CAPE COD
COMMISSION

2026 Before and After Safety Intervention Study

AN EXAMINATION OF CRASHES AT INTERSECTION AND ROADWAY SEGMENT RECONSTRUCTION PROJECTS ON CAPE COD

SEPTEMBER 2026

Prepared by Cape Cod Commission Staff.

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The information depicted on the maps and figures in this report are for planning purposes only. The source for crash data and information for maps and figures in this report is from the Massachusetts Department of Transportation (MassDOT).

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INTRODUCTION

Cape Cod Commission staff performed a before and after comparison at 12 different locations throughout the region that were recently improved to address high crash locations and improve overall safety. Staff reviewed the number and severity of crashes (along with other crash characteristics and metrics) at the following locations:

- Route 28 at Bearses Way, Barnstable
- Route 28 at Strawberry Hill Road, Barnstable
- Route 28 at Osterville-West Barnstable Road, Barnstable
- Adams Street at Sandwich Road, Bourne
- Adams Street at Cranberry Highway, Bourne
- Ben Abbey Road at Sandwich Road, Bourne
- Ben Abbey Road at Cranberry Highway, Bourne
- Route 28 at George Ryder Road, Chatham
- Route 28 at Barn Hill Road, Chatham
- Route 6A at Main Street, Orleans
- Route 6 Between South Highland Road and South Hollow Road, Truro
- Route 28 at Jones Road and Worcester Court, Falmouth

Crash data was pulled for each of the 12 locations before and after intervention. Crash data during the COVID-19 Pandemic (2020-2021) was specifically avoided as traffic patterns and roadway volumes were greatly skewed and did not accurately represent the typical roadway conditions.

Overall, the results of the safety interventions are promising. Of the 12 locations included in this study, all but three locations saw a decline in the overall number of crashes. Additionally, crashes that are occurring post safety intervention were found to be less severe for most of the locations reviewed. The three locations that saw an increase in injury related crashes were all existing signalized intersections that were upgraded. Overall, these outcomes are encouraging in that they show that targeted interventions at high-crash locations can make a real difference as well as that in specific cases there are other factors that need to be considered when quantifying the success of safety interventions. These metrics will be used moving forward in the Commission's safety-related planning and programming.

ROUTE 28 AT BEARSES WAY - BARNSTABLE

Location and Background Information

The signalized intersection of Route 28 at Bearses Way in Barnstable was previously identified by MassDOT as one of the region's top 5% high crash locations between 2017-2021. A safety improvement project was initiated with construction funding allocated in the 2015 Cape Cod Transportation Improvement Program (TIP). A Road Safety Audit (RSA) was held in May 2009 ahead of the reconstruction project which outlined the crash history, trends and potential countermeasures to be considered for the improvement project.

Project Description

The objective of the reconstruction project on Route 28 between Bearses Way and the Cape Cod Mall Entrance was intended to provide safety and mobility improvements for vehicles, pedestrians, and bicycles. In addition to new sidewalks, a shared use path and bicycle lanes were constructed to improve safety for non-motorists and promote all modes of travel along the corridor.

Route 28 was widened to a 4-lane cross section with a raised median (2 travel lanes in each direction) between Bearse's Way and the Cape Cod Mall Driveway, eliminating a bottleneck that existed between these two intersections. The construction of the raised median and access restrictions along the corridor helped to relieve congestion and eliminate head-on crashes. The project also improved vehicle safety by controlling movements in and out of the several driveways along the corridor. Work on this project also consisted of installation of new traffic signal systems at Route 28 at Bearses Way and Route 28 at Cape Cod Mall entrance intersection with modifications to both the phasing and timing. Geometric improvements were made at both intersections to help improve safety and traffic flow. Construction was completed in 2019.

Crash Analysis

Table 1: Crashes by Year – Route 28 at Bearses Way

Period	Year	Crashes
Before	2011	13
	2012	31
	2013	30
Before Total	**2011-2013**	**74**
After	2022	22
	2023	21
	2024	23
After Total	**2022-2024**	**66**

As reported in the Functional Design Report (FDR) for the reconstruction project, there were 78 reported crashes at the intersection between 2005 and 2012. Our analysis found there were 74 reported crashes at Route 28 and Bearses Way between 2011 and 2013 prior to the improvements. Of those 74 reported crashes, two crashes were reported to be collisions with a vulnerable user (both crashes were collisions with bicyclists). The reconstruction project was completed in 2019. A review of crash data during the after-intervention period of 2022 to 2024 was selected and revealed there were 66 crashes reported over the three-year period, representing an approximately 11% decrease in the number of crashes observed. Of the 66 crashes reported during the after-intervention period, there were three crashes that were reported as a collision with a vulnerable user (one collision with a cyclist, one collision with a pedestrian and one collision with a moped).

As can be seen in Figure 1, angle crashes dropped by half (from 32 to 16) post intervention. Sideswipe crashes saw a dramatic increase (from 8 to 19) likely due to the additional travel lanes installed on the minor approaches. There was a slight decrease in the number of rear-end crashes (from 30 to 26) and a slight increase in the number of head-on crashes (from 0 to 2). Single vehicle crashes remained the same (from 3 to 3).

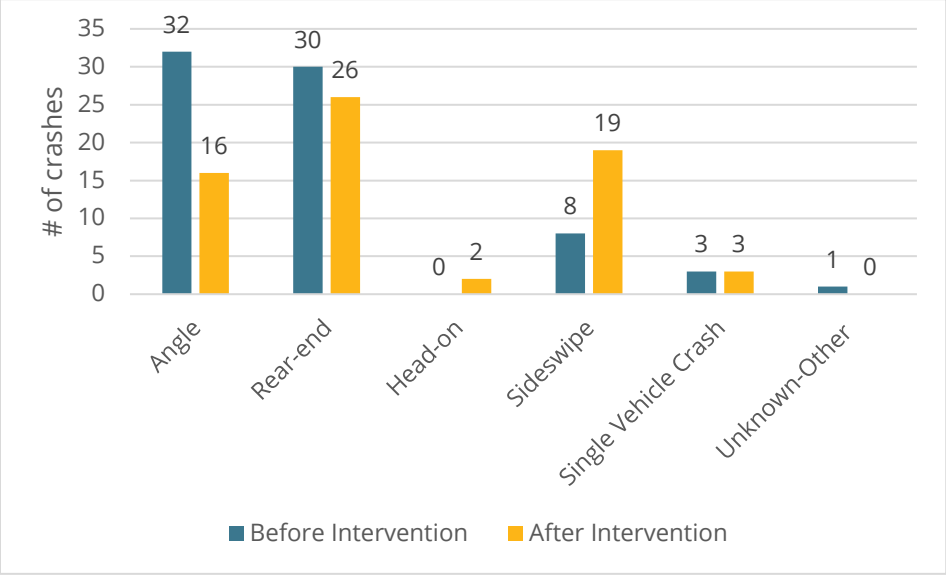


Figure 1: Crash Types, Before Intervention & After Intervention - Route 28 at Bearses Way

In Figure 2, crashes were also analyzed by severity. Property damage only (PDO) crashes—which are associated with less intense crashes—were reduced by about 21% (from 58 to 46), while personal injury crashes increased by 4 crashes (from 14 to 18) when comparing the before intervention crashes to after intervention crashes. There were no fatal crashes during either period.

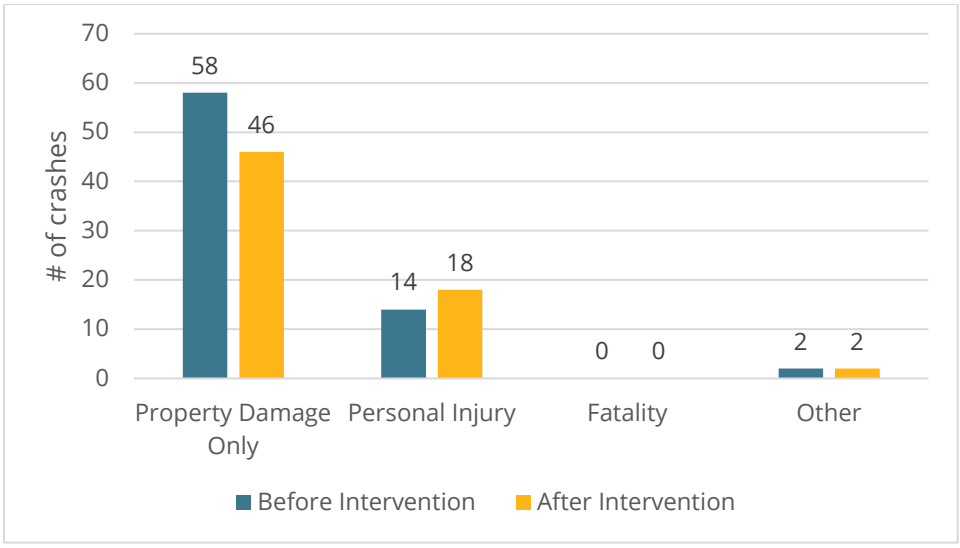


Figure 2: Crash Severity, Before Intervention & After Intervention - Route 28 at Bearses Way

Crash Rates

Table 2 presents the crash rate analysis for Route 28 at Bearses Way, measured here as crashes/million entering vehicles, or c/mev. The average crash rates for the Statewide and MassDOT District 5 for a signalized intersection are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

Table 2: Crash Rates - Route 28 at Bearses Way

Location	Before-Intervention (c/mev)	After-Intervention (c/mev)
Route 28 (Falmouth Road) at Bearses Way	2.32	2.07
District 5 Average - Signalized*	0.75	0.75
MA Average - Signalized*	0.78	0.78

**District 5 and statewide crash rates are from MassDOT's website and were calculated in 2018*

As shown in Table 2, there was a reduction in crashes in the after-intervention period which resulted in a reduction in the crash rate as well. However, the crash rate is still above the MassDOT Statewide and District 5 average crash rate for a signalized intersection.

Crash Severity Analysis

The number of crashes alone does not tell a complete story. For example, certain road changes can fail to decrease crash numbers or cause an increase in total crashes, while driving down the severity of those crashes. For this reason, it is important to look at severity metrics, especially when crashes increase or stay the same. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric attempts to weigh more severe crashes more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 3: EPDO - Route 28 at Bearses Way

Location	EPDO Before-Intervention	EPDO After-Intervention
Route 28 (Falmouth Road) at Bearses Way	354	426

As seen in Table 3, Route 28 at Bearses Way had an EPDO score of 354 in the before-intervention period, and 426 in the after-intervention period at the intersection. Although the observed number

of crashes decreased, the severity of the crashes increased. This intersection should be further monitored as to why more crashes, specifically more severe crashes, occur in the after-intervention period. Several factors related to the reconstruction project may lead to higher speeds, such as additional travel lanes, wider shoulders and reduced congestion and may contribute to the increase in injury crashes.



Image 1: Route 28 at Bearses Way – Before Intervention



Image 2: Route 28 at Bearses Way - After Intervention

ROUTE 28 AT STRAWBERRY HILL ROAD/WEQUAQUET LANE - BARNSTABLE

Location and Background Information

The signalized intersection of Route 28 at Strawberry Hill Road/Wequaquet Lane in Barnstable was previously identified by MassDOT as one of the region's top 5% high crash locations between 2017-2019. A safety improvement project was initiated with construction funding allocated in the 2016 Cape Cod Transportation Improvement Program (TIP). An RSA was conducted in 2015 ahead of the construction project which outlined the crash history, trends and potential countermeasures to be considered for the improvement project.

Project Description

The intersection improvement project at Route 28 and Strawberry Hill Road/Wequaquet Lane consisted of intersection safety upgrades including roadway reconstruction, new signs, pavement markings, modern traffic signals and upgraded pedestrian and bicycle accommodations. The left turn lanes on Route 28 were extended and the signal phasing for the left turn lanes were changed from permissive to protected only. A pedestrian phase was also installed with crosswalks and sidewalks for all four quadrants of the intersection. Construction was completed in 2018.

Crash Analysis

Table 4: Crashes by Year – Route 28 at Strawberry Hill Road

Period	Year	Crashes
Before	2014	8
	2015	9
	2016	5
Before Total	**2014-2016**	**22**
After	2022	10
	2023	10
	2024	8
After Total	**2022-2024**	**28**

Prior to the improvement project, there were 22 reported crashes at the Route 28 and Strawberry Hill Road/Wequaquet Lane intersection between 2014 and 2016. Of those 22 reported crashes, one crash was reported as a collision with a vulnerable user (collision with a pedestrian). Construction at the intersection ended in 2018, and a post intervention crash analysis period of 2022-2024 was selected. There were 28 crashes reported in the after-intervention period, representing an increase in crashes of approximately 27%. None of the crashes observed in the after-intervention period involved a vulnerable roadway user.

As can be seen in Figure 3, rear-end crashes saw the most significant increase (from 11 to 16), with most of the after-intervention period rear-ends occurring on Route 28 in both directions. The

number of angle crashes saw a minor decrease (from 8 to 7). Sideswipe crashes stayed the same (remaining at 1) and the number of single vehicle crashes saw an increase (from 0 to 2).

The increase in crashes at this intersection may be related to the Town's Strawberry Hill Road Sewer Expansion Project which coincided during this period and detoured traffic from Phinney's Lane and Strawberry Hill Road to Route 28. The detour from this construction project resulted in higher traffic volumes and congestion at this intersection which may be a contributing factor. It is recommended that further monitoring of crash trends at this intersection should be analyzed.

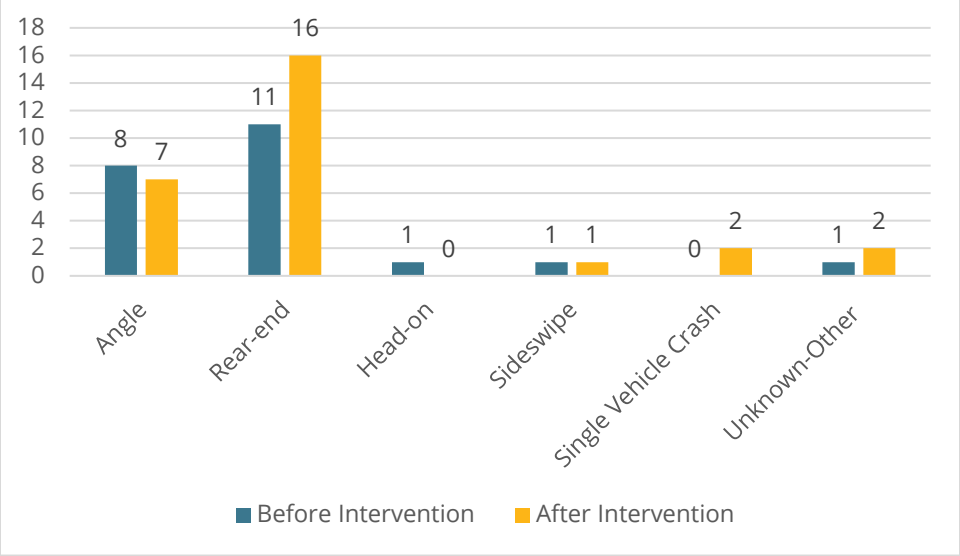


Figure 3: Crash Types, Before Intervention & After Intervention – Route 28 at Strawberry Hill Road

In Figure 4, both PDO and personal injury crashes saw an increase. The number of personal injury crashes went up (from 2 to 4) and the number of PDO crashes also went up (from 20 to 24). There were no fatal crashes during either period.

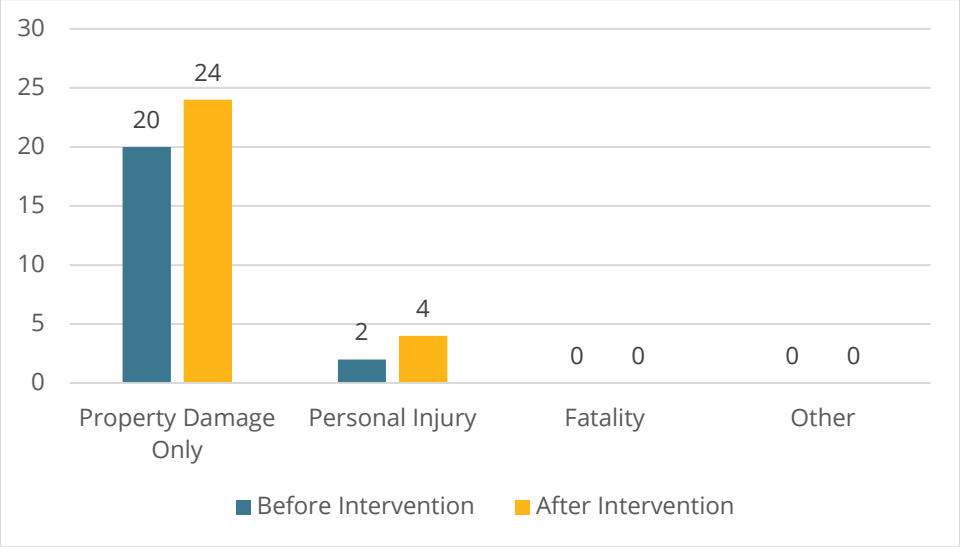


Figure 4: Crash Severity, Before Intervention & After Intervention – Route 28 at Strawberry Hill Road

Crash Rates

As shown in Table 5, the crash rates for Route 28 at Strawberry Hill Road/Wequaquet Lane are measured as crashes/million entering vehicles, or c/mev. The average crash rates for the Statewide and MassDOT District 5 for a signalized intersection are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

Table 5: Crash Rates – Route 28 at Strawberry Hill Road

Location	**Before-Intervention (c/mev)**	**After-Intervention (c/mev)**
Route 28 at Strawberry Hill Road	1.02	1.30
District 5 Average - Signalized*	0.75	0.75
MA Average - Signalized*	0.78	0.78

**District 5 and statewide crash rates are from MassDOT's website and were calculated in 2018*

As shown in Table 8, the calculated crash rate for Route 28 at Strawberry Hill Road/Wequaquet Lane, prior to the construction project, was found to be over the MassDOT Statewide and District 5 averages. Post-construction, the total number of crashes at this intersection has increased resulting in a higher crash rate that is still above the MassDOT Statewide and District 5 average for a signalized intersection.

Crash Severity Analysis

The number of crashes alone does not tell a complete story. For example, certain road changes can fail to decrease crash numbers or cause an increase in total crashes, while driving down the severity of those crashes. For this reason, it is important to look at severity metrics, especially when crashes increase or stay the same. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric attempts to weigh more severe crashes more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 6: EPDO - Route 28 at Strawberry Hill Road

Location	EPDO Before-Intervention	EPDO After-Intervention
Route 28 at Strawberry Hill Road	62	108

As seen in Table 6, Route 28 at Strawberry Hill Road/Wequaquet Lane had an EPDO score of 62 in the before-intervention period, and 108 in the after-intervention period at the intersection. The EPDO score increased not only due to a rise in the number of crashes at the intersection, but there was also increase in the number of personal-injury crashes. As stated earlier, it is recommended that further monitoring at this intersection be conducted to understand why more crashes, specifically more severe crashes, occur in the after-intervention period.



Image 3: Route 28 at Strawberry Hill Road/Wequaquet Lane - Before Intervention



Image 4: Route 28 at Strawberry Hill Road/Wequaquet Lane - After Intervention

ROUTE 28 AT OSTERVILLE-WEST BARNSTABLE ROAD - BARNSTABLE

Location and Background Information

The signalized intersection of Route 28 at Osterville-West Barnstable Road in Barnstable was previously identified by MassDOT as one of the region's top 5% high crash locations between 2017-2021. This intersection was also listed as a MassDOT Statewide Top 200 high crash location for 2019-2021. A safety improvement project was initiated with construction funding allocated in the 2018 Cape Cod Transportation Improvement Program (TIP). An RSA was conducted in 2012 ahead of the construction project which outlined the crash history, trends and potential countermeasures to be considered for improvement.

Project Description

The purpose of the intersection improvement project was to address safety by installing exclusive left turn lanes on all four approaches. A new modern traffic signal was installed with protected left turn phasing for Route 28 left turns. Bicycle and pedestrian accommodations were also incorporated, as well as emergency vehicle pre-emption. Access management was also achieved with the closure of a business driveway near the intersection. Construction was completed in 2021.



Image 5: Route 28 at Osterville-West Barnstable Road After-Intervention

Crash Analysis

Table 7: Crashes by Year – Route 28 at Osterville-West Barnstable Road

Period	Year	Crashes
Before	2015	13
	2016	9
	2017	18
Before Total	**2015-2017**	**40**
After	2022	5
	2023	5
	2024	6
After Total	**2022-2024**	**16**

There were 40 reported crashes at the Route 28 and Osterville-West Barnstable Road intersection between 2015 and 2017. Construction at the intersection ended in 2021, and an after-intervention crash analysis period of 2022-2024 selected. There were 16 crashes reported in the after-intervention period, representing a 60% decrease. There were no vulnerable roadway user crashes in either the before or after intervention periods.

As can be seen in Figure 5, each crash type saw a decrease with angle crashes having the largest decrease (from 21 to 5) due to the addition of the exclusive left turn lanes and signal phasing.

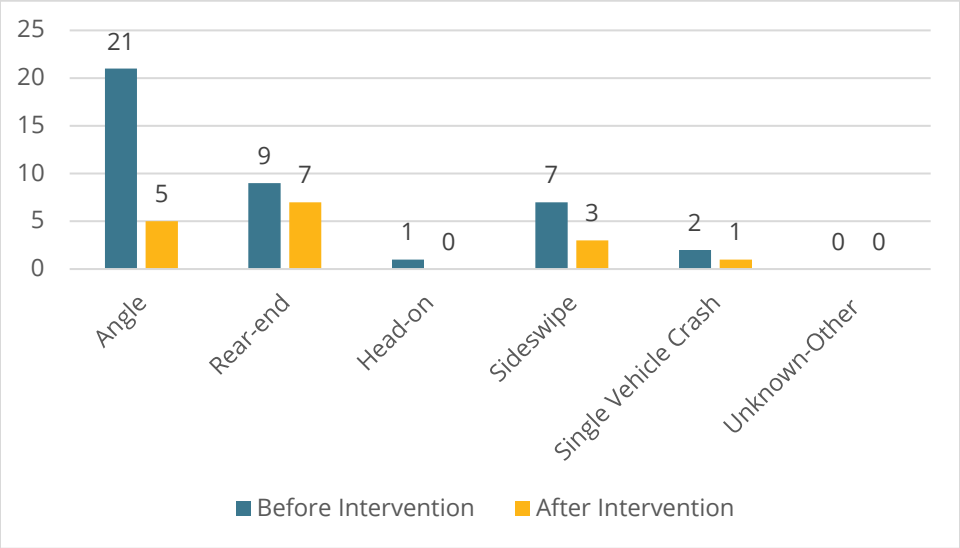


Figure 5: Crash Types, Before Intervention & After Intervention – Route 28 at Osterville-West Barnstable Road

In Figure 6, each category saw a decrease in crash severity. Crashes that occurred in the after-intervention period were less severe and resulted in PDO crashes. There were no fatal crashes during either period.

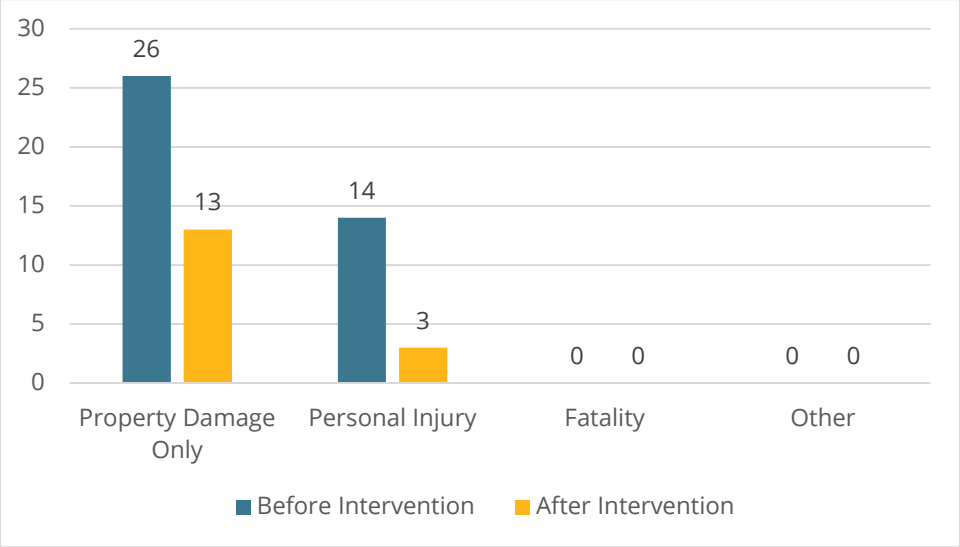


Figure 6: Crash Severity, Before Intervention & After Intervention – Route 28 at Osterville-West Barnstable Road

Crash Rates

As shown in Table 8, the crash rates for Route 28 at Osterville-West Barnstable Road are measured as crashes/million entering vehicles, or c/mev. The average crash rates for the Statewide and MassDOT District 5 for a signalized intersection are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

Table 8: Crash Rates – Route 28 at Osterville-West Barnstable Road

Location	**Before-Intervention (c/mev)**	**After- Intervention (c/mev)**
Route 28 at Osterville-West Barnstable Road	1.82	0.73
District 5 Average - Signalized*	0.75	0.75
MA Average - Signalized*	0.78	0.78

**District 5 and statewide crash rates are from MassDOT's website and were calculated in 2018*

As shown in Table 8, the calculated crash rate for Route 28 at Osterville-West Barnstable Road prior to the construction project was found to be over the MassDOT Statewide and District 5 averages. After construction, the crash rate has decreased and is now below both the MassDOT Statewide and District 5 averages for a signalized intersection.

Crash Severity Analysis

The number of crashes alone does not tell a complete story. For example, certain road changes can fail to decrease crash numbers or cause an increase in total crashes, while driving down the severity of those crashes. For this reason, it is important to look at severity metrics, especially when crashes increase or stay the same. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric attempts to weigh more severe crashes more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 9: EPDO - Route 28 at Osterville-West Barnstable Road

Location	EPDO Before-Intervention	EPDO After-Intervention
Route 28 at Osterville-West Barnstable Road	320	76

As seen in Table 9, Route 28 at Osterville-West Barnstable Road had an EPDO score of 320 in the before-intervention period, and 76 in the after-intervention period at the intersection. With a lower EPDO score, not only did crashes decrease at this intersection post construction, but the severity of the crashes has also improved with less crashes resulting in an injury.



Image 6: Route 28 at Osterville-West Barnstable Road - Before Intervention

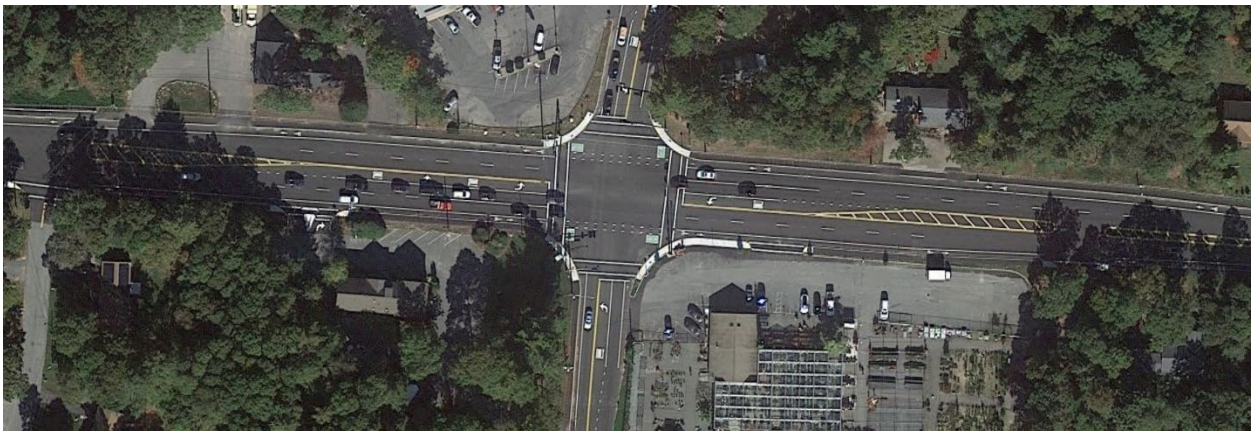


Image 7: Route 28 at Osterville-West Barnstable Road - After Intervention

ADAMS STREET AND BEN ABBEY ROAD – BOURNE

Location and Background Information

Adams Street and Ben Abbey Road are located in the Town of Bourne. These two roads act as north-south connectors between Sandwich Road and Cranberry Highway and serve as a major connection to Route 6 and the Sagamore Bridge. Ben Abbey Road is located approximately 2,000 feet east of Adams Street.

Adams Street is currently a one-lane residential roadway in the southbound direction and owned by the Town of Bourne. Adams Street is under stop control at its intersection with Cranberry Highway. Previously, Adams Street was a two-lane, two-way roadway prior to the improvement project. Located near Sagamore Bridge, there were many conflict points and heavy turning traffic movement volumes that created safety issues and congestion.

Ben Abbey Road is a two-lane, two-way roadway under MassDOT jurisdiction and is under stop-control at its intersection with Cranberry Highway and under signal control at its intersection with Sandwich Road. Ben Abbey Road provides access to four residential homes and a cemetery and was largely underutilized in comparison to Adams Street.

Project Description

In October 2015, Adams Street was permanently converted into a one-way road in the southbound direction from Sandwich Road toward Cranberry Highway. The additional roadway width on Adams Street was converted to a bike lane. The goal of this modification was to improve safety and simplify traffic operations at the bottleneck intersection of Adams Street and Sandwich Road, which previously ranked among the Top 50 crash locations in the 2014 Barnstable County High Crash Locations Report. The 2014 High Crash Locations Report listed that between 2009 and 2011, there were 18 crashes, six involving injuries, at the Adams Street and Sandwich Road intersection. Due to its proximity to the Sagamore Bridge, Adams Street was the main connection point to the Sagamore Bridge on- and off- ramps and was not designed to handle the high volume of vehicles.

Westbound Route 6 traffic that exited onto Cranberry Highway is now diverted to Ben Abbey Road instead of Adams Street where vehicles access Sandwich Road via an existing traffic signal. This configuration has lessened the impact on the Adams Street intersection and diverted traffic to a MassDOT owned roadway and traffic signal.



Image 8: Adams Street at Cranberry Highway After-Intervention

Crash Analysis

ADAMS STREET AT SANDWICH ROAD

Table 10: Crashes by Year – Adams Street at Sandwich Road

Period	Year	Crashes
Before	2013	10
	2014	11
	2015	4
Before Total	**2013-2015**	**25**
After	2022	0
	2023	4
	2024	1
After Total	**2022-2024**	**5**

Under its original configuration, there were 25 reported crashes at the Adams Street and Sandwich Road intersection between 2013 and 2015. Of those 25 before-intervention period crashes, there were no reported crashes with a vulnerable roadway user. Adams Street was converted into a southbound one-way roadway in October of 2015. During the after-intervention period of 2022-2024, there were five crashes reported, representing an 80% decrease in the number of crashes observed for this intersection. Of the five crashes that occurred in the after-intervention period, one involved a vulnerable roadway user (collision with a pedestrian).

As can be seen in Figure 7, there are no longer angle crashes and rear-end crashes occurring at this intersection with the elimination of heavy turning movements from Adams Street onto Sandwich Road. The number of head-on crashes remained the same and there was a slight increase in the number of sideswipe crashes seen (from 0 to 2) and a slight increase in the number single vehicle crashes (from 1 to 2).

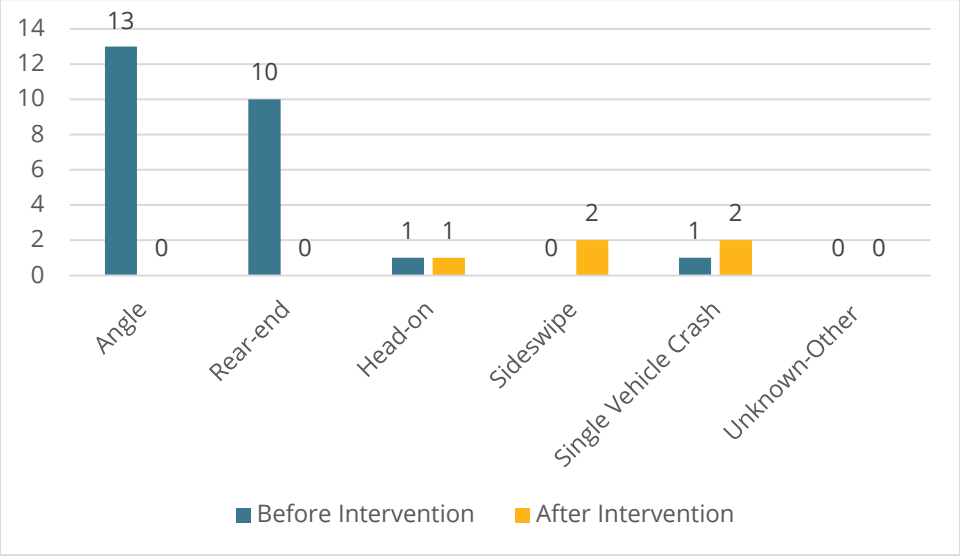


Figure 7: Crash Types, Before Intervention & After Intervention – Adams Street at Sandwich Road

Figure 8 shows the crash severity drastically decreased for both PDO and injury crashes at the Adams Street and Sandwich Road intersection. There were no fatal crashes during either period.

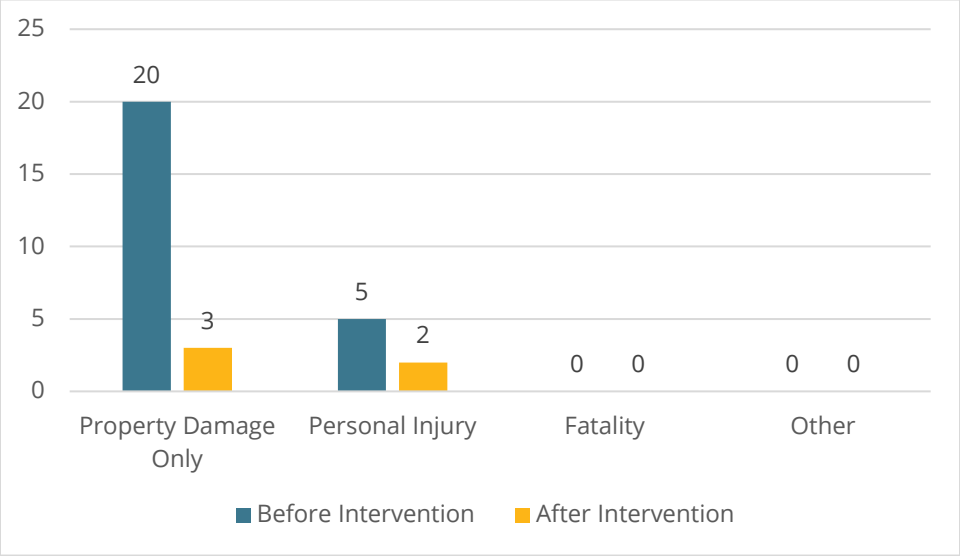


Figure 8: Crash Severity, Before Intervention & After Intervention – Adams Street at Sandwich Road

ADAMS STREET AT CRANBERRY HIGHWAY

Table 11: Crashes by Year – Adams Street at Cranberry Highway

Period	Year	Crashes
Before	2013	0
	2014	1
	2015	3
Before Total	**2013-2015**	**4**
After	2022	1
	2023	0
	2024	3
After Total	**2022-2024**	**4**

There were four reported crashes at the Adams Street and Cranberry Highway intersection between 2013 and 2015. Adams Street was converted into a southbound one-way roadway in October of 2015. An after-intervention crash analysis period of 2022-2024 was used and found four crashes reported. There were no vulnerable roadway user crashes in either the before or after intervention periods.

As can be seen in Figure 9, the types of crashes observed at Adams Street and Cranberry Highway are now exclusively all angle crashes (from 2 to 4) as the rear-end and sideswipe crashes may have been related to Cranberry Highway vehicles turning onto Adams Street which is now prohibited.

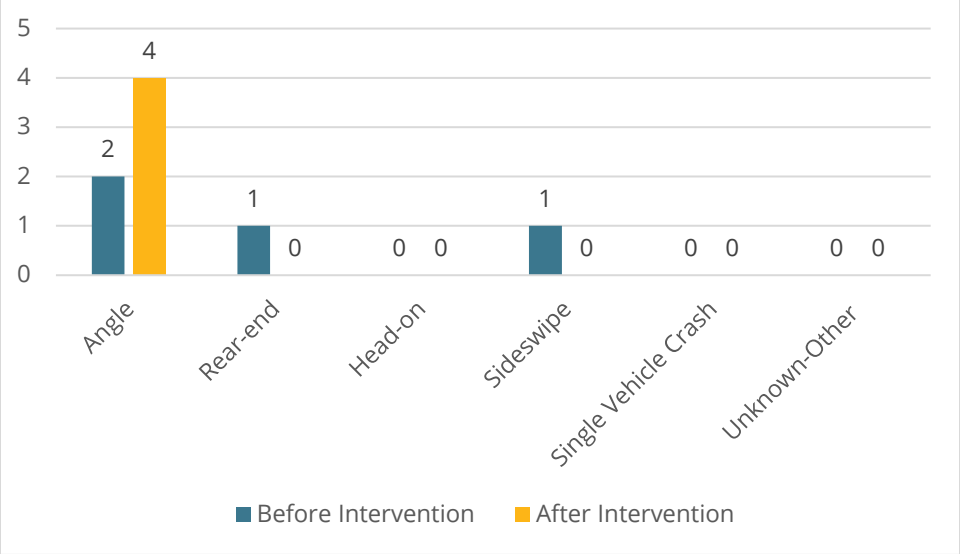


Figure 9: Crash Types, Before Intervention & After Intervention – Adams Street at Cranberry Highway

In Figure 10, the crash severity was the same for both the before and after intervention periods. There were no fatal crashes during either period.

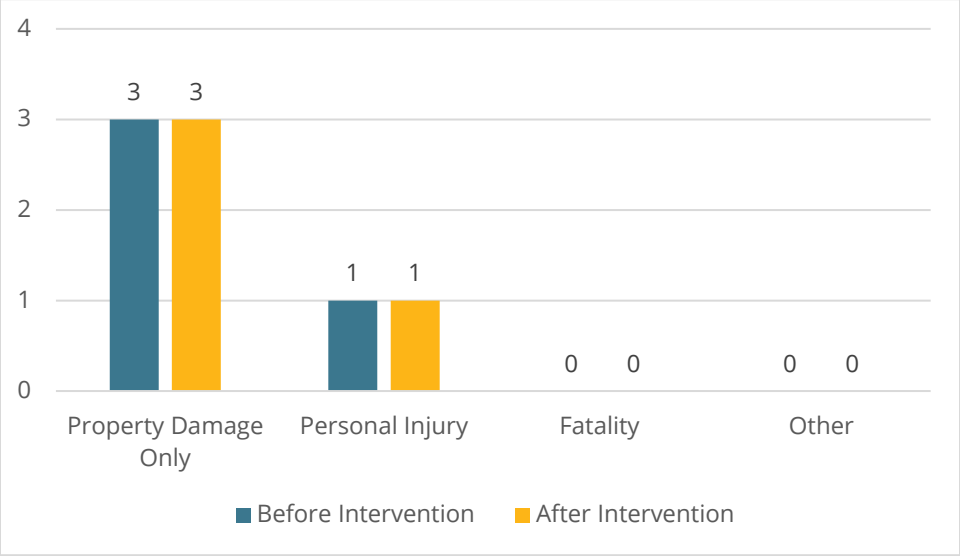


Figure 10: Crash Severity, Before Intervention & After Intervention – Adams Street at Cranberry Highway

BEN ABBEY ROAD AT SANDWICH ROAD

Table 12: Crashes by Year – Ben Abbey Road at Sandwich Road

Period	Year	Crashes
Before	2013	0
	2014	1
	2015	1
Before Total	**2013-2015**	**2**
After	2022	1
	2023	3
	2024	0
After Total	**2022-2024**	**4**

There were two reported crashes at the Ben Abbey Road and Sandwich Road intersection between 2013 and 2015. Adams Street was converted into a southbound one-way roadway in October of 2015, and as a result Ben Abbey Road now experiences a higher volume of traffic. Reviewing the after-intervention crashes between 2022-2024 data, there were four crashes reported. Although there were two additional crashes post intervention, there was a large reduction with 20 less crashes at the Adams Street and Sandwich Road intersection, which is an overall decrease of crashes in the study area. There were no vulnerable roadway user crashes in either the before or after intervention periods.

As can be seen in Figure 11, there was one additional rear-end crash, one sideswipe crash and a single vehicle crash after the intervention likely due to the additional traffic volumes at this intersection.

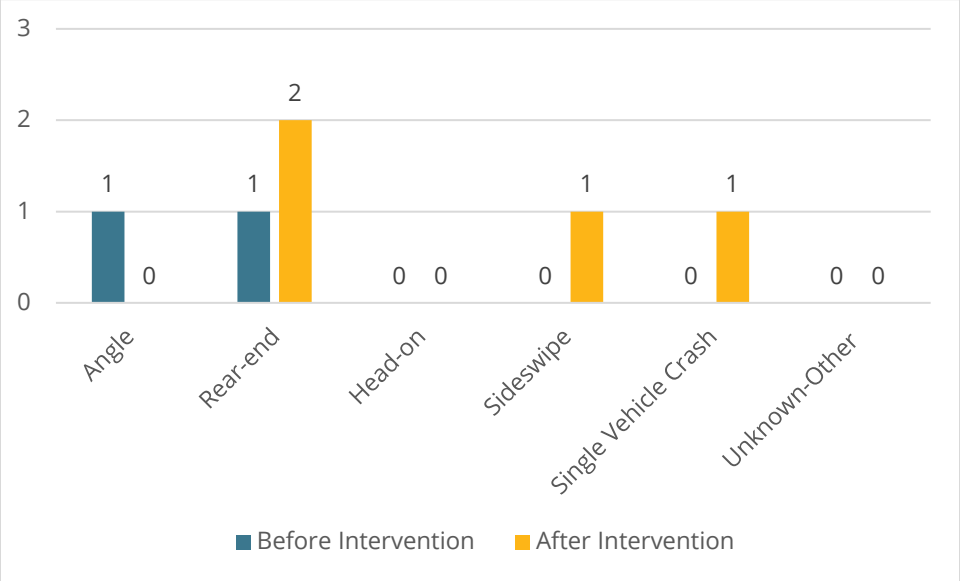


Figure 11: Crash Types, Before Intervention & After Intervention – Ben Abbey Road at Sandwich Road

In Figure 12, there has been an increase in the number of PDO crashes (from 1 to 3) while the number of observed personal injury crashes has stayed the same. There were no fatal crashes during either period.

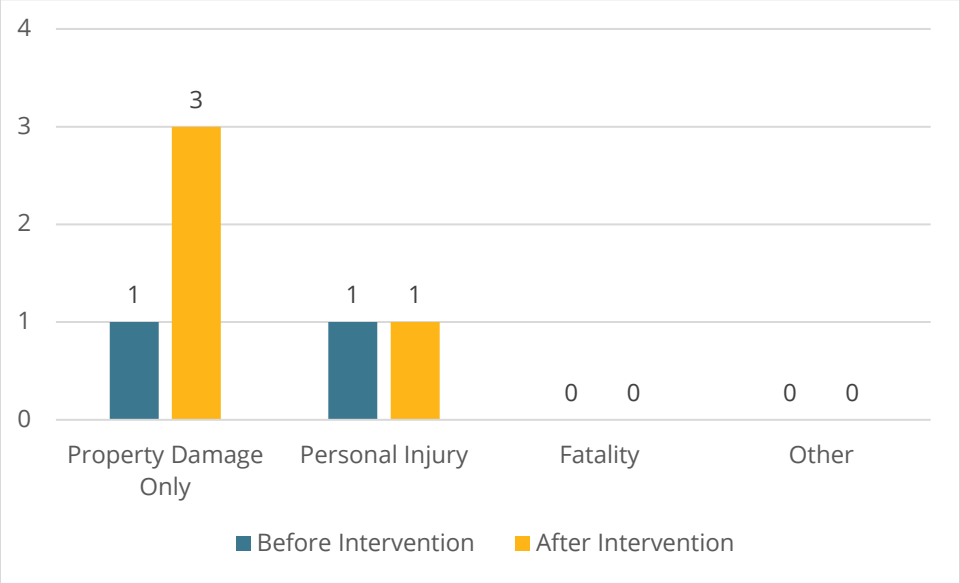


Figure 12: Crash Severity, Before Intervention & After Intervention – Ben Abbey Road at Sandwich Road

BEN ABBEY ROAD AT CRANBERRY HIGHWAY

Table 13: Crashes by Year – Ben Abbey road at Cranberry Highway

Period	Year	Crashes
Before	2013	0
	2014	0
	2015	0
Before Total	**2013-2015**	**0**
After	2022	1
	2023	0
	2024	1
After Total	**2022-2024**	**2**

There were no reported crashes at the Ben Abbey Road and Cranberry Highway intersection between 2013 and 2015. Adams Street was converted into a southbound one-way roadway in October of 2015, and as a result Ben Abbey Road now experiences a higher volume of traffic. The after-intervention crash analysis of 2022-2024 found there were two crashes reported. There were no vulnerable roadway user crashes in either the before or after intervention periods.

As can be seen in Figure 13, there were no crashes observed during the before-intervention period. During the after-intervention period there was one observed angle crash and one observed sideswipe crash.

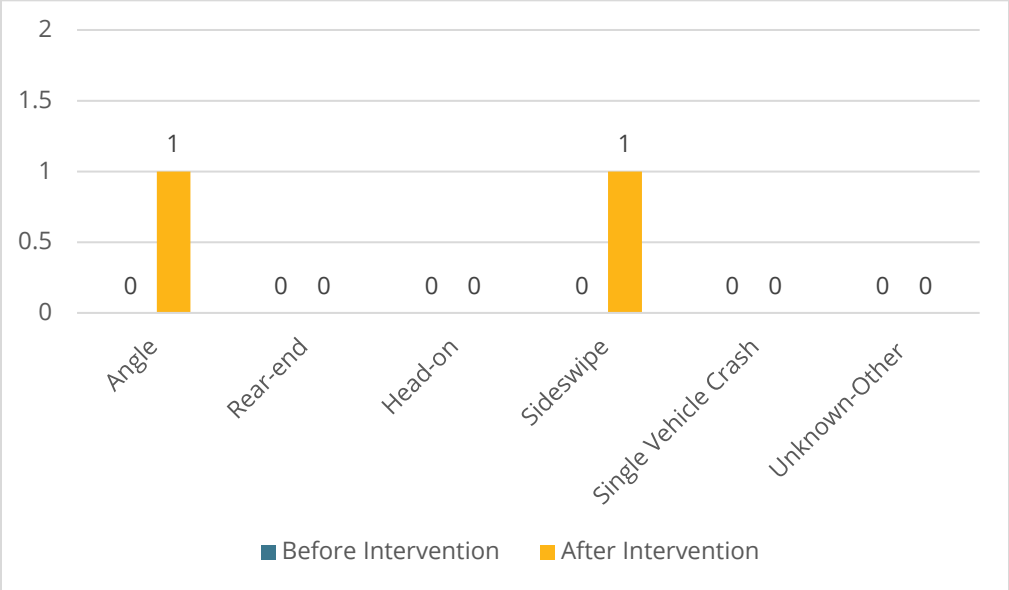


Figure 13: Crash Types, Before Intervention & After Intervention – Ben Abbey Road at Cranberry Highway

Figure 14 also shows the two crashes after intervention were both PDO. There were no fatal crashes during either period.

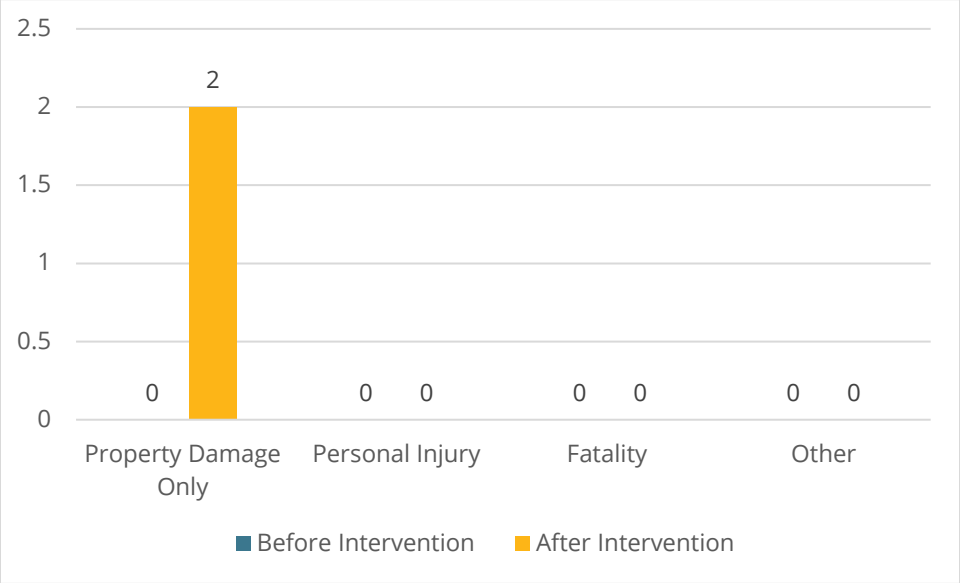


Figure 14: Crash Severity, Before Intervention & After Intervention – Ben Abbey Road at Cranberry Highway

Crash Rates

As shown in Table 14, Adams Street at Sandwich Road was the only intersection that had an initial higher-than-average crash rate before intervention. After intervention, all intersections were found to have crash rates that are lower than the Statewide and District 5 average crash rate. The crash rates are measured as crashes/million entering vehicles, or c/mev. The average crash rates for the Statewide and MassDOT District 5 are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

Table 14: Crash Rates – Adams Street and Ben Abbey Road Intersections

Location	Before-Intervention (c/mev)	After-Intervention (c/mev)
Adams Street at Sandwich Road	1.27	0.25
Adams Street at Cranberry Highway	0.36	0.36
Ben Abbey Road at Cranberry Highway	0.00	0.19
District 5 Average - Unsignalized*	0.57	0.57
MA Average - Unsignalized*	0.57	0.57
Ben Abbey Road at Sandwich Road	0.14	0.27
District 5 Average - Signalized*	0.75	0.75
MA Average - Signalized*	0.78	0.78

**District 5 and statewide crash rates are from MassDOT's website and were calculated in 2018*

Crash Severity Analysis

The number of crashes alone does not tell a complete story. For example, certain road changes can fail to decrease crash numbers or cause an increase in total crashes, while driving down the severity of those crashes. For this reason, it is important to look at severity metrics, especially when crashes increase or stay the same. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric attempts to weigh more severe crashes more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 15: EPDO – Adams Street and Ben Abbey Road Intersections

Location	EPDO Before-Intervention	EPDO After-Intervention
Adams Street at Sandwich Road	125	45
Adams Street at Cranberry Highway	24	24
Ben Abbey Road at Sandwich Road	22	24
Ben Abbey Road at Cranberry Highway	0	2

As seen in Table 15, Adams Street at Sandwich Road had an EPDO score of 125 in the before-intervention period, and 45 in the after-intervention period at the intersection. It is discernable that crashes not only decreased at Adams Street and Sandwich Road, but the crashes that did occur were also less severe, which is important to note. The intersection of Adams Street and Cranberry Highway did not experience a major change. Since there was no change in severity, PDO or number of crashes there was no change in EPDO score. The EPDO score for Adams Street at Cranberry Highway was found to be 24 for both before-intervention and after-intervention. While the Ben Abbey Road intersections at Sandwich Road and Cranberry Highway both saw a minor EPDO increase with injury crashes. Overall, the severity of crashes between all four intersections has decreased.



Image 9: Adams Street at Sandwich Road - Before Intervention



Image 10: Adams Street at Sandwich Road - After Intervention

ROUTE 28 AT GEORGE RYDER ROAD AND ROUTE 28 BARN HILL ROAD - CHATHAM

Location and Background Information

The unsignalized intersections of Route 28 at George Ryder Road and Route 28 at Barn Hill Road were improved as part of the 2018 Transportation Improvement Program (TIP) to address corridor deficiencies and create a more walkable village in West Chatham. Previously, both intersections were operating as unsignalized intersections, with the minor approaches of George Ryder Road and Barn Hill Road operating under stop control and traffic on Route 28 uninterrupted. There was also a center two-way left-turn lane that created numerous conflict points within this segment of Route 28. Although these two intersections were not identified as a top crash location by MassDOT or Barnstable County, there were safety concerns navigating this challenging area for vehicles, pedestrians, bicyclists and transit users. Motorists on the stop-controlled approaches at both intersections experienced long delay times and queuing when trying to enter Route 28 and were at risk of taking unsafe gaps into traffic.

Project Description

The objective of the improvement project was to improve traffic flow, provide multimodal accommodation and increase safety along this segment of Route 28 and at the two key unsignalized intersections. A pair of roundabouts were selected as the preferred alternative for the two study area intersections. Multimodal accommodations included a new sidewalk on the southern portion of Route 28, a shared use path on the northern portion and associated crosswalks and curb ramps.



Image 11: Route 28 at George Ryder Road After-Intervention (Photo Credit: Howard Stein Hudson)

Crash Analysis

ROUTE 28 AT GEORGE RYDER ROAD

Table 16: Crashes by Year (Route 28 at George Ryder Road)

Period	Year	Crashes
Before	2015	3
	2016	1
	2017	2
Before Total	**2015-2017**	**6**
After	2022	3
	2023	2
	2024	0
After Total	**2022-2024**	**5**

As reported in the FDR, there were 9 reported crashes at Route 28 at George Ryder Road intersection between 2009 and 2012. Additionally, our analysis revealed there were 6 reported crashes at Route 28 at George Ryder Road between 2015 and 2017. Construction of the roundabouts was completed in 2021, and an after-intervention period of 2022-2024 was selected. After-intervention, there were 5 crashes reported at Route 28 and George Ryder Road, representing an approximately 17% decrease in crashes observed. There were no vulnerable roadway user crashes in either the before or after intervention periods.

As can be seen in Figure 15, angle crashes saw a drastic decrease (from 4 to 0) with the construction of the roundabout. Rear-end crashes also fell dramatically (from 2 to 0). The only crash type which increased was single vehicle crashes (from 0 to 5), which is not uncommon for a roundabout that requires vehicles to slow down to navigate.

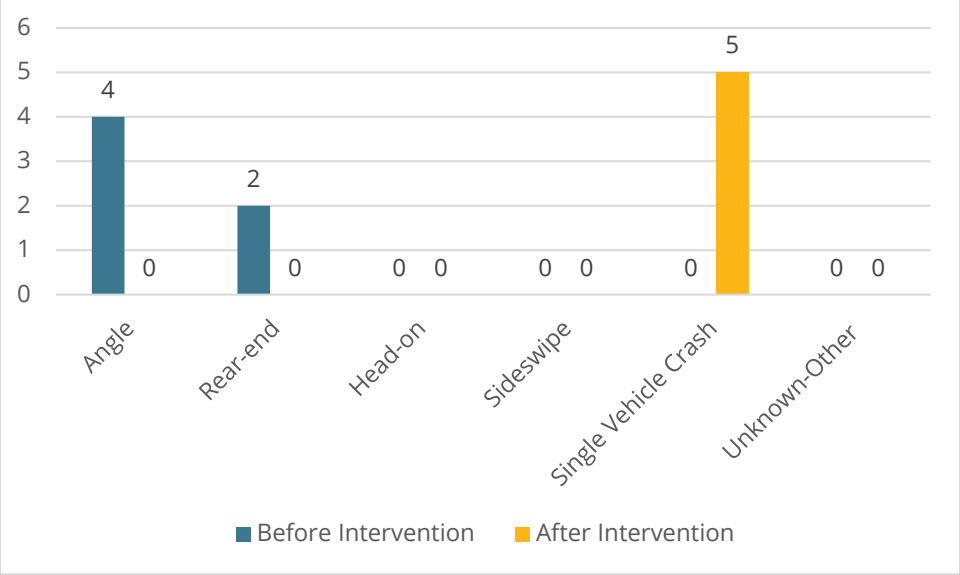


Figure 15: Crash Types, Before Intervention & After Intervention - Route 28 at George Ryder Road

In Figure 16, the number of crashes that occurred before and after intervention was analyzed by severity. PDO crashes—which are associated with less intense crashes—were reduced by 20% (from 5 to 4), while personal injury crashes remained at one crash before and after intervention. There were no fatal crashes during either period.

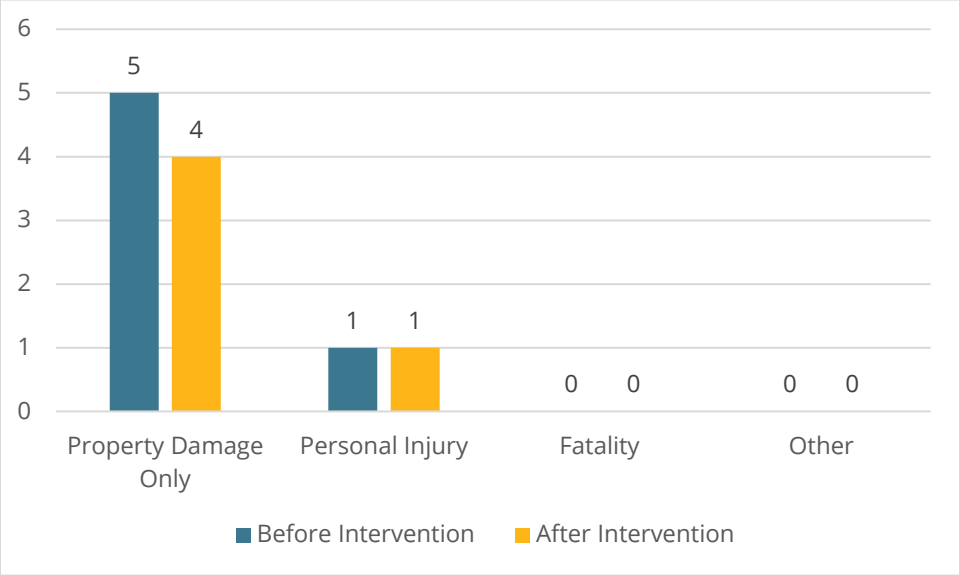


Figure 16: Crash Severity, Before Interventions & After Interventions - Route 28 at George Ryder Road

ROUTE 28 AT BARN HILL ROAD

Table 17: Crashes by Year - Route 28 at Barn Hill Road

Period	Year	Crashes
Before	2015	2
	2016	0
	2017	3
Before Total	**2015-2017**	**5**
After	2022	1
	2023	0
	2024	0
After Total	**2022-2024**	**1**

As reported in the FDR, there were 7 reported crashes at Route 28 at Barn Hill Road intersection between 2009 and 2012. Additionally, our analysis revealed there were 5 reported crashes at Route 28 at Barn Hill Road between 2015 and 2017. Construction of the roundabouts was completed in 2021, and an after-intervention crash analysis period of 2022-2024 was selected. After the intervention, there was one crash reported, representing an approximately 80% decrease. There were no vulnerable roadway user crashes in either the before or after intervention periods.

As can be seen in Figure 17, rear end crashes saw a drastic decrease (from 4 to 0) with the construction of the roundabout. Single vehicle crashes remained the same before and after intervention with one crash observed in both periods.

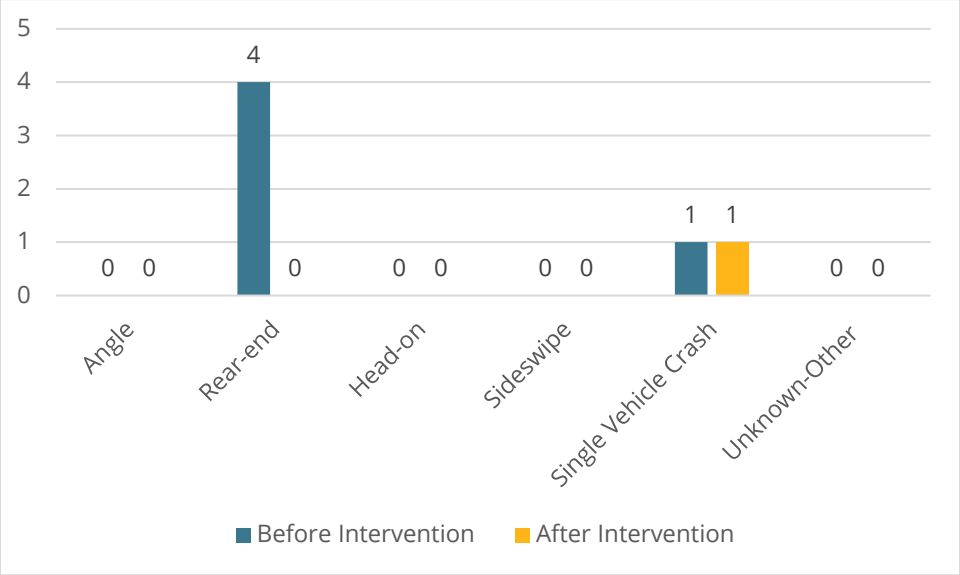


Figure 17: Crash Types, Before Intervention & After Intervention - Route 28 at Barn Hill Road

In Figure 18, the number of crashes that occurred before and after intervention was analyzed by severity. Personal injury crashes were reduced 100% (from 3 to 0), while property damage only crashes fell by 50% (from 2 to 1). There were no fatal crashes during either period.

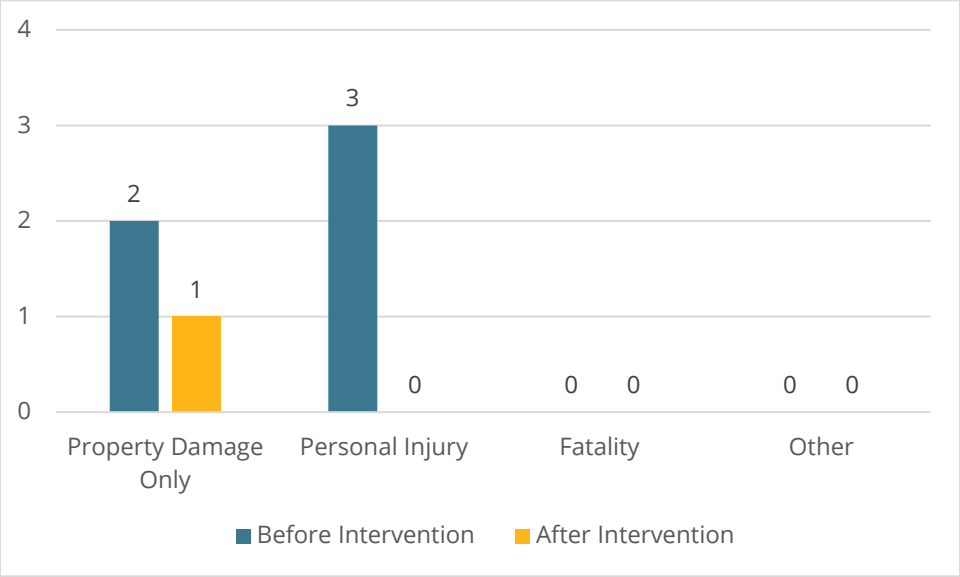


Figure 18: Crash Severity, Before Intervention & After Intervention - Route 28 at Barn Hill Road

Crash Rates

The crash rates are measured as crashes/million entering vehicles, or c/mev. The average crash rates for the State and District at an unsignalized intersection are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

As shown in Table 18, both Route 28 roundabouts experienced a reduction in overall crashes after intervention, which resulted in a lower crash rate as well. Additionally, both locations continue to have a crash rate below the MassDOT Statewide and the District 5 average rates. Route 28 at Barn Hill Road saw a much sharper decrease in crash rate since the number of crashes decreased by such a large percentage (80%).

Table 18: Crash Rates - Route 28 at George Ryder Road & Route 28 at Barn Hill Road

Location	Before-Intervention (c/mev)	After- Intervention (c/mev)
Route 28 at George Ryder Road	0.31	0.26
Route 28 at Barn Hill Road	0.28	0.06
District 5 Average - Unsignalized*	0.57	0.57
MA Average - Unsignalized*	0.57	0.57

**District 5 and statewide crash rates are from MassDOT's website and were calculated in 2018*

Crash Severity Analysis

The number of crashes alone does not tell a complete story. For example, certain road changes can fail to decrease crashes or cause an increase in total crashes, while driving down the severity of those crashes. For this reason, it is important to look at severity metrics, especially when crashes increase or stay the same. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric attempts to weigh more severe crashes more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 19: EPDO - Route 28 at George Ryder Road & Route 28 at Barn Hill Road

Location	EPDO Before-Intervention	EPDO After-Intervention
Route 28 at George Ryder Road	26	25
Route 28 at Barn Hill Road	65	1

As seen in Table 19, Route 28 at George Ryder Road had an EPDO score of 26 before intervention and 25 after intervention with only one less crash at this location. Route 28 at Barn Hill Road

experienced a much more dramatic change in EDPO score, from 65 before-intervention period to an EPDO score of 1 after intervention. The number of crashes at the Route 28 and Barn Hill Road intersection decreased by 80% and the one crash that did occur was PDO.



Image 12: Route 28 (between George Ryder Road and Barn Hill Road) - Before Intervention



Image 13: Route 28 (between George Ryder Road and Barn Hill Road) - After Intervention

ROUTE 6A AT MAIN STREET - ORLEANS

Location and Background Information

The signalized intersection of Route 6A at Main Street in the Town of Orleans was improved as part of the 2016 Transportation Improvement Program (TIP) along with the intersection of Route 28 at Main Street. Although the intersection was not considered a high crash location, the Town focused on the opportunity to improve safety by upgrading the intersection with modern traffic signal equipment and the latest roadway design standards. The effort was part of a Main Street village center revitalization based on the town's 2006 Local Comprehensive Plan to develop a village center strategy to address traffic, parking, signs, the visual look of the street, pedestrian walkways and building facades

Project Description

The project consisted of installing new traffic signals, minor geometric improvements and improved accessibility for pedestrians and bicyclists. At the Route 6A intersection of Main Street, a pair of bus turnouts were installed to support Cape Cod Regional Transit Authority (CCRTA) bus service. Multimodal accommodations were installed throughout the intersection for pedestrians and bicyclists traversing the intersection to support connectivity to the nearby Cape Cod Rail Trail. The traffic signals were upgraded from pedestal pole mounted signals to over-head mast arm mounted signals and included all new pedestrian signal equipment. The intersection also now features flashing yellow lefts for the left turn lanes and improved intersection lighting.

Crash Analysis

Table 20: Crashes by Year – Route 6A at Main Street

Period	Year	Crashes
Before	2012	4
	2013	4
	2014	2
Before Total	**2012-2014**	**10**
After	2022	0
	2023	5
	2024	3
After Total	**2022-2024**	**8**

There were 10 reported crashes at Route 6A and Main Street between 2012 and 2014. Of those 10 before-intervention period crashes, one involved a vulnerable roadway user (collision with a cyclist). Construction at the intersection ended in 2018, and an after-intervention crash analysis period of 2022-2024 was selected. There were eight crashes reported in the after-intervention period, which resulted in a 20% decrease in the number of crashes observed at this intersection. Of the eight after-intervention period crashes, three of them involved vulnerable roadway users (two involved collisions with a pedestrian and one involved a collision with a bicyclist).

As can be seen in Figure 21, based on the observed data, angle crashes decreased (from 5 to 2). The number of sideswipe crashes also saw a decline, from 4 to 1. However, there were some slight increases in other crash types, such as single vehicle crashes which saw the largest increase (from 0 to 3).

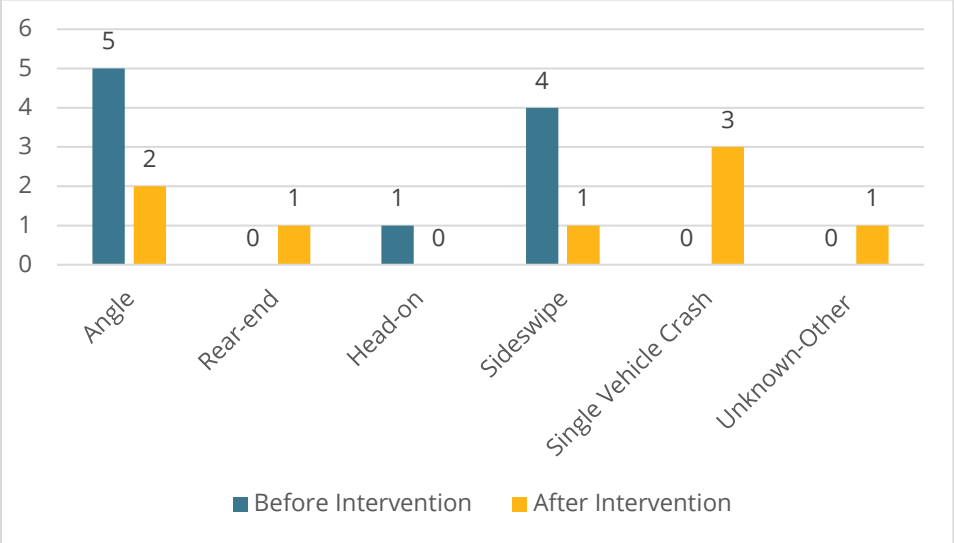


Figure 19: Crash Types, Before Intervention & After Intervention – Route 6A at Main Street

In Figure 22, crashes were also analyzed by severity for the before and after periods. PDO crashes saw a decrease (from 8 to 5) and personal injury crashes saw a slight increase (from 2 to 3). There were no fatal crashes during either period.

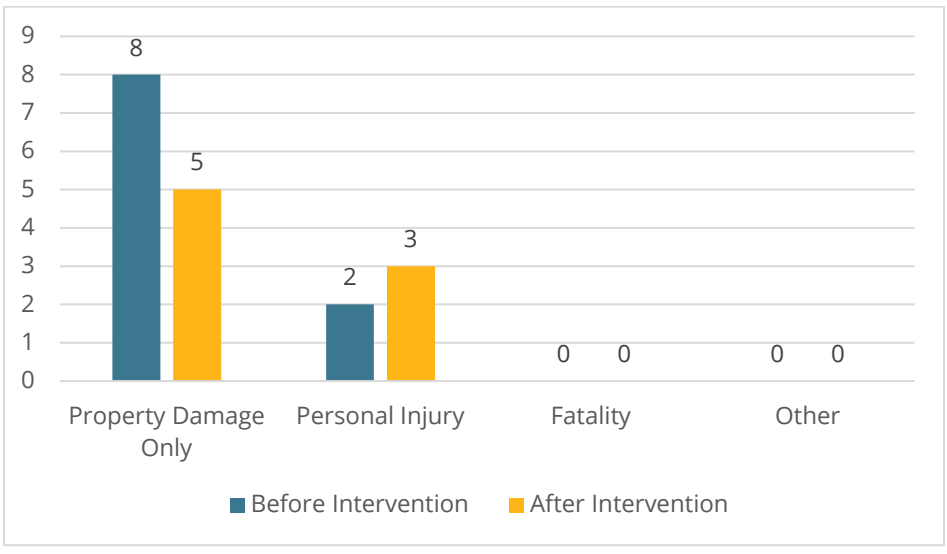


Figure 20: Crash Severity, Before Intervention & After Intervention – Route 6A at Main Street

Crash Rates

The crash rate for Route 6A at Main Street is measured as crashes/million entering vehicles, or c/mev. The average crash rates for the State and District at a signalized intersection are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

Table 21: Crash Rates – Route 6A at Main Street

Location	Before-Intervention (c/mev)	After- Intervention (c/mev)
Route 28 at George Ryder Road	0.66	0.53
District 5 Average - Signalized*	0.75	0.75
MA Average - Signalized*	0.78	0.78

**District 5 and statewide crash rates are from MassDOT's website and were calculated in 2018*

As shown in Table 24, Route 6A at Main Street experienced a small reduction in crashes in the after-intervention period, which has also resulted in a reduction in the crash rate as well. Both the before-intervention and the after-intervention crash rates at Route 6A and Main Street were below the Statewide and MassDOT District 5 average rates for a signalized intersection.

Crash Severity Analysis

The number of crashes alone does not tell a complete story. For example, certain road changes can fail to decrease crash numbers or cause an increase in total crashes, while driving down the severity of those crashes. For this reason, it can be instructive to look at severity metrics, especially when crashes increase or stay the same. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric weighs severe crashes (fatal and injury crashes) more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 22: EPDO - Route 6A at Main Street

Location	EPDO Before-Intervention	EPDO After-Intervention
Route 6A at Main Street	50	68

As seen in Table 25, Route 6A at Main Street had an EPDO score of 50 before intervention and 68 in after intervention. Although there were two less crashes at this location during the after-intervention period, there were more personal injury crashes and therefore, there was an increase in the EPDO score at the intersection.



Image 14: Route 6A at Main Street - Before Intervention



Image 15: Route 6A at Main Street - After Intervention

ROUTE 6 BETWEEN SOUTH HIGHLAND ROAD AND SOUTH HOLLOW ROAD - TRURO

Location and Background Information

A segment crash analysis was selected for a portion of Route 6 in Truro between South Highland Road and South Hollow Road that was improved during the MassDOT Truro/Wellfleet Route 6 Bicycle Accommodation Improvement project in 2017. The purpose of the MassDOT project was to re-stripe Route 6 to accommodate bike lanes within the shoulder area with associated pavement markings and signage. The project also included a road diet on Route 6 between Shore Road and South Highland Road and safety improvements to the Route 6 at South Highland Road unsignalized intersection.

Project Description

The safety improvements were focused on the intersection of Route 6 at South Hollow Road, which was a four-way unsignalized intersection with the minor streets operating under stop control. Previously, this unsignalized intersection allowed all turning movements to occur. The improvement project restricted the South Hollow Road approaches to right turns only with the installation of a channelized median island. Additionally, the segment of Route 6 between Shore Road and South Highland Road was restriped from four travel lanes (two lanes in each direction) to two lane lanes (one lane in each direction) with a yellow painted median island separating the two lanes of travel.

Crash Analysis

Table 23: Crashes by Year – Segment of Route 6 between South Highland Road and South Hollow Road

Period	Year	Crashes
Before	2015	4
	2016	3
	2017	1
Before Total	**2015-2017**	**7**
After	2022	1
	2023	0
	2024	2
After Total	**2022-2024**	**3**

There were 7 reported crashes at Route 6 between South Highland Road and South Hollow Road between 2015 and 2017. Construction took place over the Winter of 2018/2019. To stay consistent with the rest of the post-intervention analysis in this report, 2022-2024 data was used for the after-intervention period. There were 8 crashes reported in the after-intervention period, therefore there was a 50% decrease in the number of crashes observed at this intersection. There were no vulnerable roadway user crashes in either the before or after intervention periods.

As can be seen in Figure 23, the number of sideswipe crashes were significantly reduced with the reduction from four travel lanes to two travel lanes. Angle crashes and the number of rear-end crashes stayed the same during both periods. Single vehicle crashes were also reduced from one to zero during the after-intervention period.

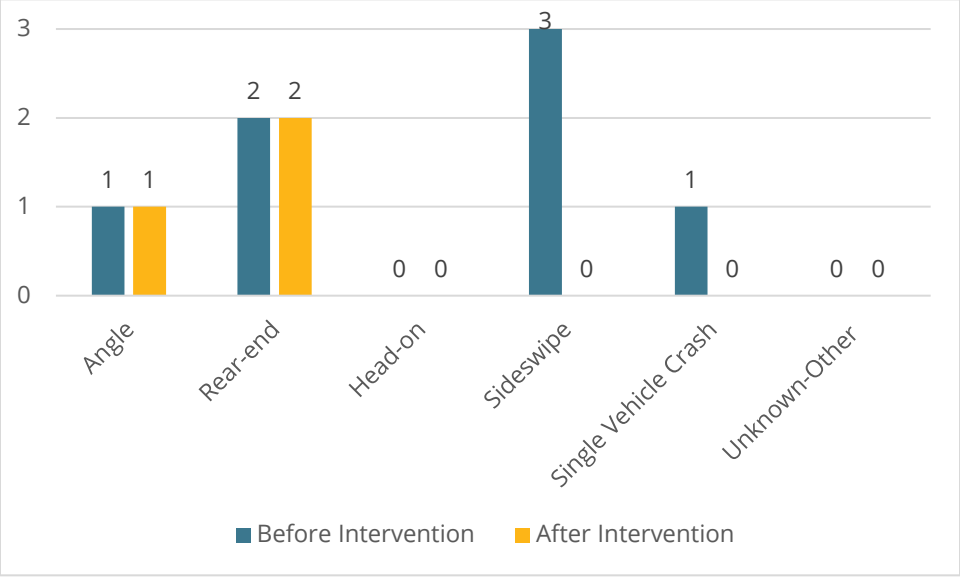


Figure 21: Crash Types, Before Intervention & After Intervention – Segment of Route 6 between South Highland Road and South Hollow Road

In Figure 24, crashes were also analyzed by severity for the before and after periods. PDO crashes saw a decrease (from 4 to 2) and personal injury crashes also saw a decrease (from 3 to 1). There were no fatal crashes during either period.

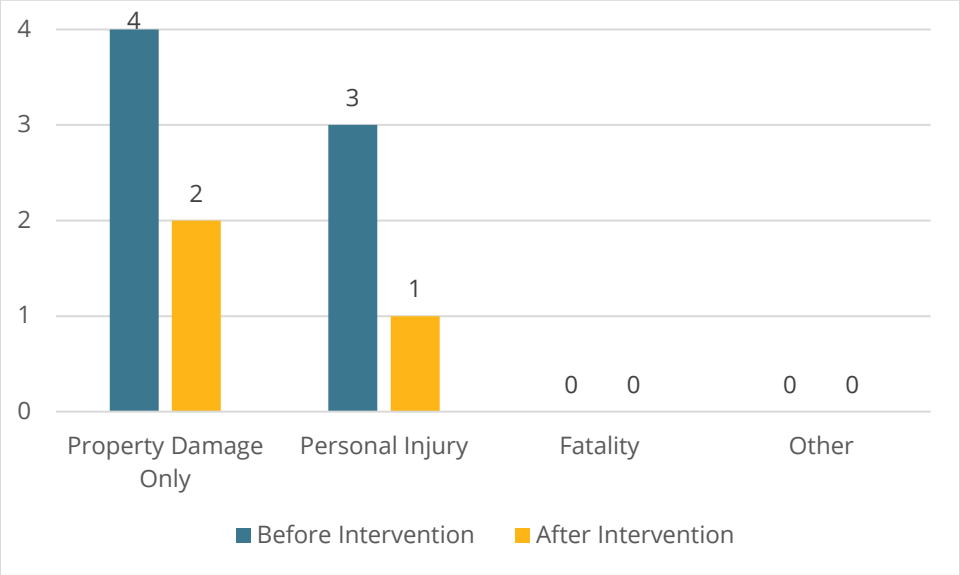


Figure 22: Crash Severity, Before Intervention & After Intervention – Segment of Route 6 between South Highland Road and South Hollow Road

Crash Rates

The crash rate for Route 6 between South Highland Road and South Hollow Road is measured as crashes/million entering vehicles, or c/mev. The average crash rates for the State and District for roadway federal functional classification are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

Table 24: Crash Rates – Segment of Route 6 between South Highland Road and South Hollow Road

Location	**Before-Intervention (c/mev)**	**After- Intervention (c/mev)**
Route 6 between South Highland Road and South Hollow Road	1.73	0.74
Principal Arterial - Other - Urban*	3.05	3.05
MA Statewide - Urban*	2.10	2.10

**Principal arterial and statewide crash rates are from MassDOT's website and were calculated in 2023*

As shown in Table 24, Route 6 between South Highland Road and South Hollow Road experienced a decrease in crashes in the after-intervention period which has also resulted in a reduction in the

crash rate as well. When compared to the MassDOT average crash rates for a principal arterial, this segment crash rate for Route 6 was below the average rates for both the before-intervention and the after-intervention.

Crash Severity Analysis

The number of crashes alone does not tell a complete story. For example, certain road changes can fail to decrease crash numbers or cause an increase in total crashes, while driving down the severity of those crashes. For this reason, it can be instructive to look at severity metrics, especially when crashes increase or stay the same. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric weighs severe crashes (fatal and injury crashes) more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 25: EPDO – Segment of Route 6 between South Highland Road and South Hollow Road

Location	EPDO Before-Intervention	EPDO After-Intervention
Route 6 between South Highland Road and South Hollow Road	67	23

In Table 28, Route 6 between South Highland Road and South Hollow Road had an EPDO score of 67 before intervention and 23 after intervention. There were over half as many crashes at this location (from 7 to 3) during the after-intervention period and of the crashes that did occur there were less severe.



Image 16: Route 6 (between South Highland Road and South Hollow Road) - Before Intervention



Image 17: Route 6 (between South Highland Road and South Hollow Road) - After Intervention

ROUTE 28 AT JONES ROAD AND WORCESTER COURT - FALMOUTH

Location and Background Information

The intersection of Route 28 at Jones Road and Worcester Court was previously analyzed in the Cape Cod Commission's *2022 Before and After Safety Study*. Based on the findings in the 2022 study, the intersection saw an increase in the number of crashes after-intervention. Since the 2022 report, additional time has passed to take another look at this intersection and evaluate whether crashes have continued to increase.

Project Description

The intersection of Route 28 at Jones Road/Worcester Court in Falmouth was already a signalized intersection prior to the TIP improvement project, however, this location experienced regular congestion and lacked adequate accommodation for pedestrians and bicyclists. The Town of Falmouth prioritized this location for improvement through funding in the 2013 Cape Cod TIP.

The proposed project involved extending the left turn lanes on all four approaches, installing a new modern traffic signal system complete with flashing yellow arrow technology for protected/permissive left turns, installation of sidewalks and a protected pedestrian crossing on all four approaches, reconstruction of the medians on the side streets and bicycle lanes. The project elements were aimed at reducing congestion while improving safety for all users.

Crash Analysis

Table 26: Crashes by Year – Route 28 at Jones Road and Worcester Court

Period	Year	Crashes
Before	2007	10
	2008	12
	2009	9
Before Total	**2007-2009**	**31**
Initial - After	2017	10
	2018	25
	2019	3
After Total	**2017-2019**	**38**
Subsequent - After	2022	13
	2023	10
	2024	6
After Total	**2022-2024**	**29**

As reported in the FDR, 31 crashes were reported at the Route 28 and Jones Road/Worcester Court intersection between 2007 and 2009. Construction on the intersection project ended in 2016. As previously included in the 2022 Before and After report, 38 crashes were reported in the initial after-intervention period of 2017-2019, representing an 18% increase from the before-intervention period.

As a follow up, staff conducted a second review of crash data for years 2022-2024. During this most recent crash analysis review, 29 crashes were reported representing a 6.45% decrease in crashes when compared to the before-intervention period.

As can be seen in Figure 19, angle crashes rose dramatically between before-intervention and initial after-intervention periods (from 8 to 15). Rear-end crashes saw a slight decrease between the before-intervention and initial after-intervention periods (from 17 to 12). Other crash types stayed broadly similar between the before-intervention and initial after-intervention periods.

When comparing the subsequent after-intervention data between 2022-2024, there has been a distinct change in the types of crashes observed at the intersection. Angle crashes have dropped by more than half (from 15 to 6), while the number of rear-end crashes has increased (from 12 to 15). The number of single vehicle crashes decreased slightly (from 3 to 1); and the number of observed head-on crashes has also increased (from 1 to 2). Overall, the change in crash types between the initial after-intervention period and the subsequent after-intervention period had the biggest change, with the 60% reduction in angle crashes occurring at the intersection.

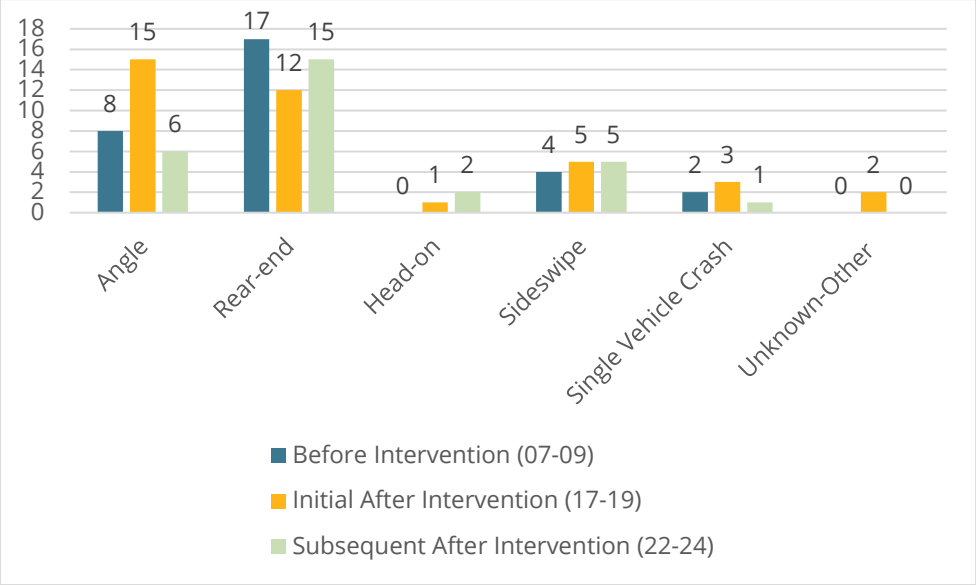


Figure 23: Crash Types, Before Intervention & After Intervention - Route 28 at Jones Road and Worcester Court

In Figure 20, the number of crashes that occurred across all periods were analyzed by severity. Property damage only crashes—which are associated with less intense crashes—increased from 22 to 31 between the before-intervention and initial after-intervention period but have since dropped back down to 23 in the subsequent after-intervention period. PDO crashes fell from 9 to 6 between the before-intervention and initial after-intervention period. Personal injury crashes remained at 6 for the subsequent after-intervention period. There were no fatal crashes during either period.

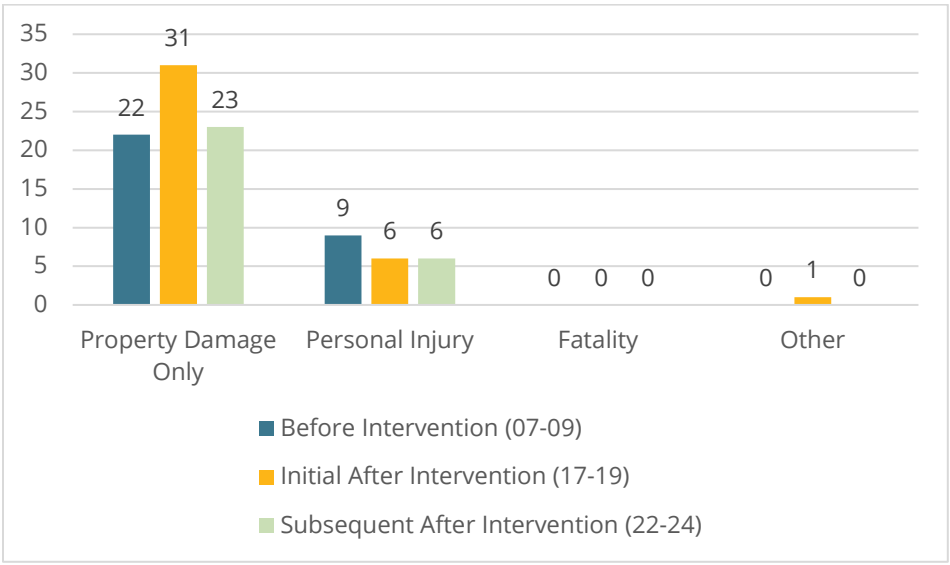


Figure 24: Crash Severity, Before Intervention & After Intervention - Route 28 at Jones Road and Worcester Court

Crash Rates

As shown in Table 18, the crash rates for Route 28 at Jones Road and Worcester Court are measured as crashes/million entering vehicles, or c/mev. The average crash rates for the Statewide and MassDOT District 5 for a signalized intersection are also provided for comparison. The crash rate worksheets for this intersection are provided in the appendix.

Table 27: Crash Rates - Route 28 at Jones and Worcester Court

Location	Before-Intervention (c/mev)**	Initial After-Intervention (c/mev)	Subsequent After-Intervention (c/mev)
Route 28 at Jones Road and Worcester Court	0.99	1.31	1.00
District 5 Average – Signalized*	0.77	0.75	0.75
MA Average – Signalized*	0.82	0.78	0.78

**District 5 and statewide crash rates are from MassDOT's website and were calculated in 2018*
***Crash rates for the before-intervention period were provided in the FDR*

The crash rate for the intersection of Route 28 at Jones Road and Worcester Court experienced an increase in the initial after-intervention period but has since decreased to pre-existing conditions within the subsequent after-intervention period. Across all periods the crash rate has been higher than the District and Statewide average crash rates.

Crash Severity Analysis

As previously stated, the number of crashes alone does not tell a complete story and is important to review severity metrics, especially at locations where crash rates or the number of crashes increase. An important metric is Equivalent Property Damage Only (EPDO). The EPDO metric weighs severe crashes (fatal and injury crashes) more heavily than crashes that result only in property damage. The specific equation is as follows:

EPDO = (Fatal Crashes + Injury Crashes) *21 + (Property Damage Only Crashes) *1

Table 28: EPDO - Route 28 at Jones Road and Worcester Court

Location	EPDO Before-Intervention	EPDO Initial After-Intervention	EPDO Subsequent After-Intervention
Route 28 at Jones Road and Worcester Court	211	158	149

As shown in Table 22, the EPDO score for the Route 28 at Jones Road and Worcester Court intersection was calculated to be 211 in the before-intervention period, 158 in the initial after-intervention period and is now 149 in the subsequent after-intervention period. These results reveal that overall safety has improved at the intersection with less severe crashes occurring.



Image 18: Route 28 at Jones Road and Worcester Court - Before Intervention



Image 19: Route 28 at Jones Road at Worcester Court - After Intervention

Conclusion

Data collection and analysis in this report suggest that safety and infrastructure improvements at these 12 locations have likely led to a decrease in the overall number of crashes. While it is difficult to draw strong conclusions on any single safety intervention, the evidence suggests that crashes generally declined. However, there were exceptions where crashes increased. The signalized intersection at Route 28 and Bearses Way saw a decrease in the number of crashes occurring at the intersection, but the crash rate was still found to be above the MassDOT State and District average rates and the EDPO score also increased. The signalized intersection of Route 28 and Strawberry Hill Road saw an increase in crashes of approximately 27% in the number of crashes observed between the before and after intervention period. Not only was there an increase in crashes at this location but the EDPO score also increased as the crashes that were occurring in the after-intervention period involved injuries and ranked more severe. It was discovered that there was a major sewer installation project on Phinney's Lane in Barnstable that might have affected traffic patterns and increased traffic volumes at the Route 28 and Strawberry Hill Road intersection. These two locations will require additional analysis to further monitor crash trends over a longer period after invention.

At locations that did see a significant decrease in crashes, there was also a strong correlation with a decrease in the severity of the crashes that did occur. The Adams Street conversion to a one-way roadway and the Route 28 at Osterville-West Barnstable Road improvement project are both good examples of this trend. The roundabout at Route 28 and George Ryder Road and Route 28 at Barn Hill Road also saw a decrease in the total number of crashes and a significant decrease in the number of crashes that resulted in an injury. Roundabouts, one-way roadways, and protective left turn signal phasing are all proven safety countermeasures and help to reduce the number of conflict points a vehicle can experience which in turn assists with reducing the likelihood of injury-related crashes.

Cape Cod MPO staff will continue to use the information gained in this report to inform future infrastructure safety improvements and will prioritize monitoring of the intersections that have seen an increase in crashes or injury related crashes after an improvement project.

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