JOHNSTON

Blueprint for Safety

Safety Data Toolkit

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The safety data toolkit is a booklet of information from the CAMPO Blueprint for Safety. This document will provide local leaders, engineers, and planners with a greater understanding of their local safety concerns. This package includes a brief summary of crash trends and focus crash types for the county in which the municipality is located. The crash data summarizes total crashes and the total crashes resulting in serious injuries or death, by emphasis areas crash types. Crash emphasis areas are also described per the route class type, highlighting the percentage of crash types on each route class and in comparison with the total mileage of each route class. Focus crash types are identified as the county's crash emphasis areas that have a higher percent share of fatal and serious injury crashes, compared with the region.

The booklet also references a variety of maps identifying locations with high crash risk by crash type, exposure and severity levels, development context, the high injury networks (HINs) and high injury intersections (HII), and overlaps with existing NCDOT projects and programs such as the State Transportation Improvement Program (STIP), Strategic Transportation Prioritization (SPOT), the MPO's Metropolitan Transportation Plan (MTP), candidate sites for review by the NCDOT Highway Safety Improvement Program (HSIP), and locations scheduled as part of the NCDOT Highway Maintenance Improvement Program (HMIP). All corridors or intersections should be studied further due to their crash history or propensity for a crash based on the associated risk factors.

Crash Statistics

The crash emphasis areas for the entire CAMPO region include the following:

- Bicycle
- Impaired Driving
- Intersection
- Lane Departure
- Motorcycle
- Older Drivers
- Pedestrian
- Seat Belts and Car Seats
- Speed

For all communities in **Johnston County,** the following focus crash types are selected based on the share of fatal and serious injury crashes and on over-representation comparing the County to the region. These crash types should be prioritized for review in all projects and programs:

- Impaired Driving
- Intersection
- Motorcycle
- Seat Belt and Car Seat

A deeper dive into these focus crash types for Johnston County reveal why these are critical safety problems. Intersection and Impaired Driving are the largest share of total crashes among these focus crash types. The focus crash types that most often lead to serious injury or death in **Johnston County** are Seat Belt and Car Seat and Motorcycle-related crashes.

Table 1. Johnston County Focus Crash Types

FOCUS CRASH TYPE	CRASH TOTAL	FATAL AND SERIOUS INJURY CRASH TOTAL	FATAL AND SERIOUS INJURY AS PERCENT OF TOTAL CRASHES
IMPAIRED DRIVING	*2,765*	*264*	*2%*
INTERSECTION	*10,971*	*265*	*24%*
MOTORCYCLE	*560*	*132*	*17%*
SEAT BELT AND CAR SEAT	*1,708*	*282*	*2%*

Of the CAMPO crash emphasis areas that are attributable to roadway features or design (i.e., intersections, lane departure or speed) or modes of transportation (i.e., bicyclist, pedestrian or motorcycle), Table describes how frequently the crash type occurred on different roadway route classes in **Johnston County**. This is compared with the percentage of roadway miles for each route class in the county to identify over-representation across certain roadway types.

Table 2. Johnston County Focus Crash Types per Route Class and Mileage

FOCUS CRASH TYPE	KA Secondary	Mileage Secondary	KA US Route	Mileage US Route	KA NC Route	Mileage NC Route	KA Interstate	Mileage Interstate	KA Non-System	Mileage Non-System
IMPAIRED DRIVING	50%	57%	14%	6%	22%	6%	11%	4%	3%	26%
INTERSECTION	43%		21%		32%		1%		3%	
MOTORCYCLE	49%		17%		23%		8%		2%	
SEAT BELT AND CAR SEAT	51%		12%		23%		13%		1%	

All focus crash types shown are over-represented on the US Route, NC Route and Interstate systems in Johnston County. None of the focus area crash types are over-represented Secondary Roads or non-system (non-NCDOT) roadways.

Crash disparities are most prominent along NC Routes in Johnston County. Intersection-related crashes are a significant concern, with 32% of Intersection fatal and serious injury crashes occurring on NC Routes, while that route class represents 6% of the overall mileage in Johnston County. Intersection, Motorcycle, and Seat Belt and Car Seat crashes resulting in serious injury and death are a top concern on NC Routes.

Summary

While all safety problems and crash types should be taken into account when developing projects and plans, four crash types are of particular focus in **Johnston County**:

- Impaired Driving
- Intersection
- Motorcycle
- Seat Belt and Car Seat

How to Use this Safety Data Toolkit

This safety data toolkit was developed to help local governments screen a location(s) for potential safety needs using data created for the CAMPO Blueprint for Safety. The data and process can be used to review a location that has already been selected for a transportation improvement or it can be used to develop a new safety project proposal.

Step 1. Identify a Location for Review

Locations along the locally maintained roadway system, in developed areas, and/or exclusive of access/controlled interstates and freeways should be priorities for review. Locations along the High Injury Network are a first tier of locations for initial consideration. Areas of the High Injury Network that overlap with other projects or proposals, such as SPOT or MTP projects, may be good candidates for review to inform the scope of work for those project opportunities.

The High Injury Network is comprised of the following information:

- ☐ High Injury Network and High Injury Intersections (all crash types)
- ☐ Bike/Ped High Injury Network and High Injury Intersections (bicycle/pedestrian only)

Step 2. Define the Safety Problem

To describe a specific safety problem or crash risk, the location selected (intersection, segment or corridor) can be reviewed using data produced by the regional safety plan. The potential for certain crash types can be described by reviewing the crash type risk maps developed for the region.

Crash Types for High-Risk Review

- ☐ Lane Departure
- ☐ Intersection Related (all crash types)
- ☐ Intersection Related (bicyclist and pedestrian crashes)
- ☐ Speed Related
- ☐ Bicycle
- ☐ Pedestrian
- ☐ Motorcycles

Step 3. Record Safety Problems and Deficiencies

Crash types that are identified as High or Very High risk for a location are recorded, in addition to information about the conditions of the site. Conditions such as lane configuration, traffic volumes, and speeds are criteria for considering types of countermeasures that may address the crash risks or safety problems noted in Step 2. Field review should always be performed to describe specific safety problems and to identify opportunities for specific countermeasures. Additional analysis may be necessary to evaluate the impacts of potential countermeasures on traffic operations, pedestrian / bicycle mobility, constructability and implementation costs. Table 3 is an example of information to be recorded for the location being reviewed.

Table 3. Site Information

LOCATION CHARACTERISTICS	EXISTING CONDITIONS (SOURCE)
HIGH INJURY NETWORK	What type of HIN is represented at the location? (see HIN maps)
LANE OR INTERSECTION CONFIGURATION	What are the number of lanes at the segment or by approach to Intersection *(Review aerial imagery or visit site)*
TRAFFIC VOLUMES	What is the Annual Average Daily Traffic (AADT) *(See Exposure maps)*
SPEEDS (OBSERVED OR POSTED)	What is the posted or observed speeds (See Severity maps for observed 85th weekday speeds)
PEDESTRIAN FACILITIES	Is sidewalk present on one or more sides of the road?
BICYCLE FACILITIES	Are designated bike lanes or separated paths present?
TRANSIT FACILITIES	Are bus stops or shelters present?
LAND USE CONTEXT	What is the predominant context for the location? Urban Core, Urban, Suburban, Rural Town or Rural *(See Block Group Classifications – Context maps)*
ACCESS MANAGEMENT	Does the location include a center median or restricted turning movements at intersections? *(Review aerial imagery or visit site)*
HIGH CRASH RISK TYPES	What types of crash risk are high or very high for the location?

Following these steps, review the Countermeasure Library for potential Countermeasure Types and detailed information about specific countermeasures and guidance about application and implementation. Consider an appropriate Safety Project Implementation Strategy that best fits the safety problem and countermeasure types selected for a location or project proposal.

Terminology and Definitions

Bicycle Risk – A multivariate measure of crash type risk associated with various roadway characteristics and local context. Higher levels of bicycle risk correlate to higher travel volumes, higher number of lanes, and on roads classified as a US Route, NC Route, or Secondary Route. Additionally, bicycle risk has a positive correlation with an urban land use context and is positively associated in areas that have higher concentrations of population and employment density, have a school or university nearby, and is within an area with a higher Social Vulnerability Index Score.

Bicycle and Pedestrian Intersection Risk - A multivariate measure of crash type risk associated with various roadway characteristics and local context. Higher levels of intersection risk are associated with higher intersection AADT, 4 or more legs within the intersection, and presence of traffic signals and transit stops. Additional factors include a positive association where the intersection is located in an urban context or is within an area with a high Social Vulnerability Index Score and population and employment density. The prevalence of zero-vehicle households was not significant in the risk of bicycle and pedestrian crashes at intersections.

Block Group (Context) Classification – The five classifications include: Rural Town, Rural, Suburban, Urban, and Urban Core, developed utilizing the NCHRP Research Booklet 1022: *Context Classification Application: A Guide*. The classifications were identified based on characteristics such as municipal location, intersection density, and building area density.

Exposure – A measure of road usage patterns through annual average daily traffic (AADT). This measure helps to identify areas where higher traffic volumes may increase the frequency of crashes.

High Injury Network (HIN) – The High Injury Network (HIN) is a collection of roadways that have a disproportionately high number of fatal and serious injury crashes compared to the entire roadway network. The High Injury Network is comprised of four deliverables:

- High Injury Network – All crashes, regardless of crash type
- High Injury Intersections – All crashes, regardless of crash type
- High Injury Network – Bicycle and pedestrian crashes only
- High Injury Intersections – Bicycle and pedestrian crashes only

Highway Maintenance Improvement Program (HMIP) – Roadways in the HMIP are designated for resurfacing, preservation, or rehabilitation. Roadways scheduled for HMIP improvements may include safety treatments within the scope of the HMIP process, such as roadway markings or rumble strips.

Highway Safety Improvement Program (HSIP) – Roadways and intersections identified through NCDOT's Highway Safety Improvement Program (HSIP) that have met warrants as potentially hazardous. The NCDOT Traffic Safety Unit identifies locations for HSIP review across five main categories: intersections, sections, bicycle/pedestrian intersections, bicycle/pedestrian mid-block crossings, and bridges. The HSIP locations are flagged with identifiable crash patterns for potential safety interventions.

Intersection Risk - A multivariate measure of crash type risk associated with various roadway characteristics and local context. Higher levels of intersection risk are associated with higher intersection AADT, 4 or more legs within the intersection, presence of traffic signals and transit stops, and where the geometry of the intersection is at less than a 70-degree angle. Additional factors include a positive association where the intersection is located in a rural, suburban, or urban core, or is within an area with a high Social Vulnerability Index Score but is negatively associated with population and employment density.

Lane Departure Risk – A multivariate measure of crash type risk associated with various roadway characteristics and local context. Higher levels of lane departure risk correlate to higher travel volumes, fewer number of lanes, and on roads classified as a US Route, NC Route, or Secondary Route. Additionally, lane departure risk is positively associated with the roadway in a rural, suburban, or urban area, have higher concentrations of population and employment density, not have a school or university nearby, and is within an area with a higher Social Vulnerability Index Score.

Metropolitan Transportation Plan (MTP) – Projects identified as part of the CAMPO 2055 MTP update. Projects identified as roadway or highway projects are shown where overlapping with the High Injury Network representing all crash types. The MTP projects identified as bicycle or pedestrian standalone projects are from the CAMPO 2050 MTP plan and are shown where overlapping with the High Injury Network representing bicycled and pedestrian crashes only.

Motorcycle Risk - A multivariate measure of crash type risk associated with various roadway characteristics and local context. Higher levels of motorcycle risk correlate to higher travel volumes, higher number of lanes, and on roads classified as a US Route, NC Route, or Secondary Route. Additionally, motorcycle risk has no correlation with land use context but is positively associated in areas that have higher concentrations of population and employment density, have a school or university nearby, and is within an area with a higher Social Vulnerability Index Score.

NC Routes (NC) - NC Routes are part of the state-maintained primary highway system with an "NC" or "North Carolina" in signing and inventory.

Pedestrian Risk - A multivariate measure of crash type risk associated with various roadway characteristics and local context. Higher levels of pedestrian risk correlate to higher travel volumes, higher number of lanes, and on roads classified as a US Route, NC Route, or Secondary Route. Additionally, pedestrian risk has no correlation with land use context but is positively associated in areas that have higher concentrations of population and employment density, have a school or university nearby, and is within an area with a higher Social Vulnerability Index Score.

Secondary Routes (SR) - Secondary Routes are part of the state-maintained system but does not carry "NC" or "US" numbers . These may have local street names when in an incorporated or developed area.

Severity – A measure of observed roadway travel speed at the 85th percentile during workdays for a 24-hour period. This data is derived from a 2023 snapshot of the Regional Integrated Transportation Information System (RITIS) – a proprietary source that has aggregated probe and connected vehicle data to a network. This measure helps identify roadway corridors where targeted interventions to manage speed could reduce the potential for fatal and serious injury crashes.

Speed Risk – A multivariate measure of crash type risk associated with various roadway characteristics and local context. Higher levels of risk for speed-related crashes correlate to higher travel volumes, fewer number of lanes, and on roads classified as a US Route, NC Route, or Secondary Route. Additionally, speed-related crash risk is positively associated with the roadway in a rural or suburban, have higher concentrations of population and employment density, not have a school or university nearby, and is within an area with a higher Social Vulnerability Index Score.

State Transportation Improvement Program (STIP) – The 2024-2033 ten-year plan that identifies the construction funding for and scheduling of transportation projects throughout the state. Projects in the STIP within the first half of the ten year time frame are considered committed projects while projects in the latter half of the ten year time frame are listed as "Funded for Preliminary Engineering Only" and may be committed in a future round of prioritization. All projects programmed in the ten year STIP and overlapping with the HIN are shown in this map packet.

Strategic Transportation Prioritization (SPOT) – The methodology used by NCDOT to score all roadway, public transportation, bicycle, pedestrian, rail, and aviation projects for potential inclusion in North Carolina's STIP. The batch of projects shown in this packet include all highway, bicycle and intersection projects submitted and scored in P 7.0 that also overlap with the HIN.

US Routes - US Routes refer to the roads within the state-maintained road network that is part of the United States numbered highway system.

Map Descriptions

High Injury Network, High Injury Intersections (All Crashes)

This map shows the top 1% of segments and top 1% of intersections as rated based on frequency and severity of crashes that occurred between 2016-2023 in the counties included in the CAMPO region.

High Injury Network, High Injury Intersections – Bicycle and Pedestrian

This map shows the top 3% of segments and top 1% of intersections as rated based on frequency and severity of crashes that occurred between 2016-2023 in the counties included in the CAMPO region.

High Injury Network + MTP Project Overlap

This map shows the overlaps between the High Injury Network / Intersections representing all crash types and the CAMPO 2050 MTP projects identified as highway or intersection improvements.

High Injury Network – Bicycle and Pedestrian + Bicycle Pedestrian MTP Project Overlap

This map shows the overlaps between the High Injury Network / Intersections representing bicycle and pedestrian crashes and the CAMPO 2050 MTP projects identified as bicycle or pedestrian improvements.

Crash Risk Level Maps

These maps show the segments or intersections with very low to very high probability for a serious injury or fatal crash involving or related to one of the following crash types:

- Lane Departure
- Intersections
- Bicycle and Pedestrian at Intersections
- Bicyclist
- Pedestrian
- Speed

High Injury Network and STIP Overlap

This map shows the overlaps between the High Injury Network / Intersections representing all crash types and the 2024-2033 STIP projects identified the CAMPO region. STIP projects scheduled for construction for 2026 or later are more likely candidates for review to include additional safety improvements.

High Injury Network and HMIP Overlap

This map shows the overlaps between the High Injury Network / Intersections representing all crash types and the 2023-2027 NCDOT HMIP projects identified the CAMPO region.   Further review and coordination is required to determine if safety improvements can be integrated into the HMIP.

High Injury Network and HSIP Review Location Overlap

This map shows the overlaps between the High Injury Network / Intersections representing all crash types and the 2024 NCDOT HSIP locations. These are locations that met Highway Safety Improvement Program (HSIP) warrants as the result of the HSIP screening process, but are not necessarily project locations.

High Injury Network and Safety Project Overlap

This map shows the overlaps between the High Injury Network / Intersections representing all crash types and the safety improvement projects that were completed since 2019 or are still in a stage of pre-completion as of December 2024. Safety projects that conducted across a wide area (e.g., countywide, division-wide) are not shown on the map.

Context (Block Group Classifications)

This map shows the area block groups as classified per one of the five context classifications developed for the safety plan. Local development context should be taken into account as these classifications are based on high level aggregate data.

Route Exposure

This map shows degrees of exposure, classified by ranges of traffic volume (AADT), for all roadway segments. The higher ranges of AADT typically result increased frequency of crashes of all severities.

Route Exposure in Context

This map shows the Route Exposure layer with the Block Group Classification layer. Higher Exposure in a highly developed area, such as an Urban or Urban Core, may result in increased conflicts between motor vehicles, pedestrians and bicyclists.

Route Severity

The map shows the observed speed (measured by the 85th percentile speed recorded for a segment for a 24-hour weekday average) using remote or probe data. This information is most reliable on high volume roads, and is less reliable on secondary or local streets.

Route Severity in Context

This map shows the Route Severity layer with the Block Group Classification layer. Higher Severity in a highly developed area, such as an Urban or Urban Core, may result in increased crash severity between vehicles, pedestrians and bicyclists.