PACTS High Crash Locations Study
Desktop Assessments

PREPARED FOR

PACTS
970 Baxter Boulevard, Suite 2
Portland, ME, 04103

PREPARED BY

vhb
500 Southborough Drive
Suite 105B
South Portland, ME 04106
207.889.3150

July 7, 2020
**Assessment**
This area is a major interchange for traffic entering/exiting I-295 and the only non-highway connection for accessing the South Portland’s west end neighborhood, the Maine Mall, and surrounding commercial areas. Westbrook Street (Route 9), in particular, is a school route and a longstanding concern for pedestrians and bicyclists navigating the two large, high traffic intersections and highway underpass. This assessment includes the following high crash locations (HCLs):

A. **Route 9 (Westbrook St.) and Broadway**: The intersection at Route 9 and Broadway is a signalized four-way intersection.

B. **Route 9 (Westbrook St.) and 295 SB Off Ramp**: The intersection of Route 9 and the 295 SB Off Ramp is a three-way signalized intersection.

C. **295 SB Off Ramp**: This road segment is the 295 southbound off ramp just prior to the intersection with Route 9.

**Pending Projects**
- There is a pedestrian/shared use path approved on Route 9 (Westbrook Street) through locations A and B.
- A traffic signal is planned for the intersection of Broadway and Sokokis St.

**Municipal Input**
Noted concerns by the city, include the following:
- The need for safe pedestrian crossings, particularly with the construction of the following:
  - The consolidated middle school on Wescott Road.
  - The shared use path on Westbrook Street between the school and the Redbank neighborhood.
- The City will be installing a traffic signal at the intersection of Broadway and Sokokis St. (adjacent to the Route 9 and Broadway intersection).
SOUTH PORTLAND: Intersections of Route 9 and Broadway, 295 SB Off Ramp

Safety Issues
In the three HCLs that comprise the study area, there were 91 crashes between 2015-2017. This section outlines safety issues for each HCL as identified through a review of crash data and aerial/street imagery.

A. Route 9 (Westbrook St.) and Broadway intersection:
At this intersection, 22 of the 38 crashes were rear-end collisions. These included vehicles traveling south on Route 9 turning right onto Broadway traveling west, and vehicles traveling east on Broadway. Another eight crashes were left turns from Broadway traveling west to Route 9 south failing to yield.

For both southbound travel on Route 9 and eastbound travel on Broadway, the primary crash types were rear-end collisions. Traveling south on Route 9, the speed, and yield condition of right turning vehicles onto Broadway, along with the free-flow ramp located immediately adjacent to the lane, may be creating conditions where the vehicles are not expecting to stop. In the eastbound direction on Broadway, sight distance appears to be sufficient so speed and congestion may be factors.

B. Route 9 (Westbrook St.) and 295 SB Off Ramp intersection:
This intersection includes 33 rear-end collisions, out of a total 45 crashes, and occurring in every leg of the intersection. Another three crashes are vehicles running the red light on Route 9 traveling south.

In the westbound direction on Broadway the primary crash type is angle and involves vehicles turning left onto southbound Route 9. In the westbound direction on Broadway, drivers have a permissive left-turn phase onto southbound Route 9, from a shared left-through lane, and it may be difficult for them to judge an adequate gap due to the multiple on-coming lanes of traffic from the eastbound direction.

The primary crash type for vehicles on the ramp approaching the intersection were rear-end collisions, many of which involved vehicles turning right onto northbound Route 9. The dual right turn lane includes two signalized lanes that are physically separated from the dual left-turn lanes at the intersection. The traffic signals for these dual right-turn lanes are angled and difficult to see for vehicles approaching the intersection from the off ramp and may be contributing to the rear-end collisions at this location.
SOUTH PORTLAND: Intersections of Route 9 and Broadway, 295 SB Off Ramp

The primary crash types for vehicles traveling southbound on Route 9 were rear-end and angle crashes. There are two through lanes that are immediately adjacent to a separated/protected access lane to the 295 NB On Ramp that travels through the intersection, uncontrolled by the signal. The angle crashes involved drivers turning left during a protected left-turn green phase from the 295 SB Off Ramp and vehicles traveling straight, oftentimes running the red light, on Route 9 south. At least half of these crashes involved southbound drivers on Route 9 running the red light.

C. 295 SB Off Ramp road segment:
Four of the eight total crashes on this road segment were rear-end collisions and another three were failure to stay in the lane. It appears many of the safety issues for this HCL are related to those described for the Route 9 and 295 SB Off Ramp intersection.

(C) 295 SB Off Ramp road segment and Route 9 (Westbrook St.) intersection
Recommendations
This section includes potential countermeasures to consider for addressing identified safety issues. Some of these countermeasures could be combined or considered as individual options. Also, it is worth noting the crash summary and initial recommendations are based on experienced crashes from 2015-2017.

While pedestrian safety was a noted concern by the city, no pedestrian crashes were recorded during this time period. That is not surprising since pedestrian crashes are often under-reported. Given the complexity of the site, the amount of crashes at this location, and the pedestrian safety concerns, a full Road Safety Audit (RSA) is recommended to better understand the safety concerns at this site. (An RSA is a formal safety performance examination of an existing or future road or intersection by an independent, multidisciplinary team. It qualitatively estimates and reports on potential road safety issues and identifies opportunities for improvements in safety for all road users).

The following are recommendations for each of the high crash locations.

A. Route 9 (Westbrook St.) and Broadway intersection:
On the Route 9 southbound approach:
- Improve right-turn lane yield signage and pavement markings.
- Control the right slip lane through signalization.
- Install advance detection.
- Remove the right slip lane and move the right turn lane so that it is immediately adjacent to the through lanes.

On the Broadway eastbound approach:
- Provide advanced signal warning.
- Apply high friction surface treatment on intersection approach.
- Install advance detection.
- Evaluate the red and yellow change interval and retime if warranted.

On the Broadway westbound approach:
- Install flashing yellow arrow or provide a protected left-turn phase.
- Evaluate the red and yellow change interval and retime if warranted.

B. Route 9 (Westbrook St.) and 295 SB Off Ramp intersection:
On the Route 9 southbound approach:
- Improve signal warning through enhanced advanced signage.
- Improve signal visibility with retroreflective backplates.
- Install advance detection.

On the 295 SB Off Ramp approach:
- Remove the right slip lane and move the right turn lanes immediately adjacent to the left-turn lanes so that the signal is visible farther up the ramp.
- Add a traffic signal within the porkchop island facing the approaching dual right-turn lanes to improve visibility.
- Provide advanced dynamic signal warning.

C. 295 SB Off Ramp road segment:
- Begin the right-turn lanes farther up the ramp to provide additional queue storage.
- Provide advanced dynamic signal warning.
SOUTH PORTLAND: Intersections of Route 9 and Broadway, 295 SB Off Ramp

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for all three locations and also shows additional crashes from 2018. The crash diagrams for all three locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 9 and Broadway</td>
<td>15541</td>
<td>16 8 14 27</td>
<td>65</td>
<td>26.3%</td>
<td>1.13</td>
<td>2</td>
<td>30-35 mph</td>
<td>4,000-16,000</td>
</tr>
<tr>
<td>Route 9 and 295 SB Off Ramp</td>
<td>19250</td>
<td>13 11 21 15</td>
<td>60</td>
<td>28.9%</td>
<td>1.06</td>
<td>1/2</td>
<td>30 mph</td>
<td>3,000-12,000</td>
</tr>
<tr>
<td>295 SB Off Ramp Segment</td>
<td>66122-19251</td>
<td>3 2 3 2</td>
<td>10</td>
<td>25.0%</td>
<td>1.25</td>
<td>1</td>
<td>Unposted</td>
<td>12,000</td>
</tr>
</tbody>
</table>

See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.

**Legend**
- MOVING VEHICLE
- REAR END COLLISION
- FIXED OBJECT
- VEHICLE BACKING
- SIDESWIP COLLISION
- PARKED VEHICLE
- OVERTURNED
- HEAD ON COLLISION
- FATAL
- OUT OF CONTROL
- ANGLE COLLISION (A B C)
- INJURY TYPE
- PATH OF: F PEDESTRIAN B BICYCLE A ANIMAL S SLED
- PAVEMENT: D - DRY, I - ICY, W - WET, S - SNOW
- WEATHER: C - CLEAR, F - FOG, R - RAIN, S - SLEET, S - SNOW, CL - CLOUDY
- TIME: A - AM, P - PM
SOUTH PORTLAND: Intersections of Route 9 and Broadway, 295 SB Off Ramp

A. Route 9 and Broadway Intersection
SOUTH PORTLAND: Intersections of Route 9 and Broadway, 295 SB Off Ramp

B. Route 9 and 295 SB Off Ramp Intersection
SOUTH PORTLAND: Intersections of Route 9 and Broadway, 295 SB Off Ramp

C. 295 SB Off Ramp Road Segment
**SOUTH PORTLAND:** Intersection of Philbrook Ave and Turnpike Approach Off-Ramp

**Overview Map of HCLs reviewed in this assessment.**

**Assessment**
This intersection is one of the main entrances to the Maine Mall. It is a four way stop. The Turnpike Approach Off-Ramp is one way, and the opposite leg is a part of the Maine Mall parking lot.

**Recent or Pending Projects**
No major MaineDOT recent or pending projects.

**Municipal Input**
City staff have not had a chance to review crash data for this intersection and had no local observations to report.

**Safety Issues**
Of the 16 crashes, 13 resulted from a failure to yield or running the stop sign. The other three were rear end collisions. The majority of crashes involved vehicles traveling west on Philbrook Ave. Philbrook Ave runs along the perimeter of the Maine Mall, with numerous access points to parking lots. Many of these access points are not stop-controlled on the major

---

*Phothographs and maps courtesy of VHB.*
SOUTH PORTLAND: Intersection of Philbrook Ave and Turnpike Approach Off-Ramp

street (Philbrook Avenue), and so drivers may not expect a stop sign at this intersection. There are stop ahead warning signs on the eastbound approach of Philbrook Avenue and on the Turnpike Approach Off-Ramp.

Recommendations
This section includes potential countermeasures to consider for addressing the identified safety issues. Some of these potential countermeasures could be combined or considered as individual options. Also, it is worth noting that the crash summary and initial recommendations are based on experienced crashes from 2015-2017. The recommendations for this site are targeted at increasing stop sign conspicuity to alert drivers of the approaching stop-controlled intersection.

All approaches:
- Apply “STOP” pavement marking just before the stop bar.
- Increase stop sign visibility using oversized signs, LED-embedded signs, or flashing beacons.
- Add “All Way” plaque beneath stop sign.
- Consider modifying intersection control/design to roundabout, which would maintain traffic flow while eliminating the potential for angle crashes, which oftentimes result in more serious injuries.

Turnpike Off-Ramp Northbound Approach:
- Apply arrow pavement markings and lane use sign indicating lane use for turn and through movements.
- Install transverse rumble strips to alert drivers to the upcoming stop.

Philbrook Ave. Westbound Approach:
- Install advanced stop ahead warning sign.
- Install transverse rumble strips to alert drivers to the upcoming stop.
- Install high friction surface treatment on intersection approaches.

Philbrook Ave. Eastbound Approach:
- Apply “STOP” pavement marking just before the stop bar.
SOUTH PORTLAND: Intersection of Philbrook Ave and Turnpike Approach Off-Ramp

Aerial view of Philbrook Ave and Maine Turnpike Approach Off-Ramp
Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram is shown on the following pages.

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Philbrook Ave and Off-Ramp</td>
<td>18350</td>
<td>7</td>
<td>7</td>
<td>2</td>
<td>7</td>
<td>23</td>
<td>37.5%</td>
<td>3.02</td>
<td>1/6</td>
<td>25 mph</td>
<td>5,000-10,500</td>
</tr>
</tbody>
</table>

The legend below will aid in understanding the crash diagram that follows.
SOUTH PORTLAND: Intersection of Philbrook Ave and Turnpike Approach Off-Ramp

Intersection of Philbrook Ave and Maine Turnpike Approach Off-Ramp

South Portland 18350
Study Period 2015-2017
# of Crashes: 16/CRF = 3.02

Prepared by Office of Safety LWJ 12/18/18
SOUTH PORTLAND: Intersection of Maine Mall Rd and Turnpike On-Ramp

Assessment
This site is one of several major intersections in the vicinity of the Maine Mall. In addition to serving through traffic on Maine Mall Road it is an on-ramp to I-95 and off-ramp from I-295 and the Maine Turnpike Approach. It is a four way signalized intersection. On the south side of the intersection the Maine Mall Road is six lanes across, four traveling north and two traveling south. North of the intersection Maine Mall Road is seven lanes across, three traveling north and four traveling south with two of those four being left only turning lanes onto the on-ramp. Traveling west on the ramp there are three lanes, one left only, one left through, and one right only. The fourth leg is the Days Inn entrance.

Recent or Pending Projects
No major MaineDOT recent or pending projects.

Municipal Input
City staff have not had a chance to review crash data for this intersection and had no local observations to report.
SOUTH PORTLAND: Intersection of Maine Mall Rd and Turnpike On-Ramp

Safety Issues
Of the 38 crashes in the intersection during the 2015-2017 period, 24 were rear-end collisions, with an even split between the northbound and southbound approaches and two on the Turnpike Off-Ramp approach. Nine crashes were related to turning movements in the intersection:
- Four (and possibly five) involved vehicles turning left from the southbound Maine Mall Road approach onto the Turnpike On-Ramp.
- Four involved vehicles from the Turnpike Off-Ramp approach, three of which involved northbound Maine Mall Road vehicles.

There were seven crashes involving vehicles running a red light. Six of those resulted in an angle crash and one a rear-end crash. The crashes involved the following movements:
- Two (and possibly three) involved vehicles turning left from Maine Mall Road onto the Turnpike On-Ramp and vehicles traveling straight on northbound Maine Mall Road.
- Four involved vehicles on the Turnpike Off-Ramp approach, three of which included a vehicle traveling northbound on Maine Mall Road.

Recommendations
This section includes potential countermeasures to consider for addressing the identified safety issues. Some of these potential countermeasures could be combined or considered as individual options. Also, it is worth noting that the crash summary and initial recommendations are based on experienced crashes from 2015-2017. Because the majority of the crashes (63 percent) are rear-end crashes, the recommendations for Maine Mall Road include increasing pavement friction and potentially retiming/coordinating adjacent signals.

Maine Mall Road Northbound:
- Install high friction surface treatment on downhill approach.
- If the angle crashes involved vehicles turning right onto the Turnpike On-Ramp, consider restricting right-turns on red.
- Install advance detection.
- Evaluate red and yellow change interval and retime if necessary.

Maine Mall Road Southbound:
- Add dotted pavement marking line to guide the left-turn movement through the intersection.
- Review timing and signal coordination so that it is coordinated with the intersection of Maine Mall Road and Philbrook Avenue to prevent rear-end crashes due to the close proximity of these intersections.
- Evaluate red and yellow change interval and retime if necessary.
- Install advance detection.
- Install high friction surface treatment on approach.

Turnpike On/Off-Ramp Westbound:
- Add dotted pavement marking line to guide left turn-movement through the intersection.
- If the angle crashes involved vehicles turning right from the Turnpike Off-Ramp onto northbound Maine Mall Road, consider restricting right turns on red.
SOUTH PORTLAND: Intersection of Maine Mall Rd and Turnpike On-Ramp

Aerial view of Maine Mall Road and Maine Turnpike On-Ramp, from Google Maps.
Crash Data

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram is shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Maine Mall Road and I-95 Access</td>
<td>15531</td>
<td>10 12 16 10</td>
<td>48</td>
<td>28.9%</td>
<td>1.33</td>
<td>1/2</td>
<td>35 mph</td>
<td>4,000-13,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagram that follows.
SOUTH PORTLAND: Intersection of Maine Mall Rd and Turnpike On-Ramp

Intersection of Maine Mall Rd and Turnpike On-Ramp

South Portland  
Node: 15531  
Study period 2015-2017  
# of Crashes: 38 / CRF: 1.33

Prepared by Office of Safety  
(WM-1-28-19)

PACTS High Crash Location Desktop Assessments 5
SOUTH PORTLAND: Intersection of Skillings Street and Route 1

Assessment
The intersection of Route 1 and Skillings Street is an angled intersection with through traffic on Route 1 that does not stop. There is a stop sign on Skillings Street where it meets Route 1. Opposite Skillings Street is the entrance to Irving Gas.

Recent or Pending Projects
A mill and fill on Route 1 was completed in 2016. Signal upgrades are being planned for the Route 1/Rumery Street intersection to facilitate pedestrian movements.

Municipal Input
Noted concerns by the city include:
- Trailer truck traffic missing the turn for Rumery Street (Hannaford’s distribution center) then attempting to make the hard right onto Skillings Street and hitting and damaging the utility pole at the corner.

Safety Issues
The crash types at this intersection are complex and varied. Four of the 18 crashes were improper turns from Route 1 onto Skillings Street. Seven crashes were related to vehicle movements coming from Skillings Street or the Irving Gas Station and failing to yield to through traffic on Route 1.

Skillings Street is a skewed two-way stop-controlled intersection between two signalized intersections. If queuing occurs at the left-turn lane pockets of these intersections, it can block the line of sight for a northbound vehicle turning left from Skillings Street onto Route 1.

Recommendations
This section includes potential countermeasures to consider for addressing the identified safety issues. Some of these potential countermeasures could be combined or considered as individual options. Also, it is worth noting
that the crash summary and initial recommendations are based on experienced crashes from 2015-2017. Because the majority of crashes are related to accessing Skillings Street from Route 1, restricting access should be considered. The following are recommended safety improvements for the intersection:

**Skillings Street Northbound:**

- Restrict left turns with a raised concrete median or a series of post mounted barriers. Vehicles that want to turn left should use the signalized intersection at Rumery Street instead. A potential negative impact would be that it would prohibit northeast bound vehicles on Route 1 from turning left into the gas station and restrict vehicles to only turning right at the Skillings Street intersection. The use of right-in, right-out porkchop islands could be used to clearly define the left-turn restriction from driveways and intersections.
  - A possible alternative would be to restrict left turns at peak hours of the day through signage but that may be easily overlooked or disregarded by drivers.
  - Another alternative would be to install a two-way left-turn lane between the signalized intersections of Rumery Street and Broadway. This would at least give turning vehicles a lane to be separated from through vehicles and the ability to perform a two-stage crossing.

**Route 1 Eastbound:**

- Restrict right turns onto Skillings Street with signage and potentially a concrete pork chop island. Trucks that miss the right turn at Rumery Street should find a safe place to make a U-turn or turn right at Broadway and access the Hannaford Distribution Center via the Lincoln Street Extension. There is currently a sign prohibiting thru trucks, however, that is only visible once drivers are already on Skillings Street. A similar sign should be installed facing eastbound drivers on Route 1, approaching Skillings Street.

**Route 1 Westbound:**

- Restrict left turns into Skillings Street with a concrete median or a series of post mounted barriers. Vehicles that want to turn left should use the signalized intersection at Rumery Street instead. Additional analysis could be performed to determine if it would be possible to allow U-turns at the intersection for those drivers that want to access Skillings Street.

**Skillings Street Southbound (Irving Gas driveway):**

- Restrict left turns with a concrete median or a series of post mounted barriers. Vehicle wanting to turn left should exit the gas station at the northern exit on Broadway.
  - Or consider the two-way, left-turn lane alternative.
SOUTH PORTLAND: Intersection of Skillings Street and Route 1

Aerial view of Route 1 (Main Street) and Skillings Street, from Google Maps
Crash Data

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram is shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Skillings St and Main St</td>
<td>16738</td>
<td>6</td>
<td>7</td>
<td>5</td>
<td>3</td>
<td>21</td>
<td>5.6%</td>
<td>3.30</td>
<td>1/6</td>
<td>30 mph</td>
<td>500-12,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.*

The legend below will aid in understanding the crash diagram that follows.
PORTLAND: Morrill’s Corner

Assessment
Morrill’s Corner is a major chokepoint for commuter track on Route 302 to and from Portland. This assessment considers the primary intersection and adjacent roadway south of the intersection on Forest Avenue.

A. Intersection of Route 302, Allen Avenue, and McDonald’s: This intersection is a four-way signalized intersection. Both the right turn from Route 302 onto Allen Avenue and the right turn from Allen Avenue onto Route 302 have offset right turn lanes.

B. Forest Avenue Roadway Segment: This roadway segment of Forest Avenue starts at the above intersection and ends at Bishop St. Traveling north, there is one through right and one through left lane. Traveling south, there is one through lane and one right turn only lane. In the middle of this segment is the ScrubaDub Exit.

Recent or Pending Projects
- MaineDOT has a project in preliminary design on Forest Avenue that begins at the Morrill’s Corner intersection and extends 0.08 miles to the north.
- The City of Portland installed smart traffic signals that use artificial intelligence to predict and respond to road conditions in real time. Following a few months of use, data shows a 20-percent reduction in wait times at the Morrill’s Corner intersection.¹

Municipal Input
Noted concerns by the city include the following:
- The Morrill’s Corner area has one of Portland’s highest concentrations of High Crash Locations, with two intersections and six segments of concern.
- The proximity of full-access, high-volume intersections and lack of adequate access management are likely contributors.
- Although MaineDOT has indicated they will be looking at significant updates and changes to this area, the frequency of crashes warrants short-term actions for quick implementation.
  - A review of the collision diagrams should be completed with a determination of the top three immediate or short-term interventions that may make a difference. This could include restriping, movement restrictions, or changes to site access (if relatively straightforward).

¹ https://www.portlandmaine.gov/2546/Smart-Traffic-Signals
**PORTLAND: Morrill’s Corner**

**Safety Issues**
Thirty-eight of the 58 crashes at the intersection of Route 302, Allens Avenue, and McDonald’s were rear end collisions. The other 20 crashes were a mix of drivers moving at an unsafe speed, lack of attention, and improper passes and lane changes.

On the Forest Avenue segment, six of the 16 crashes included vehicles exiting the ScrubaDub Car Wash and failing to yield to through traffic. The other 10 crashes were a split between rear end collisions, improper passing, and failure to stay in lane. In the peak hours, traffic from intersection (A) can spill southbound to the next intersection of Forest Avenue/Stevens Avenue/Bishop Street; however, there is no evidence of safety issues stemming from this close proximity.
PORTLAND: Morrill’s Corner

Recommendations
This section includes potential countermeasures to consider for addressing the identified safety issues. Some of these potential countermeasures could be combined or considered as individual options. Also, it is worth noting that the crash summary and initial recommendations are based on experienced crashes from 2015-2017.

A. Intersection of Route 302, Allen Avenue, and McDonald’s:
Throughout the site:
- Consider enhanced access management to better define driveway entrances and exits.
- Review signal timing to ensure coordination with the signalized intersection of Route 302 and Stevens Avenue.
- Evaluate red and yellow clearance interval and ret ime if necessary.
- Evaluate signal timing of adjacent southbound intersection of Forest Avenue/Stevens Avenue/Bishop Street to alleviate any queue spill back.
- Install advance detection, especially on Route 302 approaches.

On the McDonald’s Driveway approach:
- Restrict right-turn-on-red movement. This may decrease eastbound rear-end crashes on Forest Avenue caused by vehicles hitting the brakes after coming around the curve. Would also increase pedestrian and bicyclist safety traveling along Forest Avenue.
- Extend the median around the signal pole to provide a pedestrian refuge and reduce their exposure on the long crossing.

On the Forest Avenue eastbound approach:
- After moving eastbound through the intersection of Allen Road, the lane configuration changes from two thru lanes to one thru lane and one right-turn lane. Install signs or pavement markings closer to the intersection to mitigate abrupt lane changes.
- To alleviate rear-end crashes, consider installing high friction surface treatment at the intersection approach and install retroreflective signal backplates.

On the Allen Avenue southbound approach:
- Consider either realigning the right-turn lane so that drivers are aligned with the through lane and it feels less like a right slip lane, or adding a porkchop island to better define and separate the right-turn lanes.
  - Realigning the right-turn lane so that it is aligned with the through lane (removing the slip-lane feel) would reduce the feel of a free-flow right turn and would reduce the crossing distance for pedestrians.
  - Reconfiguring channelizing islands (indicated by blue in the images below) would better define the lane designations and also decrease pedestrian crossing distances, but may exacerbate conflicts between through vehicles and those making a right-turn-on-red as it would feel more like a free flow right turn.
  - With the porkchop island option, this would provide the option for moving the stop bar up for the right turn lane and...
moving crosswalk away from main travel way of Forest Avenue. Install signage and possibly yield marking (sharks teeth) to indicate a pedestrian crossing.

**On the Forest Avenue northbound approach:**
- Move the stop bar up to increase queuing capacity for right-turning vehicles on Allen Avenue.
- To alleviate rear-end crashes, consider installing high friction surface treatment at the intersection approach and install retroreflective signal backplates.

**B. Forest Avenue Roadway Segment:**

**Throughout the site:**
- Consider enhanced access management to better define driveway entrances and exits.

**On the ScrubaDub Car Wash exit:**
- Restrict left-turn movements with signage from the ScrubaDub Car Wash exit to Forest Avenue.
- Further define the access management through a concrete median on the centerline and an angled exit to prevent vehicles from turning left.
PORTLAND: Morrill’s Corner

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for all three locations and also shows additional crashes from 2018. The crash diagrams for all three locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 302, Allen Avenue, McDonald’s</td>
<td>16872</td>
<td>17 13 28 21</td>
<td>80</td>
<td>20.7%</td>
<td>1.38</td>
<td>1/2</td>
<td>30-35 mph</td>
<td>2,000-30,000</td>
</tr>
<tr>
<td>Forest Avenue</td>
<td>16870 - 71535</td>
<td>8 6 2 7</td>
<td>23</td>
<td>12.5%</td>
<td>2.02</td>
<td>1</td>
<td>30 mph</td>
<td>32,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.

---

**LEGEND**

- MOVING VEHICLE
- REAR END COLLISION
- FIXED OBJECT
- VEHICLE BACKING
- SIDESWIPE COLLISION
- PARKED VEHICLE
- OVERTURNED
- HEAD ON COLLISION
- FATAL
- OUT OF CONTROL
- ANGLE COLLISION
- INJURY TYPE
- PATH OF: P PEDESTRIAN, B BICYCLE, A ANIMAL, S SLED
- PAVEMENT: D DRY, I ICY, W WET, S SNOW
- WEATHER: C CLEAR, F FOG, R RAIN, SL SLEET, S SNOW, CL CLOUDY
- TIME: A AM, P PM

---
PORTLAND: Morrill’s Corner

A. Intersection of Route 302, Allen Avenue, and McDonald’s
PORTLAND: Morrill’s Corner

B. Forest Avenue Roadway Segment

Rte. 302/100/Forest Ave.

Link: 16870-71535
Element: 4047225
Study Period: 2015-2017
* of Crashes: 16 / CRF: 2.02
**PORTLAND: Intersections of Congress Street and 295 NB On and Off Ramps**

Assessment

This assessment considers two intersections on Congress Street providing access to or from I-295 via exit 5:

A. **Congress Street and I-295 NB Off-Ramp**: The intersection with the Off-Ramp is an angled intersection with a yield sign. This ramp merges directly into the two lanes of through traffic on Congress Street and crosses a bike lane.

B. **Congress Street**: The segment between the I-295 Off-Ramp and On-Ramp. This is a two-lane segment in the southbound direction and bike lane.

Pending Projects

No major MaineDOT recent or pending projects.

Municipal Input

Noted concerns by the city include the following:
PORTLAND: Intersections of Congress Street and 295 NB On and Off Ramps

- This intersection is part of a series of locations associated with Exit 5 along Congress Street and Park Avenue that are exacerbated by high-speed movements and the Congress-Park one-way pair.
- The updated Libbytown circulation study recommends making Congress and Park two-way in this area.
  - The City remains focused on geometric and/or ramp consolidation measures to further reduce speeding and conflicts.
  - Lessons from the recent geometric changes at I-295 Exit 6 and a review of those subsequent crash patterns/rates may be informative to Exit 5.

There were 11 crashes on the Congress Street link (site B), 4 of which were rear-end crashes with left-turning vehicles into the Denny’s parking lot and another 4 crashes were sideswipes. With the various ramps and driveways, there is potential for abrupt lane changes (leading to sideswipes) and slowing and stopping for turning vehicles (leading to rear-ends).

Overview of site showing both I-295 NB Ramp intersections

**Safety Issues**

The majority of crashes (21 of 23 crashes) at the intersection of Congress Street and I-295 NB Off-Ramp (site A) were rear end collisions. One additional crash resulted from a car hitting the guardrail in an attempt to avoid the vehicle in front of them, and another a failure to yield to oncoming traffic on Congress Street.

**Recommendations**

This section includes potential countermeasures to consider for addressing the identified safety issues. Some of these potential countermeasures could be combined or considered as individual options. Also, it is worth noting that the crash summary and initial recommendations are based on experienced crashes from 2015-2017.

**Both Locations:**

- Use green pavement markings through the intersections of the On- and Off-Ramps to indicate the bike lanes.
- Ensure there is adequate lighting of the crossing as pedestrians and bicyclists are harder to see in dark conditions.
PORTLAND: Intersections of Congress Street and 295 NB On and Off Ramps

A. Congress Street and I-295 NB Off-Ramp:
- Reconfigure to stop-control, instead of yield control. This will also potentially reduce the rear-end crashes on Congress Street (site B).
  - Install stop sign and stop bar.
  - Install advance stop sign warning sign.
  - Restripe pavement markings so that the approach is closer to a 90-degree angle.
  - Add high friction surface treatment.
  - Add a high visibility crosswalk.
- Consider adding transverse rumble strips in advance of the yield/stop.

B. Congress Street Link
- Increase the visibility of the driveway to alleviate rear-ends on turning vehicles.
  - Trim tree limbs.
  - Add high visibility crosswalk marking to better define the driveway.
  - Ensure pavement markings are maintained to show where driveways exist – potentially use skip marks across driveway openings and merge/diverge ramps for I-295.
PORTLAND: Intersections of Congress Street and 295 NB On and Off Ramps

Aerial view of Congress Street and I-295 On and Off-Ramps, from Google Maps
PORTLAND: Intersections of Congress Street and 295 NB On and Off Ramps

Crash Data

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for both locations and also shows additional crashes from 2018. The crash diagrams for both locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Congress St and I-295 Off-Ramp</td>
<td>19183</td>
<td>8 6 9 7</td>
<td>30</td>
<td>30.4%</td>
<td>5.04</td>
<td>1/2</td>
<td>Unposted</td>
<td>5,000-14,000</td>
</tr>
<tr>
<td>Congress Street</td>
<td>59422-19186</td>
<td>2 1 4 4</td>
<td>11</td>
<td>(9.1%)</td>
<td>(2.81)</td>
<td>1/2</td>
<td>Unposted</td>
<td>10,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.*

The legend below will aid in understanding the crash diagrams that follow.

**Legend**

- MOVING VEHICLE
- REAR END COLLISION
- FIXED OBJECT
- VEHICLE BACKING
- SIDESWIDE COLLISION
- PARKED VEHICLE
- OVERTURNED
- HEAD ON COLLISION
- FATAL
- OUT OF CONTROL
- ANGLE COLLISION
- INJURY TYPE
- PATH OF: P PEDESTRIAN B BICYCLE A ANIMAL S SLED
- PAYMENT: D DRY, I ICY, W WET, S SNOW
- WEATHER: C CLEAR, F FOG, R RAIN, SL SLEET, S SNOW, CL CLOUDY
- TIME: A AM, P PM

PACTS High Crash Location Desktop Assessments
PORTLAND: Intersections of Congress Street and 295 NB On and Off Ramps

A. Intersection of Congress Street and I-295 NB Off-Ramp
PORTLAND: Intersections of Congress Street and 295 NB On and Off Ramps

B. Congress Street (2015-2018)
PORTLAND: Intersection of Forest Avenue and Walton Street, Forest Avenue

Assessment
Site A intersection of Forest Avenue (Route 302) and Walton Street is a signalized four-way intersection with a skewed approach angle on Walton Street. Site B is the segment of Forest Avenue (Route 302) north of Site A, between Walton Street and Tremaine Street. This segment is 3 lanes with the middle lane being a two-way left-turn lane (TWLTL).

Recent or Pending Projects
No major MaineDOT recent or pending projects.

Municipal Input
Noted concerns by the city include the following:
- This intersection has a relatively isolated signal along Forest Avenue and a skewed approach angle for Walton Street, which may be contributing factors in crashes.
- The lane assignments for the Walton Street approaches should be assessed.
- City is installing an adaptive system here, which hopefully will help with red-light running and overall vehicle congestion.

Safety Issues
A. Forest Avenue (Route 302) and Walton Street intersection:
Many of the crashes at this intersection were rear end collisions (about 31 of the 40 total crashes). These accounted for most of the injury crashes and occurred primarily on Forest Avenue in both directions. Eight of the crashes involved turning vehicles and three of those involved vehicles running a red light. There were 13 crashes that resulted in injury, all but one were rear-end crashes that occurred on both Forest Avenue intersection approaches.

B. Forest Avenue (Route 302):
Almost all crashes on this segment were rear-end crashes. Out of the 12 total crashes, 11 were rear-ends and 8 were in the southbound direction approaching site A. The presence of driveways, the TWLTL, and the signal approach in the southbound direction may be the cause of the rear-ends.
PORTLAND: Intersection of Forest Avenue and Walton Street, Forest Avenue

Recommendations
This section includes potential countermeasures to consider for addressing the identified safety issues. Some of these potential countermeasures could be combined or considered as individual options. Also, it is worth noting that the crash summary and initial recommendations are based on experienced crashes from 2015-2017.

A. Forest Avenue (Route 302) and Walton Street intersection:
All intersection approaches:
- Install retroreflective backplates to enhance signal conspicuity. There is one backplate currently present, on the eastern leg of the intersection, and to that, a retroreflective border can be added.

Forest Avenue, North and Southbound:
- Use green pavement markings on what appears to be bike lanes, at intersections and through major driveway entrances. This will help to visually narrow the roadway. Also, add bike lane markings and signage to help communicate the intended use of those lanes.

- Consider access management. The wide open roadway and large driveway entrances can visually distract drivers. Reducing and better defining the access points can help to limit unexpected entries into the roadway and visually confine drivers to their lanes. Access management could take the form of better driveway definition and more narrow entries and exits, combining driveways, modifying the TWLTL into a physical or painted median with defined turning vehicle lanes.

- Evaluate red and yellow clearance interval and retime if necessary.
- Install advance detection.
- Install high friction surface treatment to alleviate rear-end crashes.

Walton Street, Eastbound:
- Trim tree limbs on intersection approach to ensure that the signal is visible to approaching drivers.

Walton Street, Westbound:
- Trim tree limbs on intersection approach to ensure that the signal is visible to approaching drivers.
- Consider possibly reassigning the lanes so that there is a through-right lane and a left-turn only lane. While there appears to be one crash involving a left-turning vehicle crash from this direction, local input indicates that this is a concern. With the lane reassignment, the left-turn lane can have a fully or partially protected phase to remove the potential conflict with oncoming traffic.

B. Forest Avenue (Route 302):
- Consider access management. Multiple driveway entrances can visually distract drivers and increase rear-end crashes. Reducing and better defining the access points can help to limit unexpected entries into the roadway and visually confine drivers to their lanes. Access management could take the form of better driveway definition and more narrow entries and exits, combining driveways, modifying the TWLTL into a physical or painted median with defined turning vehicle lanes.
PORTLAND: Intersection of Forest Avenue and Walton Street, Forest Avenue

Aerial view of Forest Avenue and Walton Street, from Google Maps
PORTLAND: Intersection of Forest Avenue and Walton Street, Forest Avenue

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram for this location is shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest Ave. and Walton St.</td>
<td>16860</td>
<td>15 10 15 14</td>
<td>54</td>
<td>30.0%</td>
<td>1.37</td>
<td>1/6</td>
<td>25/30 mph</td>
<td>3,000-20,500</td>
</tr>
<tr>
<td>Forest Ave. Segment</td>
<td>16860-16862</td>
<td>3 3 6</td>
<td>12</td>
<td>33.3%</td>
<td>1.10</td>
<td></td>
<td>30 mph</td>
<td>20,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.
PORTLAND: Intersection of Forest Avenue and Walton Street, Forest Avenue

Intersection of Forest Avenue and Walton Street:

Portland
Node: 16860
Study period 2015-2017
# of Crashes: 40 CRF=1.37
Prepared by Office of Safety
G.J.M. 1-2-19

= Overhead Signal
PORTLAND: Intersection of Forest Avenue and Walton Street, Forest Avenue

Forest Avenue:
**PORTLAND: Intersection of Washington Avenue and Allen Avenue**

There was a mill and fill project completed in 2018 through the intersection and to the north. There is one mill and fill project pending in 2020 on Washington Avenue located approximately 0.5 mile north of the intersection.

**Municipal Input**
- Allen's Corner is a large complex intersection with high levels of traffic and numerous curb cuts immediately adjacent to all approaches.
- Short of access management outcomes, the crash rate here may remain high.
  - While addition of an adaptive traffic control system here may aid in overall consistency in vehicle flow and reduce red light running, ultimately, access-management recommendations may be needed to reduce crashes.

**Assessment**
Allen’s Corner is a major intersection for local traffic and commuter traffic to/from Portland along Route 26/100. This assessment includes information for three HCL roadway segments that meet at the intersection.

- **A. Allen Avenue south of intersection:** This roadway segment runs along Allen Avenue to the northeast toward the intersection. It includes three driveway entrances.
- **B. Washington Avenue south of intersection:** This segment runs northwest along Washington Avenue toward the intersection and includes 10 driveway entrances and exits.
- **C. Allen Avenue north of intersection:** This roadway segment runs southwest along Allen Avenue toward the intersection and includes six entrances.

**Recently or Pending Projects**

**Safety Issues**

- **A. Allen Avenue south of intersection:**
  For this roadway segment there were nine total crashes, six of which were vehicles failing to yield moving into and out of the driveways. Four of these six crashes occurred at the Dunkin’ Donuts driveway. At the exit of Bangor
PORTLAND: Intersection of Washington Avenue and Allen Avenue

Savings there was a crash involving a bicycle. Two additional crashes were related to lane changes.

B. Washington Avenue south of intersection:
For the roadway segment on Washington Avenue, 20 of the 29 crashes were related to cars attempting turning movements into or out of the driveways on either side of the road. Six of these crashes were because of the same turning movement (which appears to be drivers pulling out of the Portland House of Pizza driveway). One of the crashes was due to a pedestrian crossing mid-block.

C. Allen Avenue north of intersection:
For the roadway segment on Allen Avenue north of the intersection, many of the crashes were due to vehicles turning into or out of driveways and failing to yield to through traffic. Of the 17 crashes, 14 involved drivers exiting from driveways.

Recommendations
For each of the three segments, consider the following access management strategies. The open roadway and large driveway entrances can visually distract drivers. Reducing and better defining the access points can help to limit unexpected entries into the roadway and visually confine drivers to their lane:

- Restrict left turns exiting driveways with a physical barrier like a pork chop island and raised median curbing.
- Work with property owners to consolidate and narrow driveway entrances, particularly for those properties immediately adjacent to the intersection.
PORTLAND: Intersection of Washington Avenue and Allen Avenue

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for all three locations and also shows additional crashes from 2018. The crash diagrams for all three locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Allen Ave (South)</td>
<td>17035-17061</td>
<td>1 4 4 5</td>
<td>14</td>
<td>22.2%</td>
<td>1.47</td>
<td>2</td>
<td>35 mph</td>
<td>15,000</td>
</tr>
<tr>
<td>Washington Ave</td>
<td>17060-17061</td>
<td>7 9 13 14</td>
<td>43</td>
<td>27.6%</td>
<td>3.37</td>
<td>2</td>
<td>30 mph</td>
<td>16,500</td>
</tr>
<tr>
<td>Allen Ave (North)</td>
<td>17061-13351</td>
<td>7 5 5 3</td>
<td>20</td>
<td>29.4%</td>
<td>2.81</td>
<td>3</td>
<td>30 mph</td>
<td>8,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.

```
LEGEN

MOVING VEHICLE

VEHICLE BACKING

OVERTURNED

OUT OF CONTROL

REAR END COLLISION

SIDESW IPE COLLISION

HEAD ON COLLISION

ANGLE COLLISION

PATH OF: P PEDESTRIAN B BICYCLE A ANIMAL S SLED

PAYMENT: D - DRY, I - ICY, W - WET, S - SNOW

WEATHER: C - CLEAR, F - FOG, R - RAIN, SL - SLEET, S - SNOW, CL - CLOUDY

TIME: A - AM, P - PM

```
PORTLAND: Intersection of Washington Avenue and Allen Avenue

A. Allen Avenue South of intersection

Portland
Link # 17035-17061
Element # 3122272
Study Period: 2015-2017
# of Crashes - 9 / CRF = 1.47

Prepared by Office of Safety
BFRJ 3-26-19

Allen Ave. (Route 100)

Dunkin' Donuts

Bangor Savings

Trigreen

Portland

B

I7035

I7061

10-25-17 8a4a W/R Foll to yield

1024 3-24-17 6a4P W/S Foll to keep in lane

25/17 B-29-17 8a4P D/C Foll to yield

8347 3-3-16 10a4A D/C Foll to yield

1290 4-22-16 12a5P D/C Foll to yield

25877 B-29-17 14a5P D/C Foll to yield

6749 6-5-R 5a3P D/C Foll to yield

13404 5-10-16 2a5P D/C Foll to yield

37547 5-8-16 5a3P D/C Foll to yield
PORTLAND: Intersection of Washington Avenue and Allen Avenue

B. Washington Avenue South of intersection
PORTLAND: Intersection of Washington Avenue and Allen Avenue

C. Allen Avenue North of intersection
**BIDDEFORD:** Intersection of (Route 111) Alfred Street and May Street

![Overview map of HCLs reviewed in this assessment.](image)

**Assessment**

This assessment considers the intersection of May Street and Alfred Street (Route 111) in Biddeford, as well as the roadway segment on Alfred Street leading up to it.

- **A. Intersection of Alfred Street and May Street:** This is a three-way intersection where May Street tees into Alfred Street with a stop sign on May Street. Traffic on Alfred Street does not stop. There are two painted crosswalks, one across May Street and the other across Alfred Street on the east side of the intersection.

- **B. Roadway Segment on Alfred Street:** On Alfred Street there are four driveways providing access to various businesses on both sides of the street.

**Recent or Pending Projects**

No major MaineDOT recent or pending projects.

**Municipal Input**

Response received with no comments provided for these locations.

![Street view of intersection (A) at Alfred Street and May Street traveling west on Alfred Street, from Google Maps](image)

**Safety Issues**

- **A. Intersection of Alfred Street and May Street:** The majority of crashes involved vehicles traveling east on Alfred Street: there were four rear-end crashes and one angle crash involving a vehicle turning left onto May Street. There were five crashes involving vehicles on May Street. On May Street there was one rear end, one sideswipe, and one bicycle crash in which the bicyclist was crossing in the crosswalk at the stop sign. The two angle crashes on May Street involved one vehicle turning left and one vehicle turning right onto Alfred Street.

While there were no crashes involving the crosswalk on Alfred Street, pedestrians and bicyclists crossing Alfred Street have to cross a considerable distance and four lanes of traffic. Drivers crossing in and out of May Street...
may not notice crossing pedestrians because they are trying to find their own gap in traffic.

**B. Roadway Segment on Alfred Street:**
Approximately 15 of 28 crashes were related to vehicles trying to turn into or out of the various driveways along this stretch of road. Most of those resulted in angle crashes. Five of these 15 involved vehicles turning left out of the unsignalized Five Points Shopping Center and six were related to vehicles turning left from Alfred Street into Advanced Auto or Park One Eleven. There were nine rear-end crashes, seven of which occurred in the westbound direction. There were eight sideswipe crashes, evenly split by direction. There was one crash involving a pedestrian crossing Alfred Street.

![Aerial view of (B) Alfred Street in the vicinity of the Five Points Shopping Center, from Google Earth](image)

**Recommendations**

**A. Intersection of Alfred Street and May Street:**
- **Alfred Street crosswalk:**
  - Install advance pedestrian crossing warning signs.
  - Consider crosswalk enhancements such as an advance Yield Here To Pedestrians sign and pavement markings, a median refuge, rectangular rapid flashing beacons, or other measures.
  - **On Alfred Street:**
    - Install advance intersection warning signs.
    - Install lane designation pavement markings.
    - In the eastbound direction, consider lane reassignment so that the left lane becomes a left-turn only lane approaching the intersection and a left-turn receiving lane (for vehicles on May Street) just past the intersection.
    - In the westbound direction, if adequate width is available, consider marking a right turn only lane or using pavement markings to narrow the roadway and clearly define one through/right-turn lane. Just past the intersection, the right lane could function as a receiving lane for right-turning vehicles off of May Street.
    - Consider controlling all three legs of the intersection, possibly through signalization.

**B. Roadway Segment on Alfred Street:**
- **On Alfred Street:**
  - In the westbound direction, consider lane reassignment so that the right lane becomes a right-turn only lane approaching the intersection and a right-turn receiving lane (for vehicles exiting the stop controlled Five Points Shopping Center driveway) just past the intersection.
  - On the stop controlled Five Points Shopping Center driveway, expand the raised concrete median so that it is right-in, right-out, forcing left-turning vehicles to use the signalized entrance further to the west.
BIDDEFORD: Intersection of (Route 111) Alfred Street and May Street

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for both locations and also shows additional crashes from 2018. The crash diagrams for both locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Alfred Street and May Street</td>
<td>56883</td>
<td>2 6 3 0</td>
<td>11</td>
<td>18.2%</td>
<td>1.28</td>
<td>1/4</td>
<td>25-35 mph</td>
<td>5,000-22,000</td>
</tr>
<tr>
<td>Alfred Street</td>
<td>56883-56882</td>
<td>9 8 11 7</td>
<td>35</td>
<td>39.8%</td>
<td>1.22</td>
<td>1</td>
<td>35 mph</td>
<td>22,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.

---

**Legend**

- **Moving Vehicle**
- **Rear-end Collision**
- **Fixed Object**
- **Vehicle Backing**
- **Side Swipe Collision**
- **Parked Vehicle**
- **Overturned**
- **Head On Collision**
- **Fatal**
- **Out of Control**
- **Angle Collision**
- **Injury Type**

**Path of:**
- **Pedestrian**
- **Bicycle**
- **Animal**
- **Sled**

**Pavement:**
- **Dry**
- **Icy**
- **Wet**
- **Snow**

**Weather:**
- **Clear**
- **Fog**
- **Rain**
- **Sleet**
- **Snow**
- **Cloudy**

**Time:**
- **AM**
- **PM**
BIDDEFORD: Intersection of (Route 111) Alfred Street and May Street

A. Intersection of Alfred Street and May Street
BIDDEFORD: Intersection of (Route 111) Alfred Street and May Street

B. Roadway segment on Alfred Street
**BIDDEFORD: Intersection of Route 1 and South Street**

Overview map of HCLs reviewed in this assessment.

Assessment
The intersection of Route 1 and South Street has two offset, angled intersection approaches. There are three marked crosswalks, one on each South Street approach and one crossing Route 1, through the center of the intersection.

**Recent or Pending Projects**
No major MaineDOT recent or pending projects.

**Municipal Input**
Response received with no comments provided for this location.

**Safety Issues**
Many of the crashes at this intersection (16 of 25) were rear-end collisions. The majority of rear-end crashes occurred on Route 1, with seven in the southbound direction and five in the northbound direction. On South Street, four rear-end crashes occurred in the westbound direction and one in the eastbound direction. While there are two lanes (through and left lanes) and protected left-turn signal phasing in the northbound direction on Route 1 (through and left lanes), there is only one lane in the southbound direction with permissive left-turns signal phasing.

There were six angle crashes, four of which involved northbound drivers on Route 1. One angle crash involved a driver running the red light eastbound on South Street.

Access management is another concern. The numerous driveway entrances can visually distract drivers. Reducing and better defining the access points can help to limit unexpected entries into and exits from the roadway.

**Recommendations**

**All approaches:**
- Better define driveways, narrow entries and exits, and combine driveways where possible.
BIDDEFORD: Intersection of Route 1 and South Street

Route 1:
- Restripe approach to make a narrower travel lane width. This may prevent cars from overtaking other vehicles waiting to turn left and also reduce vehicle speeds. Or, if space allows, provide a dedicated left-turn lane with protected phasing.
- Visually define the pedestrian space through sidewalk buffers. This will visually narrow and better define the roadway, along with providing a more appealing space for pedestrians.
- Evaluate yellow clearance interval and retim if necessary.
- Install high friction surface treatment to reduce rear-end crashes.

South Street:
- Restrict right-turns on red.
- Investigate alternative geometric configurations to reduce/remove the skew, including potentially using the open lot on the southeast corner of the intersection.
BIDDEFORD: Intersection of Route 1 and South Street

Aerial view of Route 1 and South Street, from Google Maps
BIDDEFORD: Intersection of Route 1 and South Street

Crash Data

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram for this location is shown on the following page.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 1 and South Street</td>
<td>56637</td>
<td>6 7 12 6</td>
<td>31</td>
<td>52.0%</td>
<td>1.13</td>
<td>1/4</td>
<td>25 mph</td>
<td>4,000-13,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.
BIDDEFORD: Intersection of Route 1 and South Street

Intersection of Route 1 and South Street

Biddeford
Node #56637
Study period 2015-2017
# of Crashes 25
Prepared by Office of Safety
(UML 1-14-19)

South Street

Route 1/ Elm St.

= Traffic Signal
**SACO: Intersections of Route 1 and Route 5, Exit 2B Off-Ramp**

Overview map of HCLs reviewed in this assessment.

**Assessment**
This assessment considers two major intersections along the Route 1 corridor in Saco that provide connections from I-195.

**A. Intersection of Route 1 and Route 5:** There are three different roadways that intersect at this signalized intersection. Route 1 extends through the intersection while both Route 5 and the Route 195 Exit 2A Off-Ramp end at the intersection opposite each other. Vehicular movements are restricted on both the Route 5 and Route 195 Off-Ramp approaches. On Route 5, vehicles must turn left or right at the intersection, and on the Route 195 Off-Ramp, traffic can move straight through or turn right at the intersection. Parallel to Route 1 there is a shared use path on the west side of the road that crosses the Off-Ramp.

**B. Intersection of Route 1 and the Exit 2B Off-Ramp:** At the uncontrolled Route 195 Exit 2B Off-Ramp intersection with Route 1, traffic from the ramp merges onto that of northbound Route 1.

Aerial view of Route 1, Route 5, and Route 195 Off-Ramps, from Google Maps

**Recent or Pending Projects**
- Saco and Scarborough Route 1 Corridor Complete Streets Plan, Draft Report dated June 4, 2019, includes recommendations for these locations.
- Traffic signal upgrade/replacement project along Route 1 (PACTS sponsored) included intersection A.
- 1½” overlay on Route 5 beginning at Route 1 and extending 0.94 miles to the east scheduled for 2020.

**Municipal Input**
- Not one of Saco’s highest critical rate factors, but certainly an intersection along a priority corridor.
- This intersection is being looked at as a specific focus area in the Route 1 Complete Streets study being done by TY Lin through PACTS for Saco and Scarborough.
SACO: Intersections of Route 1 and Route 5, Exit 2B Off-Ramp

- Discussions surrounding eliminating the 195 Ramp eastbound through movement to Ocean Park Road. Access to Route 5, Ocean Park Road, would need to come from the end of Route 195 with some radius improvements to that turning movement. This would reduce movements and speeds in the Route 1 intersection, and greatly improve the Eastern Trail crossing of that ramp.
- Improvement to overall functionality and flow of that intersection may not improve much due to its proximity to the Hannaford intersection.

Safety Issues

A. Intersection of Route 1 and Route 5:
There were 54 crashes at this intersection. The majority of the crashes were rear-end collisions: 11 southbound on Route 1, nine each on the I-195 Off-Ramp and Route 5, and five on northbound route 1. Angle crashes were the second most prevalent crash type. Thirteen of the angle crashes involved vehicles traveling straight from the Route 195 Off-Ramp and left-turning vehicles from Route 5. There were three angle crashes that involved vehicles running the red light. All three involved northbound drivers on Route 1, two of the crashes were with left-turning vehicles on Route 5 and one with a vehicle traveling straight from the Route 195 approach.

B. Intersection of Route 1 and Exit 2B Off-Ramp:
At the intersection of the Exit 2B Off-Ramp and Route 1, all of the 13 crashes were rear-end collisions on the off-ramp.

Recommendations

All approaches:
- Install advance detection.

Route 5 westbound:
- Modify the signal phasing from permissive to protected left turns.
- Apply retroreflective border to signal backplates to enhance conspicuity.

Route 195 Exit 2B Off-Ramp:
- Consider removing the right slip lane and instead move the right turn lane immediately adjacent to the through lane. This would remove the expectancy of drivers of a free-flow right turn and would require them to slow down before turning right onto Route 1. This change would also help them to better see approaching bicyclists and pedestrians on the shared use path.
- Apply retroreflective border to signal backplates to enhance conspicuity.

Route 195 Exit 2A Off-Ramp:
- Restrict right-turns on red as drivers are not expecting to have to stop. They are also looking left for a gap in traffic, and may not see shared use path users approaching from the right. The ability to turn right on red, along with the geometric configuration, creates an inherent conflict with pedestrians and bicyclists who have the walk signal on the shared use path crossing.
**SACO:** Intersections of Route 1 and Route 5, Exit 2B Off-Ramp

the merge. Depending on the results of a traffic and geometric analysis, this could also lead to changes on the Exit 2A Off-Ramp.

- Consider adding a merge sign on the ramp.
- Consider adding pedestrian crossing ahead sign on the ramp and pedestrian crossing signs at the crosswalk on the ramp.

**Route 1:**

- Evaluate red and yellow clearance interval and retime if necessary.
- Consider high friction surface treatment on intersection approaches to enhance driver’s ability to stop.
- Apply retroreflective border to signal backplates to enhance conspicuity.
SACO: Intersections of Route 1 and Route 5, Exit 2B Off-Ramp

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for all three locations and also shows additional crashes from 2018. The crash diagrams for all three locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 1 and Route 5</td>
<td>56667</td>
<td>18 12 24 18</td>
<td>72</td>
<td>31.5%</td>
<td>1.42</td>
<td>1/4</td>
<td>30-35 mph</td>
<td>1,000-14,000</td>
</tr>
<tr>
<td>Route 1 and Exit 2B Off-Ramp</td>
<td>57538</td>
<td>5 0 8 8</td>
<td>21</td>
<td>30.8%</td>
<td>2.99</td>
<td>1</td>
<td>35 mph</td>
<td>2,000-13,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.

---

### LEGEND

- **MOVING VEHICLE**
- **VEHICLE BACKING**
- **OVERTURNED**
- **OUT OF CONTROL**
- **REAR END COLLISION**
- **SIDESWIPES COLLISION**
- **HEAD ON COLLISION**
- **ANGLE COLLISION**
- **INJURY TYPE**
- **FIXED OBJECT**
- **PARKED VEHICLE**
- **FATAL**

---

**PATH OF:**
- **PEDESTRIAN**
- **BICYCLE**
- **ANIMAL**
- **SLEEP**

**PAVEMENT:**
- **DRY**
- **ICY**
- **WET**
- **SNOW**

**WEATHER:**
- **CLEAR**
- **FOG**
- **RAIN**
- **SLEET**
- **SNOW**
- **CLOUDY**

**TIME:**
- **AM**
- **PM**
SACO: Intersections of Route 1 and Route 5, Exit 2B Off-Ramp

A. Intersection of Route 1 and Route 5
**SACO**: Intersections of Route 1 and Route 5, Exit 2B Off-Ramp

B. Intersection of Route 1 and Exit 2B Off-Ramp
SACO: Intersection of Route 1 and North Street/Beach Street

Overview map of HCLs reviewed in this assessment.

Assessment
This assessment considers the signalized intersection of Route 1 and North Street/Beach Street. This angled intersection is one of three intersections in the immediate area, each forming one corner of a triangle. In the center of the triangle is Eastman Park.

Recent or Pending Projects
- Saco and Scarborough Route 1 Corridor Complete Streets Plan, draft report dated June 4, 2019.
- Traffic signal upgrade/replacement project along Route 1 (PACTS sponsored) included this intersection.
- Mill and fill on Route 1 completed in 2018, beginning at the Biddeford town line and extending north to North Street/Beach Street (PACTS sponsored).

Municipal Input
Noted concerns by the city include the following:
- This location is part of two ongoing initiatives.
  - It was looked at as the outside limits of the Route 112 corridor study done by TY Lin for MaineDOT, Saco, and the MTA.
  - It is part of an ongoing signal improvement project being administered by MaineDOT that will coordinate several signals along the Route 1 corridor in Saco and Biddeford. The signal locations and upgrades have yet to occur at this intersection.
- All pedestrian movements are signalized at this complicated intersection. There is limited right of way, and limited room between existing homes for any large-scale improvements.

Safety Issues
There were 28 crashes within this intersection. The majority of the crashes (13 of 28) were angle crashes. Four of those angle crashes involved left-turning southbound vehicles on North Street, and vehicles traveling straight on northbound Beach Street. Of the 13 angle crashes, nine involved vehicles running a red light. These red-light running crashes impacted drivers from each direction of the intersection.
**SACO: Intersection of Route 1 and North Street/Beach Street**

Also prevalent at this location were rear-end crashes. There were eight within the intersection and almost all were on the eastbound leg of Route 1. The lane assignment for the eastbound approach of Route 1, with a shared left/through and through/right, in combination with the permissive left-turn signal phasing, may be contributing to the rear-end crashes as drivers are expecting to be able to move forward rather than stop for a turning vehicle. There were also three crashes involving trucks hitting a pole on the northwest corner, as they tried to turn right onto Route 1 from North Street.

**Recommendations**

- All approaches have a permissive left-turn phase. Consider a capacity analysis to change to protected-only left-turn phases.
- Ensure that all signal backplates have retroreflective borders.
- Consider alternative geometric configurations within the three intersections surrounding the park.

**Route 1 eastbound:**
- Trim trees so that the signal is fully visible to drivers.
- Review signal timing for potential lane assignment changes, such as a left-turn only lane and a through-right lane.
- Install high friction surface treatment to reduce rear-end crashes.
- Install advance detection.

**North Street:**
- Investigate ability to increase the northwestern corner radius.
SACO: Intersection of Route 1 and North Street/Beach Street

Aerial view of Route 1 and North Street/Beach Street, from Google Maps
**SACO: Intersection of Route 1 and North Street/Beach Street**

**Crash Data**

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagrams for this location are shown on the following pages.

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.*

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 1 and North St/Beach St</td>
<td>56658</td>
<td>11</td>
<td>8</td>
<td>9</td>
<td>5</td>
<td>33</td>
<td>17.9%</td>
<td>1.19</td>
<td>1/2</td>
<td>25-35 mph</td>
<td>6,000-10,000</td>
</tr>
</tbody>
</table>

The legend below will aid in understanding the crash diagrams that follow.
SACO: Intersection of Route 1 and North Street/Beach Street

Intersection of Route 1 and North Street/Beach Street

Saco
Node: 56658
Study Period: 2015-2017
# of Crashes: 28 / CRF UJ9
Prepared by Office of Safety 6/9/18

= Traffic signal

PACTS High Crash Location Desktop Assessments
**SCARBOROUGH: Intersection of Mussey Road and Payne Road**

**Assessment**

The intersection of Payne Road and Mussey Road is a three-leg intersection. Mussey Road has an angled approach to the intersection and stop sign where it meets Payne Road. Traffic does not stop on Payne Road.

**Recent or Pending Projects**

No major MaineDOT recent or pending projects.

**Municipal Input**

Noted concerns by the city include the following:

- The primary issue is the geometry of the intersection. Mussey Road intersects Payne Road at an acute angle and sight distance appears to be limited.
- This section of Mussey Road has a Primary School located along it and therefore has higher traffic volumes during commuting hours than expected for a local side street.
- The Town believes that a more traditional intersection design is needed.
SCARBOROUGH: Intersection of Mussey Road and Payne Road

Safety Issues
The majority of the crashes (6 out of 10) were angle crashes, most of which involved vehicles turning left out of Mussey Road and those traveling straight on southbound Payne Road. Drivers turning left out of Mussey Road may have trouble judging gaps in traffic on Payne Road due to the intersection skew, and corresponding limited sight distance, as well as other potential factors, such as speed.

Recommendations
- Install dotted edge line across the Mussey Road approach to help drivers to pull forward as much as possible, without encroaching into Payne Road travel lane.
- Install advance intersection warning signs on Payne Road.
- Install an Intersection Conflict Warning System (ICWS) on Payne Road to warn drivers of vehicles entering from Mussey Road entering vehicle.
- The approach of Mussey Road is wide, and right-turning vehicles may bypass waiting, left-turning vehicles. Both vehicles could restrict the sight distance of the other driver. To restrict two vehicles from pulling up to the intersection, narrow the lane through pavement markings or physical measures.
- Investigate geometric changes to remove the intersection skew, and allowing Mussey Road to connect at a right angle.
- Consider enhanced intersection control to provide gaps for vehicles on Mussey Road. Potential alternatives could include a signalized intersection or a roundabout. It should be noted that, given the uninterrupted stretch of roadway to the south, drivers may not be expecting to stop and so a traffic signal could potentially lead to an increase in crashes.
CRASH DATA

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram for all this location is shown on the following page.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Mussey Rd and Payne Rd</td>
<td>12552</td>
<td>12</td>
<td>20.0%</td>
<td>1.52</td>
<td>2/6</td>
<td>25-45 mph</td>
<td>4,500-16,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.*

The legend below will aid in understanding the crash diagrams that follow.

**LEGEND**

- MOVING VEHICLE
- REAR END COLLISION
- FIXED OBJECT
- VEHICLE BACKING
- SIDESWIPE COLLISION
- PARKED VEHICLE
- OVERTURNED
- HEAD ON COLLISION
- FATAL
- OUT OF CONTROL
- ANGLE COLLISION
- INJURY TYPE

- PATH OF: P - PEDESTRIAN, B - BICYCLE, A - ANIMAL, S - SLED

- PAVEMENT: D - DRY, I - ICY, W - WET, S - SNOW

- WEATHER: C - CLEAR, F - FOG, R - RAIN, S - SLEET, S - SHOW, CL - CLOUDY

- TIME: A - AM, P - PM
**SCARBOROUGH:** Intersection of Mussey Road and Payne Road

Intersection of Mussey Road and Payne Road

---

**Scarborough**

Node: 12552

Study period: 2015-2017

# of Crashes: 10 / CRF: 1.52

Prepared by Office of Safety

LM: 12-2-18

---

Payne Road

---

Mussey Road

---

PACTS High Crash Location Desktop Assessments
SCOARBOURGH: Intersection of Payne Road and Route 114 (Gorham Road)

Overview map of HCLs reviewed in this assessment.

Assessment
This site includes an intersection and a roadway segment.

A. Intersection of Payne Road and Gorham Road: This is a four-leg, signalized intersection. The Gorham Road intersection leg, on the west side, is slightly skewed relative to the other three legs, which are perpendicular to each other.

B. Roadway Segment on Gorham Road: This roadway segment is the stretch of road to the east of the intersection. In the westbound direction, there is a left-turn lane, a thru lane, and a shared thru/right-turn lane. There is one lane in the eastbound direction. There is a driveway with a concrete median (A.K.A. pork chop island) to Cumberland Farms on the north side of this segment.

Municipal Input
Noted concerns by the city include the following:
- This intersection is very large in overall width and length, and includes increased turning radii for truck traffic through the intersection.
- There are multiple turning lanes from many of the approaches, which may contribute to motorist’s confusion.
- There have been reports of the eastbound Gorham Road (Rt 114) approach significantly backing up during the morning commuting hours even with dual left turning lanes onto Payne Road.
- The lane designations, and travel patterns for those commuting through the intersection should be reexamined.

Recent or Pending Projects
Mill and fill Beginning at Mussey Road and extending north 0.33 of a mile to Gorham Road (PACTS Sponsored) scheduled for 2020.
SCARBOROUGH: Intersection of Payne Road and Route 114 (Gorham Road)

Street view of intersection at Payne Road and Gorham Road traveling South on Payne Road, from Google Maps

Aerial view of Payne Road and Gorham Road, from Google Maps

Safety Issues

A. Intersection of Payne Road and Gorham Road
There were 48 crashes at the intersection between 2015-2017, most of which were rear end or angle crashes. The majority of the crashes (28 of the 48) involved vehicles traveling eastbound on Gorham Road. Eight of the 28 involved a vehicle running a red light. There were two additional red-light-running crashes involving vehicles on other legs of the intersection. Additionally, quite a few vehicles are running the red light at this intersection. In particular this is a problem with vehicles traveling South on Payne Road.

The most prevalent crash type on both southbound Payne Road and westbound Gorham Road was rear end.

B. Roadway Segment on Gorham Road
This segment has only experienced two crashes between 2015-2017 and is not a HCL. There are a number of driveways so safety may increase through access management.

Recommendations

- Investigate speed of vehicles on eastbound Gorham Road, approaching the Payne Road intersection.
- Observe conditions to note if aggressive driving is prevalent. If so, consider conducting aggressive driving enforcement and providing educational messaging.
- Consider applying high friction surface treatments on intersection approaches, particularly those in the eastbound, westbound, and southbound directions.
- Review signal cycle length and phasing, including red and yellow change intervals. Longer cycle lengths may decrease the risk of red-light-running crashes. Also, there are many signals within a short distance on the north leg of Payne Road. Consider evaluating signal timing and retiming/coordination if necessary.
- Install retroreflective borders on signal backplates and consider increasing the size of the signal heads, if possible.
- Add dotted pavement markings between the dual left-turn lanes for eastbound vehicles on Gorham Road.
- Install advance detection.
SCARBOROUGH: Intersection of Payne Road and Route 114 (Gorham Road)

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for both locations and also shows additional crashes from 2018. The crash diagrams for both locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Payne Rd and Gorham Rd</td>
<td>15611</td>
<td>14 17 17 14</td>
<td>62</td>
<td>43.8%</td>
<td>1.45</td>
<td>2</td>
<td>35 mph</td>
<td>5,000-8,500</td>
</tr>
<tr>
<td>Gorham Rd</td>
<td>15611-66237</td>
<td>1 1 - -</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>35 mph</td>
<td>11,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.

**LEDGE**

- MOVING VEHICLE
- VEHICLE BACKING
- OVER Turned
- OUT OF CONTROL
- REAR END COLLISION
- SIDESWIPE COLLISION
- HEAD ON COLLISION
- ANGLE COLLISION

**PATH OF:**
- P PEDESTRIAN
- B BICYCLE
- A ANIMAL
- S SLED

**PAVEMENT:**
- D DRY
- I ICY
- W WET
- S SNOW

**WEATHER:**
- C CLEAR
- F FOG
- R RAIN
- S SLEET
- X SNOW
- C CLOUDY

**TIME:**
- A AM
- P PM
SCARBOROUGH: Intersection of Payne Road and Route 114 (Gorham Road)

A. Intersection of Payne Road and Gorham Road

Note: the businesses are labeled incorrectly. Cumberland Farms should be in the southeast corner and Sam's Club should be in the northeast corner.
**STANDISH: Intersection of Route 114 and Route 35**

**Assessment**
The intersection of Routes 35 and 114 is a four-way stop-controlled intersection with a red, overhead flashing beacon in the center of the intersection.

**Pending Projects**
No major recent or pending MaineDOT projects.

**Municipal Input**
Noted concerns by the city include the following:
- The two major issues with the intersection of Routes 114 and 35 is volume and safety concerns.
- Primary concern with the intersection is volume with traffic backing up usually at least a mile in the evenings coming from Windham into Standish. In the assessment the town would really value any recommendations there concerning volume.
- Town interested in dedicated turn lanes coming west and east into the intersection, similar to the Routes 25/35 intersection.
- Recent change to a form-based code in the village where that intersection exists requires sidewalks as part of new development. There is an existing sidewalk along Route 114 heading into Gorham.

**Safety Issues**
There were 17 crashes at this intersection. The crashes are relatively evenly split among the intersection approaches with two to four occurring on each. Many of the crashes (8 of the 11) at this intersection are failures to yield and running the stop sign.

As noted by the municipality, if volumes are high and traffic backs-up for a mile, driver’s are likely impatient by the time they reach the intersection and do not wait their turn or run the stop sign. There are also numerous driveways near the intersection that drivers could use to bypass the intersection.
STANDISH: Intersection of Route 114 and Route 35

Recommendations

- Add turn lanes for heavy-demand movements.
  - Potentially use PACTS Miovision to determine movement patterns.
- Consider alternative intersection controls such as a roundabout or a traffic signal. A roundabout would help with both efficiency and safety, but may require right of way impacts. Right-turn bypass lanes could be incorporated, depending on right-turn demand.
- Consider access management options for the driveways near the intersection, like better driveway definition, more narrow entries and exits, and combining/consolidating driveways.
STANDISH: Intersection of Route 114 and Route 35

Aerial view of Route 35 and Route 114, from Google Maps
STANDISH: Intersection of Route 114 and Route 35

Crash Data

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram for this location is shown on the following page.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 114 and Route 35</td>
<td>15643</td>
<td>2, 5, 4, 6</td>
<td>17</td>
<td>27.3%</td>
<td>1.89</td>
<td>2/3</td>
<td>35 mph</td>
<td>5,000-9,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagram that follows.

- MOVING VEHICLE
- REAR END COLLISION
- VEHICLE BACKING
- SIDESWIPE COLLISION
- OVERTURNED
- HEAD ON COLLISION
- OUT OF CONTROL
- ANGLE COLLISION
- FIXED OBJECT
- PARKED VEHICLE
- PATH OF: P - PEDESTRIAN, B - BICYCLE, A - ANIMAL, S - SLED
- PAVEMENT: D - DRY, I - ICY, W - WET, S - SNOW
- WEATHER: C - CLEAR, F - FOG, R - RAIN, SL - SLEET, S - SHOW, CL - CLOUDY
- TIME: A - AM, P - PM
STANDISH: Intersection of Route 114 and Route 35

Intersection of Route 114 and Route 35

[Diagram showing the intersection with various traffic signs and markings]

- Flashing light
- Stop

Rte. 35
Chadbourne Rd.

Rte. 114
Richville Rd.

Standish
15643
Study period 2015-2017
# of Crashes: II/CRF = 1.89

Prepared by Office of Safety
(C.W.12/14/018)
**WESTBROOK:** Pride’s Corner

**Assessment**

This site includes two intersections and a roadway segment.

**A. Intersection at Pride’s Corner:** Pride’s Corner is a four way signalized intersection. Pride Street approaches the intersection at an angle.

**B. Roadway Segment on Route 302:** The segment along Bridgton Road has several driveways between the two intersections.

**C. Intersection of Route 302, Elmwood Avenue, and Chase Hill Road:** The intersection of Bridgton Road, Elmwood Avenue, and Chase Hill Road is an angled intersection with stop signs on Elmwood Avenue and Chase Hill Road. Traffic on Bridgton Road does not stop.

**Recent or Pending Projects**

Mill and Fill on Route 302, beginning 0.02 of a mile west of Riverside Street and extending north 1.20 miles to 0.03 of a mile west of Chase Hill Drive scheduled for 2020.

**Municipal Input**

Noted concerns by the city include the following:

- Lack of a left-turn pocket/signal, weaving, close approximately to Elmwood Avenue.
- The traffic signal controller might be at capacity.
- No pending projects on the horizon.
Safety Issues

A. Intersection at Pride’s Corner
At Pride’s corner the majority of the crashes were rear-end collisions:
- On Route 302/Bridgton Road there were six in the northbound direction and five in the southbound direction. In the southbound direction there were another two sideswipe crashes from lane changes, which also may be due to the inability to stop in time and avoiding a rear-end crash.
- There were two crashes each in both the east and westbound directions, on Pride Street and Brook Street.
Three of the crashes involved vehicles turning left from southbound Route 302/Bridgton Road onto Brook Street, colliding with vehicles traveling straight through the intersection. Four crashes involved running a red light: three of the crashes involved vehicles running the red light on Pride Street and one crash was due to a vehicle running the red light from Brook Street.

B. Roadway Segment on Route 302
Many of the crashes on Bridgton Road are due to a failure to keep in lane. Two are a result of cars failing to yield when leaving the Subway restaurant.

C. Intersection of Route 302, Elmwood Avenue, and Chase Hill Road
Five of the accidents at the intersection with Elmwood Avenue and Chase Hill Road are due to cars coming out of Elmwood Avenue failing to yield to oncoming traffic. One crash is related to a left turning vehicle into Elmwood from Bridgton failing to yield to oncoming traffic. Five crashes are because of vehicles failing to slow down for cars trying to make the turn onto Elmwood.

Recommendations

A. Intersection at Pride’s Corner
- To address the rear-end crashes and red-light running, review vehicle speed, signal operations, signal conspicuity, and enhance drivers expectancy to stop.

All approaches:
- Apply retroreflective borders to signal backplates.
- Evaluate red and yellow clearance intervals, and retime if necessary.
- Install advance detection.

Route 302/Bridgton Road:
- Install signal warning sign, in particular consider a dynamic warning sign that flashes when signal is red or warns of vehicle queue.
- Collect vehicle speed data to determine if speeds are appropriate for the speed limit and roadway/intersection design. If speeds are too high, consider traffic calming or enforcement measures.
- In the southbound direction, consider changing the left-through lane to a left-turn only phase with protected phasing.
WESTBROOK: Pride’s Corner

Pride Street:
- It is unclear if the drivers that ran the red light were traveling straight through the intersection or turning right on red. If they were turning right on red, then the modified lane assignment for southbound drivers on Route 302/Bridgton Road, may alleviate those conflicts. Also consider restricting right turns on red.
- Enhance driver expectancy of stop through advance Signal Ahead pavement markings/warning sign.

Brook Street
- Enhance driver expectancy of stop through advance Signal Ahead pavement markings/warning sign.

B. Roadway Segment on Route 302
The primary recommendations through this segment are related to access management and reducing unexpected lane changes.
- Add narrow concrete median/curbing on centerline in the vicinity of the Brook/Pride Street intersection and restrict driveways to right-in-right out access.
- Evaluate the feasibility of adding a left-turn lane/two-way left-turn lane in between the influence areas of the Brook Street and Elmwood Avenue intersections to remove left-turning vehicles from the through-lanes and reducing unexpected lane changes from through vehicles.

C. Intersection of Route 302, Elmwood Avenue, and Chase Hill Road
The rear-end and angle crashes at this intersection are indicative of drivers who do not have adequate gaps or sight distance from the stop-controlled approaches. This is exacerbated by the horizontal and vertical curvature on three of the approaches.

All approaches:
- Consider modifying the intersection control from two-way stop controlled to an alternative control, such as a traffic signal control.

Northbound Route 302/Bridgton Road:
- Investigate the ability to offset the right-turn lane to enhance the sight-distance of drivers on Elmwood Avenue.

Southbound Route 302/Bridgton Road:
- Consider adding intersection warning sign approaching Elmwood Avenue.

Elmwood Ave:
- Consider removal of landscaping/shrubs behind the guardrail northeast of the intersection that may contribute to lack of sight distance looking to the north on Bridgton Road.
Crash Data

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for all three locations and also shows additional crashes from 2018. The crash diagrams for all three locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pride’s Corner</td>
<td>16896</td>
<td>7</td>
<td>8</td>
<td>12</td>
<td>3</td>
<td>30</td>
<td>33.3%</td>
<td>1.06</td>
<td>4/6</td>
<td>30-35 mph</td>
<td>2,500-17,000</td>
</tr>
<tr>
<td>Route 302</td>
<td>16896-16897</td>
<td>2</td>
<td>1</td>
<td>7</td>
<td>3</td>
<td>13</td>
<td>30.0%</td>
<td>1.05</td>
<td>1</td>
<td>35 mph</td>
<td>17,000</td>
</tr>
<tr>
<td>Route 302, Elmwood Ave, Chase Hill Rd</td>
<td>16897</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>12</td>
<td>18.2%</td>
<td>1.77</td>
<td>1/6</td>
<td>30-35 mph</td>
<td>200-17,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.
A. Intersection at Pride’s Corner
WESTBROOK: Pride’s Corner

B. Roadway Segment in Route 302

Westbrook
Link: 16896-16897
Element: 3106442
Study Period: 2015-2017
# of Crashes: 10 / CRF: 1.05
C. Intersection of Route 302, Elmwood Avenue, and Chase Hill Road
WESTBROOK: Intersection of Route 302, Duck Pond Road, and Hardy Road

**Overview map of HCLs reviewed in this assessment.**

**Assessment**

The intersection of Route 302 (Bridgton Road), Duck Pond Road, and Hardy Road is a four-leg, two-way stop-controlled intersection with an overhead flasher. Duck Pond Road and Hardy Road are both stop-controlled with flashing red beacons and Route 302 has flashing yellow beacons in both directions.

**Recent or Pending Projects**

Rumble strip installation on both north and southbound approaches of Route 302/Bridgton Road was completed in 2017, with a break in the rumble strip though the intersection.

**Municipal Input**

Noted concerns by the city include the following:

- Lack of gaps between traffic for turning traffic off of Duck Pond and Hardy. Failure to yield at intersection.
- A round about was proposed but the neighborhood voted against it. MaineDOT is the one who came to the City with the project.
- No pending projects on the horizon.
WESTBROOK: Intersection of Route 302, Duck Pond Road, and Hardy Road

Safety Issues

There were 14 crashes within the intersection, the majority of which involve vehicles from Route 302 (8 northbound and 4 southbound). Seven of those crashes were rear-end collisions.

6 of the 14 involved vehicles on the stop-controlled approaches, either attempting to turn onto, or cross, Route 302.

Recommendations

- Right/left turn lanes for Route 302 could help reduce rear-end crashes. However, due to space restrictions and crash history, a right-turn lane on the northbound approach may be most effective.
- Add dotted edgeline along Route 302 across the approaches to Hardy Road and Duck Pond Road to delineate the travel lanes.
- Restrict driveway access to gas station on SE corner on Route 302. Vehicles should turn on Duck Pond Road to access this gas station. Drivers waiting to turn left from Route 302 onto Duck Pond Road and vehicles going straight from Hardy Road onto Duck Pond Road may be confused if a vehicle has turn signals on since the driveway is so close to the actual intersection.
- Consider modifying the signal control to an all-way stop control or a signalized intersection. Both of these intersection options may contribute to an increase in angle or rear end crashes. A roundabout could help to reduce all crash types but it is noted that the neighborhood did not want that type of intersection control.
Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram for this location is shown on the following page.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 302, Duck Pond Rd, and Hardy Rd</td>
<td>16900</td>
<td>5 5 4 7</td>
<td>21</td>
<td>28.6%</td>
<td>2.64</td>
<td>1/6</td>
<td>25-40 mph</td>
<td>1,000-16,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagram that follows.
WESTBROOK: Intersection of Route 302, Duck Pond Road, and Hardy Road

Intersection of Route 302, Duck Pond Road, and Hardy Road

Stop

Westbrook
16900
Study period 2015-2017
# of Crashes: 14/CRF = 2.64

Prepared by M&O Traffic Engineering
ID#C 6/8/18

PACTS High Crash Location Desktop Assessments
GORHAM: Intersection of Route 4/202 and Route 237

Assessment
This site includes the intersection of Routes 4/202 and 237. This intersection is a single lane roundabout with four approaches.

Recent or Pending Projects
- Proposed 1 ¼” overlay project on Route 4/202 beginning at Route 25 and extending north 3.76 miles scheduled for 2020.
- Proposed highway rehabilitation project Beginning at Acorn Street and extending north 0.28 of a mile to Route 4/202 (PACTS Sponsored MPI) scheduled for 2020.

Municipal Input
Noted concerns by the city include the following:
- Oldest roundabout installed in Gorham.
  - Four approaches with unequal traffic volumes
  - Obsolete geometry
  - Small, tight radii
- On a Statewide load truck route
- Need to consider pedestrians when thinking about this area

Overview map of HCLs reviewed in this assessment.

Street view of intersection at Route 4/202 and Route 237 traveling South on Route 4/202, from Google Maps

Aerial view of Route 4/202 and Route 237, from Google Maps
Safety Issues
There were 28 crashes within the intersection from 2015-2017. 23 of the 28 crashes were angle crashes; however, none of these angle crashes resulted in an injury. There were a few rear-end crashes and vehicles striking DFOs.

The current roundabout design does not appear to have sufficient deflection for entrance approaches, so vehicles can enter the roundabout without reducing their speed. The higher speeds reduces the time to judge an adequate gap and can also limit pedestrians ability to cross at the marked crosswalks. The two right-turn bypass lanes also contribute to long pedestrian crossing distances.

Recommendations
- Roundabouts are effective in reducing serious injuries and fatalities. One reason they work so effectively, is the deflection angle on the approaches, so that if a crash occurs it is not at a 90-degree angle but rather more like a sideswipe. The geometry of the north leg is such that a 90-degree collision is possible. The concrete splitter islands for all approaches, and particularly the north leg, should be re-evaluated to introduce a greater deflection angle for vehicles entering the roundabout.
- Add pedestrian warning signs to crosswalks and change the standard crosswalk pavement markings to high-visibility markings.
GORHAM: Intersection of Route 4/202 and Route 237

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram for this location is shown on the following page.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gorham Rotary</td>
<td>15714</td>
<td>12 7 9 8</td>
<td>36</td>
<td>7.1%</td>
<td>4.47</td>
<td>2/3</td>
<td>25-35 mph</td>
<td>7,000-8,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.

---

**LEGEND**

- MOVING VEHICLE
- REAR END COLLISION
- VEHICLE BACKING
- SIDESWIPED COLLISION
- OVERTURNED
- HEAD ON COLLISION
- OUT OF CONTROL
- ANGLE COLLISION
- FIXED OBJECT
- PARKED VEHICLE
- FAI AL
- INJURY TYPE

- PATH OF: F PEDESTRIAN B BICYCLE A ANIMAL S SLED

- PAVEMENT: D DRY, I ICY, W WET, S SNOW

- WEATHER: C CLEAR, F FOG, R RAIN, S SLEET, S SHOW, C CLOUDY

- TIME: A AM, P PM

---
GORHAM: Intersection of Route 4/202 and Route 237

Gorham Roundabout

Gorham Rotary
Link: 15714p, 59491, 59490, 59489, 59488, 59487, 59486, 59485, 59484, 59483, 59482, 59478
Study Period: 2015-2017
# of Crashes: 28 / CRF: 4.47
Prepared by Office of Safety
6/30/19
YARMOUTH: Intersection of East Main Street and North Road

Overview map of non-HCL reviewed in this assessment.

Assessment
This site includes the intersection of North Road and East Main Street in Yarmouth, which is a three-legged one-way stop controlled intersection with only the North Road approach being stop-controlled.

This is not a High Crash Location (HCL). It was last listed as a HCL in 2015. As a result, information was obtained using the MaineDOT Crash Query Tool to identify crashes between 2016-2019, which show five crashes, three rear end/sideswipe crashes and two went off road crashes.

Pending Projects
No major recent or pending MaineDOT projects.

Municipal Input
There is a large amount of traffic that travels on North Road and as a result, there are large traffic queues during peak traffic hours, particularly in the morning. Vehicles are at a standstill on North Rd, East Main St and the East Main St Ramp to Rte 1. Often it can be difficult to turn left from North Road onto East Main Street due to the high volume of traffic. In addition, vehicles have left the roadway, travelling through the “T” intersection and entering private yards, striking vehicles parked in driveways.

Recommendations
- Add dotted edge line along East Main Street across the approach of North Street. This will better delineate the travel lane so that drivers can approach the travel lane to increase sight distance, without entering the on-coming travel lane.
- Provide intersection warning signs (MUTCD W2-4 and W1-7), on the North Road approach.
- Restrict left turns from North Road onto E Main Street during peak hours.
- The north leg (East Main Street) has approximately one quarter of the AADT of the south (East Main Street) and west legs (North Street), so consider switching the stop control to the north leg for southbound vehicles on East Main Street; this would also include resiping pavement markings.
- Investigate alternative intersection controls, such as the installation of a traffic signal or roundabout.
- Restripe to square up the intersection, reducing the skew angle.

Street view of intersection at East Main Street and North Road traveling North on East Main Street, from Google Maps
YARMOUTH: Intersection of East Main Street and North Road

Aerial view of East Main Street and North Road, from Google Maps
YARMOUTH: Intersection of East Main Street and North Road

Screen Capture from MaineDOT Crash Query Tool website showing crashes at this intersection between 2016-2019
YARMOUTH: Intersection of Route 1 and Spring Street

Assessment
The intersection of Route 1 and Spring Street is a four-legged, two-way stop controlled intersection. The stop controlled approaches are on Spring Street and the Junipers Apartment Complex. Route 1 is median separated within the vicinity of the intersection and has multiple lanes in both directions.

Recent or Pending Projects
There was an intersection improvements project at the intersection adjacent to this one for the Exit 17 ramp to install a traffic signal.

Municipal Input
- Area is prone for crashes due to the combination of the intersections/merging in a small area. The intersections of Spring Street and Route 1, Juniper Drive, and Route 1, and the merging of traffic from exiting 295 SB (Exit 17) and Route 1 south all contribute to the amount of traffic movement in the area. You also have the on-ramp for 295 SB (Exit 17) in the immediate area as well.
- Trying to turn left from Spring Street (onto Route 1 south) or turning left from Juniper Drive (onto Route 1 north) can be quite difficult. When vehicles in more than one of those intersections try to make turns at the same time, movement in that area is dangerous.
YARMOUTH: Intersection of Route 1 and Spring Street

Safety Issues
There were 15 crashes within the intersection. Many of the crashes at this intersection were due to traffic crossing Route 1, particularly from Junipers Apartment Complex, and failing to yield to through traffic. This includes traffic traveling straight or left, from Spring Street and Junipers Apartment Complex, and turning onto Route 1 or crossing through the intersection. There are also several rear-end collisions on Spring Street.

Recommendations
- Restrict eastern exit from Cumberland gas station due to its close proximity to the intersection.
- Add pavement markings in the Route 1 median to better define where turning/through vehicles should be positioned.
- Restrict through and left turn movements from the minor streets by converting the intersection to a Restricted Crossing U-Turn (RCUT) intersection with downstream U-turns. The eastbound downstream U-turn could be located at the I-295 On/Off ramps. The westbound downstream U-turn could be located at the existing driveways of Coastal Hardware and Binga’s Wingas and Culligan Water or the signalized intersection leading to E Main Street and Maple’s.
YARMOUTH: Intersection of Route 1 and Spring Street

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagram for this location is shown on the following page.

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Route 1 and Spring St</td>
<td>19364</td>
<td>4 6 5 4</td>
<td>19</td>
<td>40.0%</td>
<td>2.26</td>
<td>3/4</td>
<td>30-40 mph</td>
<td>2,000-9,000</td>
</tr>
</tbody>
</table>

The legend below will aid in understanding the crash diagrams that follow.

LEGEND

- MOVING VEHICLE
- VEHICLE BACKING
- OVERTURNED
- OUT OF CONTROL
- REAR END COLLISION
- SIDESWIPER COLLISION
- HEAD ON COLLISION
- ANGLE COLLISION

- FIXED OBJECT
- PARKED VEHICLE
- FATAL
- INJURY TYPE

PATH OF: P PEDESTRIAN B BICYCLE A ANIMAL S SLED

PAVEMENT: D - DRY, I - ICY, W - WET, S - SNOW
WEATHER: C - CLEAR, F - FOG, R - RAIN, S - SLEET, S - SNOW, CL - CLOUDY
TIME: A - AM, P - PM
YARMOUTH: Intersection of Route 1 and Spring Street

Intersection of Route 1 and Spring Street

Yarmouth
Node: 19364
Study Period: 2015-2017
* of Crashes: 15 / CRF: 2.26

Prepared by Office of Safety
(LWM - 12/18/18)
Assessment
This site includes two intersections and a roadway segment:

A. **I-295 SB Off-Ramp:** The I-295 SB Off-Ramp at exit 22 is a single lane off-ramp separated by a median from the I-295 SB On-Ramp.

B. **I-295 SB Off-Ramp and Mallett Drive Intersection (Left/West):** This is a three way intersection between the off-ramp and Mallett Drive. There is a stop sign at the end of the off-ramp, traffic does not stop on Mallett Drive.

C. **I-295 SB Off-Ramp and Mallett Drive Intersection (Right/East):** This is a three way intersection with Mallett Drive with an angled approach. There is a yield sign at the end of the off-ramp here.

Recent or Pending Projects
The Mallett Drive bridge over I-295 is currently in design for rehabilitation or replacement and is currently scheduled to begin construction in October 2021.

Municipal Input
Noted concerns by the city include the following:
- This location is rather congested particularly because of the Durham Road/ Pownal Road intersection which has speed and road geometry issues.
- A signal warrant analysis is currently being conducted by MaineDOT on Mallett Drive with respect to the off-ramps.
- Three types of crashes:
  - Excessive speeds on the curved portion of the off-ramp causing vehicles to slide off during icy conditions.
  - Vehicles attempting to turn either west (left) or east (right) onto Mallett Drive and incorrectly anticipating speeds of oncoming traffic.
  - A rear-end collision (i.e. fender bender) by vehicles coming off I-295 southbound and waiting to make a turn onto Mallett Drive.
**FREEPORT:** Intersections of I-295 SB Off-Ramp and Route 125/136/Mallett Drive

**Safety Issues**

**A. SB Off-Ramp**
The major issue is vehicles speeding and running into the median. Of 11 crashes on this segment nine involved out-of-control vehicles, likely a result of speeding around the tight curve at the beginning of the on-ramp. Many of the crashes are in the early morning and early evening periods during late fall and winter months and are most likely occurring during dark conditions.

**B. SB Off-Ramp and Mallett Drive Intersection (Left/West):**
The majority of crashes (6 of 10) are a result of drivers failing to yield when turning left onto Mallett Drive.

**C. SB Off-Ramp and Mallett Drive Intersection (Right/East):**
All crashes are rear end collisions on the off-ramp.
FREEPORT: Intersections of I-295 SB Off-Ramp and Route 125/136/Mallett Drive

Recommendations

• **A. SB Off-Ramp**
  - Add high friction surface treatment to ramp.
  - Add advisory speed plaque and speed feedback signs at the start of the ramp.
  - Provide enhanced delineation through the curve with additional chevron signs and/or evenly spaced post-mounted delineators. Also, consider adding retroreflective strips to the chevron sign posts to provide additional visual grounding to drivers.

• **B. SB Off-Ramp and Mallett Drive Left:**
  - Add stop bar to left-turn lane on the off-ramp.
  - On Mallett Drive northwestbound, begin the left-turn lane for Durham Drive farther west of the off-ramp. This should include an analysis that shortening the left-turn lane would still meet turn lane length design standards.

• **C. SB Off-Ramp and Mallett Drive Right:**
  - Add high friction surface treatment on the ramp approach.

  - On Mallett Drive, consider separating the through lanes from the left turn lanes, similar to a continuous green T. To create the separation, add curbing (or another form of physical separation) starting at the left-turn lane approaching the ramp and extending through the ramp intersection, so that left turning vehicles both from Mallet and from the on-ramp, are separated from the through traffic. This will create a potential weaving conflicts between (1) vehicles that have turned left form the off-ramp merging onto the Mallett Drive through lane and (2) vehicles entering the left-turn lane from Mallet Drive to turn onto Durham Road. This should include an analysis that shortening the left-turn lane to Durham Road would still meet turn lane length design standards.
FREEPORT: Intersections of I-295 SB Off-Ramp and Route 125/136/Mallett Drive

Crash Data
The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for all three locations and also shows additional crashes from 2018. The crash diagrams for all three locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>295 SB Off-Ramp</td>
<td>18710-59619</td>
<td>3 2 6 0</td>
<td>11</td>
<td>18.2%</td>
<td>8.06</td>
<td>1</td>
<td>Unposted</td>
<td>3,500</td>
</tr>
<tr>
<td>295 SB Off-Ramp and Mallett Drive Left</td>
<td>59620</td>
<td>3 2 5 4</td>
<td>14</td>
<td>10.0%</td>
<td>2.11</td>
<td>1/3</td>
<td>35 mph</td>
<td>1,000-17,000</td>
</tr>
<tr>
<td>295 SB Off-Ramp and Mallett Drive Right</td>
<td>19275</td>
<td>2 3 4 1</td>
<td>10</td>
<td>22.2%</td>
<td>1.66</td>
<td>1/3</td>
<td>35 mph</td>
<td>1,000-17,000</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.
FREEPORT: Intersections of I-295 SB Off-Ramp and Route 125/136/Mallett Drive

A. SB Off-Ramp
FREEPORT: Intersections of I-295 SB Off-Ramp and Route 125/136/Mallett Drive

B. 295 SB Off-Ramp and Mallett Drive Left

![Diagram of intersection with details and statistics]

Freeport
Node: 59620
Study Period: 2015-2017
# of Crashes: 10/CRF: 2.11
Prepared by Office of Safety
(R.A. - 8/7/18)
FREEPORT: Intersections of I-295 SB Off-Ramp and Route 125/136/Mallett Drive

C. 295 SB Off-Ramp and Mallett Drive Right

Freeport
Node #19275
Study Period 2015-2017
# of Crashes 9 / CRF= 1.66

Prepared by Office of Safety OMP 8/7/18

Mallett Dr.
**CUMBERLAND**: Intersection of Gray Road, Blackstrap Road, and Skillin Road

**Overview map of HCLs reviewed in this assessment.**

**Assessment**
This intersection of Blackstrap Road/Skillin Road and Gray Road is a four-legged, two-way stop-controlled intersection with an overhead flashing beacon. Blackstrap and Skillin Roads are both stop controlled.

**Recent or Pending Projects**
Light Capital Paving was completed in 2018 on three of the four legs.

**Municipal Input**
Noted concerns from the city include the following:
- The need for a traffic signal
- High speeds and many near misses
- Increasing traffic and commuter delays

**Safety Issues**
There are 11 crashes at this intersection. Most of the crashes (9 of the 11) involved vehicles from Skillin Road, particularly those failing to yield to southbound traffic on Gray Road. Two of the Skillins Road crashes were rear-end collisions and one was a sideswipe.

**Recommendations**
- Wide approaches at Skillin Road and Blackstrap Road allow for right turning vehicles to bypass vehicles waiting for a gap to turn left or travel through the intersection. This creates visibility issues for both vehicles as they cannot clearly see oncoming traffic on Gray Road. The approach should be narrowed to ensure that drivers have the best possible view of on-coming traffic on Gray Road.
- Add dotted edge lines along Gray Road, across the approaches for Skillin and Blackstrap Roads. These will delineate the travel lanes and will provide better guidance to drivers on the minor streets about how close they can pull up to the Gray Road travel lanes.
- Install advance intersection warning signs on Gray Road.
- Consider changing the intersection control to an all-way stop or traffic signal depending on warrants.
**CUMBERLAND**: Intersection of Gray Road, Blackstrap Road, and Skillin Road

Aerial view of Blackstrap Road, Skillin Road, and Gray Road, from Google Maps
CUMBERLAND: Intersection of Gray Road, Blackstrap Road, and Skillin Road

Crash Data

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for all three locations and also shows additional crashes from 2018. The crash diagrams for all three locations are shown on the following pages.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray Rd, Blackstrap Rd, and Skillin Rd</td>
<td>17087</td>
<td>4</td>
<td>4</td>
<td>3</td>
<td>1</td>
<td>12</td>
<td>36.4%</td>
<td>3.08</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.

The legend below will aid in understanding the crash diagrams that follow.
CUMBERLAND: Intersection of Gray Road, Blackstrap Road, and Skillin Road

Intersection of Gray Road, Blackstrap Road, and Skillin Road

Rt 26 & 100/Gray Rd

Stop

Cumberland
Node # 17087
Study Period 2015-2017
* of Crashes: 11/ CRF: 3.08

Prepared by Office of Safety (MP 1/6/19)
FALMOUTH: Exit 53 On-/Off-Ramp to I-95

Assessment
This site includes one roadway segment, the on and off ramp to I-95 at Exit 53. This segment includes a toll booth. Driving toward Gray Road, there is a left only and a through right lane.

Recent or Pending Projects
No major recent or pending projects.

Municipal Input
Noted concerns from the city include the following:
- Have not seen accidents nor do I sense this is an unsafe area.
- Dispute as to what the actual traffic growth has been using exit 53. Some claim the growth there has been significant, more than projected. It would be helpful to have reliable data for that.
- High volume intersection with very low crash data. Good traffic light management and excellent line of sight contribute to this success.

Safety Issues
There are nine crashes on this segment; six in the eastbound direction and three in the westbound direction. Four of the five crashes at this intersection are related to cars failing to yield when changing lanes. This is particularly problematic on the off-ramp. The other crashes are rear-end collisions, distractions, and a plow striking the toll booth.

There is a weaving section in the eastbound direction where drivers must change lanes in a short distance. An overhead sign provides advance lane designation, but it can easily be overlooked due to its relatively small size.
FALMOUTH: Exit 53 On-/Off-Ramp to I-95

Recommendations

- **Eastbound direction:**
  - Provide arrow pavement markings to indicate lane designation just after the merge area, before the toll booth.
  - Provide enhanced/larger overhead lane designation signs.
- Extend the solid white lane line further to the west of the intersection with Gray Road to discourage weaving and unexpected lane changes.
**FALMOUTH: Exit 53 On-/Off-Ramp to I-95**

**Crash Data**

The crash data used for this assessment was based on 2015-2017 crash data. The following table summarizes the crash data for this location and also shows additional crashes from 2018. The crash diagrams for this location is shown on the following page.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I-95 On-/Off-Ramp</td>
<td>70699</td>
<td>2 6 1 0</td>
<td>9</td>
<td>11.1%</td>
<td>2.36</td>
<td>1</td>
<td>Unposted</td>
<td>12,500</td>
</tr>
</tbody>
</table>

*See the abbreviations and definitions section at the beginning of this report for more information about each data point.*

The legend below will aid in understanding the crash diagram that follows.

---

**LEGEND**

- **Moving Vehicle**
- **Rear End Collision**
- **Sidewipe Collision**
- **Overturned**
- **Head On Collision**
- **Angle Collision**
- **Fixed Object**
- **Parked Vehicle**
- **Fatal**
- **Injury Type**

**Path of:**
- P Pedestrian
- B Bicycle
- A Animal
- S Sled

**Pavement:**
- D Dry
- I Icy
- W Wet
- S Snow

**Weather:**
- C Clear
- F Fog
- R Rain
- S Sleet
- S Snow
- Cl Cloudy

**Time:**
- A AM
- P PM
FALMOUTH: Exit 53 On-/Off-Ramp to I-95

I-95 On-/Off-Ramp

Link: 70699-19286
Element: 3688745
Study period 2015-2017
# of Crashes: 9 / CRF: 2.36

Prepared by Office of Safety (MP 4/1/18)