

Memorandum

To: [REDACTED]
From: Casey C. Ross, *Transportation Planner*
CC: [REDACTED]
Date: [REDACTED] 2020
Re: Washington Avenue Crash Analysis – FHWA Email Response

Background

On October 22, 2020, the City of Philadelphia Office of Transportation, Infrastructure, and Sustainability (OTIS) was made aware of an email sent by [REDACTED] regarding the upcoming Washington Avenue Repaving and Improvement project.

The email was sent to [REDACTED], PennDOT District 6-0, and to [REDACTED], Federal Highway Administration. The email was forwarded to the OTIS Office of Complete Streets, which manages the Washington Avenue Repaving and Improvement Project for the City, by [REDACTED].

The Office of Complete Streets agreed to draft a point-by-point response to [REDACTED]'s email. I was asked to put together responses to any technical questions about crashes reported on Washington Avenue discussed as part of the project outreach process.

The following memo contains detailed answers to those questions.

Questions & Responses

- 1. Question: Is this crash record really atypical for a seven-year span (an average slightly less than three crashes per month), entailing a 2.4-mile major arterial with complex retail and commercial adjacent land uses?**

Using the PennDOT Homogenous Report for State Road Crashes in years 2013 to 2017, we can compare the crash rate per million vehicle miles on Washington Avenue to the crash rate per million vehicle miles on similar roadways throughout the Commonwealth. (The 2013 to 2017

report was chosen because it falls in the middle of the 2012 to 2018 date range used for Washington Avenue crash analysis).

Washington Avenue is classified as an “urban not full access controlled undivided” facility. The roadway width along Washington Avenue varies from 72'-00” to 78'-00”, and the ADT in 2017 as measured by the DVRPC was 23,162. Between 2013 and 2017, there were 186 crashes on Washington Avenue within the limits of the Repaving and Improvement Project. (Note that only crashes that occurred between 2013 and 2017 were used in these calculations in order to match the homogenous report.)

The crash rate per million-vehicle-miles traveled is calculated using the following equation:

$$\text{Rate} = \frac{(\text{crashes})(1,000,000)}{(\text{ADT})(365 \text{ days})(5 \text{ years})(\text{segment length in miles})}$$

The rate derived from this equation can be compared to the rate provided for statewide “urban not full access controlled undivided” facilities in the PennDOT Homogenous report.

The calculations for Washington Avenue are as follow:

$$\text{Rate} = \frac{(186)(1000000)}{(23162)(365)(5)(1.911)} = \frac{186,000,000}{8,077,223.70} = 2.30$$

The rate of reportable crashes per MVM within the Washington Avenue project limits for the years 2013-2017 is 2.30, compared to the statewide crash rate per MVM of 2.35 for comparable roadways provided in the 2013-2017 PennDOT Homogenous Report. As such, Washington Avenue is close to typical for roadways with comparable widths and ADTs across the commonwealth.

A critical factor to consider that is not fully represented in the rate is Washington Avenue’s urban context. Washington Avenue runs through a dense urban core and – as noted in the original question - serves complex land uses and roadway users across multiple travel modes. In this respect, Washington Avenue is vastly dissimilar to, say, a road with identical ADT of similar geometry in a rural part of Lancaster County. But that hypothetical rural roadway is part of the set compared to Washington Avenue using the Homogenous report because crash rate calculations don’t account for factors such as land use or diversity of mode share.

The City of Philadelphia’s focus isn’t merely whether Washington Avenue’s crash history is atypical for a 2.4-mile major arterial with complex retail and commercial adjacent land uses. Our concern is also that the crashes on Washington Avenue impact vulnerable roadway users (people walking, especially) disproportionately when compared to the Philadelphia citywide average.

2. Question: How many of the 250 crashes entailed serious injuries?

PennDOT changed crash injury classifications from Killed, Major, Moderate, and Minor, to Fatal Injury, Suspected Serious Injury, Suspected Minor Injury, and Possible Injury respectively. These new classifications are defined as follows:

- *Fatal Injury (formerly "Killed")*: The person dies as a result of injuries sustained in the crash within 30 days of the crash.
- *Suspected Serious Injury (formerly "Major Injury")*: Incapacitating injury, including bleeding wounds and distorted members (amputations or broken bones), and requires transport of the patient from the scene.
- *Suspected Minor Injury (formerly "Moderate Injury")*: Non-incapacitating injury, including bruises, abrasions, swelling, and limping. This is an injury that may require some form of medical treatment or hospitalization.
- *Possible Injury (formerly "Minor Injury")*: Possible injury, although there may be no visible injuries, and the patient complains of pain. This is an injury that can be treated by basic first aid application whether at the scene or in medical facilities.

In answering this question, I looked at Fatal Injuries and Suspected Serious injuries as a new definition of KSI.

A total of 11 crashes (4.34% of all crashes) on Washington Avenue between Grays Ferry Avenue and 4th Street in the time frame specified (2012 – 2018) resulted in at least 1 fatality or at least 1 suspected serious injury. In all, 8 individuals suffered a suspected serious injury, and 4 individuals suffered a fatal injury.

3. Question: Where did the fatal crashes occur?

- Washington Avenue & Broad Street
- Washington Avenue & S 8th Street
- Washington Avenue & S 15th Street
- Washington Avenue & S 24th Street

4. Question: If any [of the fatal crashes] were at the busy intersections with Grays Ferry Avenue, Broad Street, or Columbus Boulevard (beyond the project scope), maybe the causes lie with those streets, not Washington Avenue.

Three (3) of the four (4) fatal crashes on Washington Avenue occurred at minor intersections (S 8th Street, S 15th Street, and S 24th Street).

The fatal crash that occurred at Washington Avenue and Broad Street, the only fatal crash at a major intersection, involved a westbound vehicle on Washington Avenue hitting a southbound vehicle on Broad Street before crashing into a utility pole. There are no details in the crash resume of crash data indicating any contributing factors on the part of the vehicle traveling on

Broad Street. The vehicle that caused the crash, as determined by the officer on the scene and reported in the PennDOT data, was the vehicle traveling along Washington Avenue.

5. Question: Were the four fatalities spread among four separate crashes?

Yes, there were four (4) different crashes involving four (4) different fatalities.

6. Question: How were the fatalities and serious injuries arrayed among vehicle drivers/occupants, pedestrians, transit riders and bicyclists?

Three (3) of the fatalities were pedestrians and one (1) was a vehicle occupant.

7. Question: How prevalent was substance abuse in the crashes?

Nine (9) crashes (3.55% of all crashes) involved at least one (1) driver who was impaired by drugs or alcohol. One (1) of the four (4) fatal crashes involved a driver who was impaired by drugs or alcohol.

8. Question: How many [crashes] occurred after dark?

78 crashes (30.8%) occurred after dark. Of those crashes, one (1) resulted in a pedestrian fatality, one (1) resulted in a vehicle occupant fatality, and one (1) resulted in a pedestrian suspected serious injury.

9. Question: How many [crashes] occurred in inclement weather?

33 crashes (13%) occurred during inclement weather conditions. Of those 33 crashes, 28 were flagged for "Rain," three (3) were flagged for "Snow," one (1) was flagged for "fog, smog, smoke," and one (1) was flagged as "other."

Crashes that occurred in inclement weather resulted in zero (0) fatalities, one (1) suspected serious injury, six (6) suspected minor injuries, and 24 possible injuries. 13 of these crashes (39%) involved at least one (1) person walking or one (1) person on a bicycle.

10. Question: How many entailed ER vehicles?

By definition, all reportable crashes result in at least one emergency vehicle coming to the scene, be it a police car, fire truck, ambulance, tow truck, or a combination of emergency vehicles. That's what makes a reportable crash reportable. All 253 crashes therefore resulted in the involvement of an emergency response vehicle. Of the 654 individual people involved in the 253 crashes on Washington Avenue, 208 (32% of people) were transported to a medical facility.

It's important to look at who those people were to better understand the ways in which these crashes impact people other than those in the causal vehicle. 65 of the people transported to a

medical facility (31%) were not the person identified as having caused the crash, and 49 of them (24%) were in other vehicles or were pedestrians. The youngest person transported to a medical facility was 1 year old, and the oldest person was 88 years old.

11. Question: Do any of the police reports for these 250 crashes suggest that the proposed project scope would significantly help to prevent similar crashes in the future, such as those involving violations of red lights, stops signs and direction of travel regulations, illegal or careless execution of turning movements, jaywalking, and unsafe behavior by children, the elderly and those in an impaired state?

Vision Zero recognizes that humans will make mistakes, including while using our streets. That means not every crash can be prevented, but it is possible to eliminate serious injuries and the loss of life. Instead of focusing on preventing all crashes, Vision Zero focuses on reducing the severity of crashes, and on saving lives. If we design our streets for the safety of those most vulnerable on our streets — people walking and people biking — we can improve safety for everyone living, working, and traveling on them.

Six (6) crashes were related to speeding, which will be addressed through traffic calming as part of the repaving and improvement project. 105 crashes were related to aggressive driving, which will also be addressed through traffic calming and lane reductions (to limit space for sudden lane changes and erratic passing) as part of the repaving and improvement project. Finally, 22 crashes were related to running red lights, which we hope will become less prevalent as signal optimization and timing changes along the corridor make traffic flow more consistent.

50 people involved in crashes on Washington Avenue were under the age of 18. Two (2) of those children were walking in a marked crosswalk when they were struck by vehicles. Another two (2) were greater than 10 feet off road and one (1) of them, an 11-year-old, was killed. Reducing instances of aggressive driving and red-light running will help prevent these kinds of crashes, and at the very least can reduce their severity by slowing the speeds at which they happen.

105 people involved in crashes on Washington Avenue were senior citizens over the age of 65. Ten (10) of those seniors were walking when they were hit by vehicles, nine (9) of them in marked crosswalks at an intersection when the crash occurred. One (1) of these seniors was killed, and the other nine (9) suffered injuries of various severity. Reducing crossing distances along Washington Avenue will help prevent these kinds of crashes by giving seniors and others with mobility issues less distance to cross during the pedestrian cycle.

Conclusions

In his e-mail, [REDACTED] stated that “Improved traffic signal progressions, timed at about 20 mph, and selected intersection refinements probably can accomplish more to calm - and also expedite - traffic flow, and enhance safety for all who use Washington Avenue.” We agree that improved traffic signal progression and timing, combined with targeted intersection improvements can do a lot to calm traffic and improve trip consistency. These elements are included in this project.

In addition, further changing the form and function of the corridor in ways that go beyond spot improvements, is one of the most effective ways to prevent crashes that kill and seriously injury people. This project aims to promote safe operating behaviors and address one of the major causes of crashes along Washington Avenue: Aggressive Driving.

PennDOT and NHTSA define aggressive driving as a vehicle operator committing “a combination of moving offences to endanger other persons or property.” Examples of aggressive driving behaviors include (but are not limited to) speeding, tailgating slower vehicles, racing to beat red lights, running stop signs, weaving in and out of traffic, passing illegally on the right, and failing to yield the right of way to oncoming vehicles.

In a 2019 traffic study completed as part of the analysis for this project, the City identified the top ten (10) crash locations along the project corridor using 2013-2017 PennDOT crash data. A total of 91 crashes occurred at these ten (10) locations. Of these 91 crashes, 47% were attributed to some form of aggressive driving. These dangerous behaviors cannot be addressed solely through measures like signal progression and selected intersection refinements. Comprehensive changes must be made to Washington Avenue to modify the pervasive culture of aggressive driving born out in the crash statistics for the study area.

[REDACTED] stated that reports of 250 crashes within the project extents between 2012 and 2018 was a “broad brush statement.” It is my hope that this detailed information will serve to provide some nuance to the high-level data presented to the public and the press throughout the project outreach process.

While Washington Avenue has a typical crash rate when compared to the statewide average for similar roadways and the number of fatal crashes on the corridor is comparatively low, crashes involving vulnerable road users (people walking and people riding bicycles) is distressingly higher than the Citywide average for Philadelphia. Protecting vulnerable roadway users is one of the mandates of the City's Vision Zero policy, and for that reason Washington Avenue has been identified as a priority corridor for improvements that fundamentally benefit those users.