Brodhead Road
Corridor Planning Study

Brodhead Road Corridor Planning Study

Existing Conditions and Issues

April 2021 (DRAFT)

Beaver County

Center Township, Hopewell Township, and City of Aliquippa, PA

PASHEK MTR WRA

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1 INTRODUCTION AND SUMMARY

1.1 Overview and Study Area

The Southwestern Pennsylvania Commission (SPC) initiated this planning study to analyze existing conditions on Brodhead Road (SR 3007/SR18) in Beaver County and provide short-, medium- and long-term recommendations for improving multimodal transportation operations and safety and accommodating future growth.

The study is intended to serve as an investment plan that will guide planning and programming of transportation projects.

The study area is approximately 11 miles long, and stretches from Monaca to the Allegheny County line, covering Center Township, the City of Aliquippa, and Hopewell Township. 22 total intersections are in the study area, of which nine are signalized (*Exhibit 1* and *Exhibit 2*):

- INT 1 Old Brodhead Road (SR 3002) *
- INT 2 Wagner Road
- INT 3 Short Street / Milne Drive *
- INT 4 Center Commons Boulevard *
- INT 5 Beaver Valley Mall Drive / Golfview Drive *
- INT 6 Frankfort Road (SR 18) / Old Brodhead Road (SR 3002) *
- INT 7 N Branch Road
- INT 8 Baker Road Extension
- INT 9 Community College Drive *
- INT 10 Sherwood Drive
- INT 11 Center Grange Road
- INT 12 Main Street
- INT 13 Shaffer Road
- INT 14 Pleasant Drive
- INT 15 Chapel Road
- INT 16 Mill Street / Kennedy Boulevard (SR 3016) *
- INT 17 Sheffield Road *
- INT 18 Kane Road
- INT 19 20th Street
- INT 20 Laird Avenue
- INT 21 Longvue Avenue
- INT 22 Gringo Road / Laurel Road (SR 151) / Heights Road (SR 3038) (Five Points) *

* Denotes a signalized intersection

Exhibit 1: Project Area and Primary Study Intersections (Map 1 of 2)

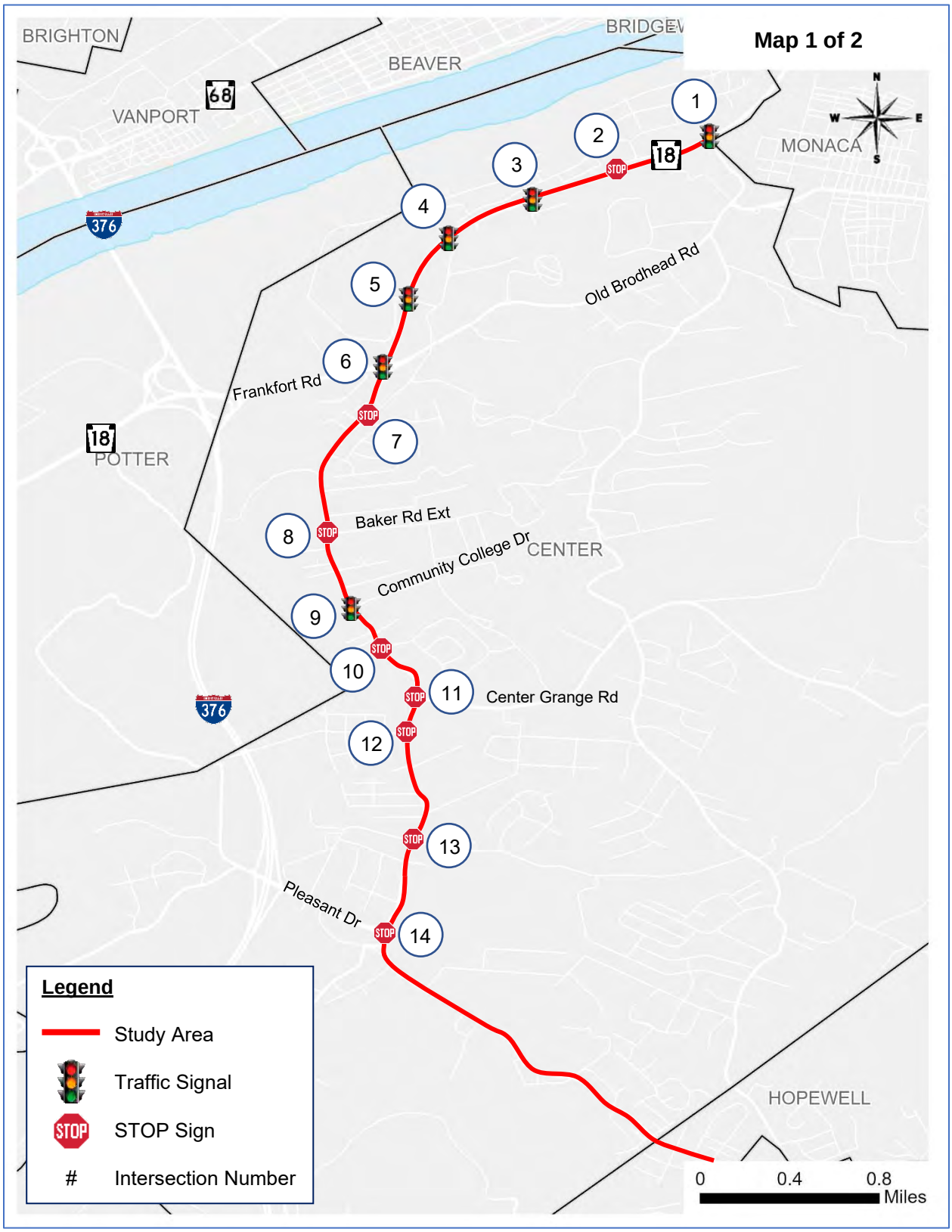


Exhibit 2: Project Area and Primary Study Intersections (Map 2 of 2)

1.2 Project Steering Committee and Vision

SPC conducted the study in collaboration with a project steering committee that included staff from SPC, the Pennsylvania Department of Transportation (PennDOT), Beaver County and Hopewell and Center townships.

The steering committee guided development of the project to date, including public engagement and input, existing conditions inventory and analysis. Bearing in mind how this effort could most effectively address identified local needs within the context of broader regional planning, SPC developed this Vision Statement for the Brodhead Road Corridor Planning Study:

> "The study should make recommendations that will improve regional mobility and accessibility for all, enhance the quality and livability of the community and advance community and economic development goals."

The Vision Statement aligns with that of "SmartMoves for a Changing Region," SPC's Long Range Plan: "The Regional Vision is a world-class, safe and well maintained, integrated transportation system that provides mobility for all, enables resilient communities, and supports a globally competitive economy."

1.3 Project Goals

In support of regional visions and based on Steering Committee guidance, study goals included the exploration of long-term improvements in the following areas:

1.4 Existing Conditions and Issues Summary

The following exhibits represent a high-level summary of noted conditions and issues for primary study intersections from north to south along the Brodhead Road corridor. Each exhibit illustrates a segment of the corridor with numbered intersections and land use context. Icons assigned to each intersection indicate the presence of the issues described below, representing either anecdotal concern or observation (in light blue) or confirmation based on analysis and/or field measurement (in dark blue). Following each segment map is a more detailed description of conditions and issues for each primary study intersection.

The findings represent a general compilation of:

- Location-specific survey and interview comments
- Location-specific Wikimap comments
- Location-specific field observations, photos, and aerial reviews
- Location-specific field measurements (e.g. signal operations, sight-distance, retroreflectivity)
- Crash trends and HSM-based crash analysis results
- Travel time data and operational analysis / level-of-service (LOS) results

The icon categories below represent topic categories to which concerns and observations were assigned, including both qualitative public and stakeholder comments and data or measurement indications.

The details supporting this summary are laid out in subsequent chapters and incorporate data from the report appendices. Ultimately, the summary considers all elements of the Existing Conditions and Issues Report and will serve as a launchpad for exploring future improvements in the study's next phase.

Exhibit 3: Summary Need/Issue Categories

Safety			Accessibility				Planning
Crash Cluster	Sight Distance	Aggressive Driving	Pedestrian	Bicycling	Transit	School	Growth
Mobility			**Operations**				**Other**
Congestion	Cut-Through Traffic	Freight	Traffic Signal Ops	Turn Lanes or Geometry	Signing and Markings	Driveways and Parking	Infrastructure

ICON COLOR LEGEND:

= not applicable at location

= anecdotal concern or general observation

= confirmed issue based on analysis and/or field-measurement

Exhibit 4: Existing Conditions Summary (Map 1 of 5)

Primary Study Intersections and Summary Issues

1. **Old Brodhead Road**
2. **Wagner Road**
3. **Short Street / Milne Drive**
4. **Center Commons Boulevard**
5. **Beaver Valley Mall Drive / Golfview Drive**
6. **Frankford Road / Old Brodhead Road**

INT # 1	
Old Brodhead Road	

The signalized intersection of **Old Brodhead Road (SR 3002) at Brodhead Road** is located at the northern terminus of the study corridor within a relatively isolated section of travel that links the Beaver Valley Mall commercial areas to the south with the Borough of Monaca to the north. Old Brodhead Road also provides an important connection to/from the Penn State Beaver campus less than 1/2-mile from this intersection.

- *Safety* – While the intersection was not flagged for safety performance, anecdotal comments referenced crashes along Old Brodhead Road. PennDOT crash data shows nominal activity along that route with only 18 total crashes since 2015 (about 4 crashes per year), although approximately 40% of those crashes appear near the intersection of Old Brodhead Road at North Branch Road.

- *Accessibility* – Related more to the Old Brodhead Road corridor than the intersection with Brodhead Road, anecdotal input has mentioned interest and potential ridership opportunities for enhanced BCTA access to the Penn State Beaver campus, including northbound and southbound route/stop improvements (e.g. bus pullovers).

- *Mobility* – The northern stretches of Brodhead Road (north of Frankfort Road / Old Brodhead Road) carry some of the highest traffic volumes in the study corridor, so some congestion or slower travel speeds can periodically affect mainline travel. However, the existing traffic signal at Old Brodhead Road (INT 1) generally operates at acceptable LOS C during both the AM and PM peak hours.

- *Operations* – Minor upgrades to traffic signal detection and lane usage may be beneficial. Traffic signal observations noted that the side-street detection may activate prematurely, and that side-street right-turns periodically use the limited shoulder to squeeze past vehicles waiting to turn left.

- *Planning and Infrastructure* – The side-street right-turn from Old Brodhead Road onto northbound Brodhead Road (towards Monaca) is posted as a local evacuation route, presumably for the nearby residential communities and/or for the Penn State Beaver campus.

INT # 2	
Wagner Road	

The intersection of **Wagner Road at Brodhead Road** is a minor, stop-controlled location with generally low-volume side-street traffic.

- *Safety* – No notable safety performance issues were identified. However, the mobility and operations issues noted below may increase the potential for vehicular conflicts between the low-volume turning traffic and the high-volume mainline traffic on Brodhead Road in this area.

- *Accessibility* – No pedestrian, bicycle, or transit activities were observed at this location. While Wagner Road primarily connects to an isolated residential area on the northwest side of Brodhead Road, any multimodal interests in this area may be better served via parallel connections along Wagner Road toward the Lowes Plaza and Short Street / Milne Drive (INT 3).

- *Mobility* – The stop-controlled Wagner Road approach operates at failing LOS F during the PM peak hour, primarily due to the high volumes of traffic along the mainline corridor, which likely results in very few acceptable gaps for the side-street traffic to be able to pull onto Brodhead Road.

- *Operations* – Northbound left-turns and southbound right-turns from Brodhead Road onto Wagner Road are permitted at this location without the benefit of auxiliary left or right turn lanes. Given the high volumes and potentially higher speeds along this stretch of Brodhead Road, these conditions may increase the potential for vehicular conflicts through this intersection.

- *Planning and Infrastructure* – No planning or infrastructure issues were noted at this location.

INT # 3	
Short Street / Milne Drive	

INT # 4	
Center Commons Boulevard	

INT # 5	
Beaver Valley Mall Drive / Golfview Drive	

The trio of signalized intersections along **Brodhead Road at Short Street / Milne Drive** (#3), **Center Commons Boulevard** (#4), and **Beaver Valley Mall Drive / Golfview Drive** (#5) collectively serve access for the broader commercial and retail areas centered around the Beaver Valley Mall.

- *Safety* – While none of the intersections were flagged for safety performance, the number of crashes may be reflective of the higher volumes of traffic on this section of Brodhead Road. Field observations noted several occurrences of atypical driving behaviors such as failure to yield properly through INT 3, red-light running on multiple approaches at INT 4 and INT 5, and occasional red-light running by heavy trucks, likely to avoid losing uphill momentum given the southbound upgrades along this stretch of Brodhead Road.

- *Accessibility* – Pedestrian and transit activity in this area is reflective of the surrounding commercial and retail land uses, including three notably busy BCTA stop locations. At INT 3 (Milne Drive), field observations noted sidewalk gaps between the Walmart Plaza and existing BCTA stops, as well as potential opportunities for enhanced trail connections between the plaza and Penn State Beaver. At INT 3 (Short Street), sidewalk gaps were also noted between the Lowes Plaza and existing BCTA stops, internally between stores and restaurants within the plaza, and across Brodhead Road (linking land uses on opposite sides of the corridor). Anecdotal comments also noted pedestrian and bicycle traffic usage along both sides of INT 5 near Beaver Valley Mall.

- *Mobility* – High traffic volumes through this stretch of Brodhead Road contribute to periodic congestion and queuing, although the overall corridor construction (i.e. multiple travel lanes, turn lanes, merge connections, etc.) is generally setup to handle such demands. While most movements operate acceptably, INT 3 operates at LOS E during the PM peak hour, and periodic side-street approach failures also occur at INT 3 in the AM peak, and INT 5 in the PM peak.

- *Operations* – Field observations generally noted areas where traffic signal and intersection operations could be enhanced through signal actuation/detection improvements (all locations), yield sign improvements (INT 3), and timing/delay refinements (INT 4 and INT 5).

- *Planning and Infrastructure* – As this is a major commercial/retail area, the potential influence of periodic holiday shopping demands and/or future redevelopment trends must also be considered.

INT # 6	
Frankfort Road (SR 18) / Old Brodhead Road	

The signalized intersection of **Frankfort Road (SR 18) / Old Brodhead Road at Brodhead Road** represents the highest-volume junction in the study corridor with volumes exceeding 20,000-25,000 vehicles per day on both the mainline corridor and along Frankfort Road.

- *Safety* – While this location was not flagged for safety performance, the higher number of crashes (relative to other areas along Brodhead Road) is reflective of the higher volumes of traffic through the intersection. Anecdotal comments noted that intersection visibility can be diminished with substantial queuing on the approaches, and the congestion/delay levels can result in increased levels of motorist frustration or aggressive driving in the area.

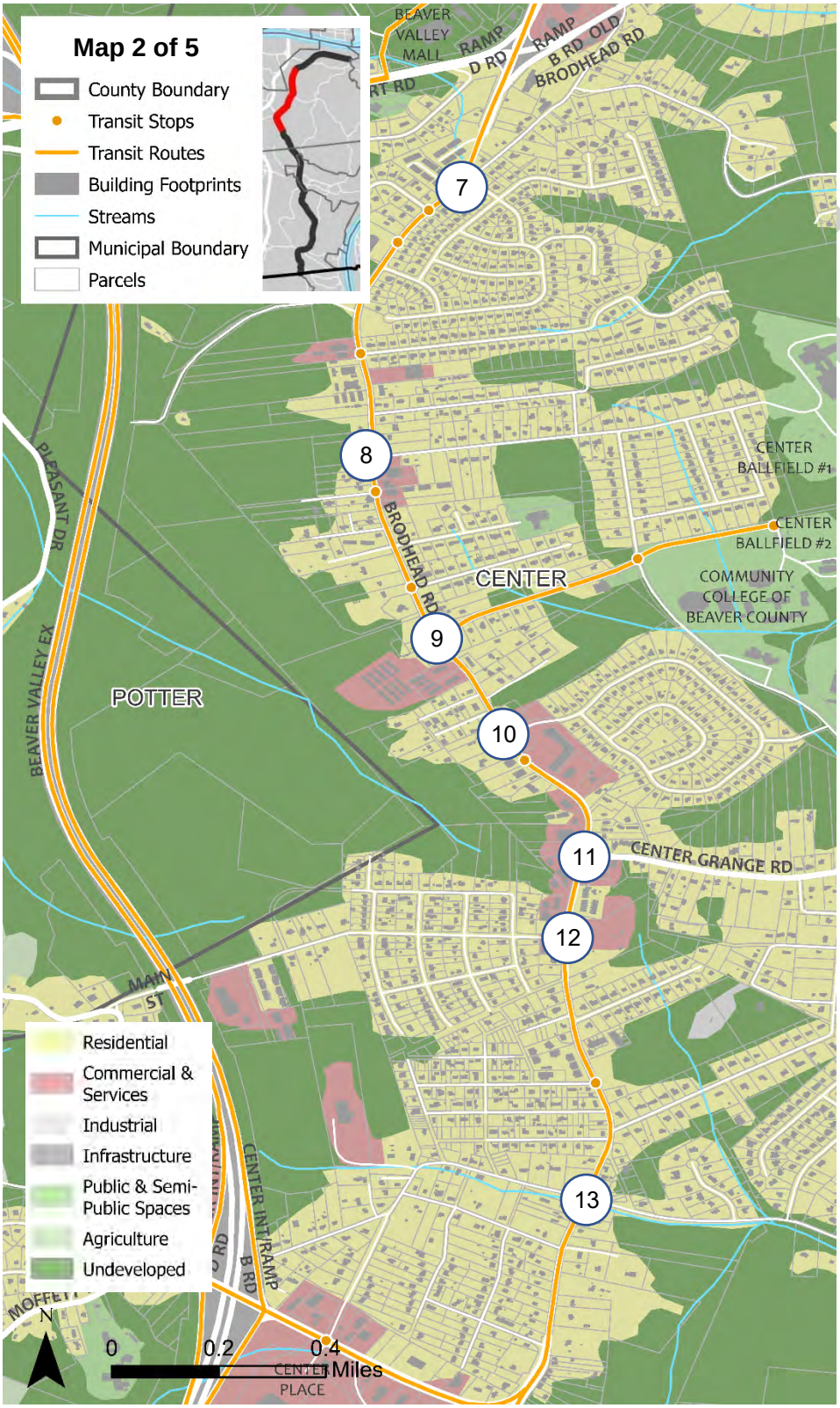
- *Accessibility* – No notable pedestrian or bicycle issues were raised at this location, although the area generally lacks a sidewalk network and ADA-accessible crossings. BCTA transit routes also pass through this location and, as such, are subject to any congestion or delays at the signal.

- *Mobility* – Frankfort Road (SR 18) is one of four main routes along Brodhead Road that link directly with I-376 and connects with Exit 39 approximately one half-mile west of the study corridor. The route also serves as an important truck linkage between I-376, Route 51, and freight-oriented sites along the Ohio River, including the Shell Petrochemical Plant to the west, and areas around Monaca Borough to the east.

- *Operations* – Congestion through the intersection can be significant with overall failing LOS F during both the weekday AM and PM peak hours. Field observations and anecdotal comments generally noted that the existing traffic signal timing, detection, and split-phase operations (i.e. each approach moves independently) all appear to contribute to significant delays. The split-phase operations are directly linked with shared turn-lane/through-lane combinations on each approach, as separate auxiliary turn lanes are not present. Anecdotal comments have noted interests in reconfiguring the approach lanes, modifying turn lanes, or exploring options such as a roundabout. Operations may also be influenced by traffic on the downstream receiving legs of the intersection including, for example, anecdotal interests in a new left-turn lane just east on Old Brodhead Road where traffic enters the nearby King's Restaurant driveway.

- *Planning and Infrastructure* – Operations through this intersection will likely be influenced by changes in the surrounding areas. Growth opportunities may include redevelopment of the former Toys R Us site near the mall, general redevelopment/rejuvenation around the mall, or interests in future green space or pocket parks as part of any redevelopments. Short-term/long-term changes in traffic usage or temporary shuttle activities related to construction at the Shell Petrochemical Plant are also likely to have a direct influence on intersection operations at this location.

Exhibit 5: Existing Conditions Summary (Map 2 of 5)



Primary Study Intersections and Summary Issues

7 **North Branch Road**

8 **Baker Road Extension**

9 **Community College Drive**

10 **Sherwood Drive**

11 **Center Grange Road**

12 **Main Street**

13 **Shaffer Drive**

INT # 7	
North Branch Road	

INT # 8	
Baker Road Extension	

The pair of intersections for **North Branch Road at Brodhead Road** and **Baker Road Extension at Brodhead Road** are typical of unsignalized intersections along the corridor that operate with stop-control only on the side-street approaches and experience access difficulties given the demands they carry to make key connections to/from the mainline corridor.

- *Safety* – While neither intersection was flagged for safety performance, field observations and anecdotal comments note several factors that influence potential conflicts. At North Branch Road, the skewed intersection geometry and a short/separate connector link, a lack of turn lanes, and potential sight distance constraints for the westbound left-turn can be problematic. At Baker Road, sign clutter or placement along the mainline corridor can also potentially obstruct clear sight lines.

- *Accessibility* – Baker Road provides a direct connection to Central Valley High School, and anecdotal comments have noted that school traffic through the area heavily impacts not just Baker Road, but also spills one block north to Christy Drive. Both locations can be difficult for car or bus access to/from Brodhead Road. Pedestrian and bicycle activity have been noted to use North Branch Road. BCTA has also generally noted that transit stops on this stretch of Brodhead Road can be difficult with no pullover areas and with aggressive drivers periodically passing stopped buses.

- *Mobility* – Both routes have been noted as potential cut-through routes, including usage of North Branch Road to access Old Brodhead Road, and Baker Road school traffic that spills over onto Christy Drive. While both intersections operate acceptably at LOS C during the AM peak hour, they both operate at failing LOS E/F during the PM peak hour, and access onto Brodhead Road can be difficult.

- *Operations* – Anecdotal comments have expressed a need for turn lanes at North Branch Road and turn lanes and/or a traffic signal at Baker Road. Business parking and property/access management along this stretch of Brodhead Road also shows a mix of well-managed access points, in comparison to locations that often have wide/open curb cuts with direct parking access that may conflict with travel along the mainline corridor.

- *Planning and Infrastructure* – As with many locations along Brodhead Road, the overall narrowness of the corridor and anticipated right-of-way constraints may present significant challenges to exploring various improvements.

INT # 9	
Community College Drive	

The signalized intersection of **Community College Drive at Brodhead Road** is the only traffic signal between Center Township and Aliquippa, and is perceived to be a viable cut through for side street traffic.

- *Safety* – While the intersection was not flagged for safety performance, anecdotal safety comments noted concerns with blind spots, particularly for emergency responders.

- *Accessibility* – Anecdotally, the Community College of Beaver County (CCBC) is accessible to the east, with Beaver County Transit Authority (BCTA) stops on the campus. However, the local pedestrian network is generally incomplete and not fully accessible, including missing sidewalk connections to existing sidewalk near the CCBC campus.

- *Mobility* – Community College Drive connects to Poplar Drive to the east, which in turn connects to Baker Road Ext, Sherwood Drive, and Center Grange Road. Anecdotally, traffic will use the signal at Community College Drive to avoid the congested unsignalized side street turns elsewhere along the corridor, resulting in increased congestion at this location.

- *Operations* – Morning/afternoon congestion is typically moderate, with existing LOS D/D in either peak hour, though the westbound approach fails in the PM peak. Side street and turning traffic in particular face lengthy delays in both peak hours. The traffic signal itself features atypical red-amber-green signal heads for pedestrians, rather than the more standard Walk/Don't Walk pedestrian signal heads.

- *Planning and Infrastructure* – No major growth is anticipated in this area, though the demand for higher education is unlikely to decrease in the future.

INT # 10	
Sherwood Drive	

The unsignalized intersection of **Sherwood Drive at Brodhead Road** represents a typical low-volume unsignalized intersection in the area.

- *Safety* – The intersection was not flagged for safety performance, and no notable sight distance issues were found.
- *Accessibility* – Some businesses along Brodhead Road exist without pedestrian facilities, resulting in a pedestrian network that is incomplete and not fully accessible.
- *Mobility* – Sherwood Drive chiefly serves as a neighborhood access point, with little to no cut-through traffic. Several businesses are also accessible via driveways off of Sherwood Drive.
- *Operations* – Morning/afternoon congestion is typically light with existing LOS B/C in either peak. Nighttime retro-reflectivity in the area is fair, with some missing or dim street lighting.
- *Planning and Infrastructure* – No major growth is anticipated in this area.

INT # 11	
Center Grange Road	

The unsignalized intersection of **Center Grange Road at Brodhead Road** represents one of the busier and more congested unsignalized junctions in the study corridor.

- *Safety* – While the intersection was not flagged for safety performance, anecdotal safety comments noted concerns with aggressive driving and queuing.
- *Accessibility* – Anecdotally, the transit stops near Center Grange Road create bottlenecks, in particular with the amount of people accessing the schools east of Brodhead Road. There is a fair number of businesses on either side of Brodhead Road in this area, though no pedestrian facilities are present.
- *Mobility* – Center Grange Road is the largest east-west route in the area that doesn't connect to I-376, providing access to multiple neighborhoods and schools, resulting in a large amount of cut-through traffic. As a result, anecdotal notes refer to difficulties for traffic turning from the side street, and a significant congestion point.
- *Operations* – Afternoon congestion can be significant with existing LOS F and failing approaches in the PM peak. Delays and queuing are further influenced by the higher volumes of turning volumes from Brodhead Road, resulting in mainline traffic blockages and spillback. Anecdotally, a southbound left turn lane and a traffic signal have been noted as desirable.
- *Planning and Infrastructure* – Future intersection demands are expected to increase, including several new neighborhoods planned east of Brodhead Road.

INT # 12	
Main Street	

INT # 13	
Shaffer Drive	

The intersections of **Main Street at Brodhead Road** and **Shaffer Drive at Brodhead Road** are typical of unsignalized intersections through the Center Township area. Only the side-streets are stop-controlled, and access to the mainline is perceived to be difficult.

- *Safety* – While neither intersection was flagged for safety performance, anecdotal safety comments identified other types of safety influences (see below), plus a perception of higher speeds and aggressive driving due to lower levels of mainline congestion through this area. At Shaffer Drive, specifically, sight distance for eastbound and westbound left-turns does not meet minimum criteria due to existing roadway curvature and vegetation looking left from the side-street.

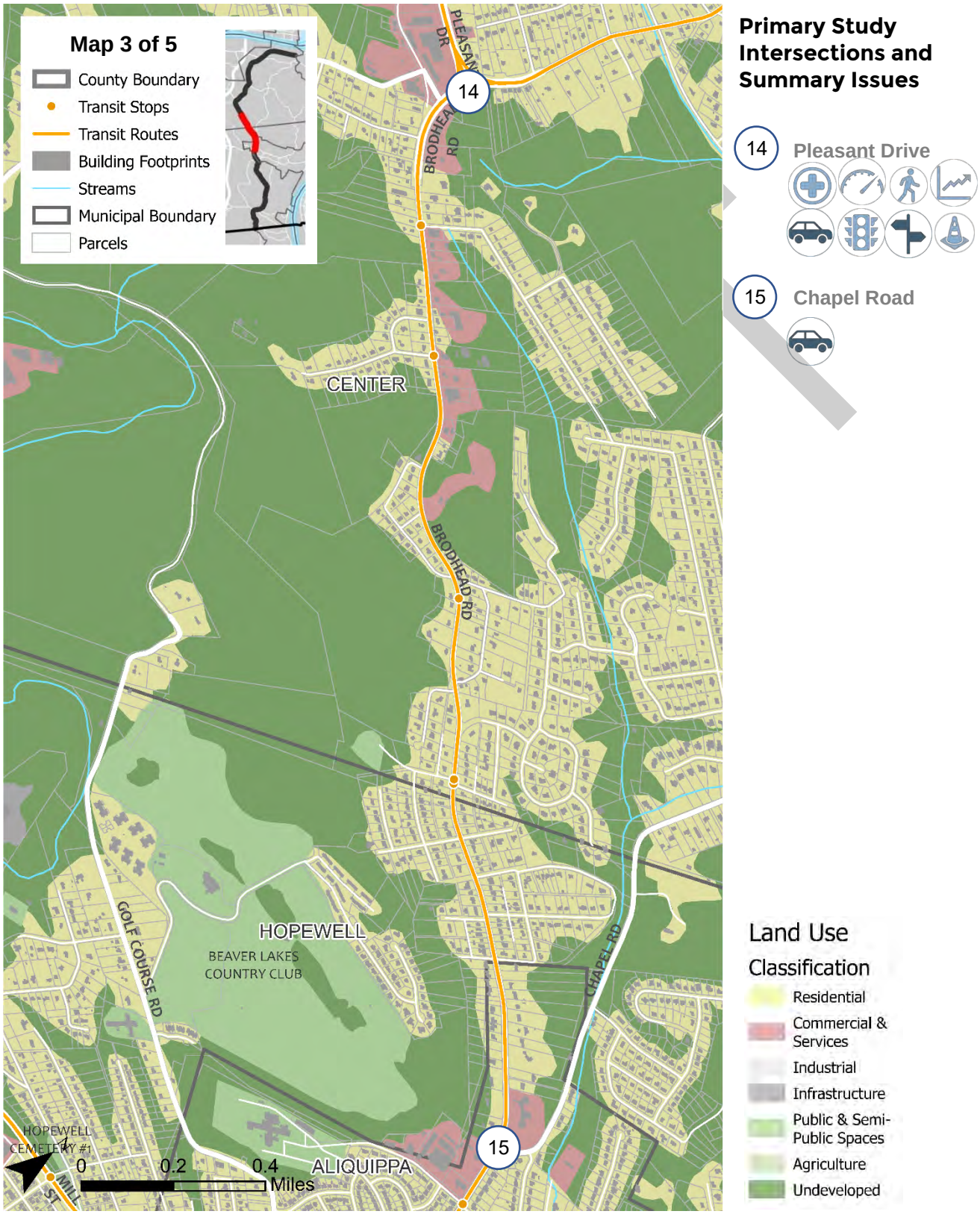
- *Accessibility* – Businesses through the area include a mix of pedestrian and auto traffic generators such restaurants and auto repair centers, but no notable pedestrian facilities.

- *Mobility* – Main Street primarily serves as an access point to neighborhoods, while Shaffer Road constitutes a more direct east-west route in the area, connecting to Pleasant Drive to the southwest and Chapel Road to the east. Morning congestion is typically light at both locations, while Main Street is moderate in the afternoon with existing LOS D; Shaffer Drive worsens to LOS E with failing approaches in the PM peak.

- *Operations* – Multiple business driveways and most parking sites in this area exist with wide, uncontrolled stretches of direct access. This trend can introduce confusion and uncertainty for side-street vehicles or mainline left-turns as to where conflicting vehicles are signaling or turning.

- *Planning and Infrastructure* – No major growth is anticipated in this area.

Exhibit 6: Existing Conditions Summary (Map 3 of 5)



INT # 14	
Pleasant Drive	

The unsignalized intersection of **Pleasant Drive at Brodhead Road** represents the only unsignalized direct connection to I-376 in the study corridor.

- *Safety* – While the intersection was not flagged for safety performance, the number of crashes clustered at this location is reflective of the higher volumes of traffic that pass through. Anecdotal safety comments noted concerns with aggressive driving and erratic maneuvers due to congestion.

- *Accessibility* – Anecdotally, this intersection has been noted as having high levels of pedestrian activity, with expressed desire for crosswalks. BCTA transit stops in the area, as well as the proximity to neighborhoods and businesses, lead to higher pedestrian volumes.

- *Mobility* – Pleasant Drive is one of four main routes along Brodhead Road that link directly with I-376 and connects with Exit 42 approximately one half-mile west of the study corridor. General comments have noted that the overall intersection is designed like a highway interchange when it is not, and interests have noted to explore reconfiguration options that might reduce the pavement area, the scale of the intersection, and/or visually slow down traffic through the junction.

- *Operations* – Afternoon congestion can be significant with existing LOS F and failing approaches in the PM peak. Anecdotally, a traffic signal or roundabout would be perceived as beneficial at Pleasant Drive. South of the intersection, nighttime retro-reflectivity is poor, with missing illumination, and dim signage. West of the intersection, concerns have been noted regarding clear signage and control of the one-way slip ramp that connects to the new surgery center.

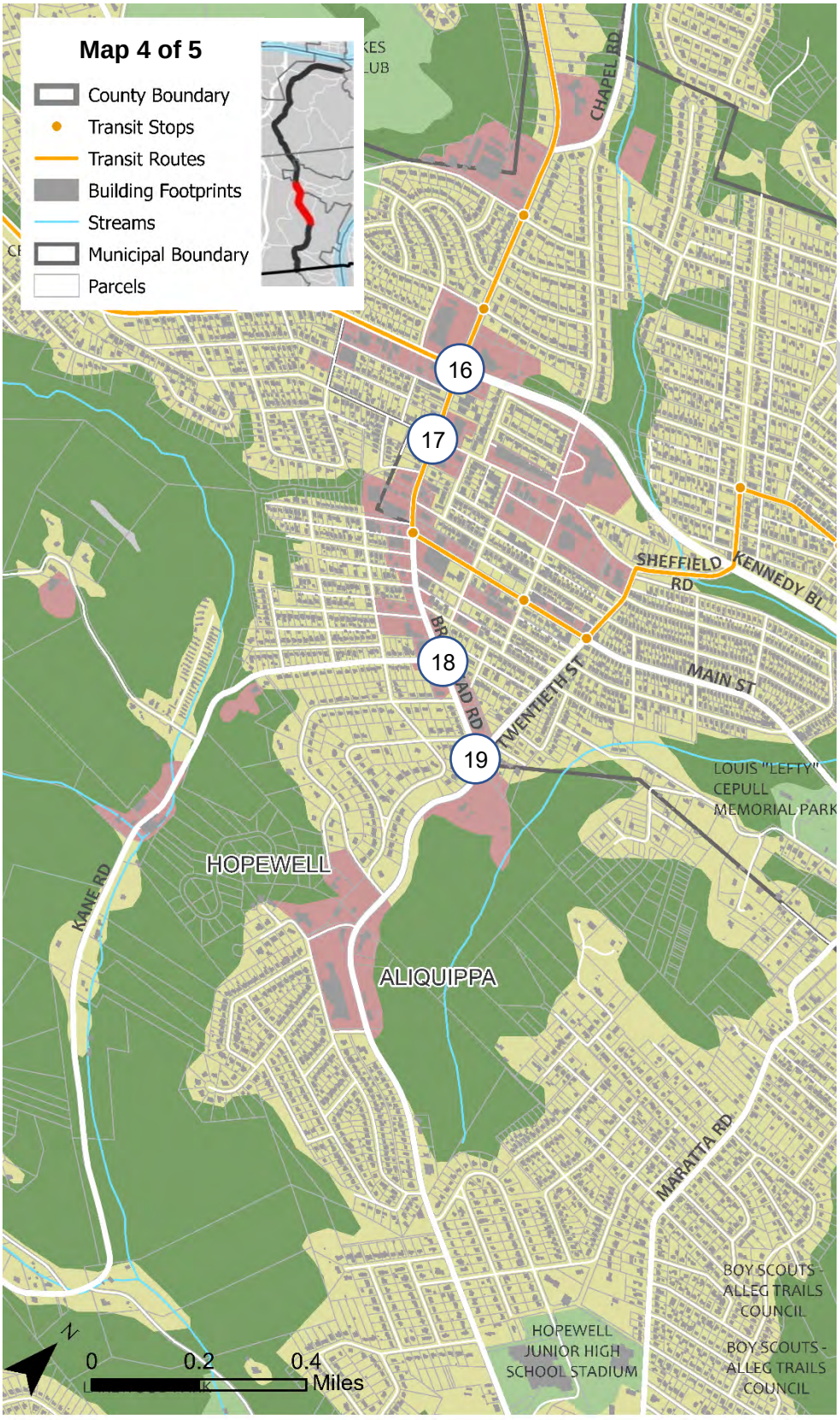
- *Planning and Infrastructure* – There is a park and ride lot west of Pleasant Drive, which has seen substantially reduced traffic as a result of the COVID-19 pandemic; it is unclear whether the pre-pandemic volume will ever fully return.

INT # 15	
Chapel Road	

The unsignalized intersection of **Chapel Road at Brodhead Road** represents a typical low-volume unsignalized intersection in the area.

- *Safety* – The intersection was not flagged for safety performance, and no notable sight distance issues were found.
- *Accessibility* – The area around Chapel Road is chiefly comprised of residential neighborhoods, with some pedestrian facilities south and east of the intersection.
- *Mobility* – **Afternoon congestion can be significant with existing LOS F and failing approaches in the PM peak.** Chapel Road serves as a sizable north-south route that parallels Brodhead Road, with a cut-through opportunities to the north.
- *Operations* – Nighttime retro-reflectivity in the area is fair, with some missing or dim street lighting.
- *Planning and Infrastructure* – No major growth is anticipated in this area.

Exhibit 7: Existing Conditions Summary (Map 4 of 5)



Primary Study Intersections and Summary Issues

16 **Mill Street / Kennedy Boulevard**

17 **Sheffield Road**

18 **Kane Road**

19 **20th Street**

INT # 16	
Mill Street / Kennedy Blvd	

The signalized intersection of **Mill Street / Kennedy Boulevard at Brodhead Road** represents one of the busiest junctions in the study corridor with cross-street traffic volumes of 17,100 vehicles daily (second only to study intersection #6 with 25,500 vehicles daily on Frankfort Road).

- *Safety* – While the intersection was not flagged for safety performance, the number of crashes clustered at this location is reflective of the higher volumes of traffic that pass through. Anecdotal safety comments noted concerns with aggressive driving and erratic maneuvers due to congestion, including the use of the CVS plaza parking lot as a cut-through to avoid intersection queues.

- *Accessibility* – Anecdotally, the business areas through Aliquippa between approximately Mill Street / Kennedy Boulevard and 20th Street have been noted as having higher levels of pedestrian activity than anywhere else along the study corridor. One of the busier BCTA transit stops along the corridor is also located just north of the intersection at Admiral Street (near Wendy's). However, the local pedestrian network is generally incomplete and not fully accessible, including missing sidewalk linkages to existing sidewalk north and west of the intersection.

- *Mobility* – Mill Street is one of four main routes along Brodhead Road that link directly with I-376 and connects with Exit 45 approximately one-mile west of the study corridor. The route also serves as important truck linkage between I-376, Route 51, and freight-oriented sites along the Ohio River.

- *Operations* – Morning/afternoon congestion can be significant with existing LOS D/F and failing approaches in either peak. Delays and queuing are further influenced by the higher volumes of truck traffic passing through the intersection, by mainline traffic blockages and spillback caused by closely-spaced driveway conflicts just south of the intersection, and due to split-phasing and lane arrangement constraints through the existing traffic signal.

- *Planning and Infrastructure* – Future intersection demands are expected to increase, including the influences of a new auto parts store just north near Admiral Street, new home developments off Mill Street, and for east/west auto and freight connections through Aliquippa.

INT # 17	
Sheffield Road	

The signalized intersection of **Sheffield Road at Brodhead Road** is representative of one of the narrowest locations along the study corridor and is mainly influenced by a mix of accessibility and operations issues.

- *Safety* – While the intersection was not flagged for safety performance, the narrowness of the corridor, congestion, and multimodal interactions in this area likely increase potential conflicts.
- *Accessibility* – The area is impacted by a mix of traffic influences, including BCTA transit stops, pedestrian and automobile access and circulation for local businesses and residential areas, and periodic student and bus traffic for nearby Aliquippa Elementary School and Senior High School.
- *Mobility* – Morning/afternoon congestion can be significant with existing LOS D/F and several failing movements or approaches in either peak.
- *Operations* – Delays and queuing on Brodhead Road are exacerbated by numerous driveways and parking access issues, upstream congestion spillback from Mill Street/Kennedy Boulevard, and turning delays/blockages with no space for turn lanes at the intersection today.
- *Planning and Infrastructure* – The narrow location and driveway/right-of-way constraints create a challenging environment for considering better pedestrian, transit stop, or turn lane infrastructure.

INT # 18	
Kane Road	

INT # 19	
20th Street	

The intersections of **Kane Road at Brodhead Road** and **20th Street at Brodhead Road** are typical of unsignalized intersections through the Aliquippa area. Only the side-streets are stop-controlled, and access to the mainline is perceived to be difficult.

- *Safety* – While neither intersection was flagged for safety performance, anecdotal safety comments identified other types of safety influences (see below), plus a perception of higher speeds and aggressive driving due to lower levels of mainline congestion through this area. At 20th Street, specifically, sight distance for westbound left-turns does not meet minimum criteria due to existing roadway curvature and vegetation looking left from the side-street.

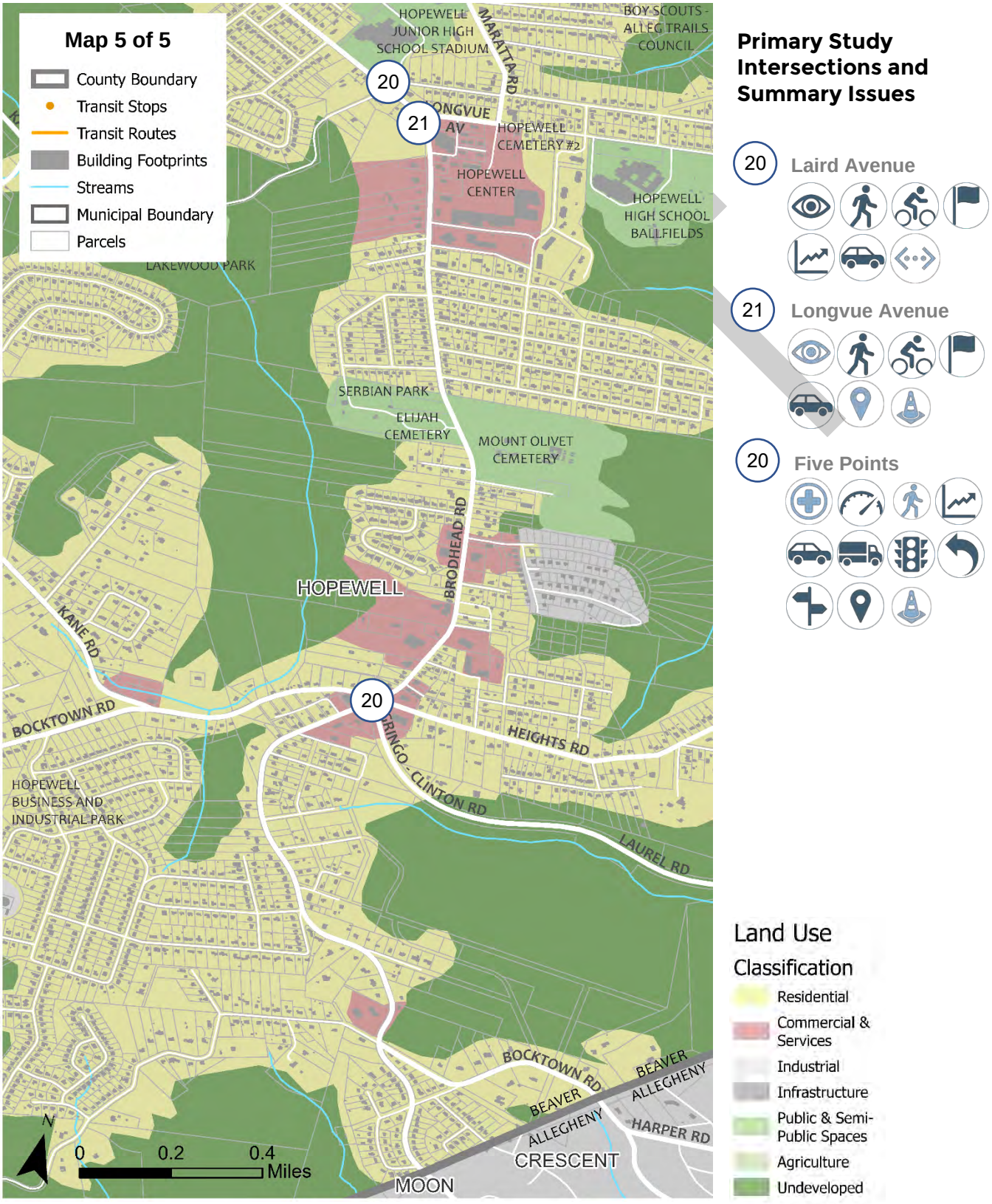
- *Accessibility* – Businesses through the Aliquippa area include a mix of pedestrian and auto traffic generators such fast-food restaurants and auto repair centers, but no notable pedestrian facilities.

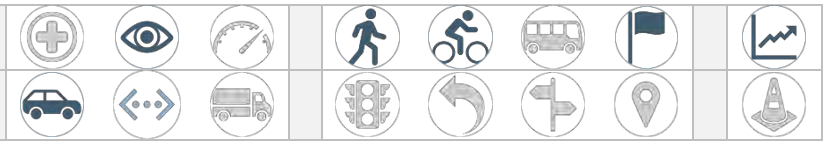
- *Mobility* – Both Kane Road and 20th Street appear to operate acceptably (both at LOS C/D), but outreach comments noted that mainline speeds and cut-through traffic patterns can make access difficult. Kane Road was noted to be a cut-through route for drivers trying to avoid congested areas to the south, such as Five Points. 20th Street was noted to be a cut-through route into downtown Aliquippa, which would avoid congestion at Sheffield Road and Mill Street / Kennedy Boulevard.

- *Operations* – Multiple business driveways and most parking sites in this area exist with wide, uncontrolled stretches of direct access. This trend can introduce confusion and uncertainty for side-street vehicles or mainline left-turns as to where conflicting vehicles are signaling or turning. Field observations also noted concerns with nighttime signing, marking, and guiderail visibility along the curved stretches of northbound Brodhead Road that run downhill just south of 20th Street.

- *Planning and Infrastructure* – Areas along Brodhead Road from 20th Street to Kane Road represent a transition zone into the busier commercial areas of the corridor through Aliquippa.

Exhibit 8: Existing Conditions Summary (Map 5 of 5)



INT # 20	
Laird Avenue	

INT # 21	
Longvue Avenue	

The intersections of **Laird Avenue at Brodhead Road** and **Longvue Avenue at Brodhead Road** are similar unsignalized intersections that are heavily influenced by school-related activities. Only the side-streets are stop-controlled, and access to the mainline is perceived to be difficult.

- *Safety* – While neither intersection was flagged for safety performance, anecdotal safety comments identified other types of safety influences (see below), including potential conflicts with school-related traffic. At Laird Avenue, specifically, sight distance for both the eastbound and westbound left-turns do not meet minimum criteria due to existing roadway grade and geometry in the area.

- *Accessibility* – The area is impacted by a mix of traffic influences, including student and bus traffic for nearby Hopewell Junior High School (east at Laird Avenue) and Senior High School (east at Longvue Avenue). Important multimodal connections for the community also include Hopewell Township Community Park (west at Laird Avenue) and several shopping and fast-food destinations just south of Laird Avenue in and around the Hopewell Shopping Center. However, sidewalk and pedestrian crossing facilities throughout this area are essentially non-existent, though there are some limited stretches of existing sidewalk along Brodhead Road that end at Forge Drive, approximately 800 feet north of Laird Avenue.

- *Mobility* – Morning and afternoon delays from the side-streets can be signification with LOS B/E at Laird Avenue and LOS E/F at Longvue Avenue. Laird Avenue, specifically, was noted to be part of a cut-through route (via connection to Kane Road) for drivers trying to avoid congested areas to the south, such as Five Points. Separately, Longvue Avenue was observed to experience severe queueing and significant blockages during school peaks and school-related events.

- *Operations* – At Longvue Avenue, short-term intersection flagging/traffic control is used to stop Brodhead Road and release the afternoon school bus. South of Longvue Avenue and in the vicinity of Hopewell Shopping Center, multiple business driveways and plaza access points can also introduce temporary traffic disruptions and potentially competing access conflicts.

- *Planning and Infrastructure* – A new elementary school is being considered near Laird Avenue, adjacent to the Junior High School. Anecdotally, several areas between Longvue Avenue (Intersection #21) and Five Points (Intersection #22) were also noted as having potential stormwater issues, including near the shopping center, BP, McKinley Avenue, Wilson Avenue, Robin Street, and Creese Street.

INT # 22	
Five Points	

The five-legged signalized intersection at **Five Points** includes the junction of Brodhead Road at Route 151 (Gringo Road / Laurel Road) and Heights Road (SR 3038) and, based on outreach efforts, received more site-specific comments/complaints than any other location along the study corridor. Most of the concerns centered on safety, mobility, and operational issues with notable congestion through the intersection.

- *Safety* – While the intersection was not flagged for safety performance, the number of crashes clustered at this location is reflective of the higher volumes of traffic that pass through. Anecdotal safety comments also noted concerns with aggressive driving and erratic maneuvers due to confusion over yield priorities and right-turn-on-red (RTOR) restrictions, the number of potential conflict points within the five-legged intersection, and the overall congestion levels.

- *Accessibility* – While crosswalks exist on the south, east, and west legs of the intersection, the pedestrian network in the surrounding area is essentially non-existent. Crossing the intersection on foot can take time and patience, as there are notable delays in waiting for pedestrian signal phases due to the overall phasing complexity of the five-legged intersection. Pedestrian and auto traffic generators such as McDonald's and CVS are located on the east side of the intersection. School bus traffic was also observed in heavy southbound queues through the area.

- *Mobility* – Gringo Road is one of four main routes along Brodhead Road that link directly with I-376 and connects with Exit 48 approximately 1.5-miles west of the study corridor. Route 151 (Gringo Road / Laurel Road) also serves as important truck linkage between I-376, Route 51, and freight-oriented sites along the Ohio River. Route 151 is also currently used as the primary truck route for truck access for the Shell Cracker Plant construction activities.

- *Operations* – Morning and afternoon congestion include failing conditions (LOF F/F). Due to factors such as congestion, grade, or lane configuration, aggressive driving and erratic maneuvers were frequently observed throughout the intersection. Several examples include (1) eastbound trucks on Route 151 continuing to travel through a red-signal to avoid stopping on the upgrade; (2) westbound motorists using the westbound right-turn lane to bypass the through-traffic queue before making a last-minute lane change; (3) southbound left-turns onto Heights Road swerving to miss right-turning motorists from Laurel Road that violate the RTOR restriction; or (4) traffic using the McDonald's parking lot as a cut-through to bypass intersection congestion. Business parking with direct access to Brodhead Road along the northwest corner of the intersection also complicates operations and forces the southbound stop bar to be placed approximately 100 feet farther back that typical.

- *Planning and Infrastructure* – Future intersection demands are expected to increase, including the influence of new home developments in the area, as well as truck/freight connectivity between I-376 and Route 51.

2 PROJECT CONTEXT

2.1 Local Context

The Brodhead Road corridor serves as a crucial element of daily life for residents in the neighborhoods near the study area and sees regular use by those living in surrounding municipalities, from Rochester Borough to the north to Moon Township in the south. Brodhead Road is the primary route enabling people to reach everyday destinations such as health care, shopping, services, school, work, bus stops and access to nearby I-376. Residents and stakeholders described the tendency of people living near Brodhead Road to prefer the road as a route to local destinations over I-376 (which runs parallel).

Because Brodhead Road is considered an essential element of daily life for residents, its functionality and safety bears directly on how people view the livability of their communities. Moreover, since the corridor is the location of businesses and services and provides access to all levels of education, it is pivotal to the area's economy. In the coming years, some stakeholders expect traffic load to increase substantially, including trips generated by hundreds of new residences currently under development, planned or anticipated in the immediate area.

From north to south, considerations include:

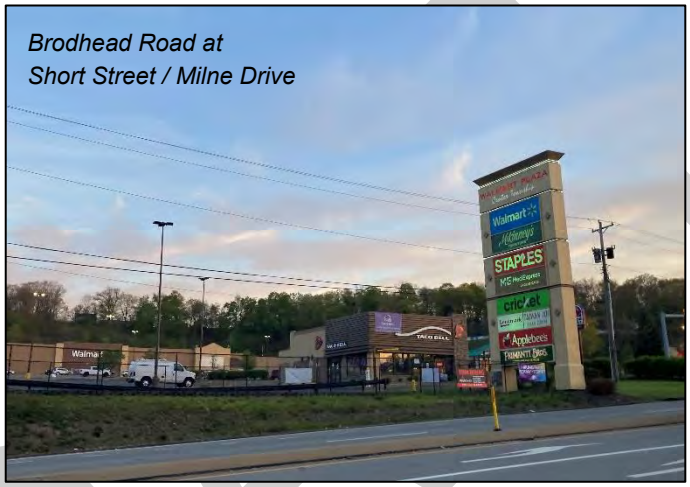
Monaca Borough

The northern point of the study area abuts Monaca Borough, and residents of Monaca use the Brodhead corridor frequently. Beaver County Transit Authority (BCTA) Route 2 runs through Monaca on its route between Rochester and Ambridge. It follows Brodhead Road to Center Township. Heavy truck traffic follows Brodhead between Monaca's Ohio River industrial zones and I-376.

Center Township

In Center Township, about 5 miles of Brodhead Road serves residents in several ways.

Center Township Considerations	
Destinations	Brodhead is a conduit for access to regional destinations, including the Beaver Valley Mall, Penn State-Beaver and Community College of Beaver County, in addition to businesses and residential areas.
Connections	Motorists use Brodhead to gain access to I-376 via interchanges at SR18 (near the Shell Petrochemical Plant, currently under construction) and at Pleasant Drive.
Emergency Response	Emergency vehicles use Brodhead Road as a primary route to respond to calls in the township, many of which originate in the commercial area near Beaver Valley Mall.
Education Facility Access	• Baker Road provides access to the Central Valley School District Complex which includes the high school, middle school, and Todd Lane Elementary School.

	• Brodhead Road provides access to Beaver County Community College, Beaver County Career and Technology Center and Beaver Valley Intermediate Unit via Community College Drive. • Center Grange Road provides access to the Center Grange Primary School.
Land Use and Character	• Old Brodhead Road to Frankfort Road (Route 18): four-lane, highway commercial with large shopping plazas anchored by big-box retail stores. Hotels anchor the Frankford Road intersection. *Brodhead Road at Short Street / Milne Drive*  • Brodhead narrows to two lanes south of Frankfort Road. The stretch between here and Lincoln Drive is primarily single- and multifamily housing. • Lincoln Drive to Main Street: two-lane, primarily mixed-use retail, commercial and service, some multifamily. • Main Street to Oakhill Road: two-lane, primarily single family and some multifamily. • Oakhill Road to Ridge Road: primarily mixed-use retail, commercial and service. • Ridge Road to Smith Avenue: two-lane primarily single family residential.

City of Aliquippa

In Aliquippa, Brodhead Road crosses the western part of the city for 1.5 miles.

Aliquippa Considerations	
Connections	Heavy truck traffic crosses Brodhead Road as it follows Kennedy and Mill between I-376 and the Ohio River industrial zones of Aliquippa and Center Township.
Transit	BCTA Route 2 leaves Brodhead Road at Aliquippa, turning east through neighborhoods to SR 51 and on toward Ambridge. Higher percentages of residents in Aliquippa than in other communities in the study area bus to work.
Land Use and Character	• Smith Avenue to Admiral Street: two-lane, primarily single family residential. • Admiral Street to 20th Street: two-lane, primarily retail, commercial, and service, some single family residential  *Brodhead Road at Sheffield Road*

Hopewell Township

Brodhead Road traverses about 4.1 miles through Hopewell Township.

Hopewell Considerations	
Connections	• Brodhead Road is a conduit for access to I-367 via interchanges at Mill Street and at SR151/Gringo Road. • Heavy truck traffic crosses Brodhead Road at the Five Points intersection, mainly traveling along Laurel Road and SR 151/Gringo Road between the township's Ohio River industrial zones and I-376.

	• Though little or no pedestrian or bicycle infrastructure is available on or near Brodhead Road in Hopewell, relatively high levels of pedestrian activity were observed along Longvue and connected streets, with residences, the schools and area businesses as generators and destinations.
Education Facility Access	Hopewell Junior High School occupies frontage on Brodhead Road, and Hopewell Senior High School is a few blocks off Brodhead along Longvue Avenue.
Land Use and Character	• 20th Street to Crestmont Drive: two-lane, undeveloped. • Crestmont Drive to Elaine Street: two lane, Crestmont Village Shopping plaza – retail and commercial. • Elaine Street to Laird Drive: two-lane, primarily residential, some retail and commercial. • Laird Drive to Park Avenue: two-lane, retail and commercial, Hopewell Shopping Center on east side of Brodhead Road.  *Brodhead Road at Laird Avenue* • Park Avenue to Beverly Drive: two-lane, primarily single family residential. • Beverly Drive to Woodside Avenue (through Five Points): two-lane, primarily retail, commercial, and service. • Woodside Avenue to Huntsridge Drive: two-lane, primarily single family residential. • South of Hopewell Township, Brodhead Road continues into Moon Township, Allegheny County. New housing developments under construction, planned or anticipated in Moon will potentially create pressure on Brodhead Road in the coming years.

2.2 Regional Context

Brodhead Road also serves or supports regional transportation needs in several ways. Some mentioned above, are to facilitate access to destinations of regional significance, including Penn State-Beaver, Community College of Beaver County and the Beaver Valley Mall. In addition:

- Freight: Just miles east and north of the study area flows the Ohio River, along which industrial and manufacturing uses predominate. Heavy truck traffic serving those areas follows Brodhead Road between Monaca and the SR18 interchange with I-376 in Potter Township, and routinely crosses Brodhead at two intersections (Kennedy/Mill and SR151/Laurel Road). Among the industrial uses in the region is the Shell Petrochemical plant, scheduled to open by 2025, which could potentially generate new supporting or related industries in the area, creating additional load.

- Interstate 376: Parallel to the Brodhead Road corridor and roughly 0.75 to 1.5 miles to the west lies I-376. This interstate serves as the major connector northward to other Beaver County communities such as Rochester, Beaver and Beaver Falls, and the Pennsylvania Turnpike (I-76). I-376 leads southward to Pittsburgh International Airport and to Pittsburgh's employment, health care and education resources. Brodhead Road indirectly serves the four area I-376 interchanges. Moreover, Brodhead Road is the detour route for I-376 traffic in this area (details in Section 4.3) and is a designated evacuation route for the Beaver Valley Nuclear Power Station.

- "Intermodality" or freight transfer centers (details in Section 3.4)

2.3 Background Plans and Studies

The following reports and studies were reviewed for the development of this report:

- SPC Smart Moves Long Range Transportation Plan (2019) – Transportation Improvement Program (2021-2024)
- SPC Regional Operations Plan (2019)
- SPC Regional Active Transportation Plan (2019)
- SPC Annual Report (2019)
- SPC Coordinated Transportation Plan (2019)
- Beaver County Comprehensive Plan (2010)
- Beaver County Greenway and Trails Plan (2007)
- Comprehensive plans for Aliquippa (1996) and Center Township (1993)
- Center Township Safe Routes to School Plan (2008)

The Southwestern Pennsylvania Commission reports and studies, Beaver County plans and local plans, all of which were rooted in public input, provide important context for the Brodhead Road corridor study. The

foundational information from the previous plans and studies generally falls in the categories of efficient movement of people and goods; mobility and accessibility; equity, environmental justice, and inclusion; improvements in livability and health; environmental sustainability; and economic growth/development/redevelopment.

This corridor study is a product of the aforementioned plans and studies and therefore acknowledges the planning work previously conducted. This study particularly reflects the thematic and visionary statements of SPC's Long Range Transportation Plan (LRTP) – Smart Moves for a Changing Region, and SPC's Transportation Improvement Program (TIP). Because this study places a high priority on multimodal/non-motorized transportation and social equity and inclusion, the report considers SPC's Regional Active Transportation plan to be a crucial foundational document as well. These regional planning efforts will continue to provide key directional considerations at all stages of the Brodhead Road corridor study.

The applicability of the Beaver County- and local-level studies to the Brodhead Road corridor varies, but all include some pertinent stakeholder comments. These are the most applicable recommendations:

1. Improved corridors (Beaver County Comprehensive Plan 2010)
    a. I-376 and Brodhead Road
        i. PennDOT and municipalities are leads/participating parties
        ii. Widen lanes, redesign intersections/interchanges, manage access to businesses
2. Maintain commercial area on Brodhead Road and create a new area on the Eastern portion of Franklin Avenue in Aliquippa (Beaver County Comprehensive Plan 2010)
3. Rezone portions Brodhead Road as commercial rehabilitation/infill (Beaver County Comprehensive Plan 2010)
    a. Commercial rehabilitation/infill at the intersections of Brodhead Road and Kennedy Boulevard/Mill Street and Brodhead Road with Sheffield Road
4. Address traffic congestion along Brodhead Road (Beaver County Comprehensive Plan 2010)
5. Improvements such as access management techniques, turn lanes, and better signalization (Beaver County Comprehensive Plan 2010)
6. Shoulders along Brodhead Road are used frequently by cyclists and could be used as highway bike lanes (Beaver County Greenway and Trails Plan – 2007)
7. Implement Safe Routes to Schools plan in Center Township (Center Township Safe Routes to Schools – 2008)

A more detailed summary of the review of prior studies and reports is presented in *Appendix A1 – Background Plans and Studies*.

3 TRANSPORTATION NETWORK

3.1 Multimodal Connectivity and Accessibility

To better understand existing conditions and future needs, the project team gathered, analyzed and mapped all available relevant data from a variety of sources and conducted field views. Combined with extensive community/stakeholder input, this information helped the team to develop a clear understanding of current conditions and prospective improvement alternatives.

The multimodal conditions inventory focused on the existing non-motorized and motorized transportation networks, including reviews of:

- Sidewalk connectivity and accessibility – the existing sidewalk network, existing curb ramp installations, pedestrian use patterns, needs and gaps
- Bicycle connectivity and accessibility – the existing bicycle infrastructure, roadway use patterns, needs and gaps
- Transit – Beaver County Transit Authority routes, stop locations, access and connectivity to destinations both local and beyond the study area

The project team examined these facilities and services within the context of land use and destinations, vehicle lanes and parking, traffic operations and freight movement.

Highlights from these inventories are summarized as follows:

Sidewalk and Bicycle Networks:

- The Brodhead Road corridor provides no bike lanes or shared-lane markings.
- The only sidewalks in the study area are 0.3 mile in Aliquippa. A few intersections provide crosswalks that do not connect to sidewalks.

Transit Stops and Service:

- Beaver County Transit Authority Route 2 uses portions of Brodhead Road from Monaca to Aliquippa, but there is an absence of standing pads, shelters and sidewalk connections.
- BCTA serves multi-modal needs by operating “kneeling” buses. BCTA reported that it is working to install bike racks on buses.

Population Characteristics:

Census data indicates where the need for or interest in multimodal connectivity is likely to be highest along the Brodhead Road corridor:

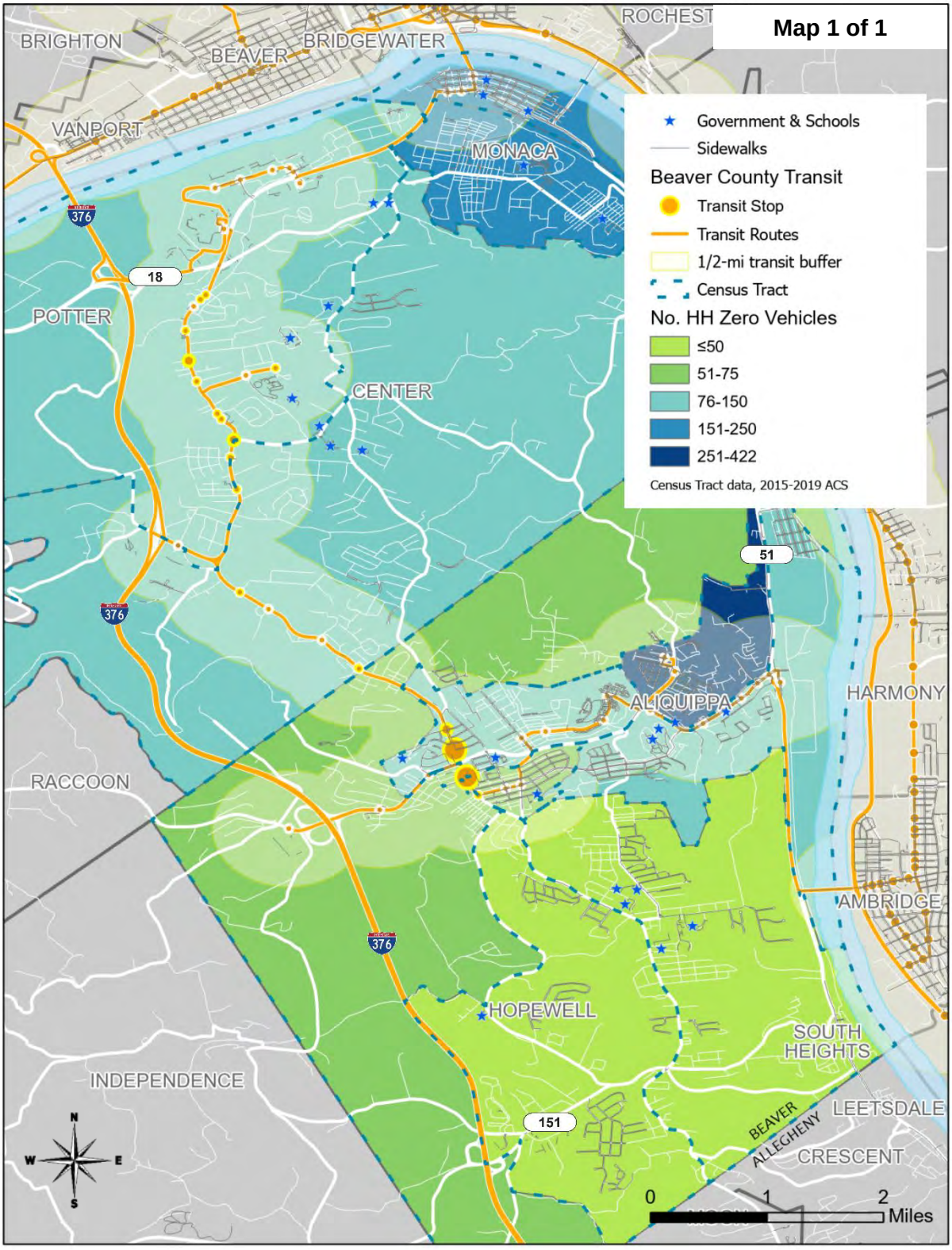
- Poverty level is a proxy for need and equity concerns. American Community Survey data (2015-2019) indicates that the highest concentrations of poverty in this area occur in Aliquippa. In the Census tracts bordering Brodhead Road the percentages of the population below the federal poverty rate are 18.6 percent and 24.8 percent, and in Aliquippa’s other two Census tracts – to the

east – the poverty rate is 39.8 percent and 46.6 percent. Households with poverty are more likely to walk, bike or use transit to reach destinations, including to those on Brodhead Road.

- Data showing larger proportions of people who bus to work indicate where infrastructure to or through the corridor may have potential to build on. Those locations within this study area are northwestern Center Township (near Beaver Valley Mall, Penn State-Beaver and CCBC), parts of Aliquippa, and eastern Hopewell Township (closest to the Ambridge Park and Ride). These areas include locations where residential areas are very near BCTA Route 2 stops or the parking lots close to bus stops. This suggests that transit ridership could be encouraged with additional “first and last mile” infrastructure.

- Another indicator of likely pedestrian activity and bicycle and transit use is Census data showing where a high percentage of households have zero vehicles. The Census tracts showing the highest rates of households with zero vehicles are those in Aliquippa, which also experience high poverty rates, as noted above. Tracts in Monaca show similarly high rates of households with zero vehicles; these tracts lie immediately outside the northern end of the corridor study. People living in these Census tracts are likely to walk, cycle or bus to destinations, at least some of the time. See the map on the following page.

Exhibit 9: Vehicle Access and Walkability



3.1.1 Pedestrian Network

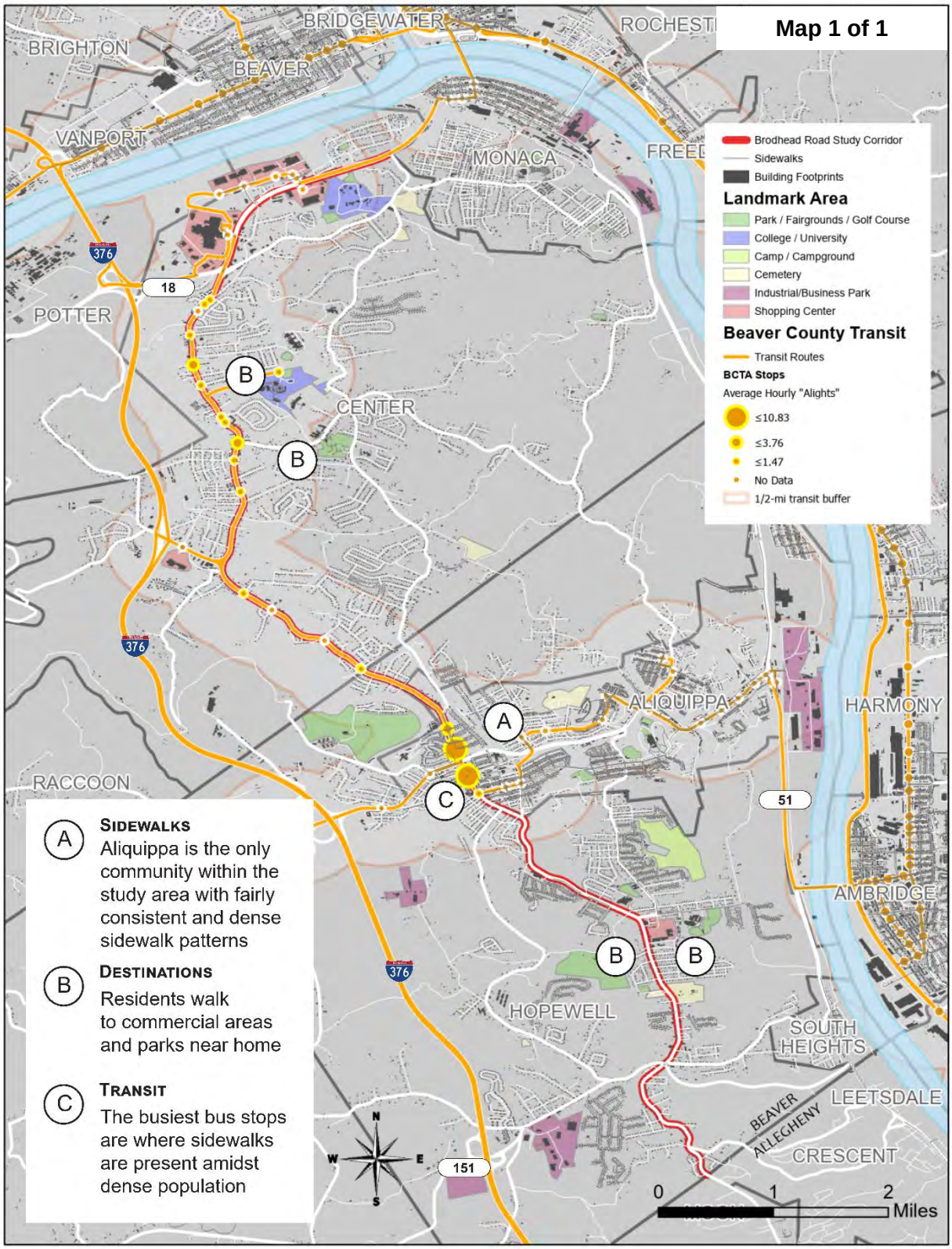
Sidewalks fronting the roadway are rare along Brodhead Road in the study area, with documentation showing very few intermittent segments totaling 0.01 linear mile in Center Township, 0.45 linear mile in Aliquippa, and 0.15 linear mile in Hopewell Township.

However, it is understood through observation and public input that pedestrians access the corridor without the benefit of infrastructure.

- Center Township: Pedestrian activity has been noted along Brodhead near Beaver Valley Mall.
- Aliquippa: Pedestrian activity to and along Brodhead Road in Aliquippa is understood through observation and public input. Walking to destinations in the city is facilitated by the frequent availability of sidewalks. In addition to the 0.45 linear miles of sidewalk fronting Brodhead Road, sidewalks are frequently available on side streets to the east and west of Brodhead between Chapel Road and 20th Street in Aliquippa. Though sidewalks are far more extensive in Aliquippa than in any other part of the study area, gaps remain in providing access to destination businesses along the corridor. For example, Sheffield Road east of Brodhead is cited as a frequent walking route, but no sidewalks are provided, and the crossings at the signalized intersection with Brodhead are not fully ADA- compliant.
- Hopewell Township: Observation, public input and Strava data reveals pedestrian activity mainly in the vicinity of Hopewell Shopping Center and the Hopewell Senior and Junior High School campuses.
- General: Pedestrian activity can also be assumed at or near BCTA bus stops along Brodhead Road, including places like Beaver County Mall, Community College of Beaver County, and in Aliquippa, where BCTA Route 2 turns east onto Main Street as it proceed toward Ambridge.

A detailed inventory of crosswalk conditions is presented in *Appendix A2 – Walkability Data*.

Exhibit 10: Pedestrian Activity



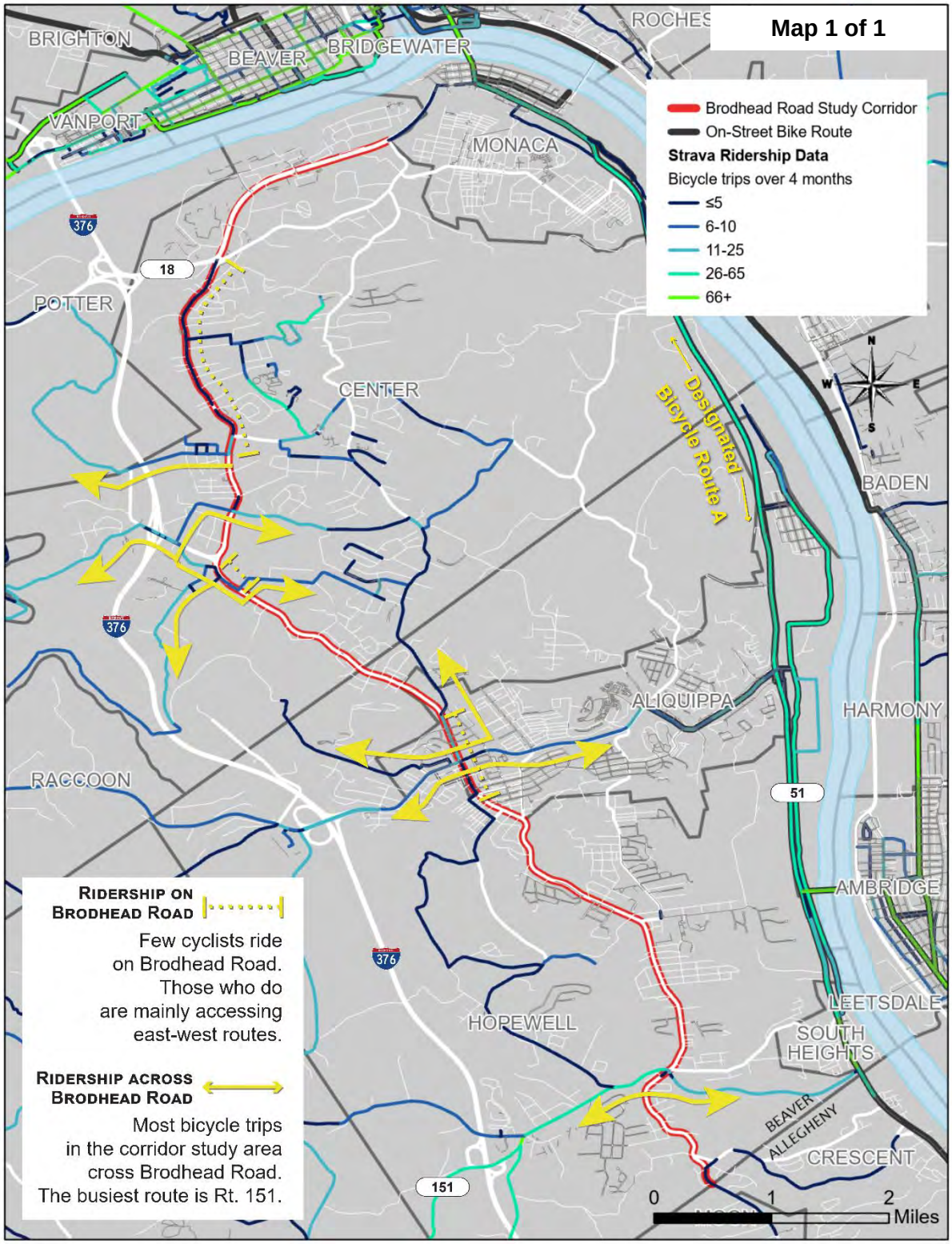
3.1.2 Bicycle Network

Though the study area includes no bicycle infrastructure, cyclists are present in the corridor, mainly traveling across Brodhead Road, with only short-distance use of the roadway itself.

As illustrated in the following map, virtually no ridership occurs along the length of Brodhead Road, according to Strava data, with north- and south-bound riders instead using Route 51 (Bicycle Route A) near the Ohio River, which is the designated bicycle route in this part of Beaver County.

Existing conditions on Brodhead Road are not currently conducive for the addition of bicycle infrastructure. The viability of shared-lane bicycle infrastructure on the roadway under current conditions is compromised by high AADT volume, limited sight distances (some locations), lane count (some locations) and speed limits (most corridor locations). The viability of bi-directional dedicated bike lanes on Brodhead is currently problematic because existing cartway and right-of-way widths vary greatly, creating the likelihood any such lanes would be intermittent, and the presence of frequent driveways in some locations.

Exhibit 11: Bicycle Activity



3.1.3 Transit Network

BCTA Route 2 (inbound) follows Brodhead Road from Monaca. In Center Township, the route digresses from Brodhead to stop on Milne Drive (Walmart), and along Wagner Road (Township Marketplace, Beaver Valley Mall). Continuing south on Brodhead, the route digresses back-and-forth on Community College Drive to Community College of Beaver County and stops just off Brodhead at the Expressway Travel Center on Pleasant Drive.

Continuing south, it stays on Brodhead Road to Mill Street in Aliquippa, where it makes a back-and-forth stop at Green Garden Plaza in Hopewell Township. The route continues south on Brodhead in Aliquippa, then turns east onto Main Street and through Aliquippa neighborhoods before continuing to Ambridge.

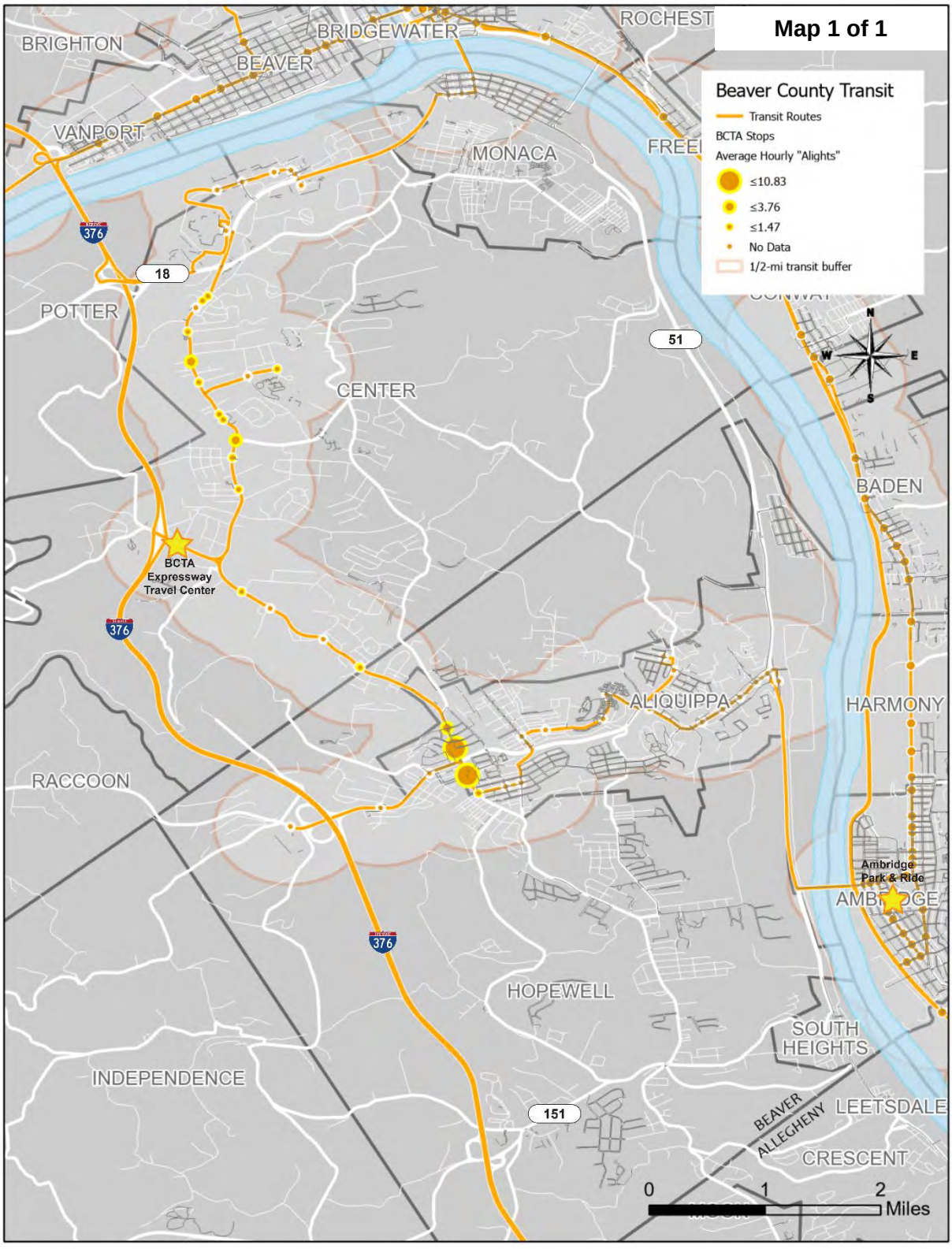
At some bus stop locations, such as the Beaver Valley Mall entrance or CCBC student entrance, riders may find protection from weather and standing pads on sidewalks. At most bus stop locations along Brodhead, however, the bus stops have no standing pads or shelters.

According to BCTA staff, the busiest stops are as follows:

- Center Township: CCBC Middle Lot (pre-Covid), Center Grange Road
- Aliquippa: Sheffield Drive, Admiral Street, Hospital Drive

Data on average boards and alights per stop is presented in *Appendix A3 – Transit Data*.

Exhibit 12: Transit Routes and Stops



Note: Ridership data reflects a point-in-time count in Spring 2021 and may differ from pre-Covid patterns.

3.1.4 Walkability, Accessibility, and Connectivity

When considering connectivity, accessibility and walkability in this corridor, the basic questions are:

- Can people walk to everyday destinations safely, comfortably and conveniently?
- Is ADA access available to assist people in getting where they need and want to go?
- Can people connect safely, accessibly and conveniently with public transit stops (e.g. within a ½ mile walk)?

The answers for Brodhead corridor are, with a few exceptions, no.

Sidewalks are non-existent in most locations in the corridor, and in Aliquippa, where sidewalks are most extensive, gaps remain.

Crosswalks are present at some intersections but rarely connect with sidewalks.

BCTA serves multi-modal needs by equipping buses with bike racks and operating “kneeling” buses. Of the 23 stops in the portion of BCTA Route 2 in the corridor area, 18 stops are listed to have ADA access and five do not. However, bus stops, except at major locations such as a transit center or Beaver Valley Mall, do not include standing pads, shelters or connections to sidewalks.

Appendix A4 – Accessibility Data

3.2 Roadway and Traffic Infrastructure

3.2.1 Existing Roadway

The Brodhead Road study corridor covers just over 11-miles in a predominantly north-south direction with its northern limits at Old Brodhead Road (SR 3002) near the Borough of Monaca, and its southern limits at the Beaver/Allegheny County line.

Typical Sections: The northernmost part of the study corridor generally consists of a four-lane divided roadway (*Exhibit 13*), plus auxiliary turn lanes at signalized intersections, for approximately 1.6-miles through the commercial/retail areas around the Beaver Valley Mall. South of Frankfort Road (SR 18) / Old Brodhead Road (SR 3002) (INT 6), Brodhead Road narrows to a two-lane undivided roadway (*Exhibit 14*) that continues through the remaining 9.4 miles of the study corridor. While a few major intersections along the southern part of the route periodically add an auxiliary left-turn lane, additional turn lanes are not typically present at most of the lower-volume cross-streets and residential or commercial driveways.

Speed Limits: Entering the study area from the north, the posted speed limit is 35 miles per hour (MPH) before increasing to 40 MPH just south of Old Brodhead Road (SR 3002) (INT 1). The posted speed limit stays consistent at 40 MPH for approximately the next 6 miles to just north of Aliquippa. Entering Aliquippa, it decreases to 35 MPH and remains so to the southern end of the study corridor.

Lane Widths: Lane widths in the study area vary between 11 feet and 12 feet, and shoulder widths vary from less than 1 foot to 9 feet. Most of the roadway features paved shoulders dropping off to grass, though areas near major intersections and dense retail access have curb and gutter.

Exhibit 13: Typical Four-Lane Cross-Section

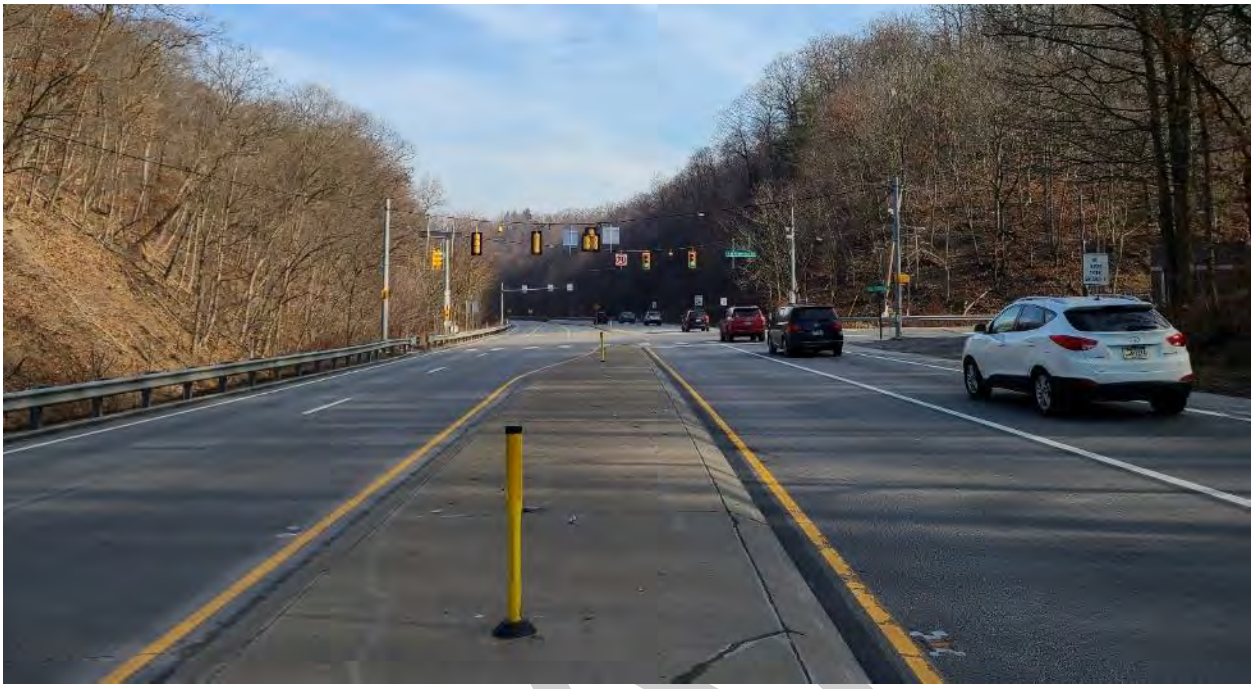


Exhibit 14: Typical Two-Lane Cross-Section

3.2.2 Traffic Signal Observations

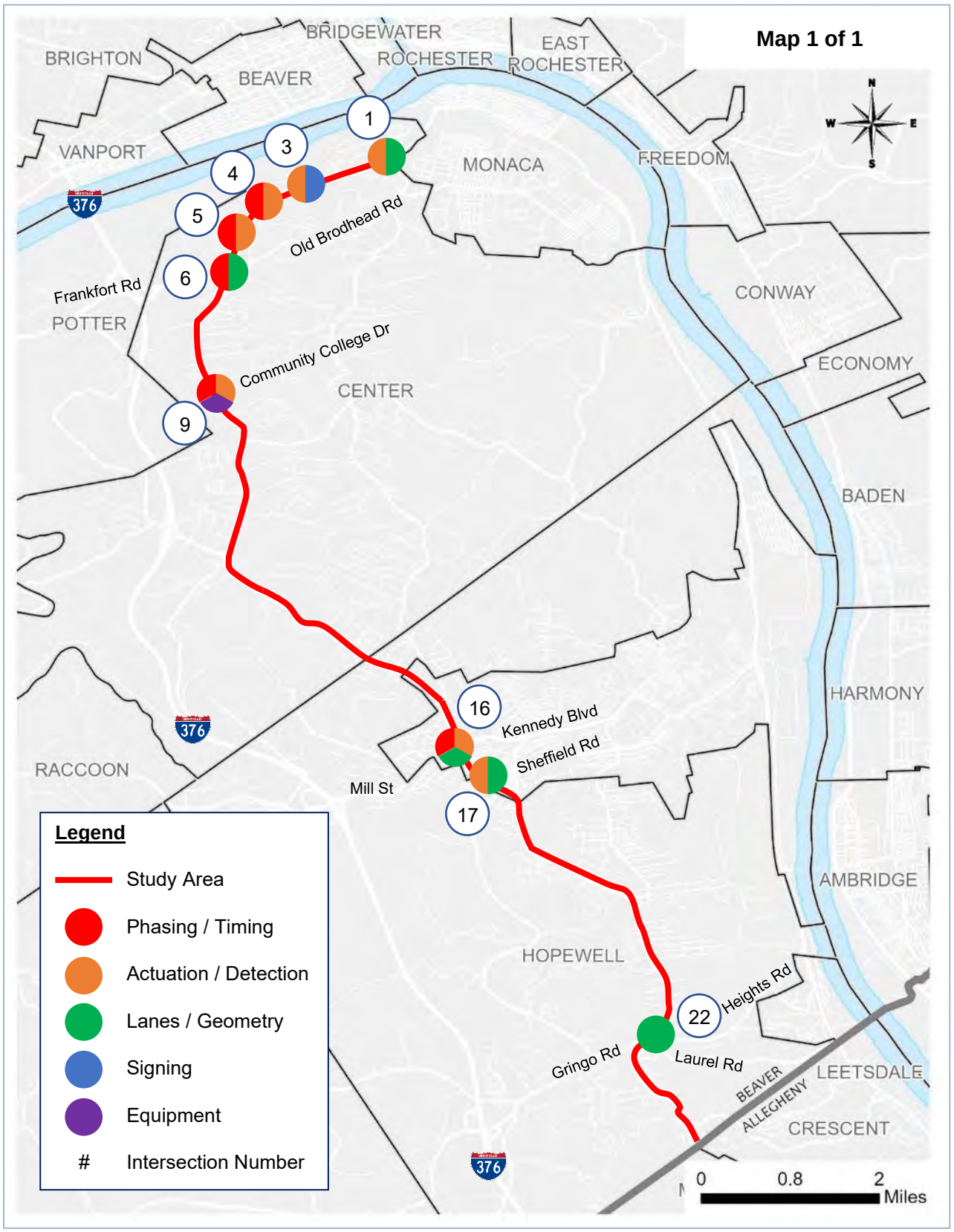
Nine of the 22 primary study intersections along Brodhead Road are signalized:

- INT 1 Old Brodhead Road (SR 3002)
- INT 3 Short Street / Milne Drive
- INT 4 Center Commons Boulevard
- INT 5 Beaver Valley Mall Drive / Golfview Drive
- INT 6 Frankfort Road (SR 18) / Old Brodhead Road (SR 3002)
- INT 9 Community College Drive
- INT 16 Mill Street / Kennedy Boulevard (SR 3016)
- INT 17 Sheffield Road
- INT 22 Five Points

Existing traffic signal details, including comments on the observed traffic signal phasing, pedestrian accommodations, queuing, congestion, and atypical driving behaviors, as well as copies of the traffic signal permit plans for each location, can be found in *Appendix A5 – Traffic Signal Observations*. Based on these details, potential traffic signal needs (*Exhibit 15*) to explore in future phases of the study could include:

- *Phasing / Timing* – Adjust split lengths to decrease minor movement delay, review all-red clearance times, eliminate split phases
- *Actuation / Detection* – Adjust actuation to avoid unnecessary phase changes, investigate detection settings to decrease minor movement delay, review detector locations
- *Lanes / Geometry* – Add turn lanes, reconfigure overall intersection geometry (Five Points), widen lanes
- *Signing* – Enhance signage for right turning traffic to yield to oncoming vehicles, add larger turn restriction signage
- *Equipment* – Install modern pedestrian signal heads, update intersection lighting

Exhibit 15: Potential Traffic Signal Needs



3.2.3 Sight Distance

Sight distance issues typically occur when drivers attempting to make a left-turn from Brodhead Road, or a left-turn or right-turn from any side-street, are unable to see the approaching or conflicting traffic a sufficient distance away to permit the driver to anticipate and avoid potential collisions. Possible sight distance obstructions can range from overgrown vegetation or the placement of roadside objects (e.g. signs, mailboxes, parked vehicles) to limitations caused directly by intersection geometry, approach grades, or the horizontal or vertical curvature of the roadway itself. Sight distance and related turning difficulties can also be more problematic in areas where travel speeds along the mainline corridor may exceed the posted speed limits – i.e. a distance that would be adequate to pull in front of traffic approaching at an expected speed of 35 MPH may not be sufficient if the approaching traffic is moving significantly faster.

With these conditions in mind and based on a combination of field observations and public/stakeholder input, 19 locations along Brodhead Road were identified for possible sight distance issues. These locations were evaluated for sight distance based on PennDOT's *Design Manual Part 2: Highway Design* (Publication 13M) and the applicable distances required per the *AASHTO Green Book: A Policy on Geometric Design of Highways and Streets (7th edition (2018))*. In comparing the field-measured distances to the requirements, movements at each location listed below (and as summarized on *Exhibit* 16, *Exhibit* 17, and *Exhibit* 18) were identified on a *Pass*/*Fail* basis where *Pass* implies that a movement meets or exceeds the requirements, while *Fail* implies that the measured distance is less than the requirements. Detailed sight distance data can also be found in *Appendix B1 – Sight Distance Data*.

- A N Branch Road (INT 7)
- B Simonfield Road
- C Community College Drive (INT 9)
- D Shaffer Road (INT 13)
- E Pleasant Drive (INT 14)
- F Mt Carmel Lane / Orchard Street
- G Chapel Road (INT 15)
- H 20th Street (INT 19) / Wigwam Road
- I Woodbine Road
- J Forge Road
- K Laird Avenue (INT 20)
- L Longvue Avenue (INT 21)
- M Cleveland Avenue
- N Harding Avenue
- O Miller Lane
- P Tee Line Drive
- Q Ohioview Avenue
- R Morrow Avenue / Yale Drive
- S Sharon Grange Road / Bocktown Road

Exhibit 16: Potential Sight Distance Needs (Map 1 of 3)

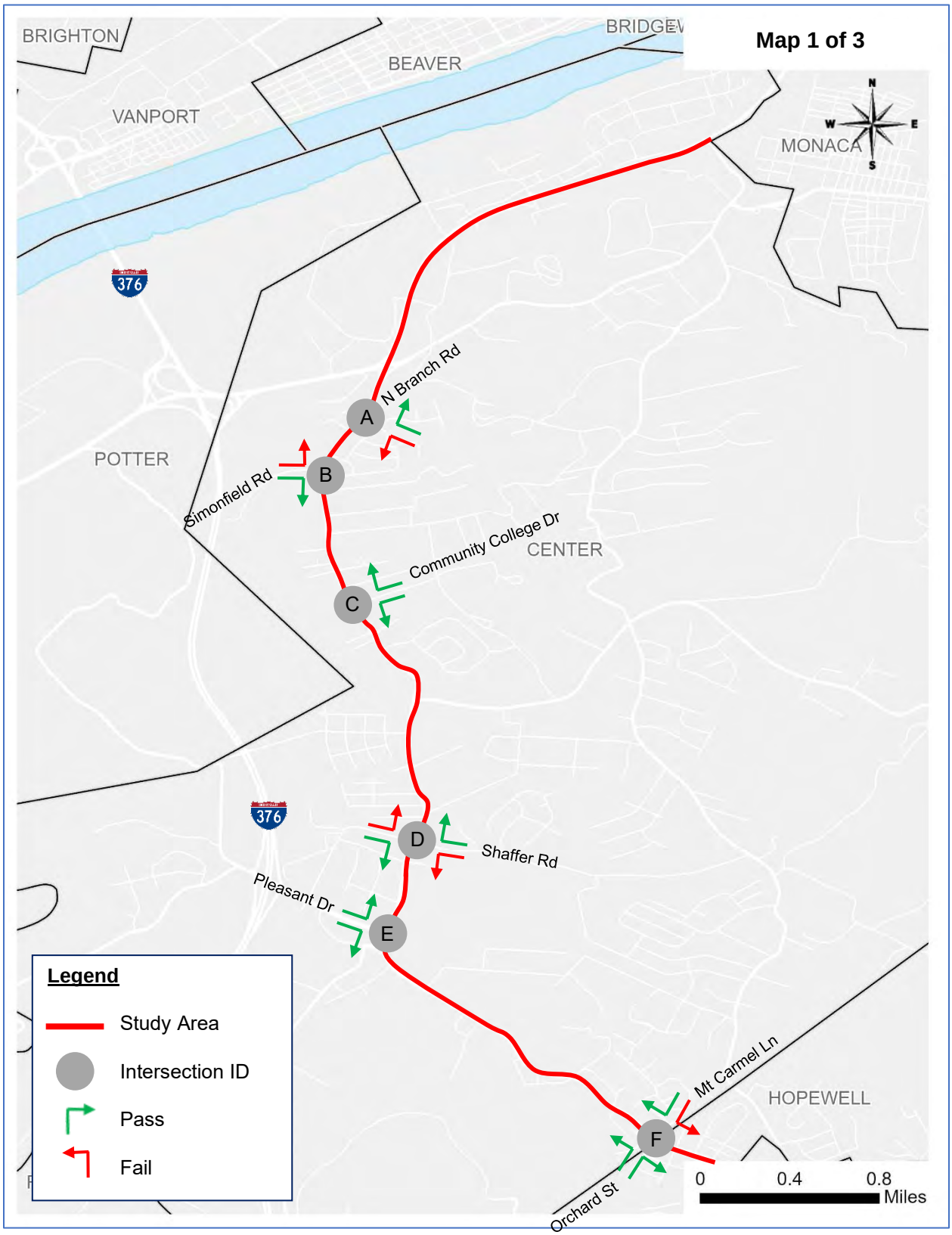


Exhibit 17: Potential Sight Distance Needs (Map 2 of 3)

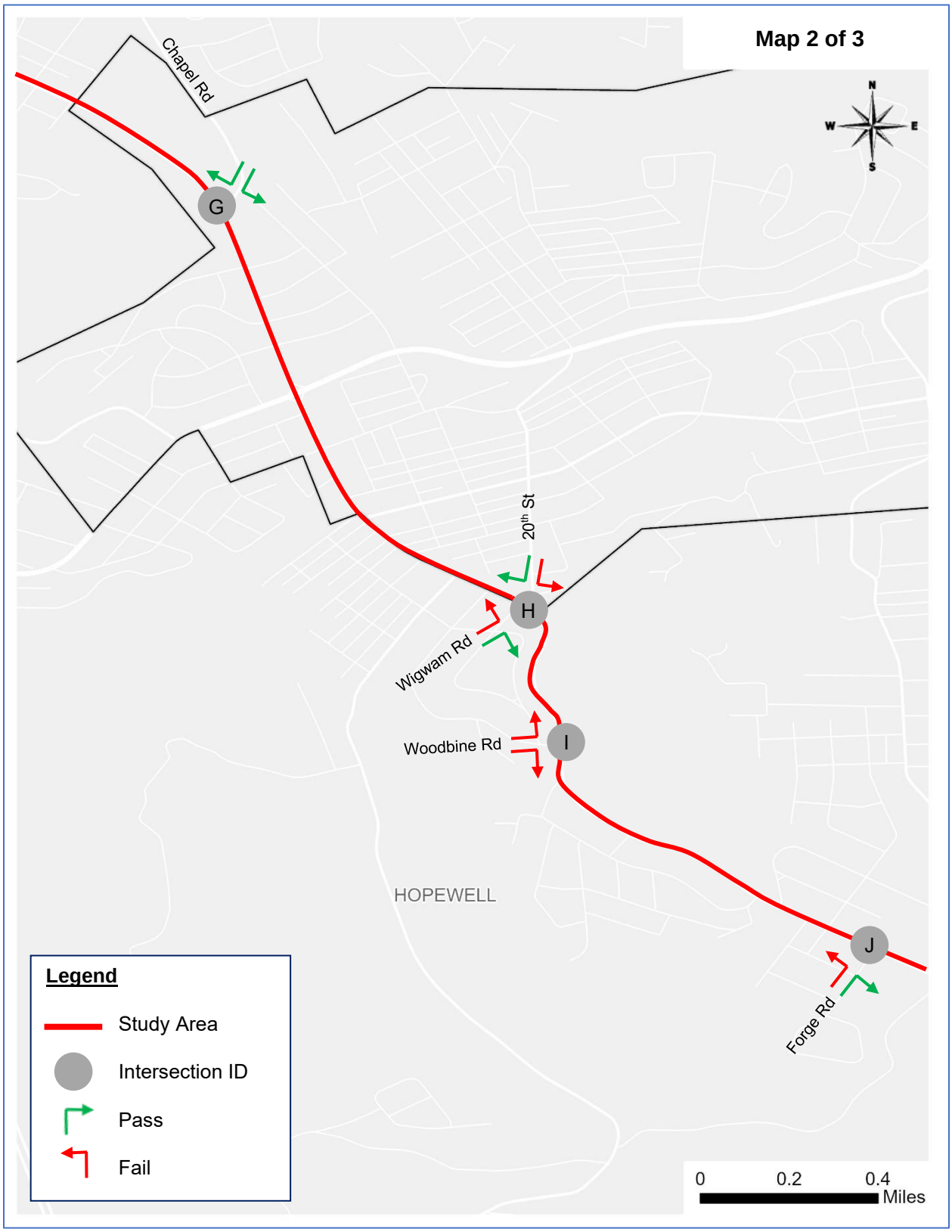
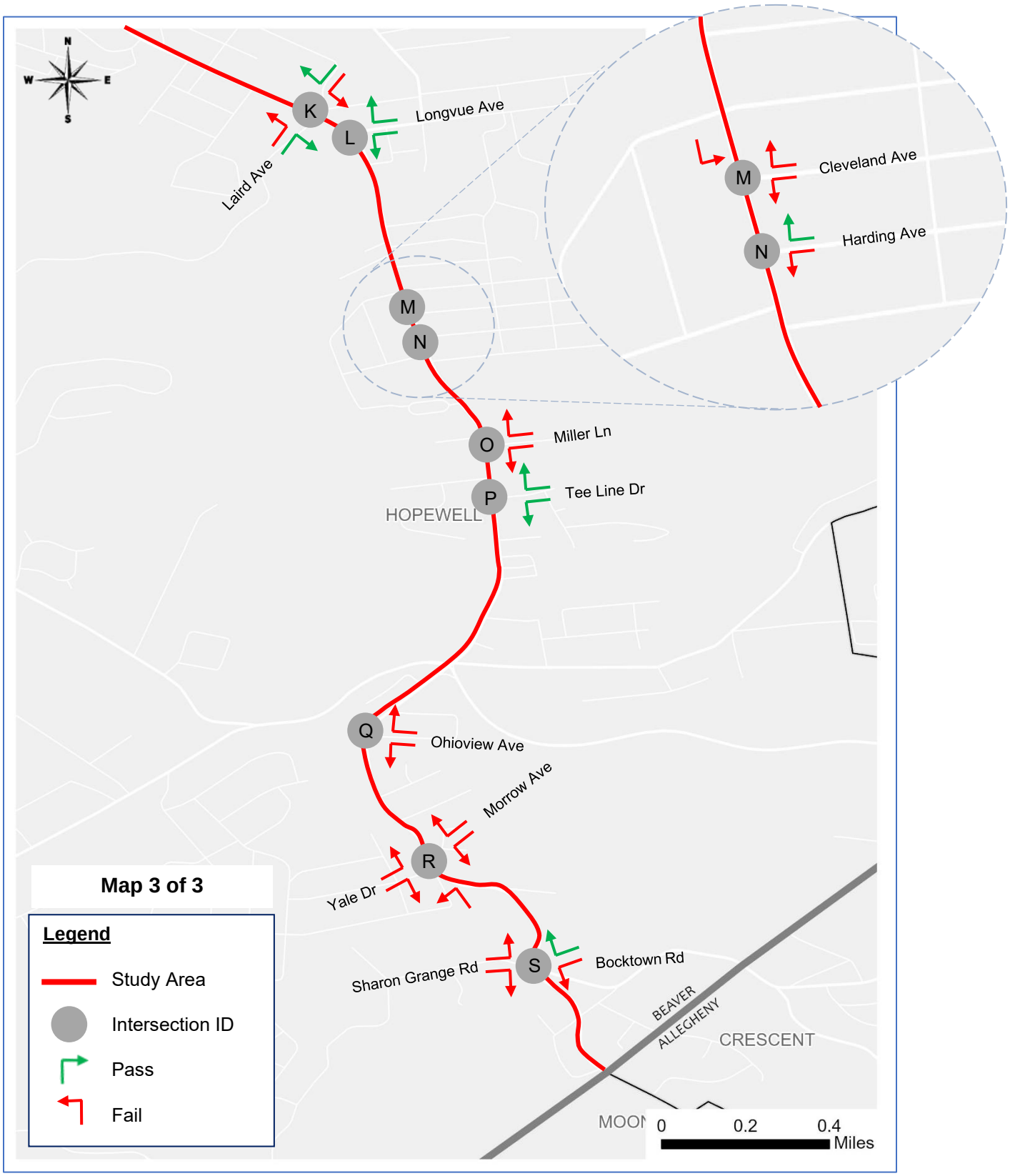


Exhibit 18: Potential Sight Distance Needs (Map 3 of 3)



3.2.4 Nighttime Field View

To help assess travel conditions and motorist guidance during hours of darkness, a nighttime field view and dashcam video was recorded to qualitatively assess the visibility, retro-reflectivity, or effectiveness of signs, pavement markings, delineation, and lighting throughout the study corridor. Specific nighttime observations focused on the following:

- *Lighting* – Roadway segment lighting not dedicated to intersections
- *Markings* – Double yellow lines, edge lines, crosswalks, stop bars, etc.
- *Delineation* – Curbs, medians, and reflective posts channelizing traffic
- *Signs* – Speed limit, warning, and other roadside signs

To compile the nighttime field view results, the elements above were evaluated in each direction for 28 individual roadway segments as detailed in *Appendix A6 – Nighttime Retro-Reflectivity Data* with observed conditions or deficiencies noted as follows:

- *Adequate* – the element is present and can be seen clearly at night
- *Needs Improvement* – the element is present but cannot be seen clearly at night
- *Missing* – the element does not appear to be present
- *Not Applicable* – the element is likely not required for the roadway geometry or adjacent land use

General findings of the nighttime retro-reflectivity assessment are summarized by segment in *Exhibit 19* and *Exhibit 20* with conditions of Excellent, Good, Fair, or Poor based on the overall observed conditions or deficiencies described above. Details or options to consider exploring for potential improvements in future phases of the study generally may include:

- *Lighting*
    - 44 of 56 segments (79%) were found to have dim or missing lighting
    - Improvements could explore new (or updated) LED technologies or additional luminaires
- *Markings*
    - 20 of 56 segments (36%) were found to have dim or missing pavement markings
    - Improvements could explore repainting the corridor with new materials, wider lines, or additional markings in critical areas
- *Delineation*
    - 2 of 56 segments (4%) were found to have dim or missing delineation
    - Improvements could explore installing new, replacement, or upgraded delineation
- *Signing*
    - 4 of 56 segments (7%) were found to have dim or missing signing
    - Improvements could install new or replacement signs, or explore other relevant options in critical areas such as larger signs, duplicate signs, reflective signpost panels, sign perimeter lighting, etc.

Exhibit 19: Nighttime Retro-Reflectivity Assessment (Map 1 of 2)

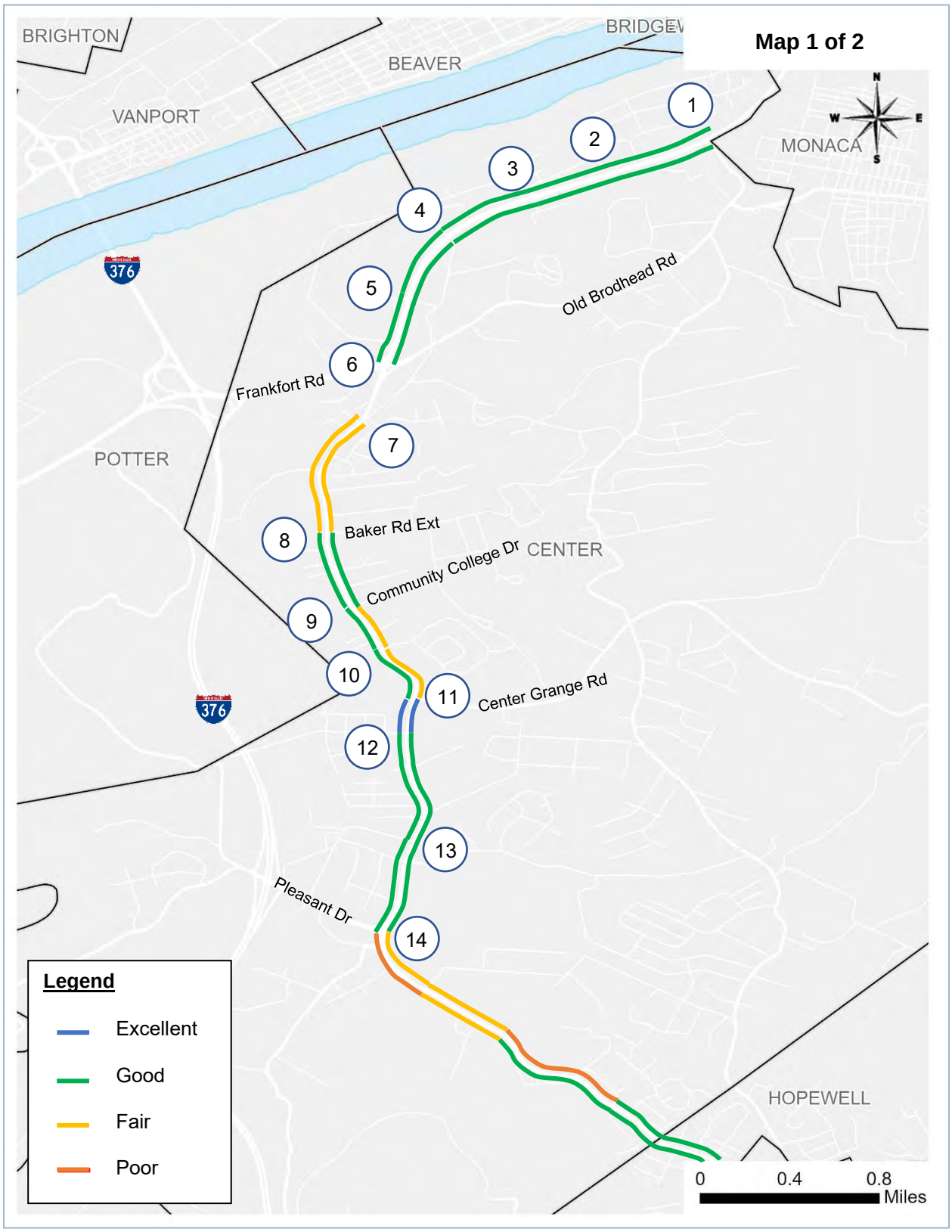


Exhibit 20: Nighttime Retro-Reflectivity Assessment (Map 2 of 2)

3.3 Traffic Operations

3.3.1 Traffic Volumes

Automatic Traffic Recorder Counts

Automatic Traffic Recorder (ATR) count data was collected for seven continuous days in December 2020 at several locations throughout the study area. Count summaries by hour, day, direction, and for weekday versus weekend totals are compiled in *Appendix A7 – Traffic Volumes*, including conversion of the results to Average Annual Daily Traffic (AADT) volumes as vehicles per day (vpd) based on adjustment factors from PennDOT's *2019 Traffic Information Report.*

Direct count results yield AADT volumes that vary significantly throughout the corridor based on how the connecting roadway network, land uses, and numerous side-street and driveway connections influence the overall traffic patterns. Coupled with broader traffic adjustments for the study area (e.g. accounting for the impacts of Covid-19), a reasonable assumption for Baseline AADT estimates along Brodhead Road ranges from 5,000 vpd south of Five Points to more than 25,000 vpd in the commercial areas near Beaver Valley Mall (*Exhibit 21*).

Exhibit 21: Daily Traffic Volume Summary – 2020 Baseline Conditions

Area	**Brodhead Road Daily Traffic Volumes** (vehicles per day)			
	5,000-10,000	**10,000-15,000**	**15,000-20,000**	**20,000-25,000**
Center Twp Commercial Area (INT 1-6: Old Brodhead to Frankfort / Old Brodhead)	■	■	■	■
Center Twp Suburban Area (INT 6-14: Frankfort / Old Brodhead to Pleasant Dr)	■	■	■	
Center-Hopewell-Aliquippa Residential Area (INT 14-16: Pleasant Dr to Mill St / Kennedy Blvd)	■	■		
Aliquippa Commercial Area (INT 16-19: Mill St / Kennedy Blvd to 20th St)	■	■	■	
Hopewell Twp School and Commercial Areas (INT 19-22: 20th St to Five Points)	■	■		
Hopewell Twp Suburban Area (INT 22 / Five Points to Allegheny County Line)	■			

A sample comparison of hourly traffic volumes throughout the day also indicates a unique pattern along Brodhead Road that varies from a traditional AM/PM commuter peak. Instead, both historic count data (from PennDOT's online *Traffic Information Repository* (TIRe)) and the project-specific 2020 ATR count data show that traffic builds continuously throughout the day, beginning with the AM peak, continuing through a higher midday travel period, and reaching its highest level during the PM peak (*Exhibit 22* and *Exhibit 23*). This comparison also shows minor variations between the historic and current count data that may be explored to help support traffic volume adjustments to account for the influence of the COVID-19 pandemic as detailed later in this section.

Exhibit 22: Hourly Volume Trends – North of Golfview Drive / Beaver Valley Mall Drive

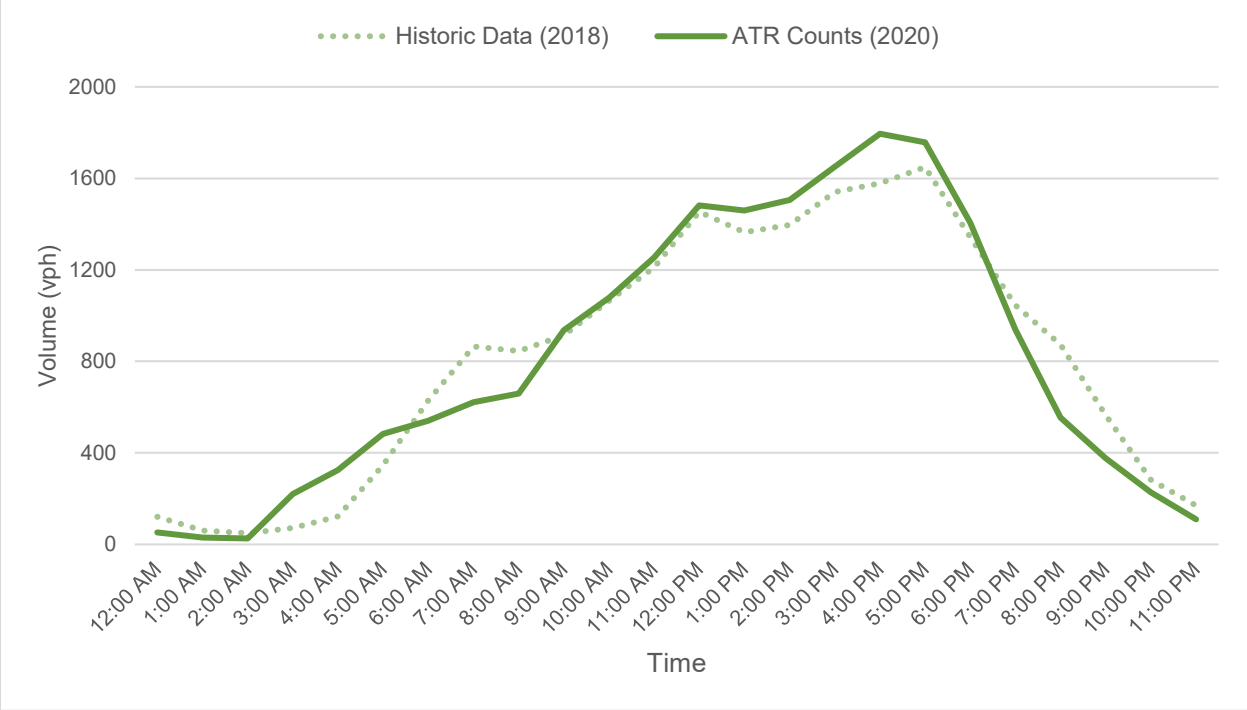
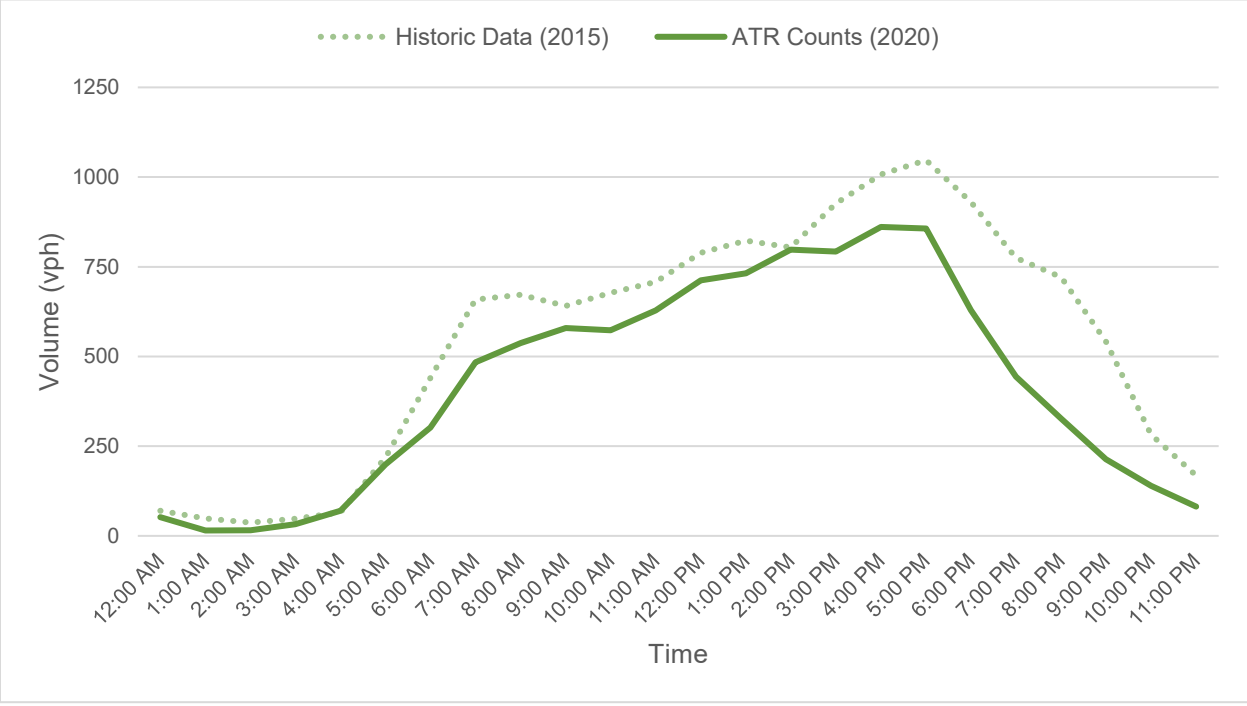


Exhibit 23: Hourly Volume Trends – North of Five Points



Intersection Turning Movement Counts

Turning movement counts (TMCs) were collected in January 2021 during a typical weekday (Tuesday or Thursday) at 22 study intersections using video based (Miovision) count equipment. The weekday TMCs covered a two-hour AM peak period from 7:00 AM to 9:00 AM, and a four-hour PM peak period from 3:00 PM to 7:00 PM. Count data included traffic volumes, pedestrian volumes, bicycle volumes, and percent trucks and buses at each intersection with details included in *Appendix A7 – Traffic Volumes*. Based on this data, system-wide peak hours were identified as:

- *AM Peak Hour:* 7:30 AM to 8:30 AM
- *PM Peak Hour:* 4:30 PM to 5:30 PM

Baseline Traffic Volume Adjustments

The influence of the COVID-19 pandemic on traffic volumes and travel patterns required a deviation from traditional data collection methods, as the latest counts may not be fully reflective of typical travel behavior due to, for example, ongoing remote school/work activities or business occupancy restrictions. To estimate the final set of 2020 Baseline traffic volumes along Brodhead Road, a project-specific travel demand model was developed to compile and adjust the latest traffic counts based on historic origin-destination travel patterns throughout the project area.

The travel demand model used PTV's VISUM 2021 software to create a model of the existing transportation network, and travel patterns in the network were based on zone-to-zone origin-destination (O-D) matrices using SPC's subscription access to the online StreetLight data platform (https://www.streetlightdata.com/). This process generally included three major steps:

1. The model was first calibrated to match existing conditions (with the influence of COVID-19) based on the January 2021 count data and corresponding January 2021 StreetLight O-D data. As part of this step, the peak hour volumes were balanced between primary study intersections where no significant change in volume was expected. However, they were left unbalanced where changes should occur due to significant driveway and side-street connections (generalized in the model as traffic source/sink locations between the primary study intersections).

2. Historic StreetLight O-D data from January 2020 was compared to the January 2021 dataset to identify significant travel pattern and volume differences throughout the study area. These differences reflect the influence of the COVID-19 pandemic and were used to adjust the initial O-D matrices developed in Step 1.

3. The VISUM model was used to reassign the adjusted O-D matrices from Step 2 onto the existing transportation network. This reassignment yields the final set of 2020 Baseline peak hour volumes used for analysis, which reflect a more typical set of travel conditions that essentially removes the influence of the pandemic (i.e., a pre- or post-COVID scenario).

The final set of 2020 Baseline peak hour volumes are summarized in *Exhibit 24* through *Exhibit 27*.

Exhibit 24: AM (PM) Peak Hour Volume Summary – 2020 Baseline Conditions (Map 1 of 4)

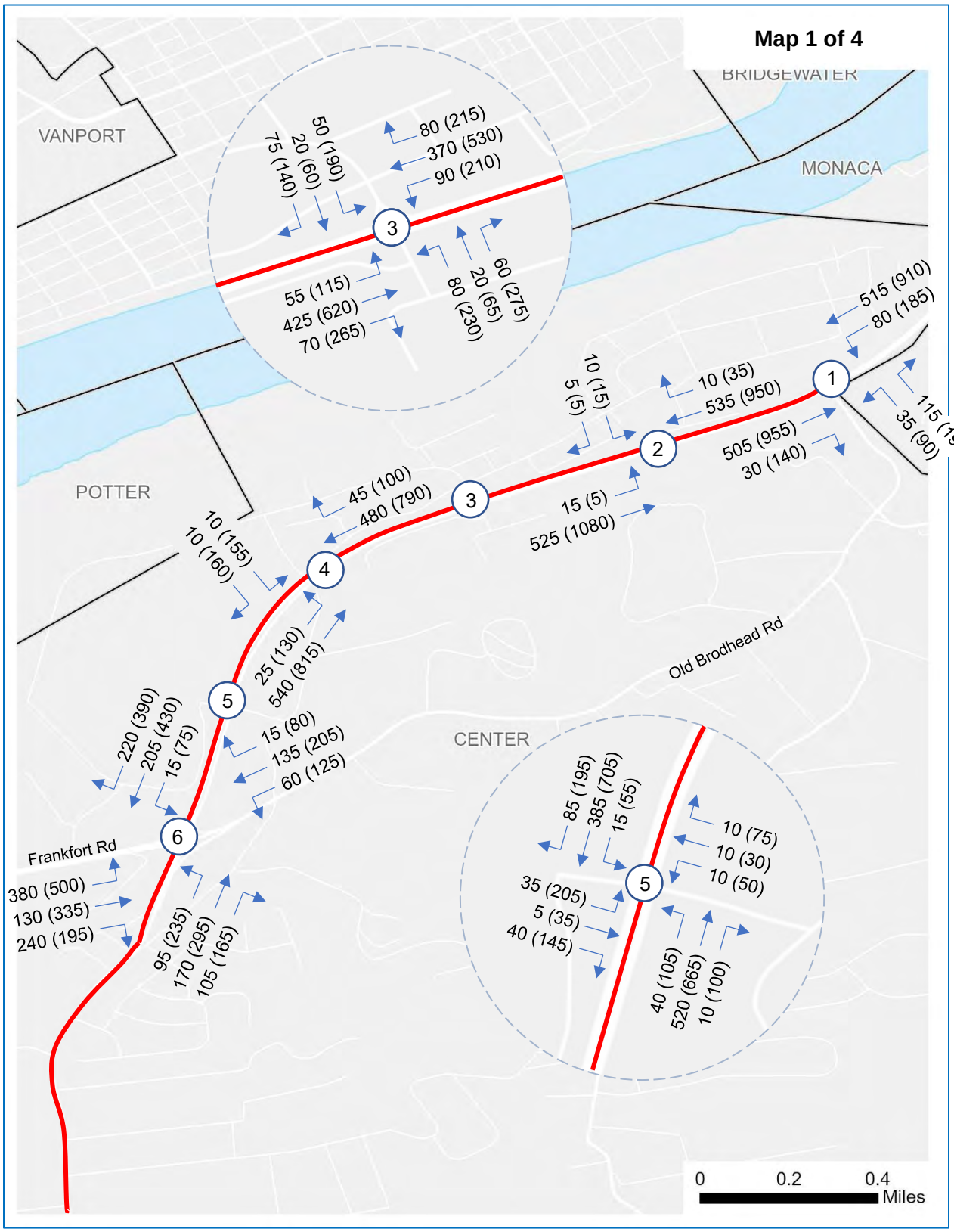


Exhibit 25: AM (PM) Peak Hour Volume Summary – 2020 Baseline Conditions (Map 2 of 4)

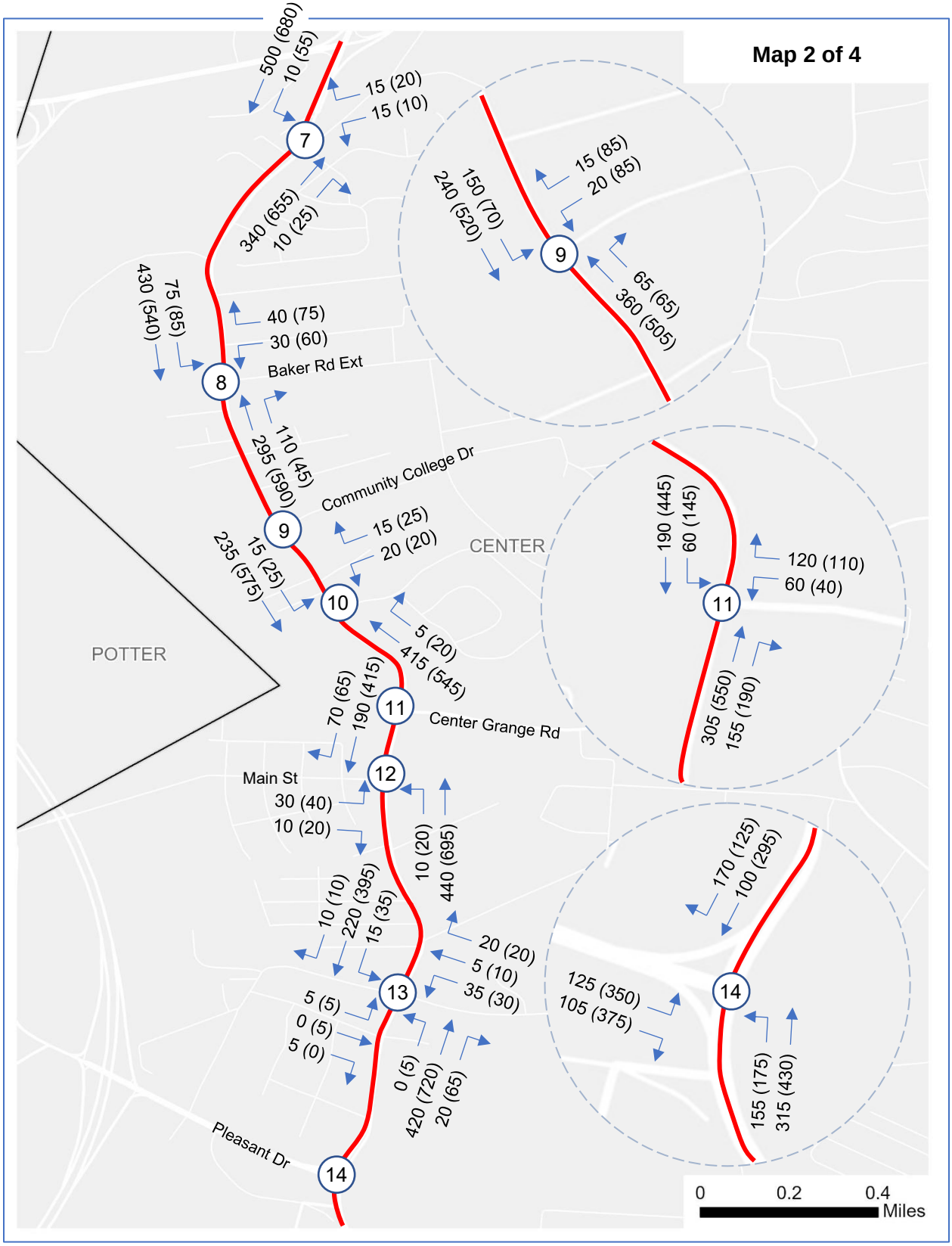


Exhibit 26: AM (PM) Peak Hour Volume Summary – 2020 Baseline Conditions (Map 3 of 4)

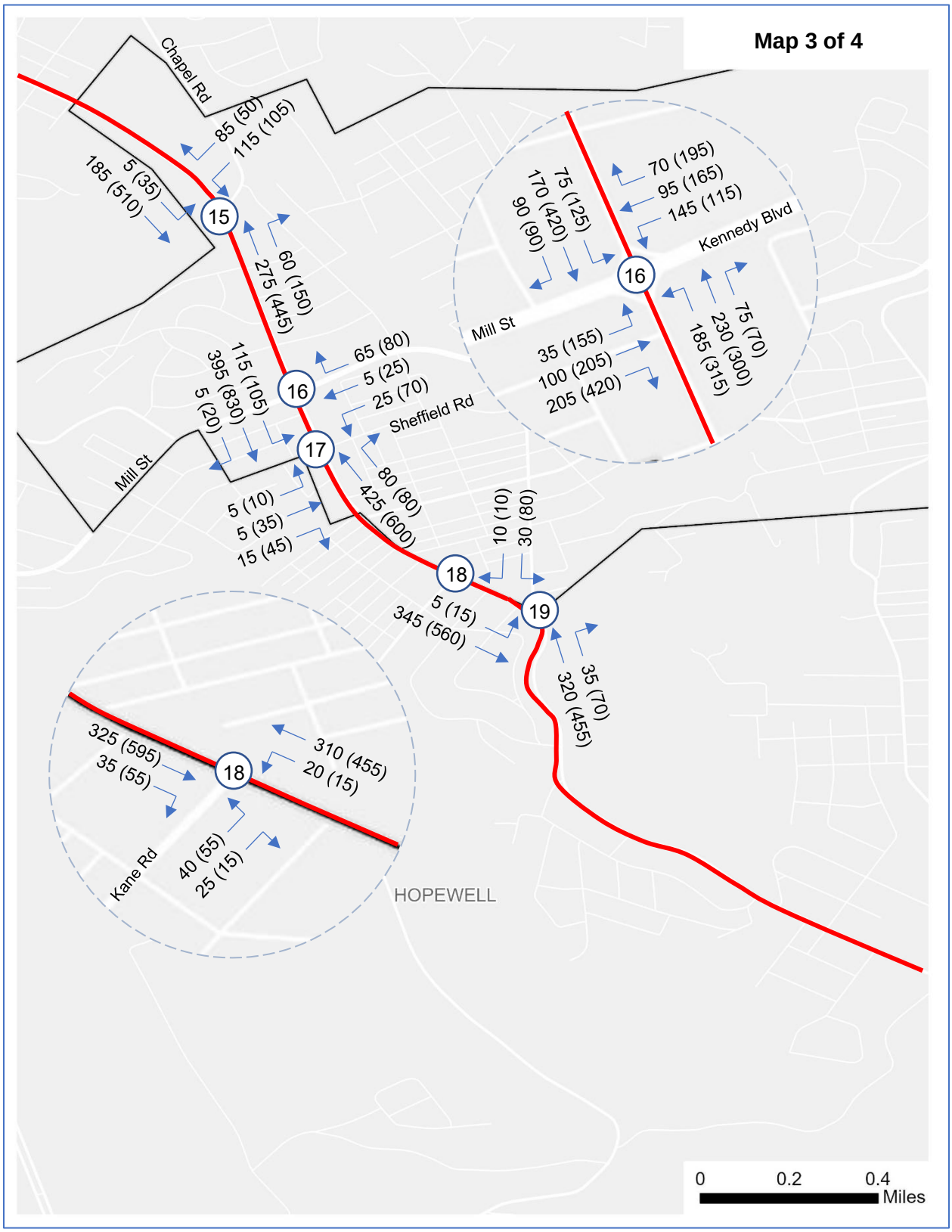


Exhibit 27: AM (PM) Peak Hour Volume Summary – 2020 Baseline Conditions (Map 4 of 4)

3.3.2 Travel Times and Speeds

Travel times and speeds along the study corridor were evaluated using SPC's access to INRIX data via the online *Regional Integrated Transportation Information System* (RITIS) platform (www.ritis.org). Available data were compiled for 13 INRIX segments along the corridor, averaged for one-year from January 1 through December 31, 2019. To estimate delay and congestion, the difference between the observed travel time and the no-stop travel time (derived from travel distance at the posted speed limit) was calculated for the northbound and southbound directions, and the AM and PM peak periods, to determine corridor-wide delay that could be expected on a typical weekday. Detailed speed, travel time, and delay estimates are included in *Appendix B2 – Travel Time and Speed Data*. Results indicate that end-to-end travel along the study corridor typically takes between 24-27 minutes, including 4-5 minutes of delay in the AM peak, and approximately 6 minutes of delay in the PM peak.

To help visualize travel conditions, peak hour travel times along the corridor were also compared to no-stop travel times on a percentage basis with a qualitative scale describing travel conditions as *Normal* (within 10% of the no-stop travel time), *Slowed* (within 20%), *Delayed* (within 30%), or *Stop and Go* (more than 30% longer). On a segment basis (counting 13 northbound and 13 southbound INRIX segments per peak), it was determined that traffic experiences normal travel speeds along the corridor just a third of the time, but experiences stop and go conditions up to 38% of the time in the AM peak, and fully half of the time in the PM peak (*Exhibit 28*). By location, delays in the study area were found to be highest north of Frankfort Road (SR 18) / Old Brodhead Road (SR 3002), through Aliquippa, and through areas north of Five Points (*Exhibit 29* and *Exhibit 30*).

Exhibit 28: Travel Time/Condition Summary

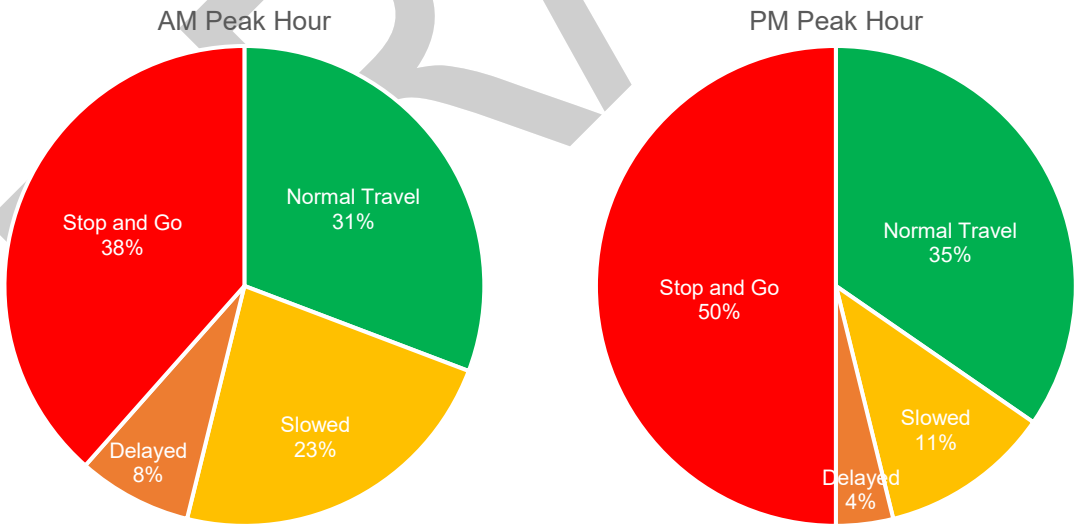


Exhibit 29: Travel Time/Condition Summary – AM Peak by Segment

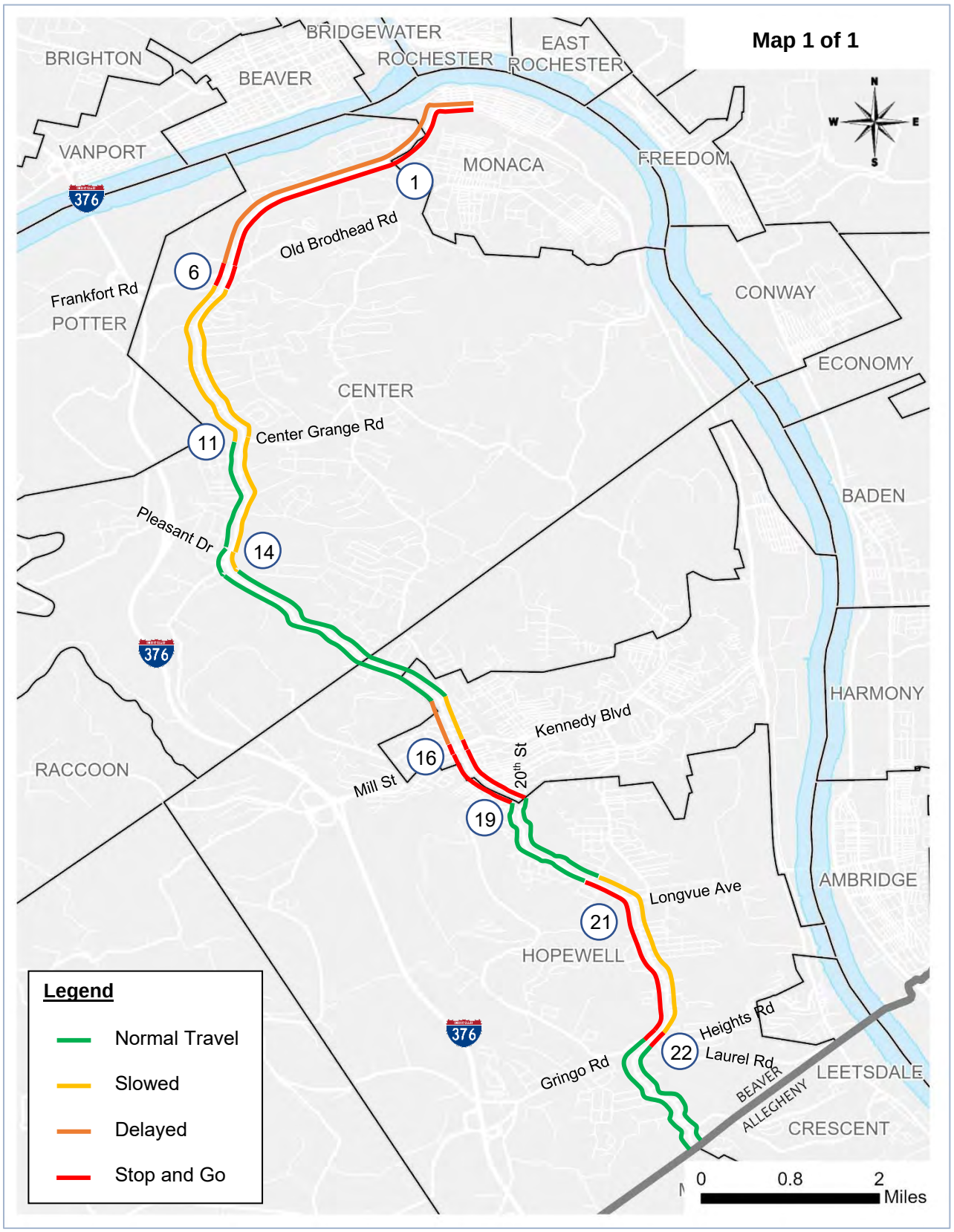
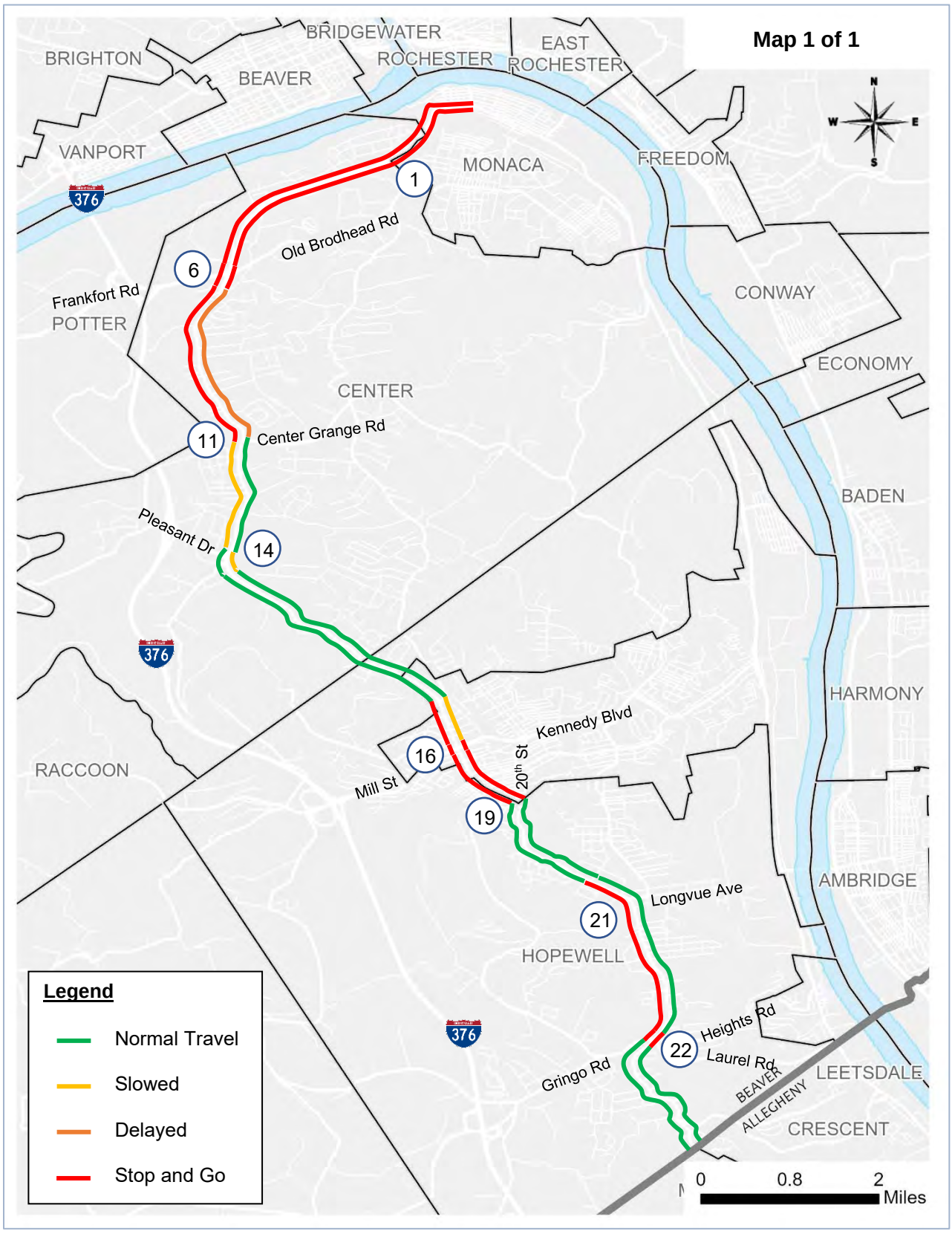


Exhibit 30: Travel Time/Condition Summary – PM Peak by Segment



3.3.3 Intersection Operations

To assess individual intersection operations throughout the corridor, intersection capacities, delays, and corresponding levels-of-service (LOS) were analyzed based on *Highway Capacity Manual* (HCM) methodologies. This approach associates vehicular delay at intersections with a letter-grade ranging from LOS A, representing the best operating conditions, to LOS F, representing the worst (or failing) conditions. PTV's VISTRO software (Version 2021, Service Pack 2) was used to complete this analysis at the 22 primary study intersections.[1] Detailed delay and LOS results are compiled in *Appendix B3 – 2020 Baseline Conditions Operations Analysis Results*.

Summary results in *Exhibit 31* reflect the overall intersection LOS for signalized locations, or the worst minor approach LOS for unsignalized locations. Results indicate that only 6 of 22 primary study intersections operate acceptably (LOS D or better) for all movements in both peaks, including INT 1, 4, 10, 12, 18, and 19 as listed in *Exhibit 31*. Various degrees of failure (LOS E/F) include the following:

- Signalized intersections with overall failing LOS F in both peak hours:
    - INT 6 Frankfort Road (SR 18) / Old Brodhead Road
    - INT 22 Five Points
- Additional signalized intersections with overall failing LOS E/F in just the PM peak hour:
    - INT 3 Short Street / Milne Drive
    - INT 16 Mill Street / Kennedy Boulevard
    - INT 17 Sheffield Street
- Unsignalized intersections with side street failures at LOS E/F in both peak hours:
    - INT 21 Longvue Avenue
- Additional unsignalized intersections with side street failures at LOS E/F in just the PM peak hour:
    - INT 2 Wagner Road
    - INT 7 N Branch Road
    - INT 8 Baker Road Ext
    - INT 11 Center Grange Road
    - INT 13 Shaffer Road
    - INT 14 Pleasant Drive
    - INT 15 Chapel Road
    - INT 20 Laird Avenue
- Locations that generally operate at acceptable LOS D or better overall, but still experience individual failing movements or approaches:
    - INT 5 Beaver Valley Mall Drive / Golfview Drive
    - INT 9 Community College Drive

[1] VISTRO is a macroscopic capacity analysis and signal optimization computer program that follows HCM methodologies. Note, however, that due to limitations within HCM 6 methodologies – such as the ability to handle intersections with complex controller operations or detector placement – HCM 2000 LOS results were compiled from VISTRO for all study area intersections.

Exhibit 31: Level of Service Summary

#	Brodhead Road at:	Control Type	LOS (AM / PM)	
			2020 Baseline Conditions	
1	Old Brodhead Road	Signal	C	C
2	Wagner Road	Stop-Control	C	F **
3	Short Street / Milne Drive	Signal	D **	E **
4	Center Commons Boulevard	Signal	C	C
5	Beaver Valley Mall Drive / Golfview Drive	Signal	D	D **
6	Frankfort Road / Old Brodhead Road	Signal	F **	F **
7	N Branch Road	Stop-Control	C	E **
8	Baker Road Ext	Stop-Control	C	F **
9	Community College Drive	Signal	D	D **
10	Sherwood Drive	Stop-Control	B	C
11	Center Grange Road	Stop-Control	C	F **
12	Main Street	Stop-Control	B	D
13	Shaffer Road	Stop-Control	C	E **
14	Pleasant Drive	Stop-Control	C	F **
15	Chapel Road	Stop-Control	B	F **
16	Mill Street / Kennedy Boulevard	Signal	D **	F **
17	Sheffield Road	Signal	D *	F **
18	Kane Road	Stop-Control	C	D
19	20th Street	Stop-Control	C	D
20	Laird Avenue	Stop-Control	B	E **
21	Longvue Avenue	Stop-Control	E **	F **
22	Five Points	Signal	F **	F **

NOTE: Signalized intersections report the overall intersection LOS; Stop-Controlled intersections report the worst movement or approach

* One or more individual lane groups fail (LOS E/F)

** One or more overall approaches fail (LOS E/F)

3.4 Freight Operations

Freight Connections: Brodhead Road – and more specifically several key connecting routes that cross Brodhead Road – play an important role in the area's freight transportation system by linking I-376 with freight-centric land uses along the Ohio River (*Exhibit 32*). This network includes connectivity to I-376 Exit 39 (via SR 18), Exit 42 (via Pleasant Drive), Exit 45 (via Mill Street), and Exit 48 (via SR 151). Access to freight-centric properties along the Ohio River occurs primarily via SR 51, with its connections to (or across) Brodhead Road via SR 18, Monaca Road / Center Grange Road, Kennedy Boulevard, and SR 151.

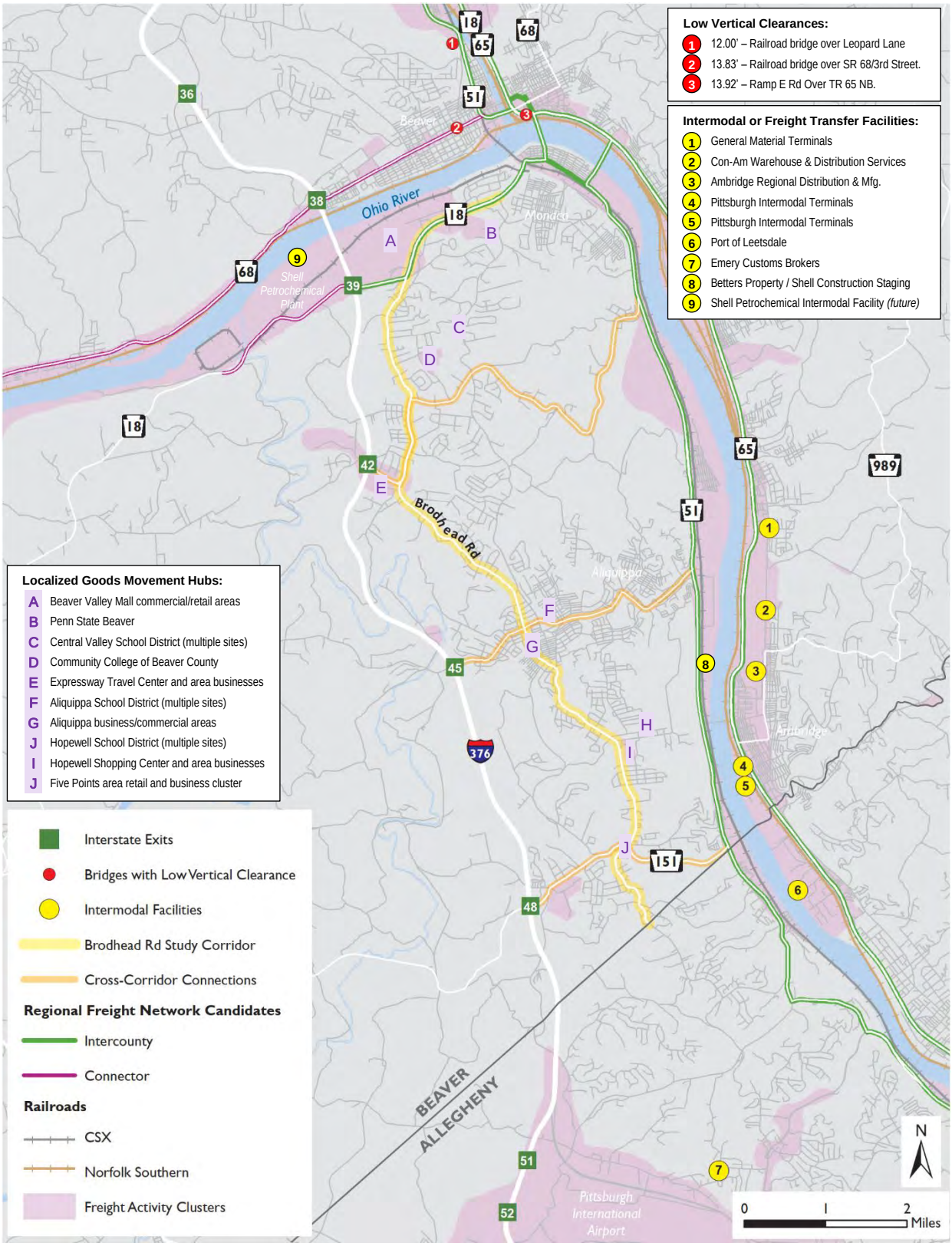
Freight Routes: Freight network connectivity was previously highlighted in a Regional Freight Network drafted as part of SPC's *Southwestern Pennsylvania Regional Freight Plan* (2016). While not a formally designated or adopted network, the concepts included a tiered system of routes that were significant to the movement of freight in the region. Designations included *Intercounty* route candidates, which reflect broader county-to-county connections across the SPC region; as well as *Connector* route candidates, which reflect important first/last-mile linkages to key freight activity clusters for the region. Based on those efforts and relative to the Brodhead Road study area, Route 65, Route 51, and portions of Route 18 through Monaca were identified as potential *Intercounty* route candidates. Additionally, at the northern end of the study area, portions of Route 18 west of Brodhead Road (near the Shell Petrochemical Plant) and portions of Route 68 on the opposite side of the Ohio River were identified as potential *Connector* route candidates.

Low Vertical Clearances: Data from the 2016 Regional Freight Plan identified three low-clearance locations in the area (*Exhibit 32*, Sites 1-3); however, all three sites are generally north of the study area, and it does not appear that they would have a substantial influence on freight movements relative to Brodhead Road.

Intermodal or Freight Transfer Facilities: Major intermodal activities and truck/rail/barge freight transfer opportunities encompass several key warehousing and distribution sites, freight terminals, and site-specific operations along the Ohio River (*Exhibit 32*, Sites 1-9). Included among these sites is the Betters Property along Route 51 that is currently being used for construction and materials staging for the Shell Petrochemical Plant, with much of the related truck traffic being routed across Brodhead Road via Route 151 through the Five Points intersection. Future opportunities for the Betters Property also include potential expansion of warehousing and distribution activities. Future operations at the new Shell Petrochemical Plan are also planning for construction of intermodal facilities as part of the site development.

Localized Goods Movement: Beyond the area's broader freight connection perspectives, several important areas more local to the Brodhead Road corridor will also influence truck demands and goods movement activities that directly serve businesses and community assets throughout Center Township, Hopewell Township, and Aliquippa (*Exhibit 32*, Sites A-J). Such activities include the delivery of retail goods, food, supplies, equipment, gasoline, construction materials, or many other types of freight that keep the area's businesses running, as well final-mile deliveries of packages and home goods throughout the area's residential communities (e.g. Amazon, UPS, FedEx).

Exhibit 32: Freight Network Summary



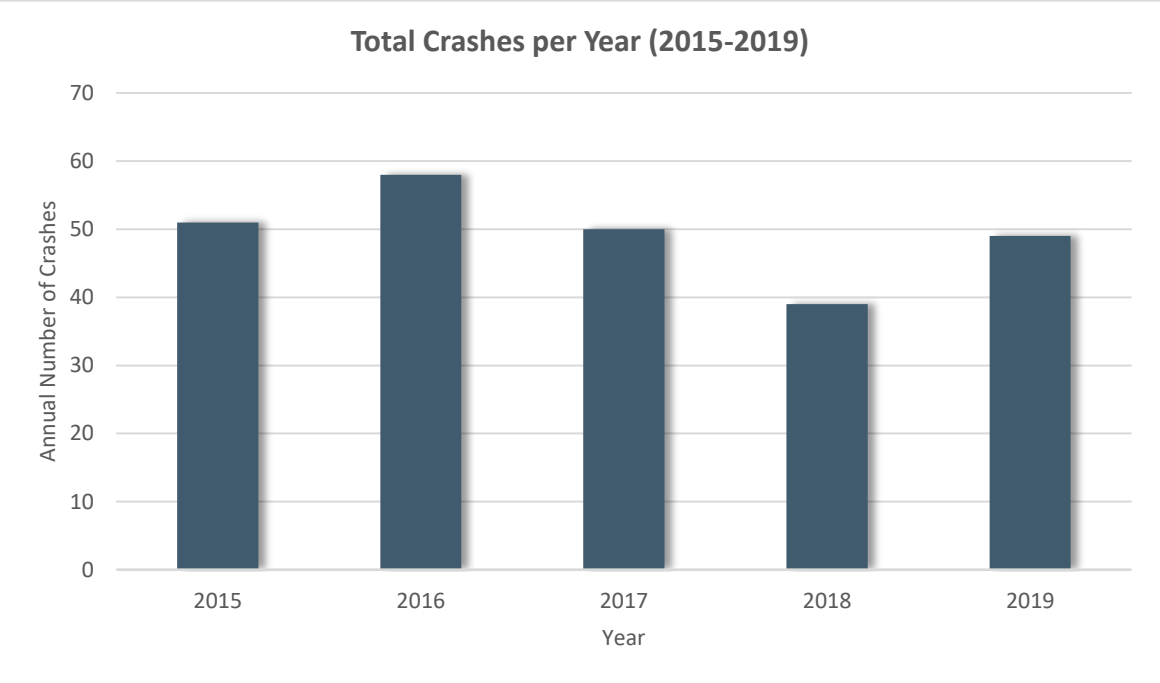
4 SAFETY

4.1 Crash Trends

To review and assess crash trends throughout the study corridor, available crash data from PennDOT's *Pennsylvania Crash Information Tool* (PCIT) was summarized for a five-year study period from 2015 through 2019. Confidential crash details and analyses based on AASHTO *Highway Safety Manual* (HSM) methodologies are included in *Appendix C*. General summary findings and trends include the following:

- There were **247 reportable crashes** in the project area from 2015-2019 with 56% occurring along roadway segments and 44% at intersections. Annual totals ranged from 39 to 58 crashes per year (*Exhibit 33*), or the equivalent of approximately 3-5 crashes per month.

Exhibit 33: Total Crashes by Year



- The totals above do not include a potentially significant number of **non-reportable crashes** that also occur along the corridor. Non-reportable crashes typically reflect minor "fender-benders" with no injuries, no towed vehicles, and minimal property damage. Such occurrences may be recorded by local/municipal police but are not otherwise included in PennDOT's PCIT database.

- No significant trends or anomalies were identified in terms of **crash location or time frame**; rather, higher levels of crash activity were logically observed at locations that experience higher volumes and during busier travel periods. Potential clusters, for example, were identified at the intersections of Brodhead Road and Frankfort Road / Old Brodhead Road, Mill Street / Kennedy Boulevard, and Five Points; and 37% of all crashes were found to occur during PM travel hours from 2:00-7:00 PM.

- No significant trends or anomalies were identified in terms of **crash severity**. Most crashes involved property damage only (52%), and the proportion of injuries or fatalities were all comparable to statewide averages. Only two fatalities occurred in the study area during the study period, with unrelated causes or locations.

- No significant trends or anomalies were identified in terms of **weather, lighting, or other potential factors**. Most crashes occurred during dry, clear weather (76%) and daylight (71%) conditions.

- On a percentage basis, three **crash types** in the project area were noted as being slightly higher than comparable statewide average proportions, including Angle (39% vs. 27% statewide), Rear-End (29% vs. 22% statewide), and Head On (8% vs. 4% statewide). This trend is likely indicative of the number of intersections and access points along the corridor, as well as the typically two-lane undivided section with limited turn-lanes except at major intersections.

- Five **pedestrian related crashes** occurred in the study area, which is better than statewide trends (2% vs. 3.2% statewide). Four of these crashes occurred in areas that have been noted as having higher levels of pedestrian activity, including Aliquippa and near Hopewell Shopping Center.

As part of the detailed safety analyses in *Appendix C*, HSM-based methods were used to evaluate the safety performance of intersections and roadway segments throughout the study corridor. It is worth noting that all locations were found to be performing comparable to or better than similar facilities (i.e. no locations were “flagged for safety performance”). These findings, however, do not preclude the consideration of project-specific anecdotal insights from stakeholder interviews, public outreach, or field observations. Such insights have noted a wide variety of concerns that potentially contribute to safety perceptions and traffic operations throughout the corridor. Examples include the potential influence of sight-distance constraints, aggressive driving, cut-through traffic, congestion and queuing, or infrastructure needs (e.g. missing sidewalk, crosswalks, etc.). While not part of the quantitative safety analyses discussed here, these types of concerns have been accounted for throughout other sections of the existing conditions documentation and will continue to be considered relative to potential needs in subsequent phases of the study.

4.2 Detours and Evacuations

As a parallel route to I-376, sections of Brodhead Road also play a role in several PennDOT interstate emergency detour routes that may be activated in the event of incidents on I-376. These detour routes are color-coded for easy identification by rerouted traffic and include the following (*Exhibit 34*):

I-376 Eastbound GREEN Detour:

- Exit 38 (Beaver/Midland) to Exit 39 (Monaca/Shippingport)

I-376 Eastbound RED Detour:

- Exit 39 (Monaca/Shippingport) to Exit 42 (Center)
- Exit 42 (Center) to Exit 45 (Aliquippa)
- Exit 45 (Aliquippa) to Exit 48 (SR 151/Hopewell)
- Exit 48 (SR 151/Hopewell) to Exit 50 (SR 60 Bus./Flaugherty Run Road)

I-376 Westbound ORANGE Detour:

- Exit 39 (Monaca/Shippingport) to Exit 38 A/B (Beaver/Midland)

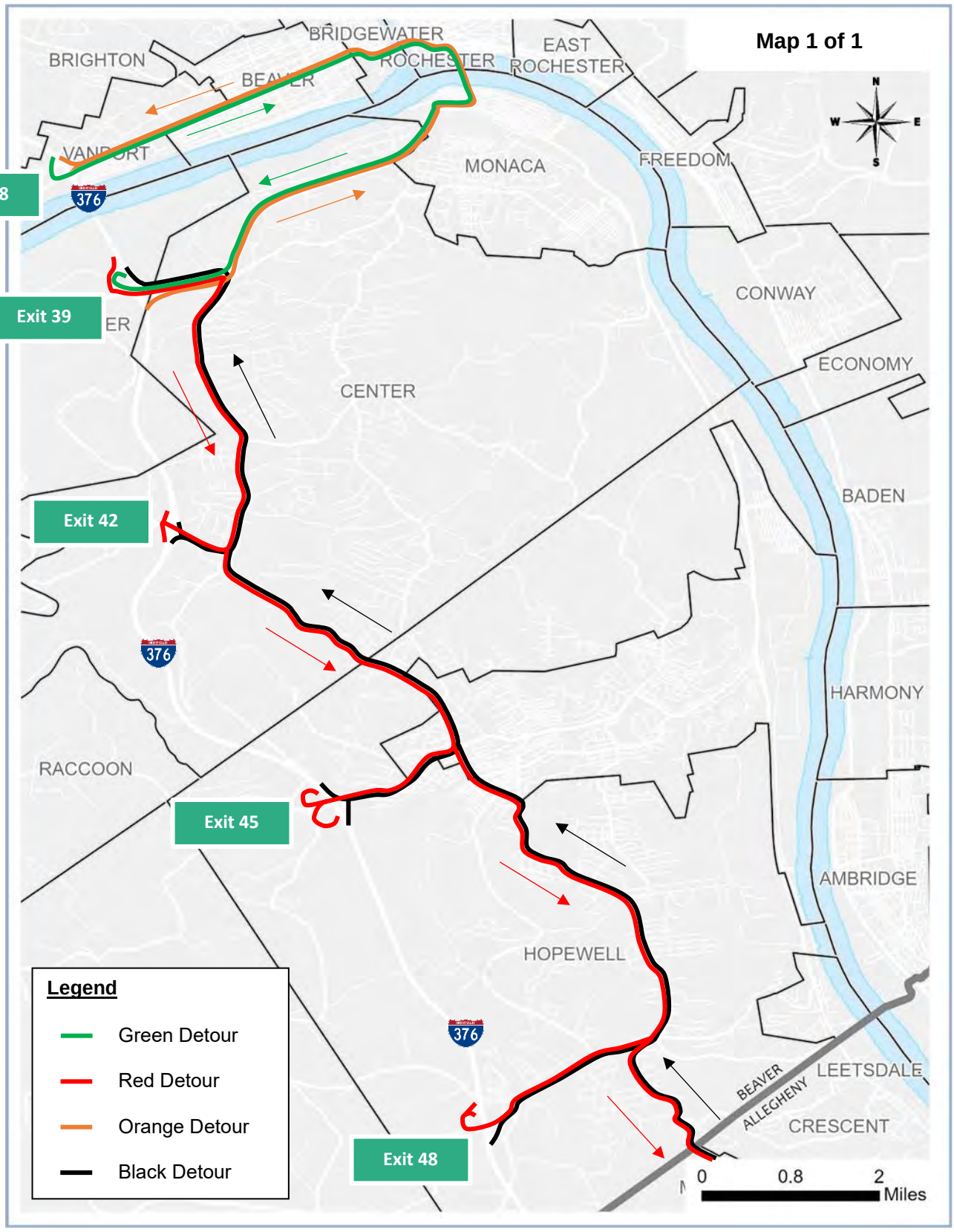
I-376 Westbound BLACK Detour:

- Exit 42 (Center) to Exit 39 (Monaca/Shippingport)
- Exit 45 (Aliquippa) to Exit 42 (Center)
- Exit 48 (SR 151/Hopewell) to Exit 45 (Aliquippa)
- Exit 51 (Flaugherty Run Road) to Exit 48 (SR 151/Hopewell)

In addition to the influence of interstate detours, Brodhead Road also plays a role in a series of emergency evacuation routes planned for the Beaver Valley Nuclear Power Station (BVNPS), which is located along the Ohio River approximately 8-miles west of the study area. In the event of an evacuation, Brodhead Road serves as a collector route for the area, primarily with a role of funneling traffic to I-376 through the following study area intersections:

- **INT 6** Frankfort Road (SR 18) / Old Brodhead Road (to I-376 Exit 39)
- **INT 14** Pleasant Drive (to I-376 Exit 42)
- **INT 16** Mill Street / Kennedy Boulevard (to I-376 Exit 45)
- **INT 22** Five Points (to I-376 Exit 48)

Exhibit 34: Interstate Emergency Detour Routes Influencing Brodhead Road



5 OUTREACH

5.1 Approach

Public and stakeholder engagement for the Brodhead Road Corridor Planning Study was designed to be effective, efficient and adaptive to the constraints imposed by Covid-19 public health measures. Early in the timeline, a project website was published and a wikimap made live to collect location-specific comments. The wikimapping tool became not only a direct public input mechanism well-suited to the 11-mile length of the Brodhead Road corridor and the virtual nature of public involvement in early 2021, but was also useful to the project team as a means of compiling and summarizing site-specific comments from all sources (e.g. field observations, stakeholder comments, public meeting input).

The project team launched and promoted an online survey that received 77 responses in February and March 2021. Respondents described their use of the corridor, ranked concerns and provided opinions on walking and cycling, transit, highway connections and anticipated land use and development changes. Many respondents submitted detailed responses to open-ended questions, identifying both site-specific issues as well as more general considerations.

5.2 Stakeholder Interviews

The stakeholder contact list for this project included 80 names representing a variety of organizations with interest in the Brodhead Road Corridor:

- Beaver County Commissioners
- County officials and staff
- PennDOT District 11
- Municipal officials and staff from study-area municipalities and surrounding communities
- Public transit operators
- Aliquippa, Central Valley and Hopewell school districts
- Beaver Valley Intermediate Unit
- Community College of Beaver County
- Penn State Beaver Campus
- Beaver County Career and Technology
- Airport Corridor Transportation Association
- Western Pennsylvania Wheelmen Bicycle Club
- Ohio River Trail Council
- Beaver County Partnership for Community and Economic Growth
- Beaver County Chamber of Commerce
- Local developers, major landholders and business owners

- Public safety and first responders

Stakeholders provided input in a combination of one-on-one interviews and focus groups. The project team conducted follow-up conversations as needed to gain additional insight. Overall, information gained from these contacts supplemented technical data collection and added context to the identification of existing transportation and safety conditions and future needs.

5.3 Public Meetings

The first public meeting for the Brodhead Road Corridor Planning Study took the form of a virtual open house held online March 3 from 6:00 to 8:00 p.m. The event had 111 registrants and 61 unique attendees. The project team promoted the meeting in preceding weeks primarily via circulating flyers and arranging email blasts from local stakeholders, in addition to social media posts and making a local radio appearance.

The meeting began with an introduction of the project team and an overview of the project background, schedule, approach and expected outcomes. The team reviewed next steps and fielded questions from attendees. At that point, attendees were invited to join breakout groups of their choice. Project team members hosted separate rooms on safety; congestion; pedestrians, bikes and transit; land use and development; and other ideas and concerns. Hosts recorded comments live on the project wikimap, which was visible to attendees of each breakout.

The project team paused during the presentation to pose interactive poll questions to attendees. Responses revealed the following:

- Attendees use Brodhead Road in a variety of ways, most popular among which were access to small businesses, access to I-376, visiting friends/family and access to restaurants.
- The top-ranking favorite Brodhead Road destination among attendees was Harold's Inn, followed by the Hopewell Shopping Center.
- Attendees felt strongly that the most important study goal is congestion reduction, system reliability and safety.
- Hopewell Township was the study area community with the highest number of residents in attendance, followed by Center Township.

Conversation in the breakout rooms was "where the rubber hit the road," as one attendee put it. The smaller-group format allowed for greater participation among attendees, allowing the project team to collect many comments from a variety of perspectives. Attendees were free to move between topic breakouts, and many chose to contribute in more than one. The project team recorded location-specific comments on the project wikimap and more general comments in the project notes.

5.4 Local Observations

As part of the public outreach process, comments were received from local stakeholders and members of the public on issues in the area. These local observations can be found in Exhibit 23 and Exhibit 24.

Local observations include:

- Intersection Geometry & Access Issues – 12 locations

- Pedestrian and Bicycle Activity – 12 locations
- Transit / Bus Stop Issues – 9 locations
- Sight Distance Issues – 9 locations
- Aggressive Driving / Speeding – 8 locations

In general, local observations noted that access throughout the corridor can be problematic for all modes of transportation. Pedestrians and bicycles use the corridor even in locations without dedicated facilities, causing friction with vehicular traffic. Buses often have choke points near schools and require frequent stops without pull-off areas. Access to and from side streets and businesses along the corridor can be difficult, often exacerbated by sight distance issues. All of this results in frustrated drivers, aggressive driving behaviors, and speeding throughout the study area.

Exhibit 35: Local Observations (Map 1 of 2)

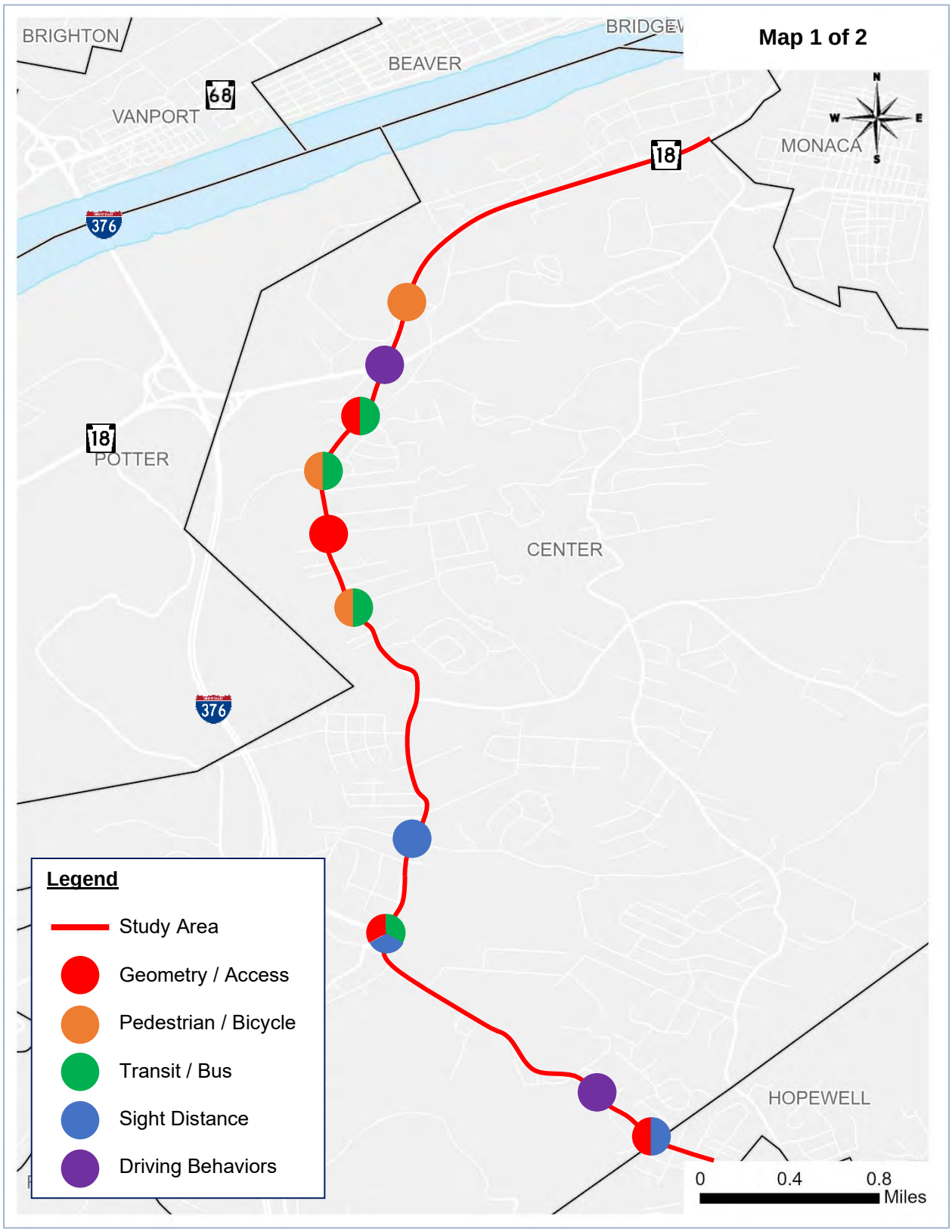


Exhibit 36: Local Observations (Map 1 of 2)

6 NEXT STEPS

6.1 Next Steps

The analysis in this report combines qualitative and quantitative data and observations to establish an understanding of the Brodhead Road corridor and its environs in several relevant contexts. This understanding of existing conditions and issues lays the groundwork for subsequent stages of the Brodhead Road Corridor Planning Study, which will involve:

- Future conditions assessment: With guidance from the Steering Committee, the project team will establish future development assumptions based on local zoning and land use plans and stakeholder expectations; the pipeline of residential, commercial and industrial development known to be in the works; and Southwestern Pennsylvania Commission forecasts adjusted for local conditions. This will support analysis of expected conditions in 2045, estimating the extent of trends and changes to which future strategies should respond.

- Identification and analysis of alternatives: Based on issues and needs identified in this report and the future conditions assessment, the alternatives analysis will identify and assess potential solutions. A second public meeting will provide residents, business owners and others with an interest in the project to respond to potential recommendations.

Ultimately, the project will result in a set of short-, medium- and long-term recommendations for improving operations and safety for all Brodhead Road users and an investment plan to guide the planning and programming of transportation projects in the study area.