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Safety Assessment
North Windham Moves Study
North Windham, Maine
(JN 3752)

Date: June 17, 2021
Subject: Safety Assessment
North Windham Moves Study
To: MaineDOT, Town of Windham
From: Randy Dunton, PE, PTOE - Gorrill Palmer

Crash History:

To complete a Safety Assessment of the study area, Gorrill Palmer (GP) obtained crash data from MaineDOT for Route 302 from River Road to Anglers Road / Whites Bridge Road; Route 35 from Windham / Standish Town Line to Route 302; and Route 115 from Route 302 to Emerson Drive in North Windham. The crash data includes the most recent three-year period available, from 2018 to 2020. To evaluate whether a location has a crash problem, MaineDOT uses two criteria to define a high crash location. Both criteria must be met to be classified as an HCL.

1. A critical rate factor (CRF) of 1.00 or more for a three-year period. A CRF compares the actual crash rate for similar intersection in the state. A CRF less than 1.00 indicates a rate of less than average **AND**

2. A minimum of eight (8) crashes over the same three-year period.

Based on the crash data provided by MaineDOT, there are three intersections and four roadway segments that are classified as a HCL. In addition to the HCL's, GP reviewed locations within the study area that, in our opinion, had a significant number of crashes (15 or more) within the same three-year period, regardless of HCL status. That resulted in three additional intersections and two additional roadway segments.

GP first identified crash patterns (3 or more similar crashes) at each location based on the collision diagrams provided by MaineDOT (attached). If crash patterns were identified, they were further analyzed as provided on the attached Summary spreadsheet. Patterns that showed a clear decreasing number of crashes (highlighted in yellow in the summary table) over the past three-years were not reviewed since the apparent contributing factor is either no longer present, or it is no longer causing an issue.

The following explores each of the high crash locations (and the five non-HCL) within the study area:

Intersections

- Node 10923: Tandberg Trail (Route 115)/Abby Road [17 crashes, CRF = 2.91] - HCL

  - Abby Road southbound Angle (5 crashes)

    This unsignalized intersection is less than 225 feet to the east of the signalized Boody's Corner. As such, it frequently experiences queues of traffic from that intersection past Abby Road. To complicate the intersection operations, this intersection is located where there are three approach lanes to Boody's corner, which could result in left turning traffic from Abby Road crossing three lanes of travel. This situation often leads to this type of crash because the left turning traffic tries to make their maneuver without being able to see all lanes of travel. Recommended mitigation to address this pattern would be to restrict the left turning movement out of Abby Road with a raised median on Route 115. It should be noted that all the crashes in this pattern occurred during the week, when commuter traffic is heaviest. Implementing the raised median will most likely result in additional left turning traffic into and out of Sand Bar Road, which is also a HCL (identified below).

  - Tandberg Trail eastbound Rear-End (3 crashes)

    Based on the collision diagram, the rear-end crashes appear to be vehicles stopping to turn left onto Abby Road being rear-ended by eastbound through vehicles. The center median recommended for the previous crash pattern identified above would also address this pattern.

- Node 14819: Tandberg Trail (Route 115)/Sand Bar Road [11 crashes, CRF = 1.89] - HCL

  - Tandberg Trail eastbound Rear-End (3 crashes)

    Based on a review of the collision diagram and summary spreadsheet, there does not appear to be an obvious reason for the crash pattern. As noted above, mitigating the Abby Road intersection with a center median may result in additional left turns into and out of Sand Bar Road. This intersection may benefit from creating a formal left turn lane on Route 115 for left turning vehicles onto Sand Bar Road.

- Node P16917: Bridgton Road (Route 302)/River Road/Turning Leaf Drive [20 crashes, CRF = 0.75] – Non - HCL

  - Bridgton Road southbound Rear-End (7 crashes)

    Most of the crashes (5) occurred on a weekday, but otherwise there does not appear to be a pattern of time of day, or time of year. Although a rear-end pattern is not uncommon for a signalized intersection, there does not appear to be a consistent contributing factor. Our recommendation is to revisit the yellow clear interval, it may need to be increased, especially if vehicles are traveling faster than the speed limit.

- Node 16919: Roosevelt Trail (Route 302)/Tandberg Trail (Route 35/115) [41 crashes, CRF = 1] - HCL

  - Roosevelt Trail northbound Rear-End (9 crashes) – Based on a review of the summary sheet, eight of the nine crashes occurred on a weekday. Otherwise there did not appear to be a clear contributing factor. This pattern is not uncommon for a signalized intersection that is at capacity. This approach experiences significant stop-n-go traffic with long queues. This intersection is one that is identified to be upgraded to an adaptive traffic signal that will improve operations, reduce delay, and reduce the queuing of traffic. This upgrade should result in reduced rear-end crashes. It should be noted that there are also eastbound and southbound rear-end patterns, but they show a consistent decline in crashes over the last three-years, so they were not investigated. The proposed adaptive traffic signals should also decrease rear-end crashes on the other approaches in addition to the northbound approach.
  - Tandberg Trail westbound Angle (4 crashes) – All four of the crashes occurred on a weekday, when commuter traffic is heaviest. This movement is both permitted but also has an overlap phase that when terminated the through traffic on Route 302 northbound has the right of way. It is unclear from the collision diagram what the contributing factor to the angle crashes might be. We do not recommend the removal of the overlap phase.

- Node 17872: Roosevelt Trail (Route 302)/Windham Shopping Center/Shaws [19 crashes, CRF = 0.58] – Non - HCL

  - Roosevelt Trail southbound Rear-End (8 crashes) – Based on a review of the summary spreadsheet, there does not appear to be a consistency in year, weekend / weekday, time of day or time of year. As discussed previously for the rear-end patterns at Boody's Corner, this intersection is also proposed to be upgraded to an advance traffic signal which should improve operations, decrease delay, and decrease queuing and result in less rear-end crashes.

  - Roosevelt Trail northbound Rear-End (3 crashes) – This pattern would also benefit from the adaptive traffic signal as described previously.

- Node 17874: Roosevelt Trail (Route 302)/Windham Mall [28 crashes, CRF = 0.81] – Non - HCL

  - Landing Road northeast-bound Rear-End (5 crashes) – Based on the summary spreadsheet, four of the five crashes occurred on a weekend. It should be noted that Landing Road is the primary access to Wal*Mart and Lowes, which have heavy weekend generators. In initial capacity analysis, this approach is significantly over capacity, which as identified previously is a contributing factor to rear-end crashes at a signalized intersection. This crash pattern may benefit from both the use of the proposed adaptive traffic control and the construction of connector roads which may provide for alternative routes and reduce the traffic using Route 302.

- Roosevelt Trail southeast-bound Rear-End (9 crashes) – The summary spreadsheet does not identify any clear contributing factors as of year, weekday / weekend, time of day or time of year. However, the rear-end crash pattern is consistent with several other rear-end patterns at the signalized intersections on Route 302 in the study area. As identified previously, this pattern is consistent with a corridor that is over capacity with significant delays and queuing. This intersection is also expected to be included in the adaptive traffic signal system, which should reduce the number of rear-end crashes by reducing the delay and queuing along the corridor.

Roadway Segments

- Nodes 16919-17872: Roosevelt Trail (Route 302) from Tandberg Trail to entrance to Shaw's [32 crashes, CRF = 1.78] – HCL. This section of Route 302 is one of, if not the, busiest section of Route 302 in the study area. This section includes two travel lanes in each direction with a combination two way left turn lane that transitions into a formal left turn lane at the signalized intersection at Boody's Corner. This section of Route 302 includes numerous closely spaced curb cuts accessing some high traffic generators. Traffic operations are complicated by the fact that southbound left turning vehicles at the signalized intersection frequently queue back into the center left turn lane used to also access the businesses.

  - Roosevelt Trail northwest-bound Angle (9 crashes) – Seven of the nine crashes occurred on a weekday, but the pattern does not appear to be consistent for time of day or time of year although five of the crashes did occur in the summertime. Our recommendation to address this pattern would be to construct a raised center median to prohibit left turns into and out of the curb cuts. This should be balanced with the potential impacts to businesses.
  - Roosevelt Trail southeast-bound Rear-End (6 crashes) – Five of the six crashes occurred on a weekday, but otherwise there does not appear to be consistent pattern. This pattern is not unexpected on an approach to a signalized intersection that is over capacity and has long queues with a lot of stop-n-go. As identified previously, the Town is pursuing an adaptive traffic signal control system that should decrease the delay and queuing of vehicles, which should help reduce crashes.
  - Roosevelt Trail southeast-bound Angle (9 crashes) – The summary spreadsheet identifies that eight of the nine crashes occurred outside of the typical peak hours of the day. Our recommendation to address this crash pattern is the same as the angle crash pattern for the northwest-bound direction identified above.

- Nodes 16919-65227: Roosevelt Trail (Route 302) from Tandberg Trail to Turning Leaf Drive [58 crashes, CRF = 1.7] – HCL. This section of roadway includes two travel lanes in each direction with no turning lanes. The roadway widens out on the northerly end to accommodate additional lanes at Boody's Corner. Like the roadway segment on the northerly side of Boody's Corner, this section of roadway includes numerous closely spaced curb cuts, some accessing uses with high trip generation.

- Roosevelt Trail northbound Rear-End (5 crashes) – Four of the five crashes occurred on a weekday in 2020, with no other clear pattern. It is unclear from the collision diagram, but being familiar with the area, it is suspected these rear-end crashes are a result of vehicles stopping to turn left into a business and being struck from behind, especially since there are no formal left turn lanes. One recommendation to address this pattern would be to provide a center turn lane.
- Roosevelt Trail northbound Sideswipe (6 crashes) – Five of the six crashes occurred on a weekday, with no other apparent pattern. Like the northbound rear-end crash pattern, it is our opinion that this is a result of vehicles stopping to turn into a business and vehicles changing lanes to continue without stopping, or vehicles pulling out from behind a stopped left turning vehicle. One recommendation to address this pattern would be to provide a center turn lane.
- Roosevelt Trail southbound Rear-End (6 crashes) – All of the six crashes occurred on a weekday, with no other clear pattern. It is our opinion that the contributing factor for this pattern is the same as for the northbound rear-end pattern, with the same recommendation for mitigation.
- Roosevelt Trail southbound Angle (12 crashes) – Nine of the twelve crashes occurred on a weekday, with no other apparent pattern. It should be noted that based on the collision diagram it appears that at least five of the crashes is associated with drivers to / from Dunkin Donuts. Like the Route 302 section directly to the north of Boody's Corner, we recommend a raised center median from Boody's Corner southerly to the cemetery.
- Roosevelt Trail southbound Sideswipe (6 crashes) – Based on the summary spreadsheet, there did not appear to be a consistent pattern for the crashes. It is our opinion that this pattern is a result of the same circumstances as the northbound sideswipe pattern, with the same recommendation for mitigation.

Of special note: As stated previously, patterns that had a consistent decreasing number of crashes over the last three years were not evaluated. However, it should be noted that there was a clear pattern (20 crashes) that based on the collision diagram appears to be left turning southbound left turning vehicles into the Walgreens / Little Ceaser's driveway. The pattern showed 11 crashes in 2018, 6 crashes in 2019, and 3 in 2020). Although this pattern shows decreasing crashes, we recommend continuing to observe this location for an increase in crashes. The previous recommendation for a raised center median in this section of Route 302 would address this crash pattern.

- Nodes 17874-17872: Roosevelt Trail (Route 302) from Landing Road to Windham Shop Center [16 crashes, CRF = 0.81] – Non – HCL. This section of Route 302 includes two travel lanes in each direction with a center left turn lane. The roadway widens out at the northerly end to accommodate auxiliary lanes at the Landing Road intersection.

  - Roosevelt Trail northwest-bound Rear-End (3 crashes) – All three crashes occurred on a weekday, with no other clear pattern. There is no obvious reason for this pattern; however, it may be a result of stop-n-go queued traffic due to the signalized intersection at Landing

Road. As discussed previously, the currently planned adaptive traffic signal system should reduce delays on the corridor and reduce the queue lengths and the stop-n-go traffic.

- Roosevelt Trail southeast-bound Rear-End (4 crashes) – All four of the crashes occurred in 2020, which may be an indicator of something different that was occurring during that time that resulted in the crashes. There was no apparent contributing factor for this pattern.

➢ Nodes 17874-59545: Roosevelt Trail (Route 302) from Landing Road to Franklin Drive [18 crashes, CRF = 1.44] – HCL. This section of Route 302 includes two travel lanes in each direction with a center left turn lane. The roadway widens out at the southerly end to accommodate auxiliary lanes at the Landing Road intersection.

- Roosevelt Trail northwest-bound Angle (3 crashes) – Based on a review of the summary spreadsheet, there does not appear to be a clear pattern for the years, weekday / weekend, time of day or time of year. There are only three curb cuts on the easterly side of the road, two to the convenience store, and one to businesses / access to the Windham Mall. Mitigation to address this pattern would include either restricting the curb cuts to right in / right out only or constructing a raised center median on Route 302.
- Roosevelt Trail southeast bound Rear-End (5 crashes) - Based on a review of the summary spreadsheet, there does not appear to be a clear pattern for the years, weekday / weekend, time of day or time of year. There does not appear to be a clear contributing factor for this crash pattern other than the stop-n-go queues from the adjacent signalized intersection with Landing Road. As discussed previously, the currently planned adaptive traffic system should reduce the queues along the corridor.

➢ Nodes 59545-19519: Roosevelt Trail (Route 302) from Franklin Drive to Trails End Road [16 crashes, CRF = 0.74] – Non – HCL. This section of Route 302 includes two travel lanes in each direction with a center left turn lane.

- Roosevelt Trail southeast-bound Rear-End (4 crashes) – All four of these crashes occurred on a weekday in the summertime. There was no clear or obvious contributing factor, other than potentially the stop-n-go of queued traffic as identified previously, which could be improved with the planned adaptive traffic signal system.
- Roosevelt Trail southeast-bound Angle (4 crashes) – Based on a review of the summary spreadsheet, there did not appear to be a consistent pattern for the crashes other than angle. There are nine curb cuts along the westerly side within this roadway segment. Potential mitigations could include raised center median, restriction of curb cuts to right in / right out, or potential access management techniques such as reducing number of curb cuts, narrowing curb cut widths, providing more separation between curb cuts.

➢ Nodes 71549-16919: Tandberg Trail (Route 35) from Rustlers to Roosevelt Trail (Route 302) [8 crashes, CRF = 1.43] – HCL. This section of Route 35 includes a single travel lane in each direction that widens out to three approach lanes at Boody's Corner.

- Tandberg Trail northeast-bound Angle (5 crashes) – All five of the crashes in this pattern occurred on a weekday. All the angle crashes within this section of roadway appear to be associated with either Windham Crossing or the convenience store, both of which are relatively close to Boody's Corner and within the area where the eastbound approach to Boody's Corner is three approach lanes. It is our recommendation that a raised center median be constructed for a minimum distance of the widened approach of Route 35 to Boody's Corner.

Overall Summary of Patterns

Based on a review of the summary spreadsheet, the following patterns were identified for the areas identified above. A description of each category is provided on the spreadsheet. It should be noted that for this summary, we have included the locations that experienced a consistent decrease in crashes (shown in yellow on the spreadsheet).

Type of crash pattern:	Rear-end (96 crashes), Angle (87 crashes), Sideswipe (18 crashes)
Year of crash:	2018 (79 crashes), 2019 (61 crashes), 2020 (61 crashes)
Weekday / Weekend:	Weekday (156 crashes), Weekend (45 crashes)
Time of Day:	AM (29 crashes), Midday (36 crashes), PM (57 crashes), Other (79 crashes)
Time of year:	Spring (26 crashes), Summer (73 crashes), Fall (50 crashes), Winter (52 crashes)