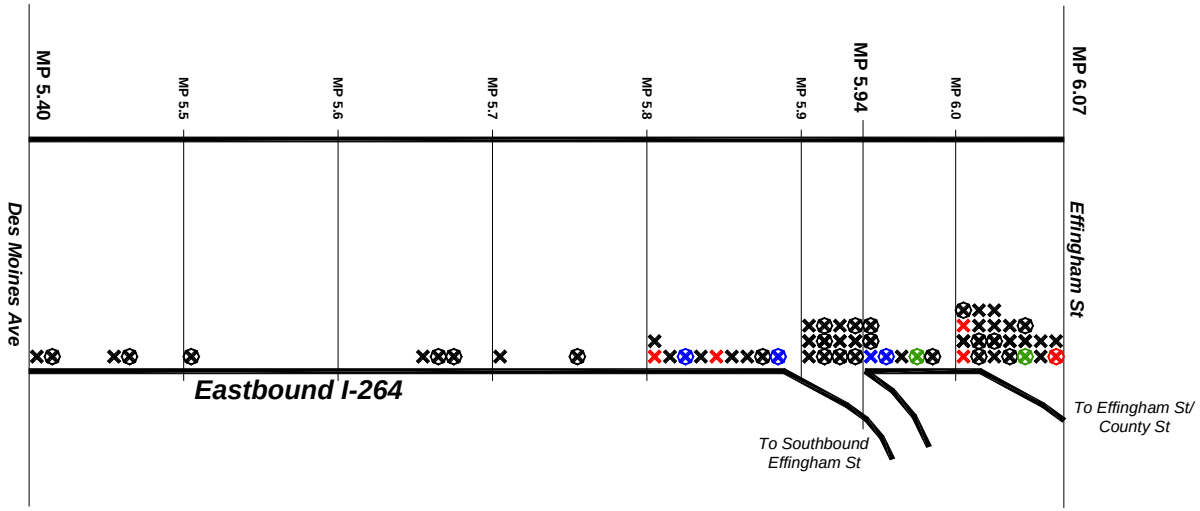
LEGEND

- Overpass
- Tunnel Facility
- HOV Facility
- **MP 286.3** Interstate Milepost

ROADWAY GEOMETRY

Eastbound Interstate 264
between Des Moines Ave and Effingham St

SEGMENT LENGTH	**0.67 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**35,737**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**21.7**
Property Damage Only	**11.7**
Crashes with Injuries	**10.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**14.3**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**4.44**

LEGEND

- Crashes With Property Damage Only — **MP 286.3** Interstate Milepost
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

COLLISION DIAGRAM

Eastbound Interstate 264
between Des Moines Ave and Effingham St

SEGMENT LENGTH	**0.67 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**35,737**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 264 Eastbound

Between Des Moines Ave and Effingham St

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	20	23	22	65
PDO Crashes	6	13	16	35
INJ Crashes	14	10	6	30
FAT Crashes	0	0	0	0
Injuries	19	16	8	43
Fatalities	0	0	0	0

Segment Length (Miles)	0.7	
Average No. of Crashes Per Year	22	
Average EPDO	42	
Average EPDO Rate	4.44	
Average Daily Traffic (Eastbound)	35,737	
% of crashes involving heavy vehicles - Segment		7.7%
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	95.4%	92.3%
Drinking without Impared Ability	1.5%	4.9%
Drinking - not known if impaired	0.0%	1.4%
Drinking with Impared Ability	**3.1%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	96.9%	96.4%
Obscured by rain/snow	1.5%	1.1%
Obscured by trees/hills	0.0%	0.2%
Obscured by other vehicles	0.0%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	0.0%	0.3%
Not stated	1.5%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	26.2%	17.3%
9:00am - 2:59pm	**40.0%**	27.9%
3:00pm - 6:59pm	24.6%	32.0%
7:00pm - 5:59am	9.2%	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	16.9%	14.6%
Tuesday	**27.7%**	13.9%
Wednesday	15.4%	14.3%
Thursday	10.8%	15.0%
Friday	**21.5%**	18.7%
Saturday	3.1%	12.6%
Sunday	4.6%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	66.2%	79.2%
Fog	0.0%	0.3%
Rain/Mist	**32.3%**	18.8%
Snow/Sleet	0.0%	1.4%
Other/Not Stated	1.5%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	10.8%	26.4%
2	**70.8%**	50.4%
3	13.8%	16.5%
4	1.5%	4.8%
5+	3.1%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	**70.8%**	53.9%
Head On	0.0%	0.3%
Side Swipe	13.8%	13.3%
Fixed Object	15.4%	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	0.0%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	3.1%	5.3%
Driver Asleep/Handicap	1.5%	3.4%
Driver Under the Influence	3.1%	4.8%
Driver Speeding	7.7%	10.7%
Driver Error	**75.4%**	67.0%
Vehicle Defective	3.1%	2.3%
Weather/Visibility	1.5%	1.1%
Road Defective	0.0%	0.0%
Road Slick	4.6%	3.8%
Not Stated	0.0%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Driver Inattention	**46.2%**	22.9%
Following too close	**35.4%**	27.8%
Exceeded speed limit	6.2%	9.5%
Cutting in	3.1%	4.0%
Avoiding other vehicle	3.1%	3.0%
Exceeded safe speed but not speed limit	1.5%	11.5%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

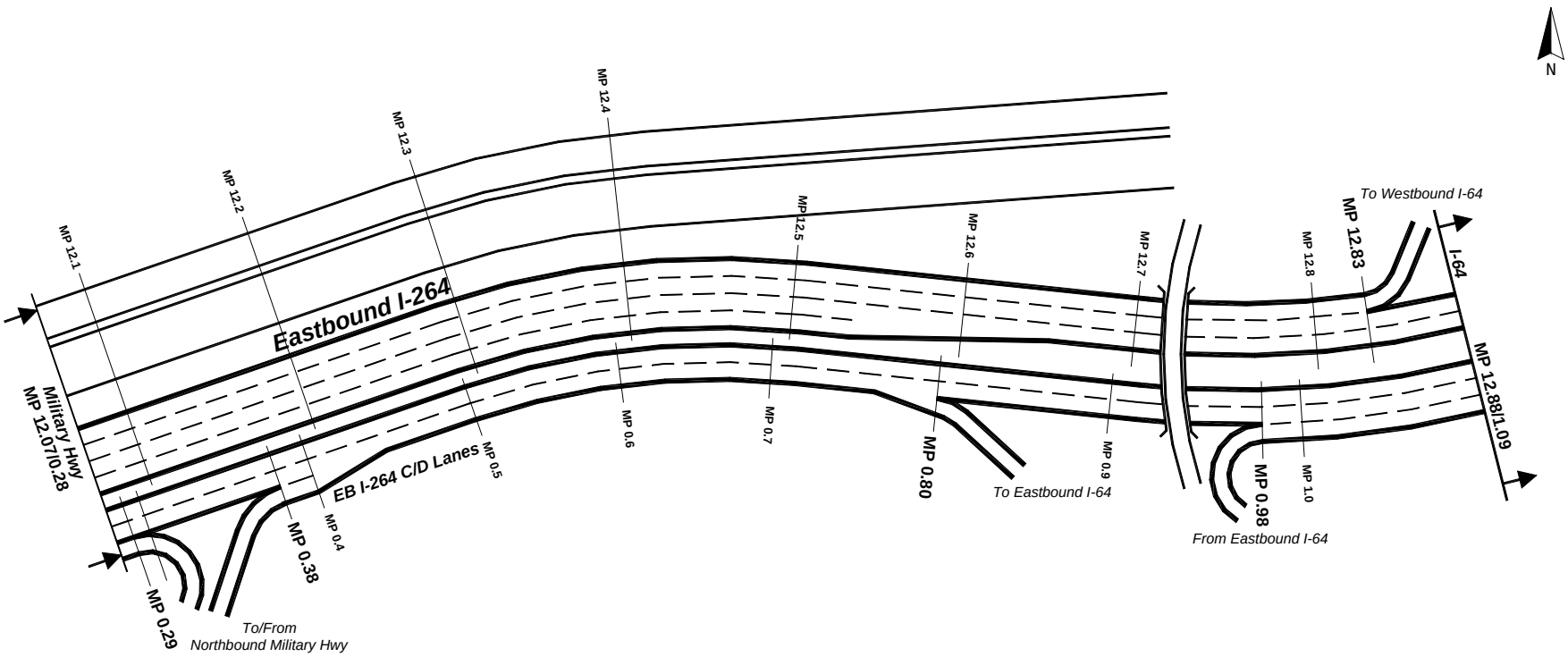
Interstate Segment:	**I-264 EB bet. Des Moines Ave & Effingham St**
Jurisdiction:	**Portsmouth**
EPDO Rate per Million Vehicle Miles of Travel:	4.44
Regional Rank by EPDO Rate:	4 of 151
Number of Crashes Per Year	21.7
Number of Injuries Per Year	14.3
Number of Fatalities Per Year	0
Segment Average Daily Traffic	35,737

OBSERVATIONS:

- 3.1% of crashes showed drinking with impaired ability. Regionwide average was 1.4%.
- 40% of all the crashes occurred during the off-peak period of 9:00 am – 3:00 pm. Regional average was 28%.
- 28% of crashes occurred on Tuesday, followed by Friday with 22%. Weekend crashes are significantly lower than the regionwide averages.
- Rain/mist caused 32.3% of all crashes. Regionwide average number was 18.8%.
- Over 70% all crashes involved 2 vehicles. Regionwide number was 50.4%.
- 71% of crashes were due to rear ends. Regionwide average was 53.9%.
- Driver error was a major factor in all the crashes (75.4%). Driver inattention and following too close were the most prevalent driver actions.

REMEDIES AND COUNTERMEASURES:

- This segment is highly congested particularly during the commuter periods. There are currently no capacity improvements planned or programmed for this segment of I-264 including the Downtown Tunnel. Remedies will be primarily based on TDM and TSM strategies.
- Nearly all of the crashes occurred at the Effingham Street's off-ramps. Variable message signs warning motorists of congestion ahead may reduce a number of these crashes.
- Ensure that there is adequate drainage as one third of crashes are occurring during rain or mist.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding. Drivers need to slow down during these conditions.
- Consider implementing VMS signs on I-264 in advance of the Des Moines Exit, to direct motorists to alternate routes including Jordan Bridge and Campostella Bridge for points east of the Downtown Tunnel.



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**42.7**
Property Damage Only	**30.0**
Crashes with Injuries	**12.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**18.7**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**4.31**

LEGEND

Overpass

Tunnel Facility

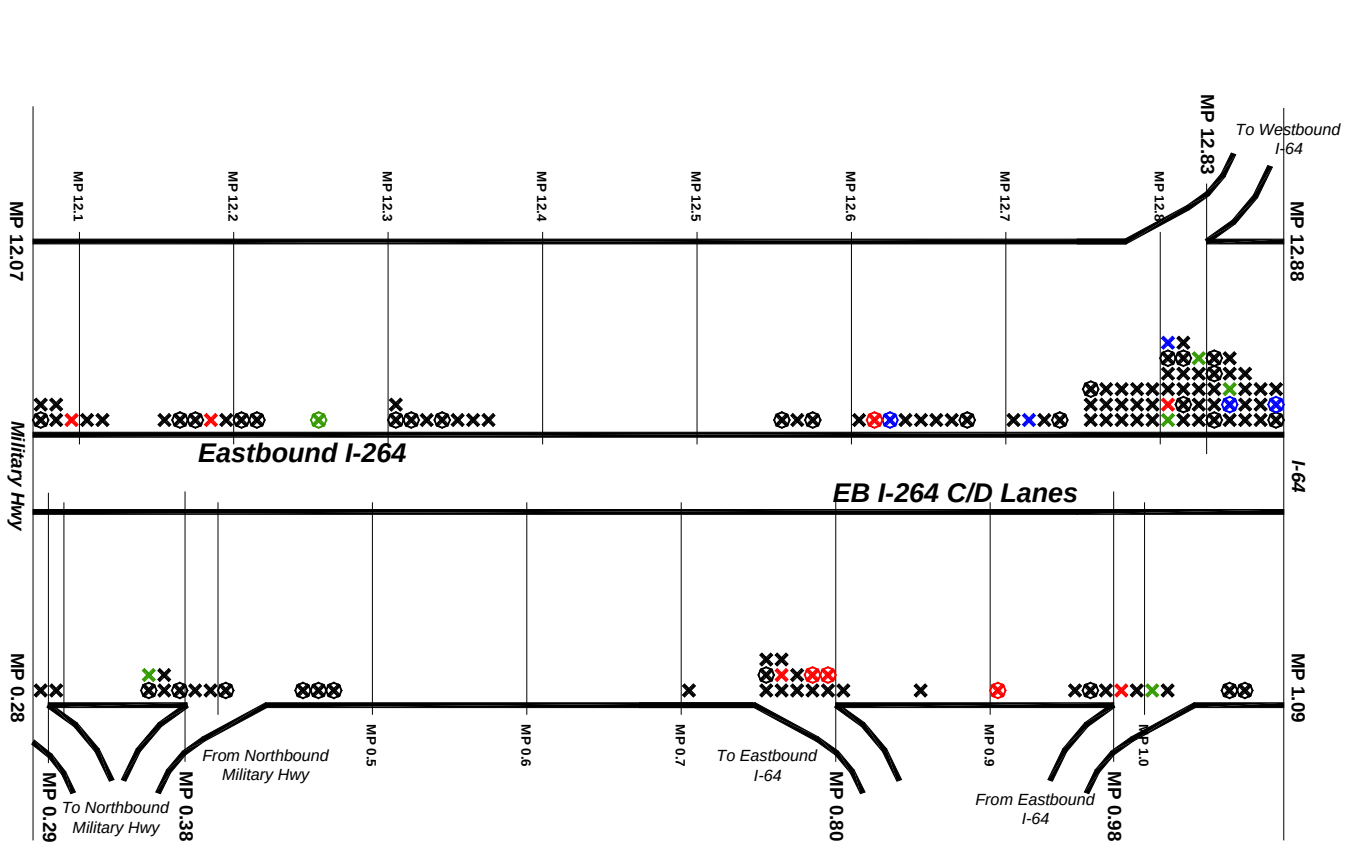
HOV Facility

MP 286.3 Interstate Milepost

ROADWAY GEOMETRY

Eastbound Interstate 264
between Military Hwy and I-64

SEGMENT LENGTH	**0.81 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**55,409**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**42.7**
Property Damage Only	**30.0**
Crashes with Injuries	**12.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**18.7**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**4.31**

LEGEND

- Crashes With Property Damage Only
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

MP 286.3 Interstate Milepost

COLLISION DIAGRAM

Eastbound Interstate 264
between Military Hwy and I-64

SEGMENT LENGTH	**0.81 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**55,409**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 264 Eastbound

Between Military Highway and I-64

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	57	43	28	128
PDO Crashes	40	27	23	90
INJ Crashes	17	16	5	38
FAT Crashes	0	0	0	0
Injuries	22	22	12	56
Fatalities	0	0	0	0

Segment Length (Miles)	0.81
Average No. of Crashes Per Year	43
Average EPDO	68
Average EPDO Rate	4.31
Average Daily Traffic (Eastbound)	55,409
% of crashes involving heavy vehicles - Segment	4.7%
- Regionwide	7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	90.6%	92.3%
Drinking without Impared Ability	0.8%	4.9%
Drinking - not known if impaired	**3.1%**	1.4%
Drinking with Impared Ability	**5.5%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	95.3%	96.4%
Obscured by rain/snow	1.6%	1.1%
Obscured by trees/hills	0.0%	0.2%
Obscured by other vehicles	0.8%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	0.0%	0.3%
Not stated	2.3%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	11.7%	17.3%
9:00am - 2:59pm	30.5%	27.9%
3:00pm - 6:59pm	**35.9%**	32.0%
7:00pm - 5:59am	21.9%	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	**20.3%**	14.6%
Tuesday	**17.2%**	13.9%
Wednesday	12.5%	14.3%
Thursday	10.9%	15.0%
Friday	14.1%	18.7%
Saturday	**16.4%**	12.6%
Sunday	8.6%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	78.9%	79.2%
Fog	0.0%	0.3%
Rain/Mist	**20.3%**	18.8%
Snow/Sleet	0.8%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	**32.0%**	26.4%
2	49.2%	50.4%
3	15.6%	16.5%
4	1.6%	4.8%
5+	1.6%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	**53.9%**	53.9%
Head On	0.0%	0.3%
Side Swipe	11.7%	13.3%
Fixed Object	**34.4%**	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	0.0%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	3.1%	5.3%
Driver Asleep/Handicap	2.3%	3.4%
Driver Under the Influence	4.7%	4.8%
Driver Speeding	7.0%	10.7%
Driver Error	**75.8%**	67.0%
Vehicle Defective	1.6%	2.3%
Weather/Visibility	1.6%	1.1%
Road Defective	0.0%	0.0%
Road Slick	2.3%	3.8%
Not Stated	1.6%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Following too close	**30.5%**	27.8%
Driver Inattention	**25.0%**	22.9%
Exceeded safe speed but not speed limit	**14.8%**	11.5%
Exceeded speed limit	6.3%	9.5%
Avoiding other vehicle	3.1%	3.0%
Did not have right-of-way	1.6%	0.5%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

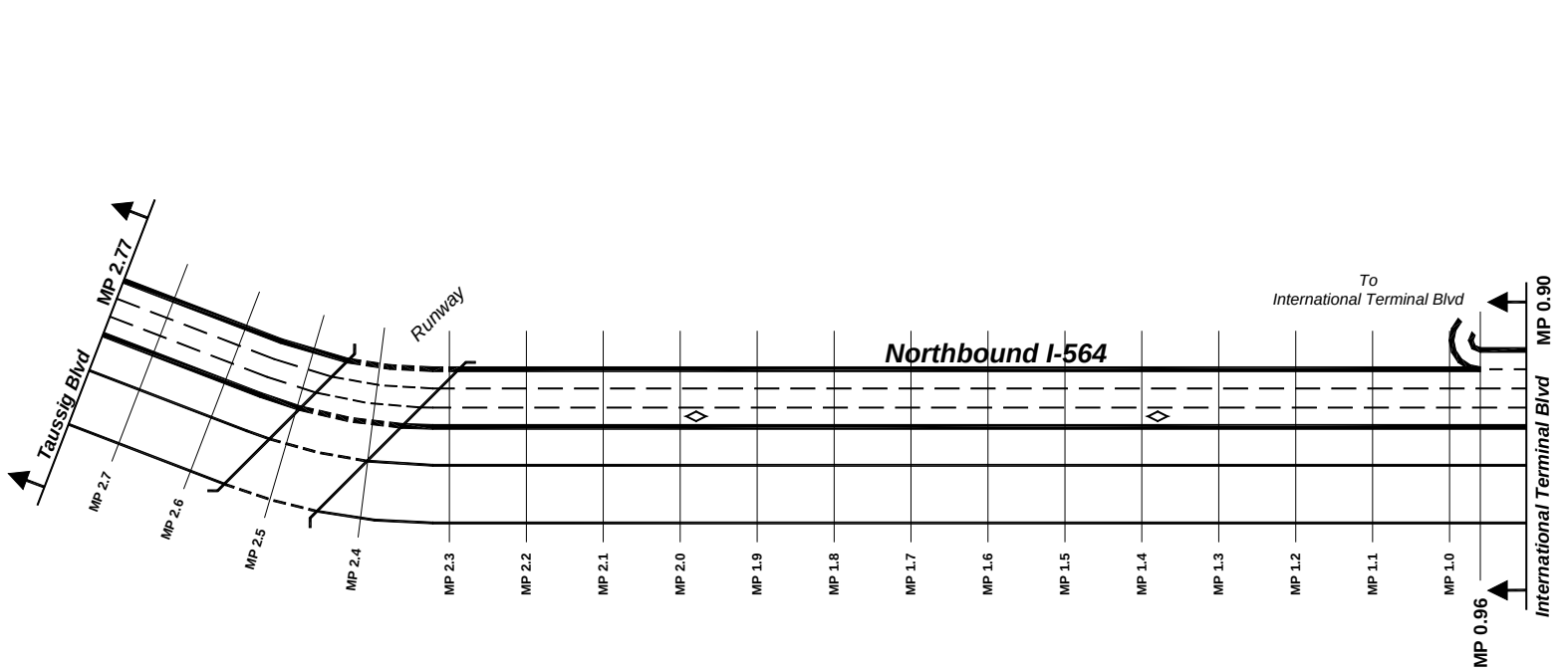
Interstate Segment:	**I-264 EB between Military Hwy & I-64**
Jurisdiction:	**Norfolk**
EPDO Rate per Million Vehicle Miles of Travel:	4.31
Regional Rank by EPDO Rate:	5 of 151
Number of Crashes Per Year	42.7
Number of Injuries Per Year	18.7
Number of Fatalities Per Year	0
Segment Average Daily Traffic	55,409

OBSERVATIONS:

- 5.5% of all crashes involved drinking with impaired ability. This is considerably higher than the regionwide average of 1.4%.
- The afternoon peak period (3 – 7 pm) had the highest percentage of crashes (35.9%).
- 20% of all crashes occurred on Monday. Saturday represented a higher than the regionwide average in terms of crashes.
- Rain/mist contributed to 20% of all crashes. Regional average was 18.8%.
- Major crash types were rear end (53.9%) and fixed object (34.4%).
- A higher percentage (32%) of single vehicle crashes occurred at this location than the regional average (26.4%).
- Most prevalent driver actions were following too close, driver inattention and exceeding safe speed.

REMEDIES AND COUNTERMEASURES:

- A review of the collision diagram indicates that approximately all crashes occurred approaching the I-64 WB off-ramp. The number of EB through lanes drops from 4 to 3 lanes on this section. With no capacity improvements planned for this section of I-264, most remedies will be based on TDM and TSM strategies.
- Crashes on the CD lanes occurred near or at on- and off-ramp junctions with Military Highway and I-64.
- Ensure that there is adequate drainage as 20% of crashes are occurring during rain or mist.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding. Drivers need to slow down during these conditions.
- Police enforcement will help deter drivers from speeding, thus reduce rear end crashes.
- Eliminate obstructions/fixed objects that may be causing a problem.
- Educate the public on the hazards of drinking and driving. Increase police enforcement for DUI violators.



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**35.0**
Property Damage Only	**23.0**
Crashes with Injuries	**12.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**14.7**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.92**

LEGEND

Overpass

Tunnel Facility

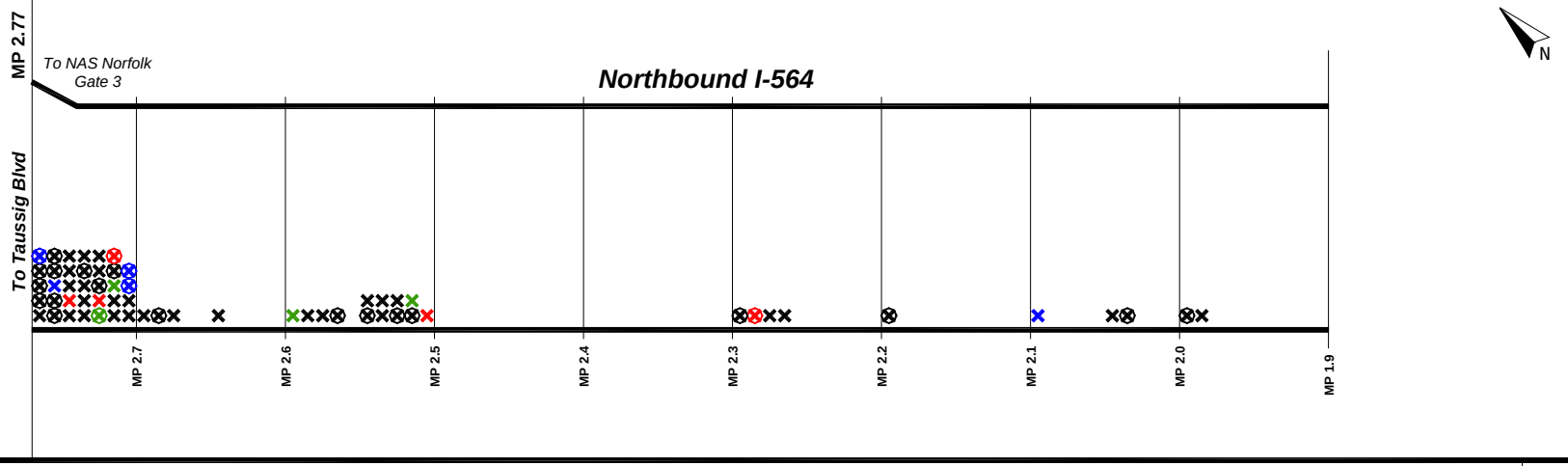
HOV Facility

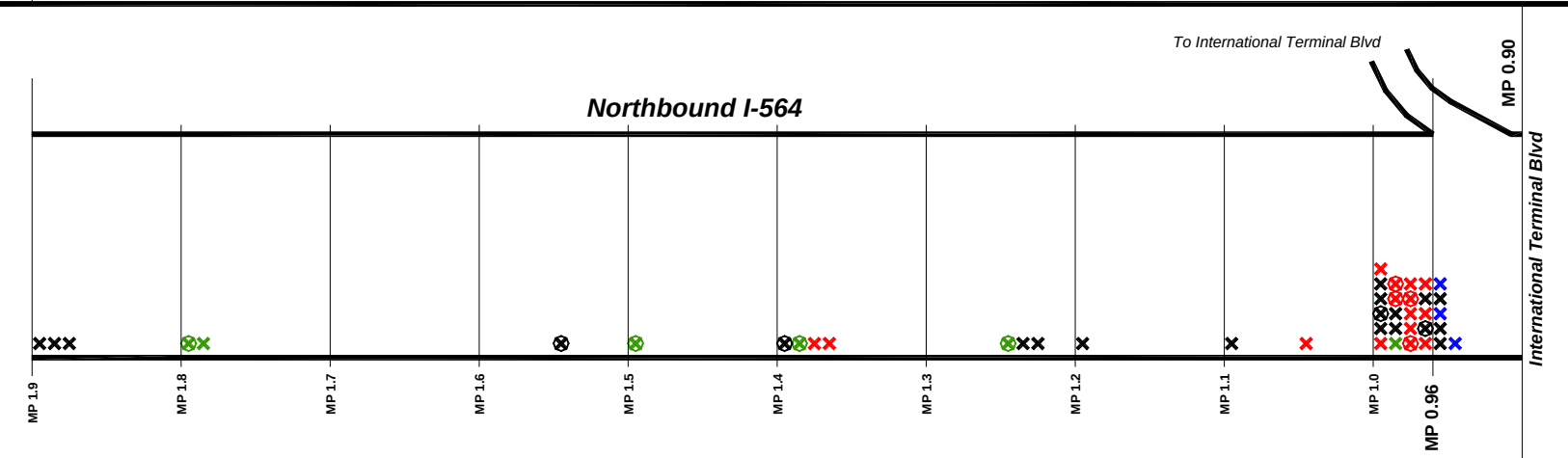
MP 286.3 Interstate Milepost

ROADWAY GEOMETRY

Northbound Interstate 564 between International Terminal Blvd and Taussig Blvd

SEGMENT LENGTH	**1.87 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**22,060**





Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**35.0**
Property Damage Only	**23.0**
Crashes with Injuries	**12.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**14.7**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.92**

LEGEND

- Crashes With Property Damage Only — **MP 286.3** Interstate Milepost
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

COLLISION DIAGRAM

Northbound Interstate 564 between International Terminal Blvd & Taussig Blvd

SEGMENT LENGTH	**1.87 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**22,060**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 564 Northbound

Between International Terminal Boulevard and Taussig Blvd

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	32	27	46	105
PDO Crashes	20	16	33	69
INJ Crashes	12	11	13	36
FAT Crashes	0	0	0	0
Injuries	16	13	15	44
Fatalities	0	0	0	0

Segment Length (Miles)	1.87	
Average No. of Crashes Per Year	35	
Average EPDO	59	
Average EPDO Rate	3.92	
Average Daily Traffic (Northbound)	22,060	
% of crashes involving heavy vehicles - Segment		1.0%
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	82.9%	92.3%
Drinking without Impared Ability	**3.8%**	4.9%
Drinking - not known if impaired	**3.8%**	1.4%
Drinking with Impared Ability	**9.5%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	97.1%	96.4%
Obscured by rain/snow	0.0%	1.1%
Obscured by trees/hills	0.0%	0.2%
Obscured by other vehicles	0.0%	0.6%
Obscured by sun/glare	1.0%	0.3%
Other	0.0%	0.3%
Not stated	1.9%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	**31.4%**	17.3%
9:00am - 2:59pm	19.0%	27.9%
3:00pm - 6:59pm	14.3%	32.0%
7:00pm - 5:59am	**35.2%**	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	**19.0%**	14.6%
Tuesday	**19.0%**	13.9%
Wednesday	14.3%	14.3%
Thursday	16.2%	15.0%
Friday	15.2%	18.7%
Saturday	12.4%	12.6%
Sunday	3.8%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	84.8%	79.2%
Fog	1.0%	0.3%
Rain/Mist	13.3%	18.8%
Snow/Sleet	1.0%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	**37.1%**	26.4%
2	42.9%	50.4%
3	14.3%	16.5%
4	1.9%	4.8%
5+	3.8%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	45.7%	53.9%
Head On	0.0%	0.3%
Side Swipe	5.7%	13.3%
Fixed Object	**41.9%**	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	6.7%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	1.0%	5.3%
Driver Asleep/Handicap	**4.8%**	3.4%
Driver Under the Influence	**9.5%**	4.8%
Driver Speeding	**19.0%**	10.7%
Driver Error	**56.2%**	67.0%
Vehicle Defective	1.9%	2.3%
Weather/Visibility	1.0%	1.1%
Road Defective	0.0%	0.0%
Road Slick	**6.7%**	3.8%
Not Stated	0.0%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Following too close	24.8%	27.8%
Driver Inattention	21.9%	22.9%
Exceeded safe speed but not speed limit	**14.3%**	11.5%
Exceeded speed limit	**11.4%**	9.5%
Did not have right-of-way	2.9%	0.5%
Avoiding other vehicle	1.9%	3.0%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

Interstate Segment: I-564 NB between International Terminal Blvd & Taussig Blvd
Jurisdiction: Norfolk

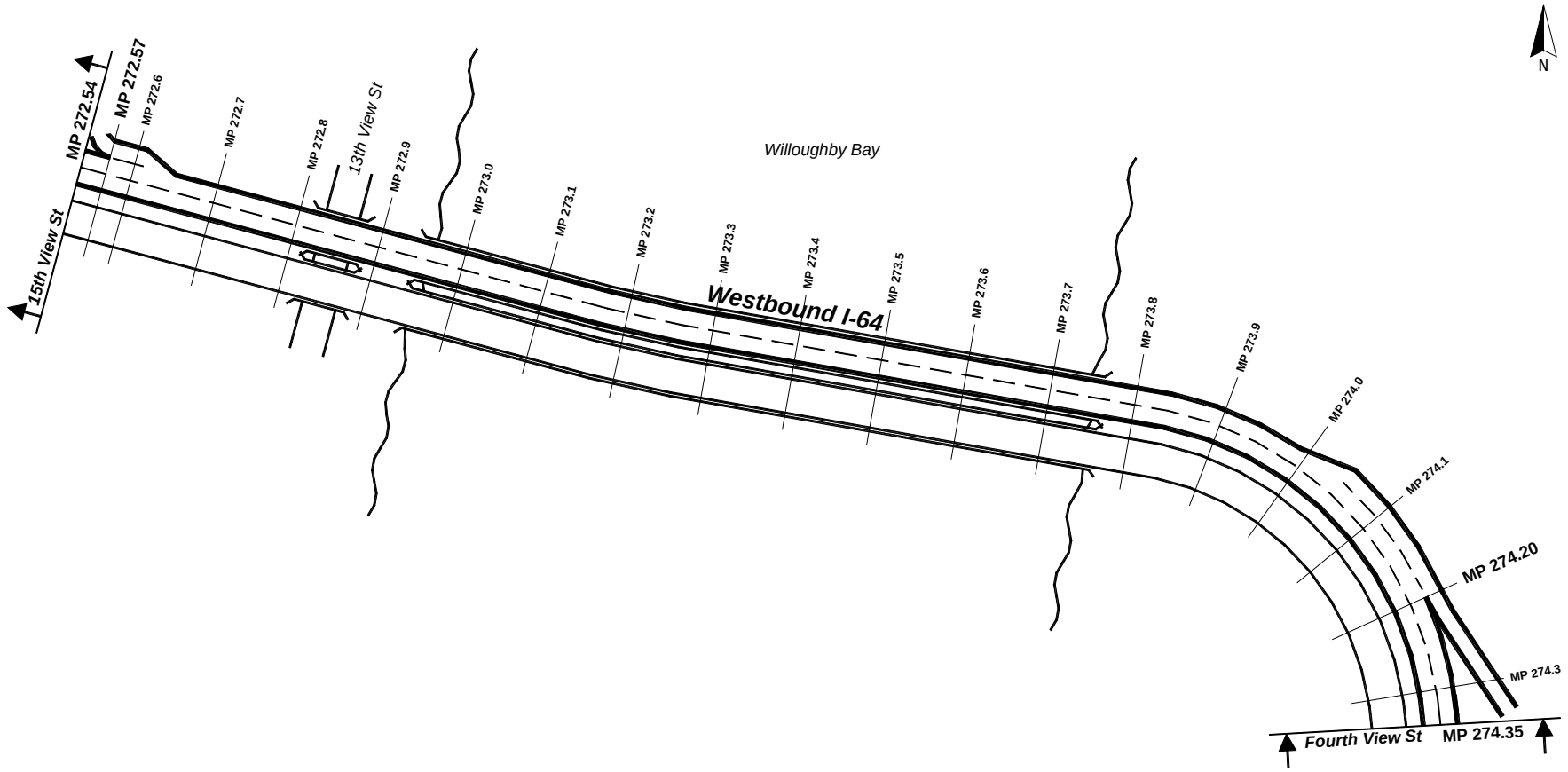
EPDO Rate per Million Vehicle Miles of Travel:	3.92
Regional Rank by EPDO Rate:	6 of 151
Number of Crashes Per Year	35.0
Number of Injuries Per Year	14.7
Number of Fatalities Per Year	0
Segment Average Daily Traffic	22,060

OBSERVATIONS:

- Only 1% of crashes involved heavy vehicles. Regionwide average was 7.8%.
- 17% of all crashes involved driving under the influence of alcohol. This is considerably higher than the average regionwide number of 8%.
- Two-thirds of all crashes occurred during the morning peak period and after 7 pm.
- Crashes were more frequent on Monday and Tuesday compared to other days of the week.
- Fixed object comprised 42% of all crashes. Regionwide average was 28%.
- A higher percentage (37.1%) of single vehicle crashes occurred at this location than the regional average (26.4%).
- Major factors causing crashes were driver error, driver speeding, DUI, road slick, and driver asleep.

REMEDIES AND COUNTERMEASURES:

- A review of the collision diagram indicates that approximately all crashes occurred at the off-ramp junction with International Terminal Blvd and the junction approaching Taussig Blvd and Gate 3 of the Norfolk Naval Base.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding. Drivers need to slow down during these conditions.
- Additional police enforcement will help deter drivers from speeding, thus reduce rear end crashes. Police enforcement will help reduce driving under the influence as well.
- Educate the public on the hazards of drinking and driving. Work with the Naval Base officials on educating the employees on the dangers of drinking and driving.
- Eliminate obstructions/fixed objects that may be causing a problem.



NO. OF CRASHES PER YEAR	**65.0**
Property Damage Only	**45.7**
Crashes with Injuries	**19.0**
Crashes with Fatalities	**0.3**
NO. OF INJURIES PER YEAR	**28.7**
NO. OF FATALITIES PER YEAR	**0.3**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.89**

LEGEND

Overpass — **MP 286.3** Interstate Milepost

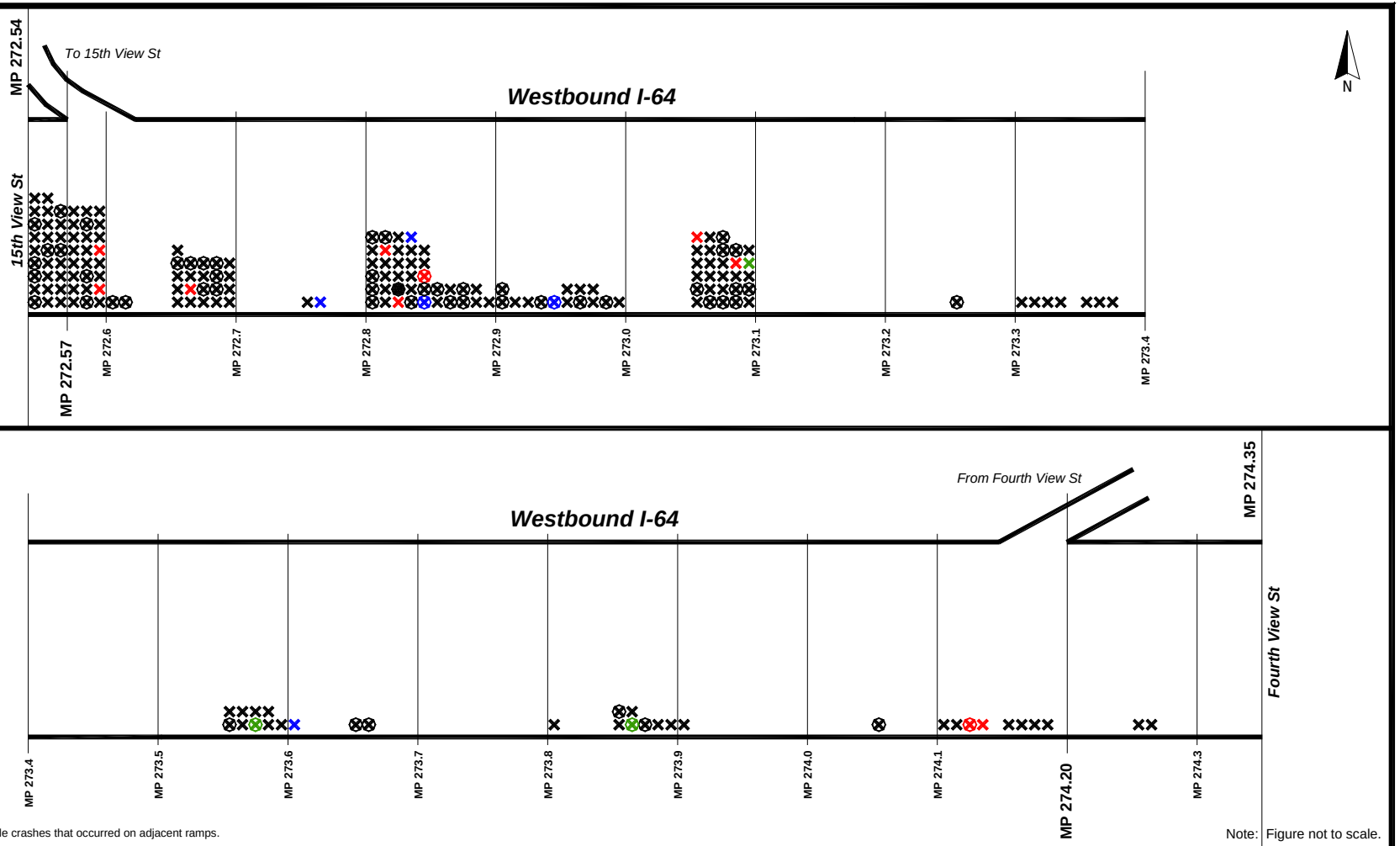
Tunnel Facility

HOV Facility

ROADWAY GEOMETRY

Westbound Interstate 64 between Fourth View St and 15th View St

SEGMENT LENGTH	**1.81 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**41,288**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**65.0**
Property Damage Only	**45.7**
Crashes with Injuries	**19.0**
Crashes with Fatalities	**0.3**
NO. OF INJURIES PER YEAR	**28.7**
NO. OF FATALITIES PER YEAR	**0.3**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.89**

LEGEND

- Crashes With Property Damage Only — **MP 286.3** Interstate Milepost
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

COLLISION DIAGRAM

Westbound Interstate 64
between Fourth View St & 15th View St

SEGMENT LENGTH	**1.81 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**41,288**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 64 Westbound

Between Fourth View Street and 15th View Street

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	68	66	61	195
PDO Crashes	47	48	42	137
INJ Crashes	21	17	19	57
FAT Crashes	0	1	0	1
Injuries	30	31	25	86
Fatalities	0	1	0	1

Segment Length (Miles)	1.81	
Average No. of Crashes Per Year	65	
Average EPDO	107	
Average EPDO Rate	3.89	
Average Daily Traffic (Westbound)	41,288	
% of crashes involving heavy vehicles - Segment		5.6%
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	94.4%	92.3%
Drinking without Impared Ability	3.6%	4.9%
Drinking - not known if impaired	0.0%	1.4%
Drinking with Impared Ability	**2.1%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	99.0%	96.4%
Obscured by rain/snow	0.5%	1.1%
Obscured by trees/hills	0.5%	0.2%
Obscured by other vehicles	0.0%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	0.0%	0.3%
Not stated	0.0%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	8.2%	17.3%
9:00am - 2:59pm	**36.4%**	27.9%
3:00pm - 6:59pm	33.8%	32.0%
7:00pm - 5:59am	21.5%	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	13.8%	14.6%
Tuesday	13.3%	13.9%
Wednesday	11.3%	14.3%
Thursday	14.4%	15.0%
Friday	**27.2%**	18.7%
Saturday	7.7%	12.6%
Sunday	12.3%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	89.2%	79.2%
Fog	0.0%	0.3%
Rain/Mist	10.8%	18.8%
Snow/Sleet	0.0%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	5.6%	26.4%
2	54.4%	50.4%
3	**27.7%**	16.5%
4	**8.2%**	4.8%
5+	**4.1%**	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	**82.1%**	53.9%
Head On	0.0%	0.3%
Side Swipe	9.2%	13.3%
Fixed Object	7.7%	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	1.0%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	4.1%	5.3%
Driver Asleep/Handicap	0.5%	3.4%
Driver Under the Influence	1.5%	4.8%
Driver Speeding	5.1%	10.7%
Driver Error	**85.1%**	67.0%
Vehicle Defective	0.0%	2.3%
Weather/Visibility	0.5%	1.1%
Road Defective	0.0%	0.0%
Road Slick	2.1%	3.8%
Not Stated	1.0%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Following too close	**43.1%**	27.8%
Driver Inattention	**12.8%**	22.9%
Exceeded safe speed but not speed limit	7.7%	11.5%
Exceeded speed limit	5.1%	9.5%
Cutting in	3.1%	4.0%
Avoiding other vehicle	1.0%	3.0%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

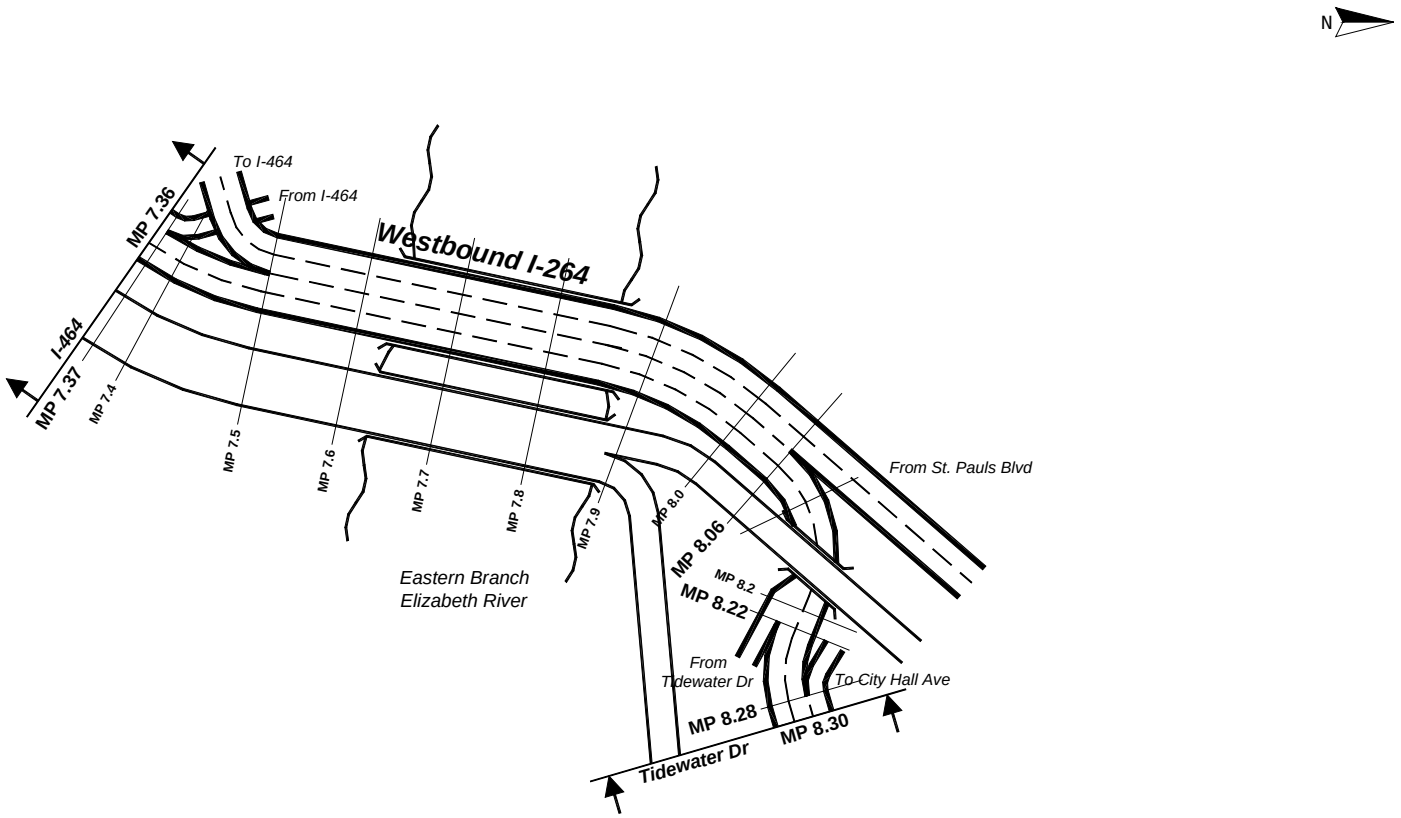
Interstate Segment:	**I-64 WB between Fourth View St & 15th View St**
Jurisdiction:	**Norfolk**
EPDO Rate per Million Vehicle Miles of Travel:	3.89
Regional Rank by EPDO Rate:	7 of 151
Number of Crashes Per Year	65.0
Number of Injuries Per Year	28.7
Number of Fatalities Per Year	0.3
Segment Average Daily Traffic	41,288

OBSERVATIONS:

- Proportion of crashes due to drinking with impaired ability (2.1%) was higher than the regionwide average of 1.4%.
- 36% of crashes occurred during the off-peak period of 9:00 am - 3:00 pm. Regionwide average number was 28%.
- Most critical day of the week was Friday representing over 20% of all crashes.
- Multi-vehicle crashes (3 or more) represented nearly one-half of the total crashes. Regionwide average was approximately 23%.
- 82% of crashes were the result of rear ends. Regional average was 53.9%.
- 85% of crashes resulted in drivers making errors and bad judgment. Regional average was 67%. Nearly one-half of all crashes were the result of following too close and driver inattention.

REMEDIES AND COUNTERMEASURES:

- This segment of I-64 remains heavily congested throughout the day and particularly during the tourist season. There are currently no capacity improvements planned or programmed for this segment of I-64 including the HRBT. Remedies will be primarily based on TDM and TSM strategies.
- An examination of the collision diagram indicates that the majority of the crashes occurred in the vicinity of the off-ramp exit at 15th View Street and the 13th View Street structure. Congestion is the major cause of all these crashes. There was also one fatality on this segment in the vicinity of 13th View Street overpass.
- Improving the real time information to motorists via variable message signs in advance of the HRBT would help divert some of the traffic to the alternate route at MMMBT or off-peak times.
- Educate the public of the dangers involved in tailgating and not paying attention when traveling on the interstate, particularly during congested time periods.
- Educate the public of the hazards of drinking and driving.



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**49.7**
Property Damage Only	**31.7**
Crashes with Injuries	**18.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**25.0**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.67**

LEGEND

Overpass — **MP 286.3** Interstate Milepost

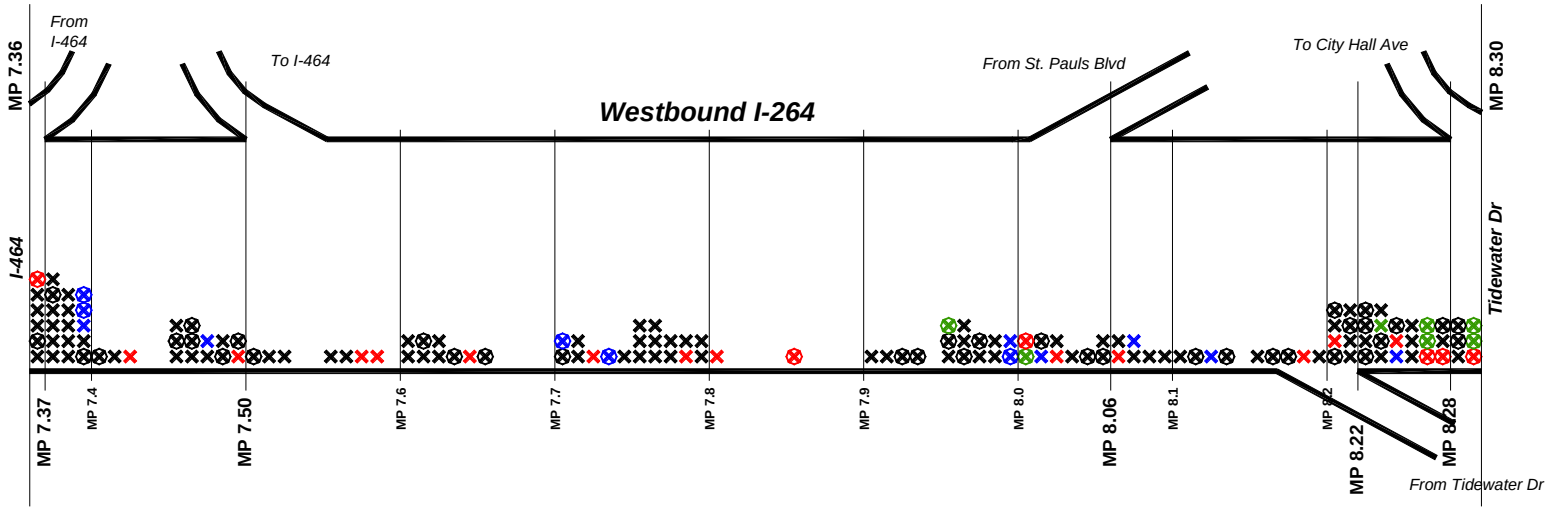
Tunnel Facility

HOV Facility

ROADWAY GEOMETRY

Westbound Interstate 264
between Tidewater Dr and I-464

SEGMENT LENGTH	**0.94 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**54,169**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**49.7**
Property Damage Only	**31.7**
Crashes with Injuries	**18.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**25.0**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.67**

LEGEND

- Crashes With Property Damage Only — **MP 286.3** Interstate Milepost
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

COLLISION DIAGRAM

Westbound Interstate 264
between Tidewater Dr & I-464

SEGMENT LENGTH	**0.94 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**54,169**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 264 Westbound

Between Tidewater Drive and I-464

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	53	44	52	149
PDO Crashes	32	32	31	95
INJ Crashes	21	12	21	54
FAT Crashes	0	0	0	0
Injuries	30	17	28	75
Fatalities	0	0	0	0

Segment Length (Miles)	0.94	
Average No. of Crashes Per Year	50	
Average EPDO	86	
Average EPDO Rate	3.67	
Average Daily Traffic (Westbound)	54,169	
% of crashes involving heavy vehicles - Segment		**12.8%**
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	92.6%	92.3%
Drinking without Impared Ability	0.7%	4.9%
Drinking - not known if impaired	**2.0%**	1.4%
Drinking with Impared Ability	**4.7%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	94.6%	96.4%
Obscured by rain/snow	1.3%	1.1%
Obscured by trees/hills	0.0%	0.2%
Obscured by other vehicles	0.0%	0.6%
Obscured by sun/glare	0.7%	0.3%
Other	0.7%	0.3%
Not stated	2.7%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	20.8%	17.3%
9:00am - 2:59pm	24.2%	27.9%
3:00pm - 6:59pm	25.5%	32.0%
7:00pm - 5:59am	**29.5%**	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	12.1%	14.6%
Tuesday	**18.1%**	13.9%
Wednesday	14.8%	14.3%
Thursday	**18.1%**	15.0%
Friday	17.4%	18.7%
Saturday	8.1%	12.6%
Sunday	11.4%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	76.5%	79.2%
Fog	0.7%	0.3%
Rain/Mist	**18.1%**	18.8%
Snow/Sleet	**4.7%**	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	23.5%	26.4%
2	55.7%	50.4%
3	14.8%	16.5%
4	5.4%	4.8%
5+	0.7%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	**54.4%**	53.9%
Head On	0.0%	0.3%
Side Swipe	16.8%	13.3%
Fixed Object	23.5%	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	5.4%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	2.7%	5.3%
Driver Asleep/Handicap	0.0%	3.4%
Driver Under the Influence	4.7%	4.8%
Driver Speeding	**12.8%**	10.7%
Driver Error	**67.8%**	67.0%
Vehicle Defective	2.0%	2.3%
Weather/Visibility	1.3%	1.1%
Road Defective	0.0%	0.0%
Road Slick	**6.7%**	3.8%
Not Stated	2.0%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Following too close	26.8%	27.8%
Driver Inattention	20.1%	22.9%
Exceeded speed limit	**13.4%**	9.5%
Exceeded safe speed but not speed limit	9.4%	11.5%
Cutting in	**6.0%**	4.0%
Hit and Run	1.3%	1.7%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

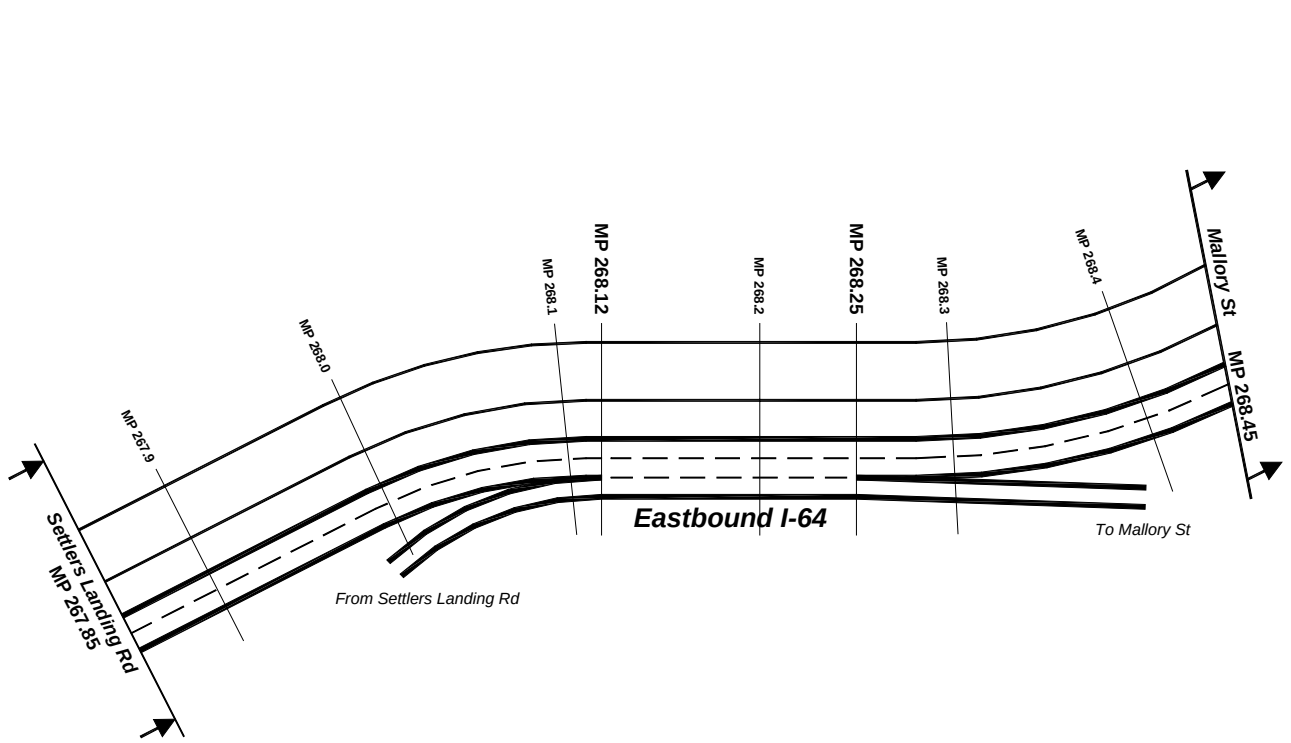
Interstate Segment:	**I-264 WB between Tidewater Dr & I-464**
Jurisdiction:	**Norfolk**
EPDO Rate per Million Vehicle Miles of Travel:	3.67
Regional Rank by EPDO Rate:	8 of 151
Number of Crashes Per Year	49.7
Number of Injuries Per Year	25.0
Number of Fatalities Per Year	0
Segment Average Daily Traffic	54,169

OBSERVATIONS:

- 13% of crashes involved heavy vehicles, which was considerably higher than the regionwide average number of 7.8%.
- 5% of all crashes involved drinking with impaired ability. This is considerably higher than the regionwide average of 1.4%.
- Crashes occurred throughout the day with slightly higher numbers after 7 pm.
- Tuesday (18%) and Thursday (18%) were most critical in terms of crash frequency.
- 18% of crashes were due to rain/mist and snow/sleet conditions.
- Over one-half of crashes were related to rear ends. Driver error, speeding and road slick were major factors causing the crashes.
- Driving over the speed limit and cutting in front of others represented higher than regionwide averages.

REMEDIES AND COUNTERMEASURES:

- This segment of I-264 remains heavily congested during the peak periods. A complex system of ramps creates major problems with merging and weaving movements on the Berkley Bridge.
- An examination of the collision diagram indicates that crashes occurred throughout the segment with more on the Berkley Bridge and approaches to the Downtown Tunnel. Weaving/merging movements and congestion were major causes for these crashes.
- There are currently no capacity improvements planned or programmed for this segment of I-264. Remedies will be primarily based on TDM and TSM strategies.
- Encourage ridesharing and other TDM Measures through the Traffix program.
- Provide VMS signs in advance of the congested area to alert drivers and divert some of the traffic to uncongested alternate route via Campostella Bridge.
- Crashes due to drinking were higher when compared to the regionwide figure. Educate the public on the hazards of drinking and driving.
- Eliminate any drainage problems.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding.
- Additional police enforcement will help deter drivers from speeding, thus reduce rear end crashes. Police enforcement will help reduce driving under the influence as well.



Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**20.7**
Property Damage Only	**13.0**
Crashes with Injuries	**7.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**11.0**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.44**

LEGEND

Overpass

Tunnel Facility

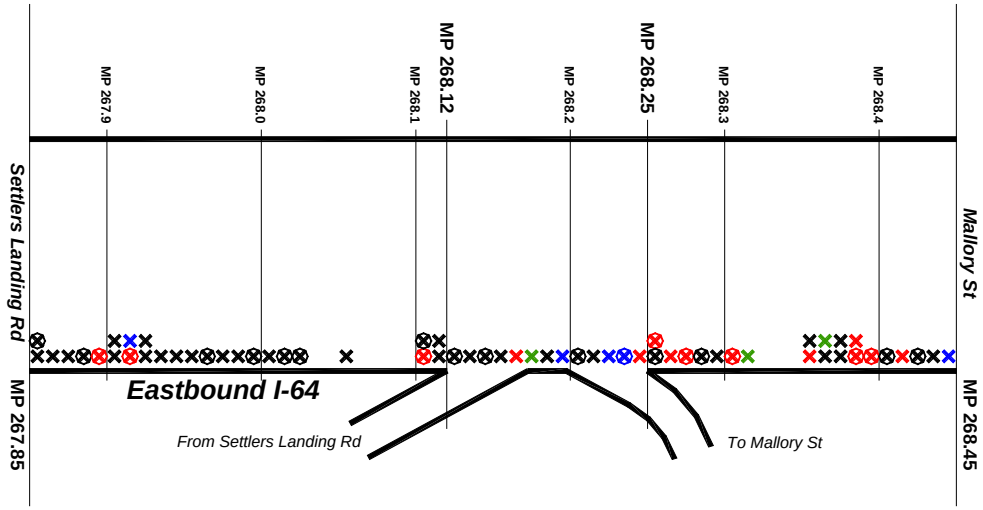
HOV Facility

MP 286.3 Interstate Milepost

ROADWAY GEOMETRY

Eastbound Interstate 64 between Settlers Landing Rd and Mallory St

SEGMENT LENGTH	**0.60 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**53,138**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**20.7**
Property Damage Only	**13.0**
Crashes with Injuries	**7.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**11.0**
NO. OF FATALITIES PER YEAR	**0.0**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.44**

LEGEND

- Crashes With Property Damage Only
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

MP 286.3 Interstate Milepost

COLLISION DIAGRAM

Eastbound Interstate 64 between Settlers Landing Rd and Mallory St

SEGMENT LENGTH	**0.60 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**53,138**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 64 Eastbound

Between Settlers Landing Road and Mallory Street

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	20	23	19	62
PDO Crashes	11	15	13	39
INJ Crashes	9	8	6	23
FAT Crashes	0	0	0	0
Injuries	10	16	7	33
Fatalities	0	0	0	0

Segment Length (Miles)	0.6	
Average No. of Crashes Per Year	21	
Average EPDO	36	
Average EPDO Rate	3.44	
Average Daily Traffic (Eastbound)	53,138	
% of crashes involving heavy vehicles - Segment		**8.1%**
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	90.3%	92.3%
Drinking without Impared Ability	4.8%	4.9%
Drinking - not known if impaired	0.0%	1.4%
Drinking with Impared Ability	**4.8%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	95.2%	96.4%
Obscured by rain/snow	3.2%	1.1%
Obscured by trees/hills	1.6%	0.2%
Obscured by other vehicles	0.0%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	0.0%	0.3%
Not stated	0.0%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	**25.8%**	17.3%
9:00am - 2:59pm	8.1%	27.9%
3:00pm - 6:59pm	29.0%	32.0%
7:00pm - 5:59am	**37.1%**	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	17.7%	14.6%
Tuesday	8.1%	13.9%
Wednesday	6.5%	14.3%
Thursday	12.9%	15.0%
Friday	21.0%	18.7%
Saturday	22.6%	12.6%
Sunday	11.3%	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	61.3%	79.2%
Fog	0.0%	0.3%
Rain/Mist	**38.7%**	18.8%
Snow/Sleet	0.0%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	27.4%	26.4%
2	43.5%	50.4%
3	**24.2%**	16.5%
4	4.8%	4.8%
5+	0.0%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	53.2%	53.9%
Head On	0.0%	0.3%
Side Swipe	8.1%	13.3%
Fixed Object	**35.5%**	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	3.2%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	3.2%	5.3%
Driver Asleep/Handicap	3.2%	3.4%
Driver Under the Influence	4.8%	4.8%
Driver Speeding	**22.6%**	10.7%
Driver Error	54.8%	67.0%
Vehicle Defective	1.6%	2.3%
Weather/Visibility	1.6%	1.1%
Road Defective	0.0%	0.0%
Road Slick	**6.5%**	3.8%
Not Stated	1.6%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Driver Inattention	21.0%	22.9%
Following too close	19.4%	27.8%
Exceeded safe speed but not speed limit	**19.4%**	11.5%
Exceeded speed limit	**11.3%**	9.5%
Cutting in	4.8%	4.0%
Avoiding other vehicle	3.2%	3.0%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

Interstate Segment:	**I-64 EB bet. Settlers Landing Rd & Mallory St**
Jurisdiction:	**Hampton**
EPDO Rate per Million Vehicle Miles of Travel:	3.44
Regional Rank by EPDO Rate:	9 of 151
Number of Crashes Per Year	20.7
Number of Injuries Per Year	11.0
Number of Fatalities Per Year	0
Segment Average Daily Traffic	53,138

OBSERVATIONS:

- 8.1% of crashes involved heavy vehicles. Regionwide average was 7.8%.
- 5% of all crashes involved drinking with impaired ability. This is considerably higher than the regionwide average of 1.4%.
- Nearly 5% of the crashes reported obstruction by rain and trees/hills. Regionwide averages were slightly over 1%.
- Higher proportions of crashes occurred during the morning peak period (6 – 9 am) and evening hours (7 pm – 6 am).
- 34% of crashes occurred during weekends. Regionwide average number was 23%.
- Rain/mist caused over one-third (38.7%) of all crashes. Regional average was 18.8%.
- Over one-half of crashes were rear ends. Driver error, speeding and road slick were major factors causing the crashes.
- Crashes involving a fixed object (35.5%) were higher than the regional average (28.2%).
- Crashes involving exceeding safe speed represented about 30% higher than regionwide averages.

REMEDIES AND COUNTERMEASURES:

- This segment of I-64 remains heavily congested during the peak periods.
- An examination of the collision diagram indicates that crashes occurred throughout the segment. Congestion and geometry are the major causes.
- Provide signs warning motorists to congestion ahead where the sight distance is limited.
- Educate the public on the hazards of drinking and driving.
- Eliminate any drainage problems.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding.
- Additional police enforcement will help deter drivers from speeding, thus reduce rear end crashes. Police enforcement will help reduce driving under the influence as well.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**23.7**
Property Damage Only	**17.3**
Crashes with Injuries	**6.0**
Crashes with Fatalities	**0.3**
NO. OF INJURIES PER YEAR	**8.7**
NO. OF FATALITIES PER YEAR	**0.3**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.12**

LEGEND

Overpass

Tunnel Facility

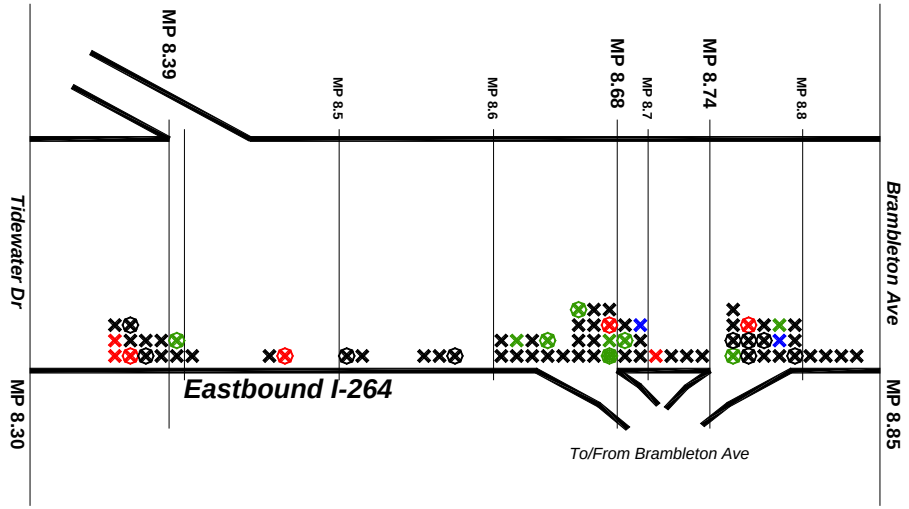
HOV Facility

MP 286.3 Interstate Milepost

ROADWAY GEOMETRY

Eastbound Interstate 264 between Tidewater Dr and Brambleton Ave

SEGMENT LENGTH	**0.55 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**50,761**



Analysis does not include crashes that occurred on adjacent ramps.

Note: Figure not to scale.

NO. OF CRASHES PER YEAR	**23.7**
Property Damage Only	**17.3**
Crashes with Injuries	**6.0**
Crashes with Fatalities	**0.3**
NO. OF INJURIES PER YEAR	**8.7**
NO. OF FATALITIES PER YEAR	**0.3**
EPDO RATE PER MILLION VEHICLE-MILES OF TRAVEL	**3.12**

LEGEND

- Crashes With Property Damage Only — **MP 286.3** Interstate Milepost
- Crashes With At Least One Injury
- Crashes With At Least One Fatality
- Crashes Where Alcohol was the Major Factor
- Crashes Where Speeding was the Major Factor
- Crashes Where Weather/Visability was the Major Factor

COLLISION DIAGRAM

Eastbound Interstate 264 between Tidewater Dr and Brambleton Ave

SEGMENT LENGTH	**0.55 miles**
SEGMENT AVERAGE DAILY TRAFFIC (2000)	**50,761**

INTERSTATE SEGMENT TRAFFIC CRASH ANALYSIS

Interstate 264 Eastbound

Between Tidewater Drive and Brambleton Avenue

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	32	21	18	71
PDO Crashes	24	13	15	52
INJ Crashes	8	7	3	18
FAT Crashes	0	1	0	1
Injuries	15	8	3	26
Fatalities	0	1	0	1

Segment Length (Miles)	0.55	
Average No. of Crashes Per Year	24	
Average EPDO	39.3	
Average EPDO Rate	3.12	
Average Daily Traffic (Eastbound)	50,761	
% of crashes involving heavy vehicles - Segment		7.0%
- Regionwide		7.8%

DRIVING UNDER INFLUENCE

Crashes with...	Segment	Regionwide
Nobody Drinking	80.3%	92.3%
Drinking without Impared Ability	2.8%	4.9%
Drinking - not known if impaired	**2.8%**	1.4%
Drinking with Impared Ability	**14.1%**	1.4%

DRIVER VISION

Crashes with...	Segment	Regionwide
No vision obscured	97.2%	96.4%
Obscured by rain/snow	0.0%	1.1%
Obscured by trees/hills	0.0%	0.2%
Obscured by other vehicles	1.4%	0.6%
Obscured by sun/glare	0.0%	0.3%
Other	1.4%	0.3%
Not stated	0.0%	1.1%

TIME OF DAY

Time of Day	Segment	Regionwide
6:00am - 8:59am	4.2%	17.3%
9:00am - 2:59pm	**33.8%**	27.9%
3:00pm - 6:59pm	25.4%	32.0%
7:00pm - 5:59am	**36.6%**	22.8%

DAY OF THE WEEK

Day of Week	Segment	Regionwide
Monday	8.5%	14.6%
Tuesday	12.7%	13.9%
Wednesday	**23.9%**	14.3%
Thursday	18.3%	15.0%
Friday	5.6%	18.7%
Saturday	**15.5%**	12.6%
Sunday	**15.5%**	10.9%

WEATHER

Weather	Segment	Regionwide
Clear/Cloudy	80.3%	79.2%
Fog	0.0%	0.3%
Rain/Mist	18.3%	18.8%
Snow/Sleet	1.4%	1.4%
Other/Not Stated	0.0%	0.3%

NUMBER OF VEHICLES

Vehicles Per Crash	Segment	Regionwide
1	40.8%	26.4%
2	53.5%	50.4%
3	4.2%	16.5%
4	1.4%	4.8%
5+	0.0%	1.9%

CRASH TYPE

Crash Type	Segment	Regionwide
Rear End	31.0%	53.9%
Head On	0.0%	0.3%
Side Swipe	**16.9%**	13.3%
Fixed Object	**46.5%**	28.2%
Pedestrian	0.0%	0.1%
Animal	0.0%	0.4%
Other	5.6%	3.8%

MAJOR FACTORS

Major Factors	Segment	Regionwide
Miscellaneous	5.6%	5.3%
Driver Asleep/Handicap	1.4%	3.4%
Driver Under the Influence	**14.1%**	4.8%
Driver Speeding	9.9%	10.7%
Driver Error	59.2%	67.0%
Vehicle Defective	**4.2%**	2.3%
Weather/Visibility	2.8%	1.1%
Road Defective	0.0%	0.0%
Road Slick	0.0%	3.8%
Not Stated	2.8%	1.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Segment	Regionwide
Driver Inattention	28.2%	22.9%
Exceeded safe speed but not speed limit	**23.9%**	11.5%
Following too close	14.1%	27.8%
Exceeded speed limit	4.4%	9.5%
Cutting in	2.7%	4.0%
Avoiding other vehicle	2.2%	3.0%

Interstate Segment Traffic Crash Analysis Summary (1998-2000)

Interstate Segment:	**I-264 EB bet. Tidewater Dr & Brambleton Ave**
Jurisdiction:	**Norfolk**
EPDO Rate per Million Vehicle Miles of Travel:	3.12
Regional Rank by EPDO Rate:	10 of 151
Number of Crashes Per Year	23.7
Number of Injuries Per Year	8.7
Number of Fatalities Per Year	0.3
Segment Average Daily Traffic	50,761

OBSERVATIONS:

- The data showed one fatality over the 3-year period. The crash was located at the EB off-ramp to Brambleton Ave and alcohol was the major factor.
- 14% of all crashes involved drinking with impaired ability. This is considerably higher than the regionwide average of 1.4%.
- 34% and 37% of crashes occurred during the off-peak times of 9 am – 3 pm and after 7 pm, respectively.
- Crashes were higher on Wednesday and weekends when compared to regionwide averages.
- Major types of crashes were fixed object (46.5%) and sideswipe (17%). Both of these numbers were higher than the regionwide averages.
- Major factors contributing to crashes were driver error, driver under the influence, speeding and vehicle defective.
- Driver inattention and exceeding safe speed were among most prevalent driver actions.

REMEDIES AND COUNTERMEASURES:

- Educate the public on the hazards of drinking and driving.
- Increase police enforcement, which will help reduce driving under the influence. Police enforcement will also deter drivers from speeding, thus reduce rear end crashes.
- Eliminate any obstruction and physical barriers.
- Educate motorists to maintain and inspect vehicles on a regular basis.

INTERSECTION CRASH ANALYSIS

PICTURE 9 – Intersection safety has become a priority throughout the country.

This section provides a detailed crash analysis for the top intersection by EPDO crash rate and the top intersection by number of crashes (1998 – 2000 data) for each Hampton Roads jurisdiction as determined from Part 2 of the *Hampton Roads Regional Safety Study*[7]. In Part 2, three methods were used to identify high-crash locations: Crash Frequency Method (Crashes per year), Crash Rate Method, and Crash Severity Method (EPDO Crash Rate). For this analysis, the Crash Frequency Method and the Crash Severity Method were used to select the top high-crash intersections for the analysis (see **Table 3** below). For crash frequency, all intersections in each jurisdiction (approximately 13,000 regionwide) were studied and ranked. For crash severity, only Congestion Management System (CMS) intersections (approximately 500 intersections regionwide) were studied and ranked. Any intersection where at least three or more legs of the intersection were regional CMS roadways was identified as a CMS intersection. CMS is a federal requirement for all metropolitan areas with a population over 200,000.

TABLE 3 - Top High-Crash Intersections in Hampton Roads (1998 – 2000)

Chesapeake	
Top Crash	Battlefield Blvd at Volvo Pkwy
Top EPDO	Dominion Blvd at Cedar Rd
Gloucester	
Top Crash	Guinea Rd at George Washington Hwy
Top EPDO	same
Hampton	
Top Crash	Coliseum Dr at Mercury Blvd
Top EPDO	LaSalle Ave at Settlers Landing Rd
Isle of Wight	
Top Crash	Brewers Neck at Carrollton Blvd
Top EPDO	same
James City	
Top Crash	Richmond Rd at Lightfoot Rd
Top EPDO	John Tyler Hwy at Centerville Rd
Newport News	
Top Crash	Jefferson Ave at Oyster Point Rd
Top EPDO	Briarfield Rd at Chestnut Ave
Norfolk	
Top Crash	Newtown Rd at Virginia Beach Blvd
Top EPDO	Ocean View Ave at Fourth View St

Poquoson	
Top Crash	Victory Blvd at Wythe Creek Rd
Top EPDO	same
Portsmouth	
Top Crash	George Washington Hwy at Victory Blvd
Top EPDO	same
Suffolk	
Top Crash	Constance Rd at Main St
Top EPDO	Godwin Blvd at Kings Hwy
Virginia Beach	
Top Crash	Lynnhaven Pkwy at Princess Anne Rd
Top EPDO	Pacific at 22nd St
Williamsburg	
Top Crash	Jamestown Rd at Route 199
Top EPDO	Capitol Landing Rd at Bypass Rd
York	
Top Crash	Rochambeau Dr at Route 143
Top EPDO	Route 132 at Route 143

7 Hampton Roads Planning District Commission, *Hampton Roads Regional Safety Study, Part 2: Interstate and Intersection Crash Findings*, Report T03-05, May 2003.

Included in this section are intersection location maps, roadway geometry diagrams, collision diagrams, and crash data summaries for each jurisdiction's intersection with the top number of crashes and the top EPDO crash rate. These details and summaries enabled observations to be made about existing crash problems. From this analysis, remedies and countermeasures for each intersection are provided. It is important to note that the recommendations listed may only be part of the solution to a host of problems; more in-depth analysis and field observations may be necessary in determining overall solutions. For some jurisdictions, the same intersection had both the top number of crashes and the highest EPDO crash rate; in these cases only one intersection was analyzed.

A discussion of Crash Frequency and Crash Severity (EPDO Crash Rate) from Part 2 of this study is located below. Only crashes that occurred within 250 feet of each intersection were included in the analysis.

Crash Frequency

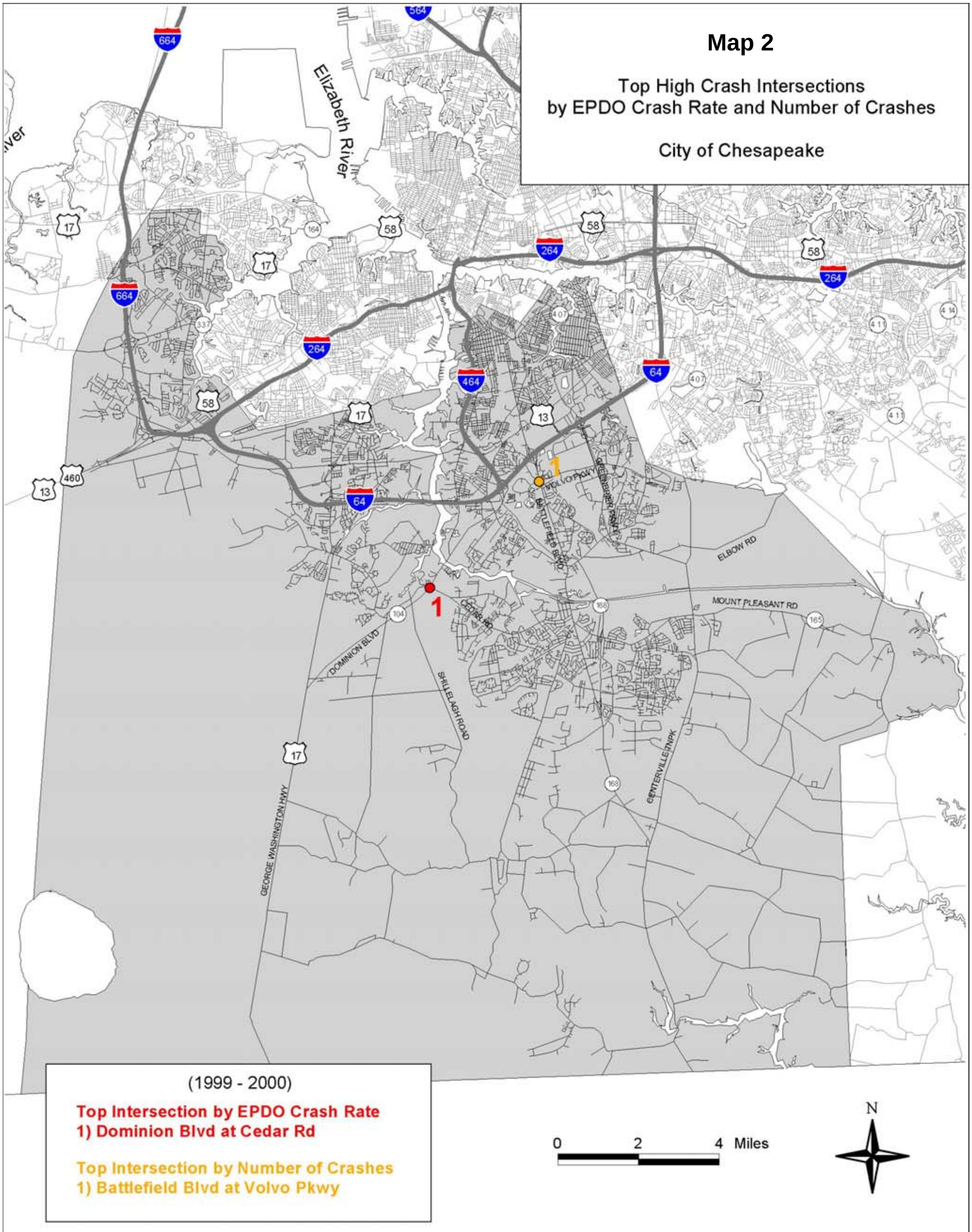
For this study, the number of crashes was averaged over the three year time period of 1998 to 2000 in each jurisdiction. For jurisdictions that only had two years of data available, those years were averaged. It is important to note that the crash frequency method does not take into account the varying amounts of traffic at each intersection. For this reason, the crash frequency method tends to rank a high-volume intersection as a high-crash location. This method also fails to account for the severity of the crashes involved. Crash frequency is useful for selecting initial lists of hazardous intersection locations. However, once these locations are identified, details of the crash data and other methods that incorporate factors such as number of injuries, number of fatalities, traffic volumes, signalized versus non-signalized intersections, roadway class, etc. should be used in the evaluation.

Crash Severity (EPDO Crash Rate)

The EPDO crash rate for the intersection analysis uses the same EPDO calculation from the interstate section (page 16) and accounts for the amount of travel that passes through each intersection. For this study, the EPDO crash rate for intersections is expressed per million entering vehicles (MEV) and is computed as follows:

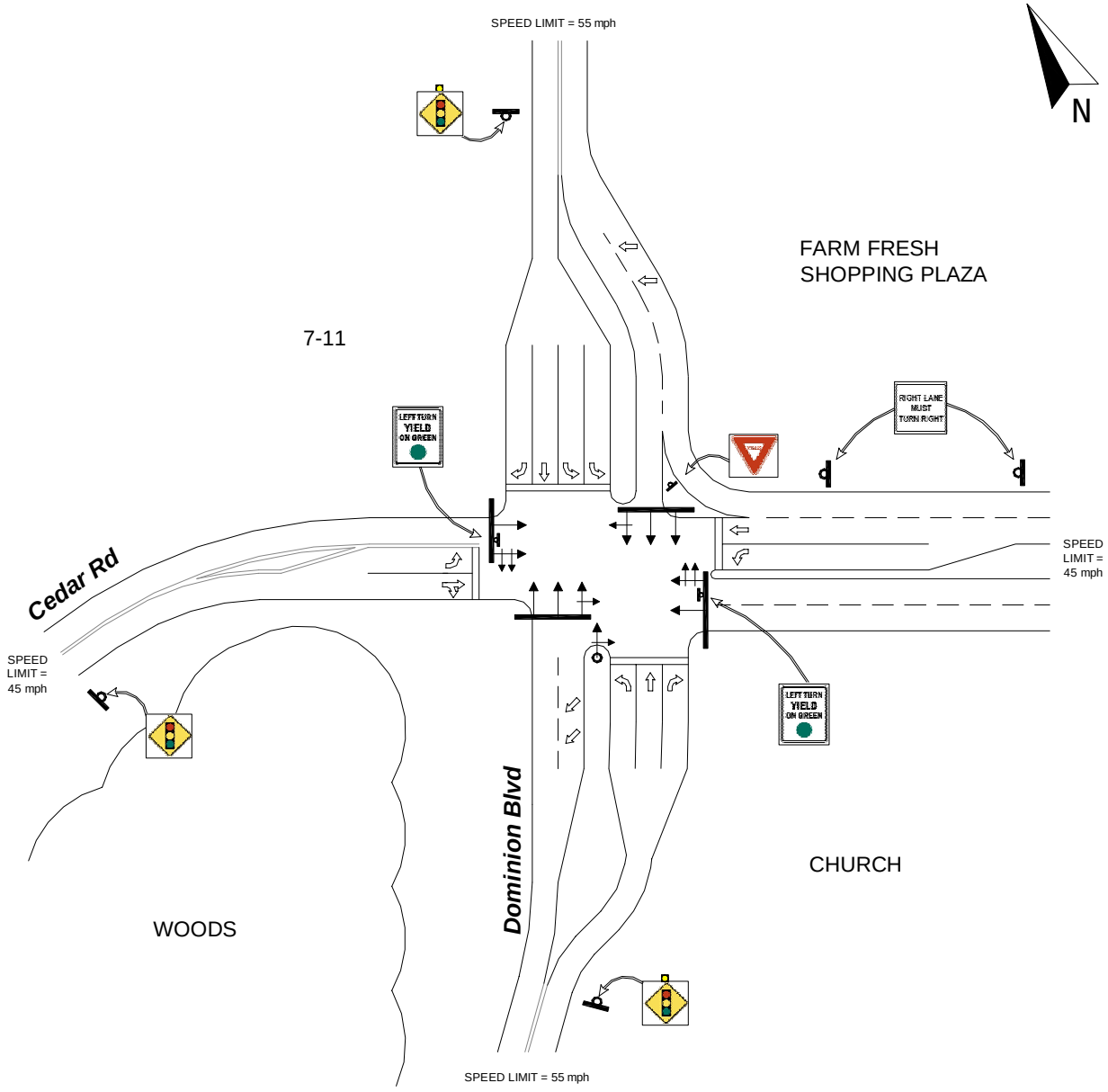
$$\text{EPDO Crash Rate} = \frac{1{,}000{,}000 \times \text{Yearly EPDO}}{365 \times \text{Daily Vehicles Entering Intersection (DVEI)}}$$

For this study, DVEI is estimated by summing the Average Daily Traffic (ADT) volumes for all legs of the intersection and dividing by two. DVEI was only tabulated for the CMS intersections.



Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation

EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Cedar Rd at Dominion Blvd
City of Chesapeake

LEGEND

CROSSWALK

SIDEWALK

SIGN

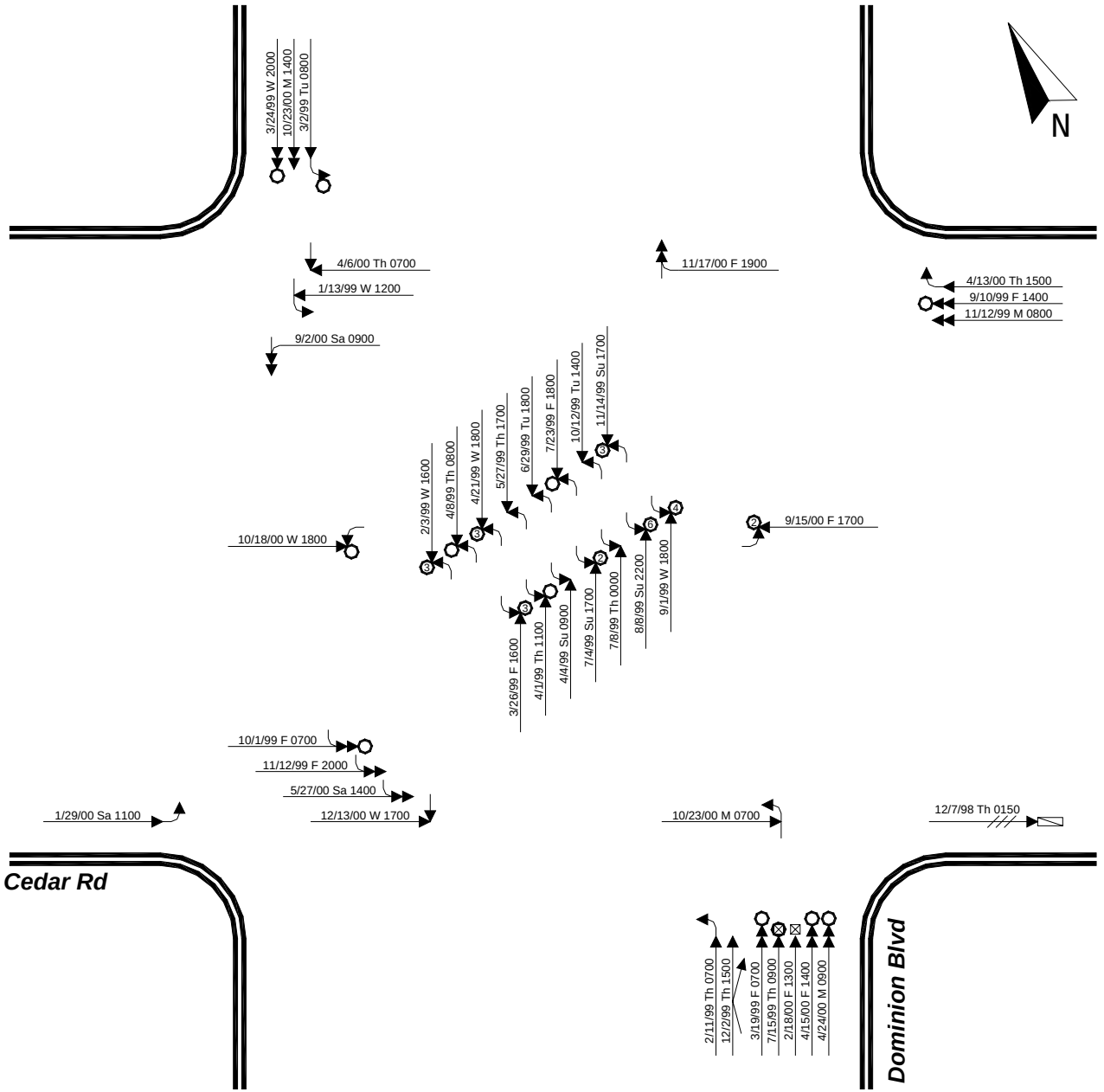
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

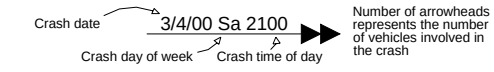
Cedar Rd at Dominion Blvd
City of Chesapeake

Analysis includes crashes within 250 feet of the intersection from **1999 to 2000**.

NO. OF CRASHES PER YEAR	**22.0**
Property Damage Only	**12.0**
Crashes with Injuries	**10.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**19.0**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**32,619**

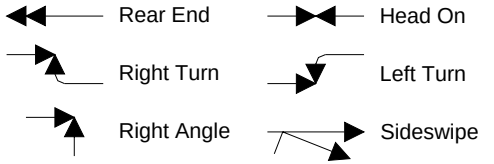
NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE



INTERSECTION TRAFFIC CRASH ANALYSIS

Cedar Rd at Dominion Blvd

City of Chesapeake

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes		27	17	44
PDO Crashes		11	13	24
INJ Crashes		16	4	20
FAT Crashes		0	0	0
Injuries		33	5	38
Fatalities		0	0	0

Average Number of Crashes	22	
Average EPDO	42.0	
Average EPDO Rate	3.53	
Volume Entering Intersection	32,619	
% of crashes involving heavy vehicles - Segment		**10.0%**
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	97.7%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	2.3%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	85.0%	83.8%
Obscured by rain/snow	**5.0%**	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	2.5%	4.5%
Obscured by sun/glare	2.5%	1.3%
Other	5.0%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	**20.5%**	11.4%
9:00 - 14:59	33.3%	35.4%
15:00 - 18:59	**35.9%**	29.9%
19:00 - 5:59	10.3%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	11.4%	14.2%
Tuesday	9.1%	14.8%
Wednesday	13.6%	14.7%
Thursday	**25.0%**	15.2%
Friday	**25.0%**	17.2%
Saturday	6.8%	14.0%
Sunday	9.1%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	88.6%	80.5%
Fog	0.0%	0.4%
Rain/Mist	11.4%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**41.5%**	18.5%
Driver Inattention	**19.5%**	17.8%
Following too close	9.8%	15.7%
Hit and run	4.9%	4.6%
Exceeded speed limit	2.4%	2.3%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	22.7%	40.6%
Right Angle	**59.1%**	39.5%
Head On	0.0%	2.1%
Side Swipe	13.6%	7.7%
Fixed Object	4.5%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**19.5%**
Type #2 	**17.1%**
Type #3 	9.8%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	2.5%	3.9%
Driver Speeding	2.5%	1.8%
Driver Error	75.0%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	**17.5%**	6.4%
Road Defective	2.5%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1999-2000)

Intersection: Cedar Rd at Dominion Blvd
Jurisdiction: City of Chesapeake

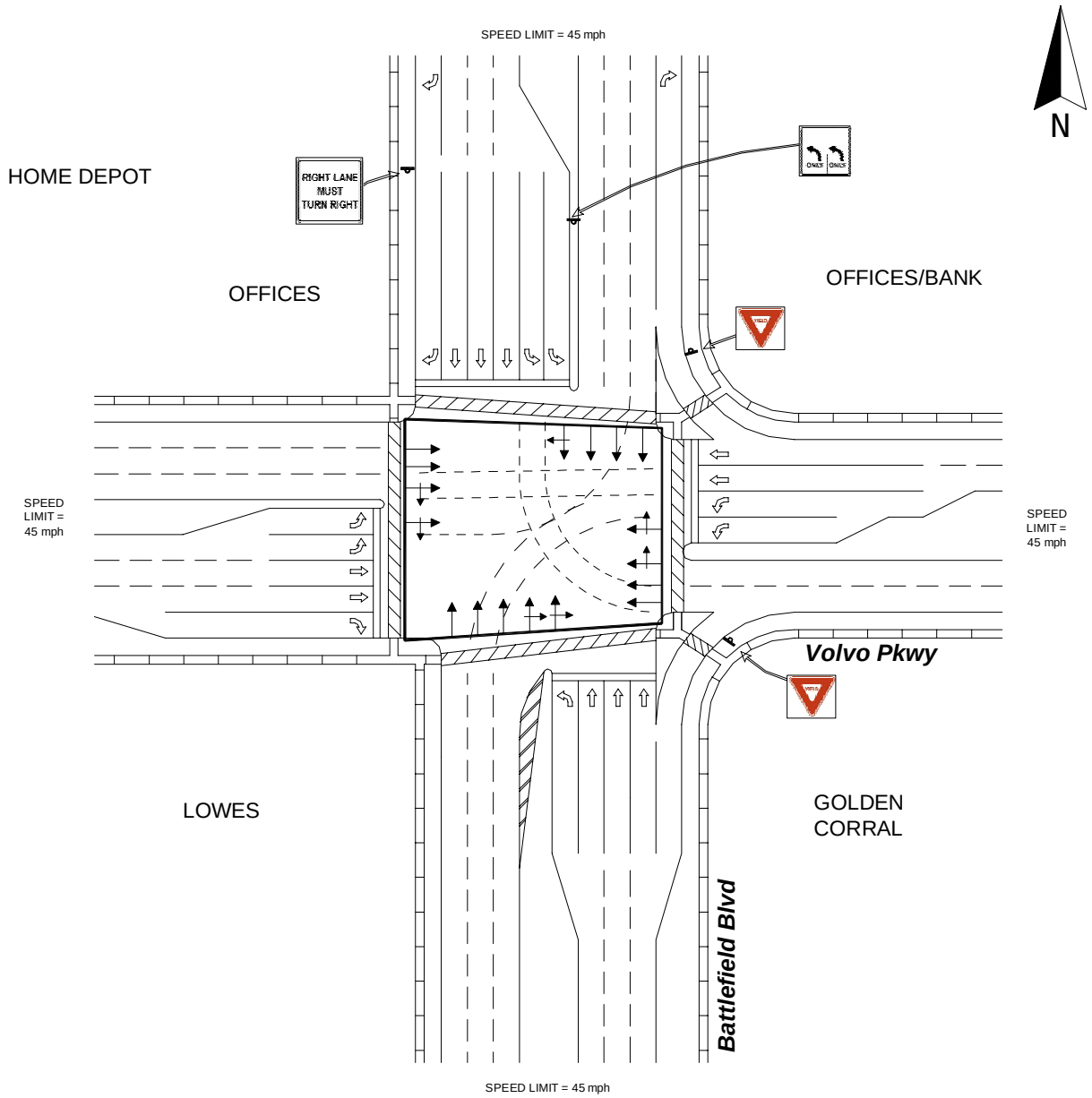
EPDO Rate per Million Entering Vehicles:	3.53
Regional Rank by EPDO Rate:	29 of 468
Number of Crashes Per Year	22.0
Number of Injuries Per Year	19.0
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	32,619

OBSERVATIONS:

- 10% of crashes involved heavy vehicles for this intersection. Regional average was 5.3%.
- 5% of crashes had driver vision that was obscured by rain/snow. Regional average was 3.1%.
- A majority of the crashes occurred during the morning (20.5% during 6 – 9 am) and afternoon (35.9% during 3 – 7 pm) peak travel periods. Regional averages for AM and PM peak periods were 11.4% and 29.9%, respectively.
- 25% of crashes occurred on Thursday, while the regional average was 15.2%.
- 25% of crashes occurred on Friday, while the regional average was 17.2%.
- 59.1% of crashes were the result of right angles collisions. Regional average was 39.5%.
- Weather/visibility was the major factor involved in 17.5% of the crashes. Regional average was 6.4%.
- The primary crash movement and type was northeast bound left-turning vehicles with southwest bound through vehicles on Dominion Blvd (19.5%). The second highest movement was southwest bound left-turning vehicles with northeast through vehicles on Dominion Blvd (17.1%). It is important to note that all of these crashes occurred in 1999. Late 1999/early 2000, the City added a double left southbound on Dominion Blvd and changed the phasing from protected/permissive to protected only for both northbound and southbound approaches. This has significantly reduced the number of left turn accidents on Dominion Blvd. By adding the dual left turn lanes for the southbound approach, the capacity was increased and the number of rear end crashes due to congestion was reduced as well.
- 41.5% of crashes were the result of drivers not having the right-of-way. Regional average was 18.5%.
- 19.5% of crashes were the result of the driver inattention. Regional average was 17.8%.

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage, as some crashes are the result of rain, snow, or mist conditions.
- Educate the public about yielding right-of-way and overall intersection safety.
- Review signal timings (Dominion Blvd may have been operating with permitted left-turns in 1999, which led to a majority of the crashes).



ROADWAY GEOMETRY

Battlefield Blvd at Volvo Pkwy
City of Chesapeake

LEGEND

CROSSWALK

SIDEWALK

SIGN

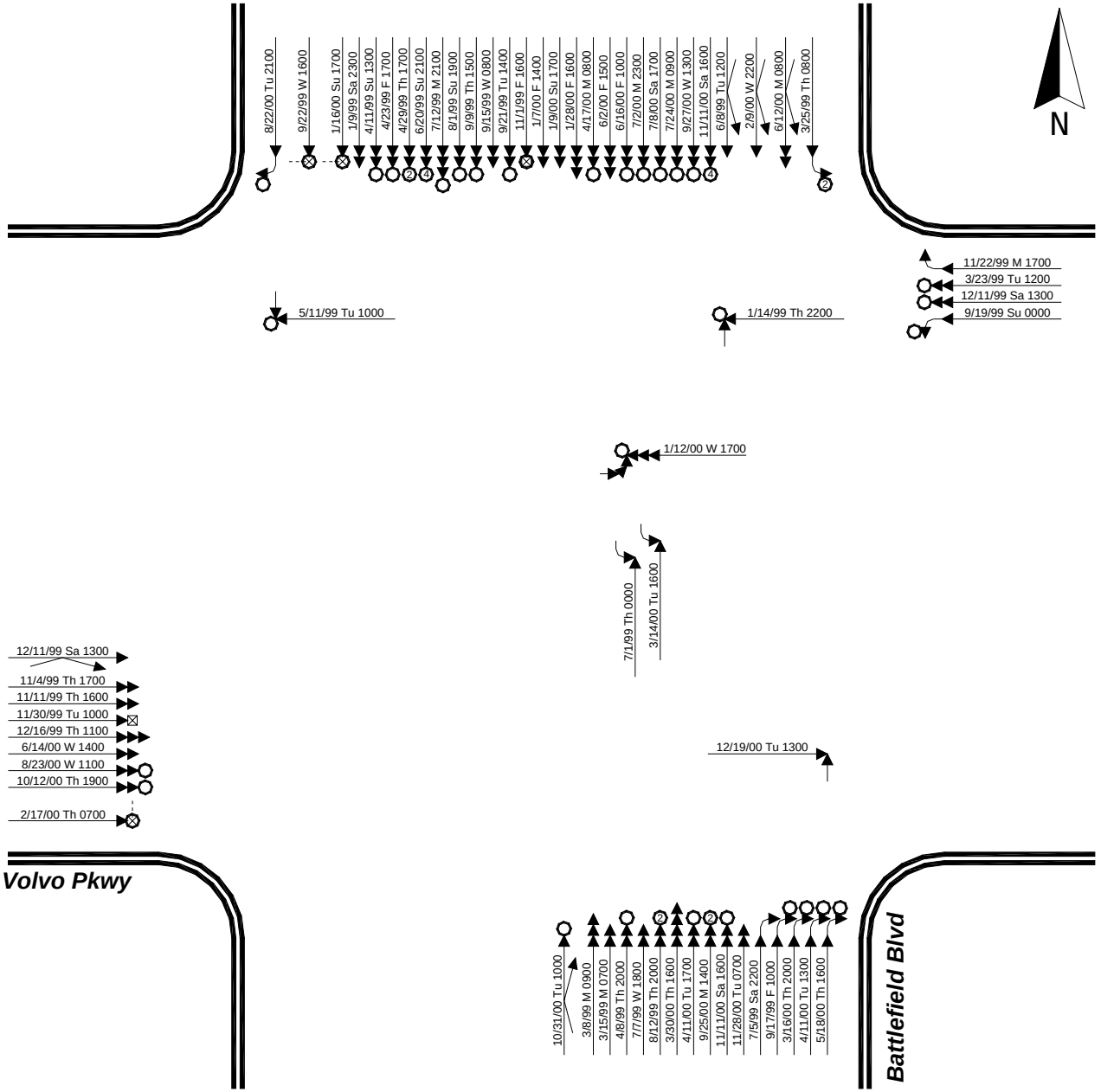
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

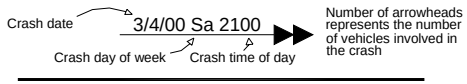
Battlefield Blvd at Volvo Pkwy
City of Chesapeake

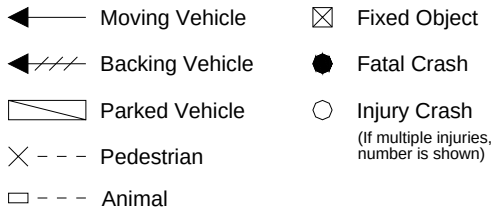
Analysis includes crashes within 250 feet of the intersection from **1999 to 2000**.

NO. OF CRASHES PER YEAR	**35.5**
Property Damage Only	**16.0**
Crashes with Injuries	**19.5**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**24.5**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**71,846**

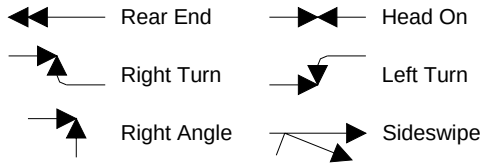
NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND





COLLISION TYPE



INTERSECTION TRAFFIC CRASH ANALYSIS

Battlefield Blvd at Volvo Pkwy

City of Chesapeake

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes		37	34	71
PDO Crashes		18	14	32
INJ Crashes		19	20	39
FAT Crashes		0	0	0
Injuries		25	24	49
Fatalities		0	0	0

Average Number of Crashes	35.5	
Average EPDO	74.5	
Average EPDO Rate	2.84	
Volume Entering Intersection	71,846	
% of crashes involving heavy vehicles - Segment		**7.7%**
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	96.9%	92.8%
Drinking without Impared Ability	3.1%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	0.0%	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	95.4%	83.8%
Obscured by rain/snow	1.5%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	1.5%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	1.5%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	10.9%	11.4%
9:00 - 14:59	32.8%	35.4%
15:00 - 18:59	32.8%	29.9%
19:00 - 5:59	23.4%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	14.1%	14.2%
Tuesday	16.9%	14.8%
Wednesday	14.1%	14.7%
Thursday	**23.9%**	15.2%
Friday	11.3%	17.2%
Saturday	11.3%	14.0%
Sunday	8.5%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	73.8%	80.5%
Fog	0.0%	0.4%
Rain/Mist	**26.2%**	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver Inattention	**36.9%**	17.8%
Following too close	**33.8%**	15.7%
Disregarded stop - go light	4.6%	5.4%
Cutting in	3.1%	90.0%
Did not have ROW	3.1%	18.5%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**73.2%**	40.6%
Right Angle	8.5%	39.5%
Head On	1.4%	2.1%
Side Swipe	8.5%	7.7%
Fixed Object	1.4%	7.1%
Pedestrian	5.6%	1.4%
Animal	0.0%	0.2%
Other	1.4%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**34.8%**
Type #2 	15.6%
Type #3 	9.4%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	1.6%	2.7%
Driver Asleep/Handicap	3.1%	1.8%
Driver Under the Influence	1.6%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	89.1%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	3.1%	6.4%
Road Defective	0.0%	0.2%
Road Slick	1.6%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1999-2000)

Intersection: Battlefield Blvd at Volvo Pkwy
Jurisdiction: City of Chesapeake

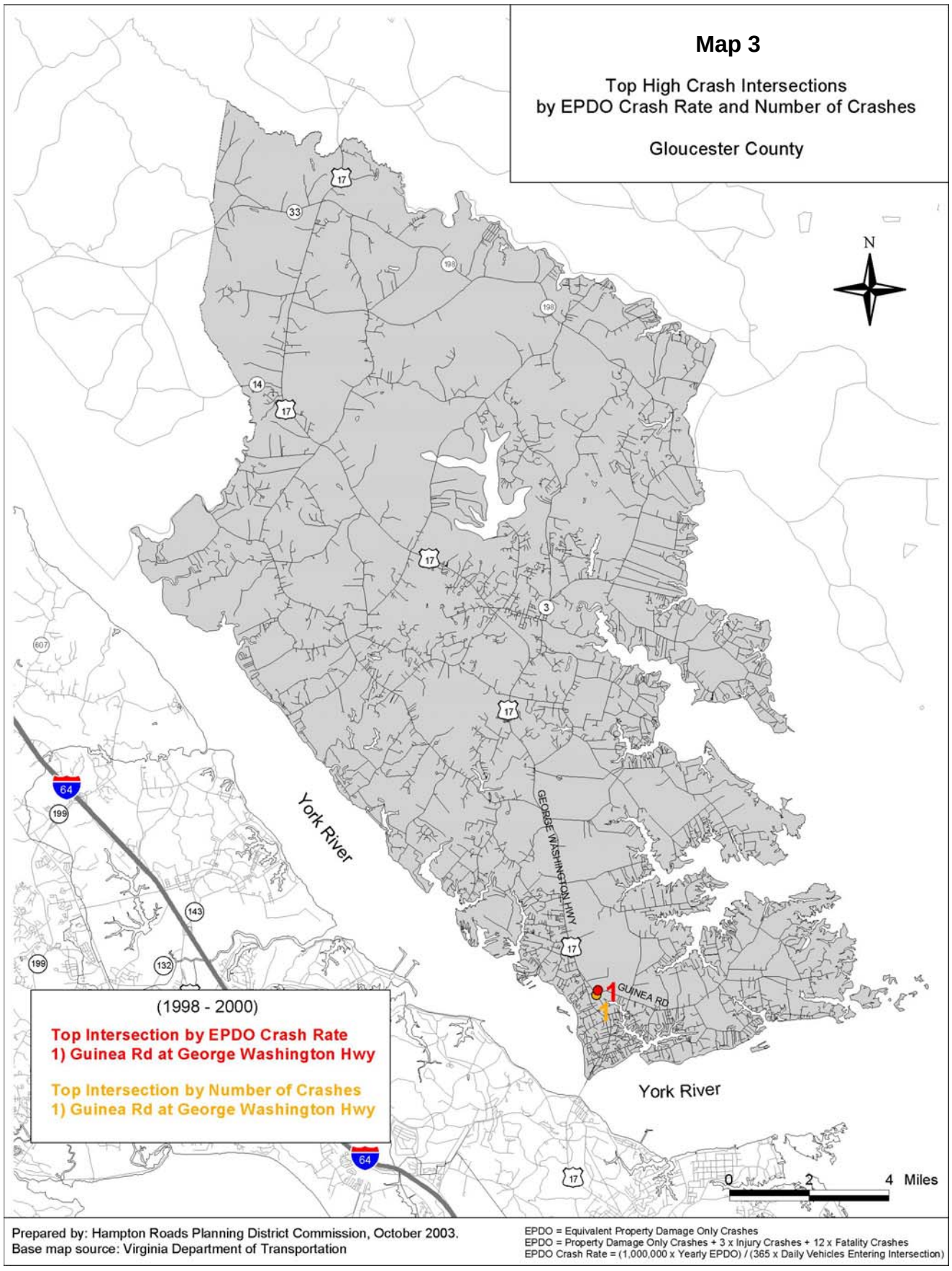
EPDO Rate per Million Entering Vehicles:	2.84
Regional Rank by EPDO Rate:	57 of 468
Number of Crashes Per Year	35.5
Number of Injuries Per Year	24.5
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	71,846

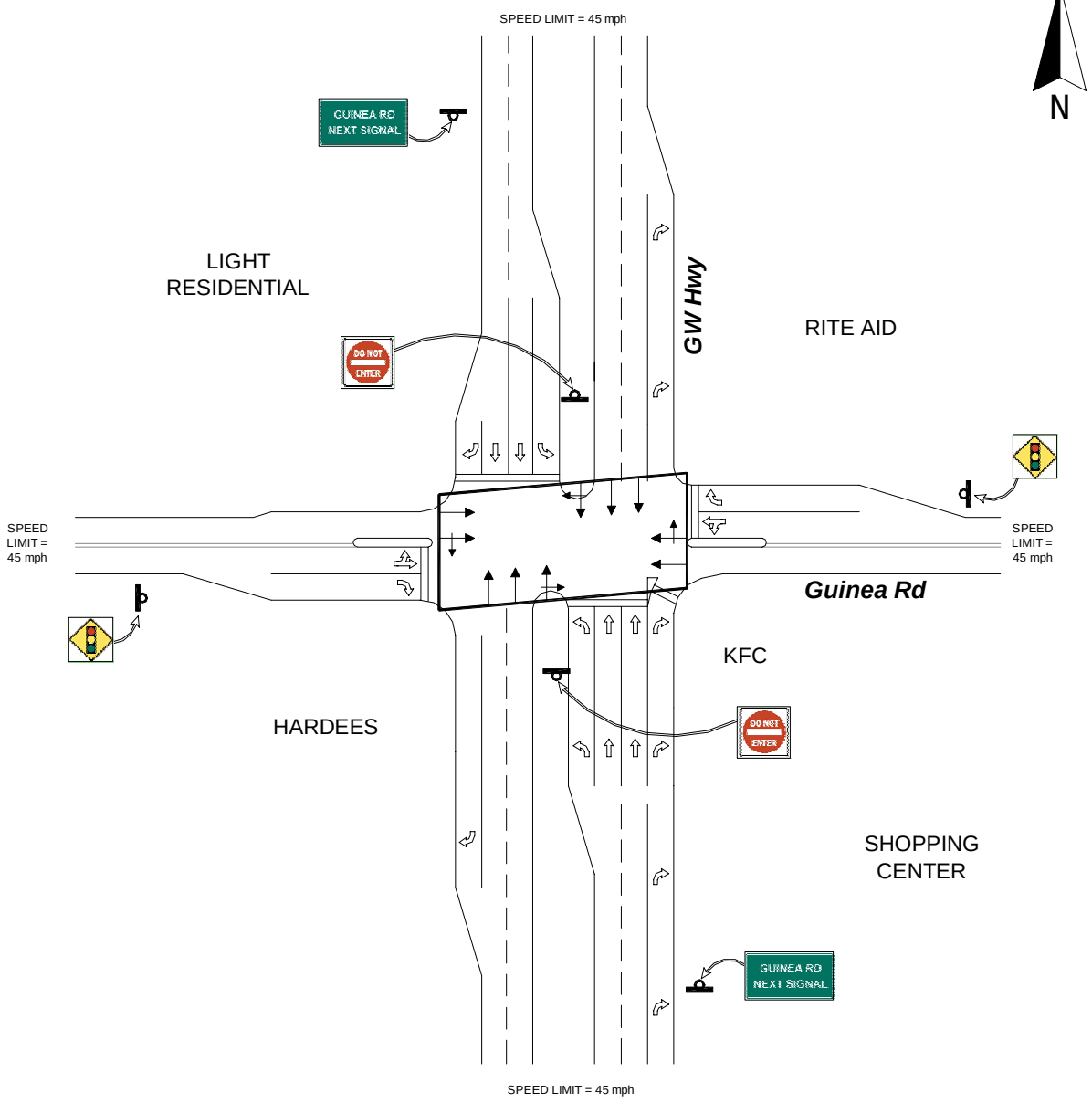
OBSERVATIONS:

- 7.7% of crashes involved heavy vehicles for this intersection. Regional average was 5.3%.
- 23.9% of crashes occurred on Thursday, while the regional average was 15.2%.
- A high percentage of crashes occurred during rain/mist (26.2%). Regional average was 17.8%.
- 73.2% of crashes were the result of rear ends. Regional average was 40.6%.
- The primary crash movement and type were rear ends traveling southbound on Battlefield Blvd (34.8%).
- 36.9% of crashes were the result of driver inattention. Regional average was 17.8%.
- 33.8% of crashes were the result of the drivers following too close. Regional average was 15.7%.

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage, as many crashes are the result of rear ends and are occurring during rain or mist conditions.
- Educate the public of the dangers involved in following too close and not paying attention when traveling through a busy intersection.
- Police enforcement will help deter drivers from tailgating, thus reduce rear end crashes.
- Ensure that signal heads are large enough to provide maximum visibility for drivers approaching the intersection.
- Review signal clearance times at the intersection.


Map 3
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
Gloucester County
N
York River
GEORGE WASHINGTON HWY
GUINEA RD
York River
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) Guinea Rd at George Washington Hwy
Top Intersection by Number of Crashes
1) Guinea Rd at George Washington Hwy
0 2 4 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Guinea Rd at George Washington Hwy
Gloucester County

LEGEND

CROSSWALK

SIDEWALK

SIGN

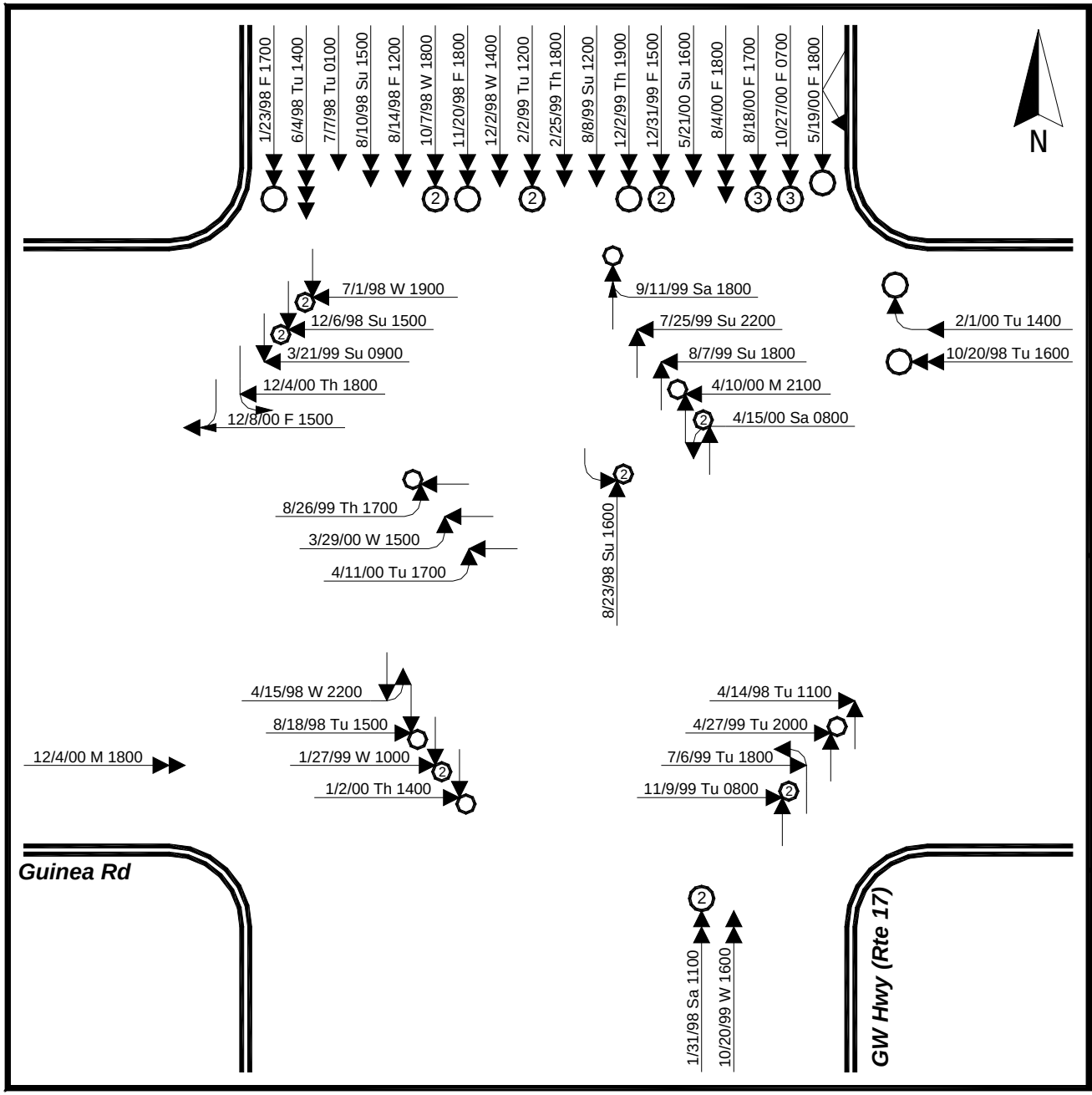
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

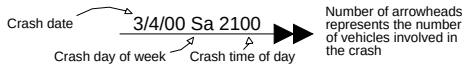
Guinea Rd at George Washington Hwy
Gloucester County

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**15.0**
Property Damage Only	**6.3**
Crashes with Injuries	**8.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**13.3**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**34,899**

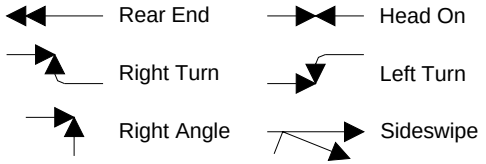
NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE



INTERSECTION TRAFFIC CRASH ANALYSIS

Guinea Rd at George Washington Hwy

Gloucester County

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	16	16	13	45
PDO Crashes	7	7	5	19
INJ Crashes	9	9	8	26
FAT Crashes	0	0	0	0
Injuries	14	13	13	40
Fatalities	0	0	0	0

Average Number of Crashes	15	
Average EPDO	32.3	
Average EPDO Rate	2.54	
Volume Entering Intersection	34,899	
% of crashes involving heavy vehicles - Segment		4.4%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	93.3%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	2.2%	1.3%
Drinking with Impared Ability	4.4%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	84.4%	83.8%
Obscured by rain/snow	2.2%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	4.4%	4.5%
Obscured by sun/glare	2.2%	1.3%
Other	6.7%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	6.7%	11.4%
9:00 - 14:59	24.4%	35.4%
15:00 - 18:59	**53.3%**	29.9%
19:00 - 5:59	15.6%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	4.4%	14.2%
Tuesday	22.2%	14.8%
Wednesday	15.6%	14.7%
Thursday	13.3%	15.2%
Friday	20.0%	17.2%
Saturday	6.7%	14.0%
Sunday	17.8%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	77.8%	80.5%
Fog	0.0%	0.4%
Rain/Mist	**22.2%**	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Disregarded stop-go light	**33.3%**	5.4%
Following too close	**22.2%**	15.7%
Driver Inattention	15.6%	17.8%
Did not have ROW	15.6%	18.5%
Exceeded speed limit	4.4%	2.3%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	46.7%	40.6%
Right Angle	**48.9%**	39.5%
Head On	0.0%	2.1%
Side Swipe	2.2%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	0.0%	1.4%
Animal	2.2%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**40.0%**
Type #2 	11.1%
Type #3 	11.1%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	2.2%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	4.4%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	82.2%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	**11.1%**	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

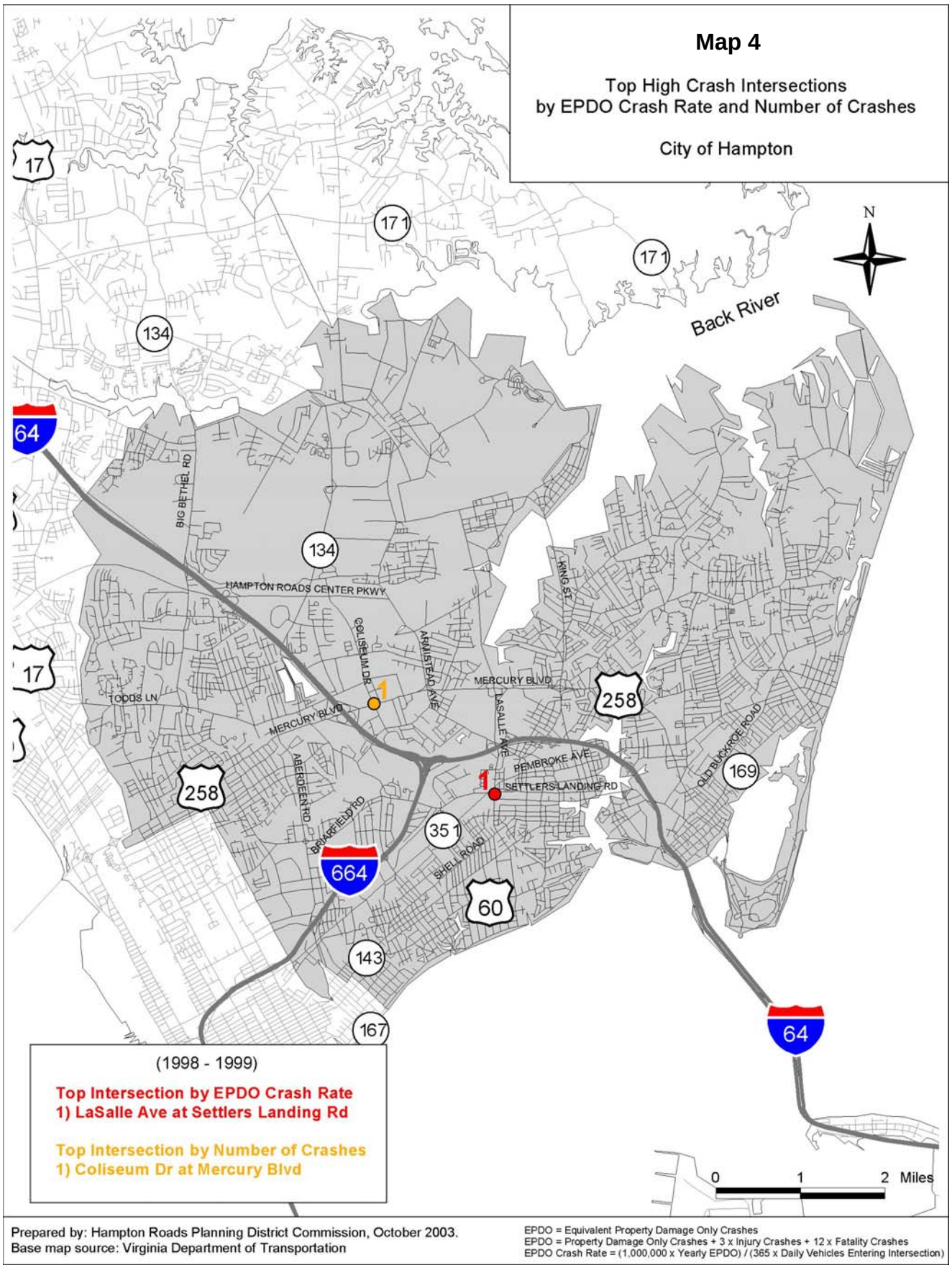
Intersection:	**Guinea Rd at George Washington Hwy**
Jurisdiction:	**Gloucester County**
EPDO Rate per Million Entering Vehicles:	2.54
Regional Rank by EPDO Rate:	80 of 468
Number of Crashes Per Year	15.0
Number of Injuries Per Year	13.3
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	34,899

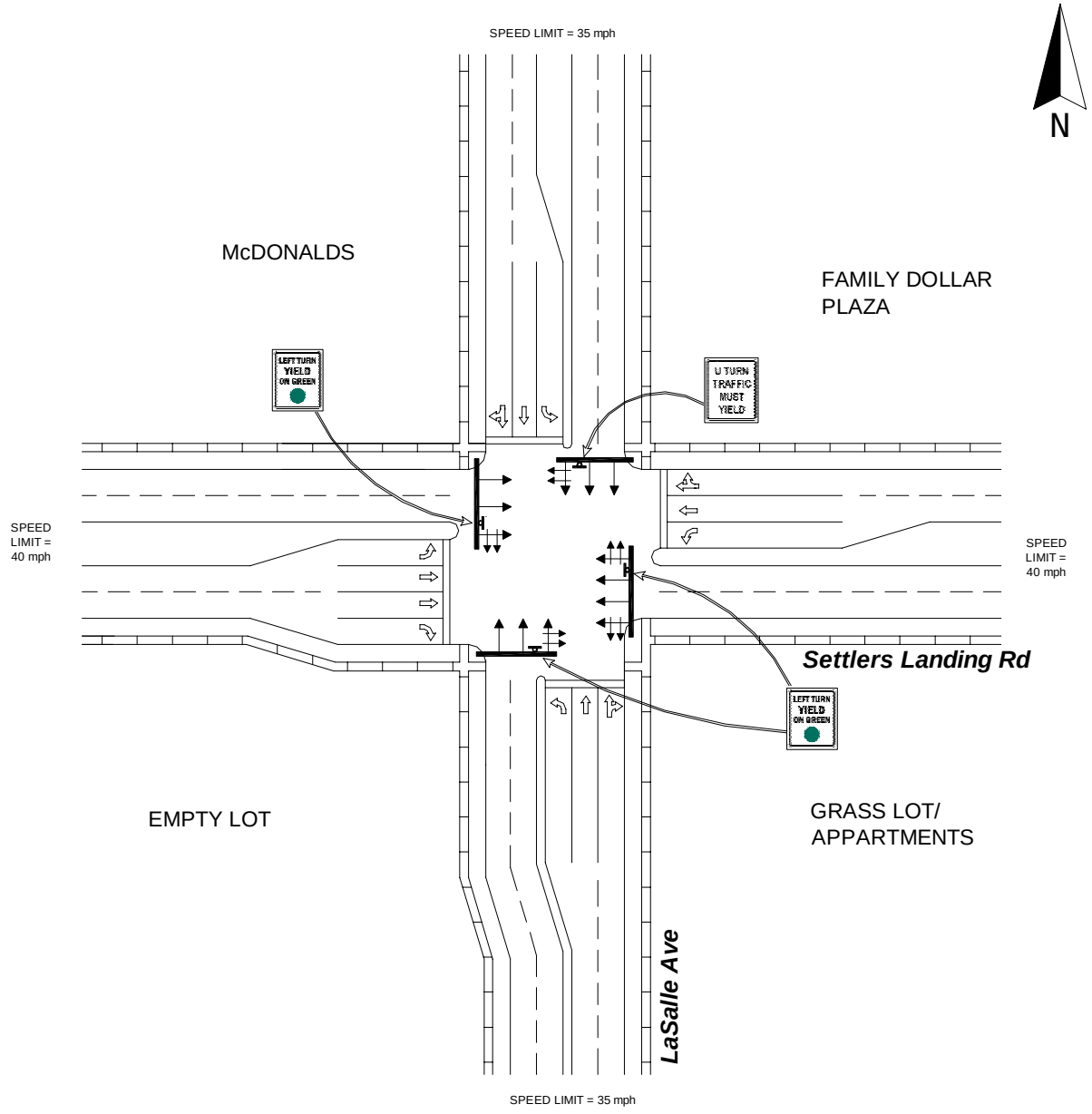
OBSERVATIONS:

- 53.3% of crashes occurred during the afternoon peak period (3 – 7pm). Regional average was 29.9%.
- A high percentage of crashes occurred during rain/mist (22.2%). Regional average was 17.8%. Weather/visibility was the major factor involved for 11.1% of all crashes, while the regional average was 6.4%.
- Many crashes (33.3%) were the result of drivers disregarding stop-go lights. Regional average was 5.4%.
- Crashes resulting from following too close were 22.2%, while the regional average was 15.7%.
- 40% of all crashes were rear ends traveling southbound on George Washington Hwy.
- Another prominent crash type was right angle (48.9%). Regional average was 39.5%. Even though right angle crashes occurred often, there was no predominant direction and crash movement.

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage as many crashes are occurring during rain or mist.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close. Drivers need to slow down during these conditions.
- Consider the use of automated safety enforcement, such as red-light cameras, to guard against crashes resulting from red-light running.
- Review signal clearance times at the intersection.
- Add flashers and 'Signal Ahead' sign north of the intersection for the southbound approach along George Washington Highway to reduce rear end crashes. If crashes continue, rumble strips may be needed.


Map 4
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
City of Hampton
N
Back River
17
171
134
64
BIG BETHEL RD
HAMPTON ROADS CENTER PKWY
COLISEUM DR
ARMISTEAD AVE
MERCURY BLVD
TODDS LN
LASALLE AVE
KING ST
258
PEMBROKE AVE
SETTLERS LANDING RD
OLD BUCKROE ROAD
169
ABERDEEN RD
BRIARFIELD RD
351
664
SHELL ROAD
60
143
167
(1998 - 1999)
Top Intersection by EPDO Crash Rate
1) LaSalle Ave at Settlers Landing Rd
Top Intersection by Number of Crashes
1) Coliseum Dr at Mercury Blvd
0 1 2 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

LaSalle Ave at Settlers Landing Rd
City of Hampton

LEGEND

CROSSWALK

SIDEWALK

SIGN

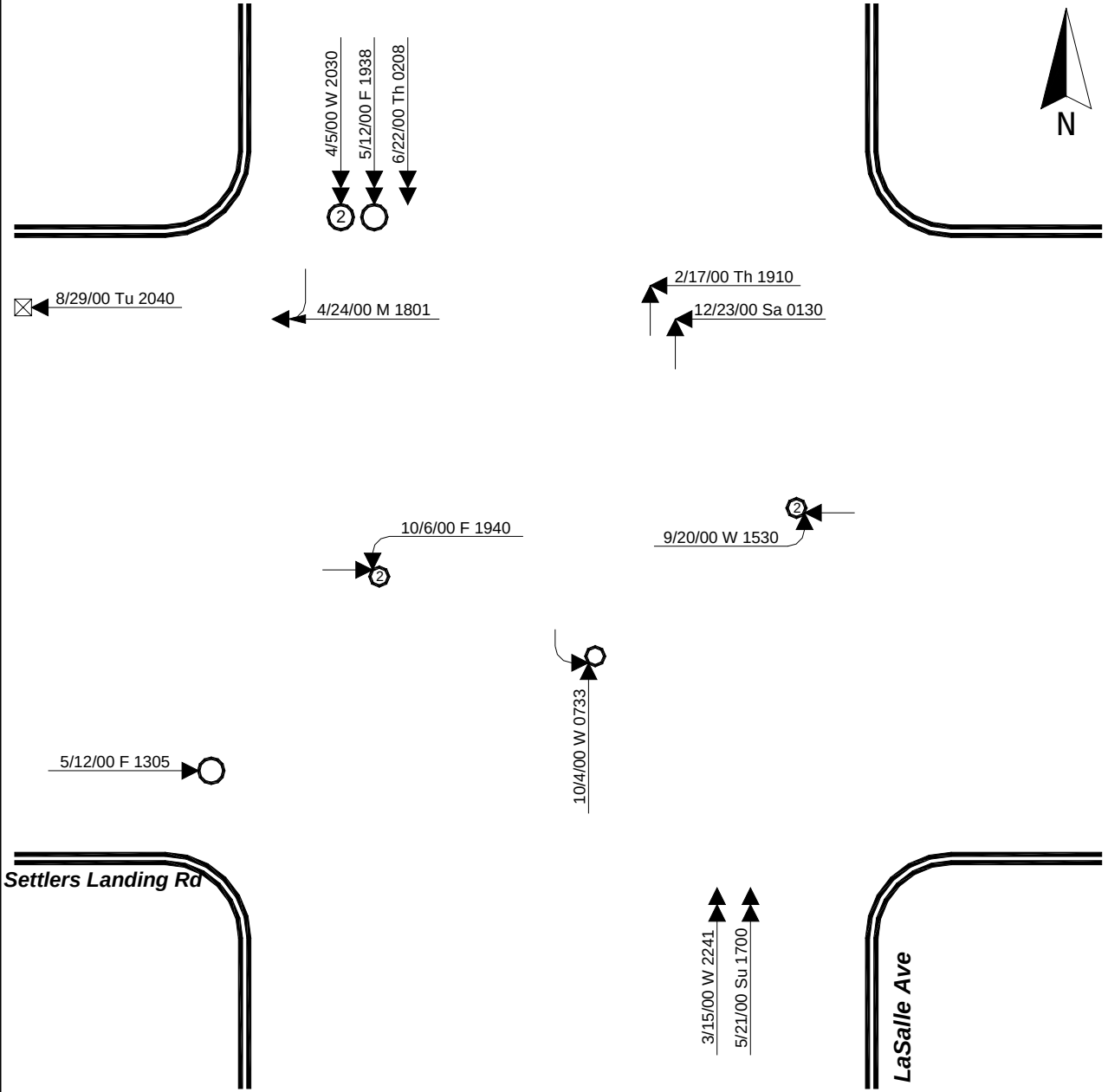
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

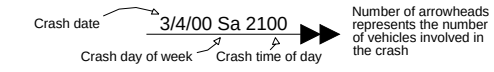
LaSalle Ave at Settlers Landing Rd
City of Hampton

The collision diagram includes crashes within 250 feet of the intersection for the year **2000**. The data below includes data from **1998-1999**.

NO. OF CRASHES PER YEAR	**33.0**
Property Damage Only	**20.0**
Crashes with Injuries	**13.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**24.5**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**24,663**

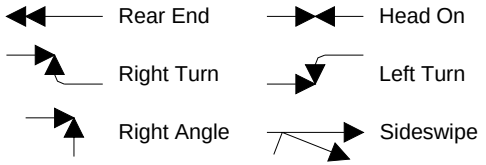
NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE



INTERSECTION TRAFFIC CRASH ANALYSIS

LaSalle Ave at Settlers Landing Rd

City of Hampton

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	35	31		66
PDO Crashes	19	21		40
INJ Crashes	16	10		26
FAT Crashes	0	0		0
Injuries	30	19		49
Fatalities	0	0		0

Average Number of Crashes	33	
Average EPDO	59	
Average EPDO Rate	6.55	
Volume Entering Intersection	24,663	
% of crashes involving heavy vehicles - Segment		0.0%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	84.6%	92.8%
Drinking without Impared Ability	7.7%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	7.7%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	100.0%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	0.0%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	7.7%	11.4%
9:00 - 14:59	7.7%	35.4%
15:00 - 18:59	23.1%	29.9%
19:00 - 5:59	**61.5%**	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	7.7%	14.2%
Tuesday	7.7%	14.8%
Wednesday	**30.8%**	14.7%
Thursday	15.4%	15.2%
Friday	23.1%	17.2%
Saturday	7.7%	14.0%
Sunday	7.7%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	92.3%	80.5%
Fog	0.0%	0.4%
Rain/Mist	7.7%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver inattention	23.1%	17.8%
Did not have ROW	15.4%	18.5%
Following too close	15.4%	15.7%
Hit and run	15.4%	4.6%
Other improper turning	7.7%	1.8%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	38.5%	40.6%
Right Angle	46.1%	39.5%
Head On	7.7%	2.1%
Side Swipe	0.0%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	7.7%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**23.1%**
Type #2 	**15.4%**
Type #3 	**15.4%**

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	7.7%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	92.3%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	0.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-1999)

Intersection: LaSalle Ave at Settlers Landing Rd
Jurisdiction: City of Hampton

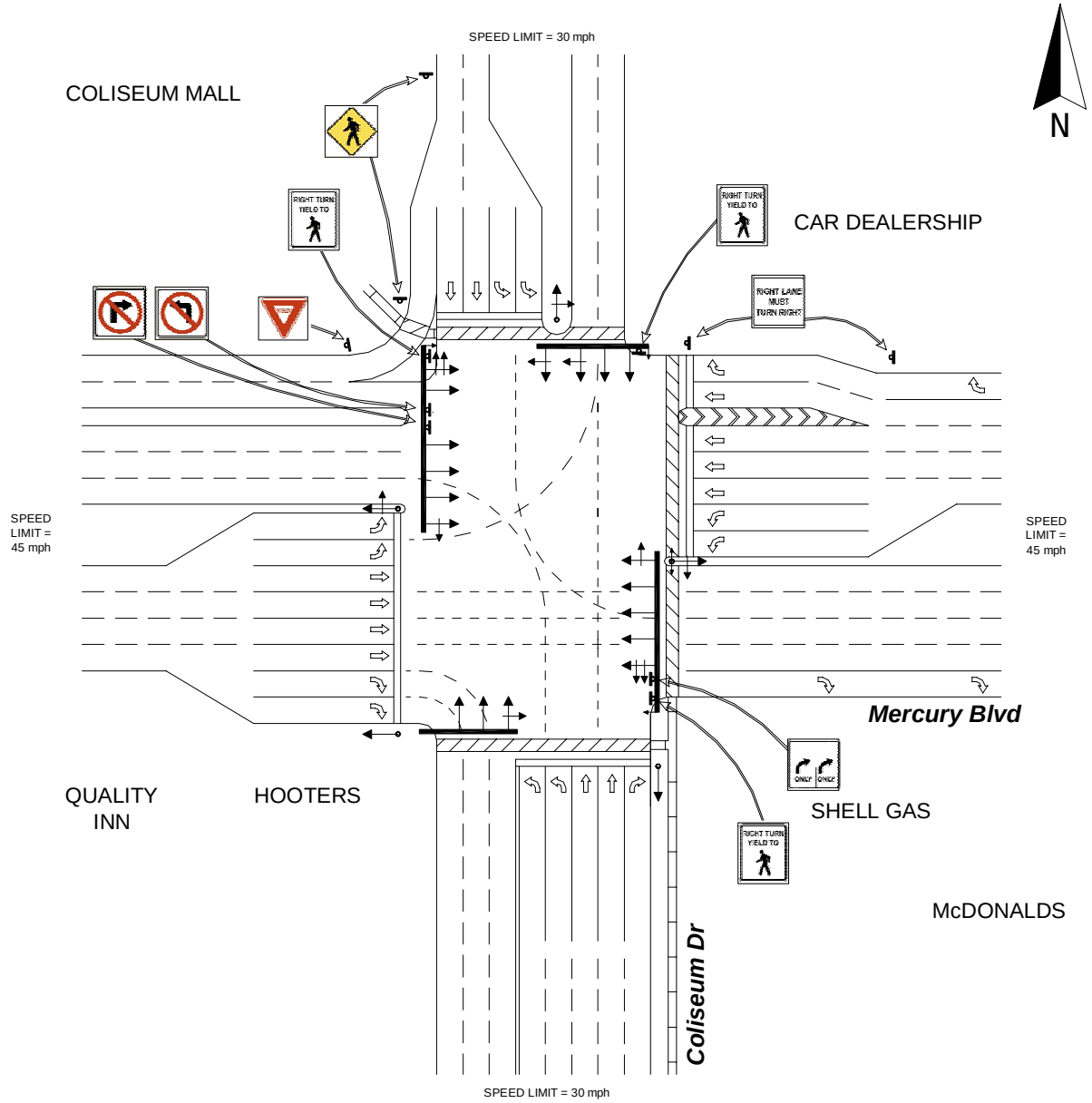
EPDO Rate per Million Entering Vehicles:	6.55
Regional Rank by EPDO Rate:	1 of 468
Number of Crashes Per Year	33.0
Number of Injuries Per Year	24.5
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	24,663

OBSERVATIONS:

- 61.5% of crashes occurred between 7 pm and 6 am, while the regional average was 23.3%. Only 7.7% of crashes occurred between 9 am and 3 pm, well below the regional average of 35.4%.
- 30.8% of crashes occurred on Wednesday, while the regional average was 14.7%.
- The primary crash movement and type were rear ends traveling southbound on LaSalle Ave (23.1%).
- 23.1% of crashes were the result of driver inattention. Regional average was 17.8%.
- It appears that a majority of crashes were the result of following too close, driver inattention, and drivers not having the right of way.
- There was no apparent trend in the patterns of traffic crashes at the intersection during the year 2000.
- There does not appear to be any deficiencies in signage or the roadway geometry at the intersection.

REMEDIES AND COUNTERMEASURES:

- Further analysis shows that most of the crashes listed in the database as occurring at this intersection in fact occurred in the vicinity, but not at the intersection.
- Review signal clearance times at the intersection.



ROADWAY GEOMETRY

Coliseum Dr at Mercury Blvd
City of Hampton

LEGEND

CROSSWALK

SIDEWALK

SIGN

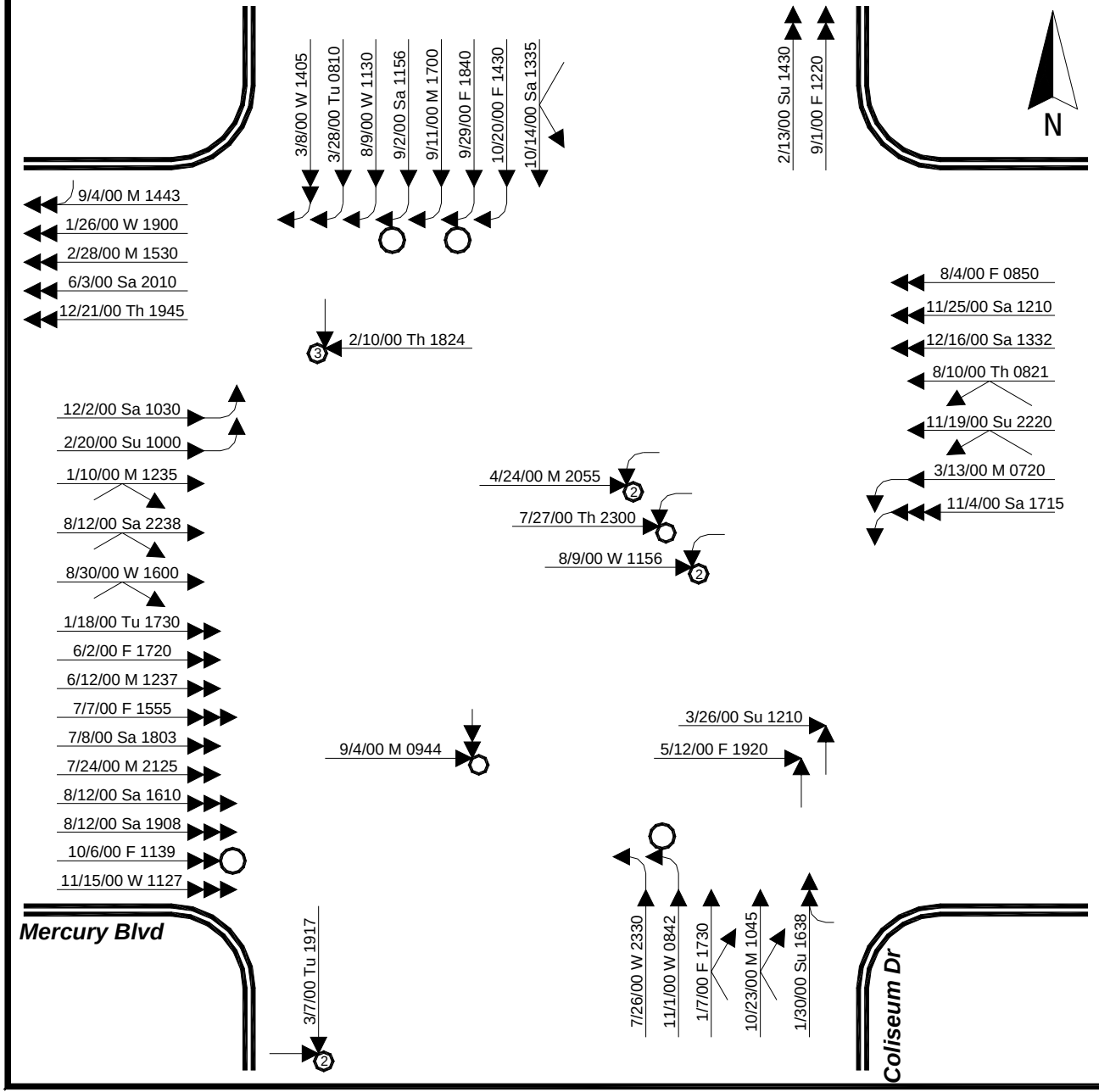
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

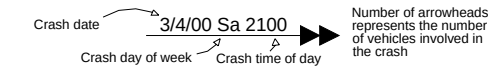
Coliseum Dr at Mercury Blvd
City of Hampton

The collision diagram includes crashes within 250 feet of the intersection for the year **2000**. The data below includes data from **1998-1999**.

NO. OF CRASHES PER YEAR	**62.5**
Property Damage Only	**46.5**
Crashes with Injuries	**16.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**26.0**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**57,320**

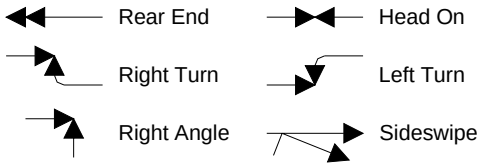
NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE



INTERSECTION TRAFFIC CRASH ANALYSIS

Coliseum Dr at Mercury Blvd

City of Hampton

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	63	62		125
PDO Crashes	42	51		93
INJ Crashes	21	11		32
FAT Crashes	0	0		0
Injuries	33	19		52
Fatalities	0	0		0

Average Number of Crashes	62.5	
Average EPDO	94.5	
Average EPDO Rate	4.52	
Volume Entering Intersection	57,320	
% of crashes involving heavy vehicles - Segment		2.0%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	98.0%	92.8%
Drinking without Impared Ability	2.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	0.0%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	96.0%	83.8%
Obscured by rain/snow	2.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	0.0%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	2.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	10.0%	11.4%
9:00 - 14:59	**40.0%**	35.4%
15:00 - 18:59	26.0%	29.9%
19:00 - 5:59	24.0%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	20.0%	14.2%
Tuesday	6.0%	14.8%
Wednesday	16.0%	14.7%
Thursday	8.0%	15.2%
Friday	18.0%	17.2%
Saturday	**22.0%**	14.0%
Sunday	10.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	78.0%	80.5%
Fog	2.0%	0.4%
Rain/Mist	18.0%	17.8%
Snow/Sleet	2.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Following too close	**48.7%**	15.7%
Disregarded signal	**10.3%**	5.4%
Driver inattention	7.7%	17.8%
Other improper turning	7.7%	4.6%
Cutting in	5.1%	1.8%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**48.0%**	40.6%
Right Angle	40.0%	39.5%
Head On	2.0%	2.1%
Side Swipe	8.0%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	2.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**24.0%**
Type #2 	**14.0%**
Type #3  (beyond the intersection)	**8.0%**

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	0.0%	3.9%
Driver Speeding	2.0%	1.8%
Driver Error	94.0%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	2.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	2.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-1999)

Intersection: Coliseum Dr at Mercury Blvd
Jurisdiction: City of Hampton

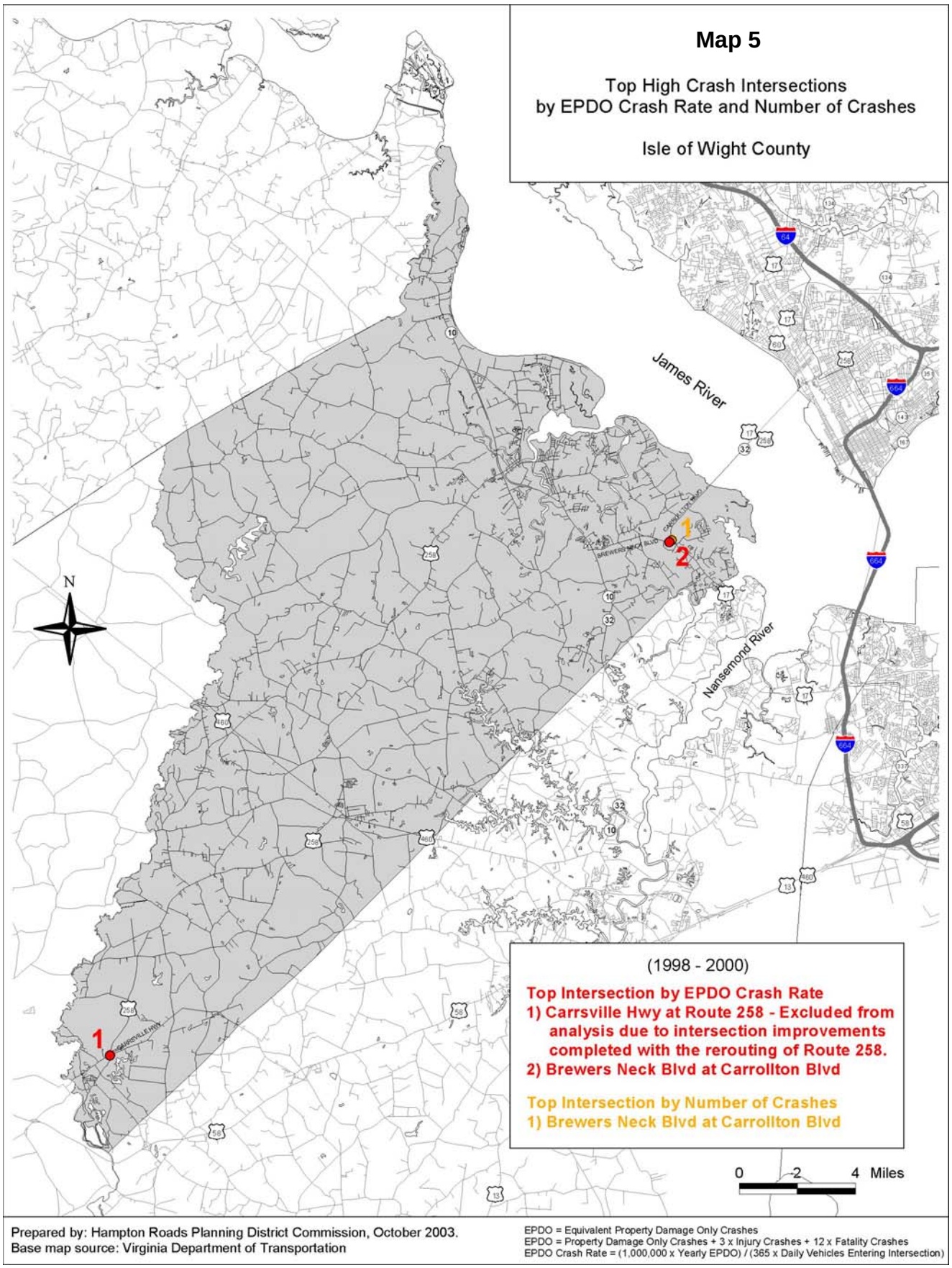
EPDO Rate per Million Entering Vehicles:	4.52
Regional Rank by EPDO Rate:	8 of 468
Number of Crashes Per Year	62.5
Number of Injuries Per Year	26.0
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	57,320

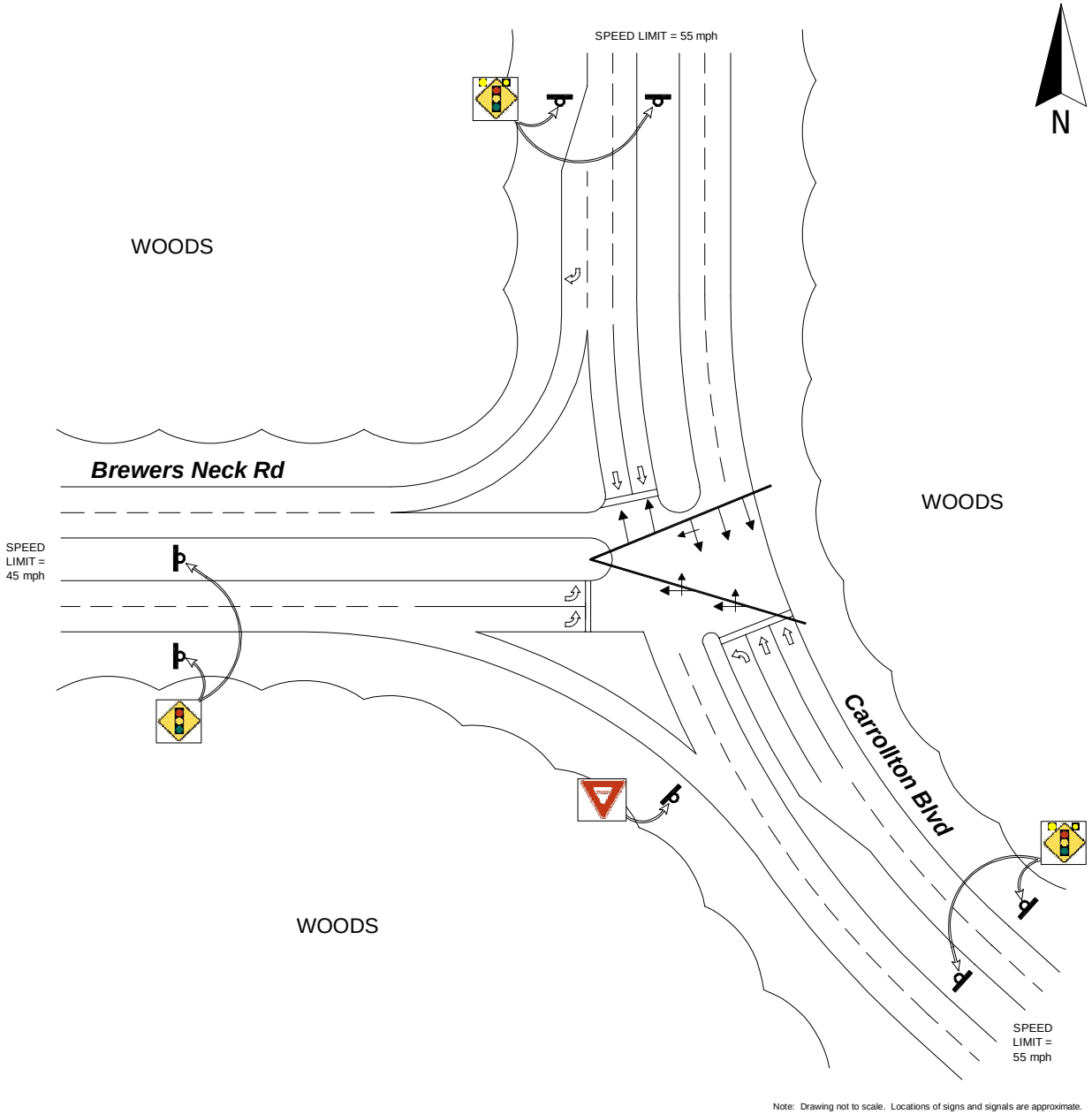
OBSERVATIONS:

- 48.0% of crashes were the result of rear ends. Regional average was 40.6%.
- 22.0% of crashes occurred on Saturday, while the regional average was 14.0%.
- The primary crash movement and type were rear ends traveling eastbound on Mercury Blvd (24.0%).
- Rear end collisions involving right-turning vehicles on southbound Coliseum Drive were also significant (14.0%).
- It appears that a majority of crashes were the result of following too close (48.7%) and disregarding the traffic signal (10.3%).
- There were also a significant number of sideswipe and rear end crashes on eastbound Mercury Blvd to the west of this intersection. Most of these crashes were more than 250' west of the intersection and did not appear on the collision diagram.

REMEDIES AND COUNTERMEASURES:

- Ensure that signal heads are large enough to provide maximum visibility for drivers approaching the intersection.
- Educate the public of the dangers involved in following too close and not paying attention when traveling through an intersection.
- Consider the installation of flashers and 'signal ahead' signs and/or rumble strips on eastbound Mercury Blvd to warn drivers of the approaching intersection.
- Consider the use of automated safety enforcement, such as red-light cameras, to guard against crashes resulting from red-light running.
- Review signal clearance times at the intersection.
- Due to the Coliseum Dr overpass from eastbound Mercury Blvd, sight distance is a problem for drivers turning right from southbound Coliseum Dr to the westbound Mercury Blvd service road. Consider replacing the yield sign with a stop sign to make it more likely that drivers will stop and look for oncoming traffic, or consider making the southbound right turn movement a free-flow movement with delineators, so long as it doesn't conflict with access to Coliseum Mall.


Map 5
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
Isle of Wight County
James River
Nansemond River
N
1
2
1
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) Carrsville Hwy at Route 258 - Excluded from analysis due to intersection improvements completed with the rerouting of Route 258.
2) Brewers Neck Blvd at Carrollton Blvd
Top Intersection by Number of Crashes
1) Brewers Neck Blvd at Carrollton Blvd
0 2 4 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Carrollton Blvd at Brewers Neck Rd
Isle of Wight County

LEGEND

CROSSWALK

SIDEWALK

SIGN

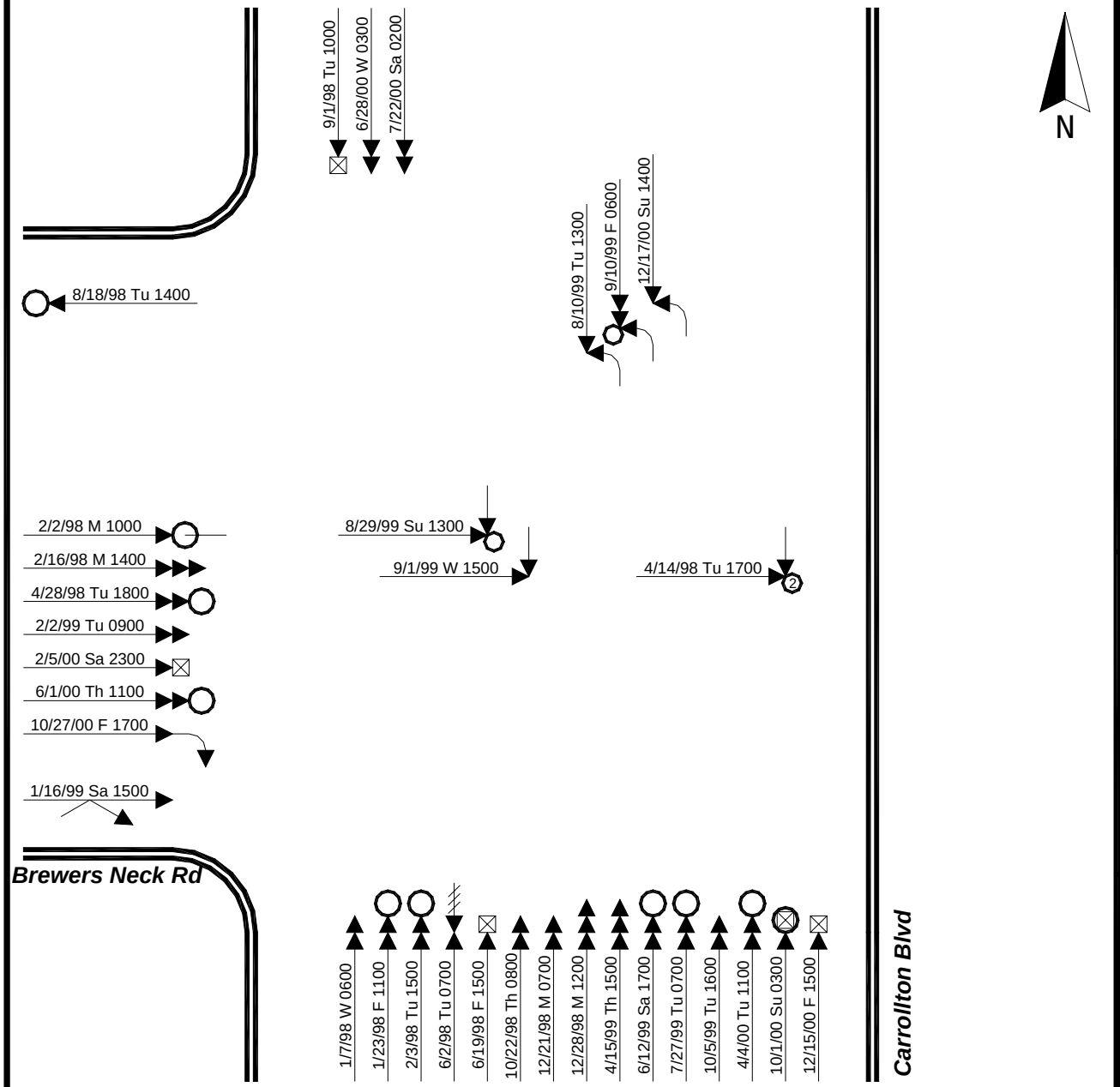
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

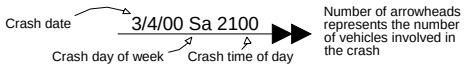
Brewers Neck Rd at Carrollton Blvd
Isle of Wight County

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**11.0**
Property Damage Only	**6.7**
Crashes with Injuries	**4.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**4.7**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**29,046**

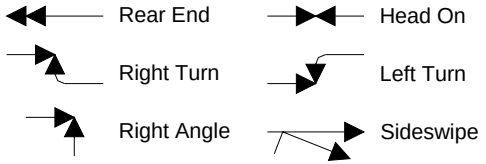
NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE



INTERSECTION TRAFFIC CRASH ANALYSIS

Brewers Neck Rd at Carrollton Blvd

Isle of Wight County

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	14	10	9	33
PDO Crashes	8	6	6	20
INJ Crashes	6	4	3	13
FAT Crashes	0	0	0	0
Injuries	7	4	3	14
Fatalities	0	0	0	0

Average Number of Crashes	11	
Average EPDO	19.7	
Average EPDO Rate	1.86	
Volume Entering Intersection	29,046	
% of crashes involving heavy vehicles - Segment		**9.1%**
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	93.9%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	3.0%	1.3%
Drinking with Impared Ability	3.0%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	97.0%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	0.0%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	3.0%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	18.2%	11.4%
9:00 - 14:59	36.4%	35.4%
15:00 - 18:59	33.3%	29.9%
19:00 - 5:59	12.1%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	12.1%	14.2%
Tuesday	**33.3%**	14.8%
Wednesday	9.1%	14.7%
Thursday	9.1%	15.2%
Friday	15.2%	17.2%
Saturday	12.1%	14.0%
Sunday	9.1%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	63.6%	80.5%
Fog	0.0%	0.4%
Rain/Mist	**36.4%**	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Following too close	**18.2%**	15.7%
Driver Inattention	**18.2%**	17.8%
Exceeded safe speed/not speed limit	**12.1%**	1.6%
Exceeded speed limit	**6.1%**	2.3%
Did not have ROW	6.1%	18.5%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**54.5%**	40.6%
Right Angle	18.2%	39.5%
Head On	0.0%	2.1%
Side Swipe	3.0%	7.7%
Fixed Object	**21.2%**	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	3.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**33.0%**
Type #2 	12.1%
Type #3 	9.1%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	3.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	3.0%	3.9%
Driver Speeding	3.0%	1.8%
Driver Error	75.8%	80.6%
Vehicle Defective	**9.1%**	0.5%
Weather/Visibility	0.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	**6.1%**	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Brewers Neck Rd at Carrolton Blvd
Jurisdiction: Isle of Wight County

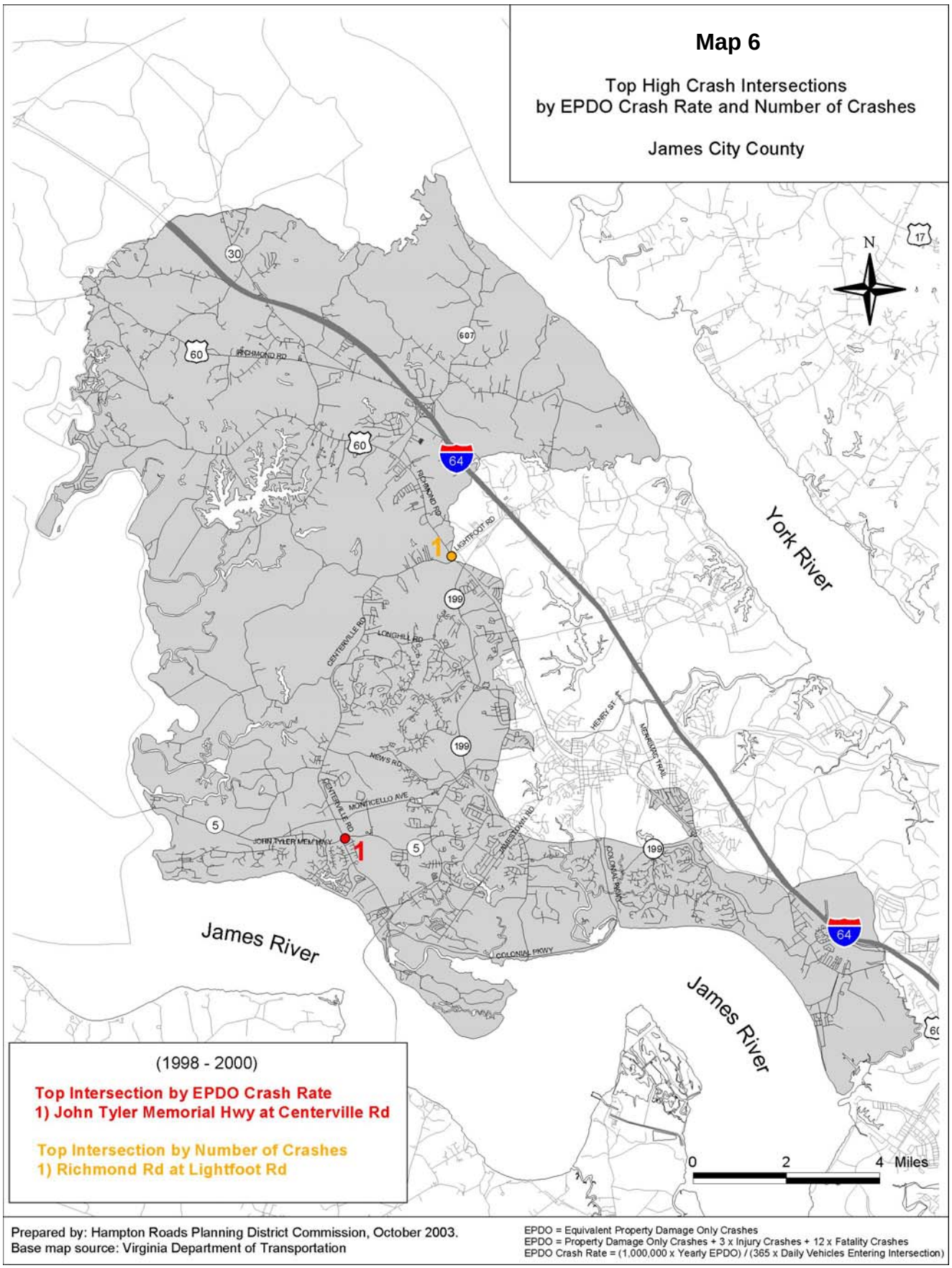
EPDO Rate per Million Entering Vehicles:	1.86
Regional Rank by EPDO Rate:	166 of 468
Number of Crashes Per Year	11.0
Number of Injuries Per Year	4.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	29,046

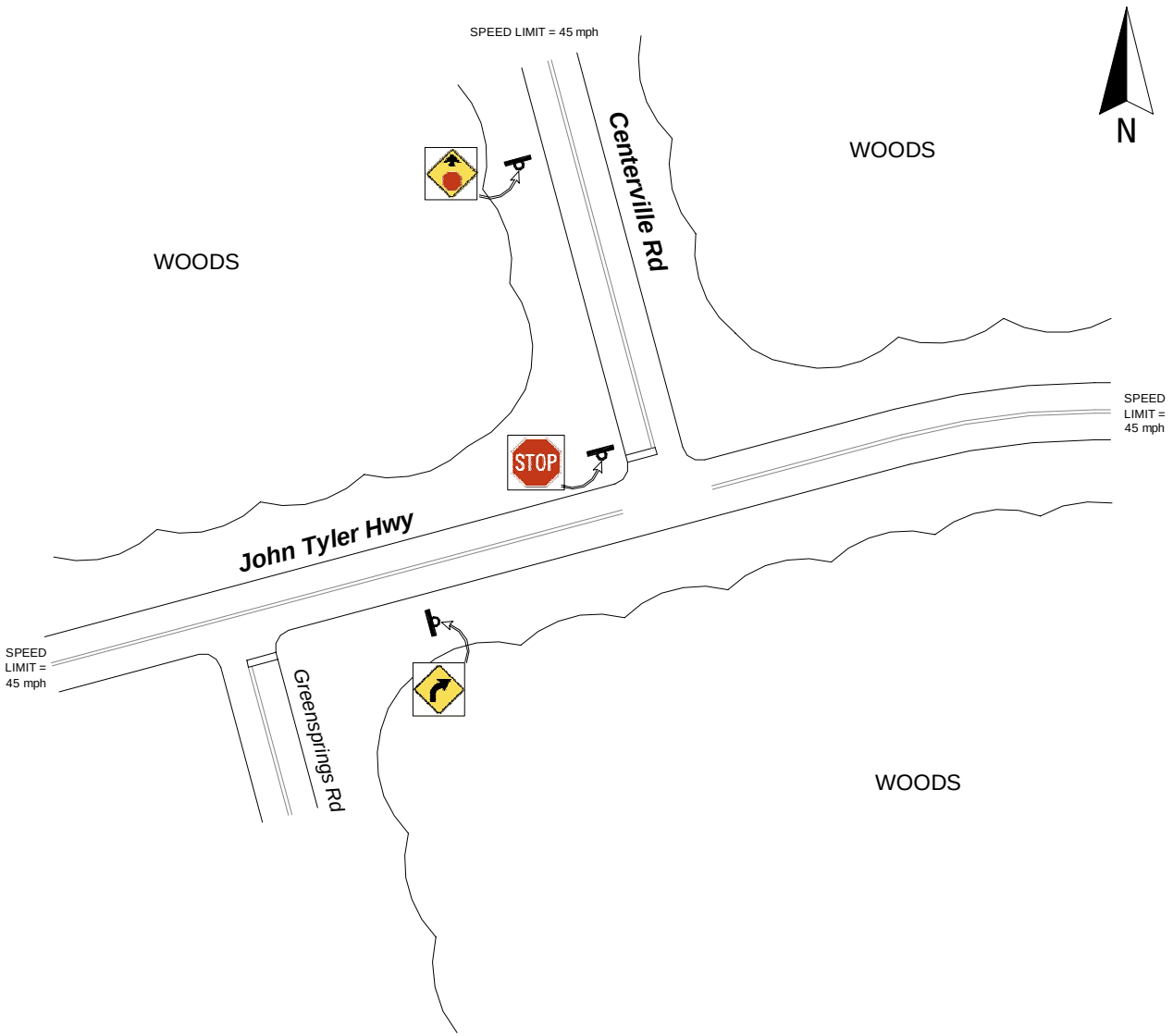
OBSERVATIONS:

- 9.1% of crashes involved heavy vehicles for this intersection, which was high when compared to the regional intersection average of 5.3%.
- 33.3% of crashes occurred on Tuesday, while the regional average was 14.8%.
- A high percentage of crashes occurred during rain/mist (36.4%). Regional average was 17.8%.
- 54.5% of crashes were the result of rear ends. Regional average was 40.6%.
- 21.2% of crashes involved hitting a fixed object. Regional average was 7.1%.
- The primary crash movement and type were rear ends traveling northbound on Carrollton Blvd (33.0%).
- 9.1% of crashes were the result of a defective vehicle. Regional average was 0.5%.
- 6.1% of crashes were the result of the road being slick. Regional average was 1.4%.
- It appears that a majority of crashes were the result of rain/mist, slick road, following too close, driver inattention, and speeding resulting in rear end crashes. In fact, 27% of the rear end crashes occurred during rain or mist.

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage as a majority of crashes are occurring during rain or mist.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding. Drivers need to slow down during these conditions.
- Police enforcement will help deter drivers from speeding, thus reduce rear end crashes.
- Eliminate obstructions/fixed objects adjacent to intersection that may be causing a problem.


Map 6
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
James City County
N
York River
James River
James River
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) John Tyler Memorial Hwy at Centerville Rd
Top Intersection by Number of Crashes
1) Richmond Rd at Lightfoot Rd
0 2 4 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

John Tyler Hwy at Centerville Rd
James City County

LEGEND

CROSSWALK

SIDEWALK

SIGN

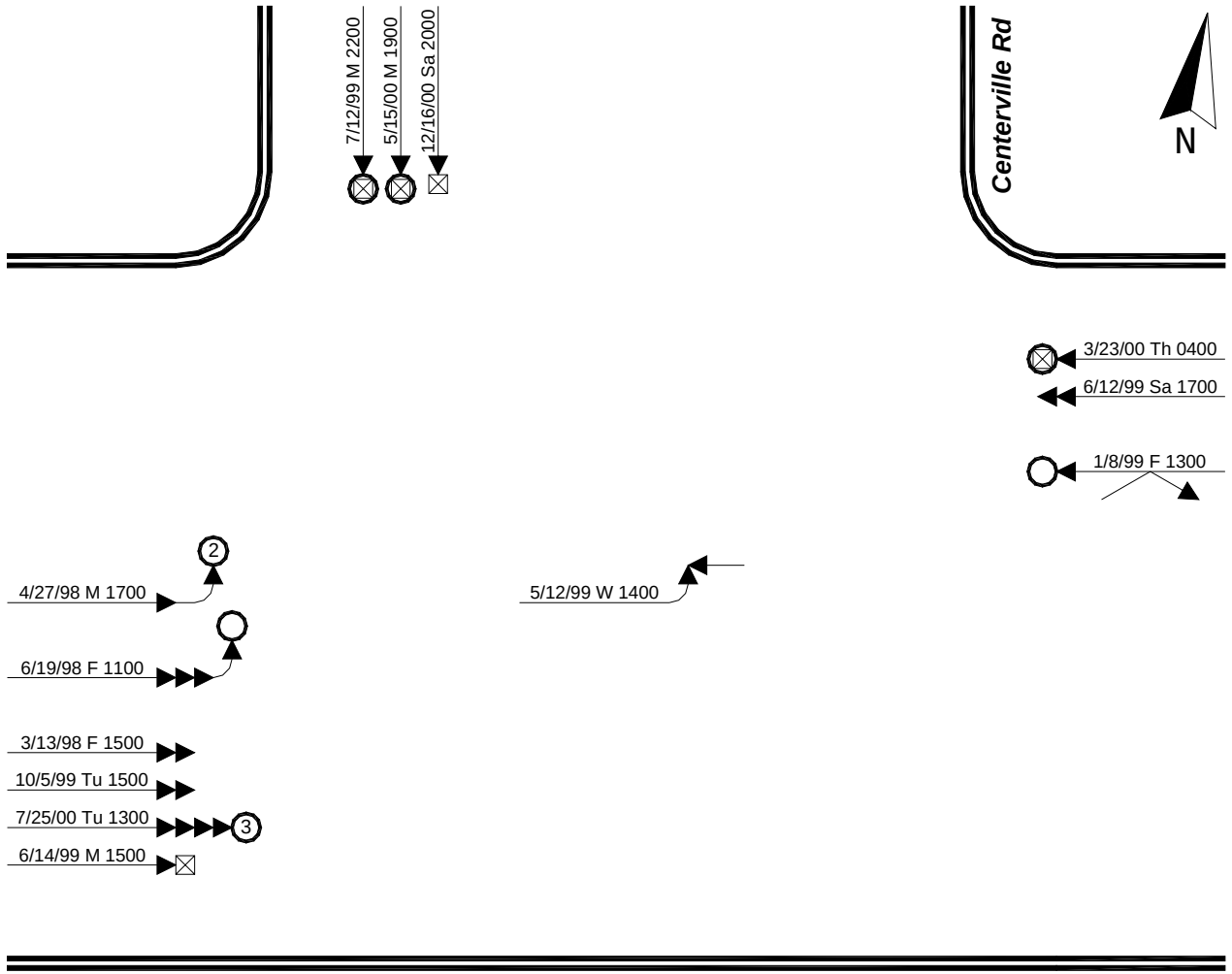
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

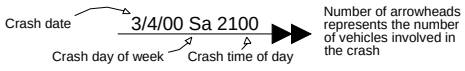
John Tyler Hwy at Centerville Rd
James City County

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**4.3**
Property Damage Only	**2.0**
Crashes with Injuries	**2.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**3.3**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**11,999**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

John Tyler Hwy at Centerville Rd

James City County

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	3	6	4	13
PDO Crashes	1	4	1	6
INJ Crashes	2	2	3	7
FAT Crashes	0	0	0	0
Injuries	3	2	5	10
Fatalities	0	0	0	0

Average Number of Crashes	4	
Average EPDO	9	
Average EPDO Rate	2.05	
Volume Entering Intersection	11,999	
% of crashes involving heavy vehicles - Segment		**15.4%**
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	92.3%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	7.7%	1.3%
Drinking with Impared Ability	0.0%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	92.3%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	7.7%	0.6%
Obscured by other vehicles	0.0%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	0.0%	11.4%
9:00 - 14:59	30.8%	35.4%
15:00 - 18:59	38.5%	29.9%
19:00 - 5:59	30.8%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	**30.8%**	14.2%
Tuesday	15.4%	14.8%
Wednesday	7.7%	14.7%
Thursday	7.7%	15.2%
Friday	23.1%	17.2%
Saturday	15.4%	14.0%
Sunday	0.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	61.5%	80.5%
Fog	7.7%	0.4%
Rain/Mist	**30.8%**	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver Inattention	**61.5%**	17.8%
Following too close	7.7%	15.7%
Avoiding other vehicle	7.7%	1.6%
Disregarded stop or yield sign	7.7%	2.0%
Fail to signal or improper signal	7.7%	0.2%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**46.2%**	40.6%
Right Angle	15.4%	39.5%
Head On	0.0%	2.1%
Side Swipe	0.0%	7.7%
Fixed Object	**38.5%**	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**38.5%**
Type #2 	**23.1%**

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	7.7%	2.7%
Driver Asleep/Handicap	**15.4%**	1.8%
Driver Under the Influence	0.0%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	76.9%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	0.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: John Tyler Hwy at Centerville Rd
Jurisdiction: James City County

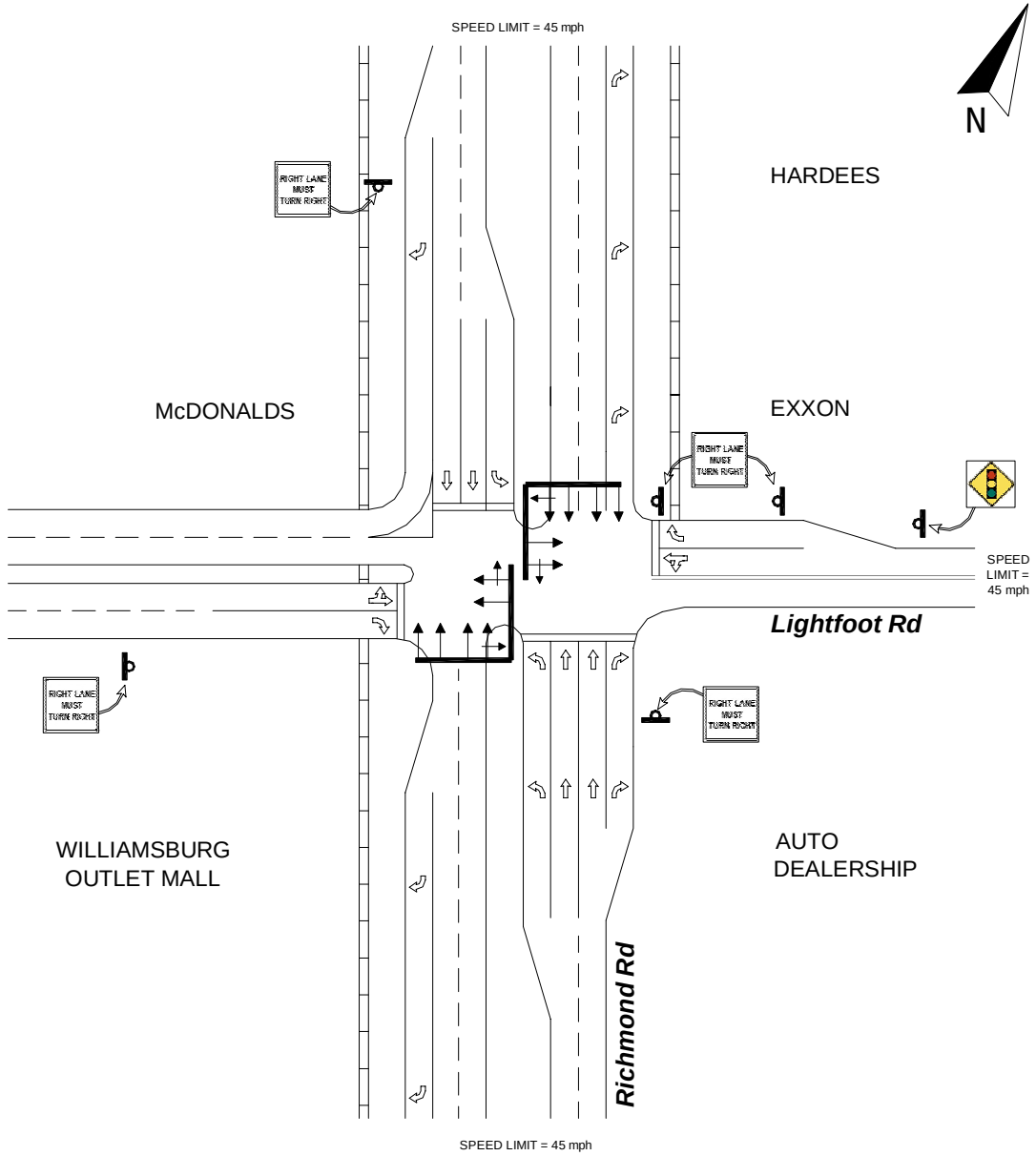
EPDO Rate per Million Entering Vehicles:	2.05
Regional Rank by EPDO Rate:	138 of 468
Number of Crashes Per Year	4.3
Number of Injuries Per Year	3.3
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	11,999

OBSERVATIONS:

- 15.4% of crashes involved heavy vehicles for this intersection, which was high when compared to the regional intersection average of 5.3%.
- 30.8% of crashes occurred on Monday, while the regional average was 14.2%.
- A high percentage of crashes occurred during rain/mist (30.8%). Regional average was 17.8%.
- 46.2% of crashes were the result of rear ends. Regional average was 40.6%.
- 38.5% of crashes involved hitting a fixed object. Regional average was 7.1%.
- The primary crash movement and type were rear ends traveling eastbound on John Tyler Hwy (38.5%). 23.1% of crashes involved vehicles traveling southbound on Centerville Rd and hitting a fixed object.
- 61.5% of crashes were the result of driver inattention. Regional average was 17.8%.
- 15.4% of crashes were the result of the driver being asleep or handicap. Regional average was 1.8%.

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage as many crashes are occurring during rain or mist.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding. Drivers need to slow down during these conditions and pay careful attention.
- Police enforcement will help deter drivers from speeding, thus reduce rear end crashes.
- Eliminate obstructions/fixed objects adjacent to intersection that may be causing a problem.
- Add eastbound left-turn lane on John Tyler Hwy at intersection to separate turning traffic from through traffic.



ROADWAY GEOMETRY

Richmond Rd at Lightfoot Rd
James City County

LEGEND

CROSSWALK

SIDEWALK

SIGN

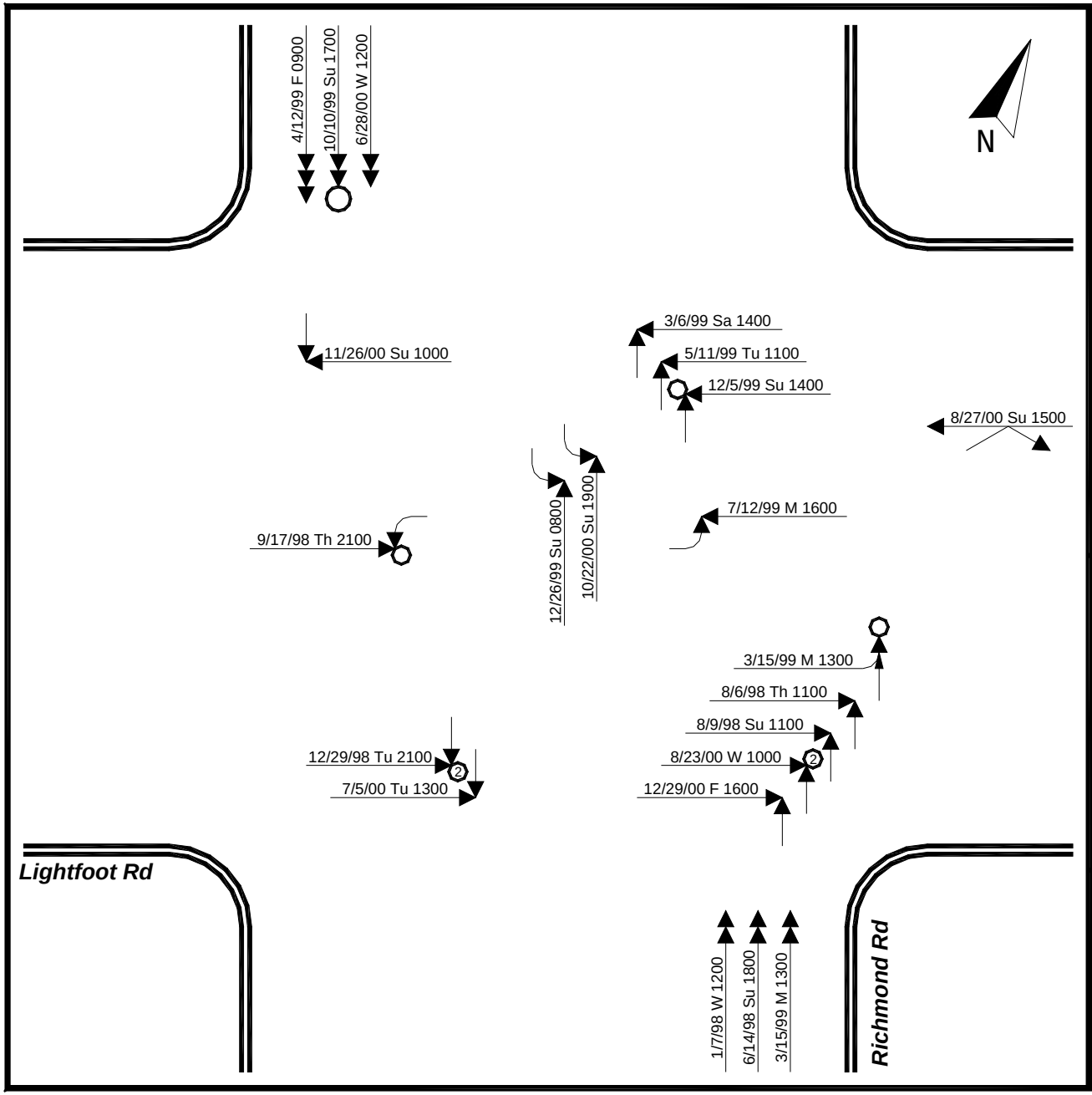
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Richmond Rd at Lightfoot Rd
James City County

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**7.3**
Property Damage Only	**5.3**
Crashes with Injuries	**2.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**2.7**
NO. OF FATALITIES PER YEAR	**0.0**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date — 3/4/00 Sa 2100 — Number of arrowheads represents the number of vehicles involved in the crash
Crash day of week — Crash time of day

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Richmond Rd at Lightfoot Rd

James City County

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	6	9	7	22
PDO Crashes	4	6	6	16
INJ Crashes	2	3	1	6
FAT Crashes	0	0	0	0
Injuries	3	3	2	8
Fatalities	0	0	0	0

Average Number of Crashes	7.3	
Average EPDO	11.3	
Average EPDO Rate	N/A*	
Volume Entering Intersection	N/A*	
% of crashes involving heavy vehicles - Segment		4.5%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	100.0%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	0.0%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	95.5%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	4.5%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	0.0%	3.8%

* Traffic volumes were not available

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	4.5%	11.4%
9:00 - 14:59	**59.1%**	35.4%
15:00 - 18:59	22.7%	29.9%
19:00 - 5:59	13.6%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	13.6%	14.2%
Tuesday	13.6%	14.8%
Wednesday	13.6%	14.7%
Thursday	9.1%	15.2%
Friday	9.1%	17.2%
Saturday	4.5%	14.0%
Sunday	**36.4%**	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	63.6%	80.5%
Fog	4.5%	0.4%
Rain/Mist	**31.8%**	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver Inattention	**36.4%**	17.8%
Disregarded stop-go light	**31.8%**	5.4%
Did not have ROW	18.2%	18.5%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	27.3%	40.6%
Right Angle	**68.2%**	39.5%
Head On	0.0%	2.1%
Side Swipe	4.5%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**22.7%**
Type #2 	13.6%
Type #3 	13.6%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	0.0%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	90.9%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	4.5%	6.4%
Road Defective	0.0%	0.2%
Road Slick	4.5%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Richmond Rd at Lightfoot Rd
Jurisdiction: James City County

EPDO Rate per Million Entering Vehicles:	N/A*
Regional Rank by EPDO Rate:	N/A*
Number of Crashes Per Year	7.3
Number of Injuries Per Year	2.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	N/A*

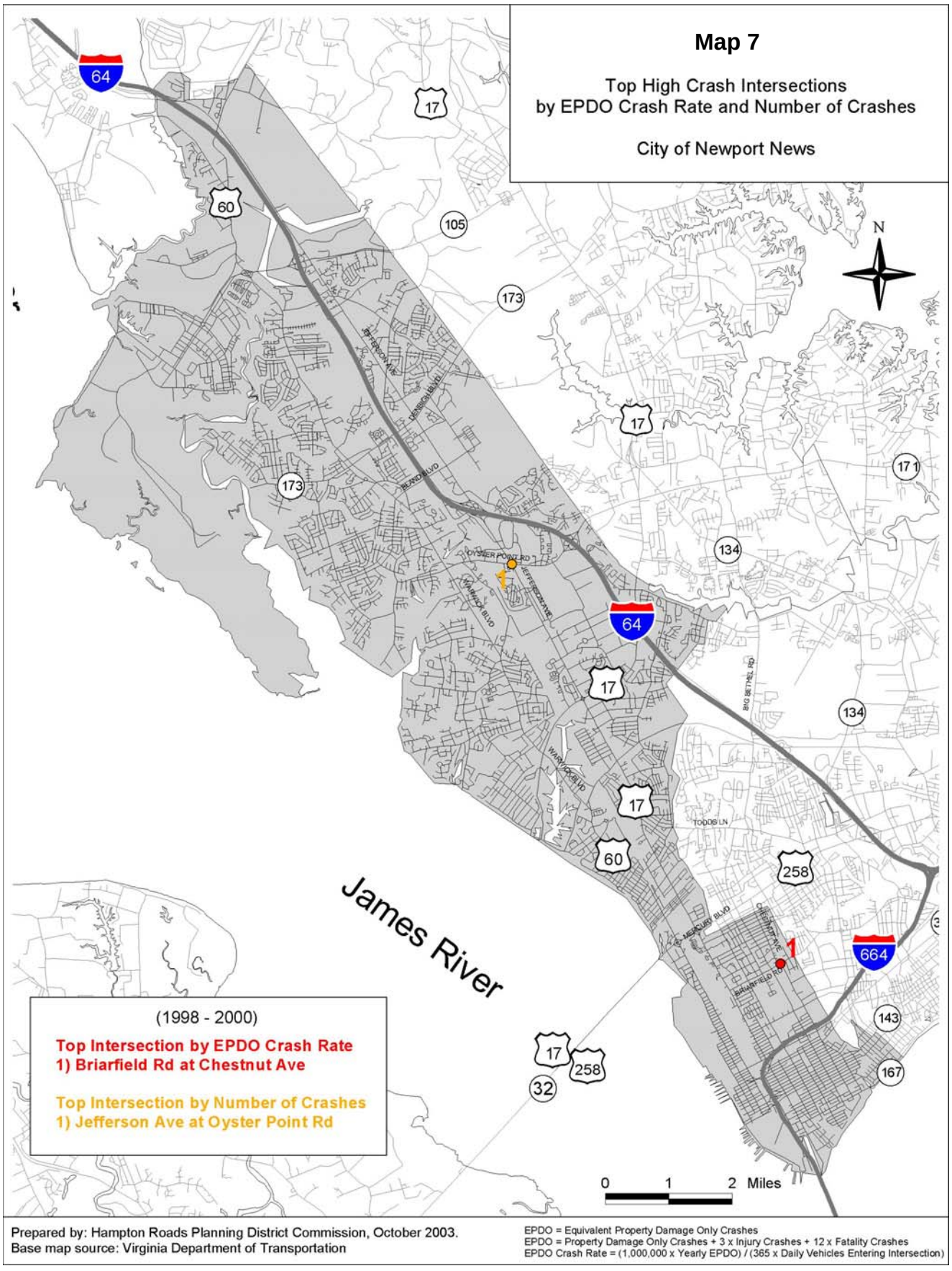
OBSERVATIONS:

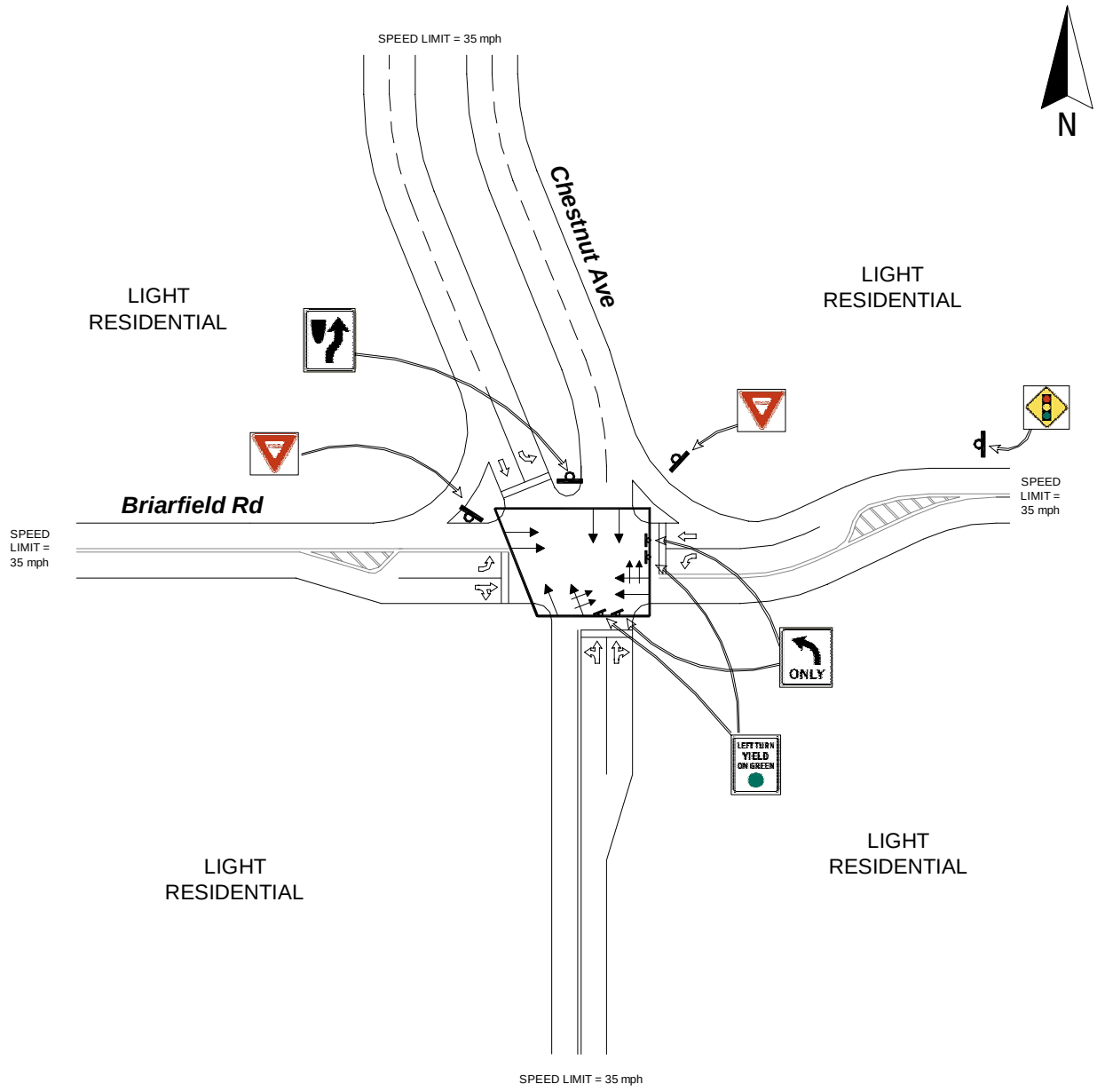
- 59.1% of crashes occurred during the mid-day period (9:00 am – 3:00 pm). Regional average was 35.4%.
- 36.4% of crashes occurred on Sunday, while the regional average was 9.9%.
- A high percentage of crashes occurred during rain/mist (31.8%). Regional average was 17.8%.
- 68.2% of crashes were the result of right angle collisions. Regional average was 39.5%.
- The primary crash movement and type were right angle collisions, involving eastbound vehicles along Lightfoot Rd with northbound vehicles on Richmond Rd (22.7%).
- 36.4% of crashes were the result of driver inattention. Regional average was 17.8%.
- A very high percentage (31.8%) of crashes were the result of drivers disregarding the stop - go light. Regional average was 5.4%.

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage as many crashes are occurring during rain or mist.
- Review signal clearance times at the intersection.
- Educate the public of the dangers involved in driving on wet surfaces and the consequences of following too close and speeding. Drivers need to slow down during these conditions and pay careful attention.
- Police enforcement will help deter drivers from running red-lights.
- Consider the use of automated safety enforcement, such as red-light cameras, to guard against crashes resulting from red-light running.
- Ensure that northbound vehicles along Richmond Rd have adequate sight distance of oncoming traffic traveling eastbound on Lightfoot Rd.

* Traffic volumes were not available.


Map 7
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
City of Newport News
N
James River
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) Briarfield Rd at Chestnut Ave
Top Intersection by Number of Crashes
1) Jefferson Ave at Oyster Point Rd
0 1 2 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Briarfield Rd at Chestnut Ave
City of Newport News

LEGEND

CROSSWALK

SIDEWALK

SIGN

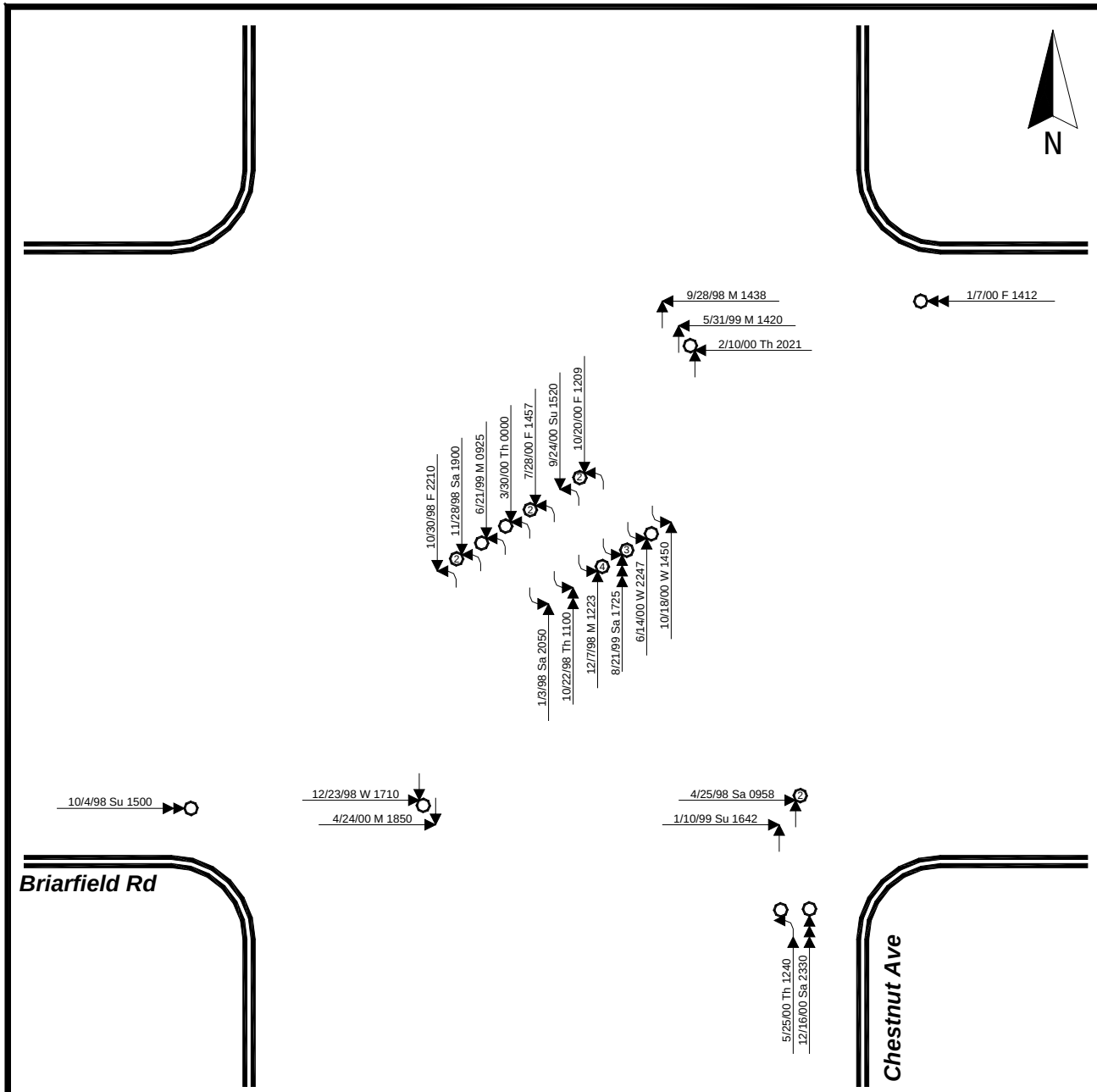
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

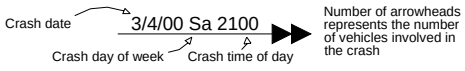
Briarfield Rd at Chestnut Ave
City of Newport News

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**8.3**
Property Damage Only	**3.0**
Crashes with Injuries	**5.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**8.3**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**16,854**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Briarfield Rd at Chestnut Ave

City of Newport News

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	9	5	11	25
PDO Crashes	4	2	3	9
INJ Crashes	5	3	8	16
FAT Crashes	0	0	0	0
Injuries	10	5	10	25
Fatalities	0	0	0	0

Average Number of Crashes	8.3	
Average EPDO	19	
Average EPDO Rate	3.09	
Volume Entering Intersection	16,854	
% of crashes involving heavy vehicles - Segment		8.3%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	91.7%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	**8.3%**	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	95.8%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	4.2%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	0.0%	11.4%
9:00 - 14:59	**52.0%**	35.4%
15:00 - 18:59	24.0%	29.9%
19:00 - 5:59	24.0%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	20.0%	14.2%
Tuesday	0.0%	14.8%
Wednesday	12.0%	14.7%
Thursday	16.0%	15.2%
Friday	20.0%	17.2%
Saturday	20.0%	14.0%
Sunday	12.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	66.7%	80.5%
Fog	0.0%	0.4%
Rain/Mist	**33.3%**	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**33.3%**	18.5%
Driver Inattention	16.7%	17.8%
Disregarded stop - go light	**8.3%**	5.4%
Exceeded speed limit	4.2%	2.3%
Following too close	4.2%	15.7%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	16.7%	40.6%
Right Angle	**79.2%**	39.5%
Head On	4.2%	2.1%
Side Swipe	0.0%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**29.2%**
Type #2 	**25.0%**
Type #3 	12.5%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	**8.3%**	3.9%
Driver Speeding	4.2%	1.8%
Driver Error	83.3%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	4.2%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Briarfield Rd at Chestnut Ave
Jurisdiction: City of Newport News

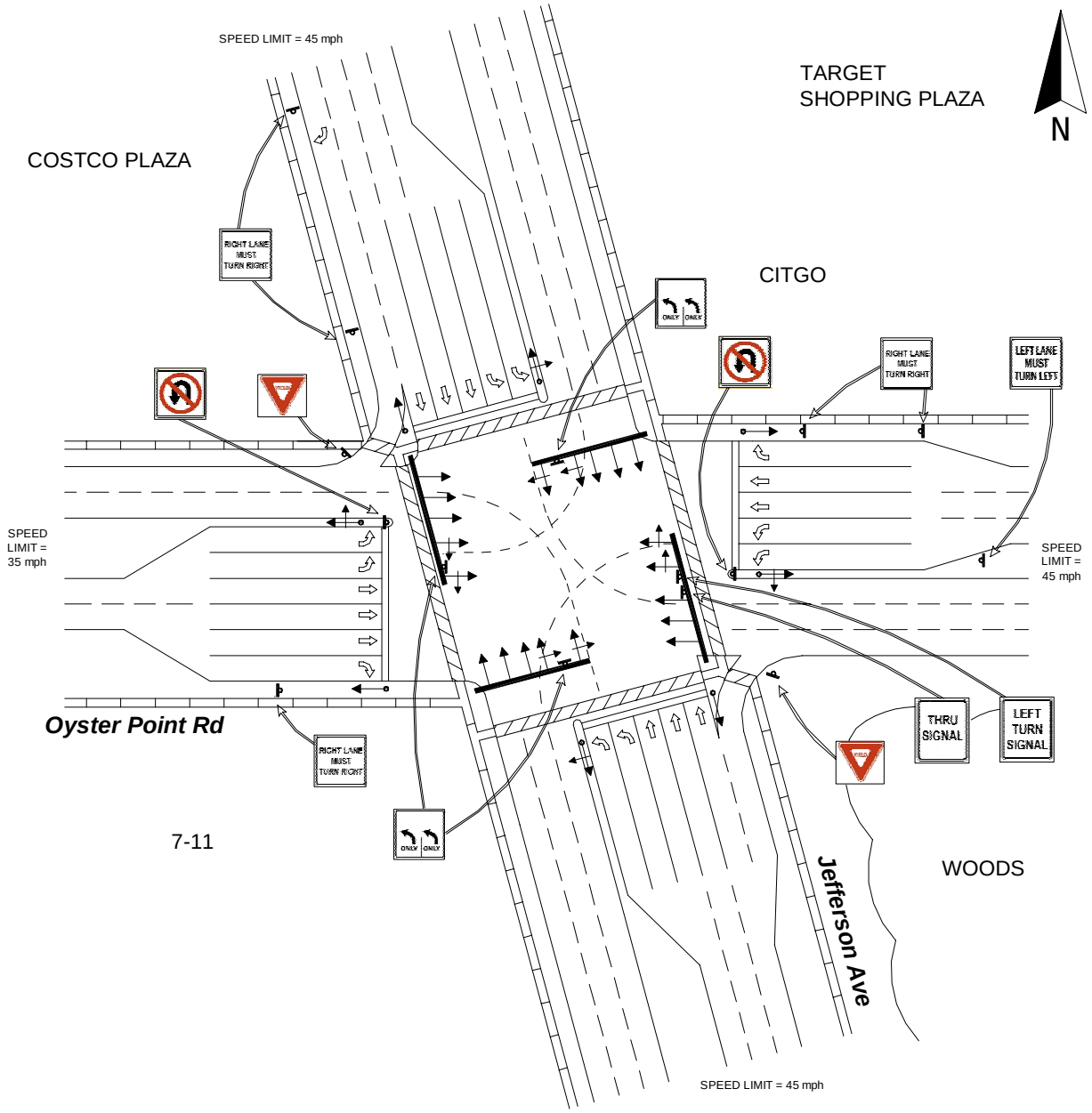
EPDO Rate per Million Entering Vehicles:	3.09
Regional Rank by EPDO Rate:	43 of 468
Number of Crashes Per Year	8.3
Number of Injuries Per Year	8.3
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	16,854

OBSERVATIONS:

- 8.3% of crashes involved drunk driving. Regional average was 4.4%.
- 52% of crashes occurred during the mid-day period (9:00 am – 3:00 pm). Regional average was 35.4%.
- A high percentage of crashes occurred during rain/mist (33.3%). Regional average was 17.8%.
- 79.2% of crashes were right angle collisions. Regional average was 39.5%.
- The primary crash movement and type were right angle crashes involving left turning vehicles from Chestnut Ave to Briarfield Rd with southbound through vehicles on Chestnut Ave (29.2%). The second highest movement was southbound left-turning vehicles with northbound through vehicles on Chestnut Ave (25%).
- 33.3% of crashes resulted from drivers not having the right-of-way. Regional average was 18.5%.
- 8.3% of crashes were the result of drivers disregarding the stop – go light. Regional average was 5.4%.

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage, as many crashes are the result of rain or mist.
- Review signal clearance times at the intersection.
- Add protected left-turn phase for both directions of Chestnut Ave at the intersection, or implement split phasing for Chestnut Ave. Lane usage changes are required if a protected left-turn phase is implemented on northbound Chestnut Ave.



ROADWAY GEOMETRY

Jefferson Ave at Oyster Point Rd
City of Newport News

LEGEND

CROSSWALK

SIDEWALK

SIGN

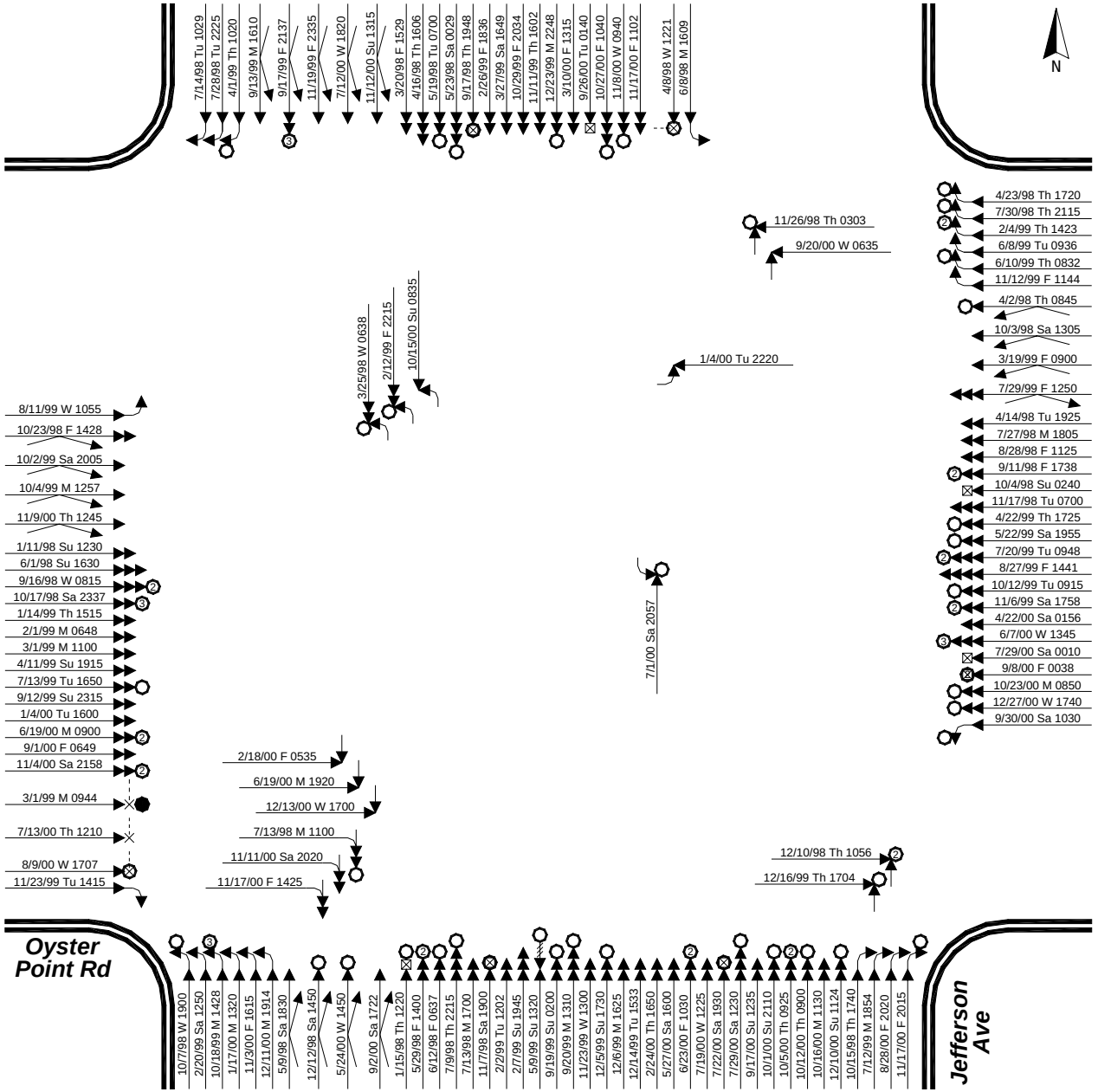
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Jefferson Ave at Oyster Point Rd
City of Newport News

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**48.7**
Property Damage Only	**28.7**
Crashes with Injuries	**19.7**
Crashes with Fatalities	**0.3**
NO. OF INJURIES PER YEAR	**27.0**
NO. OF FATALITIES PER YEAR	**0.3**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**102,266**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date: 3/4/00 Sa 2100 (Crash day of week / Crash time of day)

Number of arrowheads represents the number of vehicles involved in the crash

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Jefferson Ave at Oyster Point Rd

City of Newport News

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	45	51	50	146
PDO Crashes	24	32	30	86
INJ Crashes	21	18	20	59
FAT Crashes	0	1	0	1
Injuries	28	26	27	81
Fatalities	0	1	0	1

Average Number of Crashes	48.7	
Average EPDO	91.7	
Average EPDO Rate	2.46	
Volume Entering Intersection	102,266	
% of crashes involving heavy vehicles - Segment		3.7%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	94.8%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	0.7%	1.3%
Drinking with Impared Ability	4.5%	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	92.5%	83.8%
Obscured by rain/snow	1.5%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	2.2%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	2.2%	2.9%
Not stated	1.5%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	10.3%	11.4%
9:00 - 14:59	38.4%	35.4%
15:00 - 18:59	23.3%	29.9%
19:00 - 5:59	28.1%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	15.1%	14.2%
Tuesday	11.0%	14.8%
Wednesday	12.3%	14.7%
Thursday	16.4%	15.2%
Friday	17.8%	17.2%
Saturday	17.1%	14.0%
Sunday	10.3%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	82.1%	80.5%
Fog	0.0%	0.4%
Rain/Mist	17.9%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver Inattention	**32.1%**	17.8%
Following too close	**19.4%**	15.7%
Did not have ROW	6.7%	18.5%
Disregarded stop - go light	**6.7%**	5.4%
Other improper passing	2.2%	0.8%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**65.7%**	40.6%
Right Angle	11.9%	39.5%
Head On	0.0%	2.1%
Side Swipe	11.9%	7.7%
Fixed Object	6.7%	7.1%
Pedestrian	3.0%	1.4%
Animal	0.0%	0.2%
Other	0.7%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**24.8%**
Type #2 	17.3%
Type #3 	12.8%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.8%	2.7%
Driver Asleep/Handicap	0.8%	1.8%
Driver Under the Influence	3.0%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	90.2%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	3.8%	6.4%
Road Defective	0.0%	0.2%
Road Slick	1.5%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Jefferson Ave at Oyster Point Rd
Jurisdiction: City of Newport News

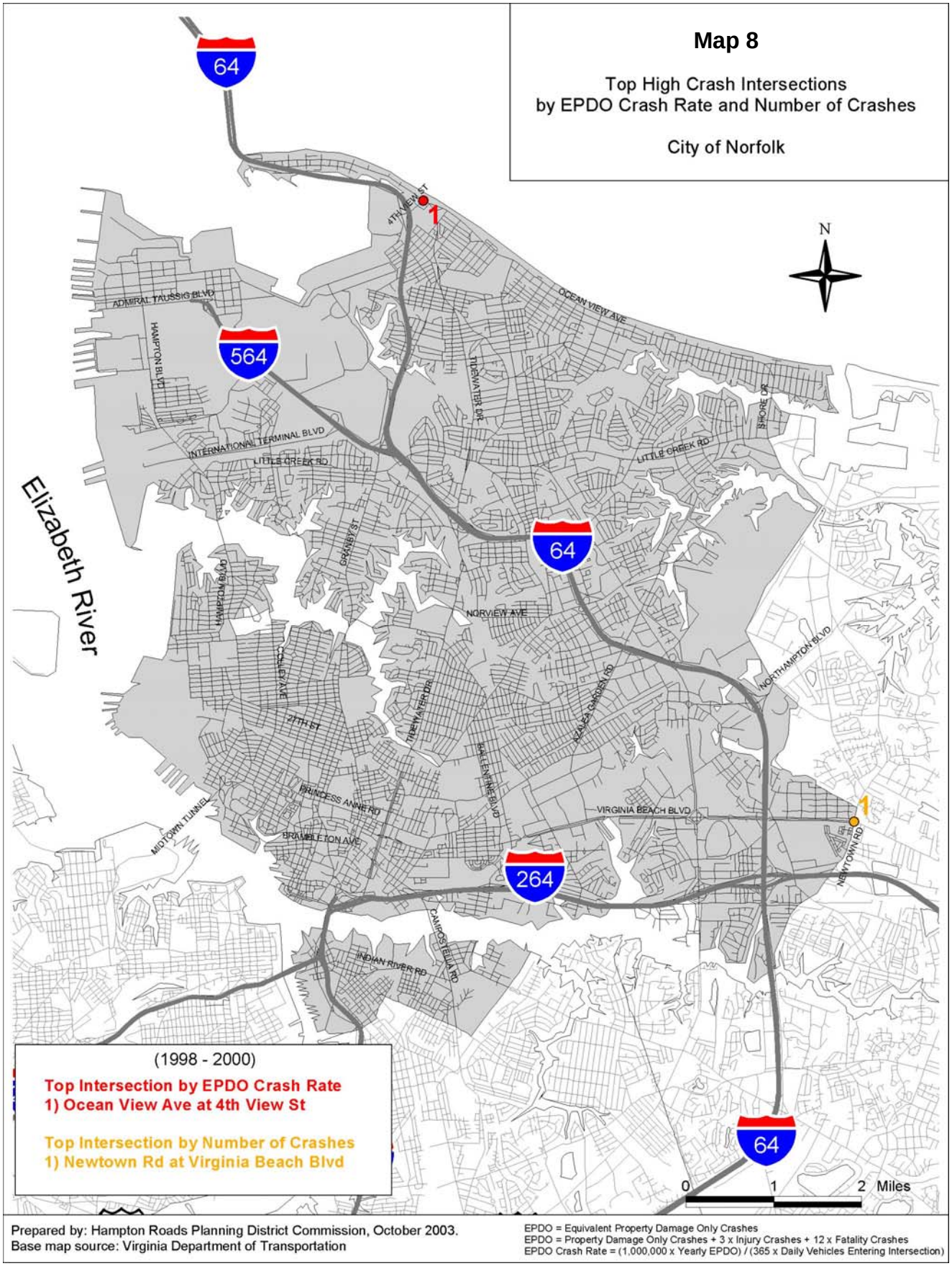
EPDO Rate per Million Entering Vehicles:	2.46
Regional Rank by EPDO Rate:	90 of 468
Number of Crashes Per Year	48.7
Number of Injuries Per Year	27.0
Number of Fatalities Per Year	0.3
Daily Number of Vehicles Entering Intersection	102,266

OBSERVATIONS:

- 65.7% of crashes were the result of rear ends. Regional average was 40.6%.
- The primary crash movement and type were rear ends traveling northbound on Jefferson Avenue (24.8%).
- 32.1% of crashes were the result of driver inattention. Regional average was 17.8%.
- 19.4% of crashes were the result of the drivers following too close. Regional average was 15.7%.
- 6.7% of crashes were the result of drivers disregarding the stop – go light. Regional average was 5.4%.

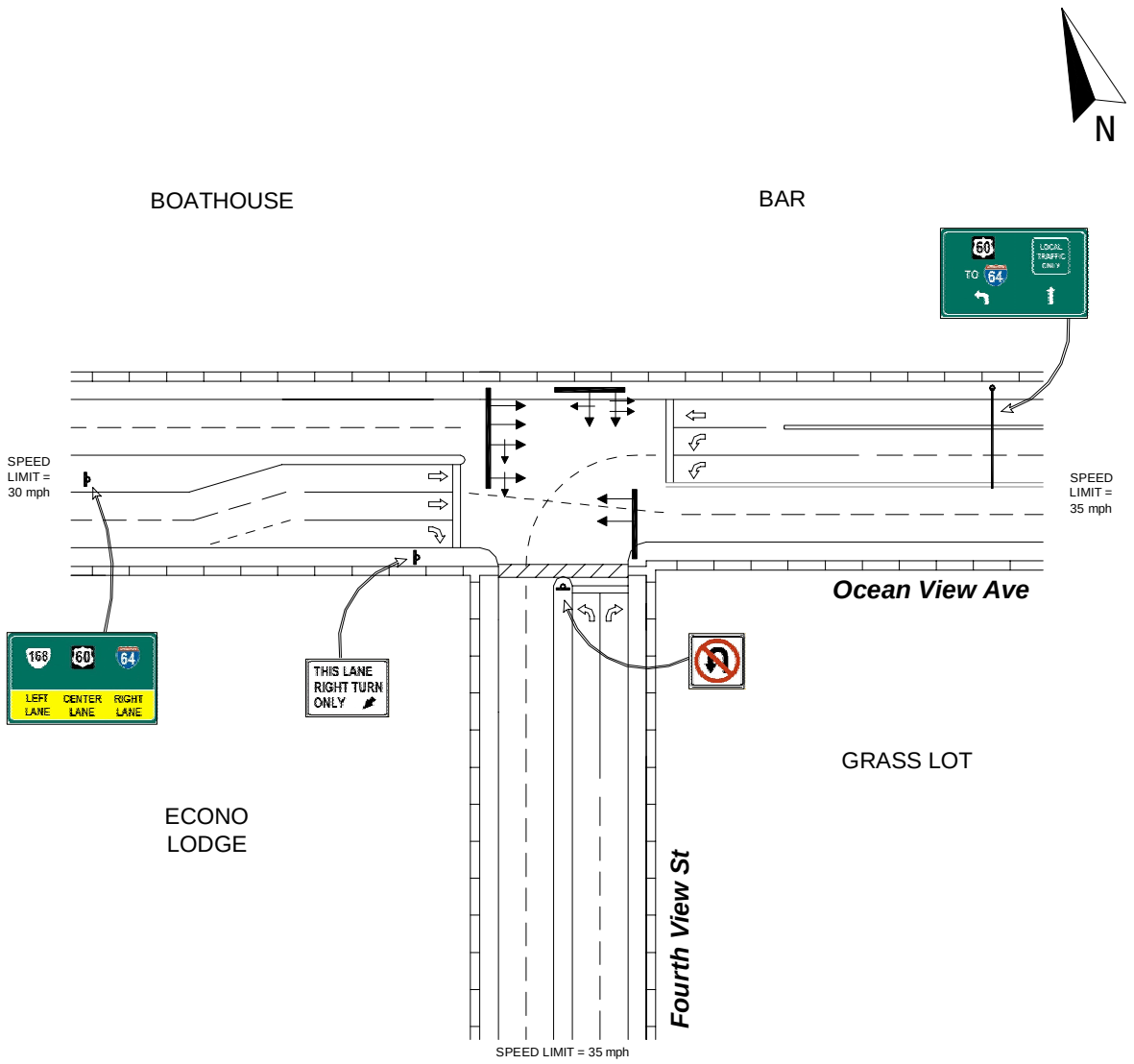
REMEDIES AND COUNTERMEASURES:

- Educate the public of the dangers involved in following too close and not paying attention when traveling through a busy intersection.
- Review signal clearance times at the intersection.
- Police enforcement will help deter drivers from tailgating, thus reduce rear end crashes.
- Consider capacity improvements including an urban interchange or viable alternate routes.



Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation

EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



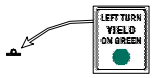
ROADWAY GEOMETRY

Ocean View Ave at Fourth View St
City of Norfolk

LEGEND

CROSSWALK

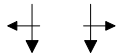
SIDEWALK



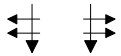
SIGN

TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

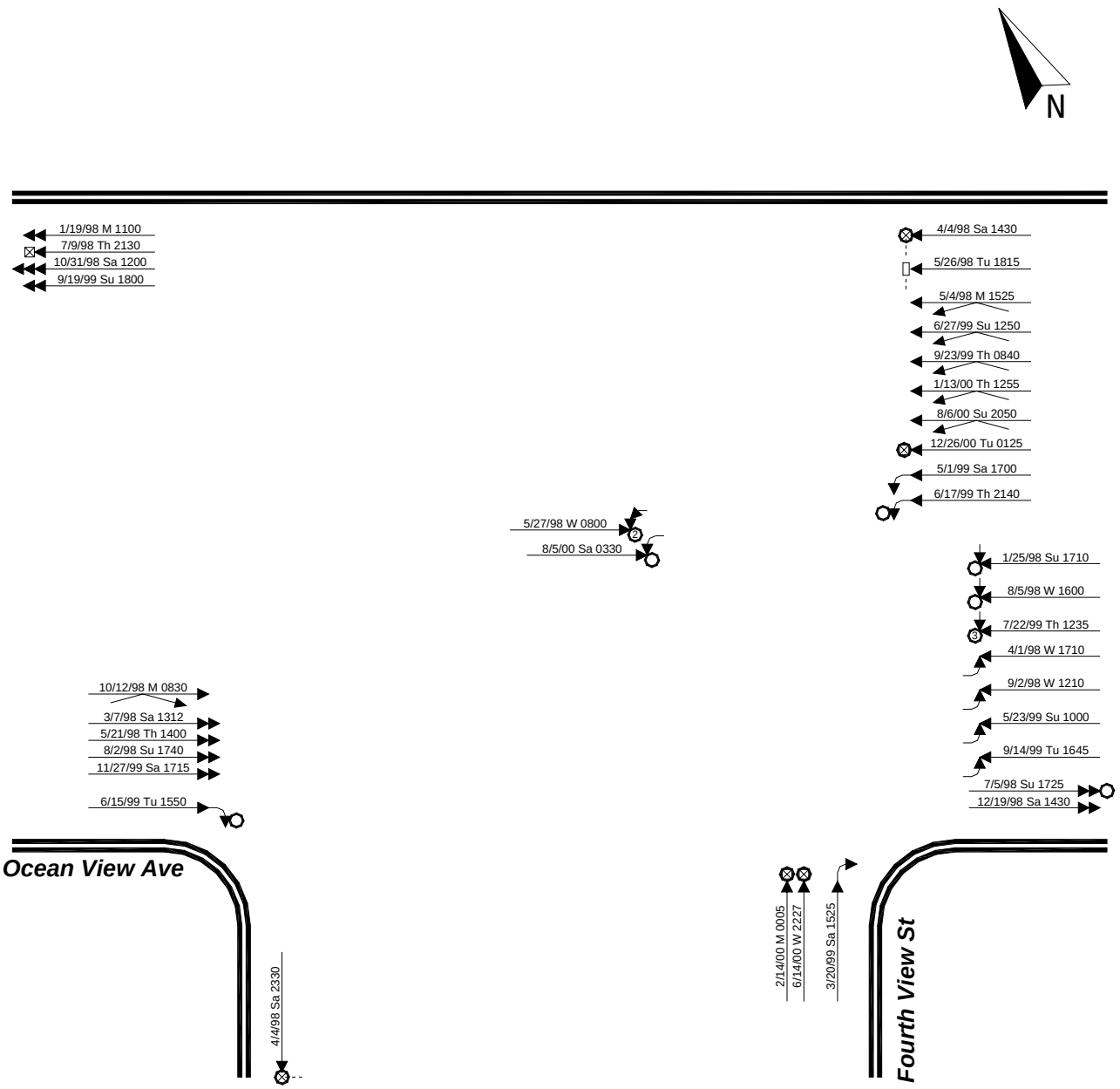


3 SECTION SIGNAL HEAD PROTECTED TURNS



5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Ocean View Ave at Fourth View St
City of Norfolk

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**11.7**
Property Damage Only	**7.3**
Crashes with Injuries	**4.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**5.3**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**15,413**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date: 3/4/00 Sa 2100 (Crash day of week / Crash time of day)
Number of arrowheads represents the number of vehicles involved in the crash

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Ocean View Ave at Fourth View St

City of Norfolk

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	18	11	6	35
PDO Crashes	12	8	2	22
INJ Crashes	6	3	4	13
FAT Crashes	0	0	0	0
Injuries	7	5	4	16
Fatalities	0	0	0	0

Average Number of Crashes	11.7	
Average EPDO	20.3	
Average EPDO Rate	3.61	
Volume Entering Intersection	15,413	
% of crashes involving heavy vehicles - Segment		0.0%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	79.4%	92.8%
Drinking without Impared Ability	2.9%	1.5%
Drinking - not known if impaired	**8.8%**	1.3%
Drinking with Impared Ability	**8.8%**	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	91.4%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	2.9%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	5.7%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	8.6%	11.4%
9:00 - 14:59	31.4%	35.4%
15:00 - 18:59	**37.1%**	29.9%
19:00 - 5:59	22.9%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	11.4%	14.2%
Tuesday	11.4%	14.8%
Wednesday	14.3%	14.7%
Thursday	17.1%	15.2%
Friday	0.0%	17.2%
Saturday	**25.7%**	14.0%
Sunday	**20.0%**	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	82.9%	80.5%
Fog	0.0%	0.4%
Rain/Mist	17.1%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Following too close	**28.6%**	15.7%
Did not have ROW	**25.7%**	18.5%
Driver inattention	8.6%	17.8%
Improper turn from wrong lane	2.9%	1.0%
Disregarded stop - go light	2.9%	5.4%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	34.3%	40.6%
Right Angle	34.3%	39.5%
Head On	0.0%	2.1%
Side Swipe	**11.4%**	7.7%
Fixed Object	**14.3%**	7.1%
Pedestrian	**5.7%**	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	14.3%
Type #2 	14.3%
Type #3 Into Bar Driveway 	11.4%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	2.9%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	**8.8%**	3.9%
Driver Speeding	2.9%	1.8%
Driver Error	**82.4%**	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	2.9%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Ocean View Ave at Fourth View St
Jurisdiction: City of Norfolk

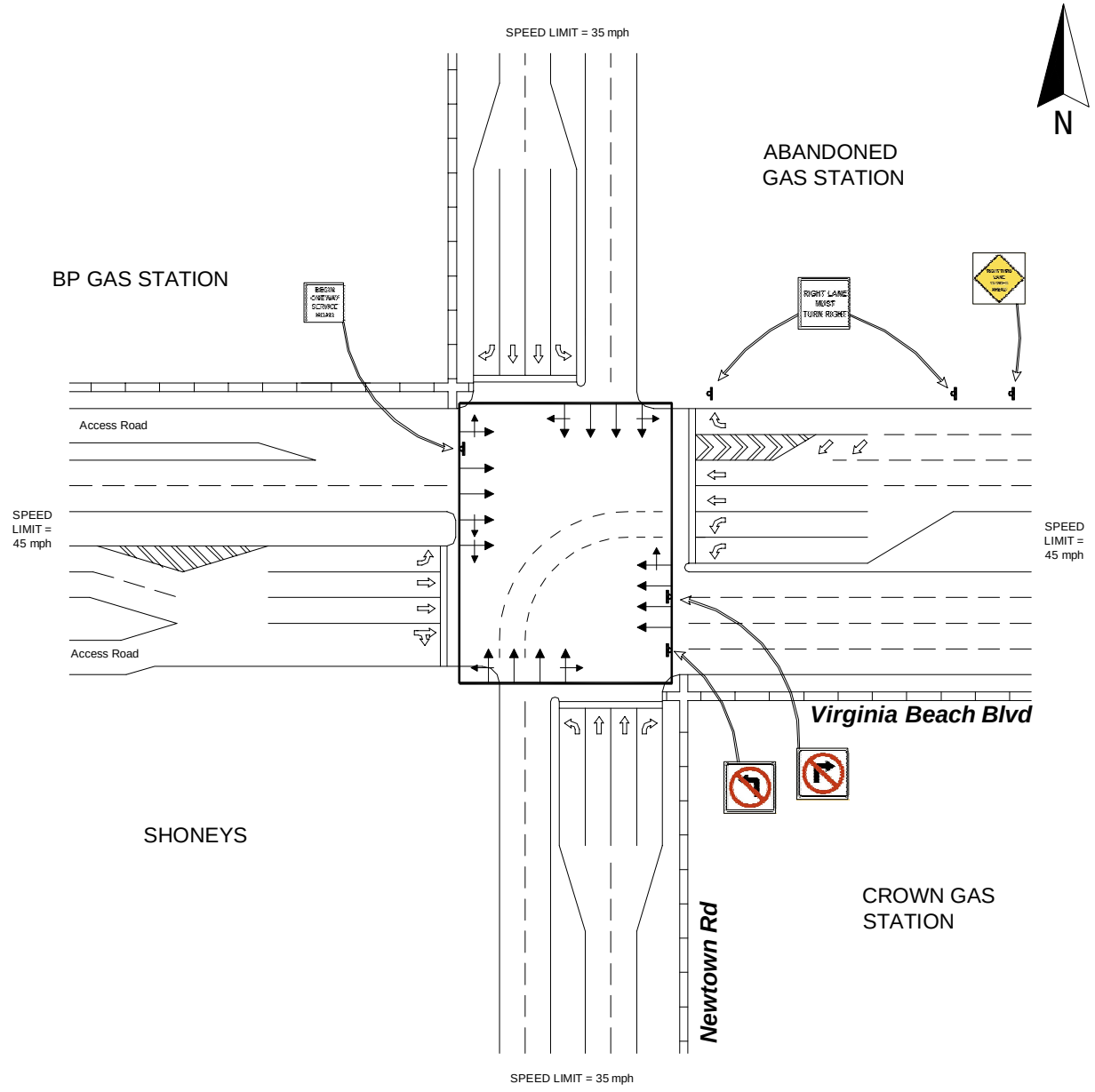
EPDO Rate per Million Entering Vehicles:	3.61
Regional Rank by EPDO Rate:	26 of 468
Number of Crashes Per Year	11.7
Number of Injuries Per Year	5.3
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	15,413

OBSERVATIONS:

- 8.8% of all crashes involved drinking with impaired ability, which was higher than the regional average of 4.4%. An additional 8.8% of crashes involved drinking where it was not known if the driver's ability to drive was impaired (Regional average was 1.3%).
- 37.1% of crashes occurred during the afternoon peak period (3 – 7 pm). Regional average was 29.9%.
- Nearly half (45.7%) of all crashes occurred on weekends (Saturday and Sunday). Regional average for weekends was 23.9%.
- Sideswipe (13.5%), fixed object (14.3%), and pedestrian (5.7%) crash types were higher than the regional averages.
- Primary crash types and movements were westbound sideswipe collisions (14.3%) and eastbound rear end collisions (14.3%) along Ocean View Ave. There were also several crashes involving turning vehicles into and out of properties just north of the intersection along Ocean View Ave.
- Most prevalent driver actions resulting in the crash were following too close (28.6%) and did not have right-of-way (25.7%).

REMEDIES AND COUNTERMEASURES:

- Educate the public of the dangers involved in drinking and driving.
- Upgrade signage and/or pavement markings along Ocean View Ave in the westbound approach make turning restrictions clear to drivers.
- Eliminate obstructions/fixed objects adjacent to intersection that may be causing a problem.
- Consider access management solutions for driveways adjacent to the intersection as many crashes are occurring to the north along Ocean View Ave.
- Review turning radius for dual left-turn lanes from westbound Ocean View Ave to Fourth View St.



ROADWAY GEOMETRY

Newtown Rd at Virginia Beach Blvd
City of Norfolk

LEGEND

CROSSWALK

SIDEWALK

SIGN

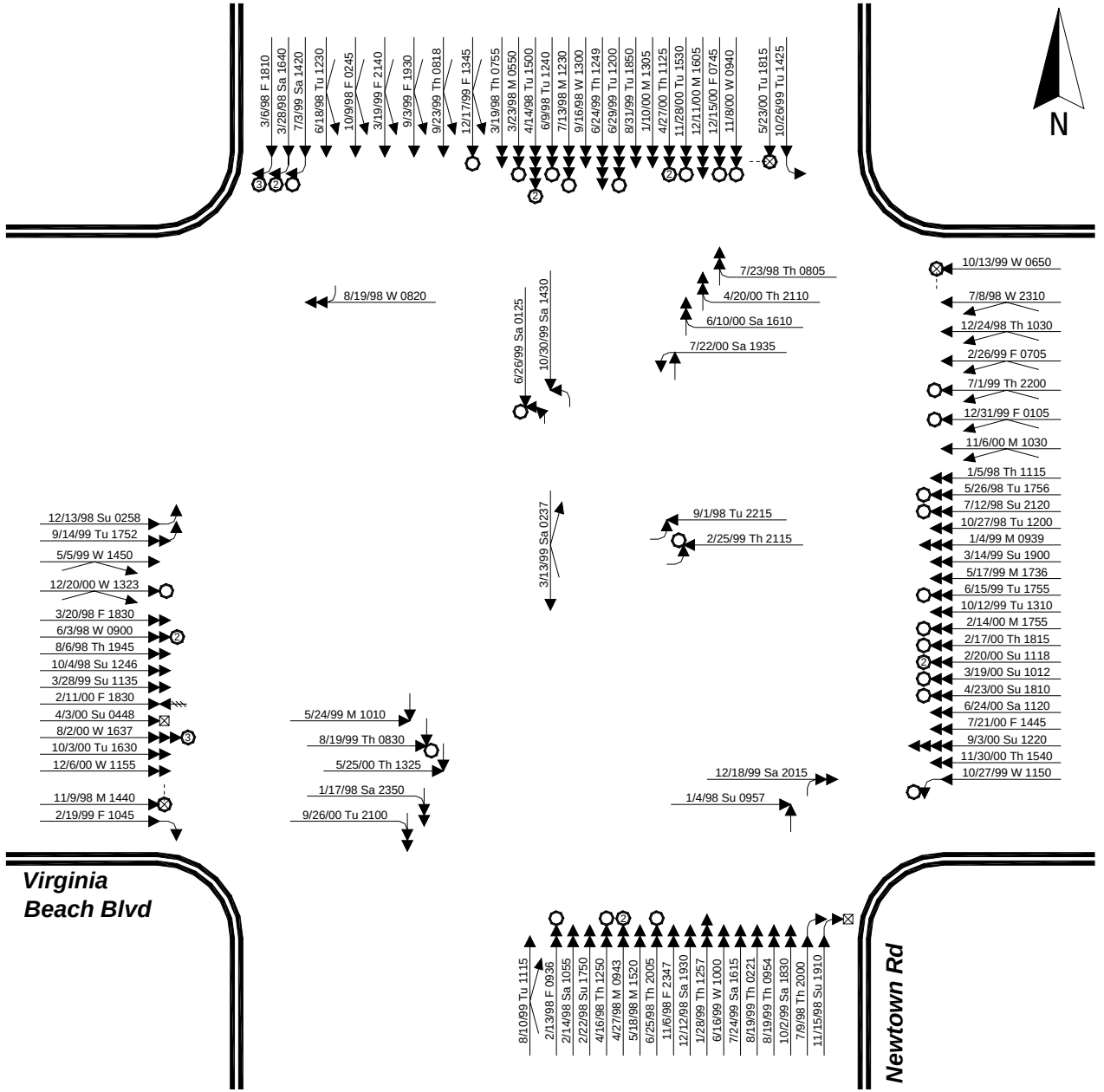
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Newtown Rd at Virginia Beach Blvd
City of Norfolk

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**36.0**
Property Damage Only	**23.7**
Crashes with Injuries	**12.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**16.3**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**71,915**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date: 3/4/00 Sa 2100 (Crash day of week / Crash time of day)
Number of arrowheads represents the number of vehicles involved in the crash

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Newtown Rd at Virginia Beach Blvd

City of Norfolk

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	40	40	28	108
PDO Crashes	26	28	17	71
INJ Crashes	14	12	11	37
FAT Crashes	0	0	0	0
Injuries	20	14	15	49
Fatalities	0	0	0	0

Average Number of Crashes	36	
Average EPDO	60.7	
Average EPDO Rate	2.31	
Volume Entering Intersection	71,915	
% of crashes involving heavy vehicles - Segment		3.3%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	92.1%	92.8%
Drinking without Impared Ability	1.1%	1.5%
Drinking - not known if impaired	1.1%	1.3%
Drinking with Impared Ability	**5.6%**	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	86.7%	83.8%
Obscured by rain/snow	3.3%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	2.2%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	4.4%	2.9%
Not stated	3.3%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	7.4%	11.4%
9:00 - 14:59	42.6%	35.4%
15:00 - 18:59	22.2%	29.9%
19:00 - 5:59	27.8%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	11.1%	14.2%
Tuesday	15.7%	14.8%
Wednesday	12.0%	14.7%
Thursday	**20.4%**	15.2%
Friday	13.9%	17.2%
Saturday	13.9%	14.0%
Sunday	13.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	83.5%	80.5%
Fog	0.0%	0.4%
Rain/Mist	16.5%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Following too close	**44.4%**	15.7%
Driver Inattention	10.0%	17.8%
Did not have ROW	8.9%	18.5%
Hit and Run	4.4%	4.6%
Avoiding other vehicle	2.2%	1.6%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**59.6%**	40.6%
Right Angle	25.0%	39.5%
Head On	0.0%	2.1%
Side Swipe	5.8%	7.7%
Fixed Object	4.8%	7.1%
Pedestrian	3.8%	1.4%
Animal	0.0%	0.2%
Other	1.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**18.4%**
Type #2 	**18.4%**
Type #3 	16.5%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	N/A	2.7%
Driver Asleep/Handicap	N/A	1.8%
Driver Under the Influence	N/A	3.9%
Driver Speeding	N/A	1.8%
Driver Error	N/A	80.6%
Vehicle Defective	N/A	0.5%
Weather/Visibility	N/A	6.4%
Road Defective	N/A	0.2%
Road Slick	N/A	1.4%
Not Stated	N/A	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Newtown Rd at Virginia Beach Blvd*
Jurisdiction: City of Norfolk

EPDO Rate per Million Entering Vehicles:	2.31
Regional Rank by EPDO Rate:	110 of 468
Number of Crashes Per Year	36.0
Number of Injuries Per Year	16.3
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	71,915

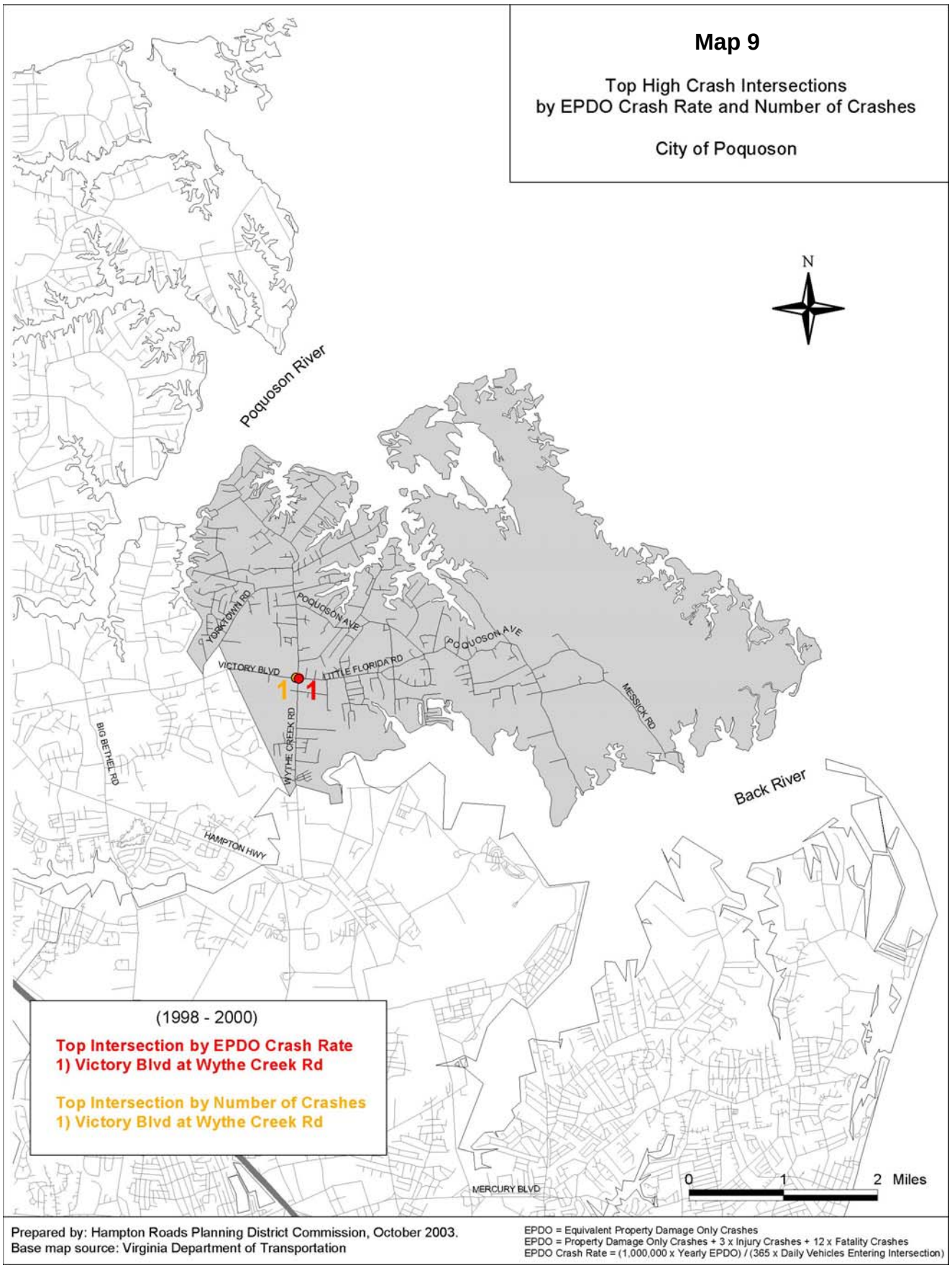
OBSERVATIONS:

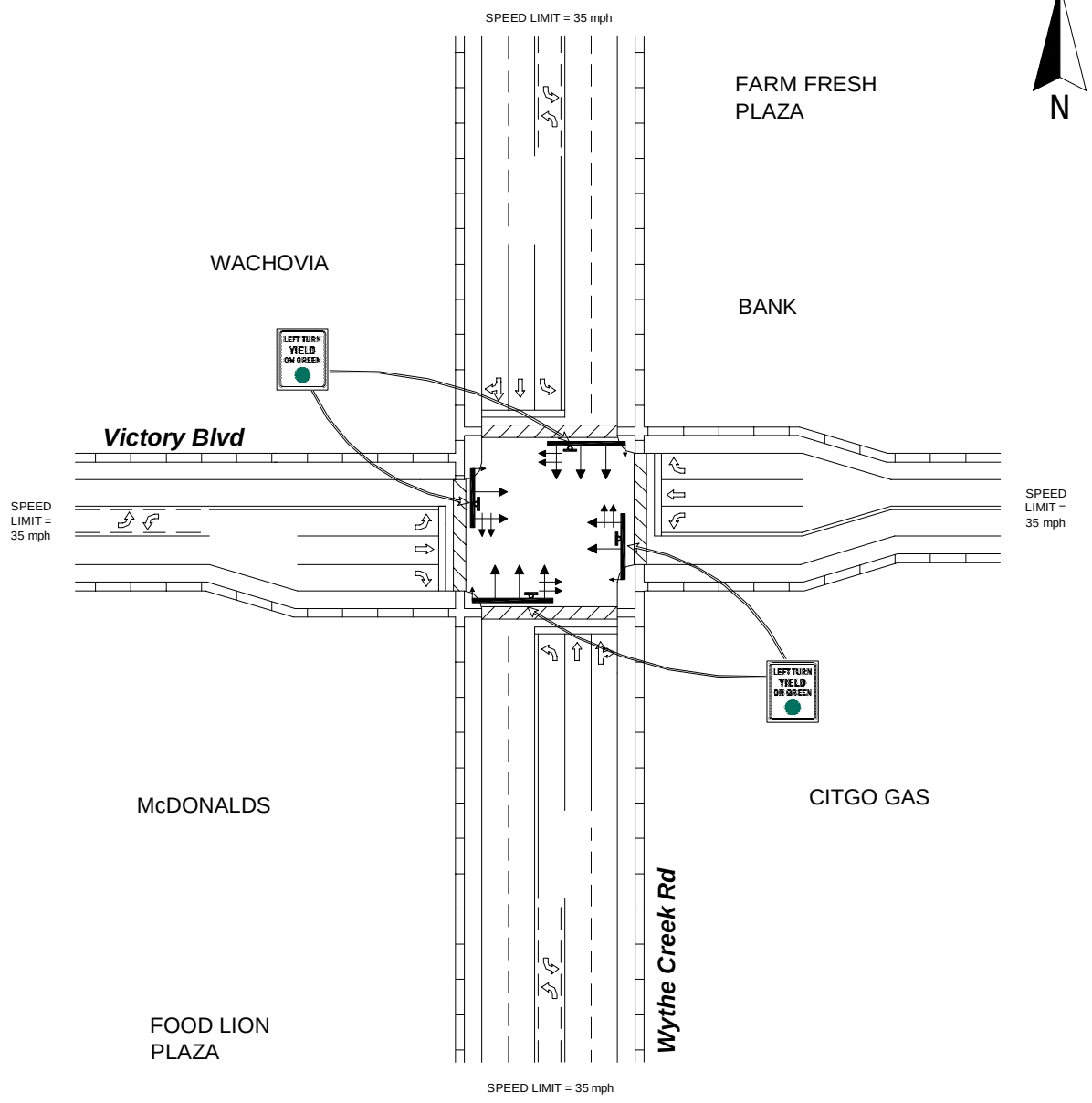
- 5.6% of crashes involved drunk driving. Regional average was 4.4%.
- 20.4% of crashes occurred on Thursday, while the regional average was 15.2%.
- 59.6% of crashes were the result of rear ends. Regional average was 40.6%.
- The primary crash movement and type were rear ends traveling westbound on Virginia Beach Blvd (18.4%) and rear ends traveling southbound on Newtown Rd (18.4%).
- A high percentage of crashes were the result of the drivers following too close (44.4%). Regional average was 15.7%.
- Field observations indicate that left turning traffic significantly exceeds the storage area and backs up into through traffic in the eastbound and southbound directions.

REMEDIES AND COUNTERMEASURES:

- Educate the public of the dangers involved in drunk driving.
- Educate the public of the dangers involved in following too close when traveling through a busy intersection.
- Police enforcement will help deter drivers from tailgating, thus reduce rear end crashes.
- Ensure that signal heads are large enough to provide maximum visibility for drivers approaching the intersection.
- Implement geometric improvements, particularly eastbound and southbound dual left-turn lanes.

* This intersection is currently in the Transportation Improvement Program (TIP) for geometric improvement (part of the 2003 Governor's Congestion Relief Program).


Map 9
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
City of Poquoson
N
Poquoson River
YORKTOWN RD
POQUOSON AVE
POQUOSON AVE
VICTORY BLVD
LITTLE FLORIDA RD
1
1
MESSICK RD
WYTHE CREEK RD
BIG BETHEL RD
Back River
HAMPTON HWY
MERCURY BLVD
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) Victory Blvd at Wythe Creek Rd
Top Intersection by Number of Crashes
1) Victory Blvd at Wythe Creek Rd
0
1
2 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Victory Blvd at Wythe Creek Rd
City of Poquoson

LEGEND

CROSSWALK

SIDEWALK

SIGN

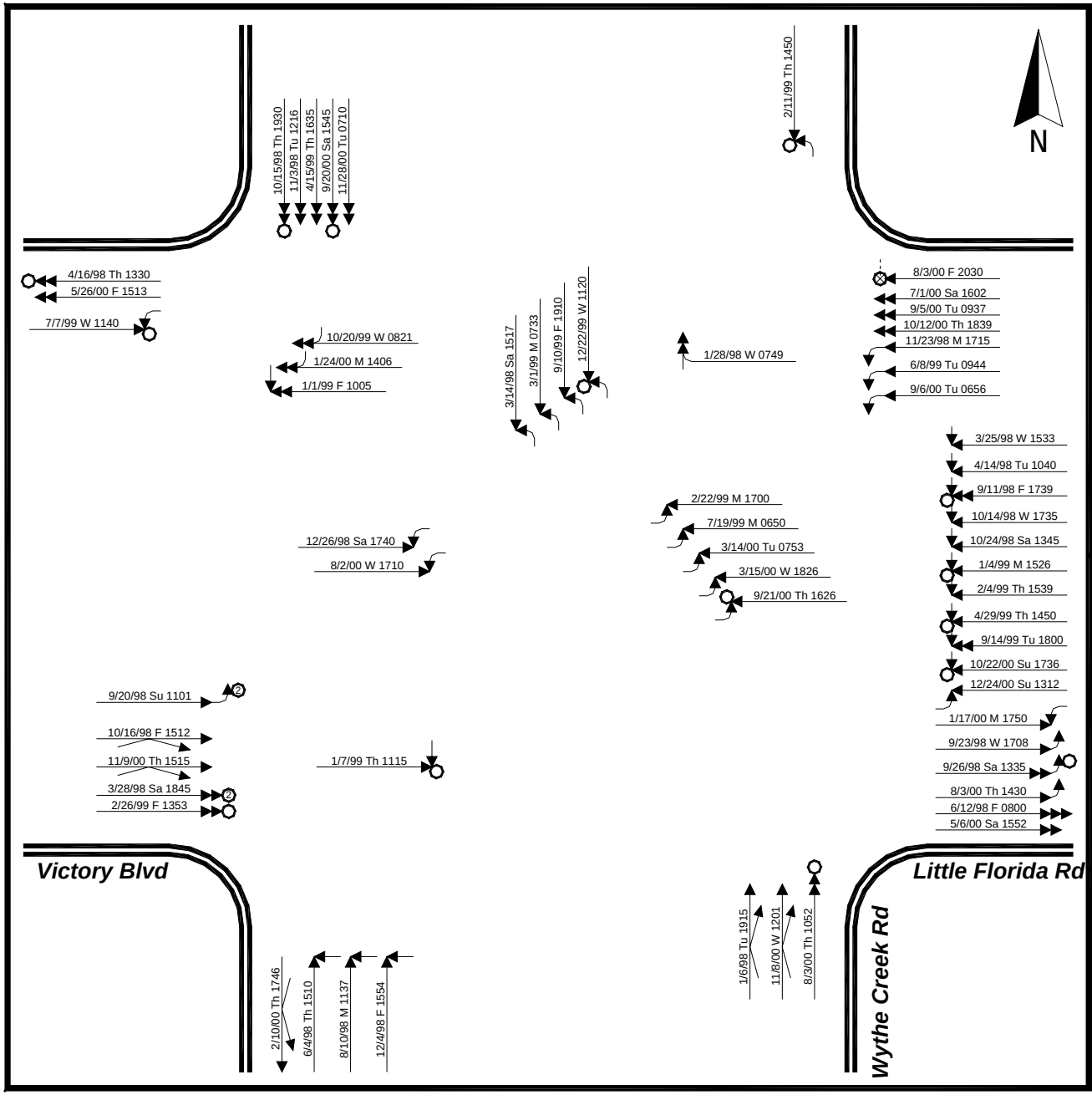
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Victory Blvd at Wythe Creek Rd
City of Poquoson

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**26.7**
Property Damage Only	**20.0**
Crashes with Injuries	**6.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**7.7**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**26,650**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date: 3/4/00 Sa 2100 (Crash day of week / Crash time of day)
Number of arrowheads represents the number of vehicles involved in the crash

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Victory Blvd at Wythe Creek Rd

City of Poquoson

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	25	27	28	80
PDO Crashes	17	19	21	57
INJ Crashes	8	8	7	23
FAT Crashes	0	0	0	0
Injuries	8	8	7	23
Fatalities	0	0	0	0

Average Number of Crashes	26.7	
Average EPDO	40.0	
Average EPDO Rate	4.11	
Volume Entering Intersection	26,650	
% of crashes involving heavy vehicles - Segment		2.6%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	98.4%	92.8%
Drinking without Impared Ability	1.6%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	0.0%	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	78.7%	83.8%
Obscured by rain/snow	1.6%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	**14.8%**	4.5%
Obscured by sun/glare	1.6%	1.3%
Other	3.3%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	13.1%	11.4%
9:00 - 14:59	34.4%	35.4%
15:00 - 18:59	**45.9%**	29.9%
19:00 - 5:59	6.6%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	13.1%	14.2%
Tuesday	14.8%	14.8%
Wednesday	16.4%	14.7%
Thursday	**23.0%**	15.2%
Friday	14.8%	17.2%
Saturday	13.1%	14.0%
Sunday	4.9%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	85.2%	80.5%
Fog	0.0%	0.4%
Rain/Mist	14.8%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

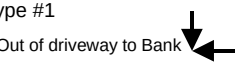
MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**51.0%**	18.5%
Following too close	**27.5%**	15.7%
Improper backing	5.9%	1.3%
Driver inattention	3.9%	17.8%
Disregarded stop - go light	3.9%	5.4%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	41.0%	40.6%
Right Angle	**49.2%**	39.5%
Head On	0.0%	2.1%
Side Swipe	8.2%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	1.6%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 Out of driveway to Bank 	**16.4%**
Type #2 	8.2%
Type #3 	8.2%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	0.0%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	85.5%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	**14.5%**	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Victory Blvd at Wythe Creek Rd
Jurisdiction: City of Poquoson

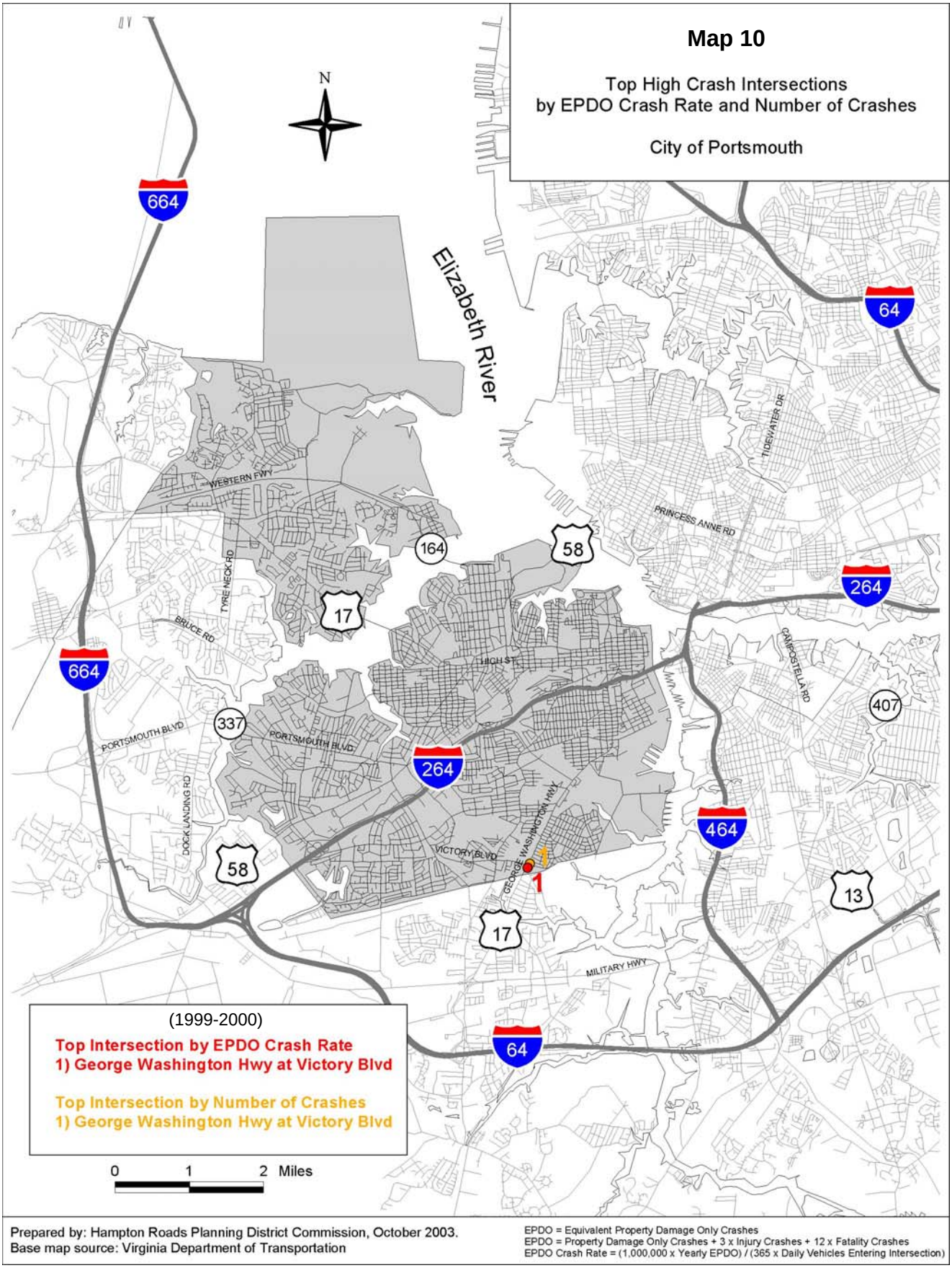
EPDO Rate per Million Entering Vehicles:	4.11
Regional Rank by EPDO Rate:	13 of 468
Number of Crashes Per Year	26.7
Number of Injuries Per Year	7.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	26,650

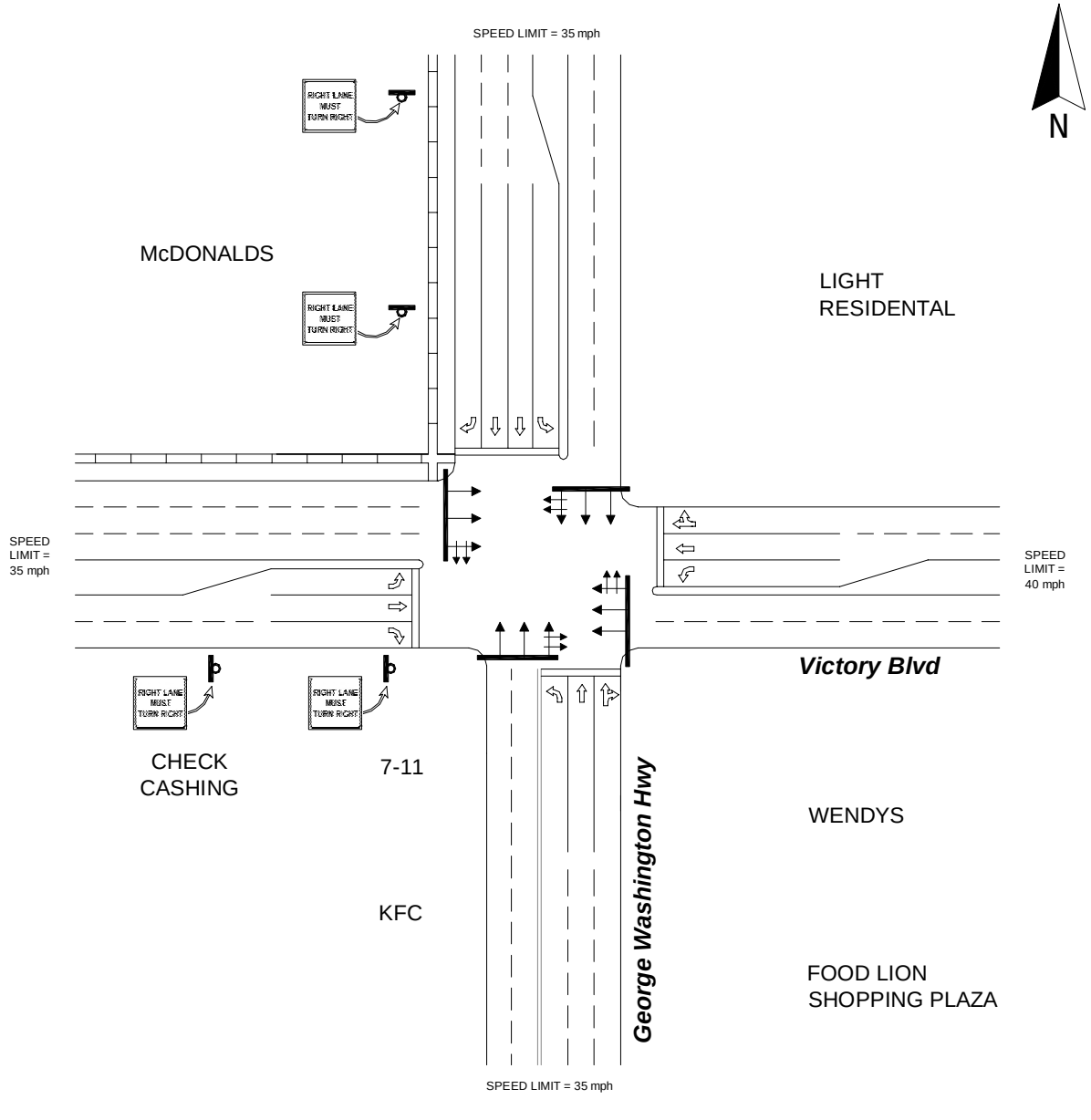
OBSERVATIONS:

- 2.6% of crashes involved heavy vehicles. The regional average was 5.3%.
- 14.8% of crashes occurred where other vehicles obscured the driver's vision. Regional average was 4.5%.
- Nearly 46% of crashes occurred during the afternoon peak period (3-7 pm). The regionwide average was 29.9%.
- 23.0% of crashes occurred on Thursday. Regional average was 15.2%.
- 49.2% of crashes were right angle collisions. Regional average was 39.5%.
- 18% of crashes involved drivers that failed to yield the right of way on left turns within the intersection.
- 28% of crashes involved movements in and out of driveways (particularly the Farm Fresh Shopping Plaza) on Little Florida Road east of the intersection.
- Most prevalent driver actions resulting in the crash were did not have right-of-way (51.0%), following too close (27.5%), and improper backing (5.9%). The regional average for crashes where drivers did not have the right-of-way was 18.5%.

REMEDIES AND COUNTERMEASURES:

- Ensure that signal heads are large enough to provide maximum visibility for drivers approaching the intersection.
- Review signal clearance times at the intersection.
- Review signal phasing and timing at the intersection.
- Consider using protected phase only left turns at the intersection. If protected/permitted phase is used, ensure that a sign, warning drivers to yield during green, is present and clearly visible.
- Consider access management solutions, such as adding a median along Little Florida Rd (east of intersection), to reduce conflict points and improve driver visibility into and out of the Farm Fresh Shopping Plaza.


Map 10
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
City of Portsmouth
N
Elizabeth River
664
64
264
464
58
17
164
337
407
13
WESTERN FWY
TYRE NECK RD
BRUCE RD
HIGH ST
PORTSMOUTH BLVD
DOCK LANDING RD
VICTORY BLVD
GEORGE WASHINGTON HWY
MILITARY HWY
PRINCESS ANNE RD
TIDEWATER DR
CAMPOSTELLA RD
(1999-2000)
Top Intersection by EPDO Crash Rate
1) George Washington Hwy at Victory Blvd
Top Intersection by Number of Crashes
1) George Washington Hwy at Victory Blvd
0 1 2 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

George Washington Hwy at Victory Blvd
City of Portsmouth

LEGEND

CROSSWALK

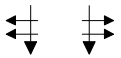
SIDEWALK

SIGN

TRAFFIC SIGNALS

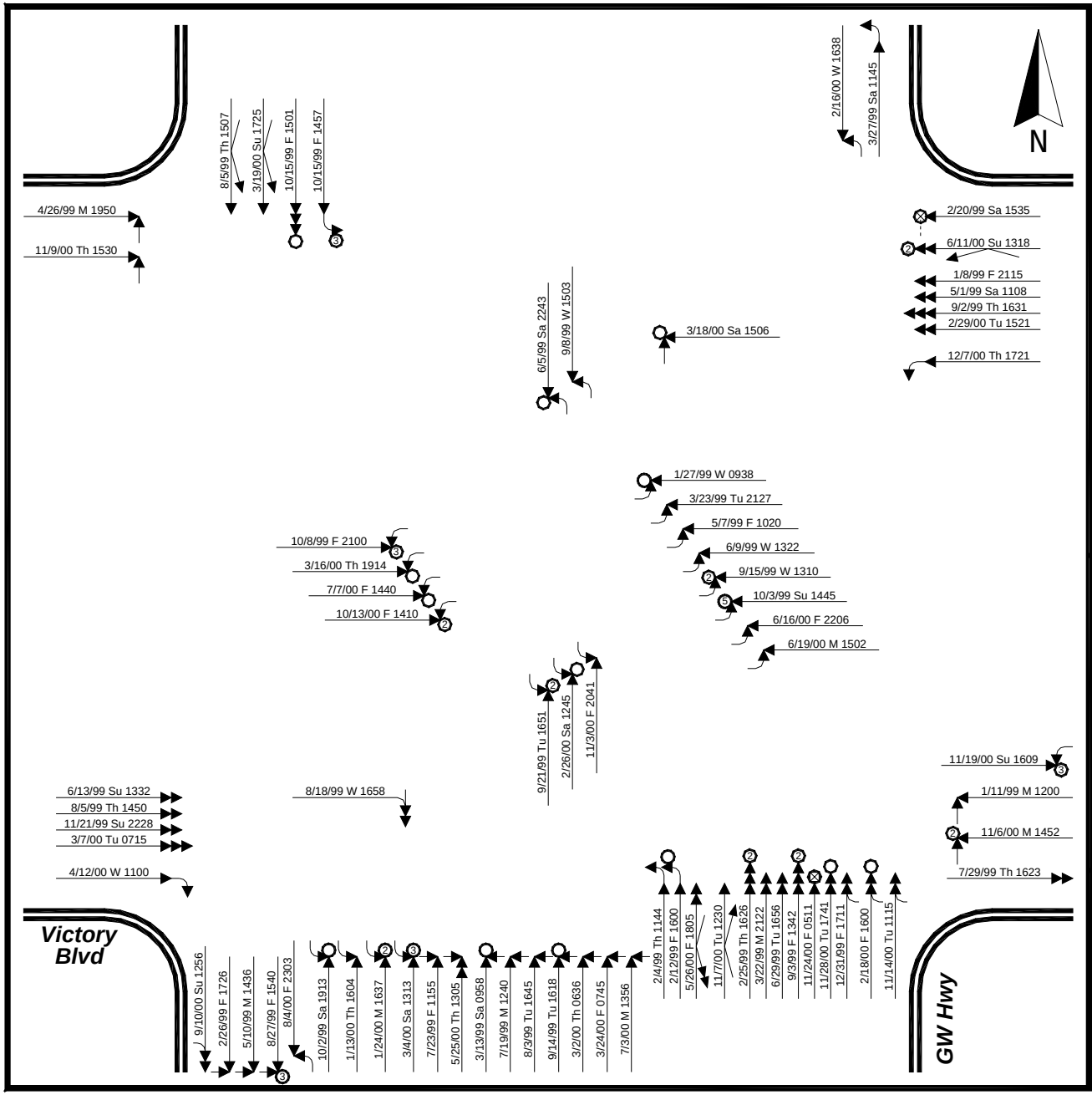
3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS



5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

George Washington Hwy at Victory Blvd
City of Portsmouth

Analysis includes crashes within 250 feet of the intersection from **1999 to 2000**.

NO. OF CRASHES PER YEAR	**55.5**
Property Damage Only	**36.5**
Crashes with Injuries	**19.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**30.0**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**40,813**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date: 3/4/00 Sa 2100 (Crash day of week / Crash time of day)

Number of arrowheads represents the number of vehicles involved in the crash

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

George Washington Hwy at Victory Blvd

City of Portsmouth

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes		59	52	111
PDO Crashes		38	34	72
INJ Crashes		21	18	39
FAT Crashes		0	0	0
Injuries		33	27	60
Fatalities		0	0	0

Average Number of Crashes	55.5	
Average EPDO	93.5	
Average EPDO Rate	6.28	
Volume Entering Intersection	40,813	
% of crashes involving heavy vehicles - Segment		**9.5%**
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	93.2%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	1.4%	1.3%
Drinking with Impared Ability	**5.4%**	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	86.5%	83.8%
Obscured by rain/snow	2.7%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	**8.1%**	4.5%
Obscured by sun/glare	1.4%	1.3%
Other	1.4%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	4.1%	11.4%
9:00 - 14:59	**39.2%**	35.4%
15:00 - 18:59	**39.2%**	29.9%
19:00 - 5:59	17.6%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	12.2%	14.2%
Tuesday	13.5%	14.8%
Wednesday	9.5%	14.7%
Thursday	16.2%	15.2%
Friday	**27.0%**	17.2%
Saturday	12.2%	14.0%
Sunday	9.5%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	86.5%	80.5%
Fog	0.0%	0.4%
Rain/Mist	13.5%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**25.7%**	18.5%
Hit and run	**16.2%**	4.6%
Driver inattention	**14.9%**	17.8%
Other improper turning	**8.1%**	1.8%
Following too close	5.4%	15.7%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	27.0%	40.6%
Right Angle	**51.4%**	39.5%
Head On	2.7%	2.1%
Side Swipe	**13.5%**	7.7%
Fixed Object	1.4%	7.1%
Pedestrian	1.4%	1.4%
Animal	0.0%	0.2%
Other	2.7%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**13.5%**
Type #2 	**10.8%**
Type #3 Out of Wendys/ Food Lion driveway 	**9.5%**

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	2.8%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	4.2%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	81.9%	80.6%
Vehicle Defective	2.8%	0.5%
Weather/Visibility	8.3%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1999-2000)

Intersection: George Washington Hwy at Victory Blvd
Jurisdiction: City of Portsmouth

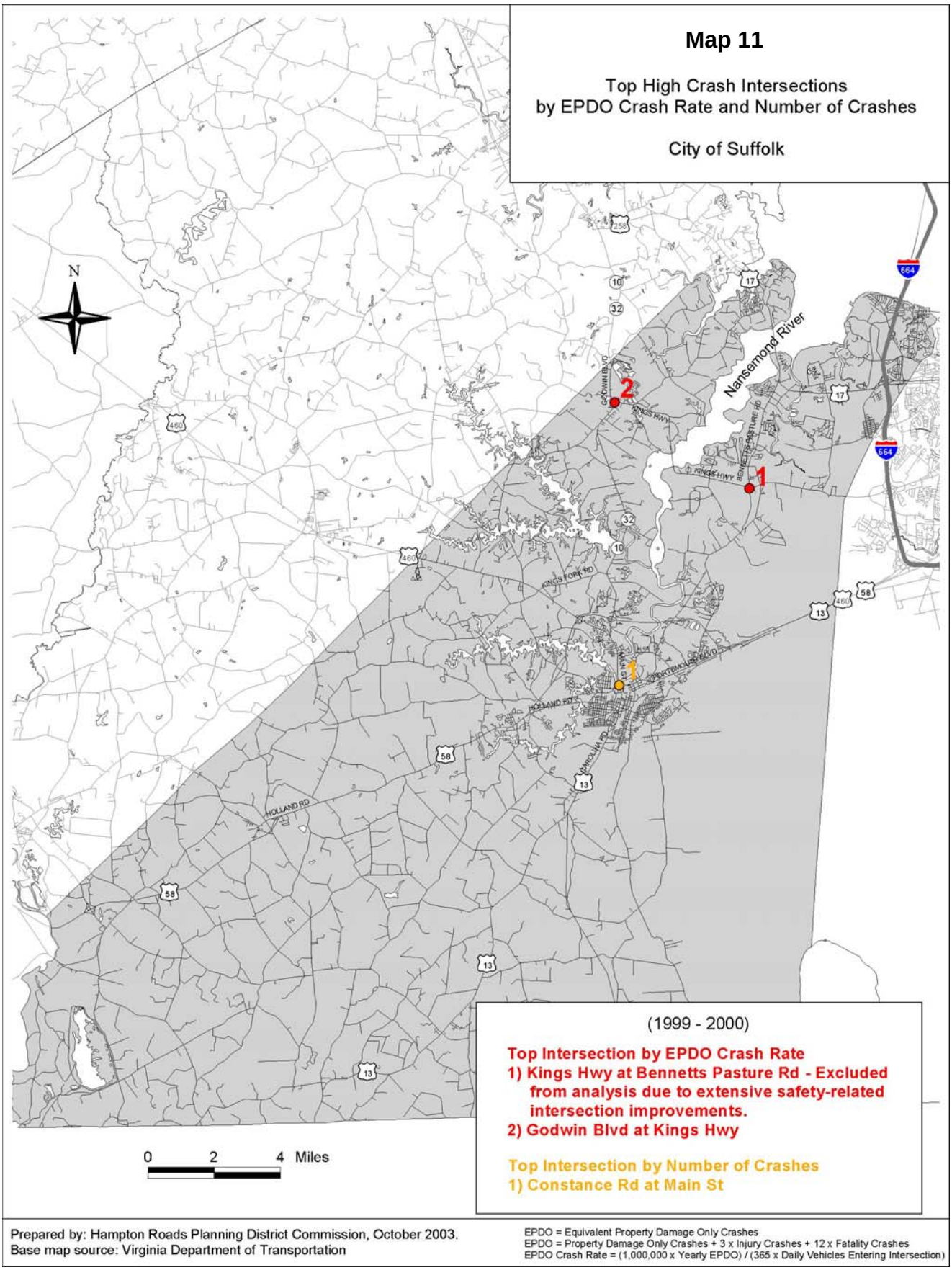
EPDO Rate per Million Entering Vehicles:	6.28
Regional Rank by EPDO Rate:	2 of 468
Number of Crashes Per Year	55.5
Number of Injuries Per Year	30.0
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	40,813

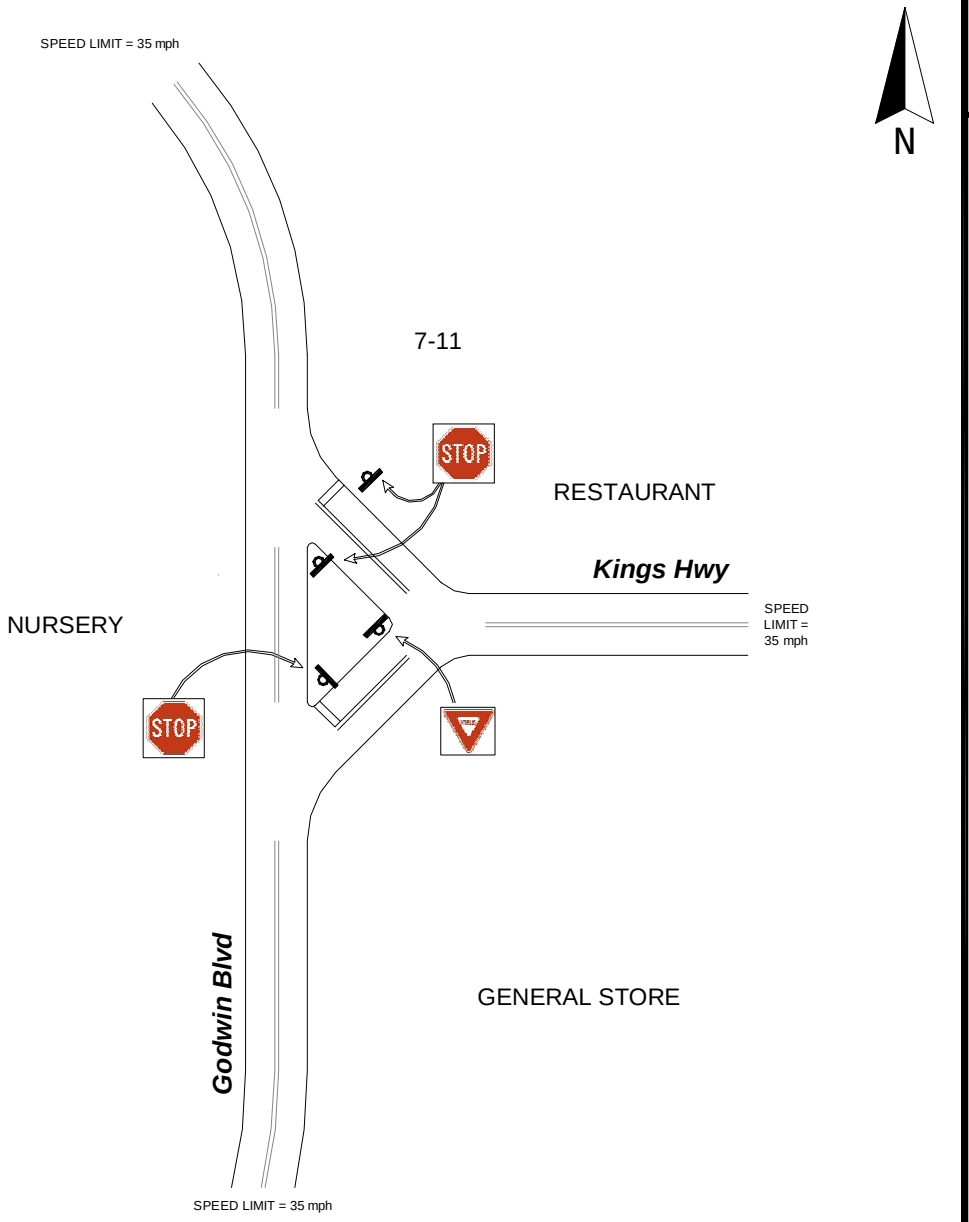
OBSERVATIONS:

- 9.5% of crashes involved heavy vehicles. This is considerably higher than the regional average of 5.3%.
- 5.4% of all crashes involved drinking with impaired ability, which was higher than the regional average of 4.4%.
- 8.1% of crashes occurred where other vehicles obscured the driver's vision. Regional average was 4.5%.
- Nearly 80% of crashes occurred during the day (9am – 7pm).
- 27% of crashes occurred on Friday. Regional average was 17.2%.
- 51.4% of crashes were right angle collisions. Regional average was 39.5%. Sideswipe crashes (13.5%) were also higher than the regional average (7.7%).
- Northbound rear ends along GW Hwy, eastbound left turns with westbound throughs along Victory Blvd, and movements in and out of driveways (Wendys/7-11/KFC) south of the intersection (access management related crashes) were the highest crash movements.
- Most prevalent driver actions resulting in the crash were did not have right-of-way (25.7%), hit and run (16.2%), and driver inattention (14.9%). 8.1% of crashes involved driver's making an improper turns, where the regional average was only 1.8%.

REMEDIES AND COUNTERMEASURES:

- Ensure that signal heads are large enough to provide maximum visibility for drivers approaching the intersection.
- Educate the public of the dangers involved in drinking and driving.
- Review signal clearance times at the intersection.
- Review signal phasing and timing at the intersection.
- Consider using protected phase only for eastbound left turns along Victory Blvd. If protected/permitted phase is used, ensure that a sign, warning drivers to yield during green, is present and clearly visible.
- Consider access management solutions, such as adding a median along George Washington Rd (south of intersection), to reduce conflict points into and out of the 7-11/KFC and Wendys/Food Lion Shopping Plaza. A median design will also provide a refuge for pedestrians crossing the roadway.


Map 11
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
City of Suffolk
N
Nansemond River
KINGS HWY
KINGS FORK RD
HOLLAND RD
MAIN ST
CONSTANCE RD
BENNETTS PASTURE RD
GODWIN BLVD
0 2 4 Miles
(1999 - 2000)
Top Intersection by EPDO Crash Rate
1) Kings Hwy at Bennetts Pasture Rd - Excluded from analysis due to extensive safety-related intersection improvements.
2) Godwin Blvd at Kings Hwy
Top Intersection by Number of Crashes
1) Constance Rd at Main St
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Godwin Blvd at Kings Hwy
City of Suffolk

LEGEND

CROSSWALK

SIDEWALK

SIGN

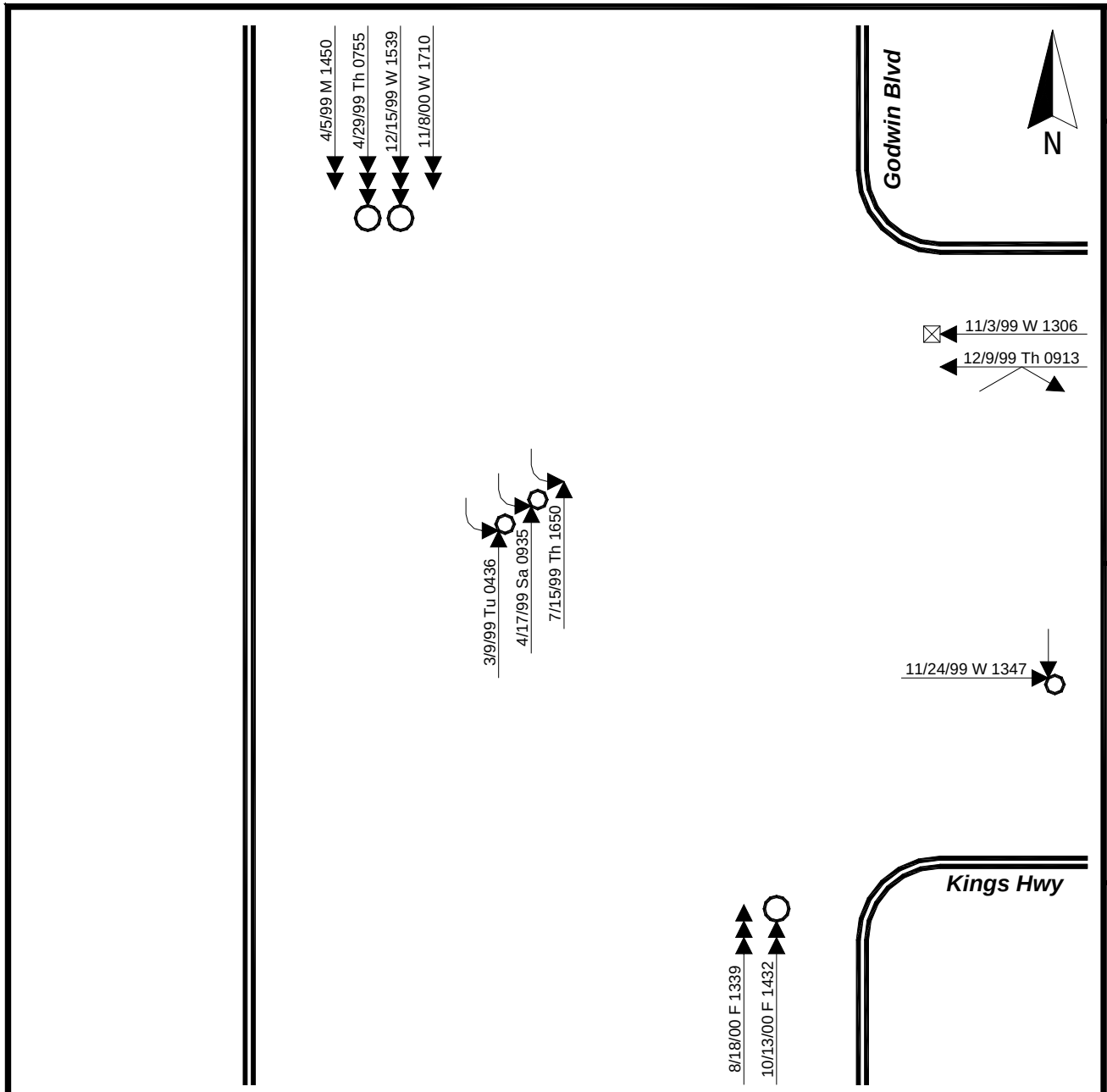
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

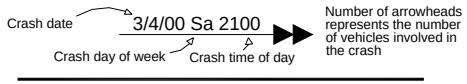
Godwin Blvd at Kings Hwy
City of Suffolk

Analysis includes crashes within 250 feet of the intersection from **1999 to 2000**.

NO. OF CRASHES PER YEAR	**6.0**
Property Damage Only	**3.0**
Crashes with Injuries	**3.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**3.5**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**11,233**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Godwin Blvd at Kings Hwy

City of Suffolk

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes		9	3	12
PDO Crashes		4	2	6
INJ Crashes		5	1	6
FAT Crashes		0	0	0
Injuries		6	1	7
Fatalities		0	0	0

Average Number of Crashes	6	
Average EPDO	12	
Average EPDO Rate	2.93	
Volume Entering Intersection	11,233	
% of crashes involving heavy vehicles - Segment		**18.2%**
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	90.9%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	**9.1%**	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	81.8%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	9.1%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	9.1%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	8.3%	11.4%
9:00 - 14:59	**58.3%**	35.4%
15:00 - 18:59	25.0%	29.9%
19:00 - 5:59	8.3%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	8.3%	14.2%
Tuesday	8.3%	14.8%
Wednesday	**33.3%**	14.7%
Thursday	**25.0%**	15.2%
Friday	16.7%	17.2%
Saturday	8.3%	14.0%
Sunday	0.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	72.7%	80.5%
Fog	0.0%	0.4%
Rain/Mist	**18.2%**	17.8%
Snow/Sleet	9.1%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**36.4%**	18.5%
Driver Inattention	**27.3%**	17.8%
Following too close	**18.2%**	15.7%
Disregarded stop or yield sign	9.1%	2.0%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**50.0%**	40.6%
Right Angle	33.3%	39.5%
Head On	0.0%	2.1%
Side Swipe	8.3%	7.7%
Fixed Object	8.3%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**33.3%**
Type #2 	**25.0%**
Type #3 	16.7%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	9.1%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	0.0%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	72.7%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	9.1%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1999-2000)

Intersection: Godwin Blvd at Kings Hwy
Jurisdiction: City of Suffolk

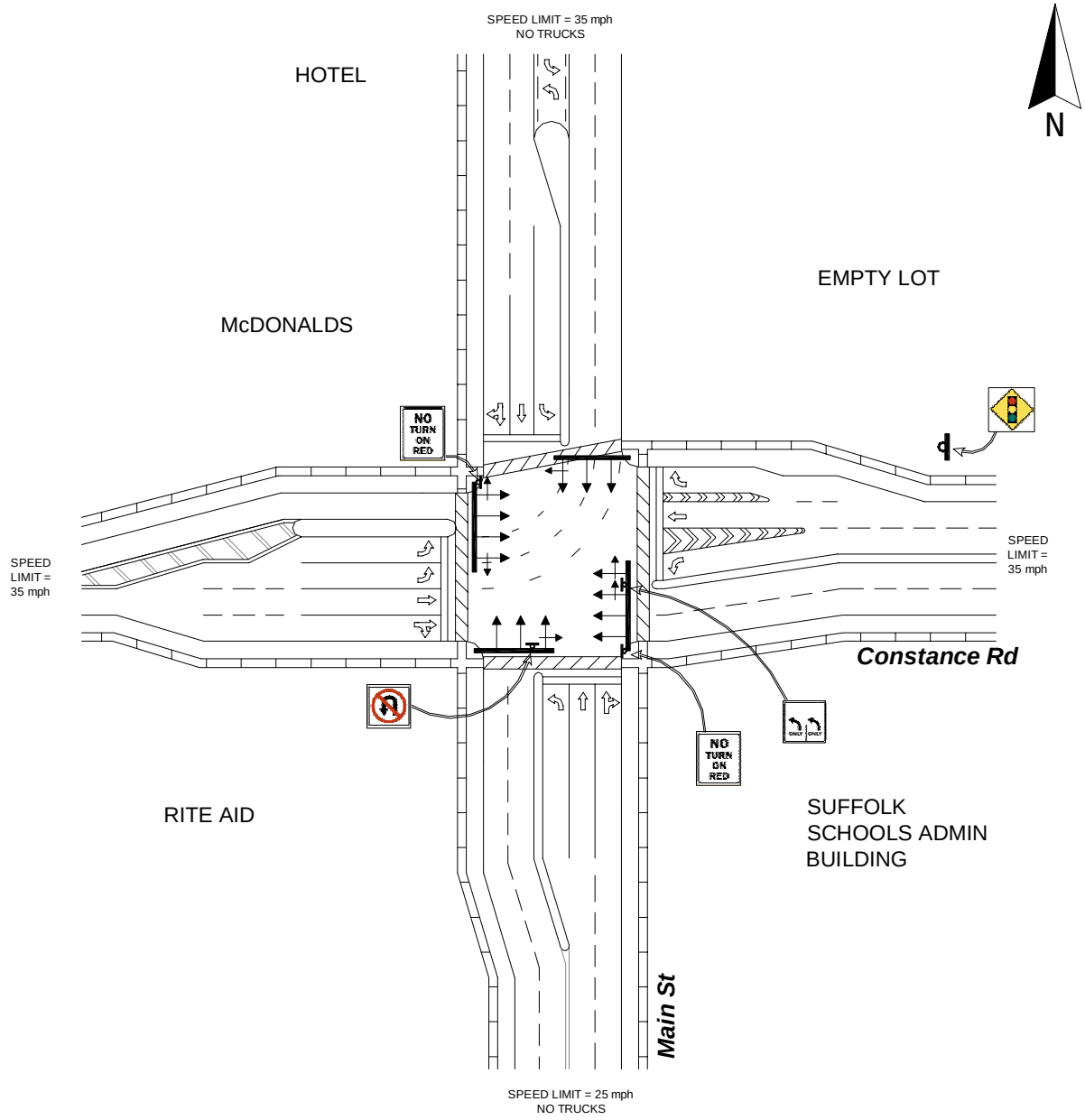
EPDO Rate per Million Entering Vehicles:	2.93
Regional Rank by EPDO Rate:	52 of 468
Number of Crashes Per Year	6.0
Number of Injuries Per Year	3.5
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	11,233

OBSERVATIONS:

- 18.2% of crashes involved heavy vehicles. Regional average was 5.3%.
- 9.1% of crashes involved drinking with impaired ability. Regional average was 4.4%.
- A majority of crashes (58.3%) occurred from 9 am to 3 pm. Regional average for this time period was 35.4%.
- 33.3% of crashes occurred on Wednesday, while the regional average was 14.7%.
- 25% of crashes occurred on Thursday, while the regional average was 15.2%.
- 18.2% of crashes occurred during rain or mist conditions. Regional average was 17.8%.
- 50% of crashes were rear end collisions. Regional average was 40.6%.
- The primary crash movement and type were rear ends traveling southbound on Godwin Blvd (33.3%). The second highest crash movement were southbound left-turning vehicles with northbound through vehicles on Godwin Blvd (25%).
- 36.4% of crashes were the result of the drivers not having the right-of-way. Regional average was 18.5%.
- 27.3% of crashes were the result of driver inattention. Regional average was 17.8%.
- 18.2% of crashes were the result of drivers following too close. Regional average was 15.7%.

REMEDIES AND COUNTERMEASURES:

- Consider the installation of 'watch for turning vehicles' signs on northbound and southbound approaches on Godwin Blvd.
- If traffic crashes continue or increase, a traffic signal may be warranted.



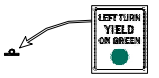
ROADWAY GEOMETRY

Constance Rd at Main St
City of Suffolk

LEGEND

CROSSWALK

SIDEWALK

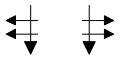


SIGN

TRAFFIC SIGNALS

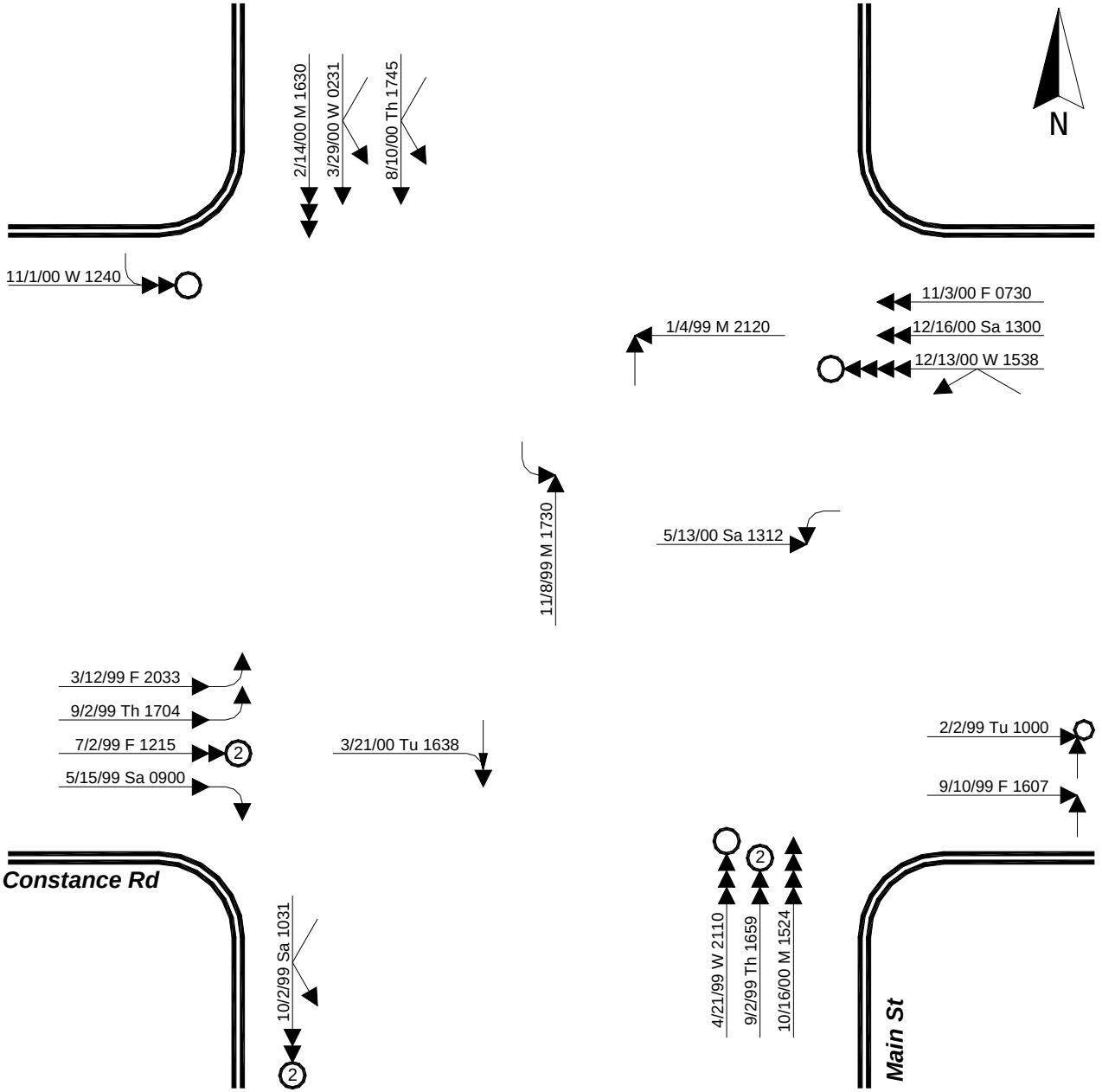
3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS



5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Constance Rd at Main St
City of Suffolk

Analysis includes crashes within 250 feet of the intersection from **1999 to 2000**.

NO. OF CRASHES PER YEAR	**14.5**
Property Damage Only	**10.5**
Crashes with Injuries	**4.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**5.0**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**40,380**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date: 3/4/00 Sa 2100 (Crash day of week / Crash time of day). Number of arrowheads represents the number of vehicles involved in the crash.

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Constance Rd at Main St

City of Suffolk

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes		16	13	29
PDO Crashes		10	11	21
INJ Crashes		6	2	8
FAT Crashes		0	0	0
Injuries		8	2	10
Fatalities		0	0	0

Average Number of Crashes	14.5	
Average EPDO	22.5	
Average EPDO Rate	1.53	
Volume Entering Intersection	40,380	
% of crashes involving heavy vehicles - Segment		**7.7%**
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	100.0%	92.8%
Drinking without Impared Ability	0.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	0.0%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	93.1%	83.8%
Obscured by rain/snow	**6.9%**	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	0.0%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	6.9%	11.4%
9:00 - 14:59	**37.9%**	35.4%
15:00 - 18:59	**37.9%**	29.9%
19:00 - 5:59	17.2%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	17.2%	14.2%
Tuesday	13.8%	14.8%
Wednesday	17.2%	14.7%
Thursday	17.2%	15.2%
Friday	17.2%	17.2%
Saturday	17.2%	14.0%
Sunday	0.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	85.7%	80.5%
Fog	0.0%	0.4%
Rain/Mist	14.3%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

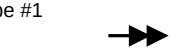
MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver Inattention	**50.0%**	17.8%
Did not have ROW	16.7%	18.5%
Disregarded stop - go light	5.6%	5.4%
Hit and run	5.6%	4.6%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	35.7%	40.6%
Right Angle	39.3%	39.5%
Head On	0.0%	2.1%
Side Swipe	**17.9%**	7.7%
Fixed Object	7.1%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**19.0%**
Type #2 	14.3%
Type #3 	14.3%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	3.4%	1.8%
Driver Under the Influence	0.0%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	48.3%	80.6%
Vehicle Defective	**6.9%**	0.5%
Weather/Visibility	0.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	44.8%	0.7%

Intersection Traffic Crash Analysis Summary (1999-2000)

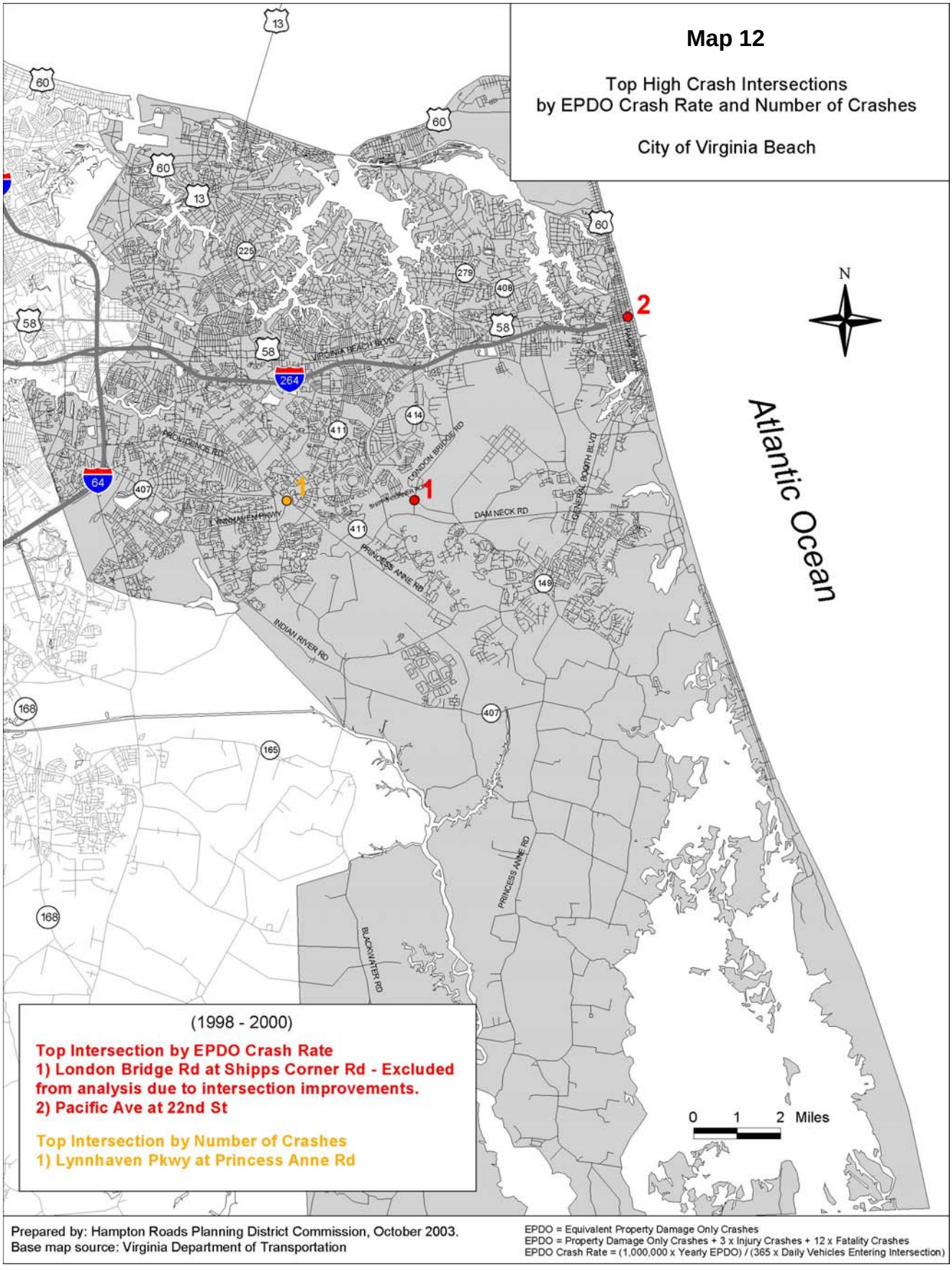
Intersection:	**Constance Rd at Main St**
Jurisdiction:	**City of Suffolk**
EPDO Rate per Million Entering Vehicles:	1.53
Regional Rank by EPDO Rate:	222 of 468
Number of Crashes Per Year	14.5
Number of Injuries Per Year	5.0
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	40,380

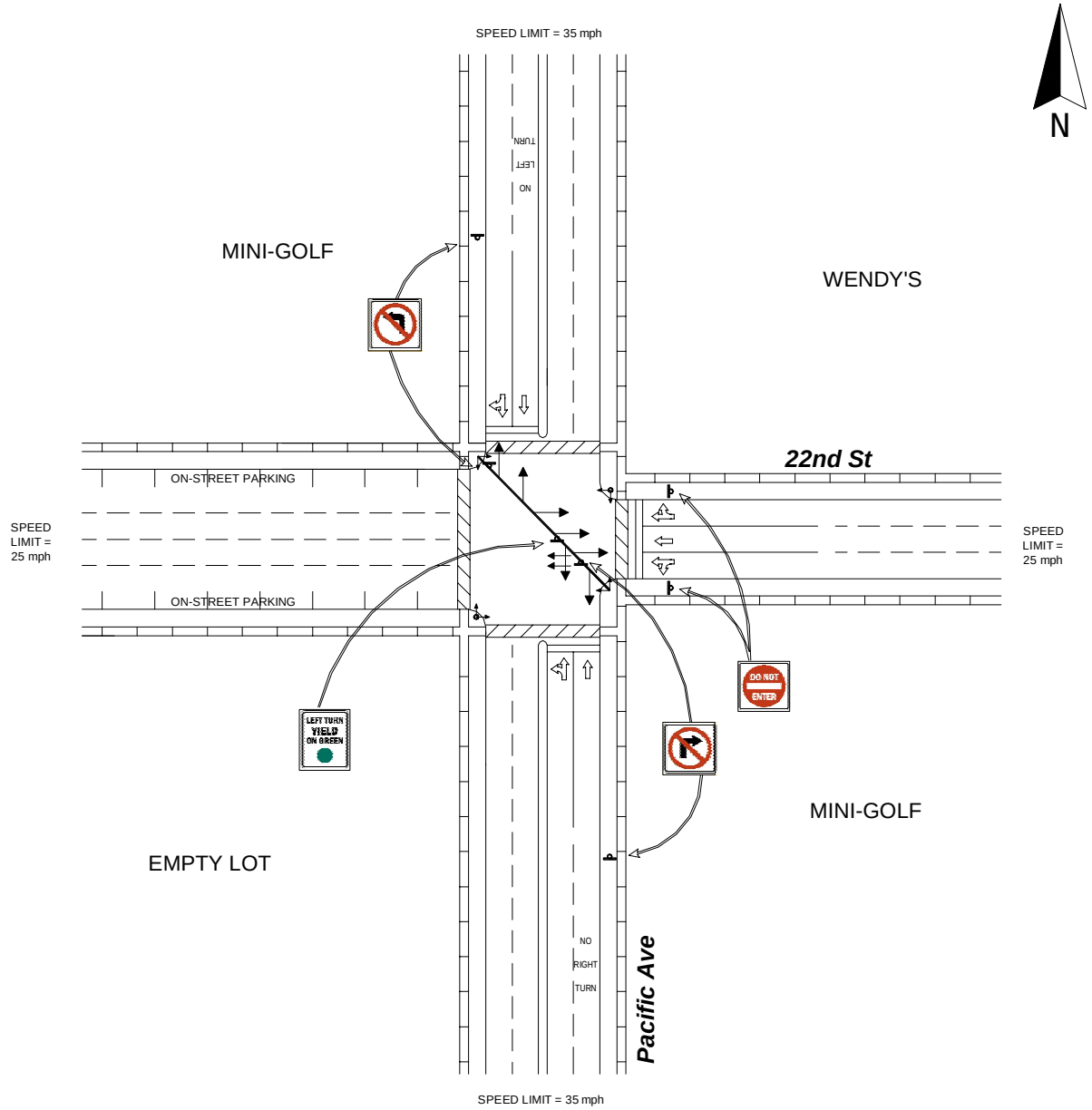
OBSERVATIONS:

- 7.7% of crashes involved heavy vehicles. Regional average was 5.3%.
- 6.9% of crashes involved the driver's vision being obscured by rain or snow. Regional average was 3.1%.
- A majority of crashes (75.8%) occurred during the day from 9 am to 7 pm. Regional average for this time period was 65.3%.
- 50% of crashes were the result of driver inattention. Regional average was 17.8%.
- The primary crash movement and types varied greatly for this intersection. Eastbound rear end collisions along Constance Rd were the highest for the intersection at 19%.
- Rear end (35.7%) and right angle (39.3%) collisions were the predominant crash type. Sideswipe collisions accounted for 17.9%, which was higher than the regional average (7.7%).
- 6.9% of crashes involved a defective vehicle. Regional average was 0.5%.

REMEDIES AND COUNTERMEASURES:

- Educate the public of the dangers involved in not paying attention when traveling through a busy intersection.
- Consider adding a 'signal ahead' sign for eastbound approach along Constance Rd.
- Ensure that driveways are not located too close to the intersection where traffic queues may regularly back up.
- Educate motorists to maintain and inspect vehicles on a regular basis.


Map 12
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
City of Virginia Beach
N
Atlantic Ocean
VIRGINIA BEACH BLVD
PROVIDENCE RD
LONDON BRIDGE RD
GENERAL BOOTH BLVD
DAM NECK RD
PRINCESS ANNE RD
INDIAN RIVER RD
BLACKWATER RD
1
2
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) London Bridge Rd at Shipps Corner Rd - Excluded from analysis due to intersection improvements.
2) Pacific Ave at 22nd St
Top Intersection by Number of Crashes
1) Lynnhaven Pkwy at Princess Anne Rd
0 1 2 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Pacific Ave at 22nd St
City of Virginia Beach

LEGEND

CROSSWALK

SIDEWALK

SIGN

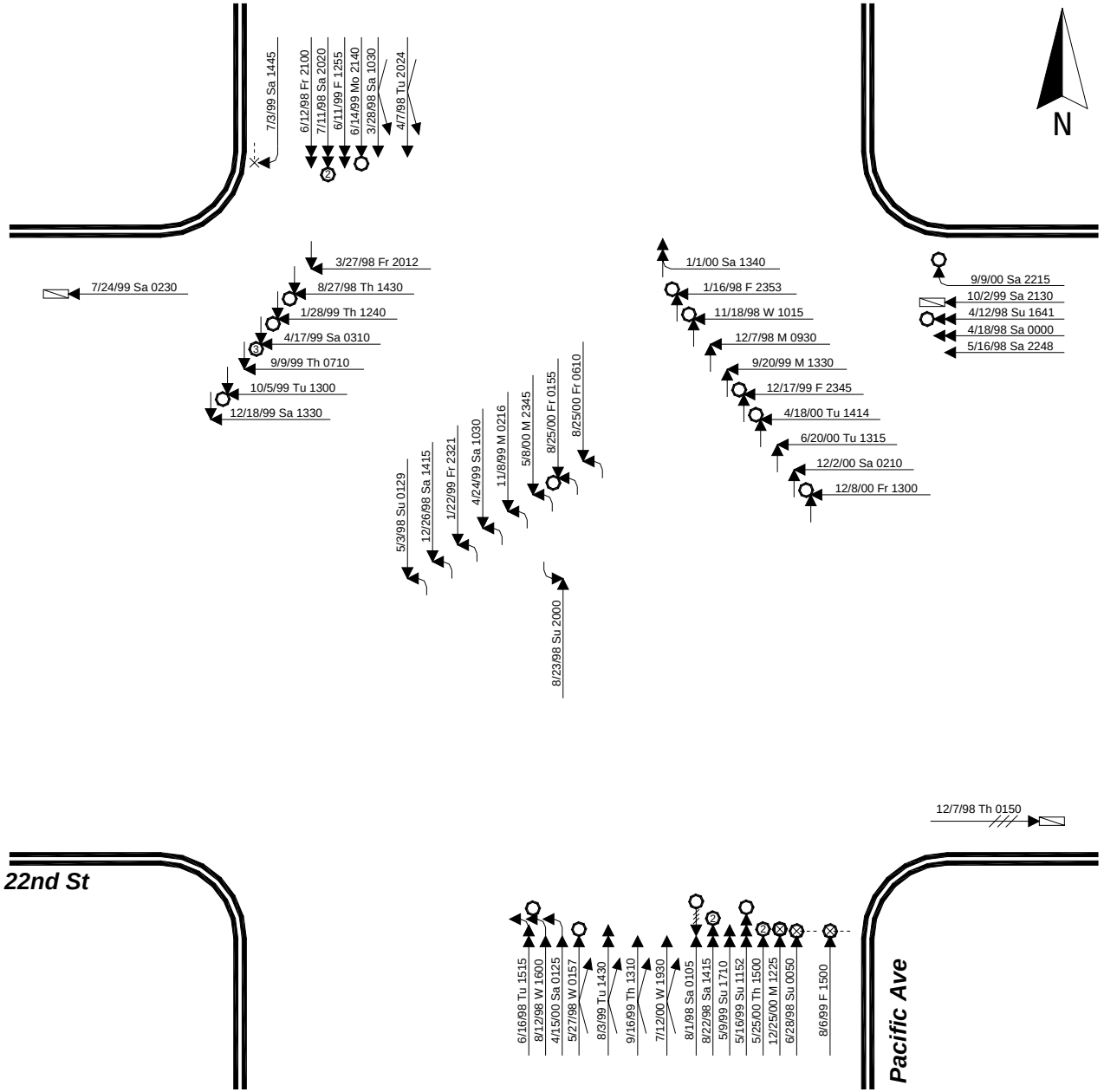
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Pacific Ave at 22nd St
City of Virginia Beach

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**19.0**
Property Damage Only	**11.0**
Crashes with Injuries	**8.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**9.7**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**20,630**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date — 3/4/00 Sa 2100 — Number of arrowheads represents the number of vehicles involved in the crash
Crash day of week — Crash time of day

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Pacific Ave at 22nd St

City of Virginia Beach

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	22	20	15	57
PDO Crashes	11	13	9	33
INJ Crashes	11	7	6	24
FAT Crashes	0	0	0	0
Injuries	13	9	7	29
Fatalities	0	0	0	0

Average Number of Crashes	19	
Average EPDO	35.0	
Average EPDO Rate	4.65	
Volume Entering Intersection	20,630	
% of crashes involving heavy vehicles - Segment		5.7%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	83.3%	92.8%
Drinking without Impared Ability	5.6%	1.5%
Drinking - not known if impaired	1.9%	1.3%
Drinking with Impared Ability	**9.3%**	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	92.6%	83.8%
Obscured by rain/snow	1.9%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	1.9%	4.5%
Obscured by sun/glare	1.9%	1.3%
Other	0.0%	2.9%
Not stated	1.9%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	3.5%	11.4%
9:00 - 14:59	36.8%	35.4%
15:00 - 18:59	10.5%	29.9%
19:00 - 5:59	**49.1%**	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	10.5%	14.2%
Tuesday	10.5%	14.8%
Wednesday	7.0%	14.7%
Thursday	12.3%	15.2%
Friday	19.3%	17.2%
Saturday	**29.8%**	14.0%
Sunday	10.5%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	87.5%	80.5%
Fog	0.0%	0.4%
Rain/Mist	12.5%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**20.0%**	18.5%
Disregarded stop - go light	**20.0%**	5.4%
Hit and run	**10.9%**	4.6%
Following too close	9.1%	15.7%
Driver inattention	5.5%	17.8%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**18.2%**	40.6%
Right Angle	**49.1%**	39.5%
Head On	0.0%	2.1%
Side Swipe	**14.5%**	7.7%
Fixed Object	**14.5%**	7.1%
Pedestrian	1.8%	1.4%
Animal	0.0%	0.2%
Other	1.8%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**18.2%**
Type #2 	**14.5%**
Type #3 	**12.7%**

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	4.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	**10.0%**	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	80.0%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	2.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	4.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

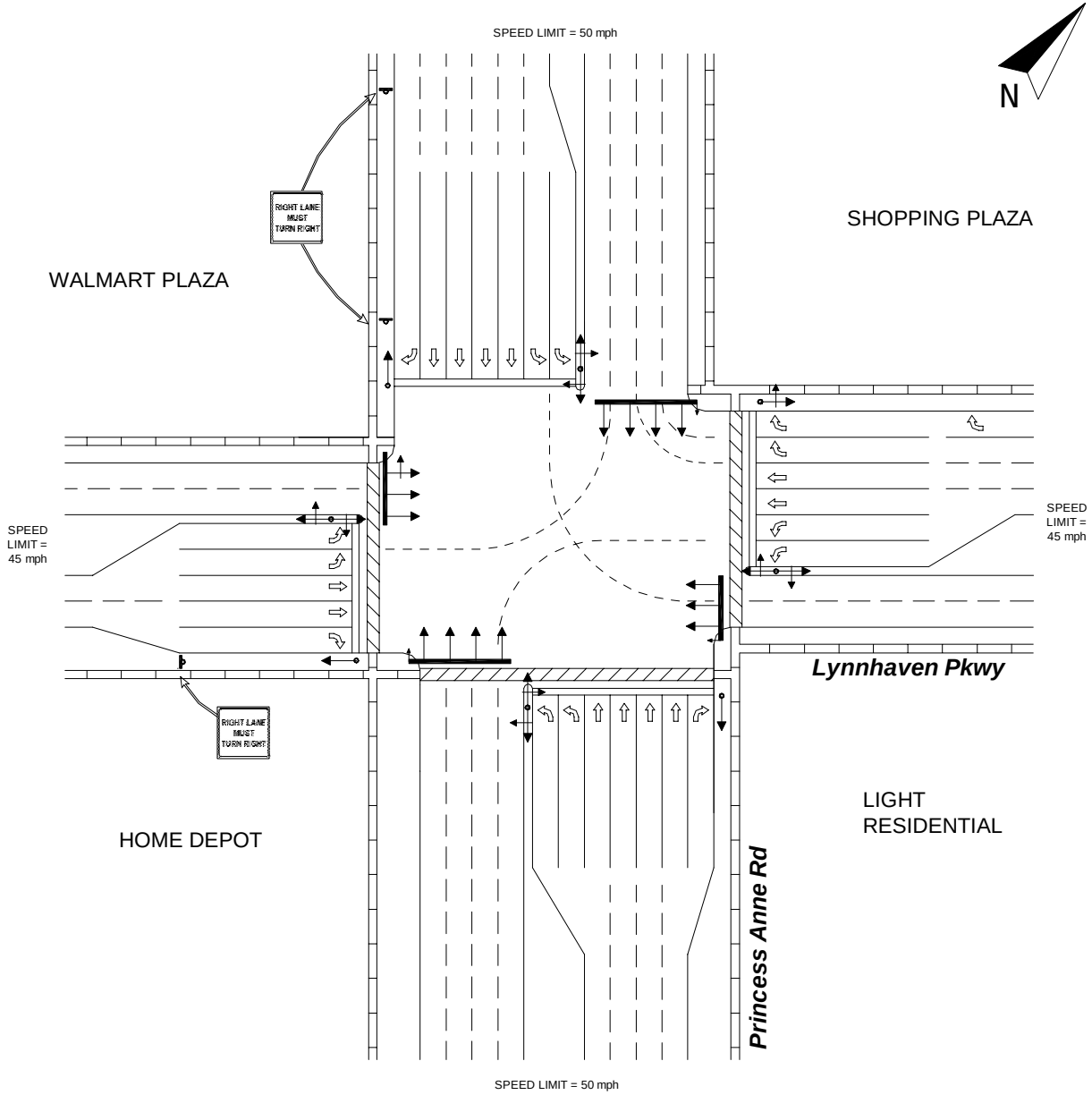
Intersection:	**Pacific Ave at 22nd St**
Jurisdiction:	**City of Virginia Beach**
EPDO Rate per Million Entering Vehicles:	4.65
Regional Rank by EPDO Rate:	7 of 468
Number of Crashes Per Year	19.0
Number of Injuries Per Year	9.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	20,630

OBSERVATIONS:

- 9.3% of crashes occurred as a result of drunk driving. Regional average was 4.4%. 16.7% of crashes involved some form of drinking, whether impaired or not.
- Approximately one half of all crashes (49.1%) occurred in the late night/early morning hours (7 pm – 6 am). Regional average was 23.3%.
- 29.8% of crashes occurred on Saturday, while the regional average was 14%.
- Unlike the regional average (40.6%), rear end collisions were not the primary problem at this intersection, accounting for only 18.2%.
- Right angle (49.1%), sideswipe (14.5%), and fixed object (14.5%) crashes for this intersection all exceeded the regional averages of 39.5%, 7.7%, and 7.1% respectively.
- The primary crash movement and type were northbound through vehicles on Pacific Ave with westbound through vehicles on 22nd St (18.2%). The second highest crash movement were northbound left-turning vehicles with southbound through vehicles on Pacific Ave (14.5%). The third highest crash movement were westbound through vehicles on 22nd St with southbound through vehicles on Pacific Ave (12.7%).
- Most prevalent driver actions resulting in the crash were did not have right-of-way (20%), disregarded stop - go light (20%), and hit and run (10.9%).

REMEDIES AND COUNTERMEASURES:

- Educate the public of the dangers involved in drinking and driving.
- Police enforcement will help deter drivers from driving under the influence and running red lights.
- Consider the use of automated safety enforcement, such as red-light cameras, to guard against the high amount of crashes resulting from red-light running.
- Eliminate obstructions/fixed objects adjacent to intersection that may be causing a problem.
- Review signal phasing, timing, and clearance times at the intersection.
- Ensure that adjacent signals are optimized and coordinated.
- Consider one-way circulation pattern with Atlantic Avenue and Pacific Avenue to alleviate traffic queues and conflict points.
- Consider add an exclusive left-turn lane on northbound Pacific Avenue.



ROADWAY GEOMETRY

Lynnhaven Pkwy at Princess Anne Rd
City of Virginia Beach

LEGEND

CROSSWALK

SIDEWALK

SIGN

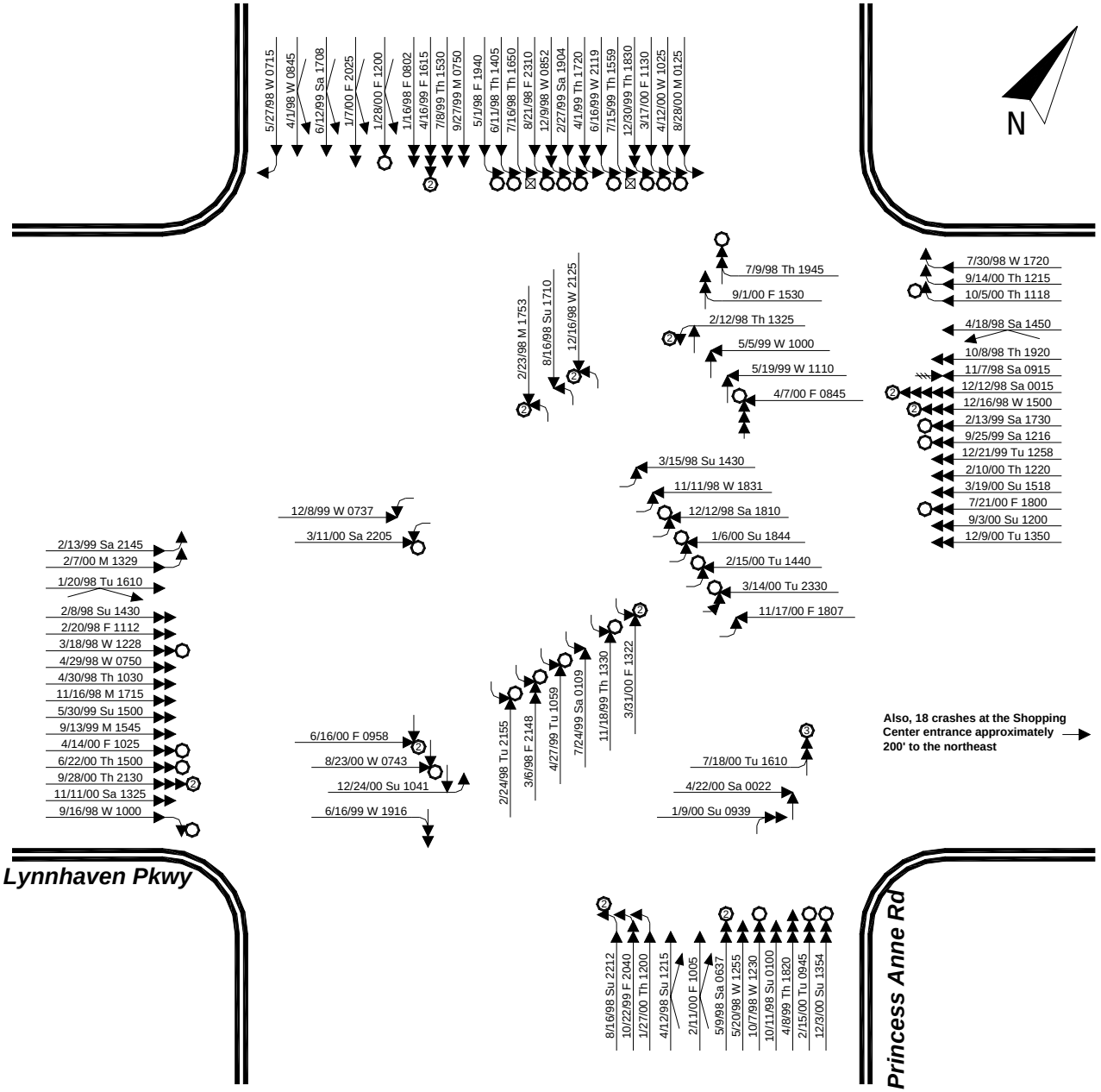
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Lynnhaven Pkwy at Princess Anne Rd
City of Virginia Beach

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**58.3**
Property Damage Only	**38.7**
Crashes with Injuries	**19.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**27.7**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**69,903**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date: 3/4/00 Sa 2100 (Crash day of week / Crash time of day)

Number of arrowheads represents the number of vehicles involved in the crash

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Lynnhaven Pkwy at Princess Anne Rd

City of Virginia Beach

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	61	61	53	175
PDO Crashes	38	43	35	116
INJ Crashes	23	18	18	59
FAT Crashes	0	0	0	0
Injuries	35	23	25	83
Fatalities	0	0	0	0

Average Number of Crashes	58.3	
Average EPDO	97.7	
Average EPDO Rate	3.83	
Volume Entering Intersection	69,903	
% of crashes involving heavy vehicles - Segment		1.9%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	95.6%	92.8%
Drinking without Impared Ability	2.2%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	2.2%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	81.5%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	**10.0%**	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	2.3%	2.9%
Not stated	6.2%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	6.3%	11.4%
9:00 - 14:59	38.9%	35.4%
15:00 - 18:59	32.0%	29.9%
19:00 - 5:59	22.9%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	6.9%	14.2%
Tuesday	10.9%	14.8%
Wednesday	10.3%	14.7%
Thursday	17.1%	15.2%
Friday	15.4%	17.2%
Saturday	**23.4%**	14.0%
Sunday	**16.0%**	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	83.2%	80.5%
Fog	0.0%	0.4%
Rain/Mist	14.5%	17.8%
Snow/Sleet	1.2%	0.7%
Other/Not Stated	1.2%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Hit and run	**27.1%**	4.6%
Following too close	**18.1%**	15.7%
Did not have ROW	15.5%	18.5%
Disregarded stop - go light	**9.7%**	5.4%
Driver Inattention	5.8%	17.8%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	41.2%	40.6%
Right Angle	39.9%	39.5%
Head On	0.7%	2.1%
Side Swipe	7.2%	7.7%
Fixed Object	7.8%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	3.3%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**16.5%**
Type #2 	15.5%
Type #3 	14.4%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	1.8%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	2.7%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	84.1%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	**9.7%**	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.9%	1.4%
Not Stated	0.9%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Lynnhaven Pkwy at Princess Anne Rd
Jurisdiction: City of Virginia Beach

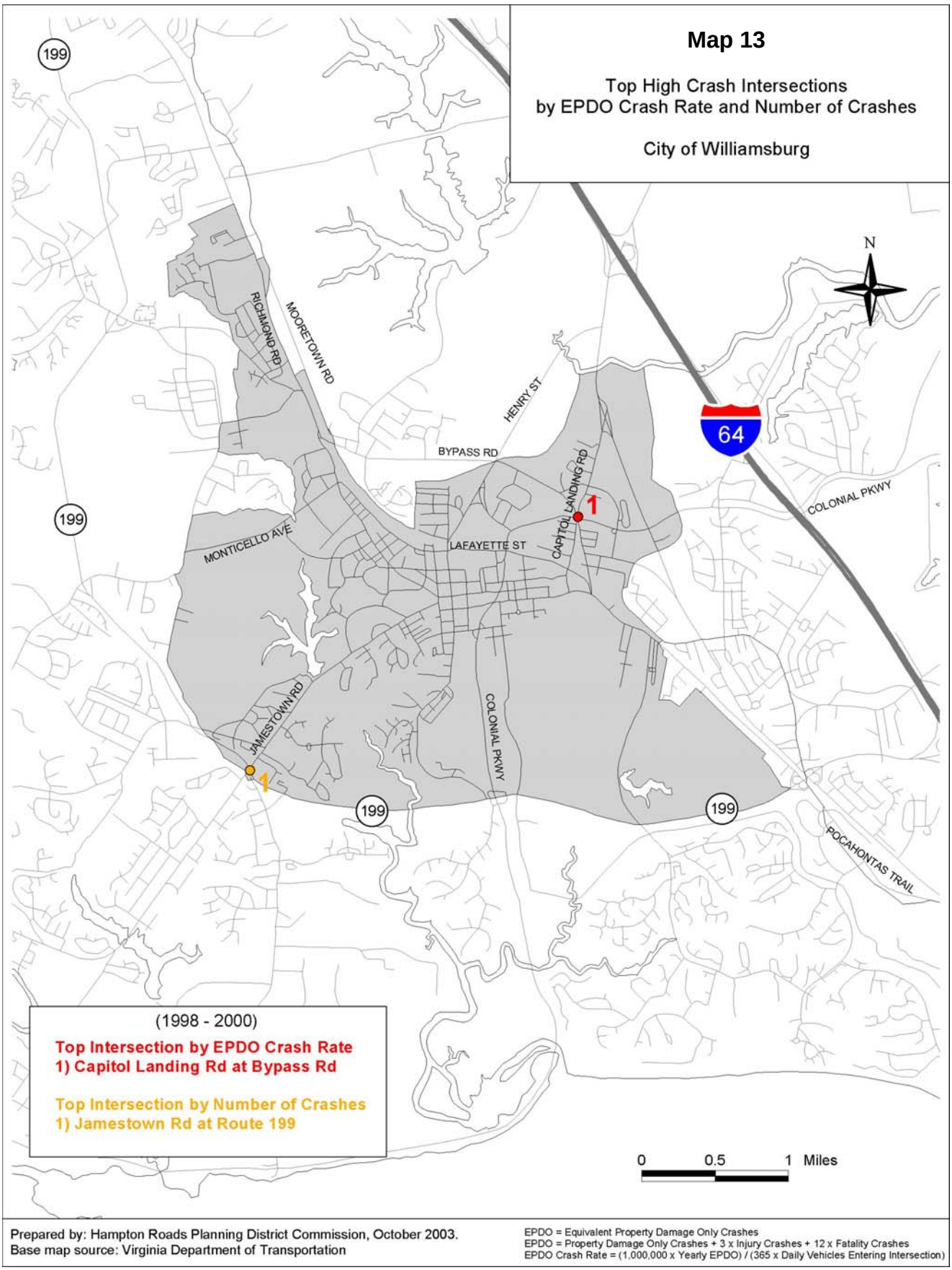
EPDO Rate per Million Entering Vehicles:	3.83
Regional Rank by EPDO Rate:	19 of 468
Number of Crashes Per Year	58.3
Number of Injuries Per Year	27.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	69,903

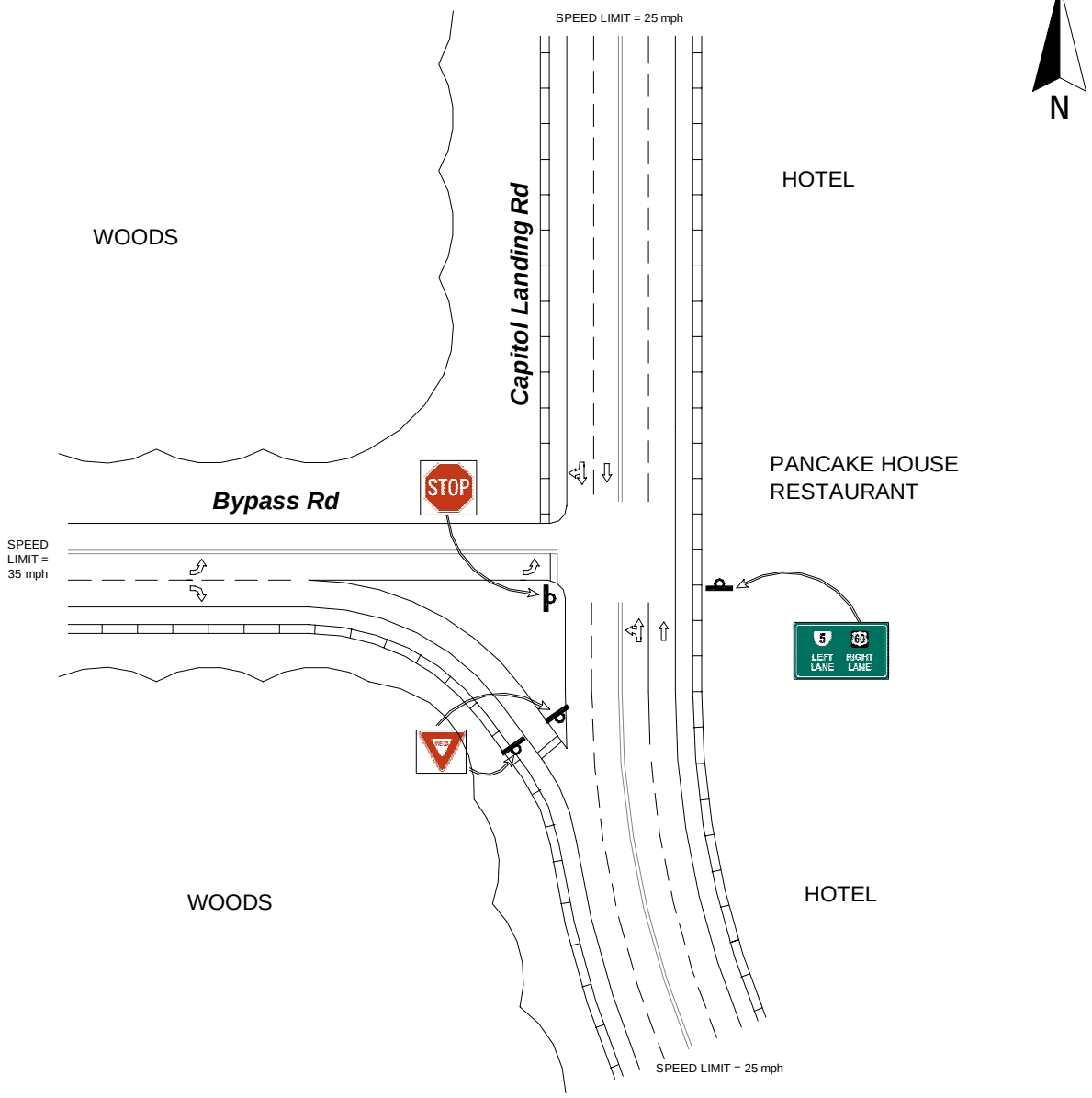
OBSERVATIONS:

- 10% of crashes occurred where other vehicles obscured the driver's vision. Regional average was 4.5%.
- Many crashes occurred during the weekend. 23.4% of crashes occurred on Saturday (regional average: 14%), while 16% occurred on Sunday (regional average: 9.9%).
- The primary crash movement and type were southeast bound rear end collisions along Princess Anne Rd from Ferrell Pkwy (16.5%).
- Most prevalent driver actions resulting in the crash were hit and run (27.1%), following too close (18.1%), and disregarding stop-go light (9.7%).
- In addition, 18 crashes occurred at the shopping center entrance approximately 200 feet to the northeast of the intersection along Lynnhaven Pkwy as a result of backed up traffic.

REMEDIES AND COUNTERMEASURES:

- Consider adding 'Slow down signal ahead' sign along Princess Anne Rd from Ferrell Pkwy. Currently, traffic moves very fast at this southeast approach.
- Educate the public of the dangers involved in following too close and not paying attention when traveling through a busy intersection.
- Consider the use of automated safety enforcement, such as red-light cameras, to guard against crashes resulting from red-light running.
- Review signal clearance times at the intersection.
- Review signal phasing and timing at the intersection.
- Consider access management solutions or the addition of a traffic signal (if feasible due the close proximity with the intersection) for the shopping center entrance along Lynnhaven Pkwy.


Map 13
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
City of Williamsburg
N
199
64
RICHMOND RD
MOORETOWN RD
HENRY ST
BYPASS RD
CAPITOL LANDING RD
COLONIAL PKWY
MONTICELLO AVE
LAFAYETTE ST
JAMESTOWN RD
POCAHONTAS TRAIL
1
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) Capitol Landing Rd at Bypass Rd
Top Intersection by Number of Crashes
1) Jamestown Rd at Route 199
0 0.5 1 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



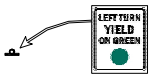
ROADWAY GEOMETRY

Bypass Rd at Capitol Landing Rd
City of Williamsburg

LEGEND

CROSSWALK

SIDEWALK



SIGN

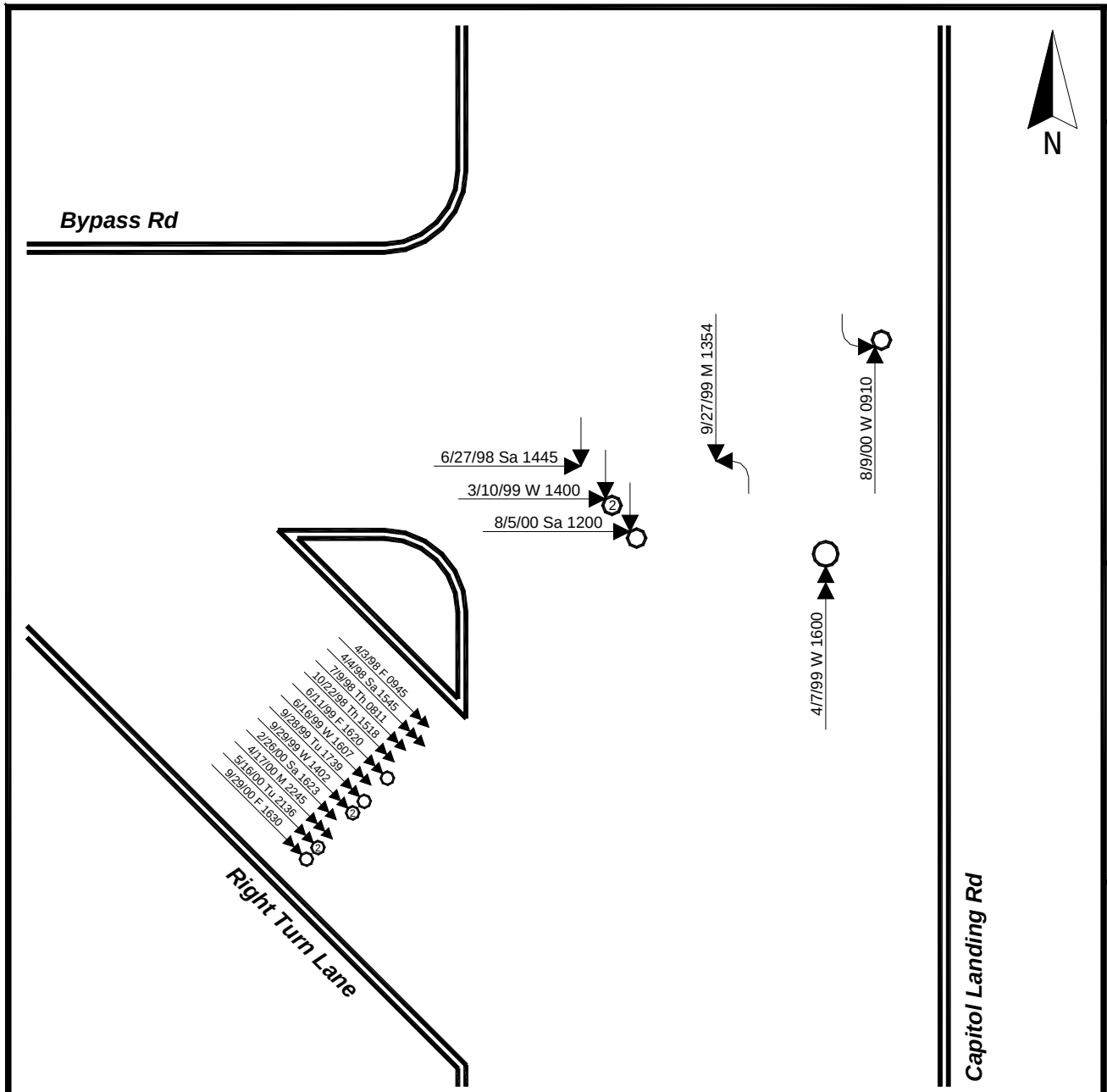
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Bypass Rd at Capitol Landing Rd
City of Williamsburg

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**5.7**
Property Damage Only	**3.0**
Crashes with Injuries	**2.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**3.7**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**20,681**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date — 3/4/00 Sa 2100 — Crash day of week / Crash time of day

Number of arrowheads represents the number of vehicles involved in the crash

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Bypass Rd at Capitol Landing Rd

City of Williamsburg

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	5	7	5	17
PDO Crashes	5	2	2	9
INJ Crashes	0	5	3	8
FAT Crashes	0	0	0	0
Injuries	0	7	4	11
Fatalities	0	0	0	0

Average Number of Crashes	5.7	
Average EPDO	11	
Average EPDO Rate	1.46	
Volume Entering Intersection	20,681	
% of crashes involving heavy vehicles - Segment		5.6%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	88.9%	92.8%
Drinking without Impared Ability	5.6%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	5.6%	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	83.3%	83.8%
Obscured by rain/snow	**11.1%**	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	0.0%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	5.6%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	5.6%	11.4%
9:00 - 14:59	38.9%	35.4%
15:00 - 18:59	**44.4%**	29.9%
19:00 - 5:59	11.1%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	11.1%	14.2%
Tuesday	11.1%	14.8%
Wednesday	**27.8%**	14.7%
Thursday	11.1%	15.2%
Friday	16.7%	17.2%
Saturday	**22.2%**	14.0%
Sunday	0.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	83.3%	80.5%
Fog	0.0%	0.4%
Rain/Mist	16.7%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver Inattention	**50.0%**	17.8%
Did not have ROW	**27.8%**	18.5%
Following too close	**22.2%**	15.7%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**72.2%**	40.6%
Right Angle	27.8%	39.5%
Head On	0.0%	2.1%
Side Swipe	0.0%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**66.7%**
Type #2 	16.7%
Type #3	

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	0.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	5.9%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	**88.2%**	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	0.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	5.9%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Bypass Rd at Capitol Landing Rd
Jurisdiction: City of Williamsburg

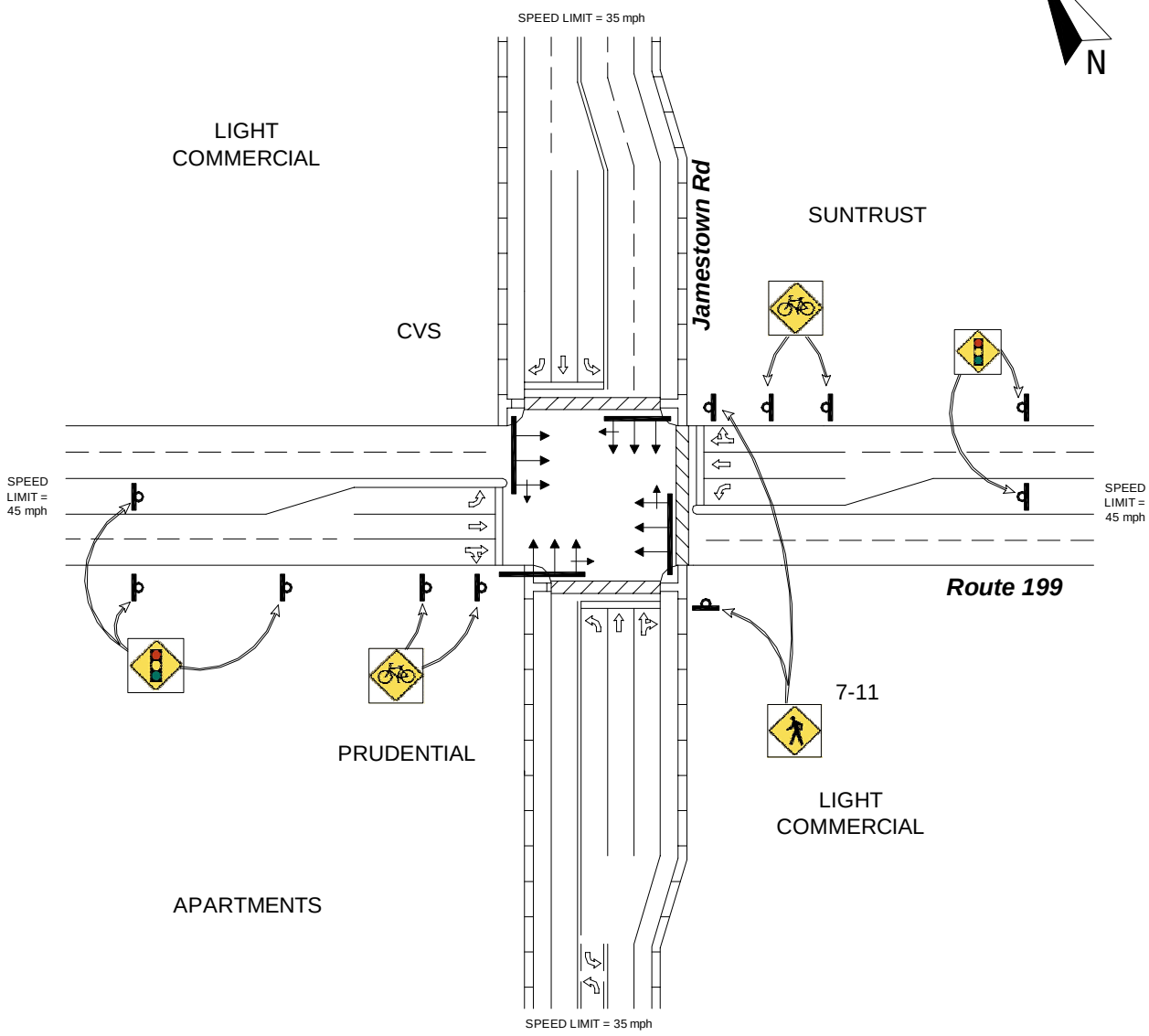
EPDO Rate per Million Entering Vehicles:	1.46
Regional Rank by EPDO Rate:	236 of 468
Number of Crashes Per Year	5.7
Number of Injuries Per Year	3.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	20,681

OBSERVATIONS:

- 11.1% of crashes involved the driver's vision being obscured by rain. Regional average was 3.1%.
- 44.4% of crashes occurred during the afternoon peak period (3 – 7 pm). Regional average was 29.9%.
- 27.8% of crashes occurred on Wednesday, while the regional average was 14.7%.
- 22.2% of crashes occurred on Saturday, while the regional average was 14%.
- 72.2% of crashes were rear end crashes. Regional average was 40.6%.
- The primary crash movement and type were rear end collisions in the southeast bound exclusive right turn lane on Bypass Rd (66.7%).
- Most prevalent driver actions resulting in the crash were driver inattention (50%), did not have right-of-way (27.8%), and following too close (22.2%).
- The major factor involved in the crashes was driver error (88.2%).

REMEDIES AND COUNTERMEASURES:

- Ensure that the intersection has adequate drainage as several crashes are occurring during rain or mist. Some rear end crashes may be weather related and others may simply be the result of driver error and inattention.
- Educate the public of the dangers involved in following too close and not paying attention when traveling through an intersection.
- Ensure that there is adequate sight distance for eastbound right-turning vehicles from Bypass Rd onto Capitol Landing Rd.
- Upgrade or supplement the signs to warn driver's of right-turning vehicles from Bypass Rd onto Capitol Landing Rd.
- Consider changing the yield sign to a stop sign for right-turning traffic from eastbound Bypass Rd to southbound Capitol Landing Rd. A "stop ahead" sign should be installed approaching the stop sign.
- Consider restriping Capitol Landing Rd to provide a free-flow right-turn lane from Bypass Rd.



ROADWAY GEOMETRY

Jamestown Rd at Route 199
City of Williamsburg

LEGEND

CROSSWALK

SIDEWALK

SIGN

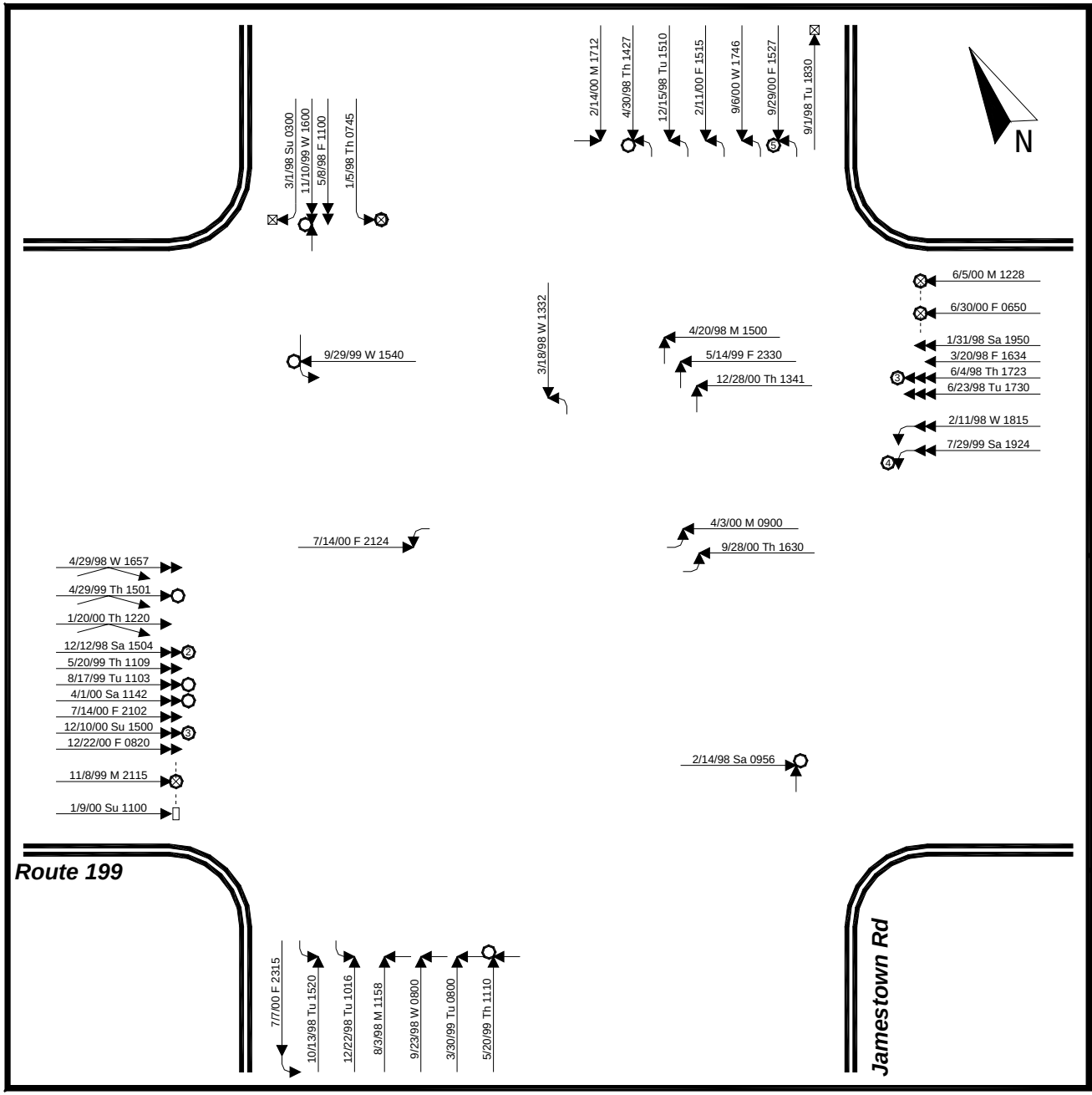
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Jamestown Rd at Route 199
City of Williamsburg

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**11.7**
Property Damage Only	**7.3**
Crashes with Injuries	**4.3**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**6.3**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**42,548**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date — 3/4/00 Sa 2100 — Number of arrowheads represents the number of vehicles involved in the crash
Crash day of week — Crash time of day

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Head On
- Right Turn
- Left Turn
- Right Angle
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Jamestown Rd at Route 199

City of Williamsburg

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	16	6	13	35
PDO Crashes	12	1	9	22
INJ Crashes	4	5	4	13
FAT Crashes	0	0	0	0
Injuries	5	8	6	19
Fatalities	0	0	0	0

Average Number of Crashes	11.7	
Average EPDO	20.3	
Average EPDO Rate	1.31	
Volume Entering Intersection	42,548	
% of crashes involving heavy vehicles - Segment		4.2%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	93.9%	92.8%
Drinking without Impared Ability	2.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	4.1%	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	72.9%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	**16.7%**	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	10.4%	2.9%
Not stated	0.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	10.2%	11.4%
9:00 - 14:59	30.6%	35.4%
15:00 - 18:59	**42.9%**	29.9%
19:00 - 5:59	16.3%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	12.2%	14.2%
Tuesday	14.3%	14.8%
Wednesday	14.3%	14.7%
Thursday	18.4%	15.2%
Friday	20.4%	17.2%
Saturday	10.2%	14.0%
Sunday	10.2%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	81.6%	80.5%
Fog	0.0%	0.4%
Rain/Mist	16.3%	17.8%
Snow/Sleet	2.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**32.7%**	18.5%
Disregarded stop-go light	**12.2%**	5.4%
Following too close	10.2%	15.7%
Driver Inattention	8.2%	17.8%
Improper turn from wrong lane	**6.1%**	1.0%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	30.6%	40.6%
Right Angle	**44.9%**	39.5%
Head On	2.0%	2.1%
Side Swipe	6.1%	7.7%
Fixed Object	8.2%	7.1%
Pedestrian	**6.1%**	1.4%
Animal	2.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**14.9%**
Type #2  Into CVS driveway	**10.6%**
Type #3 Out of 7-11 driveway 	**8.5%**

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	2.9%	2.7%
Driver Asleep/Handicap	2.9%	1.8%
Driver Under the Influence	2.9%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	77.1%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	**11.4%**	6.4%
Road Defective	0.0%	0.2%
Road Slick	2.9%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Jamestown Rd at Route 199*
Jurisdiction: City of Williamsburg

EPDO Rate per Million Entering Vehicles:	1.31
Regional Rank by EPDO Rate:	266 of 468
Number of Crashes Per Year	11.7
Number of Injuries Per Year	6.3
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	42,548

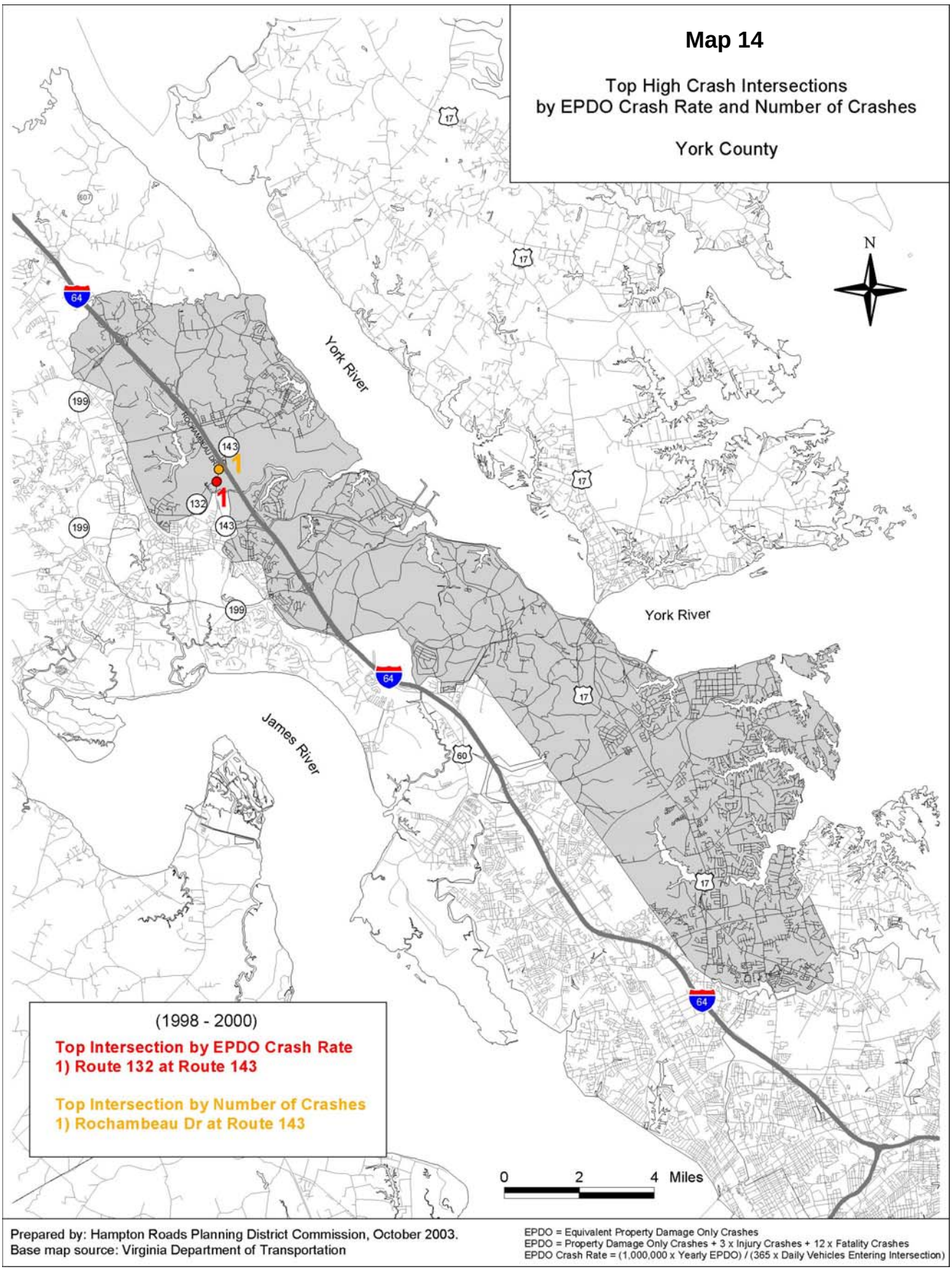
OBSERVATIONS:

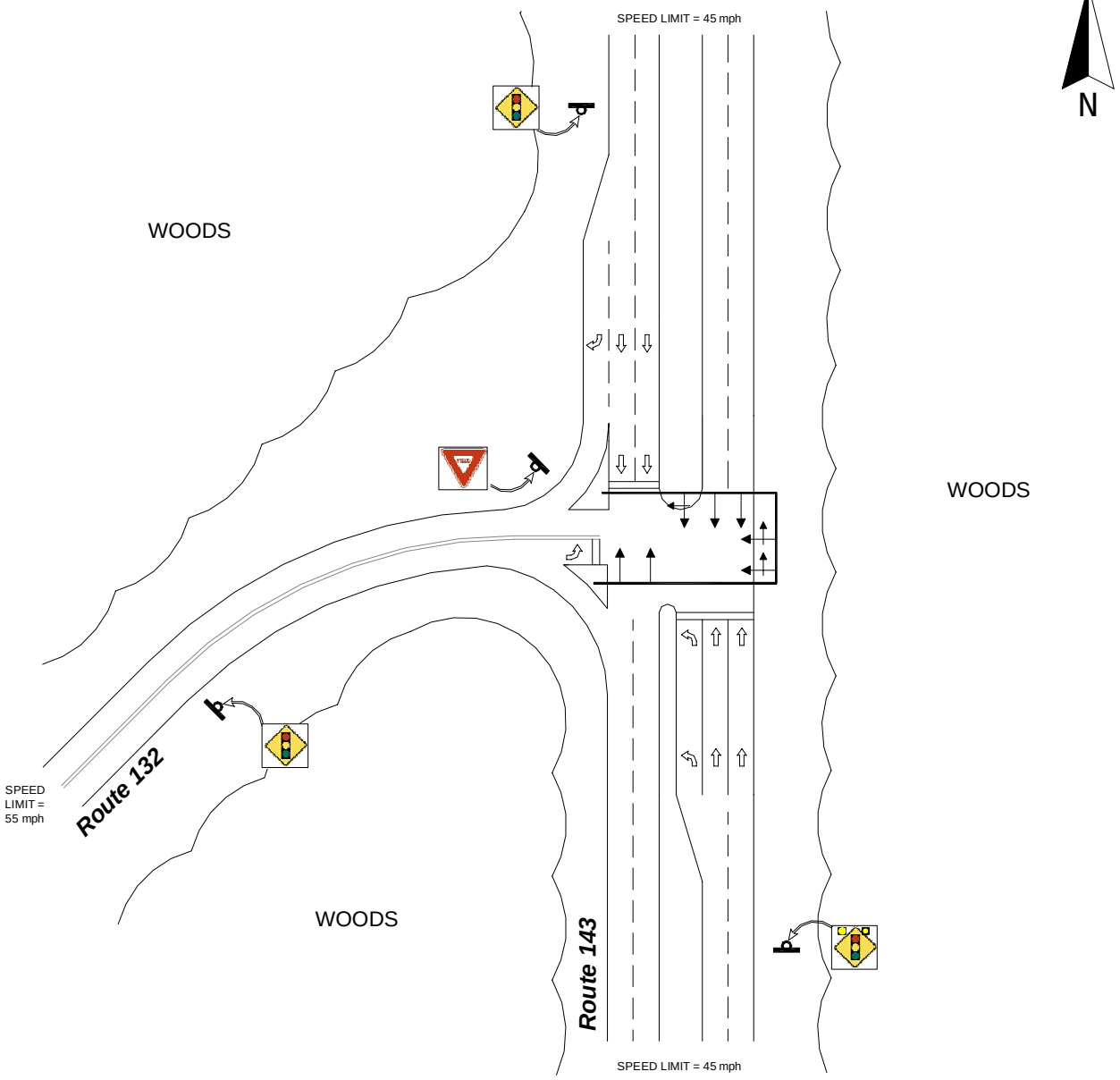
- 16.7% of crashes occurred where other vehicles obscured the driver's vision. Regional average was 4.5%.
- 42.9% of crashes occurred during the afternoon peak period (3 – 7 pm). Regional average was 29.9%.
- 44.9% of crashes were right angle collisions. Regional average was 39.5%.
- 6.1% of crashes involved pedestrians. Regional average was 1.4%.
- The primary crash movement and type were southeast bound rear end collisions along Route 199 (14.9%).
- Most prevalent driver actions resulting in the crash were did not have right-of-way (32.7%) and disregarding stop-go light (12.2%). 6.1% of crashes involved driver's making an improper turn from wrong lane, where the regional average was only 1%.
- 11.4% of crashes were the result of weather or visibility. Regional average was 6.4%.
- Many crashes were access management related. 14.9% and 12.8% of crashes involved vehicles entering and exiting the 7-11 and CVS stores along Jamestown Rd, respectively.

REMEDIES AND COUNTERMEASURES:

- Ensure that there is adequate sight distance at all intersection approaches.
- Review signal phasing, timing, and clearance times at the intersection.
- Consider access management solutions, such as adding a median along Jamestown Rd, to reduce conflict points into and out of the 7-11 and CVS. A median design will also provide a refuge for pedestrians crossing the roadway.

* This intersection is currently in the Transportation Improvement Program (TIP) for geometric improvement (Jamestown 2007 PPTA Program).


Map 14
Top High Crash Intersections
by EPDO Crash Rate and Number of Crashes
York County
N
York River
James River
(1998 - 2000)
Top Intersection by EPDO Crash Rate
1) Route 132 at Route 143
Top Intersection by Number of Crashes
1) Rochambeau Dr at Route 143
0 2 4 Miles
Prepared by: Hampton Roads Planning District Commission, October 2003.
Base map source: Virginia Department of Transportation
EPDO = Equivalent Property Damage Only Crashes
EPDO = Property Damage Only Crashes + 3 x Injury Crashes + 12 x Fatality Crashes
EPDO Crash Rate = (1,000,000 x Yearly EPDO) / (365 x Daily Vehicles Entering Intersection)



ROADWAY GEOMETRY

Route 132 at Route 143
York County

LEGEND

CROSSWALK

SIDEWALK

SIGN

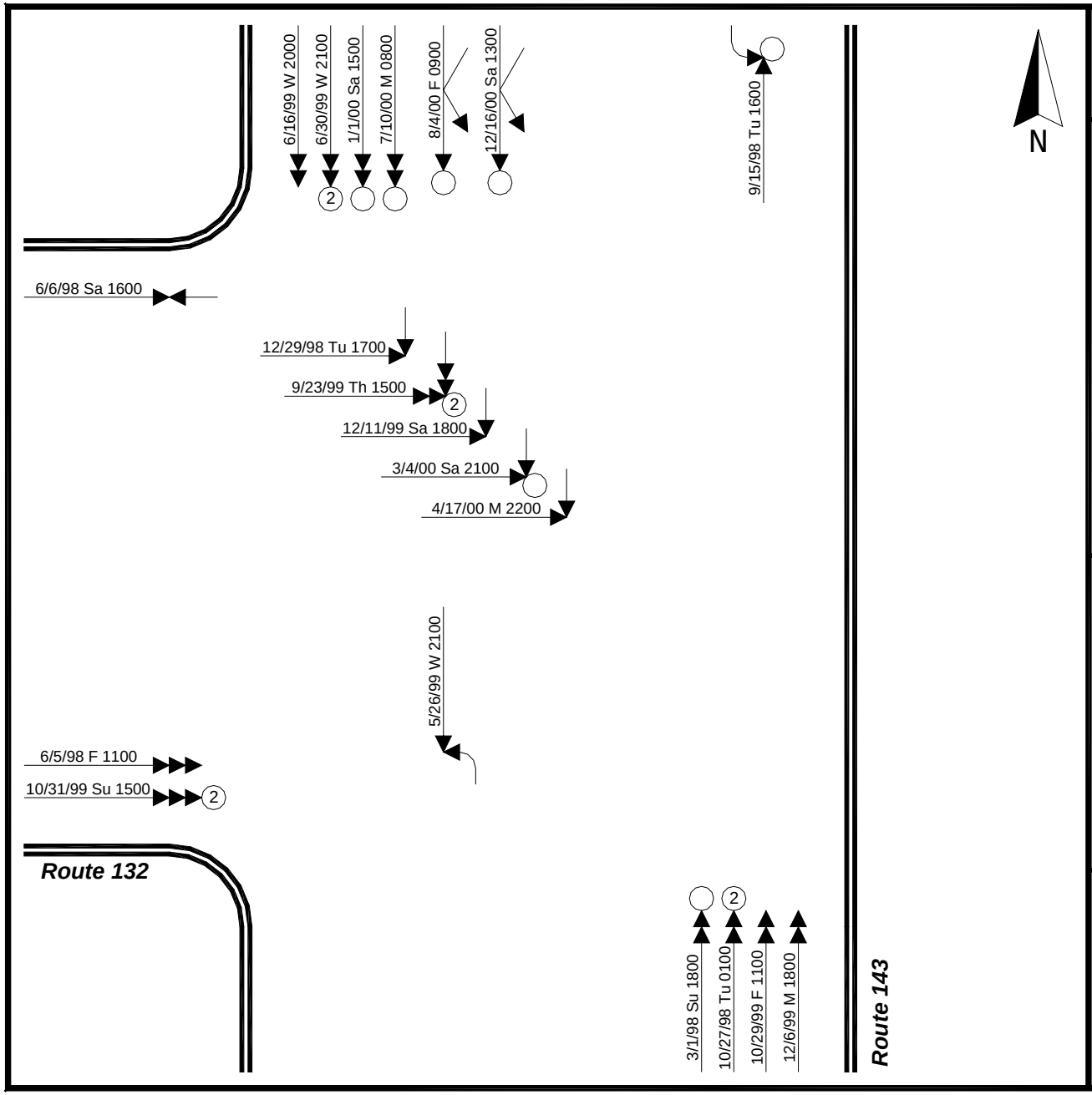
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

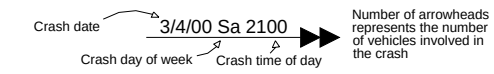
Route 132 at Route 143
York County

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**6.7**
Property Damage Only	**2.7**
Crashes with Injuries	**4.0**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**5.7**
NO. OF FATALITIES PER YEAR	**0.0**
DAILY NO. OF VEHICLES ENTERING INTERSECTION	**18,014**

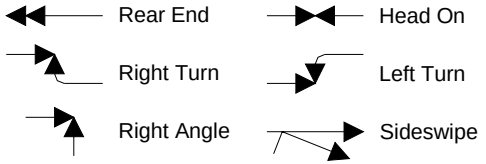
NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND



- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE



INTERSECTION TRAFFIC CRASH ANALYSIS

Route 132 at Route 143

York County

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	6	8	6	20
PDO Crashes	2	5	1	8
INJ Crashes	4	3	5	12
FAT Crashes	0	0	0	0
Injuries	6	6	5	17
Fatalities	0	0	0	0

Average Number of Crashes	7	
Average EPDO	14.7	
Average EPDO Rate	2.23	
Volume Entering Intersection	18,014	
% of crashes involving heavy vehicles - Segment		0.0%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with…	Intersection	Regionwide
Nobody Drinking	95.0%	92.8%
Drinking without Impared Ability	5.0%	1.5%
Drinking - not known if impaired	0.0%	1.3%
Drinking with Impared Ability	0.0%	4.4%

DRIVER VISION

Crashes with…	Intersection	Regionwide
No vision obscured	80.0%	83.8%
Obscured by rain/snow	5.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	0.0%	4.5%
Obscured by sun/glare	0.0%	1.3%
Other	0.0%	2.9%
Not stated	15.0%	3.8%

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	5.0%	11.4%
9:00 - 14:59	20.0%	35.4%
15:00 - 18:59	**45.0%**	29.9%
19:00 - 5:59	30.0%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	15.0%	14.2%
Tuesday	15.0%	14.8%
Wednesday	15.0%	14.7%
Thursday	5.0%	15.2%
Friday	15.0%	17.2%
Saturday	**25.0%**	14.0%
Sunday	10.0%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	80.0%	80.5%
Fog	0.0%	0.4%
Rain/Mist	**20.0%**	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Driver Inattention	**45.0%**	17.8%
Following too close	**15.0%**	15.7%
Disregarded stop-go light	**10.0%**	5.4%
Did not have ROW	5.0%	18.5%
Improper turn from wrong lane	5.0%	1.0%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	**50.0%**	40.6%
Right Angle	35.0%	39.5%
Head On	5.0%	2.1%
Side Swipe	10.0%	7.7%
Fixed Object	0.0%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**25.0%**
Type #2	20.0%
Type #3	20.0%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	5.0%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	0.0%	3.9%
Driver Speeding	0.0%	1.8%
Driver Error	90.0%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	5.0%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	0.0%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Route 132 at Route 143
Jurisdiction: York County

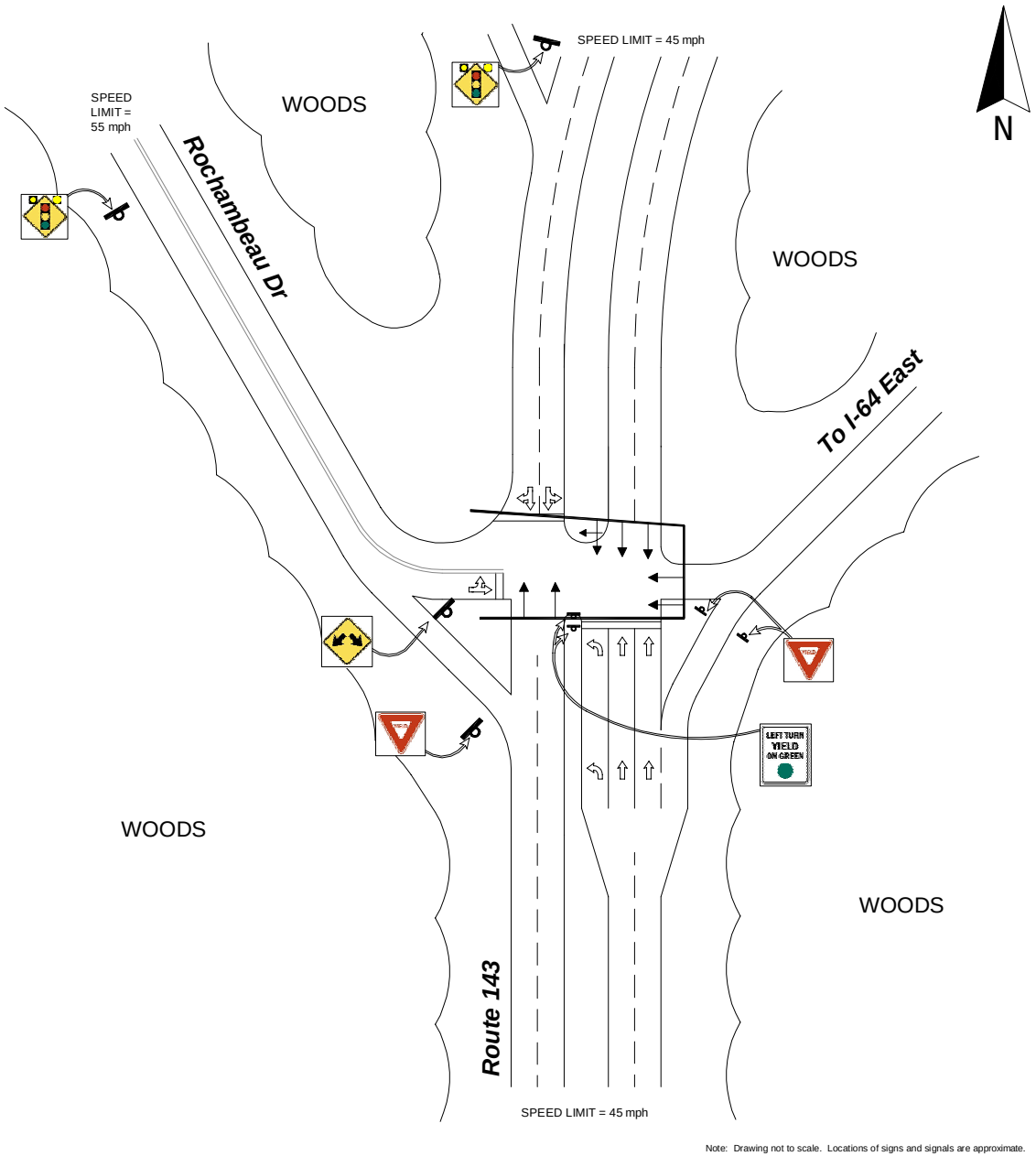
EPDO Rate per Million Entering Vehicles:	2.23
Regional Rank by EPDO Rate:	119 of 468
Number of Crashes Per Year	6.7
Number of Injuries Per Year	5.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	18,014

OBSERVATIONS:

- 45% of crashes occurred during the afternoon peak period (3 – 7 pm). Regional average was 29.9%.
- 25% of crashes occurred on Saturday, while the regional average was 14%.
- 20% of crashes occurred during rain or mist. Regional average was 17.8%.
- 50% of crashes were rear end crashes. Regional average was 40.6%.
- The primary crash movement and type were eastbound vehicles from Route 132 with southbound vehicles (right angle crashes) on Route 143 (25%).
- Most prevalent driver actions resulting in the crash were driver inattention (45%), following too close (15%), and disregarding stop-go light (10%).

REMEDIES AND COUNTERMEASURES:

- Provide adequate sight distance for eastbound turning vehicles from Route 132 onto Route 143.
- Consider the use of automated safety enforcement, such as red-light cameras, to guard against crashes resulting from red-light running.
- Review signal clearance times at the intersection.



ROADWAY GEOMETRY

Rochambeau Dr at Route 143
York County

LEGEND

CROSSWALK

SIDEWALK

SIGN

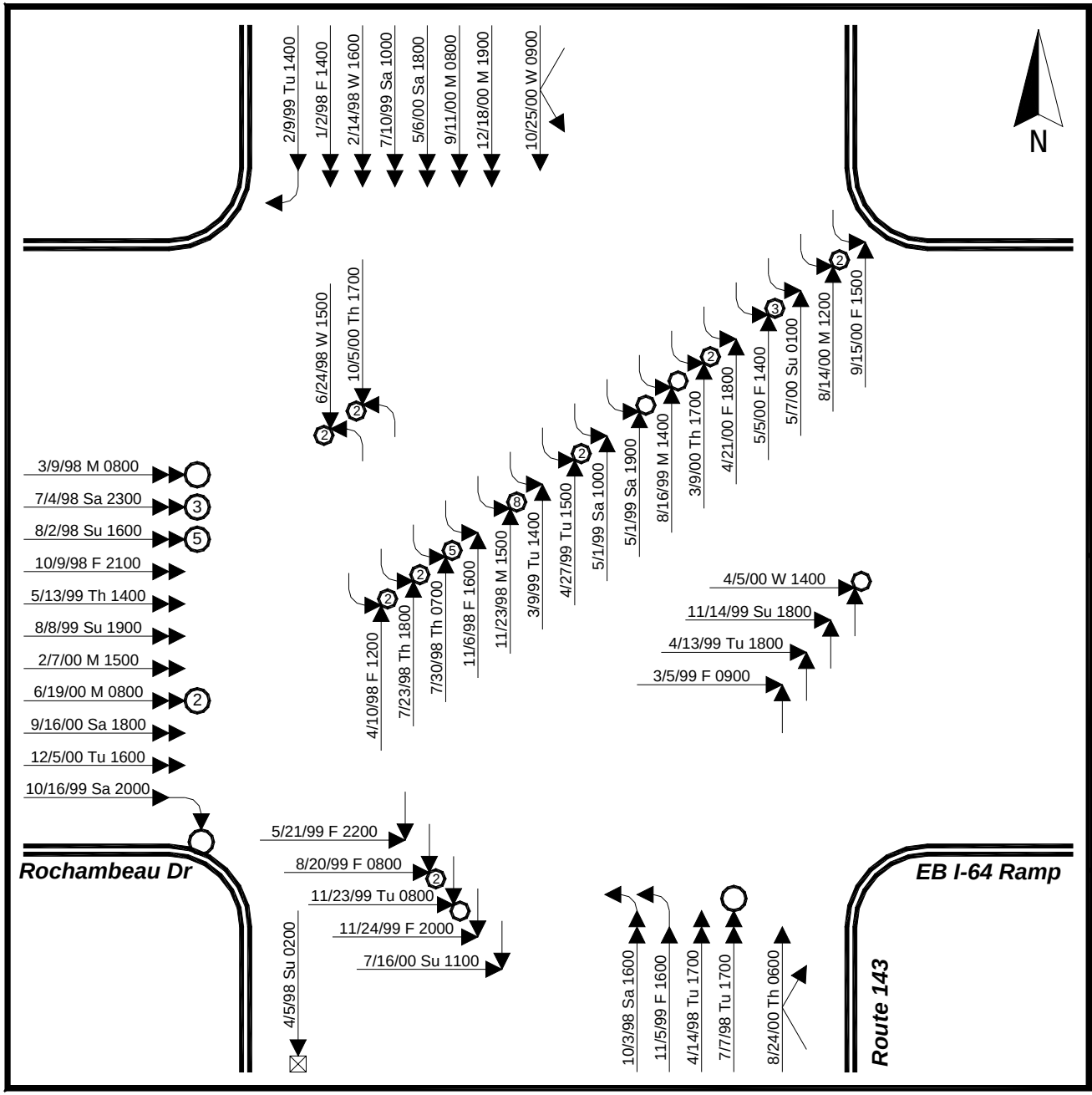
TRAFFIC SIGNALS

3 SECTION SIGNAL HEAD

3 SECTION SIGNAL HEAD PROTECTED TURNS

5 SECTION SIGNAL HEAD PROTECTED-PERMITTED TURNS

PEDESTRIAN SIGNAL HEAD



COLLISION DIAGRAM

Rochambeau Dr at Route 143
York County

Analysis includes crashes within 250 feet of the intersection from 1998 to 2000.

NO. OF CRASHES PER YEAR	**17.3**
Property Damage Only	**10.7**
Crashes with Injuries	**6.7**
Crashes with Fatalities	**0.0**
NO. OF INJURIES PER YEAR	**15.7**
NO. OF FATALITIES PER YEAR	**0.0**

NOTE: The data listed above is from the Hampton Roads Regional Safety Study - Part II and is based on data provided to HRPDC by each individual jurisdiction and/or VDOT. The number of crashes in the diagram may not match the number of crashes listed above due to either incomplete data or, in some cases, further analysis.

LEGEND

Crash date — 3/4/00 Sa 2100 — Number of arrowheads represents the number of vehicles involved in the crash
Crash day of week — Crash time of day

- Moving Vehicle
- Backing Vehicle
- Parked Vehicle
- Pedestrian
- Animal
- Fixed Object
- Fatal Crash
- Injury Crash (If multiple injuries, number is shown)

COLLISION TYPE

- Rear End
- Right Turn
- Right Angle
- Head On
- Left Turn
- Sideswipe

INTERSECTION TRAFFIC CRASH ANALYSIS

Rochambeau Dr at Route 143

York County

ACCIDENT SUMMARY

	1998	1999	2000	Total
Total Crashes	16	18	18	52
PDO Crashes	7	12	13	32
INJ Crashes	9	6	5	20
FAT Crashes	0	0	0	0
Injuries	29	8	10	47
Fatalities	0	0	0	0

Average Number of Crashes	17	
Average EPDO	30.7	
Average EPDO Rate	N/A*	
Volume Entering Intersection	N/A*	
% of crashes involving heavy vehicles - Segment		5.8%
- Regionwide		5.3%

DRIVING UNDER INFLUENCE

Crashes with...	Intersection	Regionwide
Nobody Drinking	94.2%	92.8%
Drinking without Impared Ability	1.9%	1.5%
Drinking - not known if impaired	1.9%	1.3%
Drinking with Impared Ability	1.9%	4.4%

DRIVER VISION

Crashes with...	Intersection	Regionwide
No vision obscured	94.2%	83.8%
Obscured by rain/snow	0.0%	3.1%
Obscured by trees/hills	0.0%	0.6%
Obscured by other vehicles	1.9%	4.5%
Obscured by sun/glare	1.9%	1.3%
Other	1.9%	2.9%
Not stated	0.0%	3.8%

* Traffic volumes were not available

TIME OF DAY

Time of Day	Intersection	Regionwide
6:00 - 8:59	13.5%	11.4%
9:00 - 14:59	26.9%	35.4%
15:00 - 18:59	**40.4%**	29.9%
19:00 - 5:59	19.2%	23.3%

DAY OF THE WEEK

Day of Week	Intersection	Regionwide
Monday	15.4%	14.2%
Tuesday	15.4%	14.8%
Wednesday	5.8%	14.7%
Thursday	11.5%	15.2%
Friday	**23.1%**	17.2%
Saturday	17.3%	14.0%
Sunday	11.5%	9.9%

WEATHER

Weather	Intersection	Regionwide
Clear/Cloudy	96.2%	80.5%
Fog	0.0%	0.4%
Rain/Mist	3.8%	17.8%
Snow/Sleet	0.0%	0.7%
Other/Not Stated	0.0%	0.6%

MOST PREVALENT DRIVER ACTION

Driver Action	Intersection	Regionwide
Did not have ROW	**36.5%**	18.5%
Driver Inattention	19.2%	17.8%
Following too close	13.5%	15.7%
Disregarded stop-go light	11.5%	5.4%
Exceeded speed limit	1.9%	2.3%

CRASH TYPE

Crash Type	Intersection	Regionwide
Rear End	40.4%	40.6%
Right Angle	**53.8%**	39.5%
Head On	0.0%	2.1%
Side Swipe	3.8%	7.7%
Fixed Object	1.9%	7.1%
Pedestrian	0.0%	1.4%
Animal	0.0%	0.2%
Other	0.0%	1.4%

PRIMARY CRASH MOVEMENT

Crash Type and Direction	Percent
Type #1 	**30.8%**
Type #2	**21.2%**
Type #3 	13.5%

MAJOR FACTORS

Major Factors	Intersection	Regionwide
Miscellaneous	1.9%	2.7%
Driver Asleep/Handicap	0.0%	1.8%
Driver Under the Influence	1.9%	3.9%
Driver Speeding	1.9%	1.8%
Driver Error	88.5%	80.6%
Vehicle Defective	0.0%	0.5%
Weather/Visibility	3.8%	6.4%
Road Defective	0.0%	0.2%
Road Slick	0.0%	1.4%
Not Stated	1.9%	0.7%

Intersection Traffic Crash Analysis Summary (1998-2000)

Intersection: Rochambeau Dr at Route 143
Jurisdiction: York County

EPDO Rate per Million Entering Vehicles:	N/A*
Regional Rank by EPDO Rate:	N/A*
Number of Crashes Per Year	17.3
Number of Injuries Per Year	15.7
Number of Fatalities Per Year	0.0
Daily Number of Vehicles Entering Intersection	N/A*

OBSERVATIONS:

- 40.4% of crashes occurred during the afternoon peak period (3 – 7 pm). Regional average was 29.9%
- 23.1% of crashes occurred on Friday, while the regional average was 17.2%.
- 53.8% of crashes were right angle crashes. Regional average was 39.5%.
- The primary crash movement and type were southbound left turns with northbound throughs (right angle crashes) on Route 143 (30.8%).
- The second highest crash movement and type were rear ends traveling east on Rochambeau Dr (21.2%).
- For many crashes, the driver did not have the right-of-way (36.5%). Regional average was 18.5%.

REMEDIES AND COUNTERMEASURES:

- Add left-turn lane for southbound direction of Route 143 at intersection and/or a protected left-turn phase for vehicles turning onto I-64 East ramp. It should be noted that this geometric improvement is currently scheduled in the Transportation Improvement Program (TIP).
- Ensure the visibility of "signal ahead" sign on Rochambeau Dr.

* Traffic volumes were not available.

CONCLUSIONS

In the past, safety considerations have taken place at the project level and on individual facilities through traffic engineering improvements. Education and enforcement efforts are still largely developed and conducted outside the traditional planning process. TEA-21 required safety considerations in the planning process with systemwide and multimodal perspectives.

Since safety is a TEA-21 planning factor, the HRPDC staff, as part of its Congestion Management System (CMS) program, initiated a comprehensive regional safety study in 2001. The study is designed to assist local communities in understanding the traffic safety issues. This document, Part 3 of the Hampton Roads Regional Safety Study, summarized a detailed analysis of the high-crash locations in the region. Location maps, roadway geometry diagrams, collision diagrams, crash data summaries, observations, and remedies were provided for the top 10 high-crash interstate segments by EPDO crash rate as well as the top intersection by EPDO crash rate and the top intersection by number of crashes (1998 – 2000 data) for each Hampton Roads jurisdiction.

Furthermore, the Hampton Roads MPO adopted in 1996 a multimodal Project Selection Process for allocation of Regional STP and CMAQ funding programs. It should be noted that safety is one of several performance measures incorporated in the region's project selection process. The Hampton Roads region receives nearly $30 million every year from both of these funding programs.

The Transportation Improvement Program (TIP) is a multimodal document that advances defined projects to the development and implementation stages. One primary objective of this study was to provide local decision makers with safety related information when submitting projects for inclusion in the TIP. The HRPDC staff would therefore encourage localities to use the results of the Regional Safety Study in securing other sources of funding such as VDOT's Highway Safety Improvement Program (HSIP)[8]. This program is part of the Surface Transportation Program (STP). In Virginia, the funds are allocated as follows: 10% is available for the Bicycle and Pedestrian Safety Program, 50% for the Hazard Elimination Safety (HES) Program, and 40% for the Rail-Highway Grade Crossing Safety Improvement Program. The HSIP program is a reimbursable program. Requests for reimbursement must be submitted to VDOT for processing.

Lastly, the HRPDC staff would maintain and update the regional crash database, which was created as part of this comprehensive study. This task will be accomplished through the triennial update of the regional Congestion Management System (CMS) plan.

[8] Virginia Department of Transportation, Highway Safety Improvement Program, Mobility Management Division, Highway Safety Section.

LESSONS LEARNED

Safety planning has taken on a much higher profile nationally since HRPDC initiated this study in July 2001. As we prepared our methodology for this study, there were few other metropolitan areas conducting safety planning studies and national standards were difficult to find. With the next Surface Transportation Reauthorization package further emphasizing safety planning and a new Highway Safety Manual being created, standards for conducting safety studies should become more prevalent.

Collecting data for individual crashes on a regional level was a more arduous task than was expected. Although VDOT maintains a database with substantial data for each crash throughout the state, locations of crashes are not included for non-interstate roadways within cities. Most jurisdictions maintain their own crash databases, but the quantity and quality of the data within these databases varies greatly. For example, certain jurisdictions listed crashes in their database as occurring at the intersection even though it may have occurred in an adjacent parking lot. Still other jurisdictions only listed crashes in their database if they occurred within the intersection; crashes that were listed as being as little as five feet away may not have been included in the database. As proven by the proliferation of intersections in Hampton and Portsmouth at the top of the hazardous intersection list, it is difficult if not impossible to compare intersection crash rates on a regional level when using jurisdictional crash databases.

The fact that crash locations are not included for non-interstate roadways in cities lessens the value of the VDOT crash database as a safety planning tool. Incorporating locations for each crash, regardless of whether it was in a county or a city, would improve the reliability of data in regional safety studies, as well as significantly reduce the time (and therefore provide more up-to-date data) it takes to complete similar studies.