

Pedestrian Safety Action Plan

City of Pittsburgh
2020



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Message from the Director



Dear Friends,

After a collaborative effort between local stakeholders, the Federal Highway Administration, and the Department of Mobility and Infrastructure, I am pleased to share this Pedestrian Safety Action Plan for your review.

Pittsburghers are pedestrians – they come from all backgrounds, races, ethnicities, abilities, and ages. We’ve been pedestrians since the city’s founding 250 years ago. Our city is designed for walking with the many pedestrian paths, sidewalks, and connections between neighborhoods. Eleven percent of workers in our city commute on foot – among the highest in the nation.



While Pittsburghers enjoy walking, it is not without risk. A review of the last five years of crash data reveals that pedestrian fatalities are overrepresented in the total roadway fatalities in our city.

That’s why we’ve designed this Plan – to provide safe, affordable, equitable, and enjoyable travel options in our city for people from all backgrounds, ages, and abilities. This Plan is a roadmap that provides a holistic approach for implementation of strategies and actions to improve safety and access for people walking in the city.

I’m looking forward to hearing from you as we implement this Plan. I welcome your feedback on these strategies and actions to improve safety, increase access, lower transportation costs, and most importantly, create easy and enjoyable trips for non-vehicle travel. I also look forward to our continued collaboration over the next decade as we work to improve an important component of our diverse transportation network.

Thank you to everyone who invested their time and energy contributing to this Plan. I look forward to working alongside you to make our city even safer.

Sincerely,

Karina Ricks, Director
Department of Mobility and Infrastructure



Source: Elissa Goughnour, VHB



Contents

Acknowledgments iii

Message from the Director iv

Acronyms..... viii

Definitions..... viii

Executive Summary 1

Chapter 1: Introduction and Vision..... 7

Chapter 2: Crash Analysis & Project Prioritization 15

Chapter 3: Strategies and Actions 25

Chapter 4: Performance Monitoring and Evaluation..... 33

Appendix A: Maps..... 37

Appendix B: Hot Spot Crash Diagrams..... 45

Appendix C: Pedestrian Safety Treatments..... 83

Acronyms

- ADA** – Americans with Disabilities Act
- DOMI** – Pittsburgh’s Department of Mobility and Infrastructure
- FHWA** – Federal Highway Administration
- HUD** – U.S. Department of Housing and Urban Development
- LPI** – Leading Pedestrian Interval
- NHTSA** – National Highway and Traffic Safety Administration
- PAAC** – Port Authority of Allegheny County
- PBP** – Pittsburgh Bureau of Police
- PEDSAFE** – Pedestrian Safety Guide and Countermeasure Selection System
- PLI** – Department of Permits, Licenses, and Inspections
- PPS** – Pittsburgh Public Schools
- PennDOT** – Pennsylvania Department of Transportation
- RSA** – Road Safety Audit
- SPC** – Southwestern Planning Commission
- TDM** – Travel Demand Management

1 Pennsylvania General Assembly Title 75, Section 102: <https://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&title=75&div=0&chpt=1&sctn=2&subsctn=0>

Definitions

For the purposes of this document, the following definitions will be used. Unless otherwise noted, the source of the definitions is Section 102 of Title 75, Pennsylvania’s Consolidated Statutes (Vehicle Code).¹

Crash - A crash is a sequence of events that result in an un-stabilized situation which includes at least one incident of personal injury or vehicular damage that is not a direct result of a cataclysm or deliberate intent. (See also, “reportable crash” and “non-reportable crash”)

Crosswalk - (1) That part of a roadway at an intersection included within the connections of the lateral lines of the sidewalks on opposite sides of the highway, measured from the curbs or, in the absence of curbs, from the edges of the traversable roadway; and, in the absence of a sidewalk on one side of the roadway, that part of a roadway included within the extension of the lateral lines of the existing sidewalk. (2) Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface.

Electric personal assistive mobility device or EPAMD – A self-balancing, two-nontandem-wheeled device designed to transport only one person with an electric propulsion system.

Motor vehicle – A vehicle which is self-propelled except an electric personal assistive mobility device or a vehicle which is propelled solely by human power.

Non-Reportable Crash - A crash with no injury or death of any person, in which there is no towing due to the damage to the vehicle at the time of the crash. Furthermore, if the incident occurred on private property or was a result of deliberate intent or cataclysm. (See also, “Crash” and “Reportable Crash.”)

Park or parking - (1) When permitted, means the temporary storing of a vehicle, whether occupied or not, off the roadway. (2) When prohibited, means the halting of a vehicle, whether occupied or not, except momentarily for the purpose of and while engaged in loading or unloading property or passengers.

Pedestrian - Any person who is afoot or who is using a wheelchair, a power wheelchair, or a means of conveyance propelled by human power other than a pedalcycle. (Note: this definition is not reflective on Pennsylvania Code §102, but rather, has been developed for the purposes of this document.)

Pedalcycle - A vehicle propelled solely by human-powered pedals or a pedalcycle with electric assist. The term does not mean a three-wheeled human-powered pedal-driven vehicle with a main driving wheel 20 inches in diameter or under and primarily designed for children six years of age or younger.

Reportable Crash – A crash that occurred on a highway or trafficway that is open to the public by right or custom and involves at least one motor vehicle in transport. This can be if control is lost on the roadway or if any of the harmful events occur on the roadway. It must involve: (1) injury to or death of any person; and/or (2) damage to any vehicle to the extent that it cannot be driven under its own power in its customary manner without further damage or hazard to the vehicle, other traffic elements, or the roadway, and therefore requires towing. (See also, “Crash” and “Non-Reportable Crash.”)

Right(s)-of-way – (1) The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian approaching under such circumstances of direction, speed and proximity as to give rise to danger or collision unless one grants precedence to the other. (2) The surface and space above and below any real property in which the City has an interest in law or equity, including, but not limited to any public street, boulevard, road, highway, freeway, lane, alley, court, sidewalk, parkway, swale, river, tunnel, viaduct, bridge, park, or any other place, area, or real property, other than real property owned in fee by the City.²






2 Title 4, Article 1, Chapter 411 (Public Rights-of-Way Jurisdiction) of the City of Pittsburgh, Pennsylvania Code of Ordinances.

3 Federal Highway Administration. Road Safety Audits: <https://safety.fhwa.dot.gov/rsa/>.

4 Pedestrian and Bicycle Information Center. Audit Tools: http://www.pedbikeinfo.org/resources/resources_details.cfm?id=5085.

Executive Summary

Pittsburghers walk. Since the founding of the City, a compact street network downtown has set the stage for a culture of walking that persists today. Census data⁵ indicate that about eleven percent of workers commute on foot - among the highest pedestrian commute rates in the country. The goal of the Pedestrian Safety Action Plan is to identify policy and infrastructure improvements that support the City’s mobility goals:

-  **Goal 1:** No one dies or is seriously injured traveling on city streets (streets and intersections are intuitive to use, even by an adolescent child).
-  **Goal 2:** Every resident can access fresh fruits and vegetables within 20 minutes travel of home (without requiring a private vehicle).
-  **Goal 3:** All trips less than 1 mile are easy and enjoyable to achieve by non-vehicle travel.
-  **Goal 4:** No household must spend more than 45% of income on housing + transportation + energy (for any income quintile).
-  **Goal 5:** Our streets reflect the values and pride of our city.

⁵ U.S. Census Bureau - Bicycling and Walking to Work in the United States: 2008–2012: <https://www2.census.gov/library/publications/2014/acs/acs-25.pdf>

This Plan was developed through a collaborative effort by the Pittsburgh Department of Mobility and Infrastructure (DOMI), the Federal Highway Administration (FHWA), and a core group of local stakeholders. Based on a detailed analysis of local crash data, it identifies a) critical pedestrian safety issues, b) locations with a higher risk for pedestrian crashes, c) specific actions that DOMI will undertake, and d) metrics for monitoring performance over time.

Key Crash Trends



The majority of pedestrian crashes in Pittsburgh from 2013-2017 occurred: on **weekdays** between **2 PM and 6 PM**, during **fall** and **winter** months, and at or near an **intersection**.



Most pedestrian crashes occurred on local roads, but **crashes were more severe on State-maintained roads**.



Crashes that occurred on **higher speed roads** with **three to four lanes** were more likely to result in severe injury.



Nearly 90% of all crashes occurred within 500 feet of a transit stop (both bus and light rail), and nearly 85% of all transit stops in the City had at least one pedestrian crash occur within 500 feet of the stop. For context, roughly 57% of the roadway mileage within City limits is located within 500-feet of a transit stop.



Though the largest portion of pedestrian crashes occurred during daylight hours (66%), half of all fatal and **severe injury crashes** occurred during **dark conditions (50%)**.



While the majority of pedestrian injuries involved a pedestrian under the age of 40 (57%), **more than half of all fatal and severe pedestrian injuries involved a pedestrian 40 or older (57%)**.

Hot Spot and Risk-Based Analysis

To determine where to focus their efforts, DOMI identified high-risk locations using the following factors:

- Historic crash data
- Neighborhood connectivity
- Access to transit
- Lack of pedestrian infrastructure
- Equity concerns (based on cost of living, age, race, ethnicity, access to a vehicle, and other individual and household characteristics, reported in Census data)

This process led to the identification of ten “Hot Spot” locations where crashes have been concentrated (based on historical crash data), as well as roughly 100 additional corridors that may be more likely to experience crashes in the future (see map on page 20). DOMI will conduct pedestrian-focused Road Safety Audits (RSAs) on these corridors to identify and prioritize specific treatments for implementation.

Hot Spot Locations Selected for Further Review

1. Liberty Avenue
2. 6th Avenue
3. Penn Avenue
4. Grant Street
5. 5th Avenue
6. E Ohio Street
7. Forbes Avenue
8. Centre Avenue
9. Liberty Avenue – East
10. E Carson Street

Strategies and Actions

This Plan presents 10 priority strategies and actions related to engineering, data, policy, engagement, encouragement, accessibility, health, enforcement, and education:

- 1) Conduct pedestrian-focused RSAs and walkability audits.
- 2) Formalize and implement the City’s signal policy.
- 3) Improve pedestrian scale lighting at key crossings and intersections and on high-priority corridors.
- 4) Address sidewalk gaps and improve the continuity of the pedestrian network.
- 5) Educate and engage with neighborhood and community groups on issues of pedestrian safety and protecting pedestrian access to the right of way.
- 6) Build cross-departmental understanding and cooperation around pedestrian crashes.
- 7) Enforce existing laws so that everyone feels comfortable navigating the transportation network.
- 8) Design pedestrian facilities that are safe and easy to use for people of all ages, abilities, and backgrounds.
- 9) Work with stakeholders to enable seamless connections between travel modes.
- 10) Implement pedestrian programs and policies that improve pedestrian safety, as well as air quality and/or public health.

At least annually, DOMI will measure and report progress toward both implementation of the Plan and measures of effectiveness. Progress will be reported via a report to the Office of the Mayor and shared with City Council and stakeholders and will use metrics such as:

- Pedestrian crashes per year
- Annual pedestrian crash rate
- Number of pedestrian commuters per month
- Number of RSAs and walkability audits conducted per year



Source: Elissa Goughnour, VHB



Source: Elissa Goughnour, VHB



Source: Elissa Goughnour, VHB

Introduction and Vision



CHAPTER 1

Introduction and Vision

Founded over 250 years ago, Pittsburgh was originally designed to be navigated on foot with sidewalks, pedestrian paths, and public steps connecting neighborhoods. Many neighborhoods are within walking distance of main street business districts with varied and often historic buildings providing interest along the route. Pittsburgh’s history as a walking city influences the way people get around today. Pittsburgh has one of the highest rates of commuting on foot in the country and is one of the least-dependent on cars for commuting.^{6,7}

Being a pedestrian in Pittsburgh is not without risk, however. Based on the last five years of crash data, pedestrian fatalities are overrepresented as a proportion of total roadway fatalities. Children and seniors tend to be disproportionately affected.⁸ Furthermore, pedestrian infrastructure is distributed unequally and data shows that people from lower-income neighborhoods are disproportionately represented among traffic fatalities. Across Pittsburgh, census tracts (defined as areas of roughly 4,000 residents) that had rates of poverty greater than 25% saw nearly twice the rate of pedestrian crashes (fatalities per 100,000 persons) compared to tracts with a poverty rate below 15%.⁹

6 U.S. Census Bureau - Bicycling and Walking to Work in the United States: 2008–2012: <https://www2.census.gov/library/publications/2014/acs/acs-25.pdf>

7 BikePGH - 2016 Census Numbers: Pittsburgh Bucks National Trend, Sees Large Increase in Bike Commuters: <https://www.bikepgh.org/2017/09/15/2016-census-numbers-pittsburgh-bucks-national-trend-sees-large-increase-bike-commuters/>

8 PennDOT Crash Data 20112015 for the City of Pittsburgh

9 “Pedestrian Deaths in Poorer Neighborhoods.” Governing, A Governing Research Report, 5 Aug 2014. <https://www.governing.com/gov-data/pedestrian-deaths-per-capita-by-poverty-rates-for-metro-areas.html>






Department of Mobility and Infrastructure’s (DOMI) Vision:

Provide the people of Pittsburgh the physical mobility necessary to achieve equitable economic mobility and a sustainable, inclusive, and vibrant city.






Pedestrian Safety Action Plan Vision Statement:

This Plan will outline clear steps toward making walking safer and more attractive in Pittsburgh, ultimately encouraging more people to choose to walk for most short trips.

DOMI’s Goals

-  **Goal 1:** No one dies or is seriously injured traveling on city streets (streets and intersections are intuitive to use, even by an adolescent child).
-  **Goal 2:** Every resident can access fresh fruits and vegetables within 20 minutes travel of home (without requiring a private vehicle).
-  **Goal 3:** All trips less than 1 mile are easy and enjoyable to achieve by non-vehicle travel.
-  **Goal 4:** No household must spend more than 45% of income on housing + transportation + energy (for any income quintile).
-  **Goal 5:** Our streets reflect the values and pride of our city.

To achieve DOMI’s goals, this Plan must define actionable steps toward a future where:

-  **Step 1:** People are safe walking day or night an in all neighborhoods.
-  **Step 2:** Pittsburgh has a pedestrian network that is accessible and intuitive for everyone.
-  **Step 3:** Kids can safely walk around Pittsburgh.
-  **Step 4:** Pittsburgh pedestrian network is connected to other modes.
-  **Step 5:** Walking supports community mental and physical health, well-being, and connections.

This Pedestrian Safety Action Plan was informed by a workshop and analysis led by the Federal Highway Administration (FHWA) and collaboration with the Complete Streets Advisory Committee.¹⁰ The Plan identifies pedestrian-related trends and measures to improve pedestrian safety, including a network of streets for future pedestrian investments. It documents the City's pedestrian crash trends and risks; identifies specific "Hot Spots" and corridors for further study; and outlines specific goals and measurable actions. Findings from the analysis completed as part of this Plan will be used to inform future policy and infrastructure investments.

Through the Plan, DOMI aims to identify the cause of disparities in the pedestrian network and develop solutions for a future where people in all Pittsburgh neighborhoods can walk safely, regardless of their age, gender, race, ability, or income. At the end of the day, the City's goal is to create a safe, efficient transportation system and improve the health and well-being of all our neighbors and neighborhoods. For city leaders, a connected and accessible pedestrian network is a non-negotiable component of the overall transportation network.

The City of Pittsburgh is committed to making walking a safe and enjoyable experience for all.



Context

The City of Pittsburgh takes pedestrian safety very seriously. A Complete Streets policy¹¹ was passed in 2016 to reflect the growing need for planning and design to create streets and public spaces that are safe and comfortable for all people to use.

This policy also encourages greater connectivity within the transportation network. An accessible pedestrian network is fundamental to a vibrant and economically thriving city, allowing people of varying abilities to access shops and restaurants, socialize with friends, exercise, and get to work or school safely, affordably, and conveniently. Walkable communities present a range of economic, social, and health benefits compared with less walkable areas.¹²

As part of implementing the Complete Streets policy, Pittsburgh is shifting toward a Pedestrian First approach. This means that all transportation projects and programs, from scoping to maintenance, will consider the needs of pedestrians first, as well as supporting the safety and efficiency of streets for all roadway users.

An important piece of this shift is changing the definition of a pedestrian to be more inclusive. Pennsylvania Code §102 defines a pedestrian as "a natural person afoot."¹³ For the actions contained within this document, this definition has been broadened to include any person who is afoot or who is using a wheelchair, a power wheelchair, or a means of conveyance propelled by human power other than a pedalcycle. While the City's Bike(+) Plan includes several non-motorized transportation options that might fit this definition as well (like scooters), these human-powered conveyances are recorded as "pedestrians" in crash data and are allowable uses within pedestrian spaces. Therefore, these modes are considered in both Plans.

¹⁰ The Complete Streets Advisory Committee is led by the City of Pittsburgh and comprised of volunteers to help advance complete streets implementation throughout the City.

¹¹ Pittsburgh Complete Streets Policy: <https://pittsburgh.legistar.com/LegislationDetail.aspx?ID=2876655&GUID=58D1D58A-BAA3-4C2A-B9A1-E040B0F-44D64&Options=ID%7CText%7C&Search=complete&FullText=1>

¹² Victoria Transport Policy Institute - Economic Value of Walkability: <https://www.vtpi.org/walkability.pdf>

¹³ Pennsylvania General Assembly Title 75, Code 102: <https://www.legis.state.pa.us/cfdocs/legis/LI/consCheck.cfm?txtType=HTM&title=75&div=0&chpt=1&sctn=2&subsctn=0>



Source: Elissa Goughnour, VHB



A pedestrian is any person who is afoot or who is using a wheelchair, a power wheelchair, or a means of conveyance propelled by human power other than a pedalcycle.

DOMI is responsible for:

2,423

lane-miles of roadway

50+

miles of bike lanes

37

miles of multi-use trails

150

bridges

611

traffic signals

65

flashing school zone assemblies

4

Rectangular Rapid Flashing Beacons

10

flashing warning signs

500

retaining walls

1,300+

miles of sidewalks

800+

sets of public steps

Challenges and Considerations

The creation of DOMI and the commitment to pedestrian safety have placed the City in a better position than ever to build out a complete, accessible pedestrian network. The following considerations are integral to the department's success with this goal.

Topography and Accessibility

Pittsburgh is a city of hills, which presents challenges for providing safe and accessible paths for everyone. A robust system of public steps has been built over decades to address the topographic challenges in many neighborhoods, but the reality is that the network simply is not accessible to many pedestrians. In some cases, infrastructure can be retrofitted to meet current accessibility standards, or accommodations can be made to provide an alternative. We recognize these accommodations cannot always be made—we cannot dramatically change the landscape our City was built upon—but the City is dedicated to promoting retrofits or other accommodations where feasible.

Inspection and Maintenance

Inspection and maintenance are fundamental to a safe, functional transportation system. Proper inspection to verify that facilities are built as designed and regular maintenance will ensure that the transportation network is functioning as intended. In Pittsburgh, sidewalk maintenance is the responsibility of the adjacent property owner under Municipal Code § 417.02.¹⁴ The cost for maintenance can be too high for some property owners and in the case of abandoned or vacant properties, enforcing the repair can be close to impossible.

The Department of Permits, Licenses, and Inspections (PLI) inspectors are responsible for citing property owners, but the current process for reviewing and identifying failing sidewalks does not adequately address the scale of network gaps. The result is an uneven and incomplete sidewalk network that can be particularly challenging for individuals with disabilities to navigate.

A revised process for reviewing and identifying those locations is necessary to ensure a high-quality network of sidewalks.

Cost Burden for Low-Income Residents

Transportation can be a major cost for some Pittsburgh households. The U.S. Department of Housing and Urban Development (HUD) notes that housing and transportation can account for around half of a typical, middle income household's budget; however, these necessary, life-sustaining costs may account for a much higher proportion of a low-income household's budget. Providing safe infrastructure and opportunity for pedestrian travel is a key consideration for the success of this Plan.

Emerging Mobility

New technologies are changing the way people get around Pittsburgh. DOMI is actively planning for various types of emerging mobility, electric scooters, e-bikes as part of the Healthy Rides bike share, and connected and autonomous vehicles, among others. These new mobility options will provide opportunities for additional modal choice but will require thoughtful consideration on policies and designs that maintain access and safety for all roadway users. In early 2020, DOMI published the Bikes(+) Plan, a master plan that articulates actionable strategies to improve safety and connectivity for people using bicycles, scooters, and similar light, personal mobility devices.



“Transportation in Pittsburgh has so much potential to be multi-modal. Our street network is narrow; cars, bikes, buses and pedestrians are used to sharing space. Our city is dense; therefore, most trips are short and easily navigable by many modes. As Pittsburgh's population grows, so will the amount of people using our streets. Policies and initiatives like this one will ensure that it grows in a safe and sustainable way, giving mobility options for everyone regardless of how they choose to move.”

- City of Pittsburgh DOMI, Complete Streets

¹⁴ Pennsylvania General Assembly Title 75, Code 417.02: https://library.municode.com/pa/pittsburgh/codes/code_of_ordinances?nodeId=COOR_TIT-FOURPUPLPR_ARTIPURI-W_CH417PAPR_S417.02SICUMA

Crash Analysis & Project Prioritization



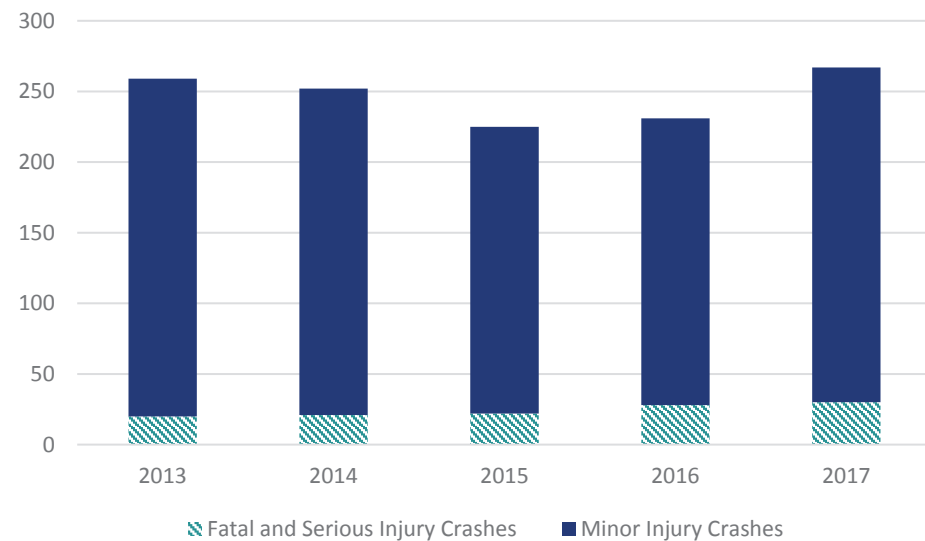
Chapter 2

Crash Analysis & Project Prioritization

Pedestrian safety is a growing concern nationally as well as in Pittsburgh. According to the National Highway Traffic Safety Administration (NHTSA), pedestrian fatalities in the United States increased 53% in the decade between 2009 and 2018. In 2018, 39% of all counties in the U.S. experienced at least one pedestrian fatality. Allegheny County is one of the over 600 counties (~20%) that observed more than one pedestrian fatality each year between 2014 and 2018.¹⁵

In 2016, BikePGH's Report on Pedestrian & Bicycling Safety in Pittsburgh noted that 1,284 pedestrian crashes, including 19 fatal crashes, occurred between 2011 and 2015. These numbers remained relatively consistent during the five-year period between 2013 and 2017, with 1,234 pedestrian crashes occurring in the City (Figure 1). Nearly 10% of those, or 121 crashes, resulted in a pedestrian fatality or severe injury.¹⁶

Figure 1: Pedestrian Crashes by Year, City of Pittsburgh



Pedestrians accounted for nearly 30% of traffic fatalities in Pittsburgh between 2013 and 2017, despite only being involved in 6% of total crashes.

¹⁵ NHTSA, Geographic Summary of Pedestrian Traffic Fatalities. Available: <https://crashstats.nhtsa.dot.gov/Api/Public/ViewPublication/812822>

¹⁶ PennDOT Crash Data 2011-2015 for the City of Pittsburgh.

This section provides an analysis of recent pedestrian crash history (2013-2017)¹⁷ using data provided by the Pennsylvania Department of Transportation (PennDOT). It is important to note that this analysis summarizes factors that are related to pedestrian crashes but does *not* indicate causation. However, several factors identified in this analysis reflect known significant factors based on existing literature, including dark lighting conditions, pedestrian age, and vehicle speed.

Pedestrian fatalities make up a much larger proportion of fatalities relative to other modes. Pedestrians accounted for nearly 30% of fatal crashes in Pittsburgh between 2013 and 2017, despite only being involved in 6% of total crashes.

Who

Crashes involving the following parties were more likely to result in severe injuries and fatalities:

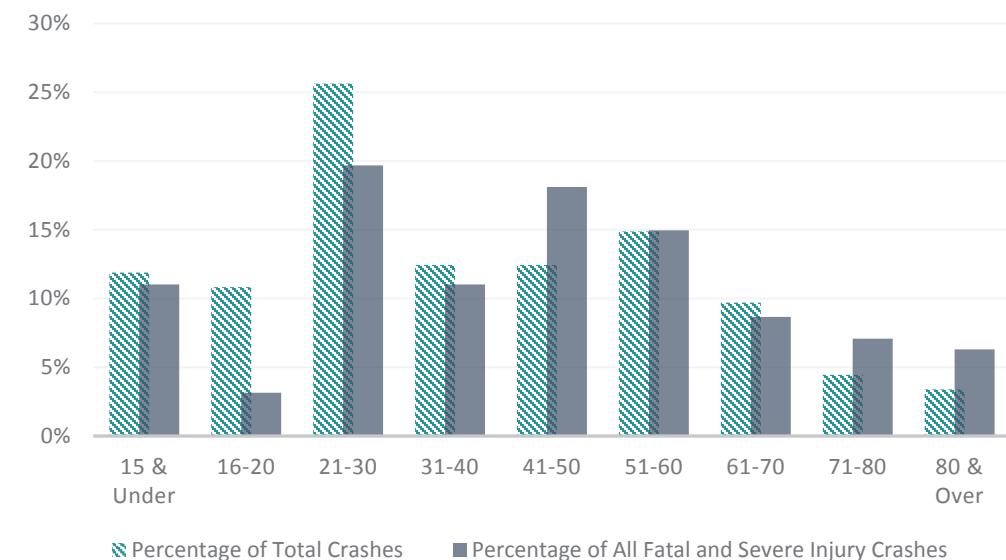
Men. Slightly more female pedestrians were involved in a crash between 2013 and 2017 (51%), but the majority of fatal and severe injury crashes involved males (62%).

Commercial vehicles. Commercial vehicles were involved in 5% of total pedestrian crashes but 14% of crashes involving fatal and severe injuries.

A drunk or drugged driver. Crashes involving a drunk or drugged driver represent 3% of all pedestrian-involved crashes but 10% of fatal and severe crashes.

People older than 40: While the majority of pedestrian injuries involved a pedestrian under the age of 40 (57%), more than half of all fatal and severe pedestrian injuries involved a pedestrian older than 40 (57%). Persons 40 and older only comprise 40% of the City's residents (Figure 2).

Figure 2: Pedestrian Crash Severity by Pedestrian Age



When

Crashes at the following times were more likely to result in severe injuries and fatalities:

Weekdays. More severe and fatal crashes occurred on weekdays (on average, 15.9% of all crashes per day) than on weekends (on average, 10.2% of all crashes per day).

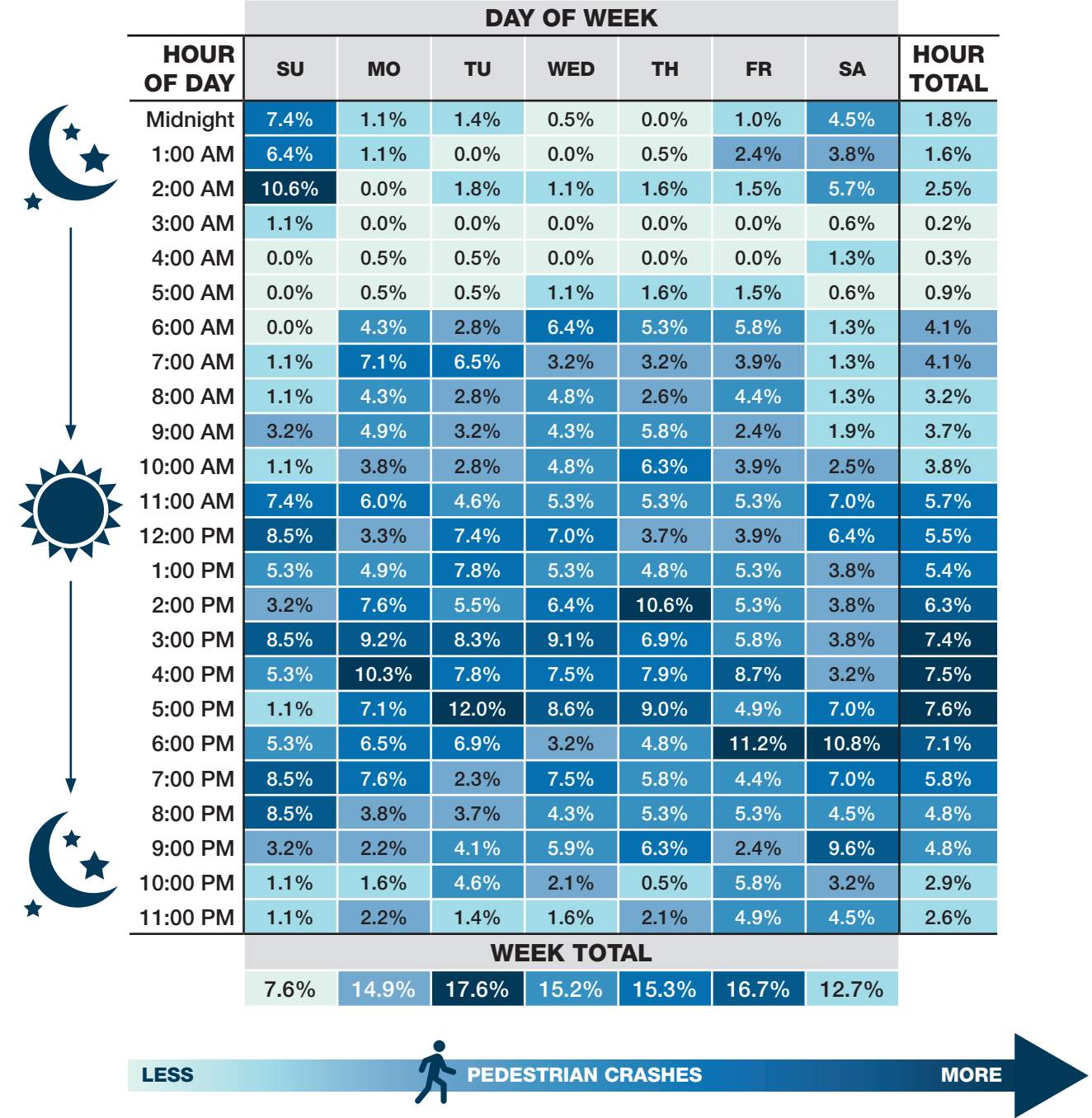
¹⁷ For the purposes of this report, a fatal and severe injury crash corresponds to a "K" and "A" injury crashes on the KABCO severity scale.

In fall and winter. Pedestrian crashes, including fatal and severe injury crashes, occurred more frequently in fall and winter (October-March), compared to the rest of the year.

During dark conditions. Though the largest portion of pedestrian crashes occurred during daylight hours (66%), half of all fatal and severe injury crashes occurred during dark conditions (50%). Nearly all crashes that took place during dark conditions occurred in locations where street lighting was present.

Late at night. Overall, more crashes occurred between 2 PM and 7 PM (Figure 3); however, crashes occurring between 11 PM and 3 AM were more likely to result in a severe injury or death.

Figure 3: Total Pedestrian Crashes by Time of Day / Day of Week



Where

Pedestrian crashes at the following locations were more likely to result in severe injury or fatality:

Signalized intersections. Most pedestrian crashes occurred at or near an intersection (70%). Most intersection-related crashes, for all severities, occurred at signalized locations (65% of intersection-related total crashes and 63% of intersection-related fatal and severe injury crashes). Signalized intersections may tend to have more pedestrian activity overall.

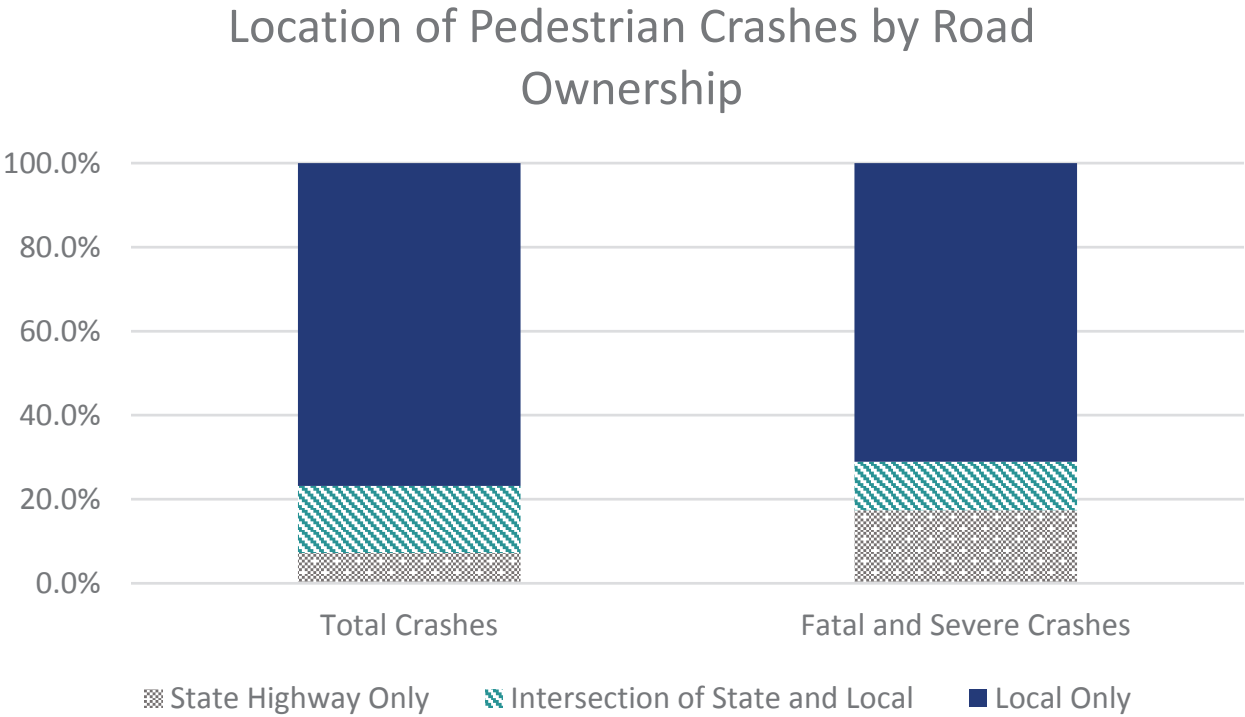
Higher-speed roads. Most crashes occurred on roads with a posted speed limit of 25 mph or less, but crashes that occurred on roads with a posted speed limit of 40 mph or more were more likely to result in severe injury or fatality. This is consistent with national findings, as research has proven that higher vehicle speeds result in more severe pedestrian crashes.¹⁸

Wider roads. Most crashes occurred on smaller roads (1 or 2 travel lanes), but crashes on roads with 3 or more travel lanes were more likely to result in severe injury or fatality.

Near transit. Nearly 90% of all crashes occurred within 500 feet of a transit stop (both bus and light rail), and nearly 85% of all transit stops in the City had at least one pedestrian crash occur within 500 feet of the stop. For context, roughly 57% of the roadway mileage within City boundaries is located within 500-feet of a transit stop.

On State-maintained roads. Most pedestrian crashes occurred on local roads (77%; Figure 4), but crashes were more severe on State-maintained roads (29% of fatal and severe injury crashes occurred on State-maintained roads, despite these streets only comprising 13% of the City’s road network).

Figure 4: Distribution of Fatal and Severe Injury Pedestrian Crashes by Roadway Agency Maintenance¹⁹



¹⁸ NHTSA - Literature Review on Vehicle Travel Speeds and Pedestrian Injuries: <https://one.nhtsa.gov/people/injury/research/pub/HS809012.html>.
¹⁹ “State and Local” designation refers to crashes that occurred at the intersection of a state-maintained and locally maintained road.

Prioritizing Locations in Pittsburgh for Further Review

The following pages describe the four methods that DOMI used to identify specific locations that necessitate further review related to pedestrian safety. As identified in the Goals and Actions section of this Plan, DOMI will conduct pedestrian-focused Road Safety Audits (RSAs) on these corridors to identify specific treatments for implementation.

A) Hot Spot Analysis: Locations with a concentration of pedestrian crashes, based on historical crash data

B) High-Risk Corridors: Locations that may be more likely to have crashes in the future, based on a combination of physical and demographic traits

C) Network-Need Corridors: High-volume, high-speed streets that may lack sufficient infrastructure for pedestrians to navigate safely

D) Business Districts with High Frequency Transit: Streets within local business districts that have high-frequency transit access, and provide an important contribution to the local economy

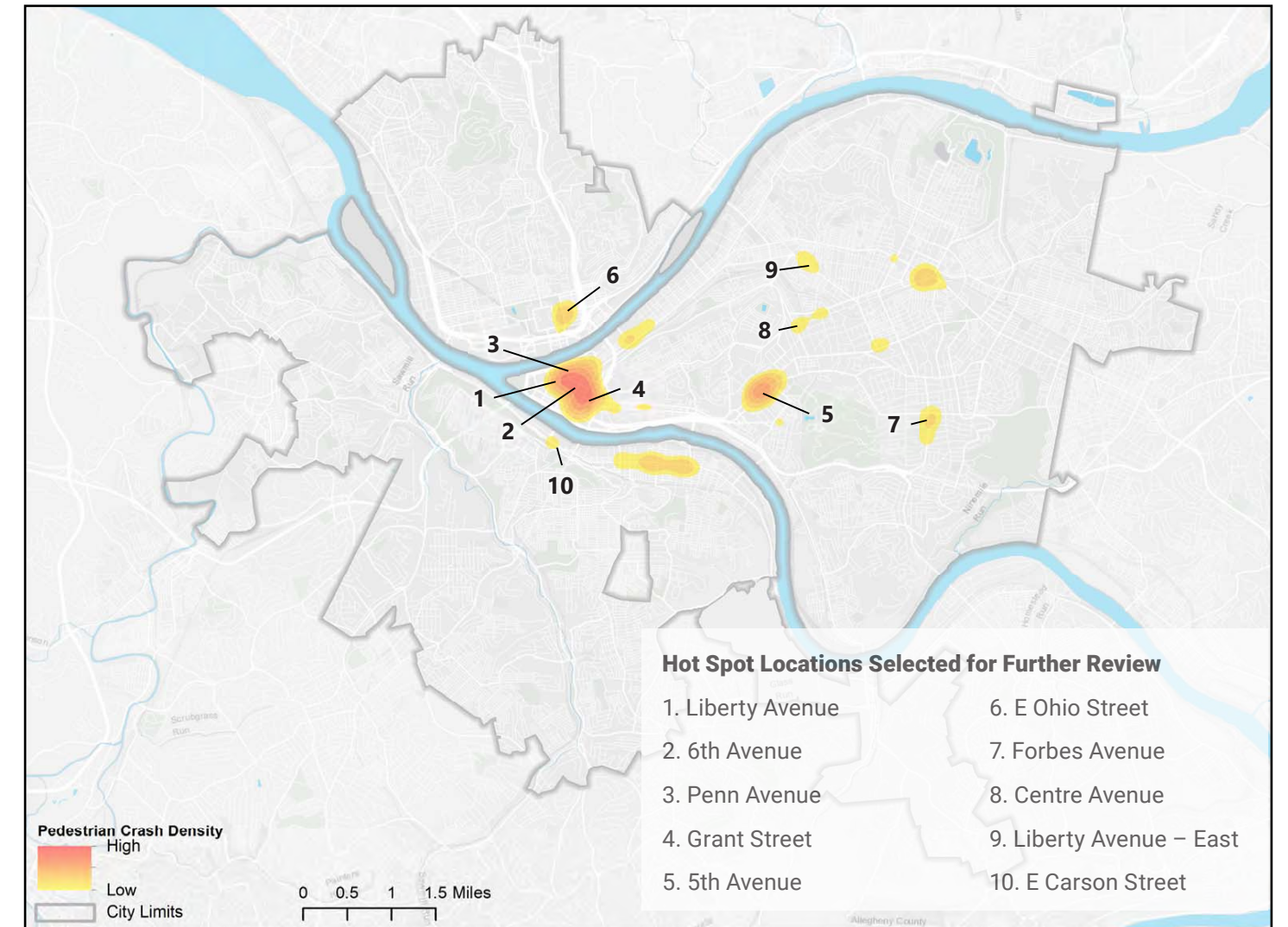
A) Hot Spot Analysis

An analysis of all reported pedestrian crashes between 2012 and 2017 identified locations that have experienced a high number of crashes (a.k.a. Hot Spots). To prioritize locations for further review, the list of Hot Spots was refined to eliminate locations with recent/ongoing/active transportation projects (those that are being designed or are in construction). For instance, although there are significant pedestrian crash Hot Spots along E Carson Street on the Southside, on Liberty Avenue in the Strip District, and around the intersection of Penn and Centre Avenues, these sites have ongoing or planned PennDOT or DOMI projects that aim to improve safety for all modes (i.e., additional retrofits are not needed in the near future). This process resulted in a list of 10 priority Hot Spots for further review (Figure 5). These sites are ranked in order of crash frequency and density. A larger version of the Hot Spot map is included in Appendix A, and crash diagrams for each of the Top 10 Hot Spot locations are included in Appendix B.



Source: Elissa Goughnour, VHB

Figure 5: Pedestrian Crash Hot Spot Locations (2013-2017)



Basemap Source: ESRI, HERE, Garmin, Open Street Map

Approximately 13% of pedestrian crashes occurred within these 10 Hot Spot locations between 2013 and 2017. These Hot Spots have slightly different crash trends than the citywide patterns identified in the earlier section. Some notable pedestrian crash trends at these locations include:

- Crashes are most likely to occur at an intersection, particularly at a signalized intersection.
- Crashes occur more often within a marked crosswalk.
- Crashes tend to involve a turning vehicle, as opposed to a vehicle traveling straight or performing another maneuver.
- Crashes mostly occur during weekday business hours (7 AM to 7 PM).

B) High-Risk Corridors

While historical crash information is important, research has shown that pedestrian crashes and near-misses are often underreported.²⁰ This can be due to a variety of reasons, including the minimum criteria for reporting a traffic crash or if the people involved choose not to file a police report. Pennsylvania reportable crashes are limited to events where there is a documented injury or a car is towed. For this reason, it is also important to evaluate locations that have similar characteristics of high pedestrian crash locations (i.e., those which may be more likely to experience crashes in the future). Criteria for identifying High-Risk Corridors include:

- High density of recent pedestrian crashes (2013-2017)
- High pedestrian travel demand indicated by high transit ridership, high numbers of walking commuters, and high neighborhood Walk Scores
- High motor vehicle traffic volumes (e.g., annual average daily traffic)
- Important infrastructure characteristics such as unsignalized crosswalks, transit stops, and steps
- Higher exposure and/or vulnerable populations, as measured through high rates of zero-car households and households under 100% of the federal poverty threshold

These corridors are important for both pedestrian access and crash prevention, and the City will target improvements around these locations to proactively address pedestrian safety where it is needed most.

C) Network-Need Corridors

Network-Need Corridors represent high-volume, high-speed streets that may lack sufficient infrastructure for pedestrians to navigate safely. The project team defined these locations as streets that accommodate at least 9,000 vehicles per day and have an average distance of at least 500 feet between marked crosswalks.²¹ These locations may not currently accommodate high volumes of pedestrian traffic, but they are important transit corridors and/or connect to existing commercial districts. With more investment, these streets could become viable,

safe pedestrian corridors. As identified in the Goals and Actions section of this Plan, DOMI will review each of these corridors individually to determine specific treatments for implementation.

D) Business Districts with Frequent Transit Service

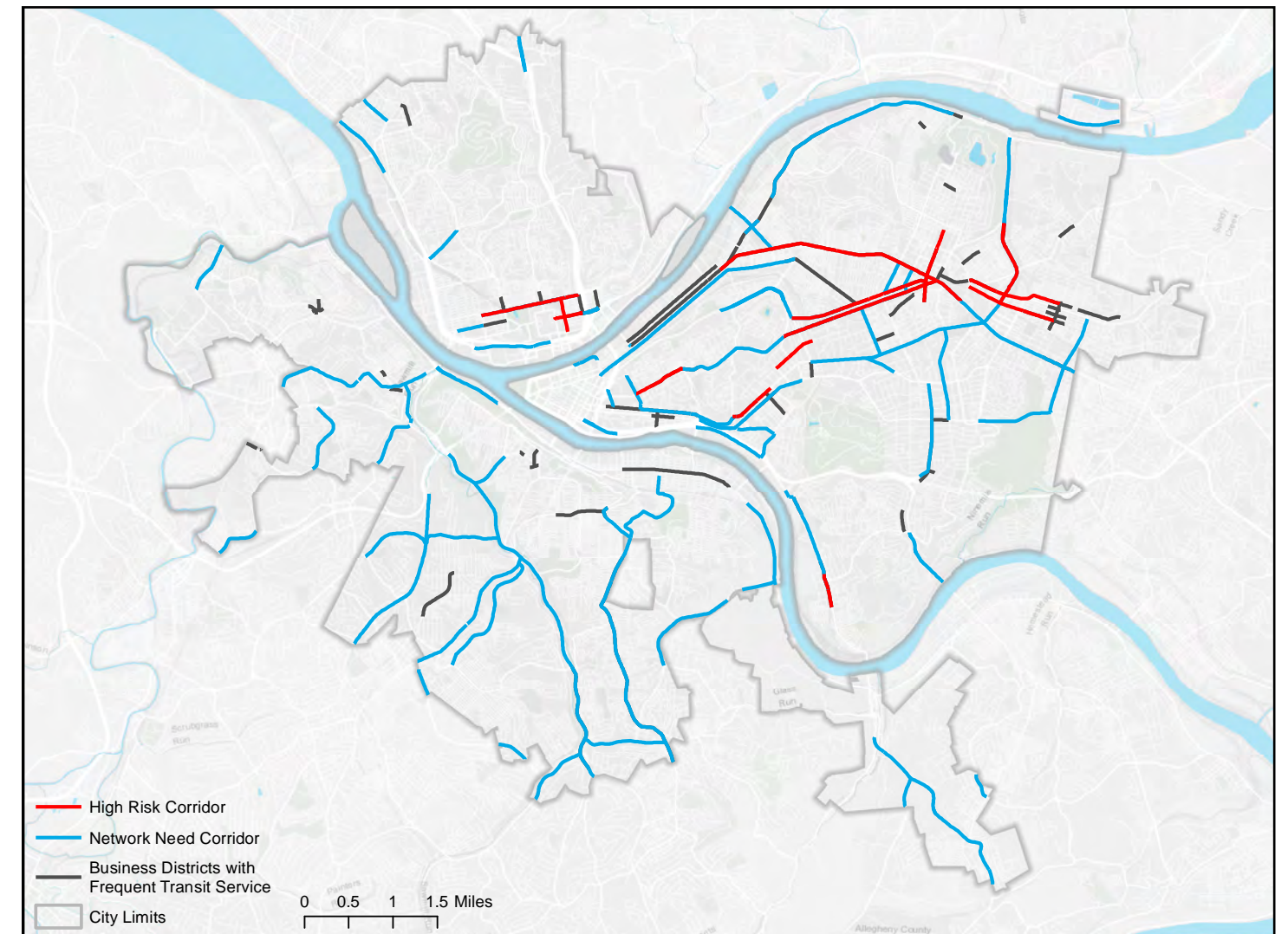
Streets within local business districts that have high-frequency transit access provide an important contribution to the local economy. The City's Bureau of Neighborhood Empowerment designates local community business districts, and the Port Authority of Allegheny County (PAAC) defines a frequent transit service area as:

"The ¼-mile area around a transit stop or the ½-mile area around a transit station where transit vehicles come, on average, every fifteen minutes for fifteen hours of the day and every thirty minutes for an additional five hours of the day, every day of the week."²²

Providing safe pedestrian accommodations in these locations will encourage local community activity and provide multimodal transportation options for all occasions and trip purposes. As identified in the Goals and Actions section of this Plan, DOMI will review each of these corridors individually to determine specific treatments for implementation.

Figure 6 shows the places identified as High-Risk, Network Need, and Business Districts with High-Frequency Transit. An individual map of each of the corridor types is included in Appendix A.

Figure 6: Pedestrian Risk-Based Corridor Analysis



Basemap Source: ESRI, HERE, Garmin, Open Street Map

²⁰ Stutts, J. C., & Hunter, W. W. (1998). Police Reporting of Pedestrians and Bicyclists Treated in Hospital Emergency Rooms. Transportation Research Record, 1635(1), 88–92. <https://doi.org/10.3141/1635-12>.

²¹ https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07_17-508compliant.pdf

²² Port Authority of Allegheny County Annual Service Report 2017: <https://www.portauthority.org/siteassets/services/service-request/2017asr.pdf>

Strategies and Actions



Chapter 3:

Strategies and Actions

Over the next ten years, Pittsburgh will pursue a number of strategies to improve safety and access for people walking in the City. The strategies and actions presented in this Chapter respond to the findings of the analysis presented in Chapter 2. They reflect a holistic approach to safety that includes engineering, data, policy, engagement, encouragement, accessibility, health, enforcement, and education. Appendix C presents a sampling of the fundamental treatments used to improve pedestrian safety.

Priority Actions



1) Conduct pedestrian-focused RSAs and walkability audits.

- Allocate budget for 3 RSAs per year, to allow all locations to be addressed within the 10-year timeline for this Plan. Conduct RSAs to address safety issues at Hot Spot locations and on the Risk-Based priority corridors.
- Allocate budget for 5 walkability audits per year, to allow all locations to be addressed within the 10-year timeline for this Plan. Conduct walkability audits to ensure walkable routes to transit stops and schools.
- Ensure that RSAs and walkability audits identify a short list of priority infrastructure investments that are proven (based on research) to reduce the risk and severity of crashes for pedestrians, provide adequate pedestrian infrastructure, and crossing opportunities.
- Leverage existing capital projects, repaving, utility projects, and private-led street/streetscape projects to install/upgrade pedestrian facilities near schools, transit stops, and other public destinations.

e. Leverage existing City and partner-led programs to implement projects, including:

- City Programs

- Neighborhood Traffic Calming Program²³
- Critical Sidewalk Gap Investments
- Complete Streets Design Guidelines²⁴
- City of Pittsburgh Bike(+) Plan²⁵
- Neighborhood/Area Plans²⁶

- Partner Programs

- PennDOT + Allegheny County Health Department Traffic Safety Program
- PennDOT Connects²⁷
- Southwestern Planning Commission (SPC) Road Safety Audit Program²⁸
- ACCESS transportation education²⁹
- PAAC First/Last Mile Plan and Program³⁰
- PAAC Station Improvement Plan and Program³¹

f. Establish a dedicated line item in the Capital Budget to support implementation of projects identified through this program, with funding based on need.

g. Develop reportable milestones and create a public dashboard to track progress.

²³ <https://pittsburghpa.gov/domi/traffic-calming>

²⁴ <https://pittsburghpa.gov/domi/complete-streets>

²⁵ <https://pittsburghpa.gov/domi/bikeplan>

²⁶ <https://pittsburghpa.gov/dcp/np>

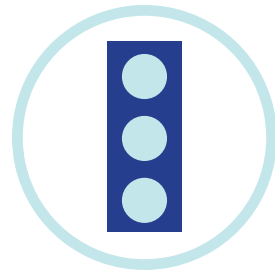
²⁷ <https://www.penndot.gov/ProjectAndPrograms/Planning/Pages/PennDOT-Connects.aspx>

²⁸ <https://www.spcregion.org/programs-services/transportation/operations-safety/>

²⁹ <https://myaccessride.com/is-access-for-me/>

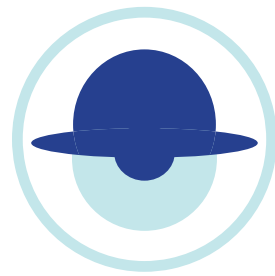
³⁰ https://www.portauthority.org/contentassets/d1e84d83d7d9471dbd5c11dadd25e56/paac-2019-flm-program-plan_singlepage_withhyperlinks.pdf

³¹ <https://www.portauthority.org/contentassets/07501f71ad4e4b12b6b6bb76c5a80430/stationevaluation.pdf>



2) Formalize and adopt the City's traffic signal policy, in order to:

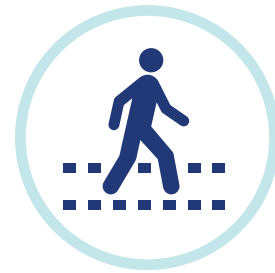
- Identify and define the City's signal priorities to help prioritize how and where to make signal improvements.
- Prioritize traffic signals for safety improvements or full replacements based on risk and exposure for all users.
- Clarify thresholds and guidelines for treatments such as those included in the Complete Streets Design Guide, including: Leading Pedestrian Intervals, protected phasing for pedestrians and turning vehicles, automatic pedestrian recall, and other enhancements.



3) Improve pedestrian scale lighting at key crossings and intersections and on high-priority corridors.

- Adopt a Complete Street Design Guide that includes updated standards for spacing, design and illumination requirements based on the land-use context of the roadway.
- Prioritize lighting review at crossings within high crash locations, high-risk corridors, and in business districts with high-frequency transit service.
- Leverage existing City and partner-led programs (see Action 1) to ensure that all streetscape and trail projects include updated lighting consistent with the Complete Streets Design Guide.

- Update, as necessary, City's policies and design guidance to ensure that street redesign/construction projects include pedestrian-scale lighting as appropriate based on context.



4) Address sidewalk gaps and improve the continuity of the pedestrian network.

- Create a sidewalk program that seeks to close sidewalk gaps. Use a data-driven prioritization of existing sidewalk gaps to identify an annual priority list of projects based on risk, demand/exposure, and concentrations of vulnerable populations.
- Develop cost estimates for closing all known sidewalk gaps and use these estimates to establish an annual line item in the Capital Budget for sidewalks, with the goal of completing the network within 10 years.
- Invest in the maintenance and rebuilding of public staircases based on the Pittsburgh Steps Plan to ensure pedestrian connections between neighborhoods.



5) Educate and engage with neighborhood and community groups on issues of pedestrian safety.

- Introduce this Pedestrian Safety Action Plan via social media and neighborhood meetings. Establish a dashboard – either online or via an annual report – to track progress and maintain transparency around implementation.

- Conduct a recurring survey of individual neighborhoods and employers to find out what makes people feel safe and comfortable when walking in Pittsburgh.

- Continue to grow the diversity and capabilities of neighborhood-based bicycle and pedestrian committees by reaching out to gender-based, minority, and limited English-speaking communities and organizations.

- Engage youth. Include at least one youth representative as a stakeholder in a Capital Project related to pedestrian safety (this could be a representative from the school, youth team, etc.) Engage youth in fun, placemaking projects to foster a sense of investment in their community and empower them to co-create spaces where they feel safe and welcomed. Projects could include traffic gardens, block parties, and art projects.



6) Build cross-departmental understanding and cooperation around pedestrian crashes.

- Improve processes with Pittsburgh Bureau of Police (PBP) and PennDOT to record data on all pedestrian and bicycle crashes, not just those that result in a severe injury or fatality.
- Conduct a pedestrian fatality / critical injury crash review with city staff including PBP, DOMI, and The Mayor's Office. One meeting will be held two weeks prior to the beginning of the Pittsburgh Public School (PPS) school year and one meeting within two weeks of the first day of spring. This meeting will ensure that pedestrian safety is at the forefront and factors related to the crashes are understood.
- Evaluate pedestrian crashes annually, publish the results in the dashboard/annual report mentioned under Action #6, and hold an annual inter-departmental summit to discuss action and crash reduction progress, changes in trends, and future needs.

- Work with partners, such as BikePGH, to develop a mechanism for collecting near-miss data to supplement reported crash data.

- Expand the geographic coverage of pedestrian counts or develop another method for determining pedestrian exposure throughout the city.

- Establish and maintain comprehensive traffic volumes and average vehicle speeds for all public roads to help assess risk of severe injury or fatality for pedestrians involved in a crash with a vehicle.



7) Enforce existing laws so that everyone feels comfortable navigating the transportation network.

- Prioritize enforcement of non-moving infractions, particularly on high risk corridors or within neighborhood business districts, that produce an unsafe pedestrian environment including parking too close to crosswalks, parking within painted curb extensions, and parking on the sidewalk.
- Increase enforcement of existing laws related to pedestrian crashes at Hot Spot locations and on Risk-Based Corridors (e.g., speeding and not yielding to pedestrians in marked/unmarked crosswalks). Work with State lawmakers to investigate the possibility of automated enforcement of those actions most closely tied to crashes.
- Produce a joint memo between DOMI and the Pittsburgh Bureau of Policy on crosswalk design and enforcement including a summary of regulations, policies, design standards, and enforcement techniques to ensure consistency across departments.
- Conduct a yearly crosswalk education campaign to improve vehicle and bicycle yielding to pedestrians.



8) Design pedestrian facilities that are safe and easy to use for people of all ages, abilities, and backgrounds.

- Integrate the Complete Streets Design Guidelines into the development review process to facilitate integration into street designs.
- Continue to implement the Neighborhood Traffic Calming Program to reduce vehicle speeds; thereby reducing the potential chance and severity of all crashes.
- Establish yearly workshops to discuss new bicycle and pedestrian design standards with the disability community to ensure that they understand the intent of the design and so that designers can understand any unforeseen implications to access.
- Update the Americans with Disabilities Act (ADA) Transition Plan, including a path for continued investment in ADA curb cuts, and audible cues at all signalized intersections.
- Map sidewalk gaps, steps, and slopes and make publicly accessible in an interactive, multi-lingual format, design to help inform the public's route and mode choices.



9) Work with stakeholders to enable seamless connections between travel modes.

- Create "mobility hubs" that cluster various travel options in a single location (e.g., public and private micromobility services at public transit stops).
- Inventory the amenities at bus stops and prioritize investment in high-quality bus stop facilities within the defined frequent transit service area, including shelters with navigation information, bike racks, and other furniture, to enable safe access to transit for people of all ages and abilities.
- Dedicate staff time to new policy, permitting or regulation that will ensure that new mobility technology supports diverse populations and accessibility needs.



10) Implement pedestrian programs and policies that improve pedestrian safety, as well as air quality and/or public health.

- Develop a formal travel demand management (TDM) program for employers with over 1,000 employees in Pittsburgh to incentivize alternative commuting modes and telework options. Expand or encourage the formation of TDM programs at Pittsburgh universities to increase the share of biking and walking commuters.
- Continue to support the Pittsburgh Shade Tree Commission³² and other initiatives to maintain mature street trees with new developments to provide buffer and shade to pedestrians and to improve air quality.
- Incentivize the construction of fewer parking spaces at new multi-use developments and provide transportation alternatives, such as micromobility services, at these locations.
- Create partnerships with public health officials, local health providers, and senior living centers to implement programs and policies that encourage walking to support mental and physical health.

³² Pittsburgh Shade Tree Commission, created by Pittsburgh ordinance [Title Four, Article XIII, Chapter 487](#).



Source: Elissa Goughnour, VHB

Performance Monitoring and Evaluation



Chapter 4

Performance Monitoring and Evaluation

The Department of Mobility and Infrastructure will measure and report progress in both implementation of the Plan and measures of effectiveness at least annually by way of a report to the Office of the Mayor shared with City Council and public stakeholders. Progress tracking will include, but is not limited to:

Table 1: Plan Performance Monitoring and Evaluation Criteria

Metric	Baseline (2020)
1. Percent of streets with ADA-compliant sidewalks (both sides in commercial areas, at least one side in residential areas)	Begin 2021
2. Count of pedestrian commuters by month ³³	Total: 22,959 (2018) White: 15,705 Black/African American: 3,878 Asian: 1,870 Other: 1,506
3. Crashes involving people walking	249 (2019)
4. Crash rate (crashes/population) for people walking	0.83 crashes per 1,000 residents (2019)
5. The number of RSAs/walkability audits conducted per year.	0
6. Annual City budget (including grant funding) for signal, lighting, sidewalk, and intersection projects that seek to improve pedestrian safety.	\$15,222,441 (2021 Budget Estimate)

33 Make My Trip Count proportions multiplied by total commuters by race in the ACS

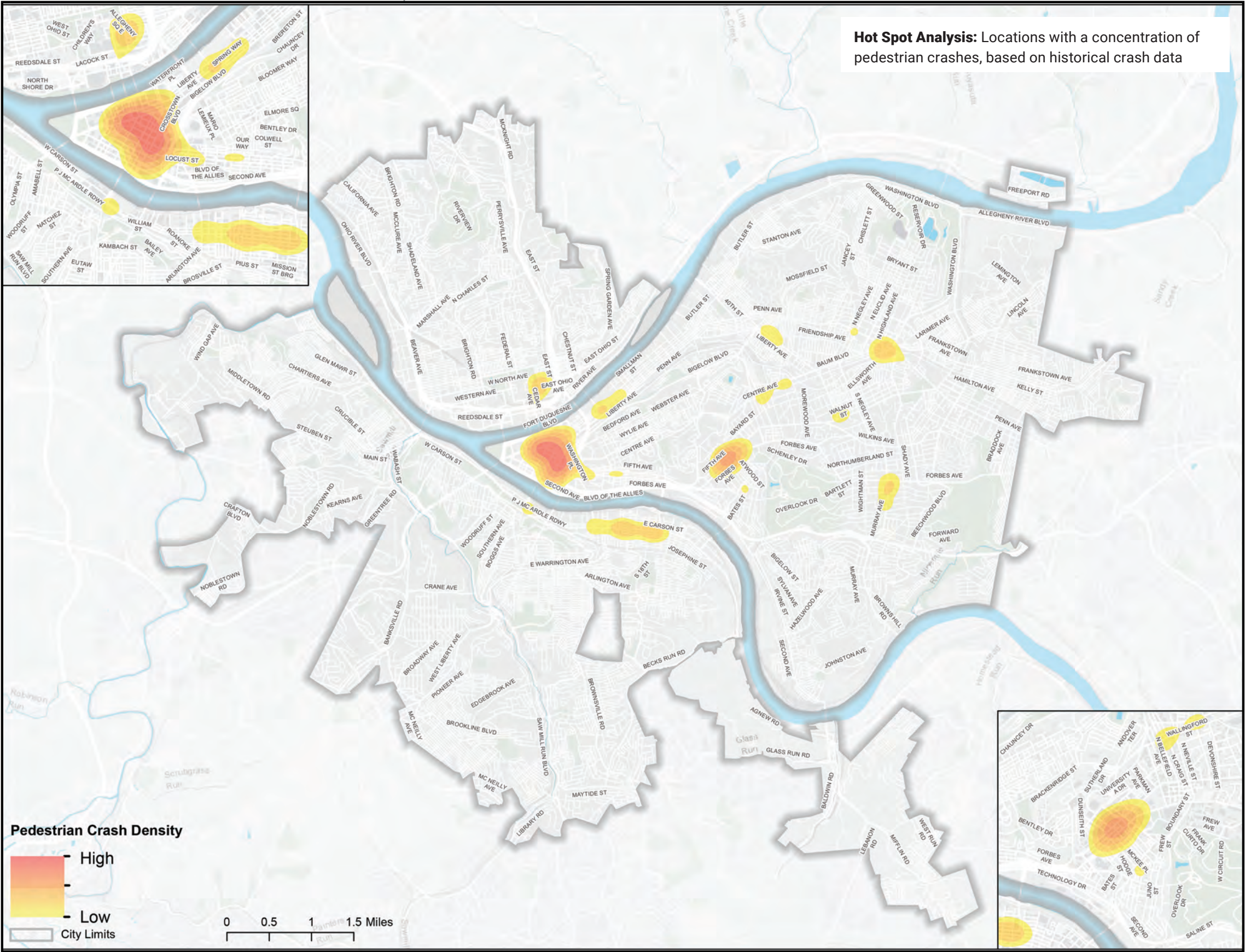


Source: Eljessa Goughnour, VHB



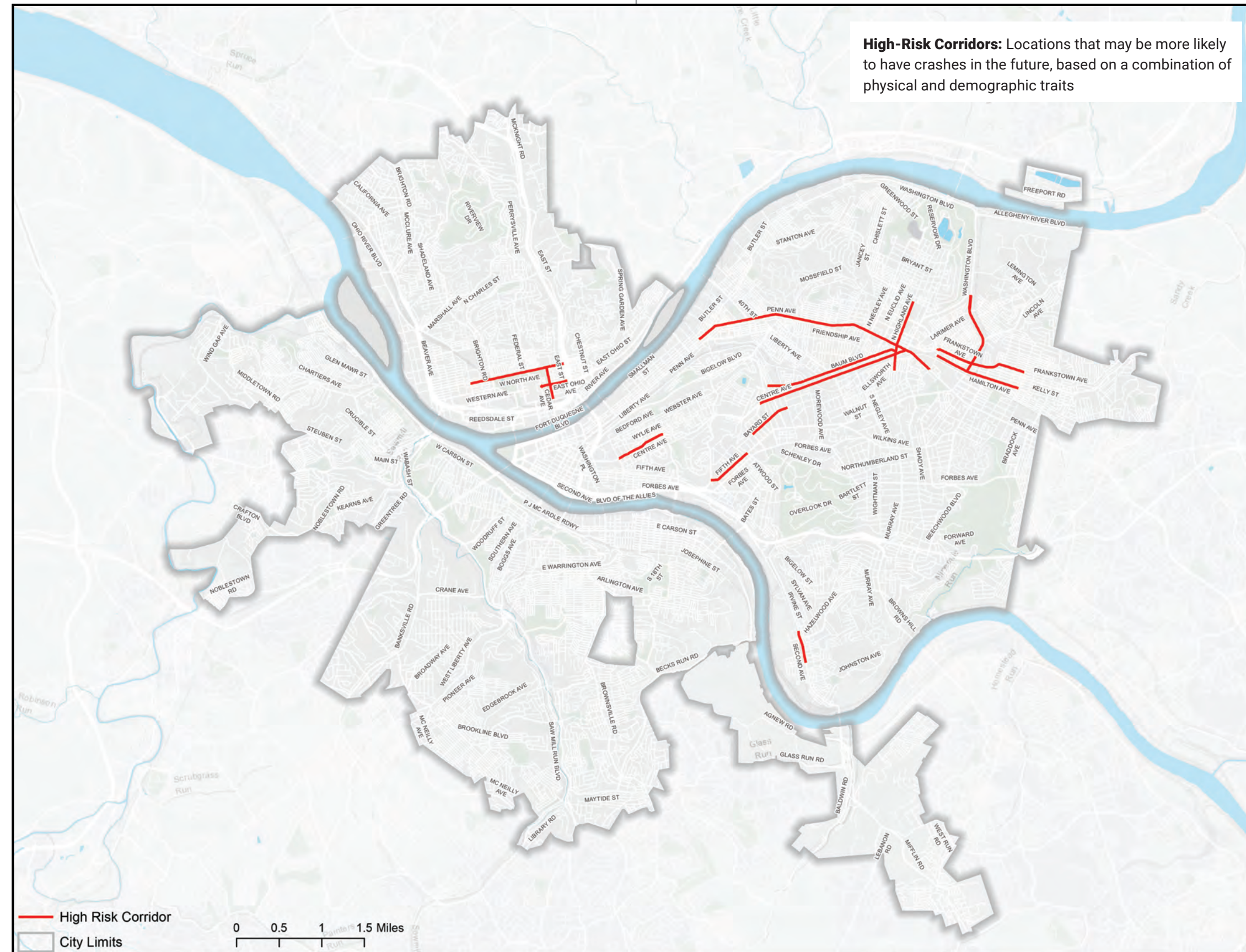
Appendices

Appendix A
Maps



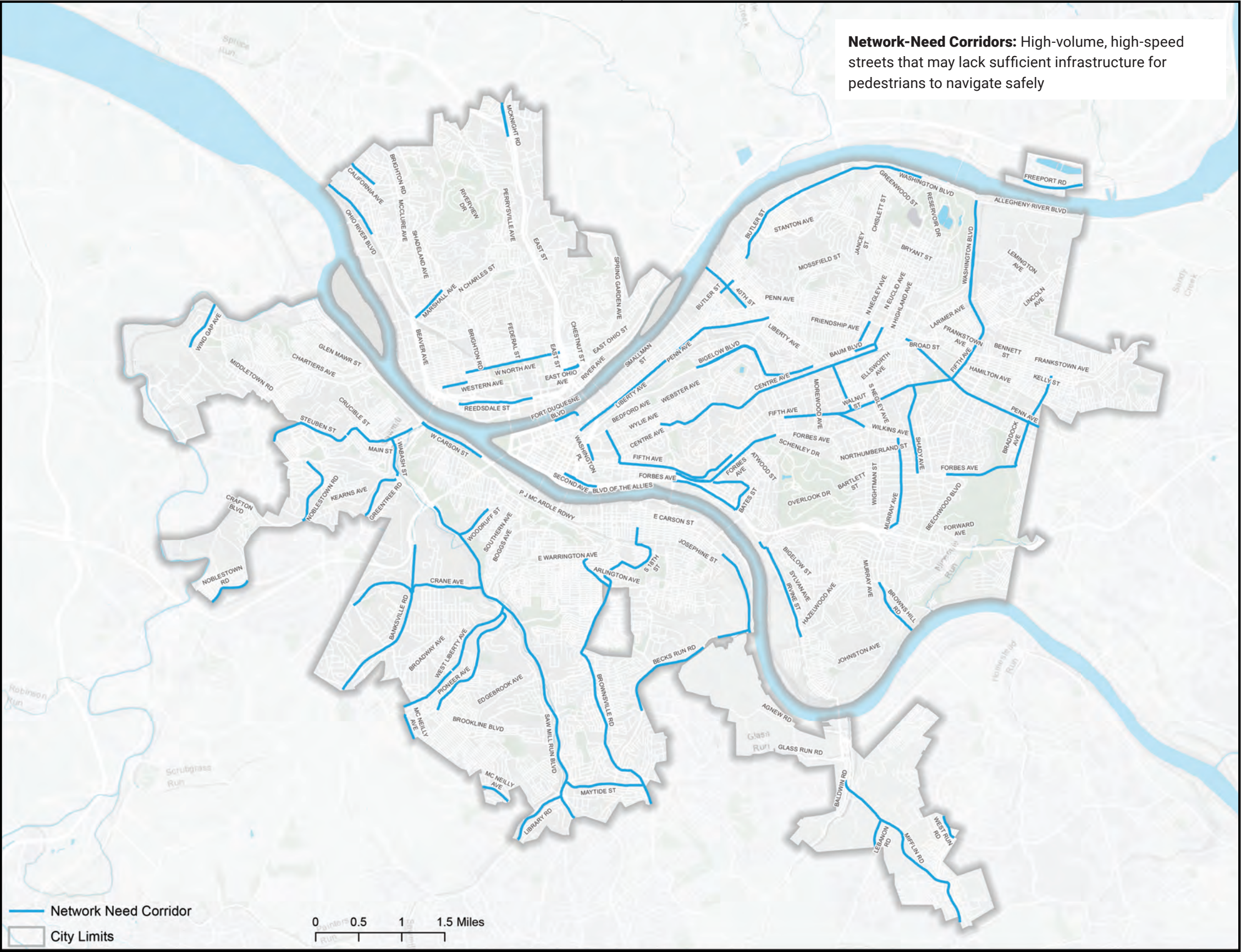
Basemap Source: ESRI, HERE, Garmin, Open Street Map

Figure 8: High Risk Corridors for Pedestrians



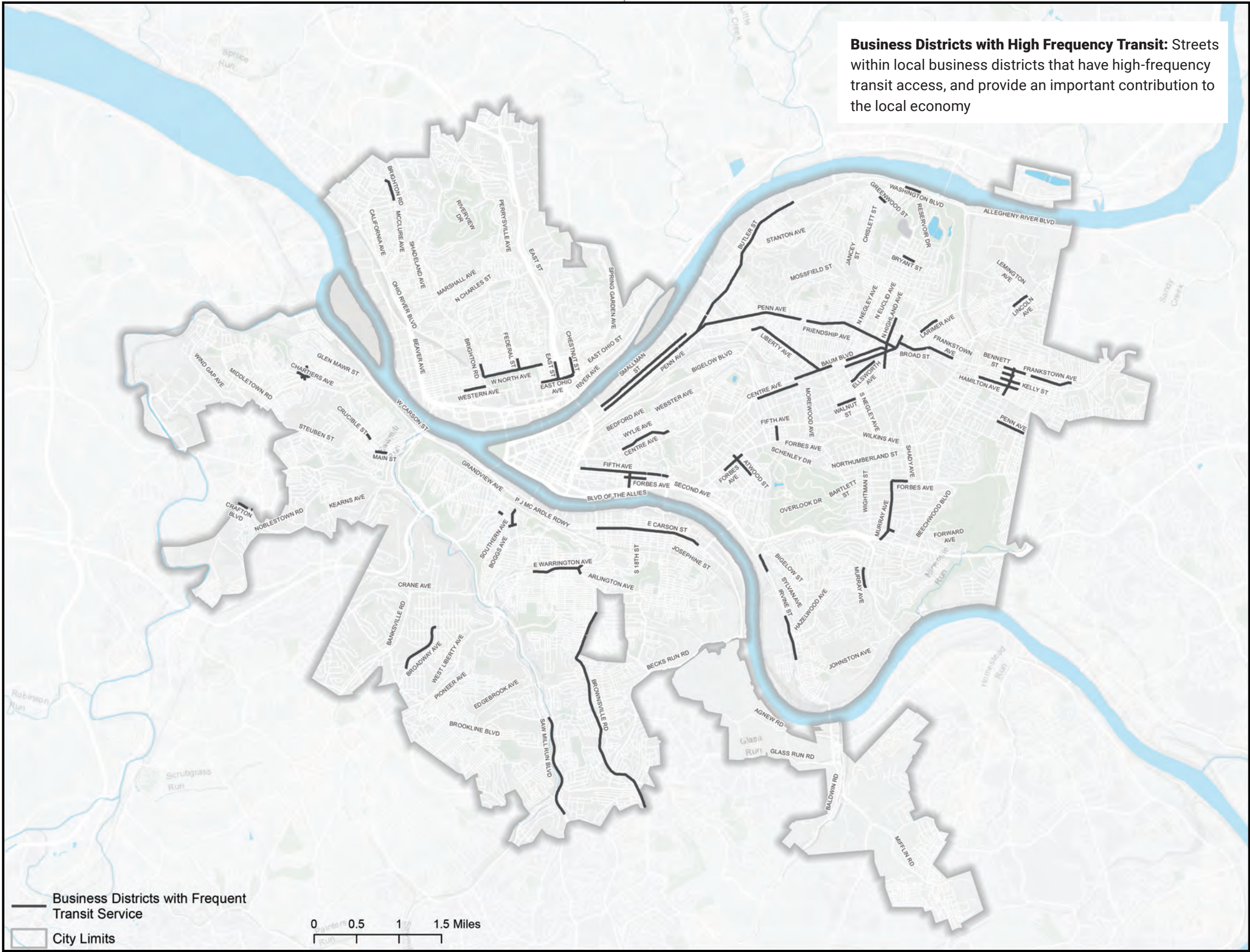
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Figure 9: Network-Need Corridors for Pedestrians



Basemap Source: ESRI, HERE, Garmin, Open Street Map

Figure 10: Corridors in Business Districts with Frequent Transit Service

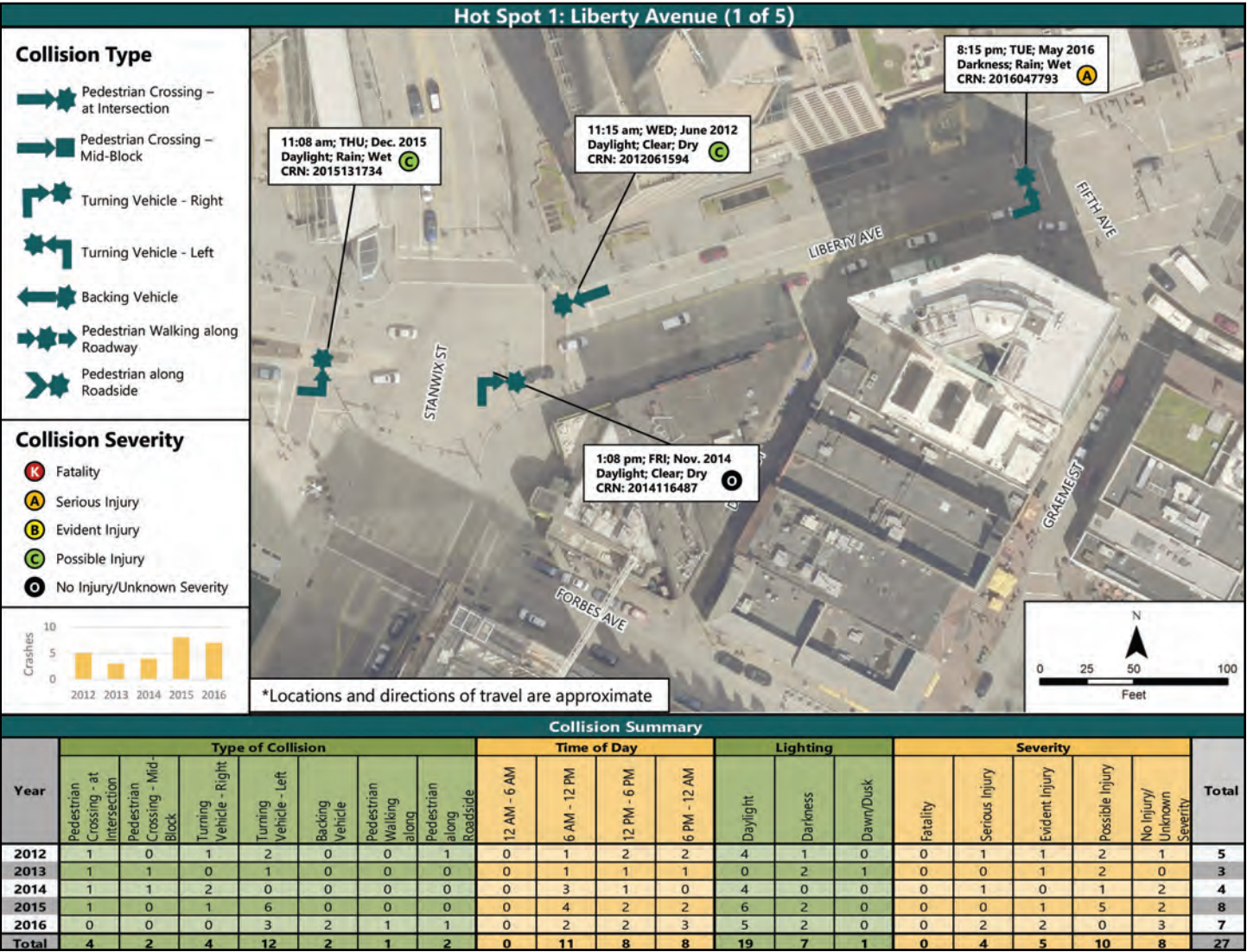


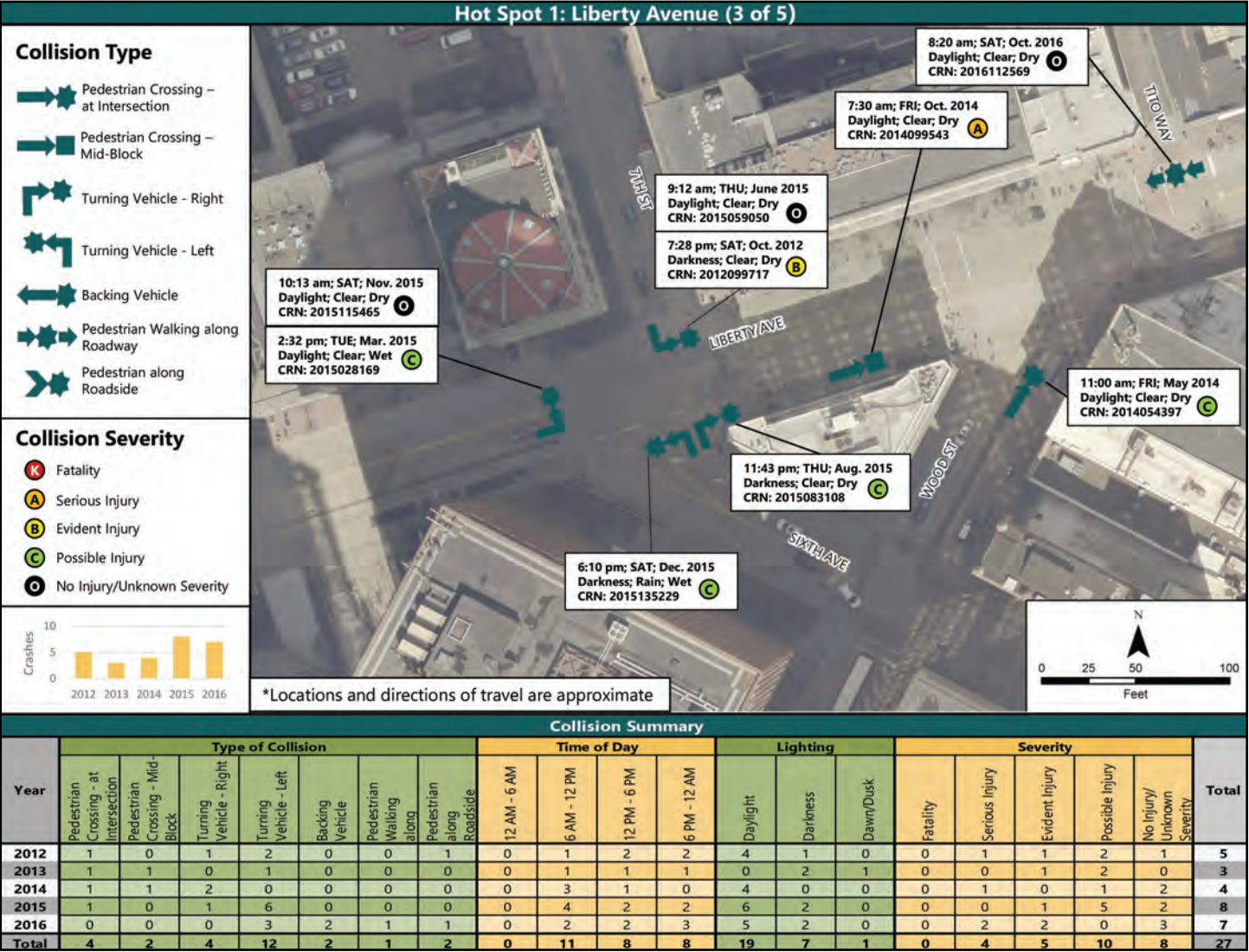
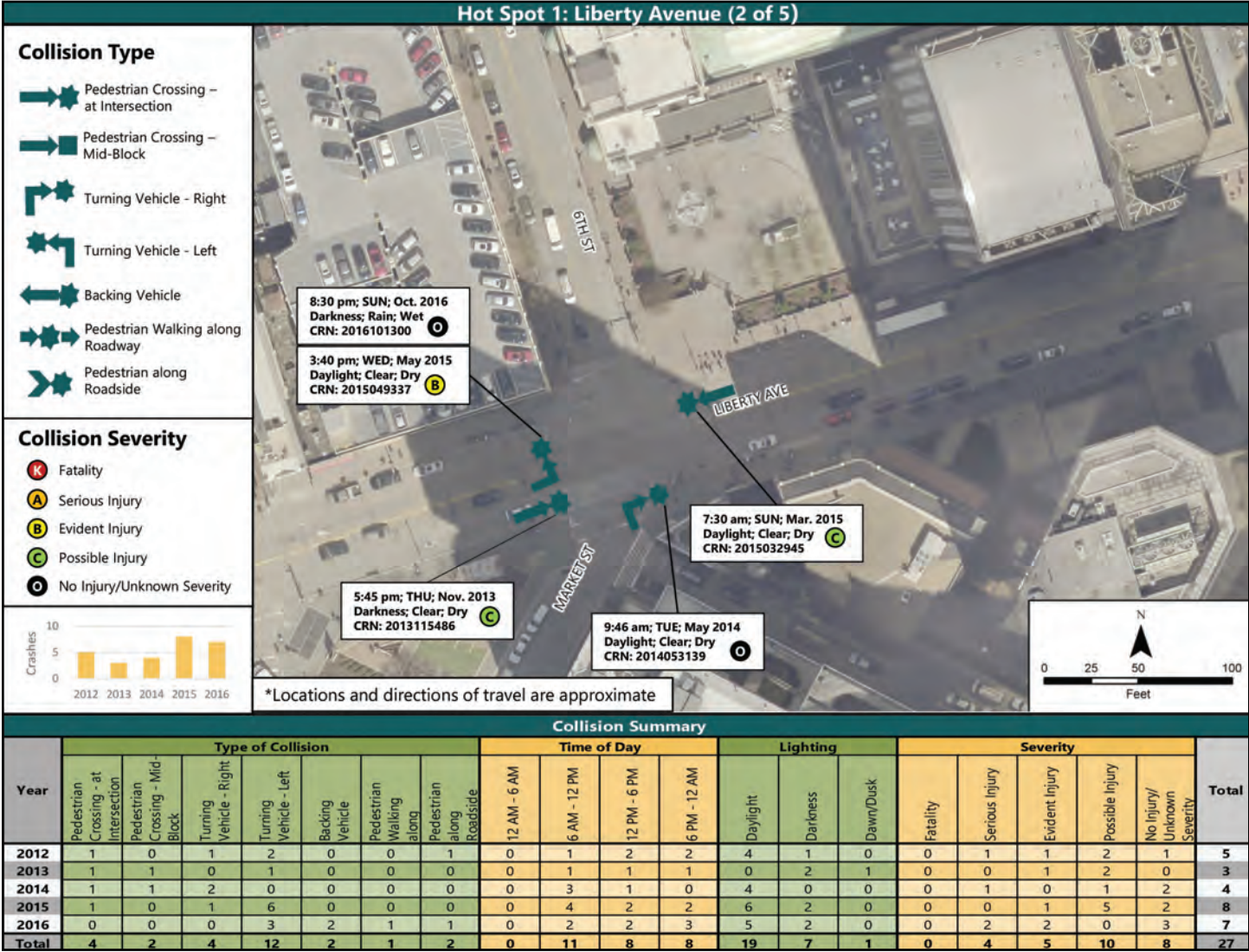
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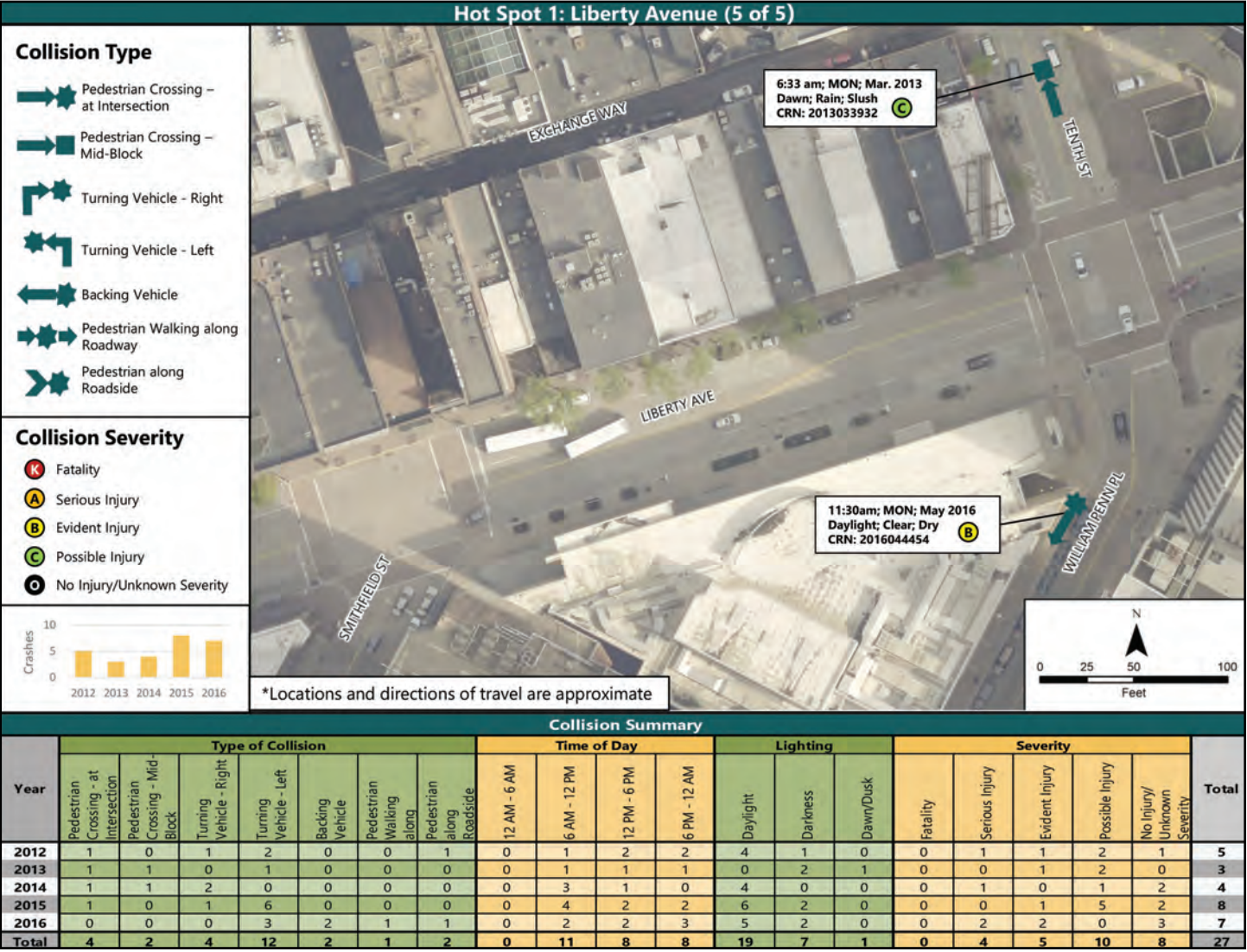
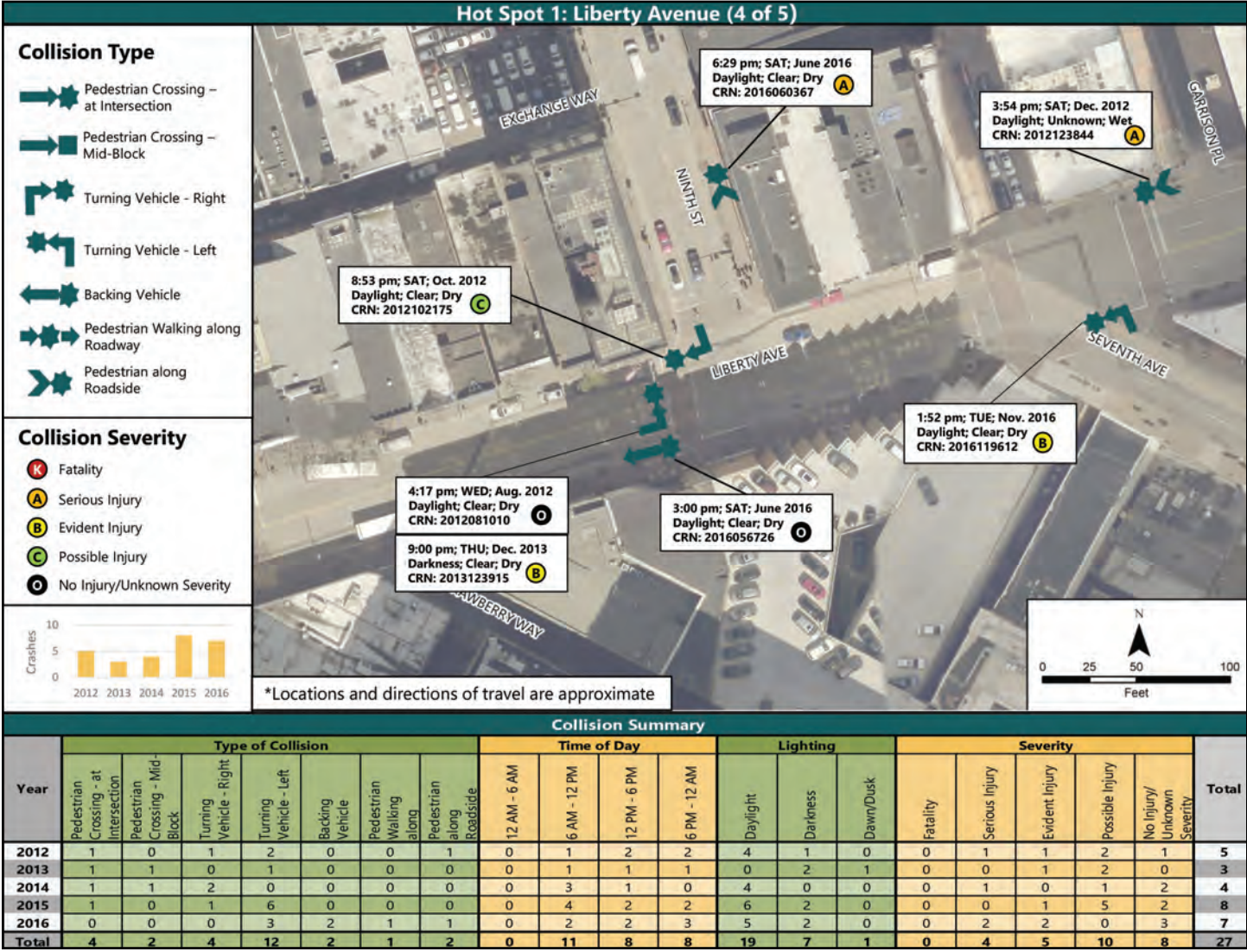
Appendix B

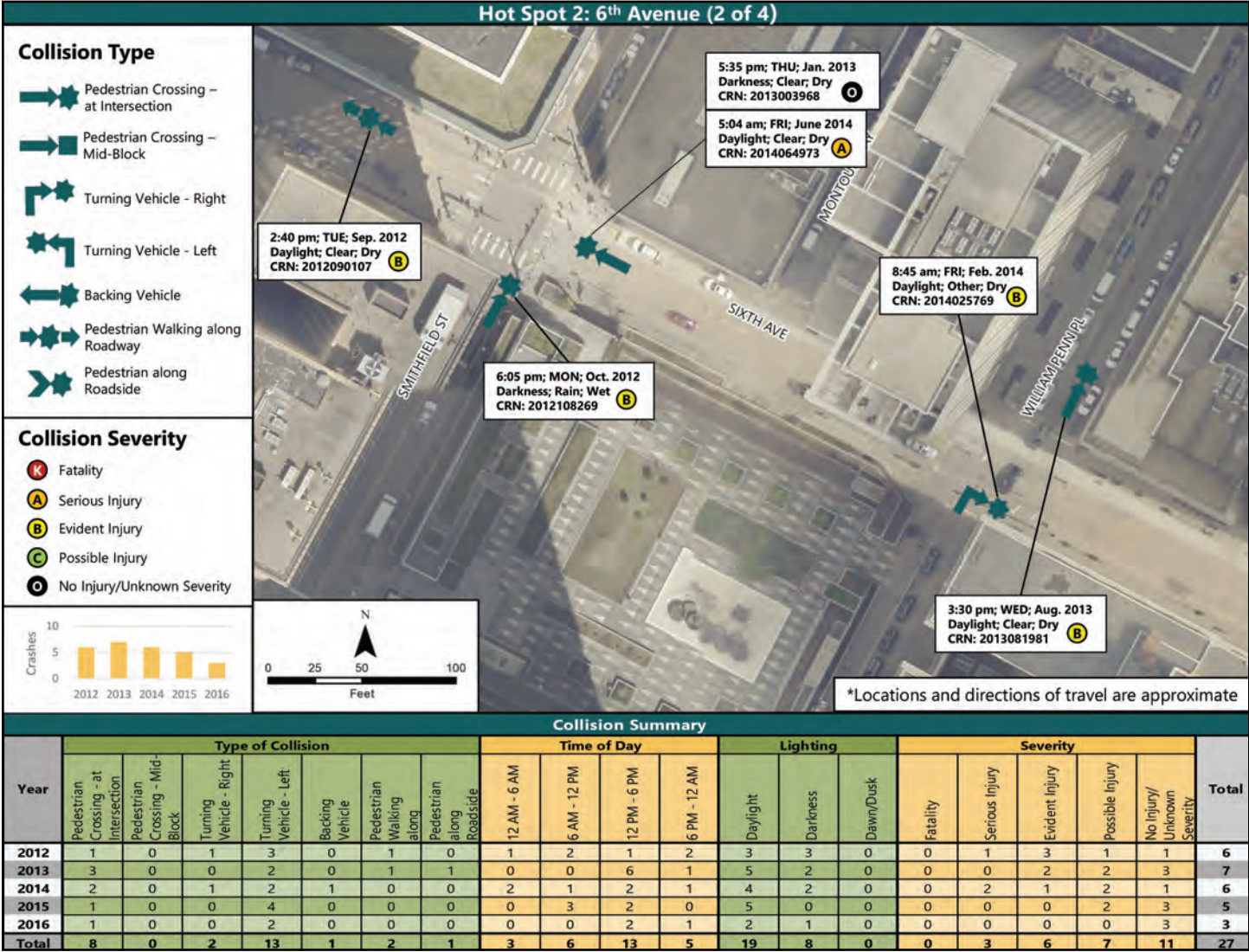
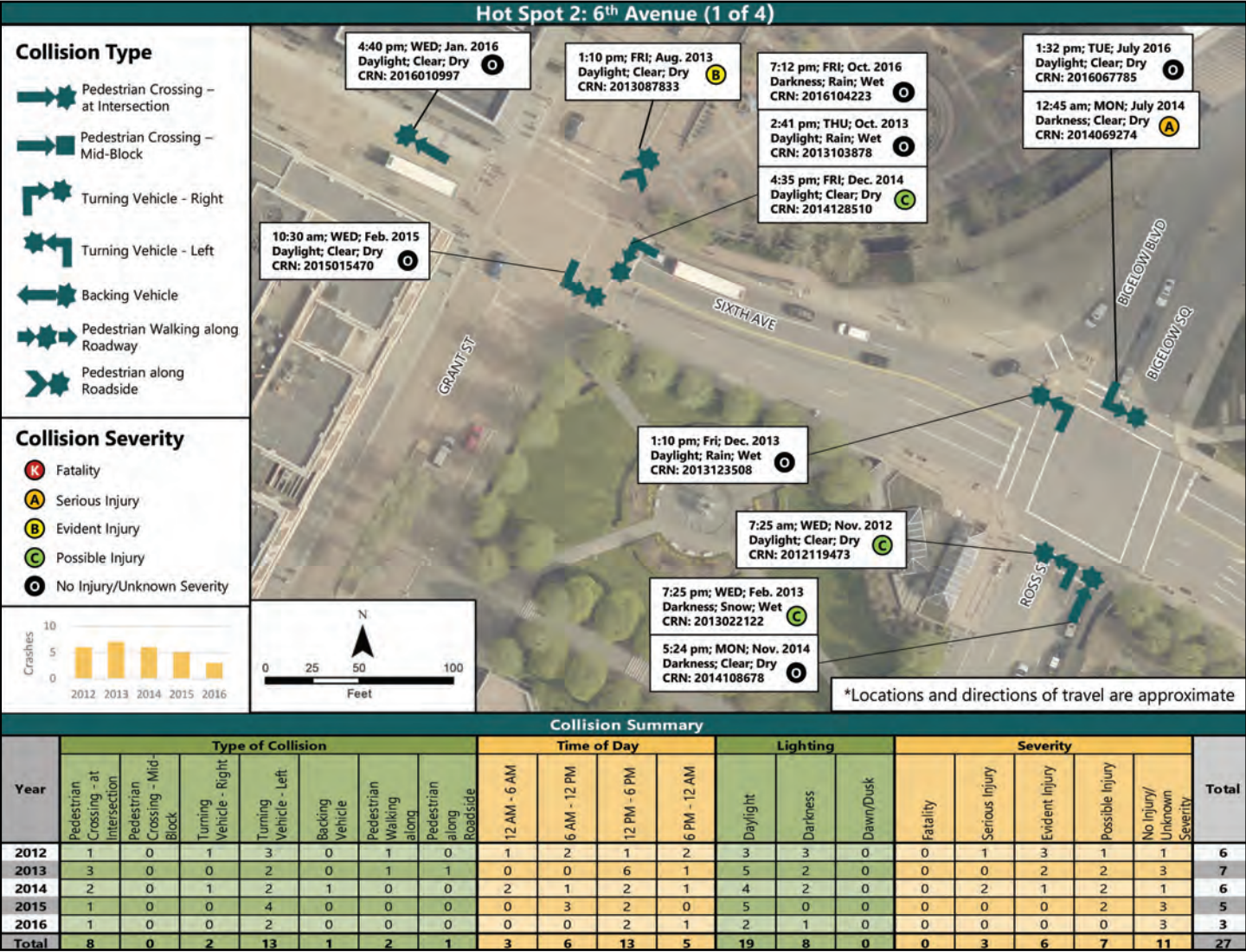
Hot Spot Crash Diagrams

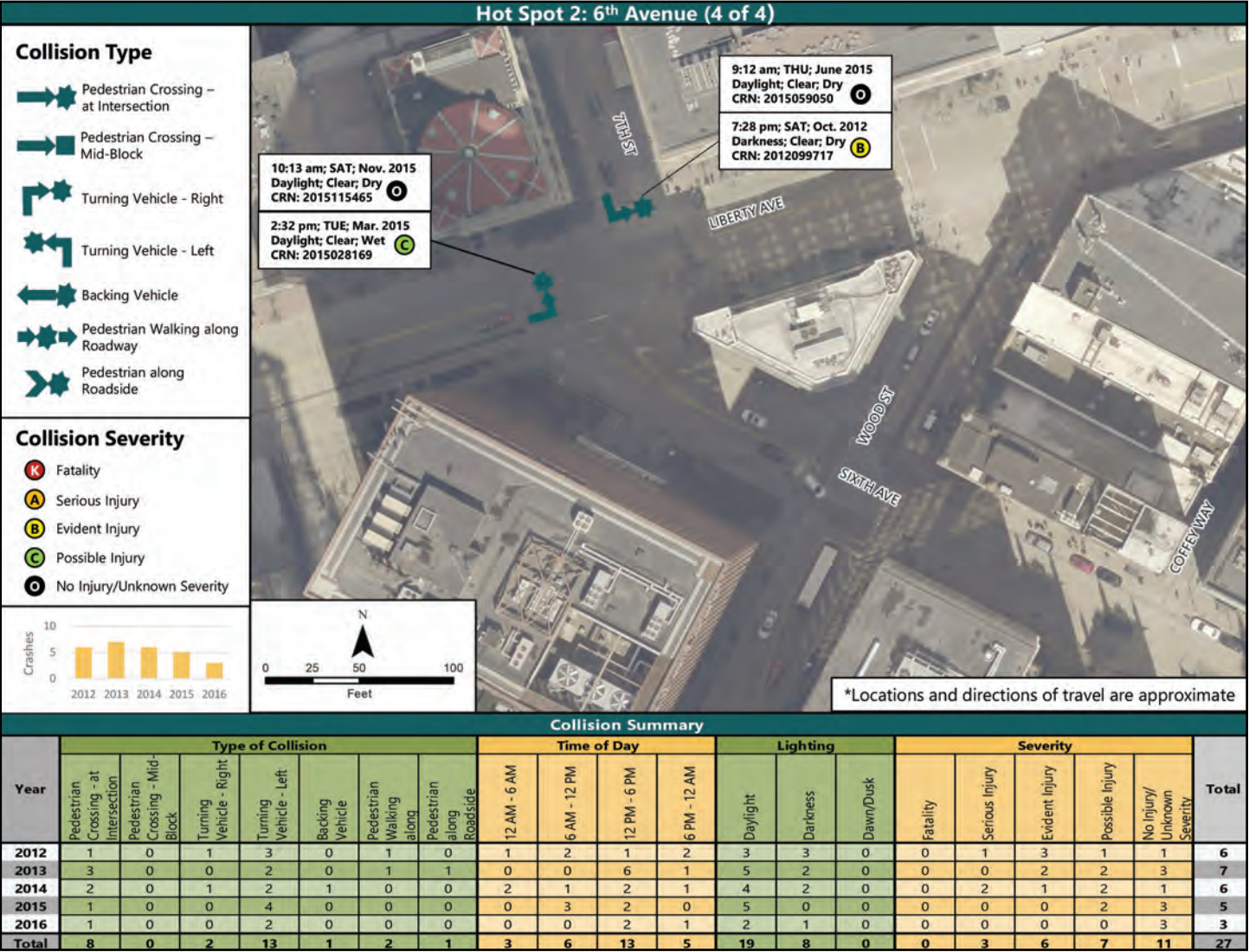
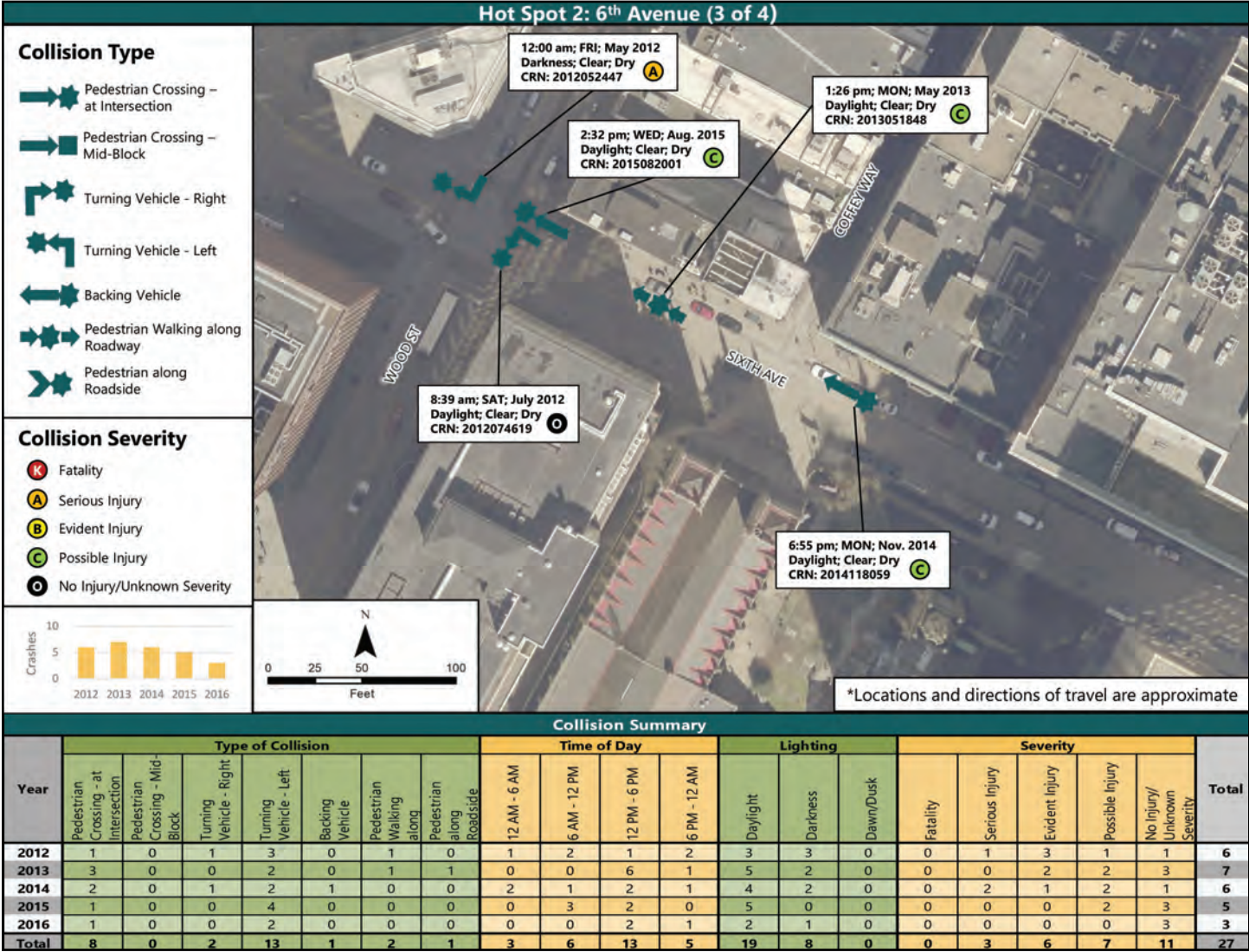
Note: During the preliminary planning process for this Plan, crash diagrams were developed using crashes that occurred between 2012 and 2016 to analyze Hot Spot crash trends in more detail. These noted the location of the pedestrian, the action of the vehicle, and the conditions at the time of the crash. These diagrams, located in Appendix B, helped to inform pedestrian safety actions in this Plan and should be used to better understand the safety concerns at each specific location identified in the Hot Spot analysis.

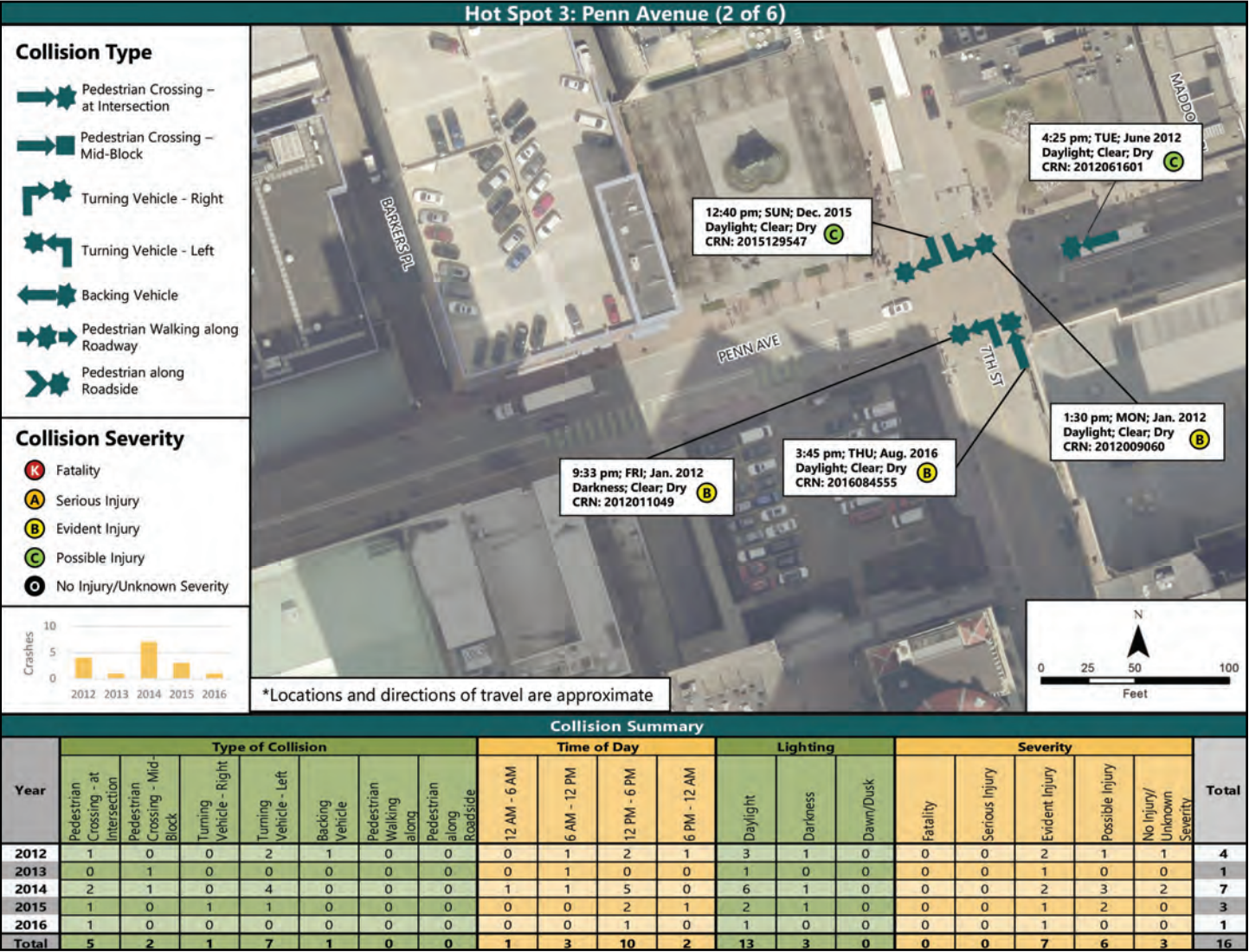
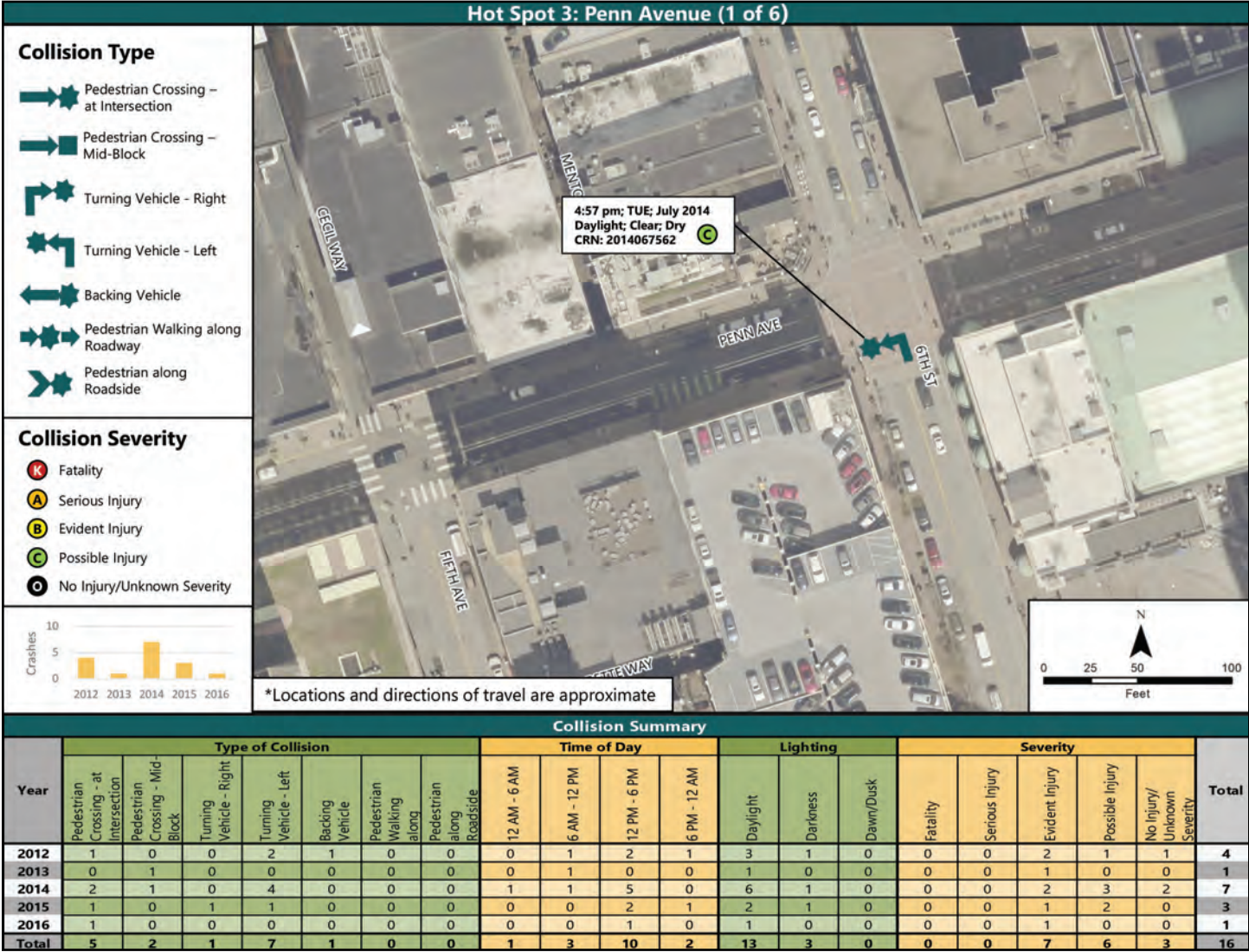


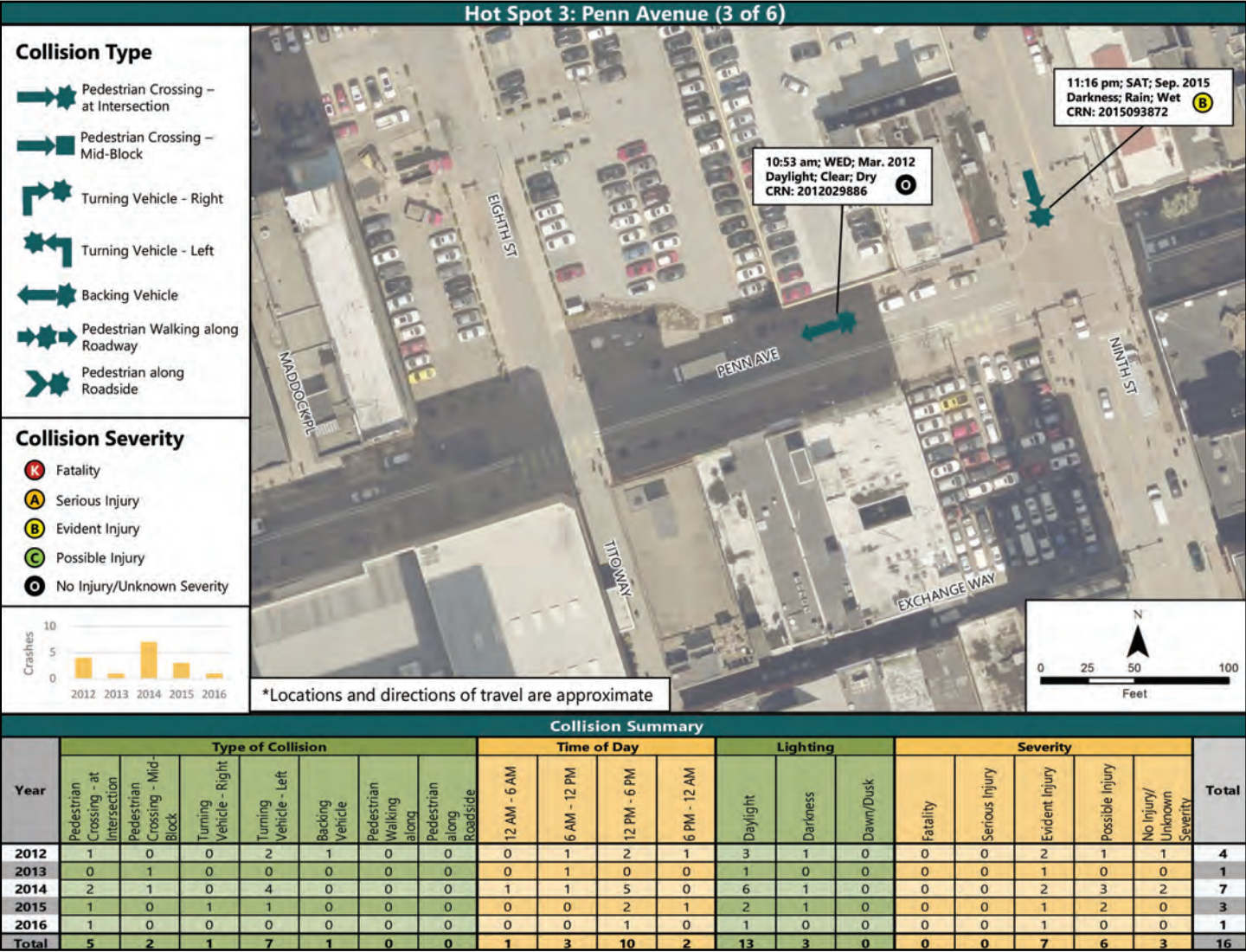


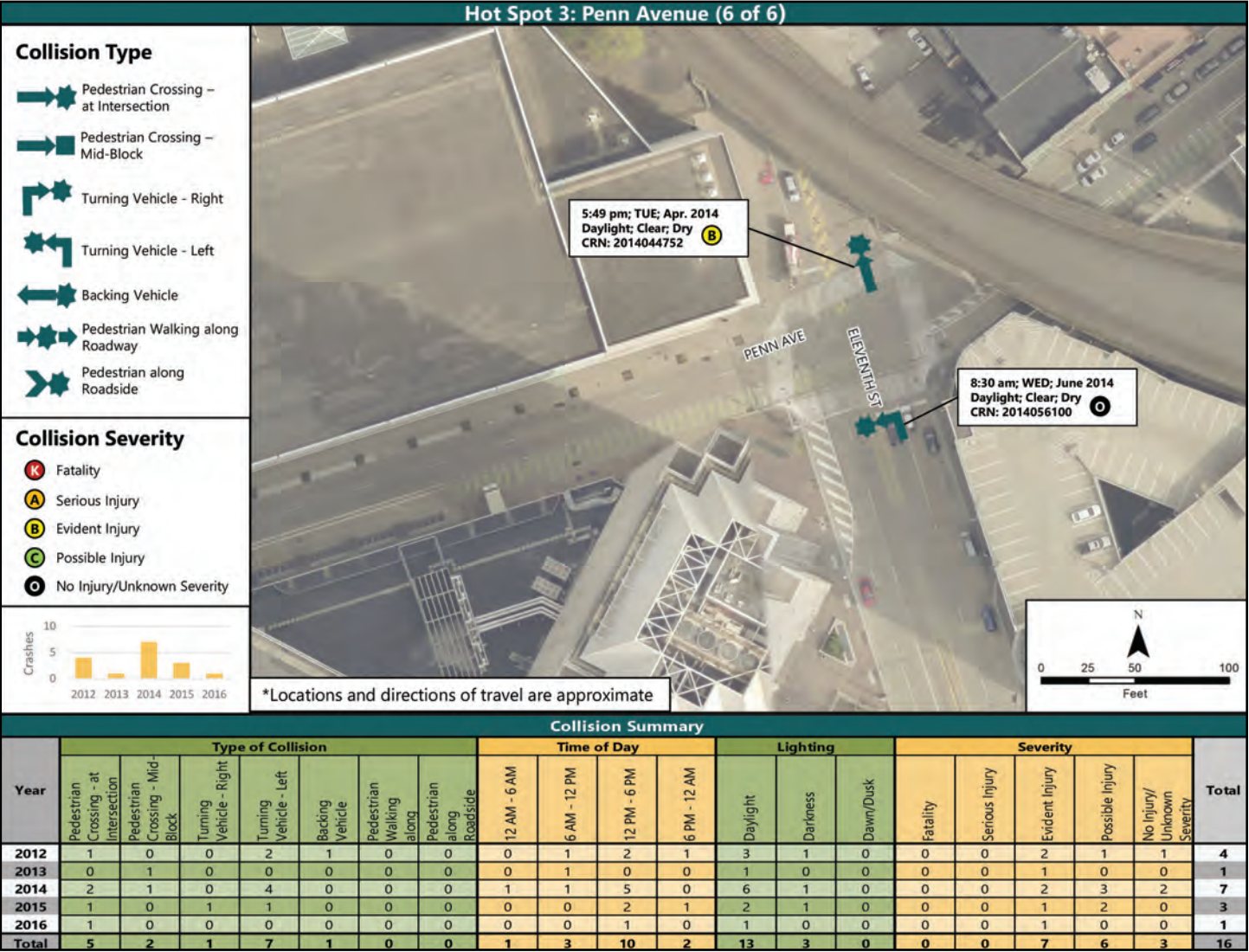
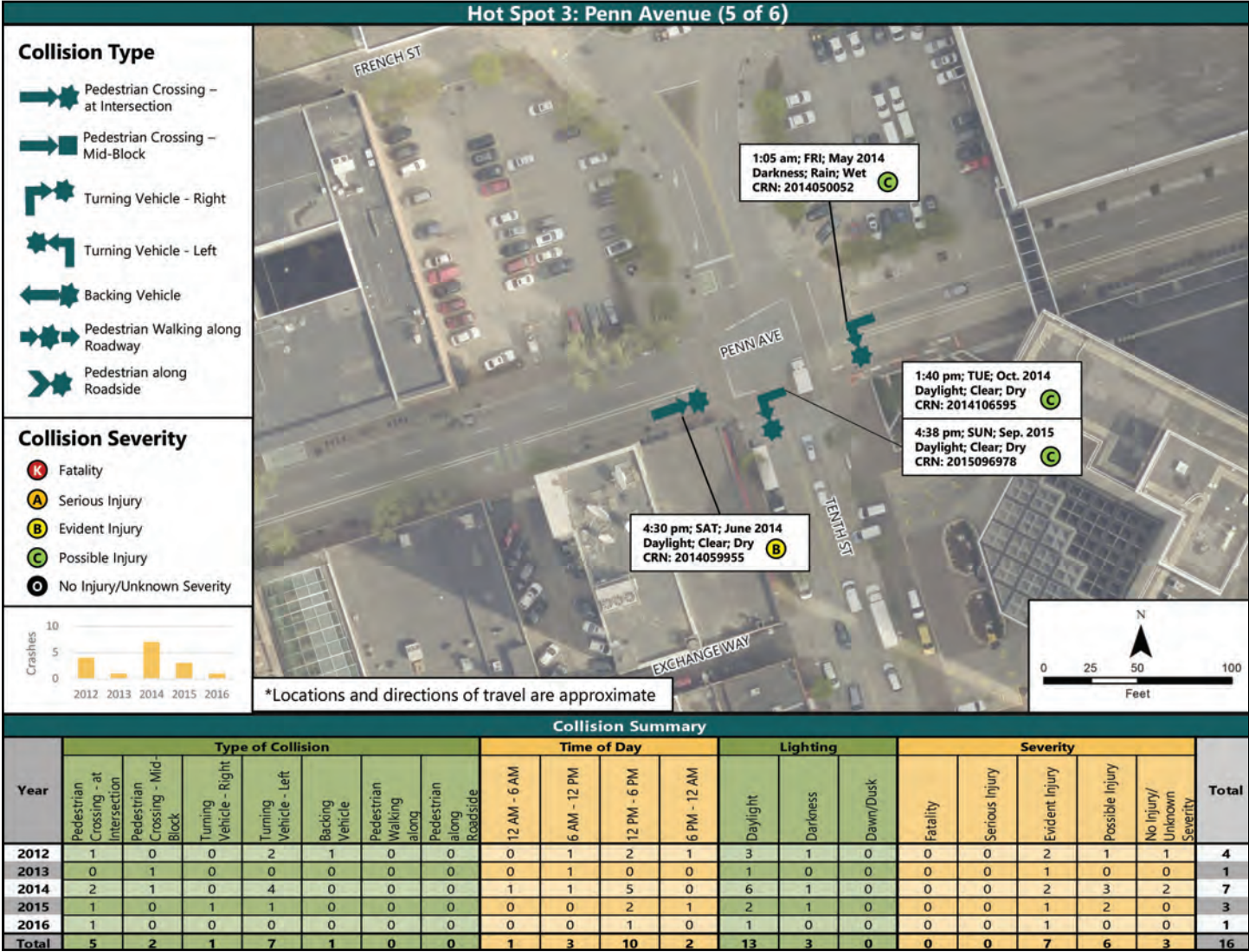


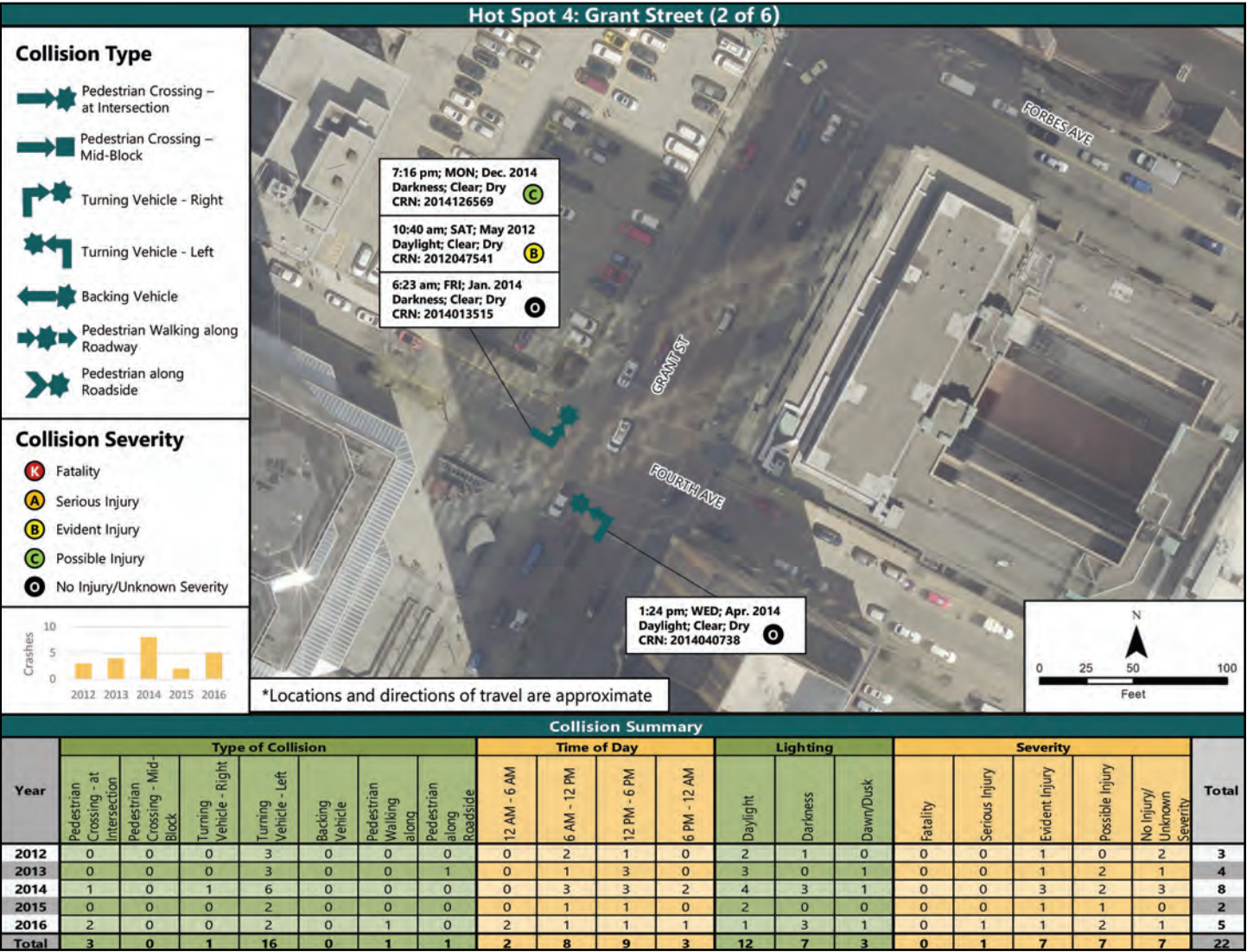
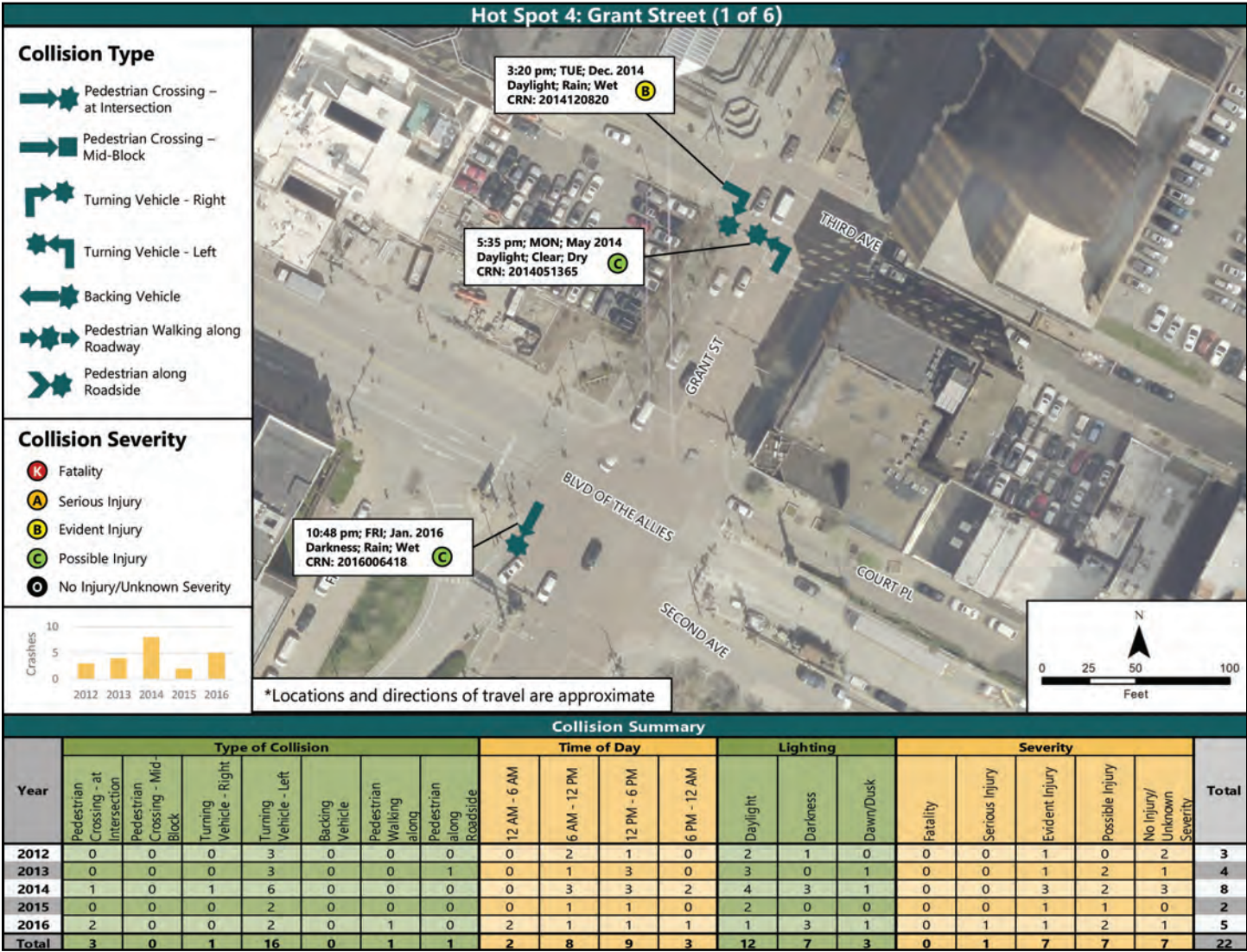


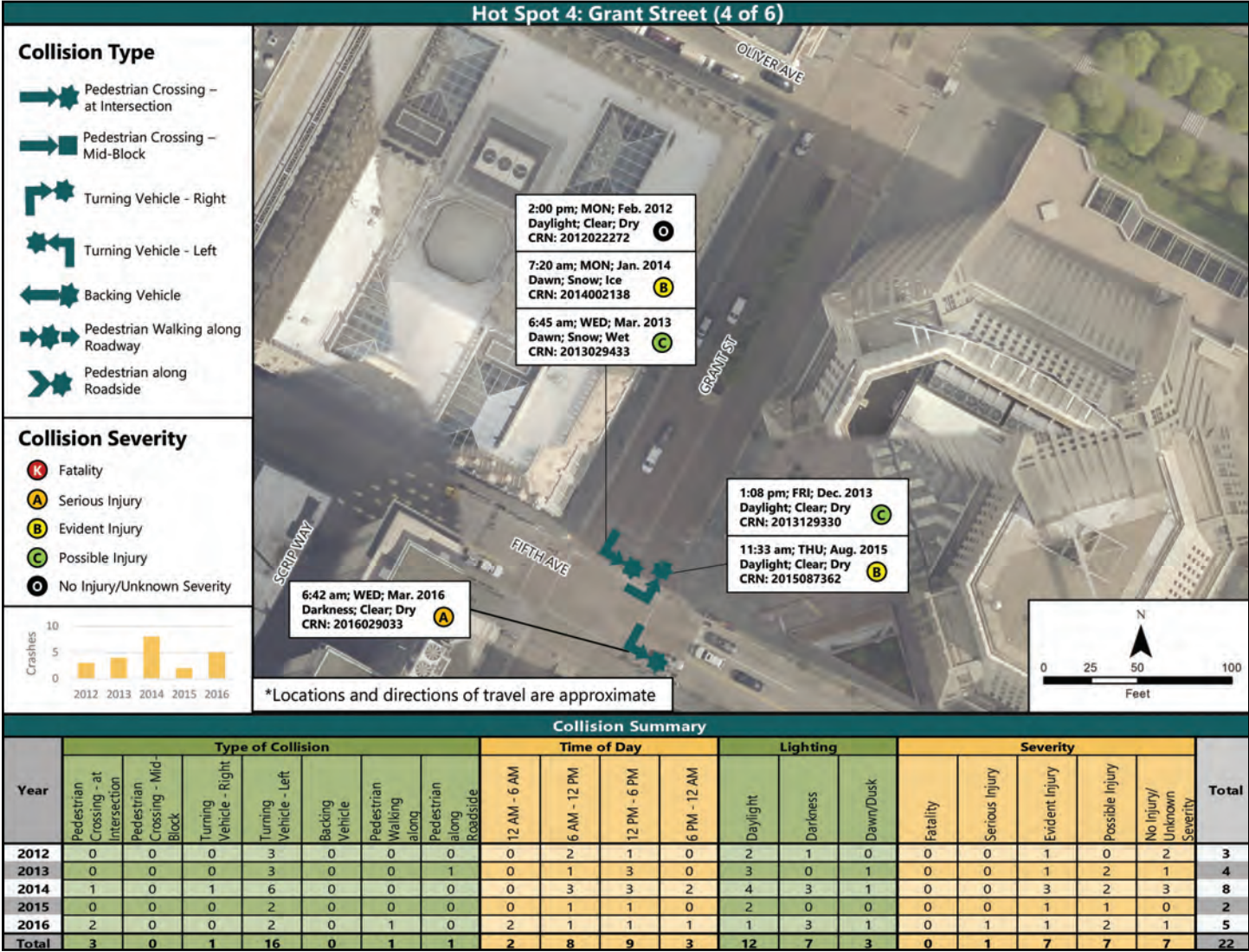
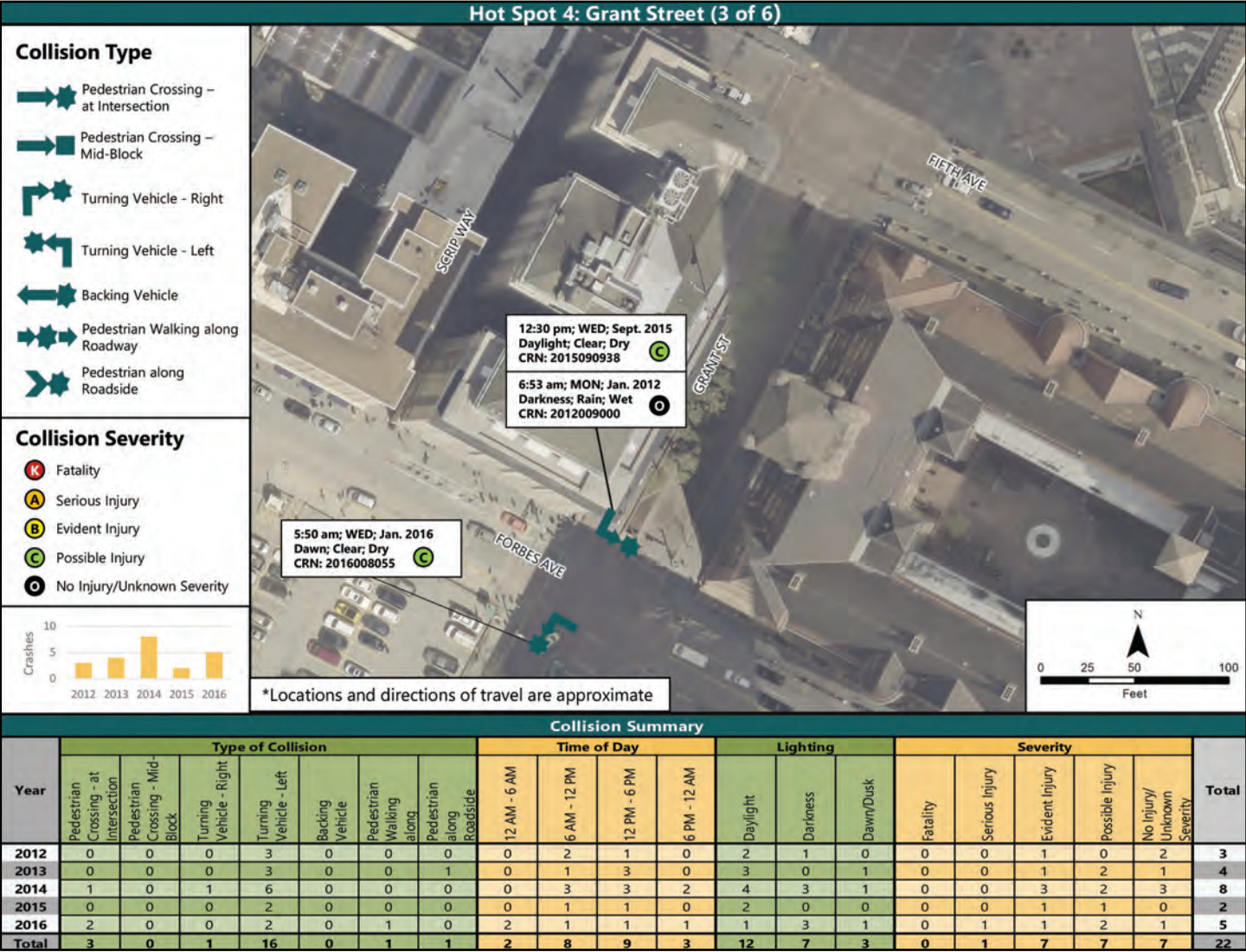


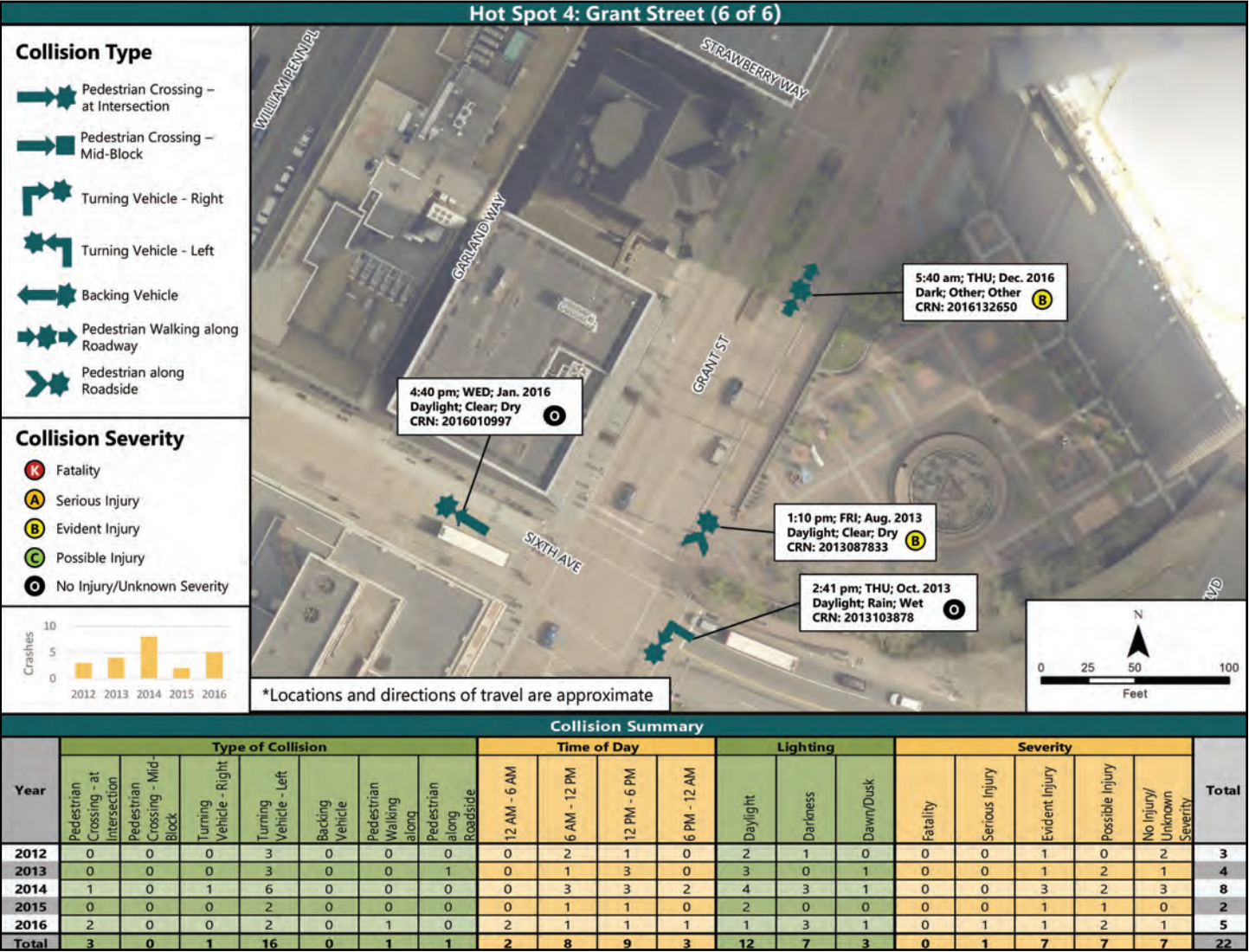
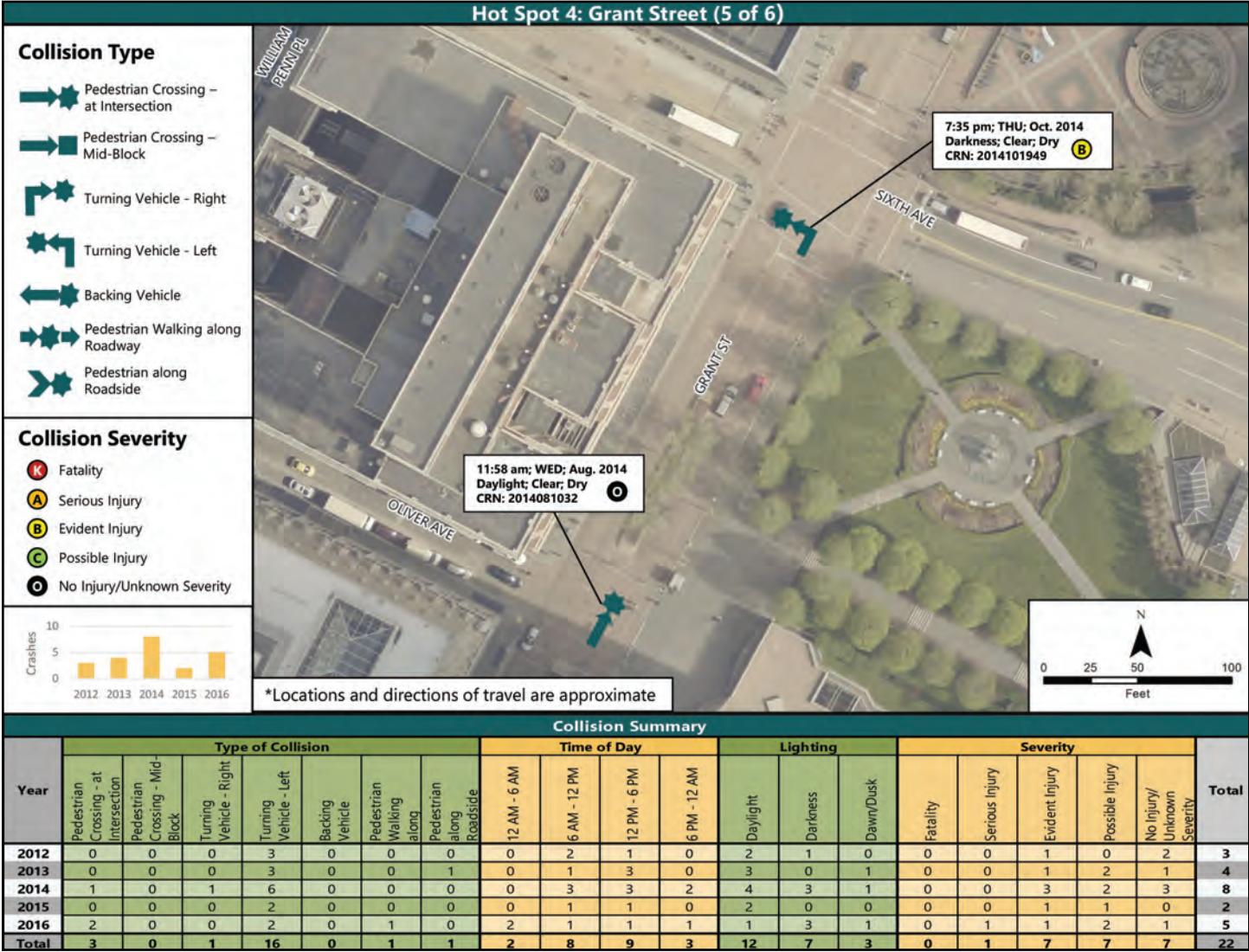


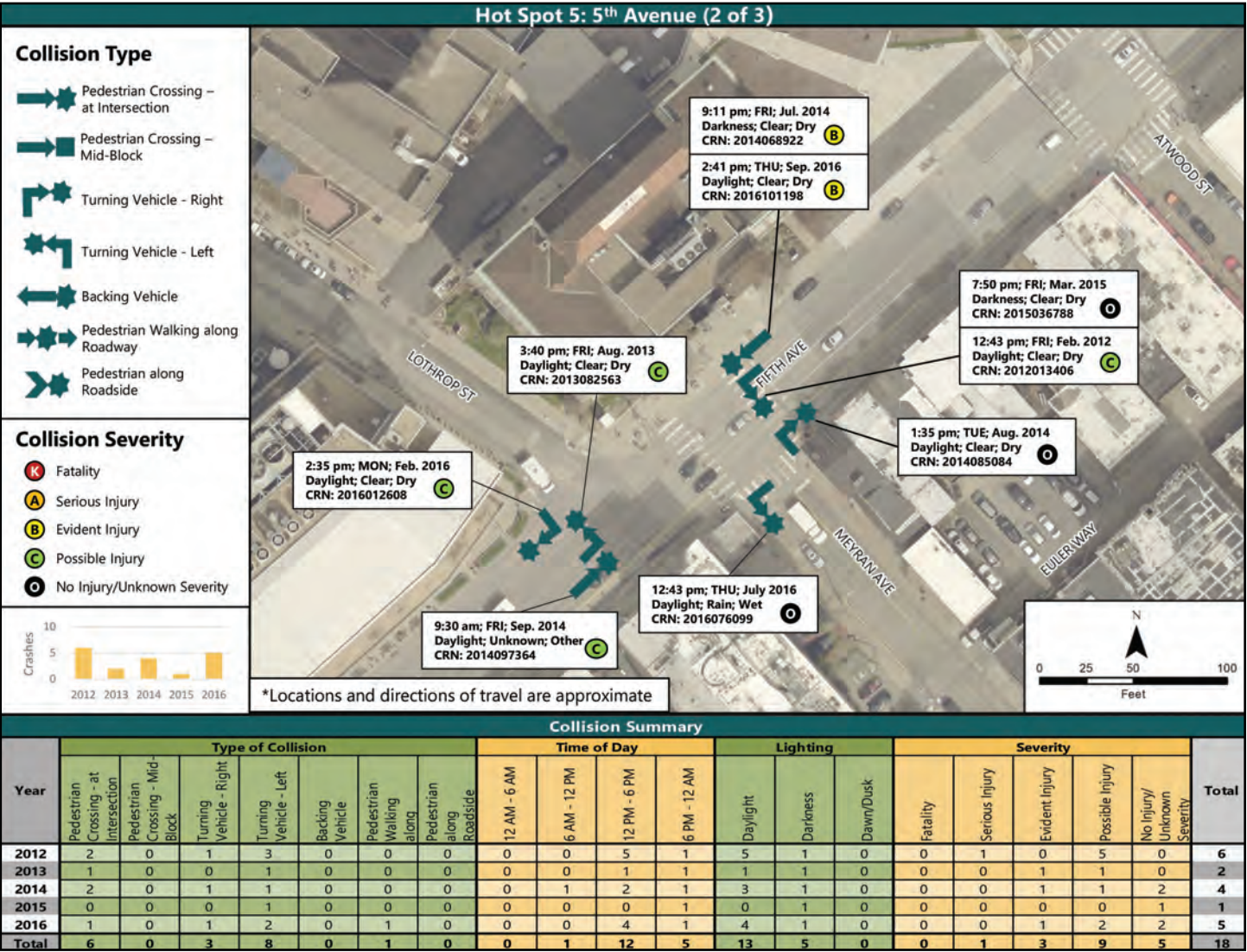
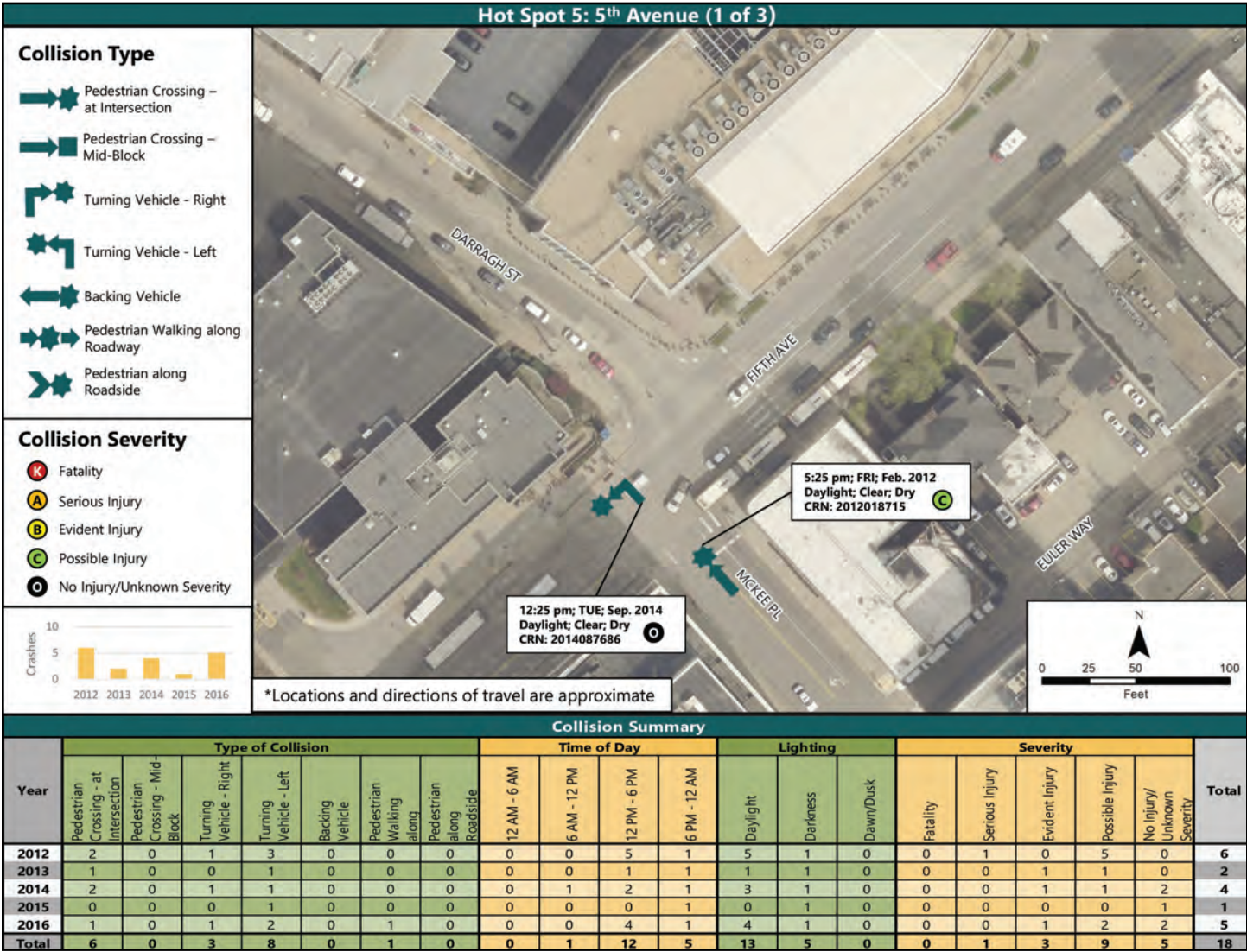


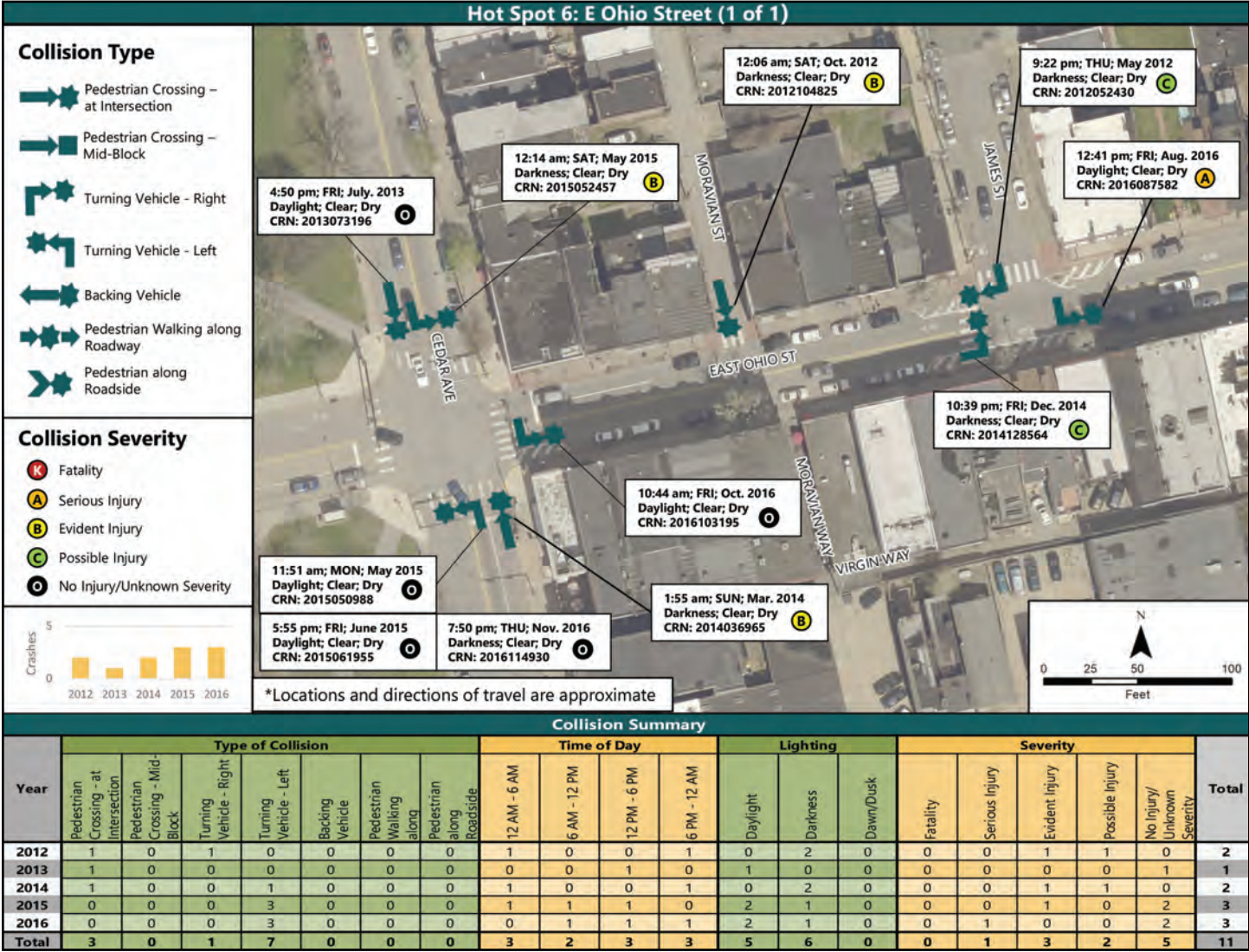
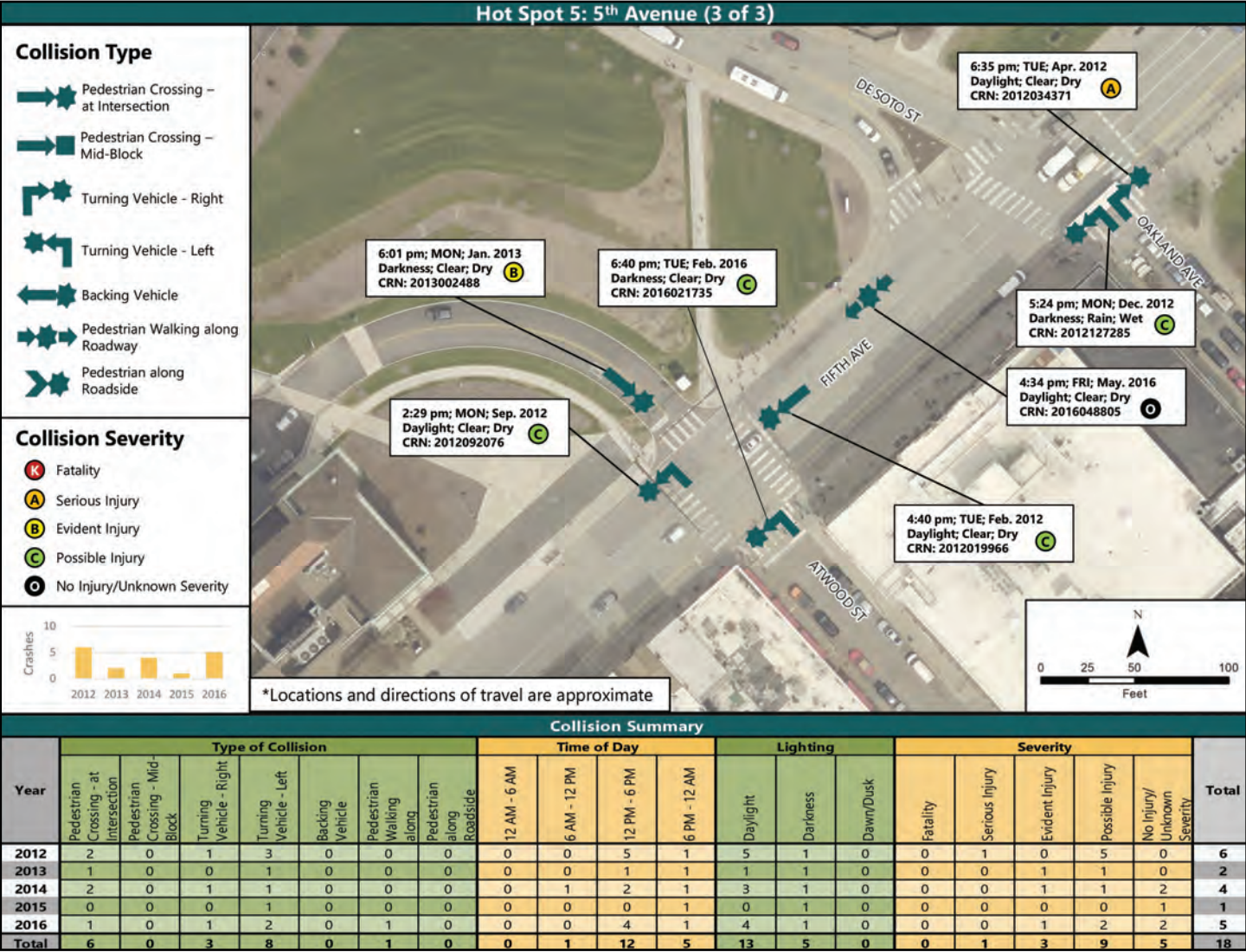


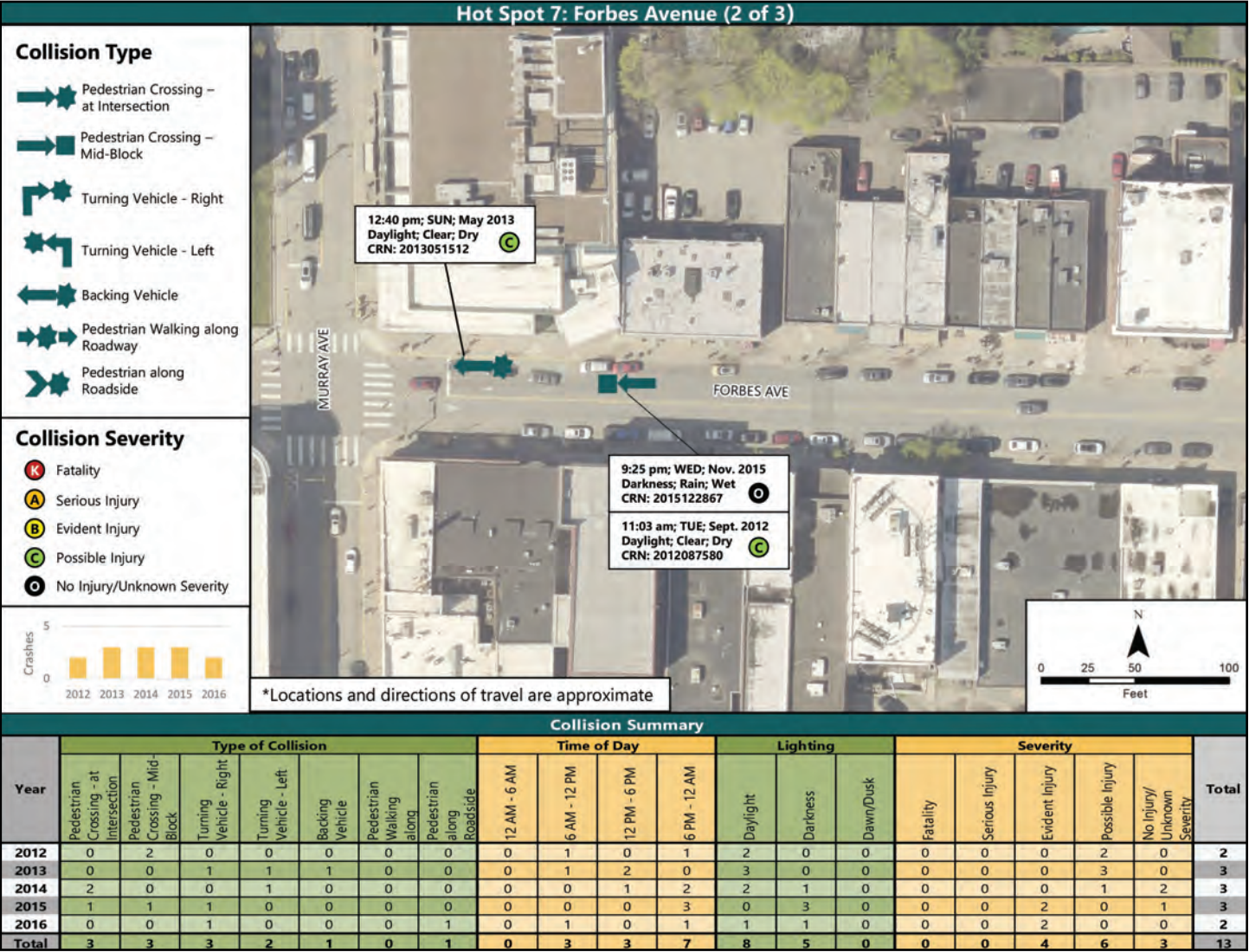
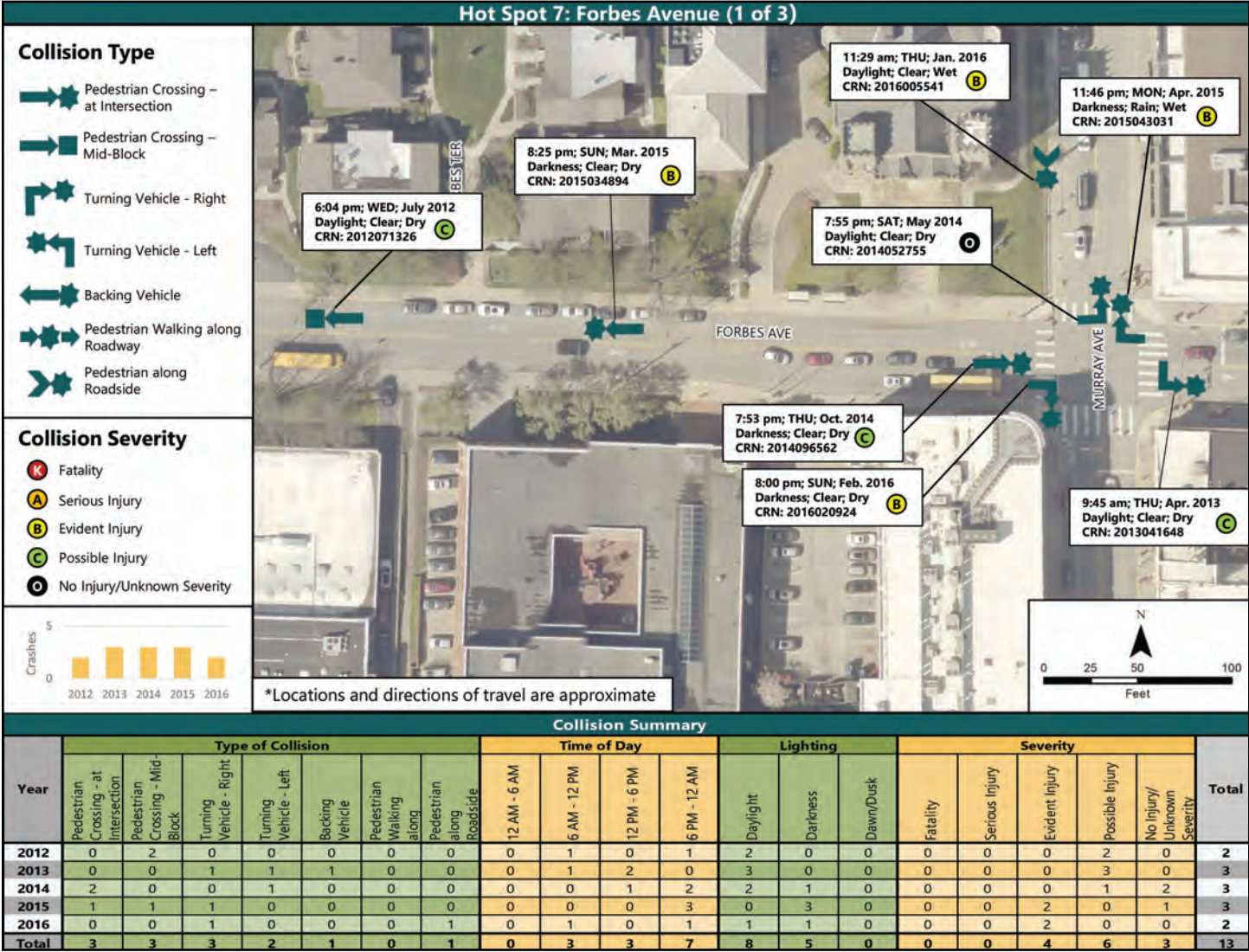


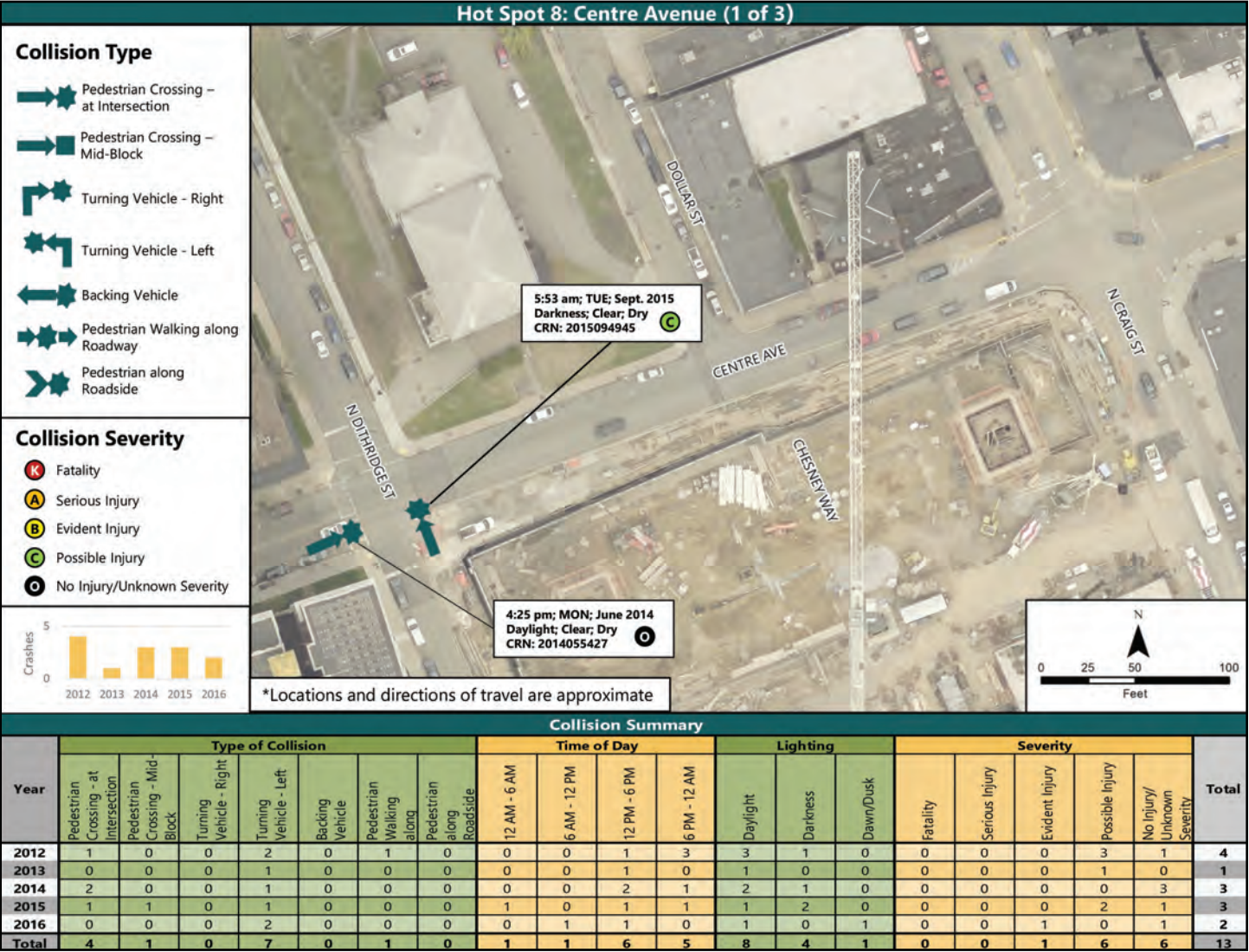
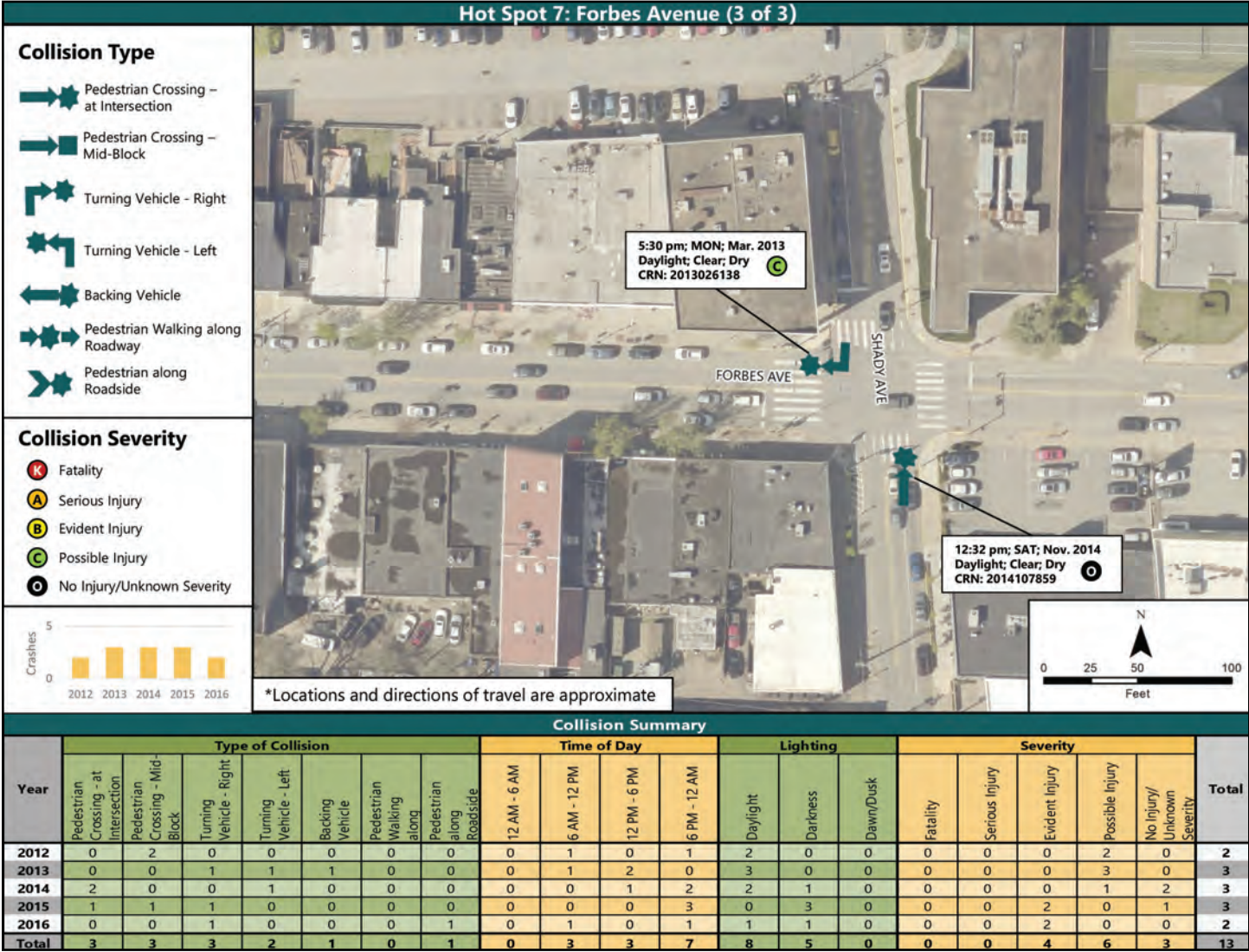


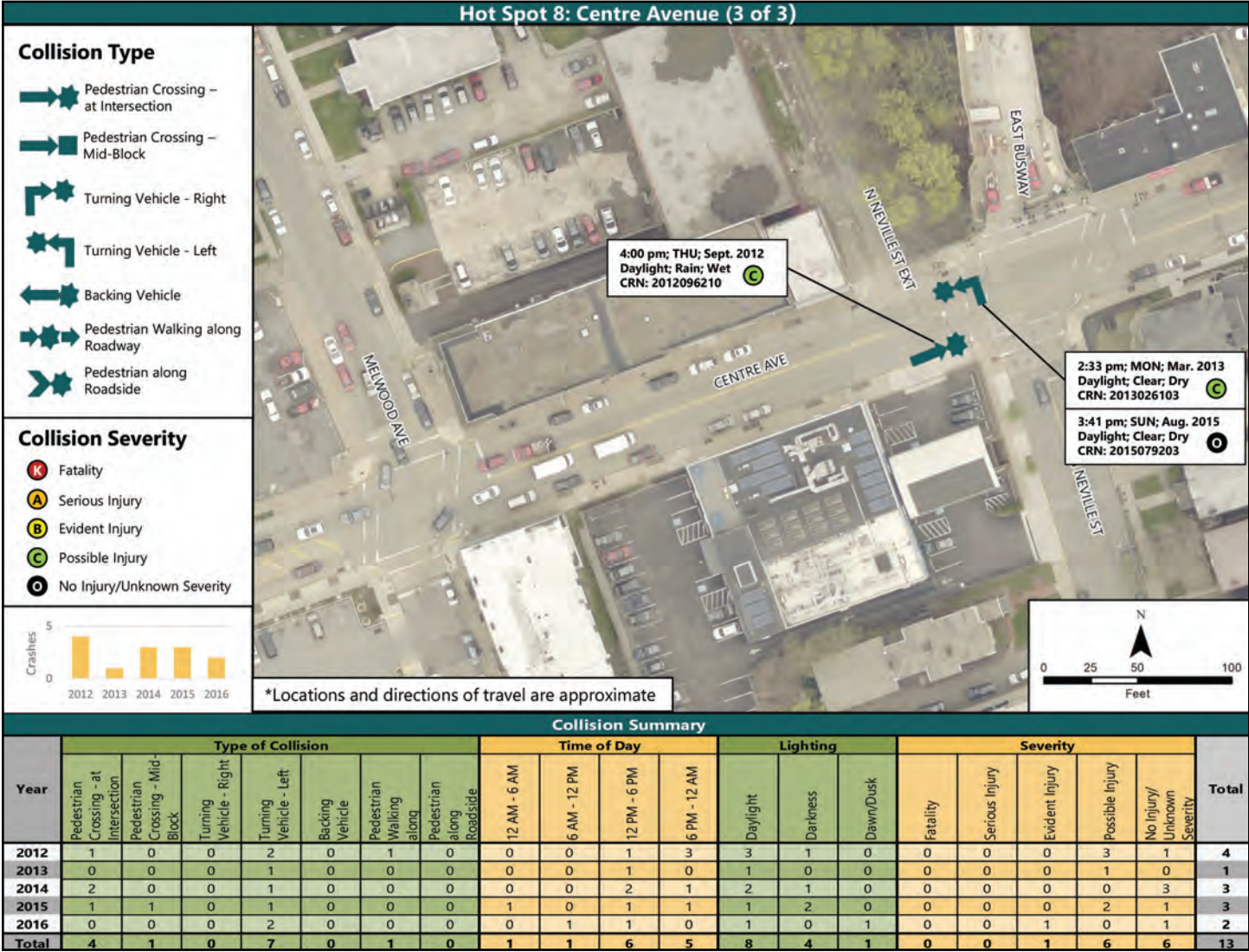
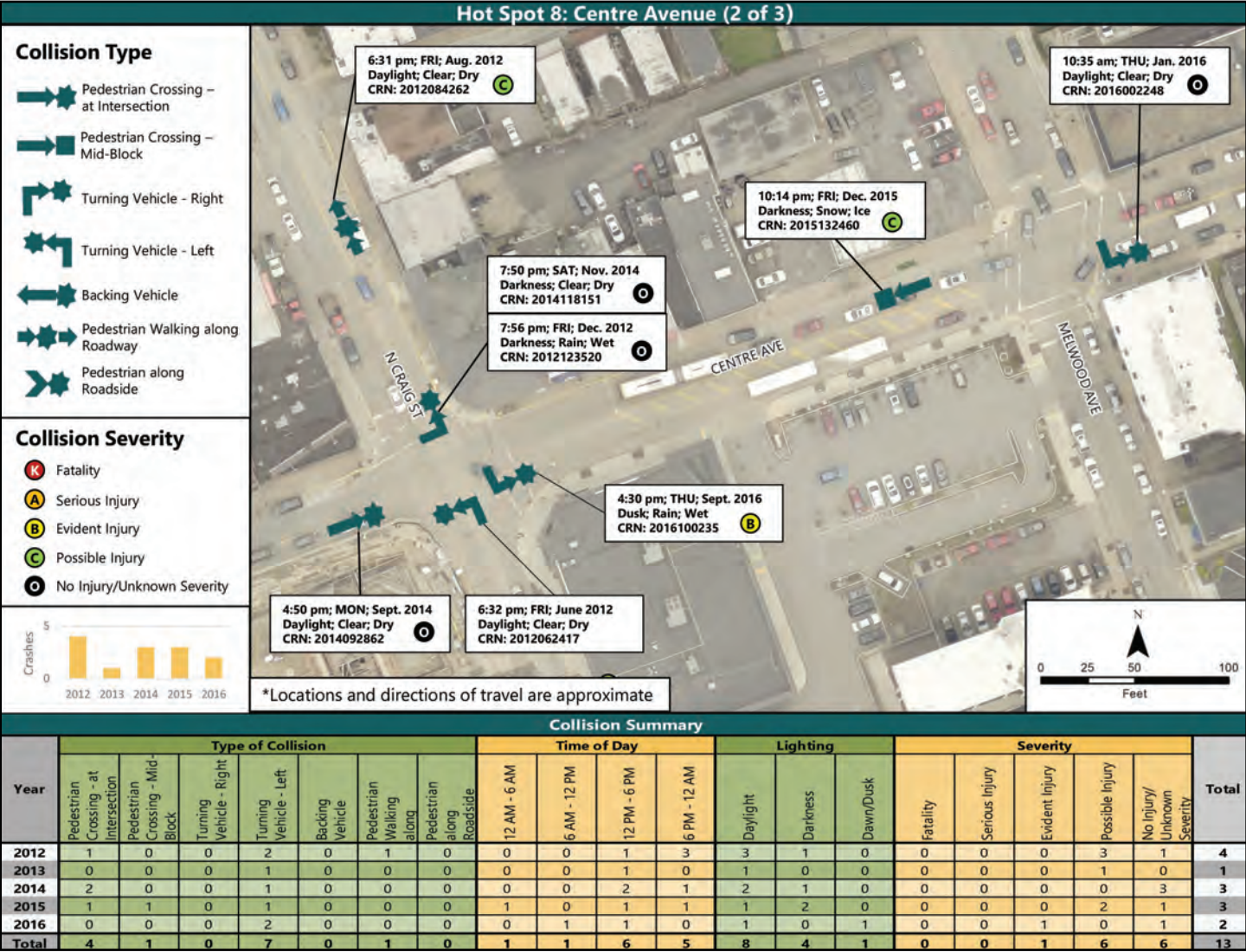


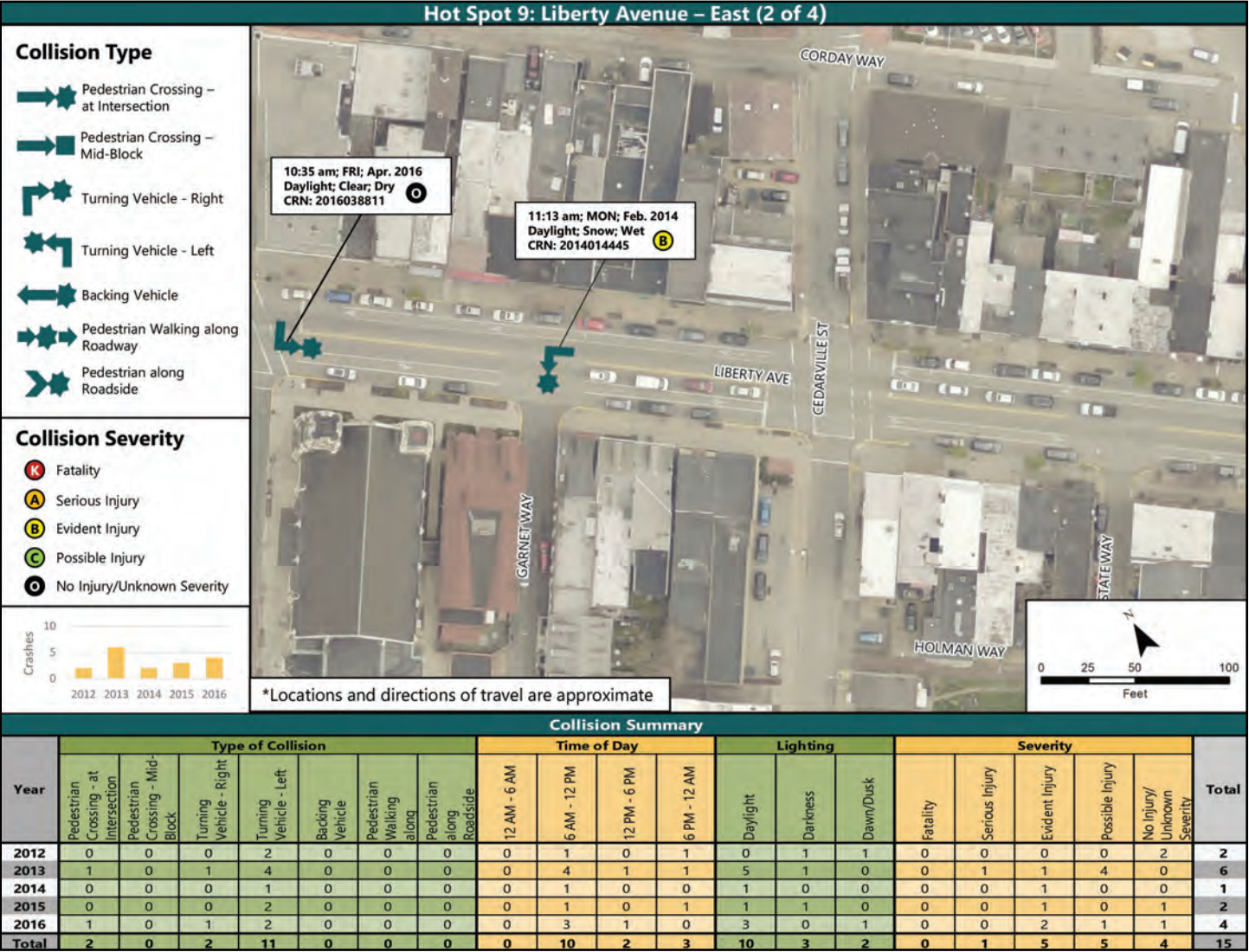
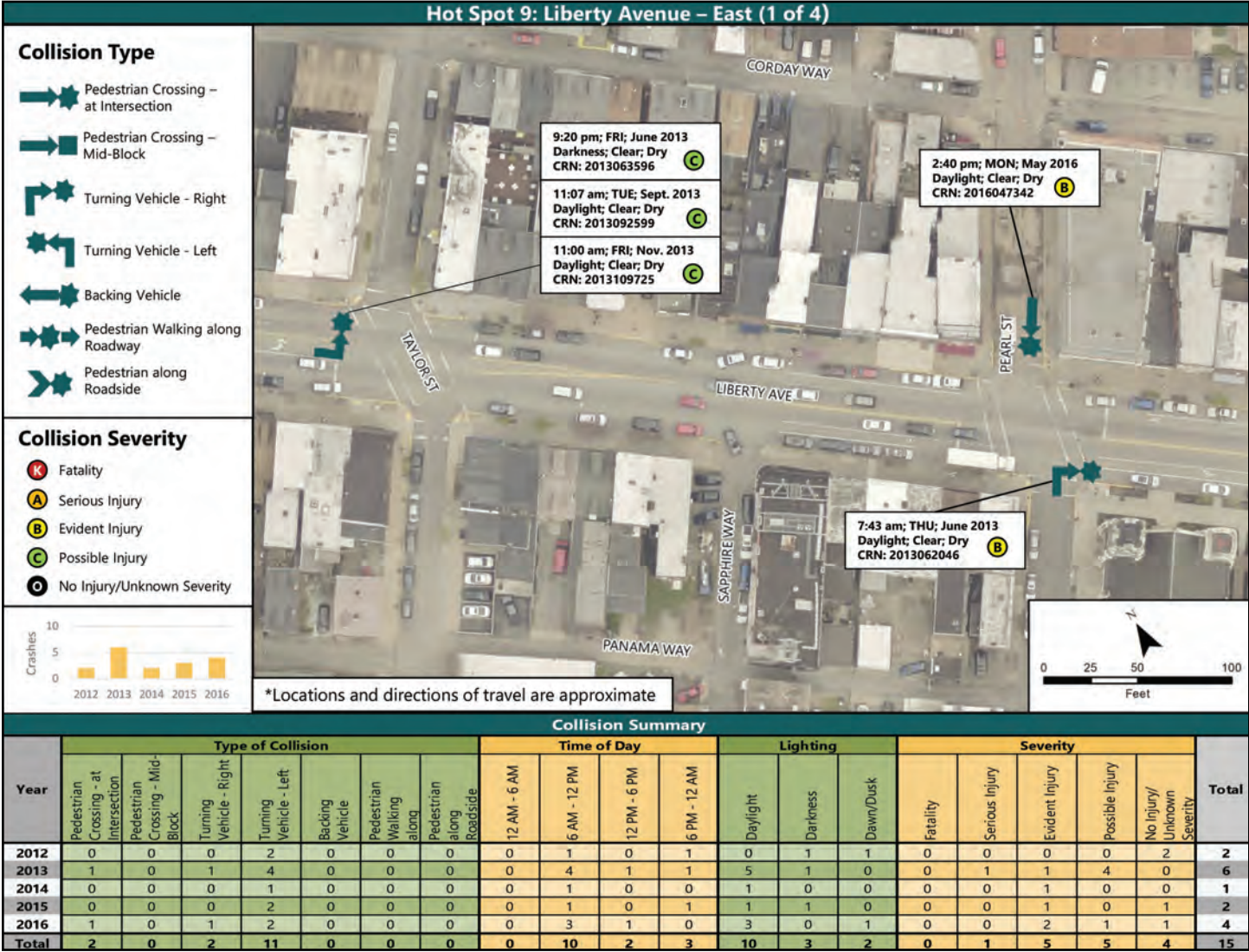


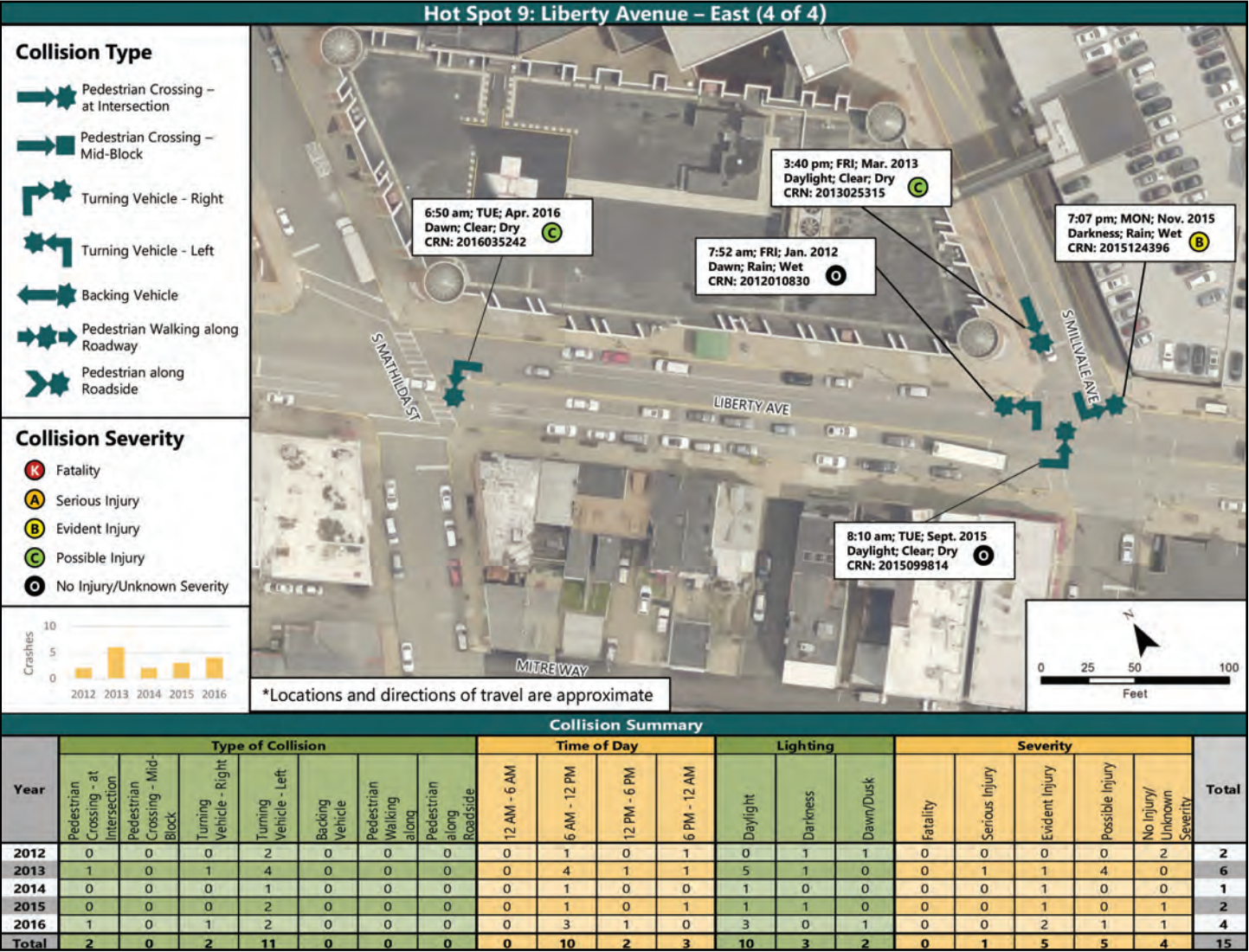
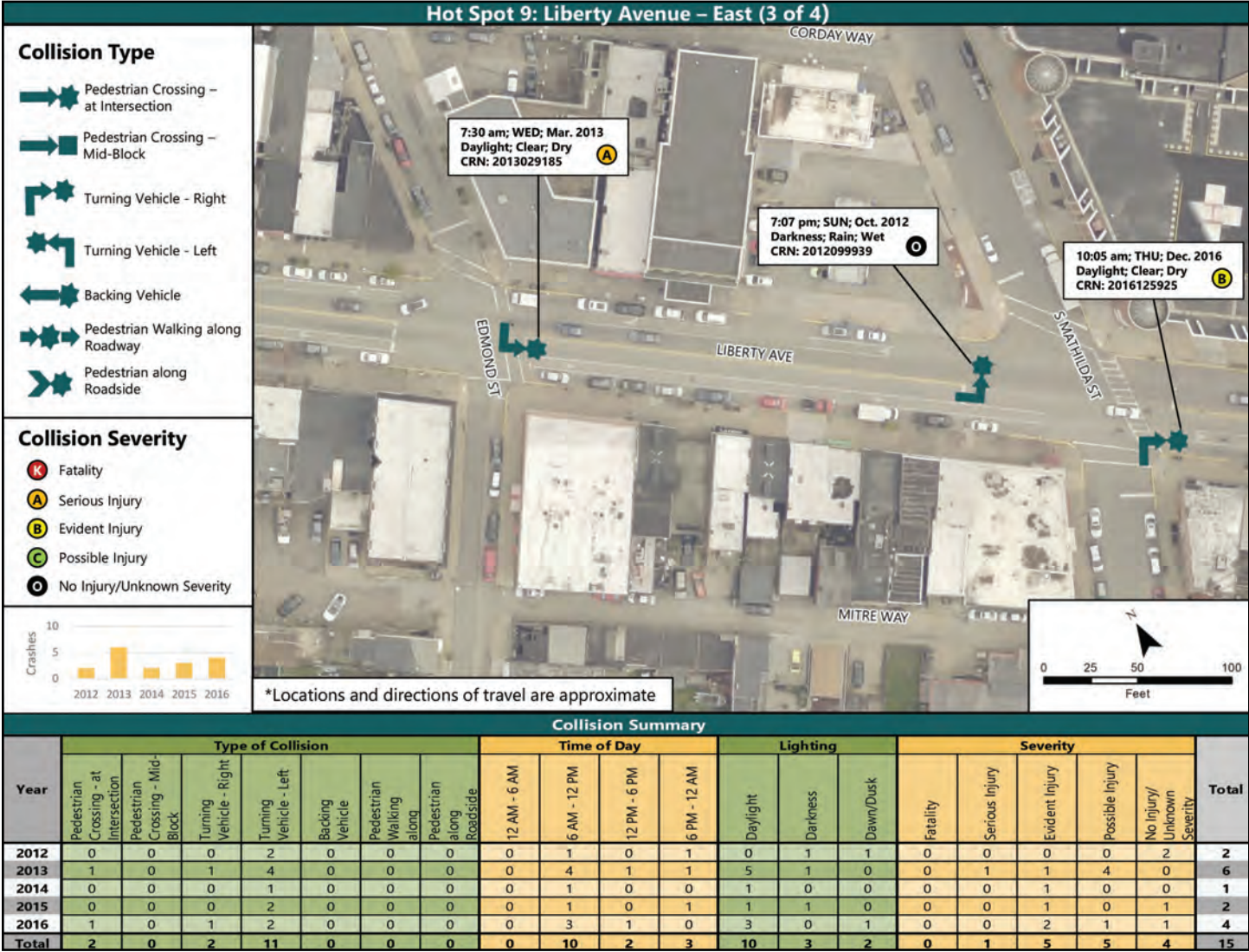


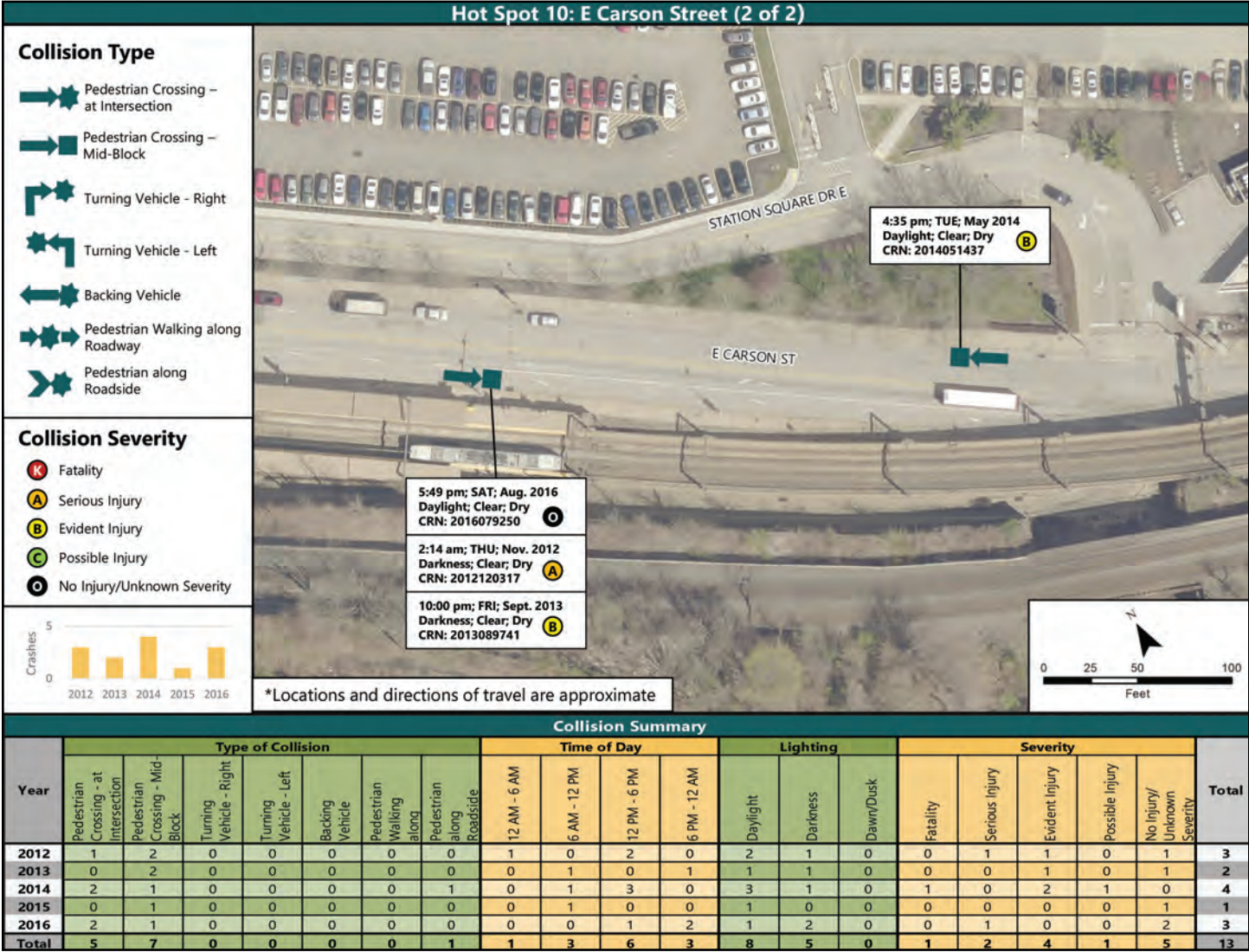
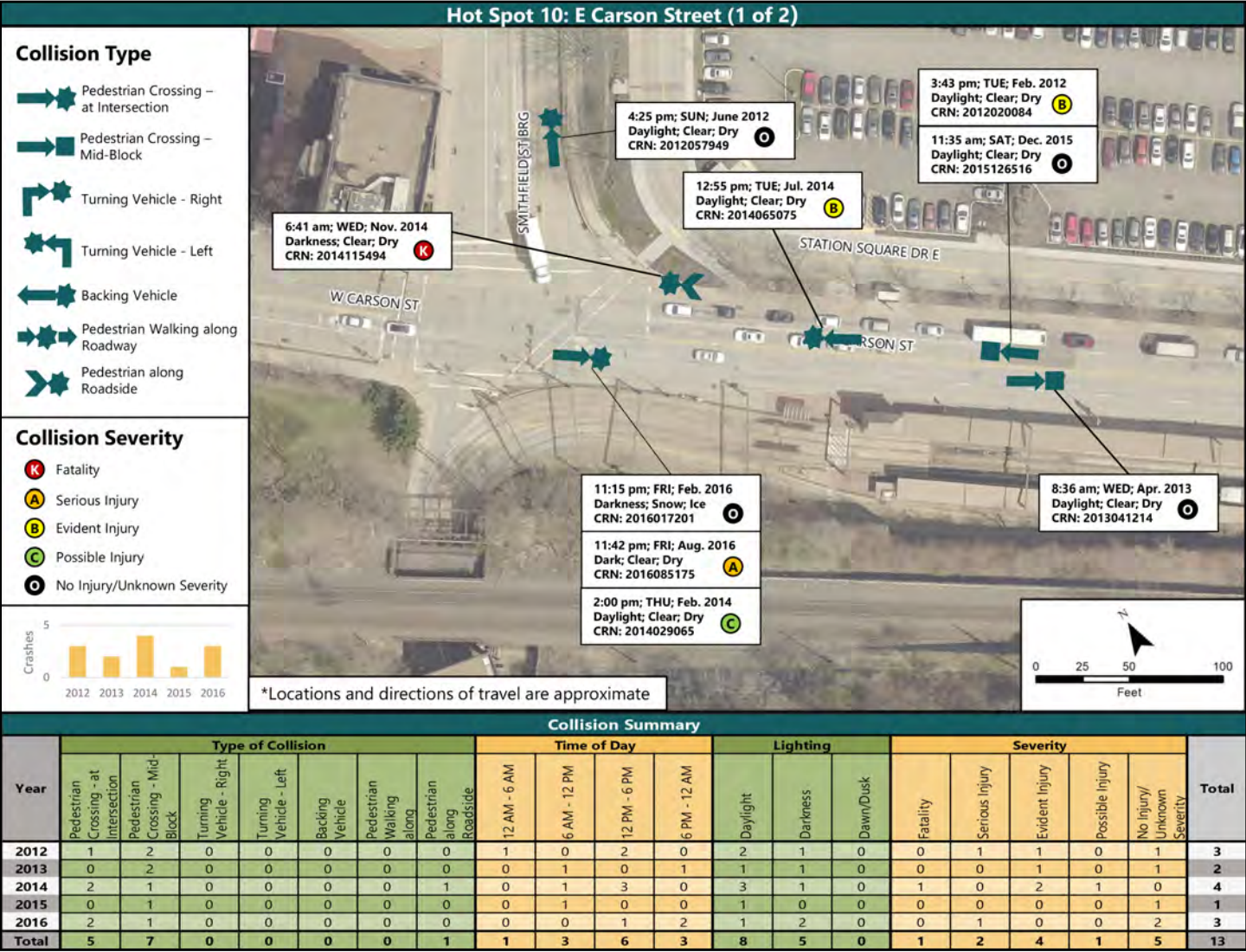












Appendix C

Pedestrian Safety Treatments

The following are a sampling the fundamental treatments used to improve pedestrian safety. There are many more options that should be considered based on each location's unique characteristics and safety concerns – including those related to speed mitigation and traffic calming. For a more robust list, please refer to the FHWA Pedestrian Safety Guide and Countermeasure Selection System (PEDSAFE).³⁴

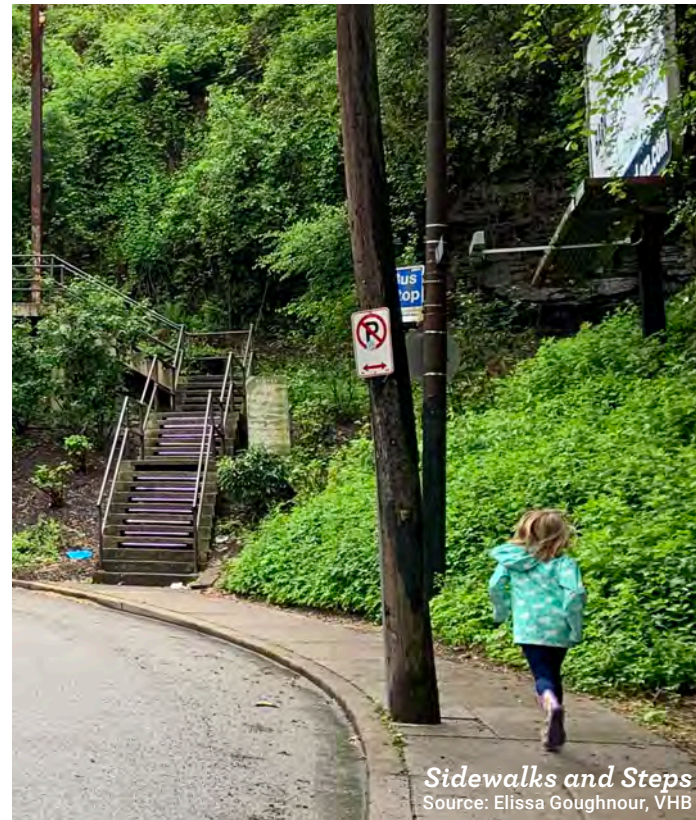
Along the Road

Sidewalks

Sidewalks and walkways are “pedestrian lanes” that provide people with space to travel within the public right-of-way that is separated from roadway vehicles. They provide places for children to walk, run, skate, ride bikes, and play. Sidewalks are associated with significant reductions in pedestrian collisions with motor vehicles.³⁵ Such facilities also improve mobility for pedestrians and provide access for all types of pedestrian travel: to and from home, work, parks, schools, shopping areas, and transit stops. Walkways should be part of every new and renovated road facility and every effort should be made to retrofit streets that currently do not have sidewalks.

Steps

Pittsburgh has more public staircases than any city in the United States. The City's steps connect communities and provide residents access to transit and other amenities. Nearly two-thirds of the steps are in low or moderate-income areas. They are critical assets in the City's pedestrian transportation network and beyond.³⁶



Sidewalks and Steps
Source: Elissa Goughnour, VHB



Steps
Source: Elissa Goughnour, VHB

³⁴ FHWA. Pedestrian Safety Guide and Countermeasure Selection System. (FHWA-SA-04-003). Available: <http://www.pedbikesafe.org/pedsafe/>

³⁵ Hunter, W. W., J. S. Stutts, W. E. Pein, and C. L. Cox. Pedestrian and Bicycle Crash Types of the Early 1990s. Publication FHWA-RD-95-163, FHWA, U.S. Department of Transportation, 1995.

³⁶ Pittsburgh Citywide Steps Assessment: <https://pittsburghpa.gov/citysteps/>

Crossing the Road

Marked Crosswalks

Marked crosswalks indicate optimal or preferred locations for pedestrians to cross and help designate right-of-way for motorists to yield to pedestrians. There are a variety of crosswalk marking patterns. In some instances, a marked crosswalk may not be enough and additional measures, such as a median refuge island or curb extensions, may be needed to enhance pedestrian safety.³⁷ It should be noted that unmarked crossings are also legal pedestrian crossing locations.

Pedestrian Signal

Pedestrian signals help pedestrians to understand when they should cross a signalized intersection. The signal can be enhanced or combined with other treatments, such as protected left turn phasing or Leading Pedestrian Interval (LPI), where the pedestrian gets a “head start” as the pedestrian phase begins before parallel motorized traffic receives their green light. Accessible pedestrian signals that provide supplemental information in non-visual formats (such as audible tones, speech messages, and/or vibrating surfaces), as described in the Manual of Uniform Traffic Control Devices, may be provided.

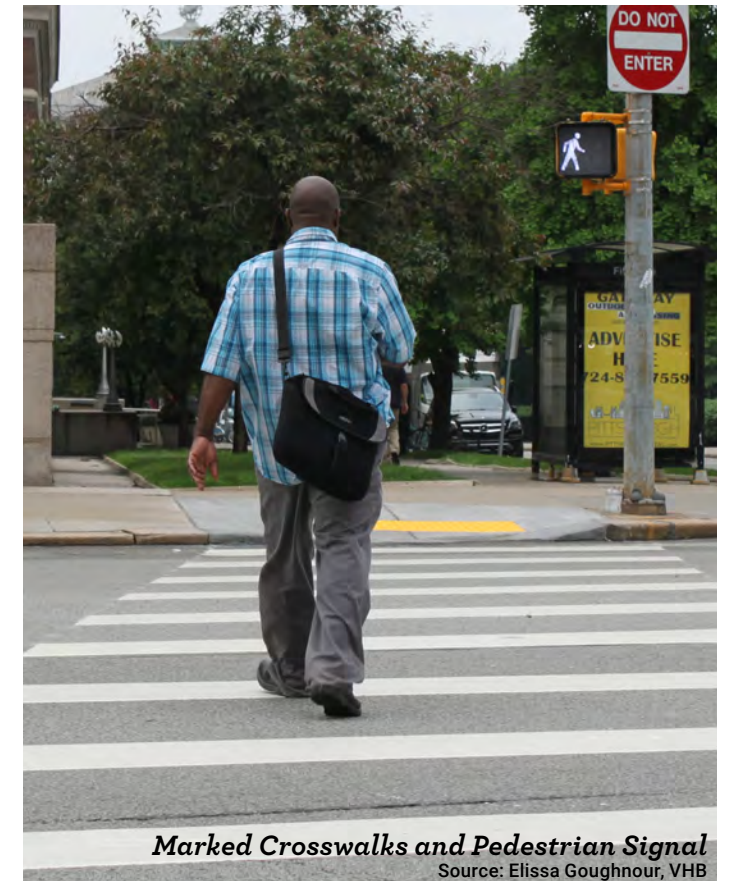
Enhanced Signage

Signage can be used to warn motorists to expect pedestrians. These can be placed in advance of areas with pedestrian activity, or at specific crossing locations. In some locations, signs can get “lost” in visual clutter so care must be taken to their use and placement.

Curb Ramp

Curb ramps provide access between the sidewalk and roadway for people using wheelchairs, strollers, walkers, crutches, handcarts, bicycles, or who have mobility restrictions that make it difficult to step up and down high curbs. Curb ramps must be installed at all intersections and midblock locations where there are pedestrian crossings, as mandated by federal legislation (1973 Rehabilitation Act and ADA 1990).

³⁷ FHWA. Guide for Improving Pedestrian Safety at Uncontrolled Crossing Locations Available: https://safety.fhwa.dot.gov/ped_bike/step/docs/STEP_Guide_for_Improving_Ped_Safety_at_Unsig_Loc_3-2018_07-17-508compliant.pdf



Marked Crosswalks and Pedestrian Signal
Source: Elissa Goughnour, VHB



Enhanced Signage
Source: Elissa Goughnour, VHB



Curb Ramp
Source: FHWA

Crosswalk Lighting

Pedestrian fatalities occur disproportionately during dark conditions. Adequate roadway lighting enhances the safety of all roadway users, while pedestrian-scale lighting improves nighttime security and enhances commercial districts.

Curb Extension

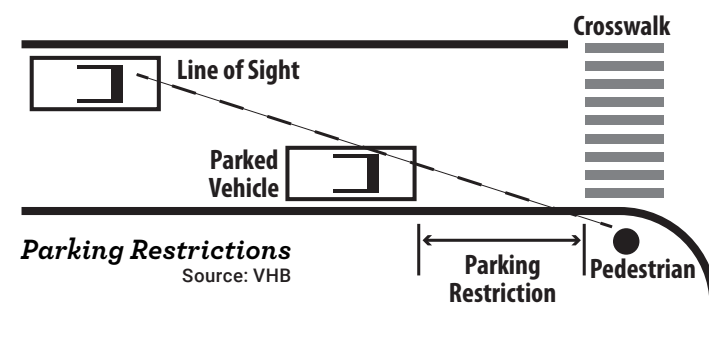
Curb extensions—also known as bulb-outs or neckdowns—extend the sidewalk or curb line out into the parking lane and reduce the effective street width. This countermeasure improves pedestrian crossings by reducing the pedestrian crossing distance, reducing the time that pedestrians are in the street, visually and physically narrowing the roadway, and improving the ability of pedestrians and motorists to see each other. Curb extensions also create space for the addition of a curb ramp. Curb extensions can be painted or created through a concrete extension of the sidewalk.

Crossing Island

A crossing island, or a pedestrian refuge island, is a median with a refuge area that is intended to help protect pedestrians crossing a multilane road. Crossing islands should be considered as a supplement to the crosswalk and can be using at both uncontrolled and controlled crossing locations (e.g., stop or signal controlled).

Parking Restrictions

Eliminating parking spaces too close to a crosswalk will improve pedestrian and motor vehicle visibility, which can reduce the likelihood of pedestrian-vehicle conflicts and collisions. Curb extensions can help to formalize this parking restriction.



Crosswalk Lighting
Source: Elissa Goughnour, VHB



Curb Extension
Source: pedbikeimages.org - Carl Sundstrom



Crossing Island
Source: Elissa Goughnour, VHB

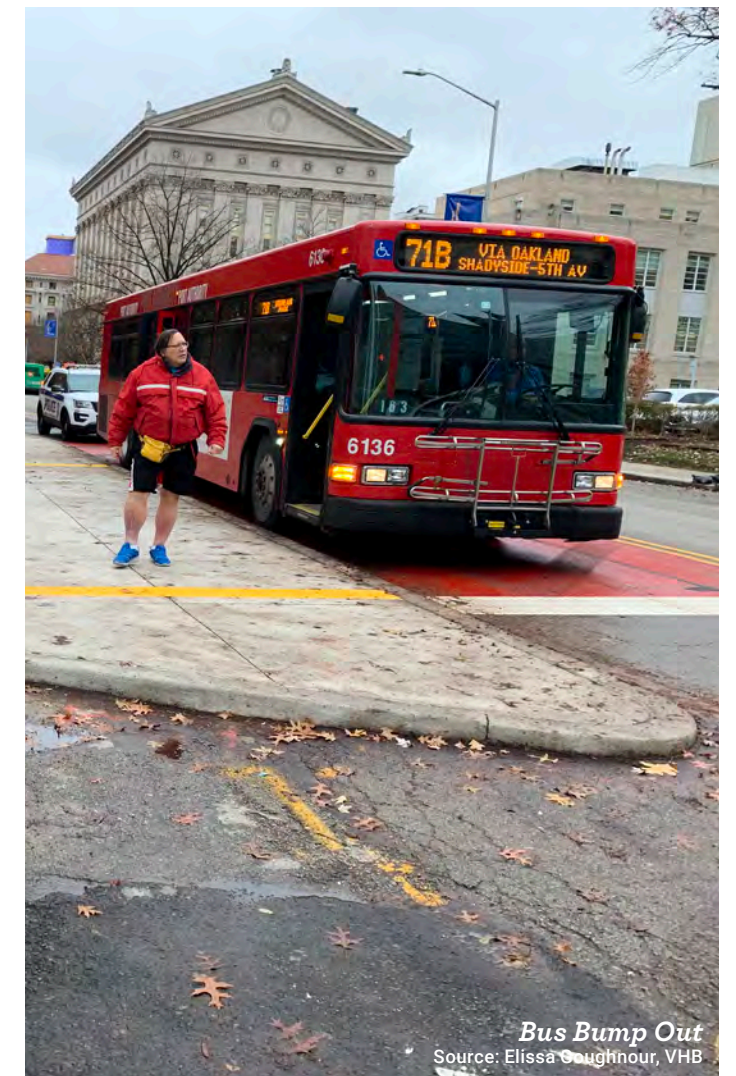
Transit

Bus Bump Out

Bus bump outs – also known as bus bulbs – provide additional space for passengers to board and alight transit vehicles without interfering with sidewalk flow. They can also have positive traffic calming effects by narrowing the roadway, and when placed at intersections, can be designed with smaller curb radii that force right-turning vehicles to reduce speed. When coupled with a pedestrian crossing, bus bulb outs, like curb extensions, also reduce pedestrian exposure by shortening the crossing distance.

Transit Stop Amenities

The physical safety of transit passengers while using and accessing transit facilities is crucial to the success of the transit system. Transit stop design, placement, and features are all important elements to improve the safety of transit passengers. Transit stops and associated crosswalks should be placed in locations that are convenient to riders. The stops should be accessible and include ramps, landing pads, and connections to accessible routes. Adequate lighting at transit stops and crosswalks will improve visibility of transit riders, and stop amenities, such as shelters and benches, will make the stops more comfortable and attractive.



Bus Bump Out
Source: Elissa Goughnour, VHB



Transit Stop Amenities
Source: EXTECH/Exterior Technologies, Inc.

