
Downtown-Uptown-Oakland-East End Bus Rapid Transit Project

Categorical Exclusion Documentation

October 2018

Prepared for:
Federal Transit Administration

Prepared by:
Port Authority of Allegheny County

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Acronyms

APE	Area of Potential Effect
BEB	Battery-Electric Buses
BRT	Bus Rapid Transit
DCNR	Department of Conservation and Natural Resources
DGE	Diesel Gallon Equivalents
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
LOS	Level of Service
MSAT	Mobile Source Air Toxics
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
PAAC	Port Authority of Allegheny County
DEP	Pennsylvania Department of Environmental Protection
PGC	Pennsylvania Game Commission
PNDI	Pennsylvania Natural Diversity Inventory
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Officer
SPC	Southwestern Planning Commission
TIP	Transportation Improvement Program
USDOT	U.S. Department of Transportation
VMT	Vehicle Miles Traveled

1. Description of the Proposed Action and Purpose and Need

1.1. DESCRIPTION OF THE PROPOSED ACTION

The proposed action, known as the Downtown-Uptown-Oakland- East End Bus Rapid Transit (BRT) Project (this proposed project), would provide BRT service and connect Downtown Pittsburgh with Uptown, Oakland, and other East End neighborhoods. In the BRT Core area along Fifth and Forbes Avenue, between Downtown Pittsburgh and Oakland, the proposed project would include reconfiguration of street operations to allow for dedicated transit lanes. Bicycle facilities and enhanced, branded stations are also proposed in the BRT Core as well as signal priority at key intersections and other technology-focused investments to improve the customer experience by sharing more real-time arrival and departure information for smartphone users.

East of the BRT Core, the proposed project would consist primarily of improved BRT operations on existing streets along three routes that would connect these outlying areas to the BRT Core: Highland Park (Route 1), Squirrel Hill (Route 2), and the East Busway (Route 3) at Wilkinsburg. All new BRT services would use branded BRT vehicles. New battery electric articulated buses would be operated along the East Busway and existing, rebranded diesel buses would be used for the Highland Park and Squirrel Hill routes. Enhanced and branded stations are proposed in Highland Park and Squirrel Hill, where the BRT would operate in mixed traffic along existing streets. Only one physical improvement is proposed along the East Busway: a new electric charging station is proposed at the existing Wilkinsburg station to accommodate the new battery-electric vehicle charging needs.

The area of the proposed project is illustrated in Figures 1–5, which show the three routes in Figure 1, the BRT Core in Figures 2 and 3, the Highland Park and East Busway routes in Figure 4, and the Squirrel Hill route in Figure 5. Mapping included in this categorical exclusion memorandum occurs at two scales. The first scale is for the entire area of proposed project (Figure 1). The second scale is represented by a series of four maps permitting greater detail (Figures 2 through 5).

Buses in the BRT Core would operate as follows:

- Westbound from Oakland (inbound toward Downtown), all buses would operate on Fifth Avenue at Bellefield Avenue and would run in dedicated lanes on Fifth Avenue through Oakland, Uptown, and Downtown to Liberty Avenue, with short segments operating in mixed traffic near Craft Avenue and near Washington Place. Buses would then turn right from Fifth Avenue into a dedicated bus lane on Liberty Avenue, then turn right into the dedicated bus lane on Sixth Avenue, before returning eastbound on Forbes Avenue.
- Eastbound from Downtown (outbound) on Forbes Avenue in the dedicated lanes through Uptown and Oakland to Schenley Drive Extension, with short segments operating in mixed traffic near Chatham Square and Craft Avenue. Buses in route to Highland Park and Wilkinsburg would turn left at Bellefield Avenue in mixed traffic between Fifth and Forbes Avenues. Buses in route to Squirrel Hill would continue eastbound on Forbes Avenue.

Within the BRT Core portion, various improvements are planned for the roadway sections to accommodate the dedicated bus lane and bicycle facilities, including a reduction in the number of general traffic lanes and reduction of some on-street parking, implementation of dedicated bus lanes and a network of bicycle facilities. Widening to provide additional turning lanes would occur on Fifth Avenue and on Forbes Avenue approaching Craft Avenue. Intersections would be upgraded to provide transit signal priority, queue jumps at certain locations, an active traffic management system (Smart Signals) to improve general traffic flow, and signals for bicycle and pedestrian movements. BRT stations would also be constructed in the BRT Core portion of the proposed project alignment. In the Uptown neighborhood, reconstruction of the pavement including new sidewalks would occur on both Forbes and Fifth Avenues. In Oakland, limited reconstruction would be required, and in Downtown, the improvements would be implemented primarily through modified signage and pavement markings.

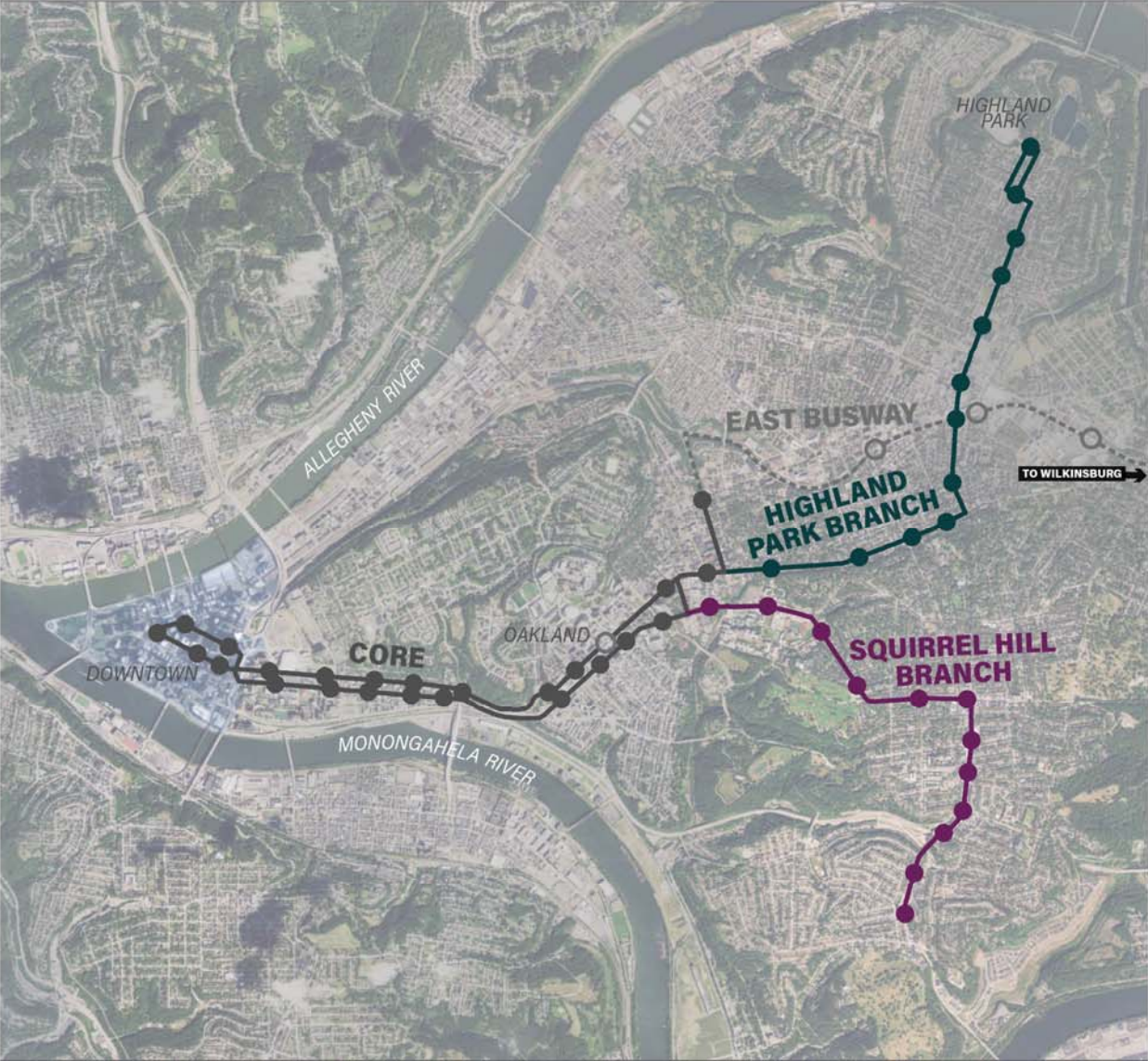
The proposed BRT Core improvements would extend a total of 7.67 miles using existing surface streets. Eastbound physical improvements from Liberty Avenue/Fifth Avenue to Neville Street/Centre Avenue would extend for 3.62 miles, and westbound physical improvements from Neville Street/Centre Avenue to Liberty Avenue/Fifth Avenue would extend for 4.05 miles.

The Highland Park route would follow the existing Port Authority route 71B - Highland Park. This route would run from Downtown Pittsburgh via the common BRT routing outlined above through Uptown and Oakland to Highland Park, operating in mixed traffic via Fifth Avenue, Highland Avenue, and Bryant Street, with a terminal loop via North Euclid Avenue, Bunker Hill Street, and North Saint Clair Street. Along this route, inbound and outbound station would be constructed with bump outs as necessary at twelve locations. Signals would be upgraded as necessary.

The Squirrel Hill BRT route would be built from the combined service of existing Port Authority routes 61A – North Braddock, 61B – Braddock/Swissvale, and 61C – McKeesport where they operate along a common route. This route would run from Downtown Pittsburgh via the common BRT routing outlined above through Uptown and Oakland to Squirrel Hill and Greenfield, operating in mixed traffic via Forbes Avenue and Murray Avenue to a BRT terminus at Loretta Street. Service on routes 61A, 61B, and 61C would continue beyond the BRT corridor along their current routes to their current respective eastern termini. Along this route, inbound and outbound stations with bump outs as necessary. Signals would also be upgraded as necessary.

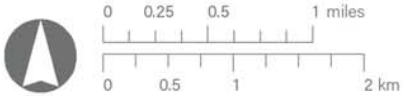
The BRT East Busway route would follow the existing Port Authority route P3, with the western end of the route extended to Downtown from the current terminus at Robinson Street at Fifth Avenue, and with the eastern end of the route terminating at Wilksburg station rather than the current terminus at Swissvale station. The BRT East Busway route would run from Downtown Pittsburgh via the common BRT routing outlined above through Uptown and Oakland and then travel in mixed traffic along Neville Street to the Martin Luther King, Jr. East Busway, an existing two-lane bus-only highway serving the city's eastern neighborhoods and suburbs east of the city. The BRT East Busway route would serve existing stations along the East Busway to a proposed terminus at Wilksburg Station. The only improvements in this section include new signing at existing stations and the charging station, No other physical improvements are necessary.

Figure 1. Area of Proposed Project (BRT Core and Routes)



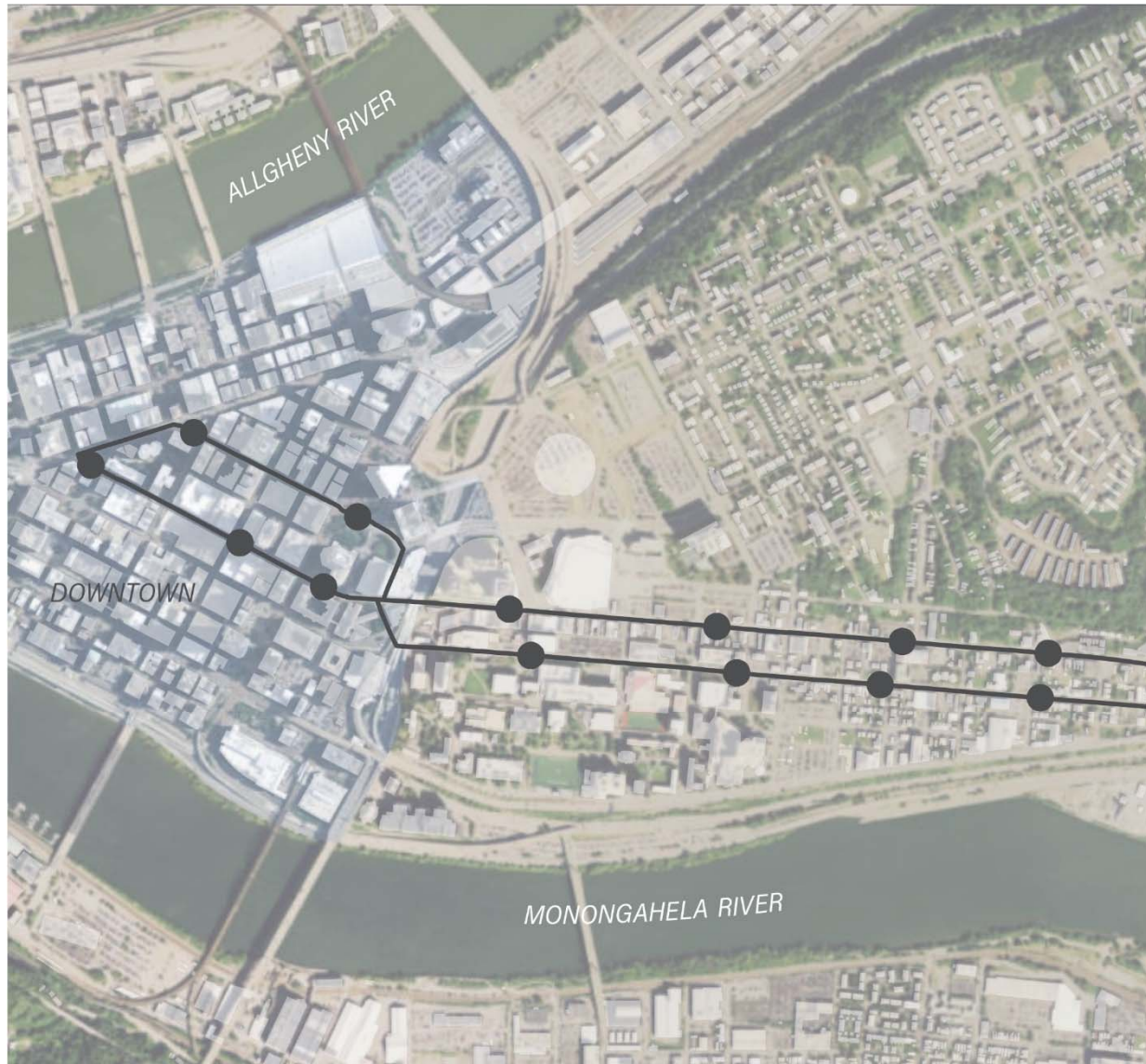
Project Maps

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations



1. Description of the Proposed Action and Purpose and Need

Figure 2. Area of Proposed Project (Core: Downtown)



Project Maps
Core: Downtown

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

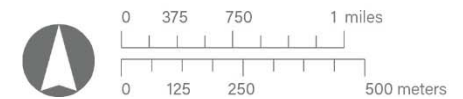
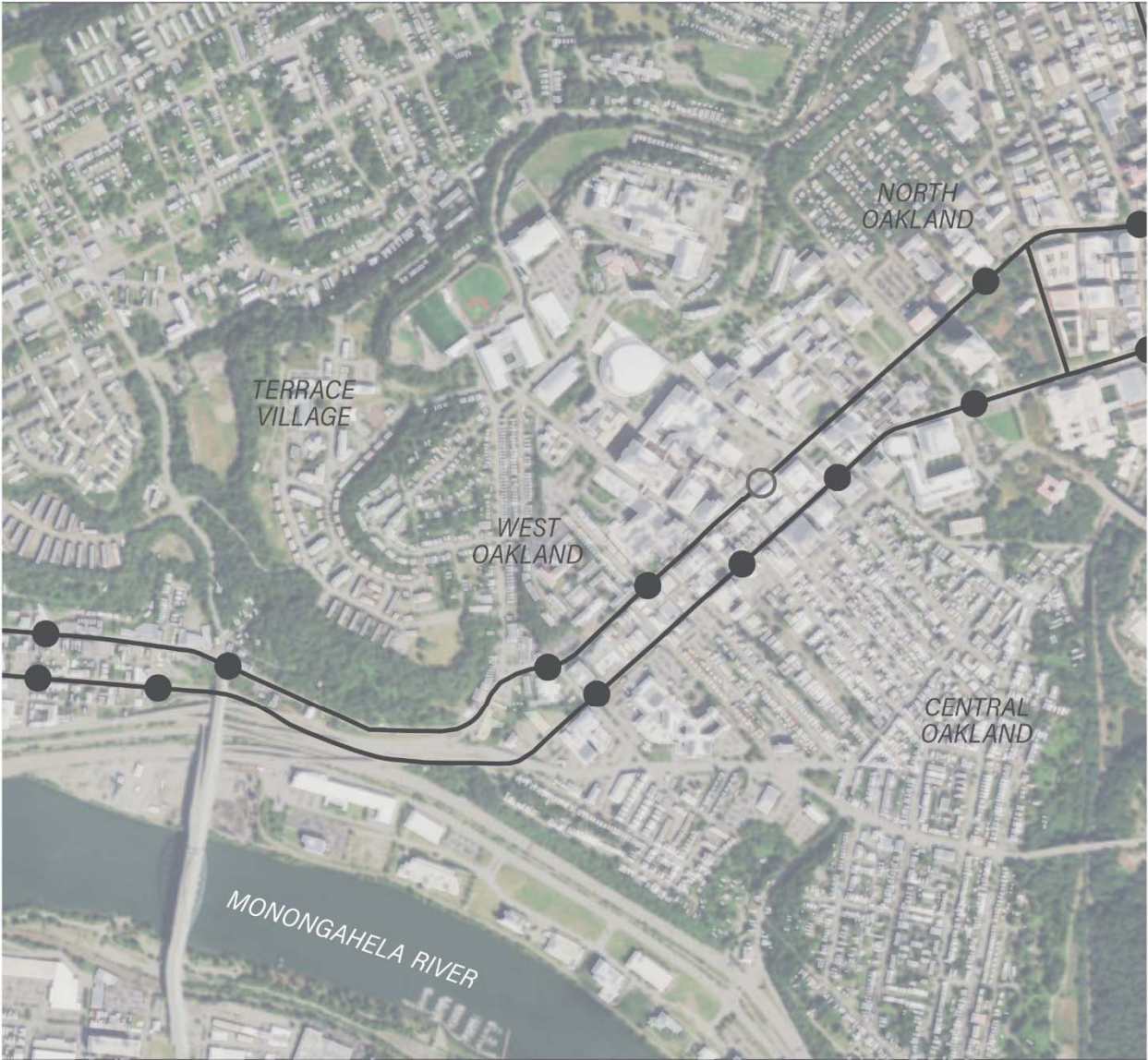
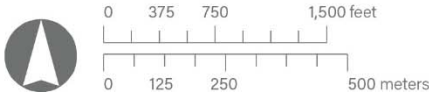


Figure 3. Area of Proposed Project (Core: Oakland)



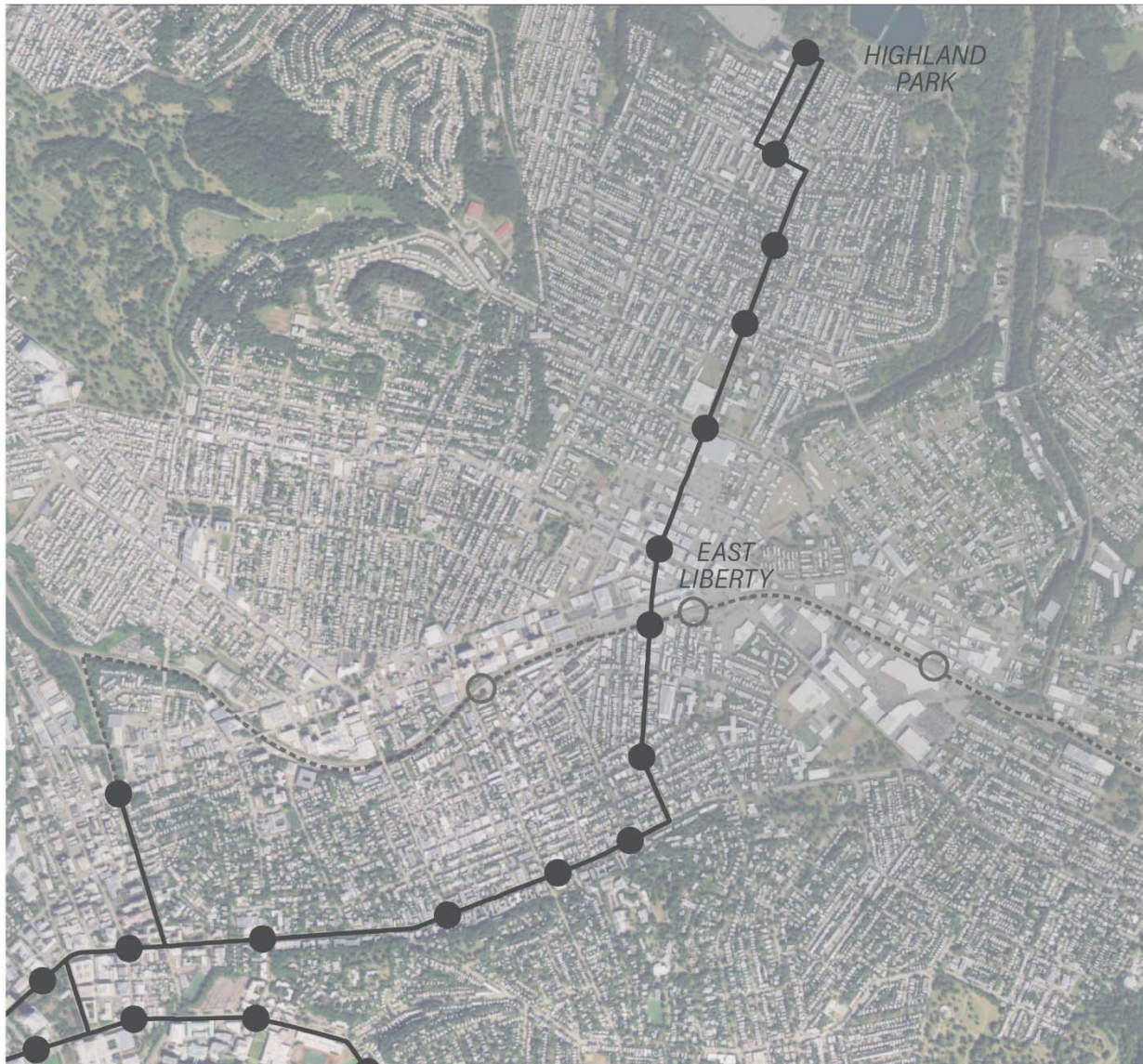
Project Maps
Core: Oakland

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations



1. Description of the Proposed Action and Purpose and Need

Figure 4. Area of Proposed Project (Highland Park Route)



Project Maps
Branch: Highland Park

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

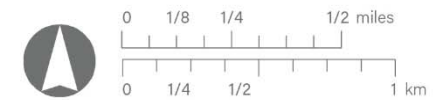
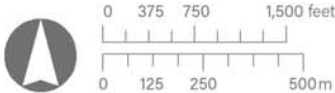


Figure 5. Area of Proposed Project (Squirrel Hill Route)



Project Maps
Branch: Squirrel Hill

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations



The following capital improvements are proposed:

- **Dedicated Lanes:** Curbside running, dedicated bus-only lanes are proposed throughout the entire length of the BRT Core corridor. This includes a loop through Downtown via Fifth Avenue Liberty Avenue and Sixth Avenue, and on Forbes and Fifth Avenues in Uptown and Oakland.
- **Bicycle Facilities:** A continuous network of bicycle facilities from Downtown to Oakland, consisting of protected on-street bicycle lanes on Fifth and Forbes Avenues in Uptown, a shared sidewalk between Oakland and Uptown, and a protected two-way cycle track on Fifth Avenue in Oakland.
- **Reconfigured Traffic Lanes:** A reconfiguration of traffic lanes within the BRT Core, including conversion of Fifth Avenue and Sixth Avenues in Downtown to one-way operation in the opposite direction to the bus lanes included in the proposed project, a reduction to a single traffic lane in Uptown on Forbes Avenue east of Pride Street and on Fifth Avenue east of Magee Street, limited widening of Fifth Avenue and Forbes Avenues in Oakland approaching Craft Avenue to provide turning lanes, elimination of one general traffic lane on Fifth Avenue and Forbes Avenue in Oakland, and converting the existing contra-flow bus lane on Fifth Avenue between Jumonville Street and Bellefield Avenue into a two-way bicycle track.
- **Parking Changes:** On-street parking would be eliminated or restricted along some portions of the proposed BRT Core through downtown, reduced to a single curbside parking lane along Fifth and Forbes Avenues in Uptown, and eliminated or restricted in some areas of Oakland. A limited number of parking spaces would be eliminated along the routes at certain stations where curb bumpouts would be constructed.
- **Enhanced/Branded Stations:** Twenty-two station platforms, generally in directional pairs, would be constructed in the BRT Core. There would be 25 station platforms, generally in directional pairs, constructed on the Highland Park route. There would be 24 station platforms, also generally in directional pairs, constructed on the Squirrel Hill route. Existing stations along the East Busway from Wilkinsburg to the Neville Avenue Ramp, and the station currently (July 2018) under construction at Atwood and Fifth would also be served by the BRT but are not included as a part of this proposed project. The station at Atwood and Fifth is being advanced separately from this NEPA action and has independent utility from the proposed project. Proposed locations of stations are based on existing bus stops, intersection locations, and corridor activity generators. A typical station would consist of a platform with shelters, passenger seating, signage, real-time passenger information, bicycle racks, ticket vending machines for improved fare collection, and trash receptacles. A limited number of stations would be constructed on curb extensions or bumpouts.
- **Traffic Signals:** Forty-six traffic signal modifications or replacements are proposed along the corridor. Changes would include altering existing geometric and striping plans, upgrading controller equipment, or adding transit signal priority to improve traffic progression, provide bus priority, improve bus service reliability, and reduce delays. Queue jump signals are provided on Fifth Avenue on Washington Place, and on Forbes Avenue at Armstrong Tunnel, at the I-376 ramp, and at Craft Avenue to facilitate buses moving through mixed traffic. Many would also include smart signal equipment.

- **Battery-Electric, Branded Buses and Supporting Infrastructure:** Battery-electric, articulated buses are proposed for use on the proposed BRT East Busway route. New charging stations and retrofitting of existing maintenance facilities to house and support this new fleet technology are also proposed. A total of 25 new battery-electric buses and 34 rebranded diesel buses would comprise the BRT fleet at the commencement of service. Buses operating on the Highland Park and Squirrel Hill BRT routes would still be branded to distinguish the BRT buses from other service.
- **Dedicated Bicycle Facilities:** Dedicated bicycle facilities to provide effective multimodal transferability and access in the BRT Core portion of the proposed project are included as part of the project.

1.2. PURPOSE AND NEED

The purpose of the proposed project is to create additional BRT services throughout the Downtown-Uptown-Oakland-East End corridor to improve access to and within the area of the proposed project with faster, more reliable, and easy to use transit service that expands connectivity throughout the region, to neighborhoods along and near the corridor, and to the various employment destinations in the area of the proposed project. Investment in fast, reliable transit service in this corridor would support integrated transportation, land use, and economic goals in the region in a cost-effective manner that maximizes existing capacity along the corridor.

2. Outreach and Engagement

Public engagement activities for the proposed project have generally occurred during two phases. Phase 1 was the alternatives analysis phase, which occurred from January 2012 through December 2014. Phase 2 is the current project development phase which started in May 2015. The following summarizes the public engagement activities to date.

2.1. ALTERNATIVES ANALYSIS PHASE

Outreach activities during the alternatives analysis phase consisted of:

- Eight meetings were conducted with a Stakeholder Advisory Group between September 2011 and September 2013.
- Nine public meetings were held in the Hill District, Oakland, Uptown and East End between January 2012 and October 2012.
- Additional meetings (131) were held between the project team and various agencies, officials, individual stakeholders, and organizations between August 2010 and February 2014.
- A tour of the Health Line BRT system in Cleveland was hosted on June 20, 2013, by the Allegheny County Executive, which included 70 stakeholders and elected officials. Participants had the opportunity to view different station types, observe exclusive bus lanes, and to review economic development along the corridor.



2012 Public Meeting in the Hill District

Project updates and information about upcoming public engagement activities have been advertised in a variety of locations using a variety of methods, including:

- Website: Sustainable Pittsburgh, a local non-profit organization, established a website that coordinated communication between the stakeholders and provided information about bus rapid transit to the public. Although not a website hosted by the PAAC, project-related information, such as meeting minutes, handouts, and project visual simulations, was posted.
- Newspaper advertisements and articles: Public and community meetings were announced via advertisements and news articles in the *Pittsburgh Post-Gazette*, *The New Pittsburgh Courier*, the *Pittsburgh City Paper*, and via email flyers sent to the Stakeholder Advisory Group.
- Newsletter: A hardcopy newsletter was distributed to a broad mailing list providing updates on project progress and announcing dates of community meetings.
- Translation services: The project scoping booklet was prepared in English, Spanish, and Braille. No other language translation services were requested.

2.2. PROJECT DEVELOPMENT PHASE

Outreach activities during the project development phase is ongoing and has consisted of:

- Eight meetings were conducted with a Stakeholder Advisory Group between September 2011 and September 2013.
- Four general public meetings were held between May 2015 and August 2017.
- Over 45 additional meetings with specific neighborhoods and businesses, business representative groups and community and service organizations we conducted between Spring 2017 and Spring 2018.
- One online survey was available from March 21, 2017, through April 14, 2017. The survey collected 1,982 responses.

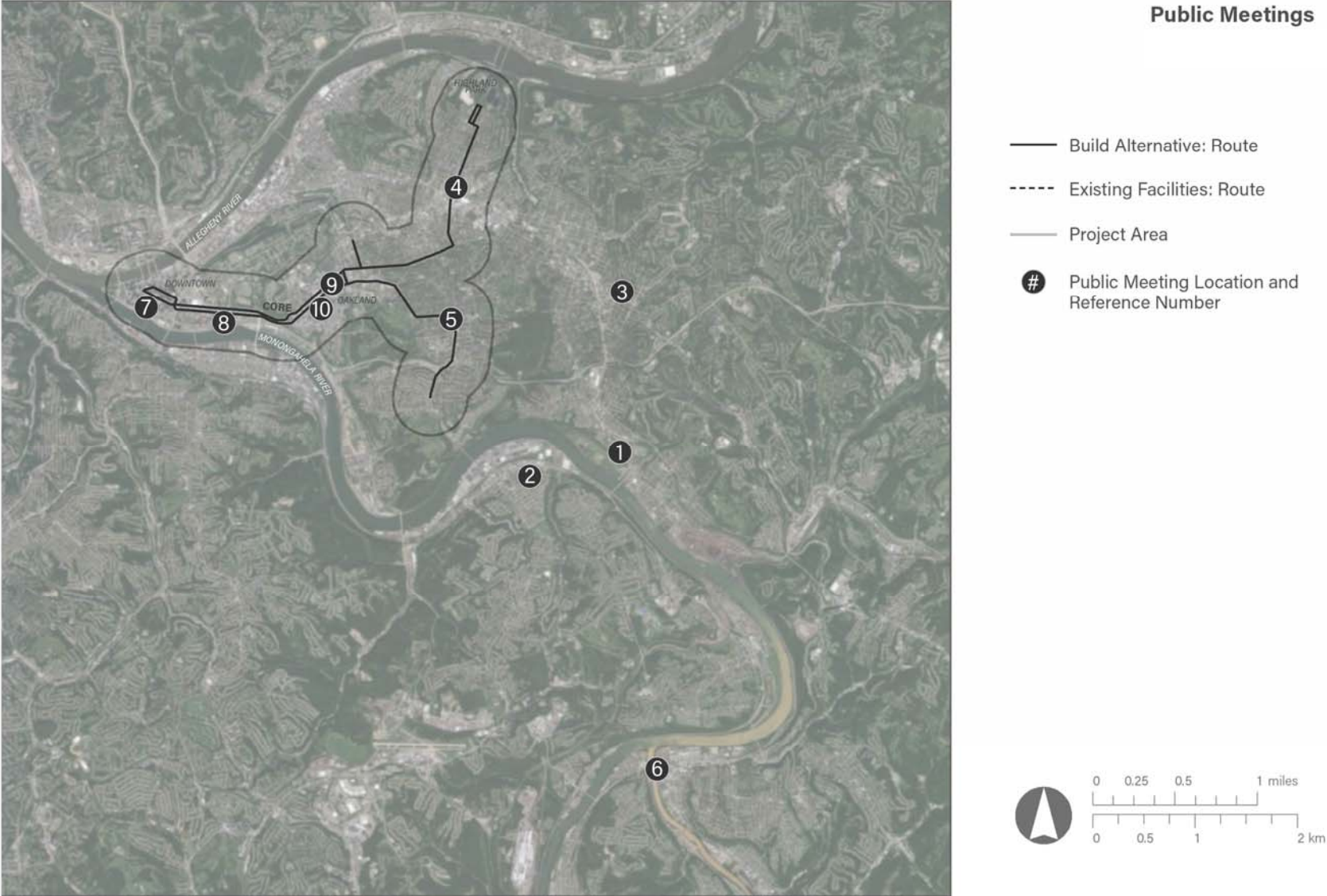
Additional public meetings are underway for Spring 2018 with continuing discussions with communities on potential changes to regular route bus service anticipated for the proposed BRT project's service initiation. These additional meetings are planned in response to community concerns about the frequency, span, and proposed changes to the bus network upon initiation of the proposed project.

Table 1 identifies the Spring 2018 public engagement schedule.

Table 1. Spring 2018 Public Engagement Schedule

	Date and Time	Public Meeting	Location
1	Thursday, April 12, 2018	Rankin Public Meeting	Rankin Christian Center, 230 3 rd Avenue, Rankin, PA 15104
2	Wednesday, April 18, 2018	Homestead Public Meeting	Carnegie Library of Homestead, 510 East 10 th Avenue, Munhall, PA 15120
3	Tuesday, May 1, 2018	Wilksburg Public Meeting	Hosanna House Small Conference Room, 807 Wallace Avenue, Wilksburg, PA 15221
4	Wednesday, May 2, 2018	East Liberty Public Meeting	Eastminster Presbyterian Church, 250 North Highland Avenue, Pittsburgh, PA 15206
5	Thursday, May 3, 2018	Squirrel Hill Public Meeting	Squirrel Hill Jewish Community Center, 5738 Forbes Avenue, Pittsburgh, PA 15217
6	Thursday, May 10, 2018	McKeesport Public Meeting	The McKeesport Palisades, 100 Fifth Avenue, McKeesport, PA 15132
7	Monday, May 14, 2018	Downtown Public Meeting	Lawrence Hall Room 200, Point Park University, 212 Wood Street, Pittsburgh, PA 15222
8	Thursday, May 17, 2018	Uptown Public Meeting	Paramount Film Exchange, 544 Miltenberger Street, Pittsburgh, PA 15219
9	Tuesday, May 22, 2018	Oakland Public Meeting #1	University of Pittsburgh, 3959 Forbes Avenue, Pittsburgh, PA 15213
10	Thursday, May 24, 2018	Oakland Public Meeting #2	Oakland Planning and Development Corporation Career Center, 294 Semple Street, Pittsburgh, PA 15213

Figure 6. Spring 2018 Public Engagement Locations



3. Land Use and Zoning

The proposed project is located within the urban core of the Pittsburgh region. The proposed project would connect Downtown Pittsburgh, the city's academic and health care hubs in Oakland, and some of the densest residential neighborhoods in the City's East End. The proposed project would serve a heavily developed, high density corridor with a diverse mix of commercial, office, residential, education, and retail uses.

Within the corridor, existing land uses include office buildings, universities, retail stores/services, government services, single- and multi-family residential (including affordable housing), museums, libraries, performing arts centers, hospitals and other medical facilities, parking lots, parks, auditoriums, religious institutions, sports facilities, and a mainline railroad. Some vacant land is also located within the corridor and concentrated in the Uptown neighborhood between the City's two major hubs of employment (Downtown and Oakland).

The BRT core between Downtown and Oakland is comprised primarily of commercial, medical, educational, and government uses. Many properties are mixed-use, with residential dwellings above commercial storefronts. As the corridor extends further east along the East Busway as well as the Highland Park and Squirrel Hill routes, residential uses predominate, with a mix of low, medium and high densities. This is complemented by medium-density commercial and office.

3.1. POPULATION, EMPLOYMENT, AND HOUSING CHARACTERISTICS

As of 2015, the total population of the City of Pittsburgh is 303,625¹ in a land area of 55.8 square miles, equaling an overall population density of 5,441 persons per square mile. Of this number, 88,959 (29.7 percent) people reside within 0.5 mile of the proposed station areas, which is a combined total area of 9.9 square miles. This equates to a population density of 8,985 persons per square mile in areas 0.5 miles from the station areas and future improvements.

The total number of housing units within Allegheny County is 589,681 with 62,973 (10.7 percent) units located within 0.5 mile of the station areas. Housing density is higher in the western portion of the BRT Core and of the Highland Park BRT route. Along the Squirrel Hill BRT route, housing density increases as the route moves further south.

According to Southwestern Pennsylvania Commission (SPC) forecast estimates, approximately 389,459 jobs were located in the City of Pittsburgh in 2015, equaling an employment density of 6,980 jobs per square mile.² Employment in the project corridor is 258,546, which is more than 66 percent of the total employment within the City of Pittsburgh. The corridor employment density is approximately 26,142 jobs per square mile, with concentrated employment located within Downtown and Oakland, the urban core area of the corridor. Additional employment centers in the region are located along the

¹ Source: <https://www.census.gov/quickfacts/fact/table/pittsburghcitypennsylvania/PST045217>.

² Source: SPC Cycle 10a forecast adopted by the Commission on June 27, 2016.

corridor within the Highland Park route, indicating the continued growth of employment further east of the urban core area. While less-concentrated employment exists along the Squirrel Hill route, the continued growth in population within this portion of the corridor has resulted in additional mixtures of land uses, including multi-family residential and commercial/retail centers, along the route that are supportive of transit investment.

3.2. MAJOR TRIP GENERATORS

Major trip generators that would be served by the proposed project include:

BRT Core

- **Duquesne University:** Duquesne University is a private Catholic university with over 10,000 students.
- **The University of Pittsburgh:** The University of Pittsburgh is a state-related university with nearly 35,000 students.
- **Carlow University:** Carlow University is a private liberal arts university with more than 2,000 students.
- **Point Park University:** Point Park University is a liberal arts university and performing arts conservatory in Downtown Pittsburgh with approximately 4,000 students.
- **Magee-Women's Hospital of University of Pittsburgh Medical Center (UPMC):** Magee-Women's Hospital of UPMC specializes in treating women, and has 321 beds and records over 20,000 admissions annually.
- **UPMC Mercy Hospital:** UPMC Mercy Hospital is part of the UPMC system and has 404 beds.
- **Pittsburgh Veterans Affairs (VA) Hospital:** The Pittsburgh VA Hospital is a major medical and surgical care facility that serves the Veteran population in the tristate area of Pennsylvania, Ohio, and West Virginia. The hospital has 742 beds and employs approximately 1,300 people.
- **UPMC Presbyterian Hospital and Clinics:** UPMC Presbyterian Hospital is an adult medical-surgical hospital and designated as a Level 1 Regional Trauma Center. The hospital has 1,482 beds and nearly 60,000 admissions annually.
- **UPMC Shadyside Hospital and Clinics:** The hospital employs a medical staff of nearly 1,000 physicians with 520 beds. Hillman Cancer Center and other clinics are also located on the UPMC Shadyside campus.
- **Petersen Events Center:** The Petersen Events Center is a 12,508-seat arena on the University of Pittsburgh campus that hosts men's and women's basketball games, as well as concerts and other events.
- **Fitzgerald Field House:** Fitzgerald Field House is an athletic venue on the campus of the University of Pittsburgh with a 4,122-seat capacity.

- **PPG Paints Arena:** With 19,758 seats, this multi-purpose arena at the eastern fringe of Downtown Pittsburgh serves as home to the Pittsburgh Penguins, and hosts numerous other sports and entertainment events.
- **A.J. Palumbo Center:** The Palumbo Center is a 4,406-seat arena in Uptown that hosts the Duquesne basketball, volleyball, and wrestling programs, as well as concerts, boxing matches, and other events.
- **David L. Lawrence Convention Center:** Located in downtown Pittsburgh near the Allegheny River, the convention center has hosted thousands of conferences and events since its opening in 2003.
- **Schenley Park and Phipps Conservatory:** Schenley Park is a 300-acre public park in the Oakland, Greenfield, and Squirrel Hill neighborhoods. The Phipps Conservatory is a botanical garden with the first and only Leadership in Energy and Environmental Design Platinum-certified greenhouse.
- **Point State Park:** Also known as The Point, this is a 36-acre park in Downtown Pittsburgh where the Allegheny and Monongahela rivers meet to form the Ohio River. The park contains Fort Pitt and Fort Duquesne, two of the oldest structures in the city.
- **Carnegie Music Hall:** The 1,950-seat music hall located in the building houses the Carnegie Museums of Art and Natural History and the Carnegie Library of Pittsburgh along Forbes Avenue in Oakland.
- **Benedum Center for the Performing Arts:** Originally built in 1928 as a movie theatre, it now functions as a concert hall and performing arts center.
- **Heinz Hall for Performing Arts:** Heinz Hall is a performing arts center and concert hall that holds 200 performances every year. It is located in downtown Pittsburgh and has a 2,676-seat capacity.
- **O'Reilly Theater:** Located in Downtown Pittsburgh, the theatre has 650 seats and hosts 235 performances a year.
- **Byham Theatre:** Originally built in 1903 and renovated in 1991, the theatre hosts variety of performing arts and has a seating capacity of 1,300.
- **Trinity Cathedral:** Trinity Cathedral is located downtown and serves as the cathedral for the Episcopal Diocese of Pittsburgh.
- **Carnegie Museums of Art and Natural History and Carnegie Library of Pittsburgh Main Branch:** Two of four Carnegie Museums, the Museums of Art and Natural History were founded in 1896 and are located on Forbes Avenue near the Carnegie Mellon campus. The Museum of Art features more than 30,000 objects on display, and the Museum of Natural History is one of the top five ranked natural history museums in the United States. In addition, the Carnegie Library of Pittsburgh's Main Branch is located within the same building and is the largest branch in the system.
- **Soldier and Sailor's Memorial Hall:** The Soldier and Sailor's Memorial Hall is the only memorial dedicated to honoring all branches of military service in the United States. The building contains a museum and a 2,300-seat auditorium.

- **Fort Pitt Museum and Block House:** Located within Point State Park in Downtown Pittsburgh, the Fort Pitt Museum and Block House is an indoor/outdoor museum and includes the Fort Pitt Blockhouse, which is the oldest extant structure in Western Pennsylvania.
- **Oakland Commercial District:** The Oakland Commercial District runs primarily along Fifth and Forbes avenues. The district contained 462 businesses with 26,119 employees in 2016, and provides small business grants and a façade improvement program.
- **Allegheny County Courthouse:** The courthouse in Downtown Pittsburgh was built in 1888, and is designated a National Historic Landmark due to its importance as an example of the Romanesque Revival style of architecture.
- **Pittsburgh City-County Building:** Located across the street from the courthouse in Downtown Pittsburgh, the City-County Building contains more than 500,000 square feet of floor space over 10 stories.

Highland Park Route

- **St. Paul's Cathedral:** St. Paul's Cathedral serves as the main cathedral for the Roman Catholic Diocese of Pittsburgh.
- **Chatham University:** Chatham University is a small private university with over 2,200 students.
- **Pittsburgh Center for the Arts:** Founded in 1945, this facility serves as a non-profit arts center.
- **East Side Retail Shopping Complex:** East Side is a large mixed retail development located along Centre Avenue (formerly Penn Circle South) at Highland Avenue in the East Liberty neighborhood.
- **The Village of East Side:** The Village of East Side is a large shopping center along Penn Avenue in the East Liberty neighborhood.
- **Bryant Street Commercial District:** The Bryant Street Commercial District is located in the Highland Park neighborhood. The district contained 67 businesses and 444 employees in 2011. Major industries include educational services, health care and social assistance, and retail.
- **Kelly-Strayhorn Theater:** The Kelly-Strayhorn Theater is located in the East Liberty neighborhood and has a capacity of 350.
- **Pittsburgh Theological Seminary:** Pittsburgh Theological Seminary is a small Presbyterian seminary founded in 1794. Its 2015 enrollment was 249.
- **Highland Park, Pittsburgh Zoo, and PPG Aquarium:** Highland Park is a large public park at the north end of the neighborhood of the same name. It contains the Pittsburgh Zoo and PPG Aquarium, a 77-acre facility that houses over 4,000 animals and hosted approximately 1 million visitors in 2015.

Squirrel Hill Route

- **Carnegie Mellon University:** Carnegie Mellon University is a leading private research university with more than 13,000 students.

- **Squirrel Hill Business District:** Centered at the intersection of Forbes Avenue and Murray Avenue, the business district features several blocks of a wide variety of businesses. In addition to hosting the Jewish Community Center and the Squirrel Hill Branch of the Carnegie Library of Pittsburgh, the district regularly hosts events such as the outdoor Squirrel Hill Night Markets.
- **The Manor Theatre:** The newly renovated Manor Theater is one of the oldest and best-known movie theaters in Pittsburgh.

3.3. LAND USE GUIDELINES

Although the City of Pittsburgh currently does not have a comprehensive plan, Allegheny County does have a comprehensive plan which was reviewed for consistency. Additionally, a number of planning initiatives have been conducted for individual neighborhoods/communities within the area of the proposed project.

- **Allegheny Places: Allegheny County Comprehensive Plan (Allegheny County):** In 2014, Allegheny County updated the Transportation Element of the 2010 *Allegheny Places: Allegheny County Comprehensive Plan* to advocate for the “Downtown-Oakland-East End BRT project which would enhance prospects for economic development and community revitalization through transit improvements” in the proposed project corridor.³ The comprehensive plan targets growth and development for Downtown Pittsburgh and Oakland and seeks to orient growth to corridors containing a mix of uses, including office, industrial, commercial and residential uses.⁴
- **The Uptown/West Oakland EcoInnovation District (Uptown/West Oakland):** In September 2017, the City of Pittsburgh Planning Commission adopted the Uptown/West Oakland EcoInnovation District Plan, which seeks to establish an “innovation district” with the purpose of expanding job growth and economic opportunity:

Innovation districts that are walkable, bikeable, and transit-oriented result in healthier, happier lifestyles for residents, foster greater equity in access, and create a better environment for businesses to succeed.⁵

- **Envision Downtown (Downtown Pittsburgh):** Envision Downtown is a partnership between the City of Pittsburgh and the Pittsburgh Downtown Partnership to accelerate growth and development in Pittsburgh’s central business district. The partnership is focused on the role that infrastructure investment can play to attract and retain the innovation workforce of tomorrow and specifies a goal to expand transit ridership by 80 percent by 2030.⁶
- **Oakland 2025 Master Plan: A Vision for Sustainable Living and Mobility (Oakland):** The Oakland 2025 Master Plan is focused on strategies to support the continued growth of Oakland as a hub of innovation and technology with a high quality of life.

³ Allegheny Places: *Transportation Element Update*, 2014

⁴ Allegheny County, *Allegheny Places: The Allegheny County Comprehensive Plan Executive Summary*, December 2008

⁵ City of Pittsburgh, *Uptown/West Oakland Eco-Innovation District*, 2017

⁶ Envision Downtown, 2017

- **East Liberty Community Plan (East Liberty):** The East Liberty Community Plan focuses on creative approaches to community revitalization, commercial growth, and preserving the character of the neighborhood through targeted economic development and workforce strategies.
- **Forward/Murray (Squirrel Hill):** The Squirrel Hill Urban Coalition, in coordination with Carnegie Mellon University’s School of Architecture, oversaw an initiative to examine conditions in the community that surrounds the five-point intersection of Forward Avenue, Murray Avenue, and Pocusset Street. Improved transit from the proposed BRT project would support efforts described in the *Envisioning the Forward/Murray Gateway Report* to enliven the street, allocate more space for nonmotorized system users, and maximize community benefits related to existing and improved transit network connectivity.⁷

3.4. LAND USE IMPACTS OF THE PROPOSED PROJECT

Figure 7 through Figure 10 identify the zoning districts and existing land uses identified in the project corridor. The construction and operation of the proposed project would not alter or change the character of any of the current land uses and the project is largely consistent with the land use plans described above and below; therefore, no adverse impacts are anticipated. **Allegheny Places: Allegheny County Comprehensive Plan (Allegheny County):** The comprehensive plan targets growth and development for Downtown Pittsburgh and Oakland and seeks to orient growth to corridors containing a mix of uses, including office, industrial, commercial and residential uses.⁸ The proposed project would encourage and support growth along corridors identified for investment consistent with the aims of the comprehensive plan.

- **The Uptown/West Oakland EcolInnovation District (Uptown/West Oakland):** The proposed action is consistent with the Uptown/West Oakland EcolInnovation District plan. Transportation, expanded mobility, better parking management, and the benefits of the proposed BRT are a core focus of the EcolInnovation Plan. The implementation of the proposed project would support the EcolInnovation Plan by contributing to localized efforts to improve the level and quality of transit service, reduce daily VMT, and help to decrease annual greenhouse gas emissions. The EcolInnovation Plan specifically focuses on the need to reduce driving by encouraging walking, cycling, and transit for local trips and the need for Fifth Avenue and Forbes Avenue to achieve the “highest design standards.” This proposed project, in addition to adding BRT along Fifth and Forbes Avenues, would result in improved amenities for pedestrians and cyclists and increase mode choice, consistent with the themes and priorities of the EcolInnovation Plan.
- **Envision Downtown (Downtown Pittsburgh):** The proposed project would add a modern, efficient transit amenity to the Downtown to support mobility and help the City of Pittsburgh achieve the transportation infrastructure goals that are key to the success of Envision Downtown.
- **Oakland 2025 Master Plan: A Vision for Sustainable Living and Mobility (Oakland):** The proposed project would be consistent with a key theme of the master plan – the need for expanded mobility

⁷ Squirrel Hill Urban Coalition, *Envisioning the Forward/Murray Gateway Report*, 2014

⁸ Allegheny County, *Allegheny Places: The Allegheny County Comprehensive Plan Executive Summary*, December 2008

choices and the role that multimodal transportation systems play to enhance Oakland's vibrant, desirable neighborhoods. The master plan embraces complete streets, featuring high-quality mass transit services as well as the implementation of best practices for urban bicycling infrastructure. The master plan explicitly recommends the need for the proposed project along Fifth Avenue and Forbes Avenue as a key element of the master plan's overall vision for improved mobility.

- **East Liberty Community Plan (East Liberty):** The proposed project may help improve access to the neighborhood and contribute to initiatives described in the East Liberty Community Plan to expand pedestrian-friendly amenities, improve transportation connections, and unlock transit-oriented development throughout the community.⁹
- **Forward/Murray (Squirrel Hill):** Improved transit from the proposed BRT project would support efforts described in the *Envisioning the Forward/Murray Gateway Report* to enliven the street, allocate more space for nonmotorized system users, and maximize community benefits related to existing and improved transit network connectivity.¹⁰

⁹ *East Liberty Community Plan: Many Voices Driving Change*, 2010

¹⁰ Squirrel Hill Urban Coalition, *Envisioning the Forward/Murray Gateway Report*, 2014

Figure 7. Zoning (Core: Downtown)

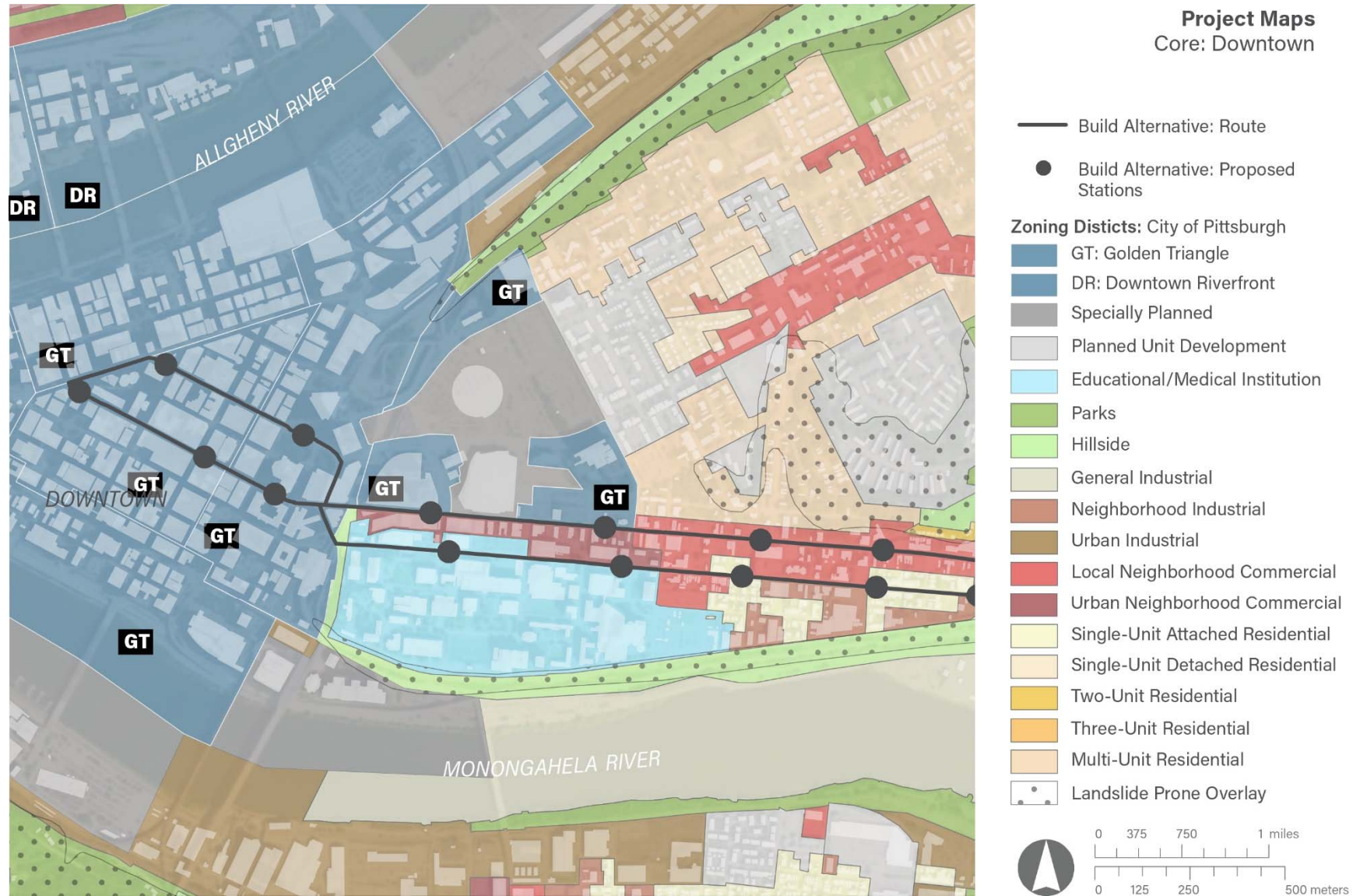
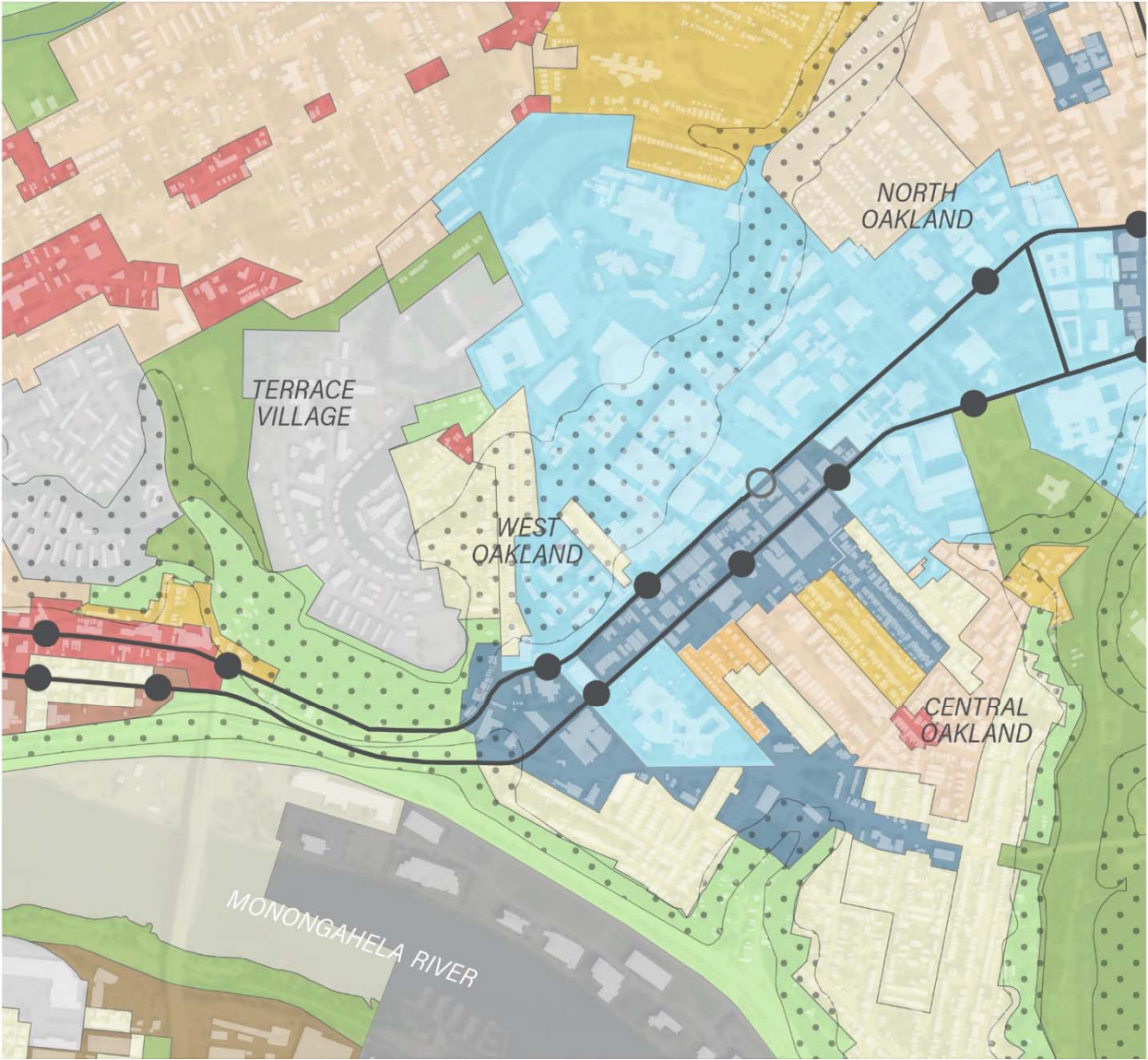


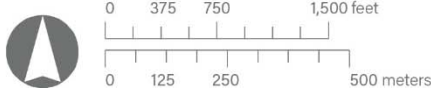
Figure 8. Zoning (Core: Oakland)



Project Maps
Core: Oakland

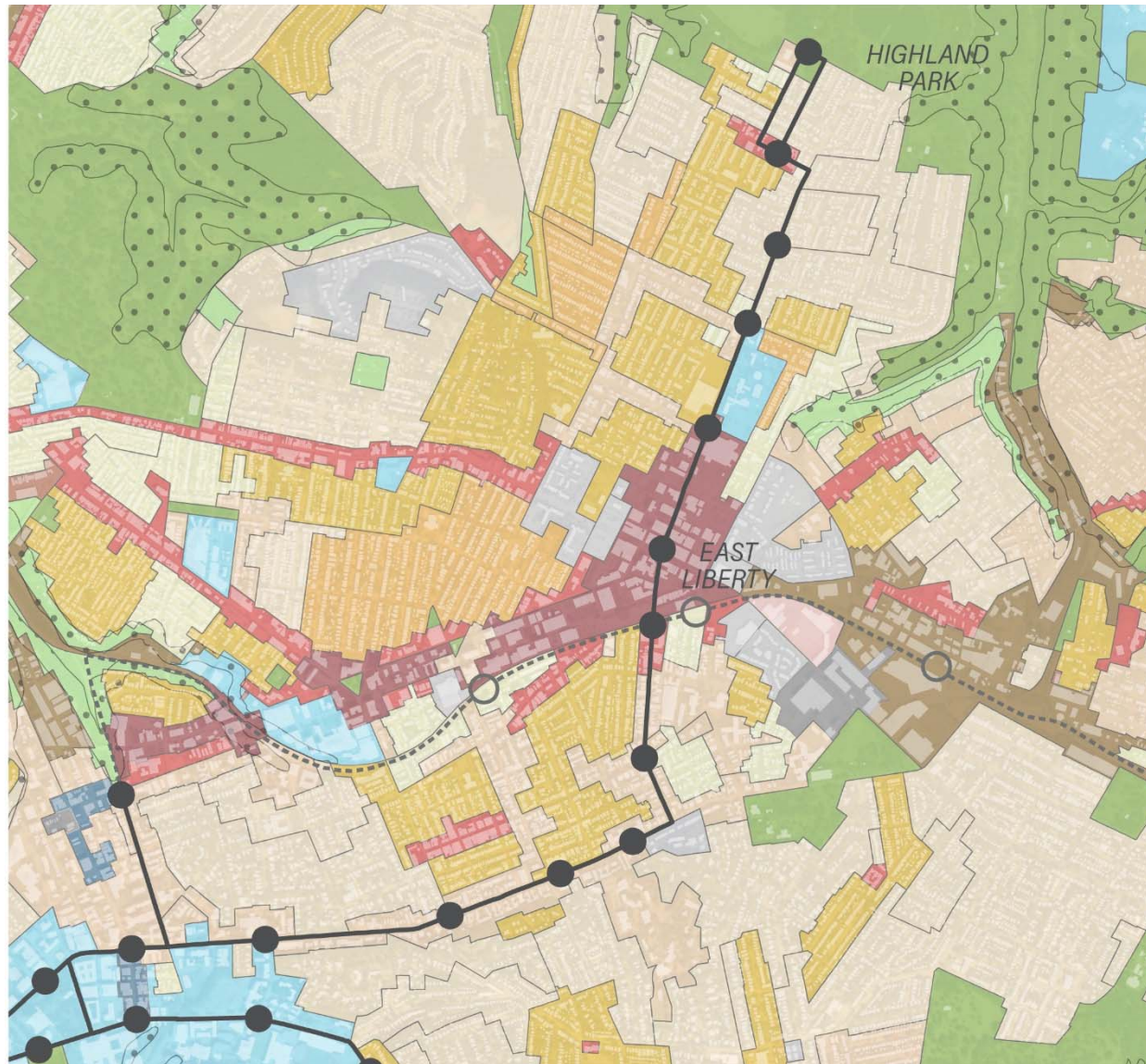
- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

- Zoning Disticts: City of Pittsburgh**
- Oakland Public Realm
 - Specially Planned
 - Planned Unit Development
 - Educational/Medical Institution
 - Parks
 - Hillside
 - General Industrial
 - Neighborhood Industrial
 - Urban Industrial
 - Local Neighborhood Commercial
 - Single-Unit Attached Residential
 - Single-Unit Detached Residential
 - Two-Unit Residential
 - Three-Unit Residential
 - Multi-Unit Residential
 - Landslide Prone Overlay



3. Land Use and Zoning

Figure 9. Zoning (Highland Park)



Project Maps
Branch: Highland Park

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

Zoning Districts: City of Pittsburgh

- Oakland Public Realm
- Specially Planned
- Planned Unit Development
- Educational/Medical Institution
- Parks
- Hillside
- General Industrial
- Neighborhood Industrial
- Urban Industrial
- Local Neighborhood Commercial
- Urban Neighborhood Commercial
- Single-Unit Attached Residential
- Single-Unit Detached Residential
- Two-Unit Residential
- Three-Unit Residential
- Multi-Unit Residential
- Landslide Prone Overlay

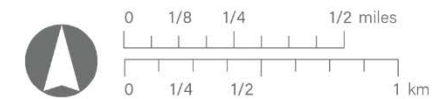


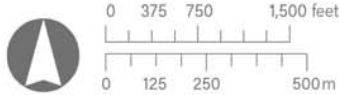
Figure 10. Zoning (Squirrel Hill)



Project Maps
Branch: Squirrel Hill

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

- Zoning Districts: City of Pittsburgh**
- Oakland Public Realm
 - Specially Planned
 - Planned Unit Development
 - Educational/Medical Institution
 - Parks
 - Hillside
 - General Industrial
 - Neighborhood Industrial
 - Urban Industrial
 - Local Neighborhood Commercial
 - Single-Unit Attached Residential
 - Single-Unit Detached Residential
 - Two-Unit Residential
 - Three-Unit Residential
 - Multi-Unit Residential
 - Landslide Prone Overlay



4. Transportation Impacts

4.1. TRAFFIC

The proposed project would include three BRT routes serving a common routing (the BRT Core) between Downtown Pittsburgh and Oakland, and then separating to respective termini in Highland Park, Squirrel Hill, and the East Busway at Wilksburg. In the BRT Core, the proposed project would include reconfiguration of street operations which would potentially impact traffic operations. East of the BRT Core, the proposed project would consist primarily of BRT operations on existing streets, with improvements limited to signal and station operations. Accordingly, the traffic impacts of the proposed project were evaluated using different methodologies for the BRT Core and the BRT routes east of the core.

4.1.1. BRT Core

For the BRT Core from Morewood Avenue west through Oakland, Uptown and Downtown, extensive reconfiguration of street operations was anticipated which would potentially impact traffic operations. For this portion, traffic impacts were analyzed using the *Highway Capacity Manual* methodology to compare the BRT Build Alternative to the No-Build Alternative under projected 2020 opening-day conditions (as this was the anticipated opening year when the analysis was started). The proposed project is estimated to initiate operations in 2021. For the purposes of estimating traffic impacts, the analysis year is 2020. Under the 2013 existing conditions, selected as a baseline at the beginning of the study, congestion is widespread in the corridor, with 10 intersections currently operating at LOS E or F in either the AM or PM peak hours or both. These intersections are distributed throughout the study area in Downtown, Uptown, and Oakland. The traffic impact of the proposed project in each of these neighborhoods within the BRT Core are discussed separately below.

In the Downtown area, west of the Crosstown Expressway, the changes in LOS under the Build Alternative generally indicate a shift in traffic patterns, since the roadway would be reconfigured to accommodate the proposed BRT bus route via Fifth Avenue, Liberty Avenue, and Sixth Avenue. Currently, both Fifth Avenue and Sixth Avenues operate as two-way streets, while under the proposed project Fifth Avenue would become one way eastbound for general traffic with a westbound bus lane, and Sixth Avenue would become one way westbound for general traffic with an eastbound dedicated bus lane. As a result of this, a variety of shifts in overall traffic patterns would occur, including some reductions in capacity but also the reduction of some conflicting movements. Two intersections would degrade to LOS E or F in one peak period, and one would improve from LOS E to LOS A. Thus, the proposed BRT improvements and accompanying lane reconfiguration would result in changes in traffic and congestion patterns, and would not change overall levels of congestion.

In the Uptown area, between the Crosstown Boulevard and Craft Avenue, some degradation of LOS would result since the number of traffic lanes would be reduced and queue jumps would be provided at certain intersections. In the western sections of Fifth and Forbes Avenues, two general traffic lanes would be retained to accommodate traffic volumes. The eastern sections of Fifth and Forbes Avenues would be reduced to a single general traffic lane. The Forbes Avenue contra-flow lane would be

eliminated to accommodate the proposed bus lane from Sixth Avenue to the Armstrong Tunnel, resulting in some rerouting of traffic, but otherwise general traffic patterns would not be reoriented as is the case for the Downtown portion of the project. Two intersections would degrade to LOS E or F in one or both peak periods, and one currently at E or F would improve in the AM peak.

In the Oakland area, east of Craft Avenue, the changes in LOS under the proposed project indicate a reorientation of the street usage although general traffic patterns would not be reoriented as they would be Downtown. In most of the Oakland portion of the proposed project, one general traffic lane would be removed and replaced with a dedicated bus lane, which would serve BRT and other buses. The current Fifth Avenue contra-flow bus lane would be removed and replaced with a protected cycle track, and all eastbound bus routes would be shifted to the proposed Forbes Avenue bus lane. Some on-street parking would be eliminated to provide an additional travel lane at some key intersections. Fifth Avenue would be widened approaching Craft Avenue to maintain the current number of general traffic lanes in addition to the proposed bus lane, and Forbes Avenue would be widened approaching Craft Avenue to provide an additional turning lane in addition to the existing number of lanes and the proposed bus lane. Five intersections would degrade to LOS E or F in one or both peak periods, while six would improve. Of these, intersections at Halket Street and McKee Place, would see a degradation in LOS due to (due to a reduction in general traffic lanes) while those at Bigelow Boulevard would see degradation due to the provision of a queue jump signal phase for buses. In other locations, improvements at congested gateway intersections such as Forbes/Craft and Fifth/Craig would offset to some extent decreased LOS at adjacent intersections such as Forbes/Halket and Fifth/Neville as one bottleneck is improved and peak congestion shifts to another location.

4.1.2. East of BRT Core

On the proposed BRT routes east of the BRT Core, BRT buses would replace a similar number of existing conventional buses and would continue to operate in mixed traffic with no changes proposed to lane configuration or traffic operation, aside from some level of traffic signal priority. Physical changes would be limited to the construction of BRT stations along these proposed routes. Because of this, traffic impacts along these routes would be expected to be less than in the BRT Core and a full level of capacity and simulation modeling was not conducted.

At a February 21, 2018 meeting, the project team and Southwestern Pennsylvania Commission (SPC) staff agreed to use SPC's regional model for evaluating existing and projected traffic operation on the BRT routes east of the BRT Core. This model can provide data on existing and projected daily traffic volumes, roadway capacity, volume/capacity ratios and average travel speeds. Model runs for existing conditions as well as for opening year with and without the proposed project were available from SPC and appeared to be suitable for evaluating the traffic impacts of the proposed project on the BRT routes east of the BRT core.

SPC's regional model is TP+-based, and forms the basis of the region's Air Quality Conformity analysis. It is based upon SPC's Cycle 10 forecasts, the MPO's regionally-approved population, household, and employment forecasts, and includes the complete highway and transit network in SPC's 10-county region. The model was validated to 2015 conditions, and used to model 2017 existing conditions, as well as 2020 and 2040 forecasts. The model includes mode-split calculations as well as trip

assignment procedures. The model provides link-level outputs including projected volumes, speeds, and volume/capacity (V/C) ratios, in addition to regional Measures of Effectiveness (MOEs) such as air quality, but does not provide intersection-level levels of service. Because of the model methodology, traffic projections are not always linearly based upon inputs, but can reflect shifts as the traffic assignment reaches equilibrium.

For the Air Quality evaluation, SPC used the regional model to forecast 2020 travel conditions for the BRT No Build and Build conditions for the preferred alternative. For this study, SPC provided model runs and output to document projected traffic conditions in the project study area.

On the Highland Park route east of the BRT Core, the regional model for the 2020 No Build scenario without the proposed project shows a high level of congestion on Fifth Avenue approaching Oakland, with localized congestion in the East Liberty Business district but relatively uncongested operation in residential areas of Shadyside and Highland Park. With the proposed project, the regional model projects an overall drop of 4 percent in V/C ratios on the Highland Park route. The projected changes vary widely, with minor increases of up to 3 percent on some links, but drops as much as 10 percent on others. These changes could be a result of a shift of trips to transit, but it could also reflect a shift in vehicular routes in response to changes in congestion in Oakland or elsewhere in the corridor. Based upon these findings, the proposed project would not be expected to result in adverse impact on traffic flow on Fifth Avenue or Highland Avenue along the BRT route.

On the Squirrel Hill route east of the BRT Core, the regional model for the 2020 No Build scenario without the proposed project shows moderate congestion on Forbes Avenue near the CMU campus, with increasing congestion approaching the Squirrel Hill business district, and high levels of congestion through the Murray Avenue business district. With the proposed project, the regional model projects on average no change in V/C ratios on the Squirrel Hill route. The projected changes vary widely, with anticipated traffic increases on some links achieving 9 percent, particularly the uncongested westbound Forbes Avenue near Schenley Plaza on some links, but would drop up to 10 percent on other links. These changes could be a result of a shift of trips to transit, but it could also reflect a shift in vehicular routes in response to changes in congestion in Oakland or elsewhere in the corridor. On Murray Avenue, projections show less impact of BRT, with changes in V/C ranging from +4 percent to -4 percent. Based upon these findings, the proposed project is not projected to result in adverse impacts on traffic flow on Forbes Avenue or Murray Avenue along the Squirrel Hill BRT route.

4.1.3. Travel Time

Due to the proposed improvements in the BRT Core, detailed traffic analysis and modeling using a VISSIM simulation model was conducted to measure travel time changes in this portion of the proposed project. As the BRT routes of the proposed project east of the BRT Core would continue to operate a similar number of buses in mixed traffic with no capacity or geometric changes, no significant changes to travel times are anticipated though it is expected that bus travel reliability would improve due to transit signal priority improvements

Travel times would increase under the proposed project on Fifth Avenue westbound between Morewood Avenue and Bellefield Avenue, reflecting capacity constraints through Oakland. However,

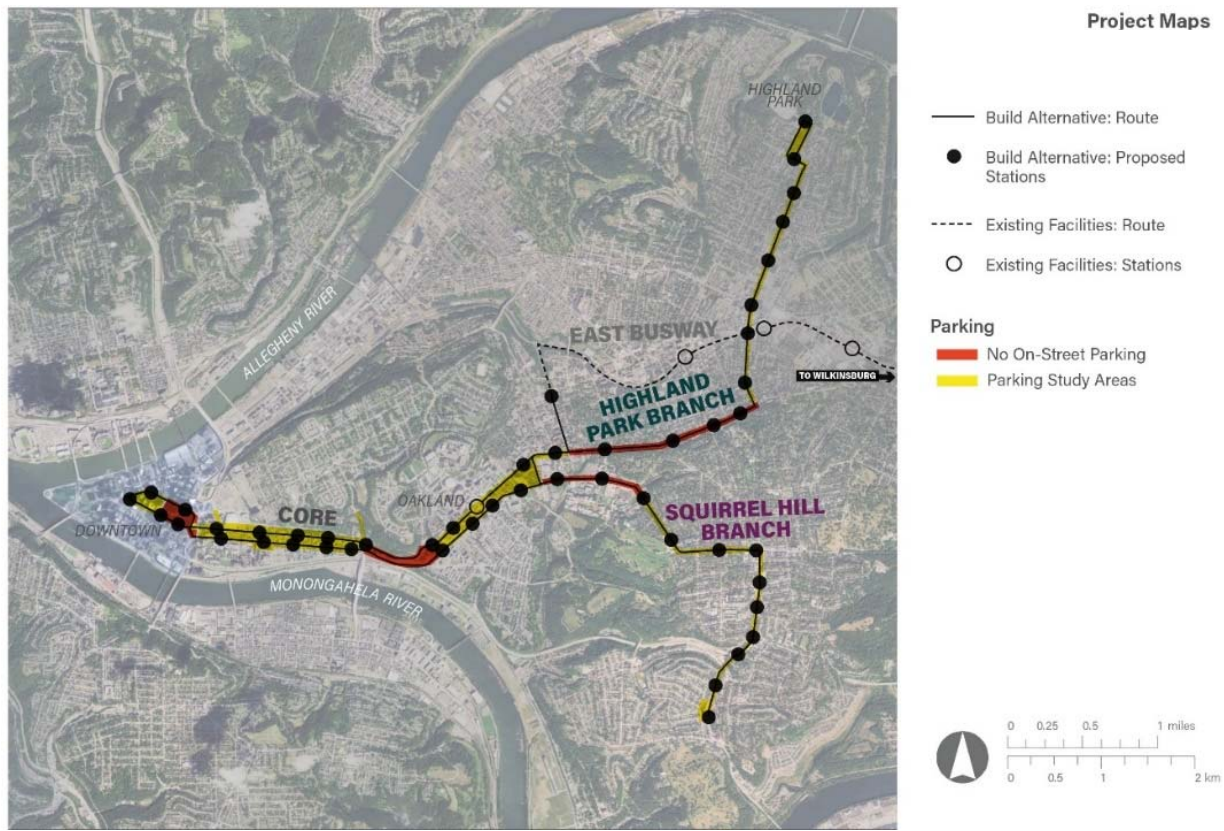
travel times on Fifth Avenue through Oakland would be similar to no build conditions, with slight increases projected in the 2020 Build Alternative. Travel times on Fifth Avenue between Oakland and Uptown and through Uptown would show little change. Travel times eastbound on Forbes Avenue through Uptown and in the AM through Oakland would improve slightly in the AM peak, and degrade somewhat in the PM peak, again reflecting capacity reductions in Oakland due to signal phasing and lane configuration.

Bus travel times are projected to improve under the BRT Build Alternative saving 3.5 minutes for the westbound Atwood Street in Oakland to Wood Street downtown during the AM period and saving 2.4 minutes for the PM period. The eastbound Wood Street downtown to Atwood Street in Oakland would also improve, saving 9.6 minutes during the AM period and saving 7.7 minutes during the PM period. Further refinement of traffic signal priority and coordination would likely provide additional improvement in travel times over those tabulated here. Analysis showed more consistent bus travel times under the BRT build alternative, due to removing buses from the variable congestion in mixed traffic flows in the proposed project corridor.

4.2. PARKING ANALYSIS

Many portions of the project corridor currently have no on-street parking and with no parking changes proposed as part of the proposed project in certain location, those sections were not analyzed for possible parking impacts. Between the portions of the corridor with no on-street parking, which typically occur at transitions between neighborhoods due to topographic and land use patterns, on-street parking within the study area is located in several well-defined neighborhood areas as shown in Figure 11. Each of these areas was analyzed individually, using methodology sensitive to the parking constraints in that community.

Figure 11. Parking Study Areas



4.2.1. BRT Core

Downtown

Parking in the Downtown area is primarily provided by off-street parking in garages and lots, with 24,305 off-street spaces located within Downtown itself, plus an additional 17,736 fringe parking spaces available to Downtown commuters in the North Shore, Station Square Strip District and Hill District areas. No off-street parking in Downtown would be displaced by the proposed project. The off-street parking supply is supplemented by 497 metered on-street parking spaces within Downtown.

Within Downtown, on-street parking is highly regulated to provide a balance between competing needs for the limited curb space and number of lanes available. In many cases, parking is permitted only during off-peak hours, and when permitted, may be limited to loading zones or other specific uses. In some cases, valet parking operations and hotel loading are permitted during limited time periods in areas where parking is otherwise prohibited. A total of 56 on-street spaces were identified where parking is permitted during some period of the day and that would be affected by the proposed project, along with three spaces for hotel bus parking and 20 spaces for valet parking, but with the availability varying during different times of day.

On-street parking spaces in the AM and PM peaks would be reduced by 17 spaces, with a reduction of 50 spaces at midday and 49 spaces in the evening and weekend. In addition, the 20 valet spaces

would be displaced. In comparison to the total 497 metered on-street spaces, or the over 42,000 off-street spaces, this is a relatively small overall impact. However, there may be certain localized impacts, particularly on loading and valet operations, and the City of Pittsburgh is coordinating with affected property owners to identify alternative accommodations.

Uptown

Currently, in Uptown, 251 on-street parking spaces are available on Fifth Avenue. Forbes Avenue provides 214 on-street parking spaces. Intersecting streets provide an additional 294 on-street parking spaces. However, due to short block lengths, this parking is broadly dispersed. Thus, 759 on-street parking spaces were identified within the study area. Off-street parking is provided for employees and visitors in garages and lots operated by universities, hospitals and other private operators. Only a small number of parked vehicles—approximately 35 vehicles—are registered to addresses in the study area.

Based on field data and analysis conducted for this study, on-street spaces on Fifth Avenue would decrease from the existing 251 spaces to 131 (a reduction of 120 spaces or 48 percent). On-street spaces on Forbes Avenue would decrease from the existing 214 spaces to 81 spaces (a reduction of 133 spaces). Other streets in the study area would see a reduction in existing on-street spaces from 294 to 275 (a reduction of 19 spaces or six percent). Combined, the total on-street parking spaces in the study area would be reduced from the existing 759 spaces to 487 spaces (a reduction of 272 spaces or 36 percent).

The existing observed demand for on-street parking in the study area peaks at 479 vehicles during the morning, and drops to 304 by the evening. The proposed reduction to 487 on-street parking spaces with implementation of the proposed BRT alignment would accommodate the existing peak demand for 479 spaces, with a surplus of 8 spaces. Demand for parking on Fifth and Forbes Avenues would exceed the proposed number of spaces on these streets, but other streets in the study area have sufficient on-street parking capacity to accommodate this demand (*Table 2*).

Table 2. Projected Uptown Parking

Subarea	Uptown Parking Supply		Max. Existing Parking Demand			Projected Parking Surplus		
	Existing	Proposed	AM	PM	Evening	AM	PM	Evening
Fifth Avenue	251	131	175	132	102	-44	-1	29
Forbes Avenue	214	81	121	113	91	-40	-32	-10
Other Streets	294	275	183	162	111	92	113	164
Total	759	487	479	407	304	8	80	183

Oakland

The Oakland study area contains 327 on-street parking spaces, primarily on Forbes Avenue and on intersecting streets, with a limited amount of parking on some sections of Fifth Avenue. A large amount of off-street parking is provided in public garages and for employees and visitors in lots and garages operated by the universities, medical facilities, and other properties.

Under the proposed project, the total of on-street parking spaces in the study area would decrease from the existing 327 spaces to 283 spaces during peak hours and to 307 spaces during off-peak hours.

The existing observed off-peak demand for on-street parking in the study area peaks at 267 vehicles at 1:00 PM. With implementation of the proposed project, the reduction to 283 off-peak on-street parking spaces would accommodate the existing highest off-peak period demand for 267 spaces, with a surplus of 40 spaces (*Table 3*). Demand for parking on Forbes Avenues would exceed the proposed number of spaces on these streets, but Fifth Avenue and other streets in the study area would have sufficient on-street parking capacity to accommodate this demand.

Table 3. Projected Oakland Parking Surplus

Subarea	Oakland Parking Supply			Max. Existing Parking Demand		Projected Parking Surplus	
	Existing	Proposed Peak	Proposed Off-Peak	Peak	Off-Peak	Peak	Off-Peak
Fifth Avenue	56	89	89	50	53	39	36
Forbes Avenue	127	72	96	83	109	-11	-13
Other Streets	144	122	122	102	105	20	17
Total	327	283	307	235	267	48	40

4.2.2. East of the BRT Core

Highland Park

The Highland Park route of the proposed BRT would operate in mixed traffic east of Neville Street. While on-street parking is not permitted on the Fifth Avenue portion of the route, it is generally permitted along Highland Avenue and other neighborhood streets. Parking in the East Liberty and Highland Avenue business districts is metered. Parking on a small section of Highland Avenue is designated as part of Residential Permit Parking Area X, and non-residents are limited to one-hour parking during certain hours. Parking in residential areas is controlled through statutory prohibitions such as at driveways, fire hydrants, and intersections.

The proposed project would include curb bumpouts as part of station construction at the proposed Walnut Street, Stanton, Wellesley, and Euclid stations. Approximately 32 total on-street parking spaces would be eliminated along the Highland Park route as part of the proposed project.

Table 4. Highland Park Route Parking Changes

Location		Parking Spaces Displaced by BRT				
Street	Cross Street	Inbound		Outbound		Total
		Nearside	Farside	Nearside	Farside	
North Highland Avenue	Walnut Street	0	4	1	4	9
North Highland Avenue	Stanton Avenue	4	1	4	0	9
North Highland Avenue	Wellesley Avenue	4	1	4	1	10
Bryant Street	North Euclid	0	0	4	0	4
Total						32

Squirrel Hill

The Squirrel Hill route of the proposed BRT would operate in mixed traffic east of Bellefield Avenue. Currently, all parking is prohibited along Forbes Avenue between Craig Street and Margaret Morrison Street, otherwise, on-street parking is generally permitted along the route. Parking in the Squirrel Hill and Greenfield business districts is metered. Parking on a section of Forbes Avenue east of the CMU campus is designated as part of Residential Permit Parking Area K, and non-residents are limited to one-hour parking during certain hours. Parking in residential areas is controlled through statutory prohibitions such as at driveways, fire hydrants, and intersections. Within the Squirrel Hill business district, the Public Parking Authority of Pittsburgh operates five metered, off-street parking lots, including the 71-space Beacon/Bartlett Lot, and the 39-space Douglas/Phillips lot.

The proposed BRT would include curb bumpouts as part of station construction at the proposed Northumberland, Wightman, Beacon, Phillips, Morrowfield, and Welfer stations. These would be spread throughout the corridor. Sixteen spaces would be eliminated within the Squirrel Hill business district at the Phillips and Beacon BRT stations, but these are immediately adjacent to the Beacon/Bartlett and Douglas/Phillips lots, with a combined capacity of 110 off-street parking spaces.

Table 5. Squirrel Hill Route Parking Changes

Location		Parking Spaces Displaced by BRT				Total
Street	Cross Street	Inbound		Outbound		
		Nearside	Farside	Nearside	Farside	
Forbes Avenue	Northumberland Street	0	0	0	4	4
Forbes Avenue	Wightman Street	4	0	0	4	8
Murray Avenue	Beacon Street	4	0	0	4	8
Murray Avenue	Phillips Avenue	4	0	0	4	8
Murray Avenue	Morrowfield Avenue	4	0	4	0	8
Murray Avenue	Welfer Street	4	0	3	0	7
Total						43

4.3. TRANSIT IMPACTS

The proposed project would result in several changes to existing transit service in the corridor. All three routes would operate a common routing through Downtown, Uptown, and Oakland, primarily in the network of dedicated bus lanes that would be installed. This common routing would begin in Oakland westbound (inbound toward Downtown) on Fifth Avenue at Bellefield Avenue, and would run in dedicated lanes on Fifth Avenue to Liberty Avenue in Downtown, with short segments operating in mixed traffic near Craft Avenue and near Washington Place. The routing would turn right from Fifth Avenue into the dedicated bus lane on Liberty Avenue, and then turn right into the dedicated bus lane on Sixth Avenue. The proposed BRT routes would then travel eastbound (outbound from Downtown) on Forbes Avenue in the dedicated lanes through Uptown and Oakland to Schenley Drive Extension, with short segments operating in mixed traffic near Chatham Square and Craft Avenue.

Buses would operate in mixed traffic on Bellefield Avenue northbound between Fifth and Forbes Avenues in both the inbound and outbound directions, depending on the route. Combined headways of the three BRT routes in this core corridor would be 2.5 minutes peak, and 5 minutes off-peak and weekends; although headways would be adjusted based upon demand and operations. The BRT Core route would replace existing Port Authority route P3, with the western end of the route extended to

Downtown from the current terminus at Robinson Street, and with the eastern end of the route terminating at Wilkinsburg station rather than the current terminus at Swissvale station. The BRT Core route would run from Downtown Pittsburgh via the common BRT routing outlined above through Uptown and Oakland to the new Wilkinsburg terminus, operating in mixed traffic via Fifth Avenue and Neville Street, and then operating via the East Busway. While current service on route P3 is frequent during the peak periods, it is less frequent during off-peak period, with no service provided during late night or on weekends. Service on the BRT Core route would maintain existing P3 weekday frequencies, and service would be extended weekday nights and added on weekends. Headways on the BRT Core route would be 10 minutes peak and 15 minutes off-peak and weekends; although headways would be adjusted based upon demand and operating requirements.

The Highland Park BRT route would replace existing Port Authority route 71B - Highland Park. This route would run from Downtown Pittsburgh via the common BRT routing outlined above through Uptown and Oakland to Highland Park, operating in mixed traffic via Fifth Avenue, Highland Avenue, and Bryant Street, with a terminal loop via North Euclid Avenue, Bunker Hill Street, and North Saint Clair Street. Service headways would be comparable to those on current route 71B, with frequent service throughout the operating day seven days per week. Headways on the Highland Park BRT route are initially proposed to be 10 minutes peak and 15 minutes off-peak and weekends; although headways would be adjusted based upon demand and operating requirements.

The Squirrel Hill BRT route would be built from the combined service of existing Port Authority routes 61A – North Braddock, 61B – Braddock/Swissvale, and 61C – McKeesport where they operate along a common route. This route would run from Downtown Pittsburgh via the common BRT routing outlined above through Uptown and Oakland to Squirrel Hill and Greenfield, operating in mixed traffic via Forbes Avenue and Murray Avenue to a BRT terminus at Loretta Street. Service on routes 61A – North Braddock and 61B – Braddock/Swissvale would continue beyond the BRT corridor at Murray Avenue along Forbes Avenue in mixed traffic along their current routes to their current respective termini. Service on Route 61C – McKeesport would continue beyond the BRT corridor at Loretta Street along Murray Avenue in mixed traffic, following the current routing to the current terminal in McKeesport. Service headways would be comparable to those on current route 61A, 61B, and 61C, with frequent service throughout the operating day seven days per week. Combined headways on the Squirrel Hill BRT route are initially proposed to be 5 minutes peak, and 15 minutes off-peak and weekends; although headways would be adjusted based upon demand and operating requirements.

Service on routes 61D – Murray, 71A – Negley, 71C – Point Breeze, and 71D – Hamilton would be retained, with these routes continuing along existing routes to their eastern termini. West of Bellefield Avenue, these routes would operate in the network of dedicated bus lanes along with the BRT routes, and would serve the BRT stations with all other stops discontinued. These routes would have a new western terminus at Craft Avenue, and would no longer provide direct service to Uptown and Downtown. From Fifth Avenue, these buses would travel via Craft Avenue to a time recovery/layover facility to be constructed near Hamlet Street, and would return to service on Forbes Avenue via Craft Avenue. Some trips would likely loop directly back into eastbound service on Forbes Avenue via Craft Avenue without layover. Where these routes overlap the Highland Park and Squirrel Hill BRT routes, they would serve the BRT stations with all other stops in these areas discontinued. Trip frequency on

these routes would be reduced somewhat from current levels, reflecting increased service on the BRT routes in the areas of common operation. Service would be provided on these routes during the same time periods and days as at present, although headways and service would be adjusted based upon demand and operating requirements. Frequency on Route 64 would be increased to provide additional service to the Waterfront.

Service on other routes which serve Oakland, including 54, 28X, 58, 67, 69, 75, 81, 83, and 93 would operate in the network of dedicated lanes in Oakland, and would likely have minor routing changes to enable them to use these lanes. These routes, and other routes which overlap portions of the BRT routes, would serve BRT stations in areas of common routing, with all other stops in the common areas discontinued.

5. Air Quality

The proposed project is located within an area designated by the US Environmental Protection Agency (EPA) as being in non-attainment for fine particulate matter (PM_{2.5}) and for the 8-hour ozone standard. Furthermore, the area is currently designated as a maintenance area for carbon monoxide (CO).

Effective April 5, 2006, the EPA published a Final Rule (40 CFR §93.116) that establishes transportation conformity criteria and procedures for determining which transportation projects must be analyzed for local air quality impacts in particulate matter nonattainment and maintenance areas. The rule was followed by a guidance document issued by the EPA and the Federal Highway Administration (FHWA) that provides the information for state and local agencies to meet the hot-spot requirements established in the conformity rule.

The study area encompasses the proposed project alignment. Traffic data within the study area were provided for this proposed project corridor for the opening year (2020) and the horizon year (2040); this data was utilized to determine the potential air quality impacts of the proposed project.

Air quality analyses were performed, as per NEPA requirements, to determine the regional conformity of the proposed project, analyze the proposed project's potential to cause or contribute to violations of the National Ambient Air Quality Standards (NAAQS), and to determine the proposed project's Mobile Source Air Toxics (MSAT) effects. As such, the following analyses were conducted:

- Regional Conformity Analysis: performed to determine if the proposed project is included on SPC's Transportation Improvement Program (TIP) and, as such, conforms to the long-term regional air quality goals of the region.
- Carbon Monoxide (CO) Analysis: performed on the worst-case intersection, as determined through intersection screening, to determine if the proposed project has the potential to exceed the CO NAAQS.
- Particulate Matter (PM_{2.5}) Analysis: performed to determine if the proposed project is a Project of Air Quality Concern (POAQC) and would require a PM microscale analysis.
- Mobile Source Air Toxics (MSAT) Analysis: conducted to determine whether the proposed project has the potential to produce any meaningful MSAT effects.

Battery-electric, articulated buses (BEB) are proposed for use on the East Busway route of the proposed project. It would be possible to operate additional BEBs beyond those included in the proposed project on the Highland Park route of the BRT, however the proposed project does not include an electric charging facility at the Highland Park terminus, and any such operation would need to be interlined with the East Busway BRT route. BEBs result in reduced energy consumption and greenhouse gas emissions, as they are powered by electric motors that obtain energy from an on-board battery.

5.1. REGIONAL CONFORMITY ANALYSIS

SPC concluded a regional Air Quality Conformity Assessment with a public comment period from August 16 through September 15, 2017. This is a regional assessment of the entire transportation network, rather than a project-level emissions analysis, with the assumption that this proposed project would be built and in operation in 2020.

The public had an additional opportunity to comment on the Long-Range Plan. SPC scheduled an action at the September 25, 2017, Commission meeting to determine approval and conformity for the amended Transportation Improvement Program (TIP) and Long-Range Plan.

Per SPC's *Air Quality Conformity Determination – Pittsburgh Transportation Management Area Draft Report* (August 2017), the proposed project is included on SPC's 2017–2020 TIP and 2040 Transportation Plan. As such, it is also included within the regional conformity process, confirming that it would not adversely affect the ability of SPC to achieve its applicable air quality goals.

5.2. CARBON MONOXIDE (CO) ANALYSIS

This proposed project is in Pennsylvania's Allegheny County, which is classified as a maintenance area for CO. As such, a CO screening analysis was performed, based on 2040 LOS and volume data, to determine whether any intersections would require further analysis. Of the 45 intersections screened, 24 demonstrated LOS D or below. Out of these 24 intersections, 16 would decrease to LOS D or below due to this proposed project. Per Pennsylvania Department of Transportation's (PennDOT) *Project-Level Air Quality Handbook*¹¹ guidance, any intersection with a Build Alternative LOS D or below must be screened further.

Of the 24 intersections with Build Alternative LOS D or below, the Fifth Avenue and McKee Place/Darragh Street intersection was selected for the CO microscale analysis, as it had the highest AM peak-period volume and the fourth-highest PM peak-period volume. Furthermore, this intersection was LOS F in the AM and PM peak periods in both the No-Build Alternative and Build Alternative, and the volume-to-capacity ratio (delay) increased from 1.67 to 1.96 in the AM period and from 1.18 to 1.40 in the PM period, when comparing the No-Build Alternative to Build Alternative.

Following PennDOT's *Project-Level Air Quality Handbook*, a microscale CO analysis was conducted at the intersection of Fifth Avenue and McKee Place/Darragh Street using EPA's CAL3QHC dispersion model and EPA's MOVES2014a emissions model. Allegheny County-specific data were obtained from the SPC for input to the MOVES2014a emission model. Worst-case meteorological conditions were assumed for the analysis. Maximum 1-hour and 8-hour CO levels were predicted for the existing year (2013), opening year (2020), and future year (2040) at the intersection selected for analysis. The results of the analysis indicate that no exceedances of the NAAQS are expected with this proposed project.

¹¹ Pennsylvania Department of Transportation, *Project-Level Air Quality Handbook*, Publication No. 321
<https://www.paep.org/wp-content/uploads/PUB-321-Project-Level-Air-Quality.pdf>

5.3. PARTICULATE MATTER (PM_{2.5}) ANALYSIS

This proposed project is in Pennsylvania's Allegheny County, which is classified as a nonattainment area for the annual standard for PM_{2.5}. As such, in accordance with the EPA's November 2015 guidance, *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas*,¹² this proposed project would require a quantitative PM analysis if it is deemed to be a "Project of Air Quality Concern."

Information regarding this proposed project, its effect on regional and local traffic, as well as the vehicles proposed to be used for BRT operations, would be supplied to the interagency group to aid its decision as to whether this proposed project is a "Project of Air Quality Concern" (POAQC). The total amount of weekday diesel bus VMT would decrease by 3,569 under the Build Alternative compared to the No-Build Alternative. The total amount of weekday bus VMT would decrease by 1,685 miles under the Build Alternative compared to the No-Build Alternative (a 12.6 percent decrease). Furthermore, there would be 1,885 BRT electric VMT in the Build Alternative. It is currently assumed that this proposed project would not be classified as a "Project of Air Quality Concern," and that a quantitative PM_{2.5} analysis would not be required. This would be confirmed via PennDOT's Level 2 Screening and will occur in July 2018.

5.4. MOBILE SOURCE AIR TOXICS EMISSIONS

On February 9, 2007, and under authority of Clean Air Act Section 202(l), the EPA signed a Final Rule, Control of Hazardous Air Pollutants from Mobile Sources, which sets standards to control MSATs from motor vehicles. Under this rule, the EPA set standards on fuel composition, vehicle exhaust emissions, and evaporative losses from portable containers.

On February 3, 2006, the FHWA released *Interim Guidance on Air Toxic Analysis in NEPA Documents*. This guidance was superseded on December 6, 2012, by the FHWA's *Interim Guidance Update on Air Toxic Analysis in NEPA* and again on October 18, 2016, by the FHWA's *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*.¹³ The purpose of the FHWA's guidance is to advise on when and how to analyze MSATs in the NEPA environmental review process for highways.

A qualitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives* (FHWA 2006). The FHWA's Interim Guidance groups projects into the following tier categories:

¹² United States Environmental Protection Agency, November 2015. *Transportation Conformity Guidance for Quantitative Hot-Spot Analyses in PM_{2.5} and PM₁₀ Nonattainment and Maintenance Areas*. <https://www.epa.gov/state-and-local-transportation/project-level-conformity-and-hot-spot-analyses#pmguidance>.

¹³ Federal Highway Authority, Frequently Asked Questions (FAQ), Conducting Quantitative MSAT Analysis for FHWA NEPA Documents. https://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/moves_msat_faq.pdf. Accessed September 2016.

- No analysis for projects without potential for meaningful MSAT effects
- Qualitative analysis for projects with low potential MSAT effects
- Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects

Based on the FHWA's recommended tiering approach, this proposed project falls within the Tier 2 approach (i.e., for projects with a low potential for MSAT effects). The amount of MSATs emitted would be proportional to the VMT, assuming the vehicle mix does not change. The weekday bus VMT would decrease in the Build Alternative, as compared to the No-Build Alternative. Furthermore, this proposed project would use a greater number of electric zero-emission buses. As such, this proposed project is predicted to generally produce no meaningful MSAT effects.

Regardless of the No-Build Alternative or Build Alternative, emissions would likely be lower than present levels in the design year because of the EPA's national control programs that are projected to reduce annual MSAT emissions by over 90 percent between 2010 and 2050. Local conditions would likely differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

6. Energy

This proposed project would result in regional benefits related to reduced energy consumption. Reduced VMT would occur with implementation of this proposed project, and the operation of BEBs into the existing bus fleet would reduce energy consumption and greenhouse gas emissions. BEBs are driven by an electric motor that obtains energy from an on-board battery, Table 6 presents the change in VMT between No-Build and Build Alternative conditions in 2020. VMT is anticipated to decrease by 12.6 percent with implementation of this proposed project, thereby decreasing transportation-related energy consumption.

Table 6. Weekday Bus VMT by Fuel Type (2020)

Fuel & Bus Type	No-Build Alternative	Build Alternative	Increment
BRT Diesel	0	3,673	3,673
Local Diesel	13,325	6,082	-7,243
<i>Total Diesel</i>	<i>13,325</i>	<i>9,756</i>	<i>-3,569</i>
<i>Total BRT Electric</i>	<i>0</i>	<i>1,885</i>	<i>1,885</i>
Total	13,325	11,640	-1,685

In addition, the East Busway route, one of three routes of the proposed project, would be served solely by BEBs. It would be possible to operate additional BEBs beyond those included in the proposed project on the Highland Park route of the BRT, however the proposed project does not include an electric charging facility at the Highland Park terminus, and any such operation would need to be interlined with the East Busway BRT route. Research by Carnegie Mellon University's Scott Institute for Energy Innovation indicates that BEBs would reduce tailpipe and greenhouse gas emissions compared to conventional diesel buses.¹⁴ While BEBs have a high cost, the Scott Institute determined that battery cost would decrease as energy density increases, and therefore recommends BEBs as the most viable alternative to conventional diesel.

Fuel economy for vehicles that use alternative fuels and propulsion systems is typically expressed in terms of diesel gallon equivalents (DGE). This allows a comparison of the fuel economy of various vehicle technologies and fuel types. Table 7 presents the fuel economy in terms of DGE and greenhouse gas emissions of several different bus technologies. As shown in the table, the annual DGE use of a BEB is considerably lower than that for diesel, CNG, or hybrid buses. Furthermore, battery-electric propulsion generates the least amount of greenhouse gas emissions (by nearly a factor of three) when compared to clean diesel technology.

¹⁴ Carnegie Mellon University – Scott Institute for Energy Innovation. January 2017. *Policymaker Guide: Which Alternative Fuel Technology is Best for Transit Buses?* https://www.cmu.edu/energy/public-policy/17-104%20Policy%20Brief%20Buses_WEB.pdf

Table 7. Propulsion System Lifecycle Greenhouse Gas Emissions

	Clean Diesel	CNG	Diesel-Electric Hybrid	Battery-Electric	Hydrogen Fuel Cell
# Buses	50	50	50	50	50
Annual Mileage	40,000	40,000	40,000	40,000	40,000
Lifecycle (years)	12	12	12	12	12
Annual DGE Use	500,000	555,556	400,000	86,957	294,118
Lbs CO ₂ /gallon	27.824	23,598	27.824	—	Not Available
Lbs CO ₂ /kwh	—	—	—	1.348	—
kwh/DGE	—	—	—	38.081	—
Tons of CO ₂	4,174,000	3,933,000	3,339,000	1,339,000	—

Source: Massachusetts Bay Transportation Authority, *Alternative Propulsion Systems: Boston's Next Generation Bus Fleet* (March 2014)

7. Environmental Justice

7.1. INTRODUCTION

To comply with Presidential Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, FTA is required to analyze whether the proposed project would have disproportionately high and adverse human-health or environmental effects on minority populations and low-income populations.¹⁵ This Environmental Justice analysis follows the U.S. Department of Transportation's (USDOT) Final Order on Environmental Justice, April 1997 (as subsequently amended), as well as the U.S. Environmental Protection Agency's (EPA) Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses, April 1998 and FTA's Environmental Justice Policy Guidance for Federal Transit Administration Recipients (Circular 4703.1 effective August 15, 2012).

FTA Circular 4703.1 establishes three guiding principles for environmental justice:

- To avoid, minimize, and mitigate disproportionately high and adverse effects;
- To ensure the full and fair participation by all potentially affected communities; and,
- To prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations.

This Environmental Justice analysis identifies low-income and minority communities within the study area and determines if they would be subject to disproportionate environmental impacts. The assessment would also summarize the public outreach undertaken by PAAC specifically to address potential environmental justice concerns of the community.

¹⁵ The US DOT Order 5610.2(a) (Actions to Address Environmental Justice in Minority Populations and Low-Income Populations) provides these definitions:

- a) Low-Income means a person whose median household income is at or below the US Department of Health and Human Services poverty guidelines.
- b) Minority means a person who is:
 - (1) Black: a person having origins in any of the black racial groups of Africa;
 - (2) Hispanic or Latino: a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race;
 - (3) Asian American: a person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent;
 - (4) American Indian and Alaskan Native: a person having origins in any of the original people of North America, South America (including Central America), and who maintains cultural identification through tribal affiliation or community recognition; or
 - (5) Native Hawaiian and Other Pacific Islander: people having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.

7.2. EXISTING CONDITIONS

The environmental justice study area has been established to evaluate the potential for direct and indirect project effects and is defined as 1/4-mile from the Build Alternative alignment and stations (Figure 12). The demographic profile of the environmental justice study area is based on the 2010 Decennial Census and American Community Survey 5-year Estimates (2010-2015) and utilizes census block-level data to identify community characteristics at a localized level. Figure 12 also shows neighborhoods entirely or partially within or the environmental justice study area as well as the census delineated block groups that comprise these neighborhoods and are used to identify environmental justice communities (shown in white outline within neighborhood delineations).

7.2.1. Existing Demographic Data for the environmental justice Study Area

Demographic information summarized by neighborhood is shown in Table 8. The table also summarizes the key demographic characteristics for both the City of Pittsburgh and Allegheny County since, following CEQ guidance, environmental justice populations may be identified where the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. For Allegheny County and the City of Pittsburgh, the minority population is approximately 22 percent and 33 percent, respectively. The region, as well as the communities directly affected by the proposed project have very low proportion of Hispanic identity (less than 5 percent).

Per CEQ guidance, low-income populations in an affected area should be identified with the annual statistical poverty thresholds from the Bureau of the Census' Current Population Reports, Series P-60 on Income and Poverty. Using FTA guidance, the low-income threshold is established as households with a median income at or below 150 percent of Department of Health and Human Services (HHS) poverty levels. For Allegheny County and Pittsburgh, the percent of population that at this threshold is approximately 20 and 32 percent, respectively.

While these statistical thresholds establish a baseline, USDOT and FTA guidance also suggests that effects on any minority or low-income population in the study area be considered such that additional environmental justice communities may be identified even in census areas that do not achieve the threshold percentages. Figures 13 and 14 identify the individual block group information for each neighborhood in the environmental justice study area by its environmental justice status in comparison with the City of Pittsburgh and Allegheny County as a whole. Based on the demographic data and mapping by block group, and applying FTA guidance, the whole of the study area of the proposed project can be considered to be comprised predominantly of environmental justice communities with higher concentrations of environmental justice populations in the Terrace Village, Upper Hill, North Oakland, West Oakland, Squirrel Hill North, East Liberty, Larimer and Hazelwood neighborhoods.

Figure 12. Environmental Justice Study Area

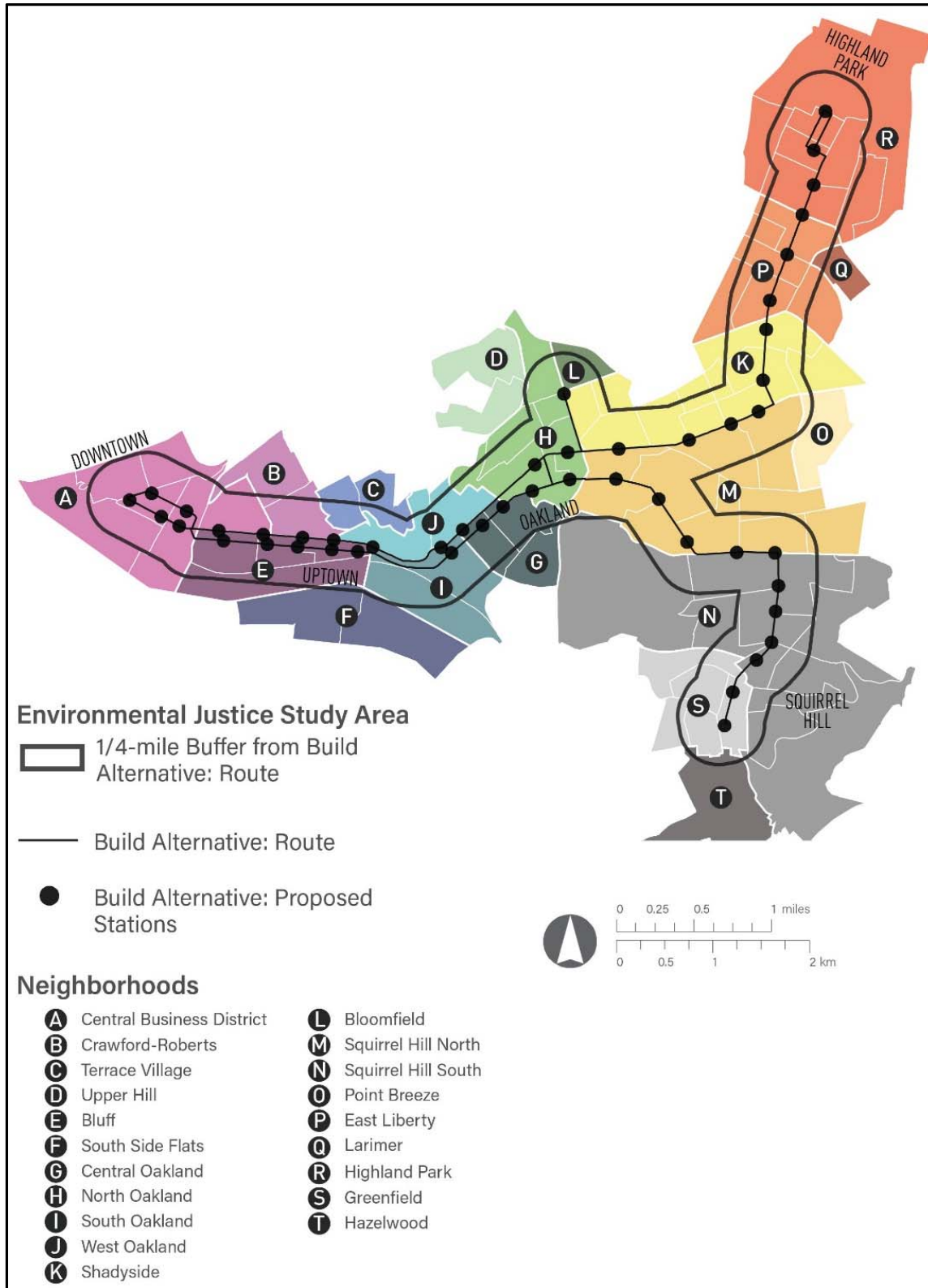


Table 8. Environmental Justice Study Area Demographics

Geographies	Population	% Racial Minority	% Hispanic or Latino (of any race)	% Low Income
Allegheny County	1,229,010	22%	2%	20%
City of Pittsburgh	381,668	33%	2%	32%
Neighborhoods				
A. Central Business District	4,060	20%	3%	23%
B. Crawford-Roberts	2,225	91%	2%	51%
C. Terrace Village	1,174	88%	1%	72%
D. Upper Hill	1,300	79%	2%	31%
E. Bluff	6,294	35%	3%	49%
F. South Side Flats	1,157	3%	5%	35%
G. Central Oakland	5,822	18%	3%	79%
H. North Oakland	9,602	38%	4%	50%
I. South Oakland	827	19%	3%	79%
J. West Oakland	735	43%	3%	64%
K. Shadyside	11,617	29%	3%	30%
L. Bloomfield	842	33%	3%	59%
M. Squirrel Hill North	21,561	45%	2%	18%
N. Squirrel Hill South	16,042	15%	3%	22%
O. Point Breeze	1,004	9%	3%	8%
P. East Liberty	4,856	75%	2%	42%
Q. Larimer	652	79%	2%	69%
R. Highland Park	6,810	26%	3%	28%
S. Greenfield	4,198	17%	3%	18%
T. Hazelwood	817	66%	3%	63%
Notes: Racial minorities are persons who are non-White, and who are Black, Asian American, American Indian and Alaskan Native, Native Hawaiian or Other Pacific Islander, some other race or two or more races. Low-income threshold is established as households with a median income at or below 150 percent of HHS poverty levels.				

This data was used by the project team to develop a public engagement plan that effectively reaches minority and low-income populations and to help inform the determination of whether the proposed project would have disproportionately high and adverse impacts on environmental justice populations.

Figure 13. Environmental Justice Minority Populations

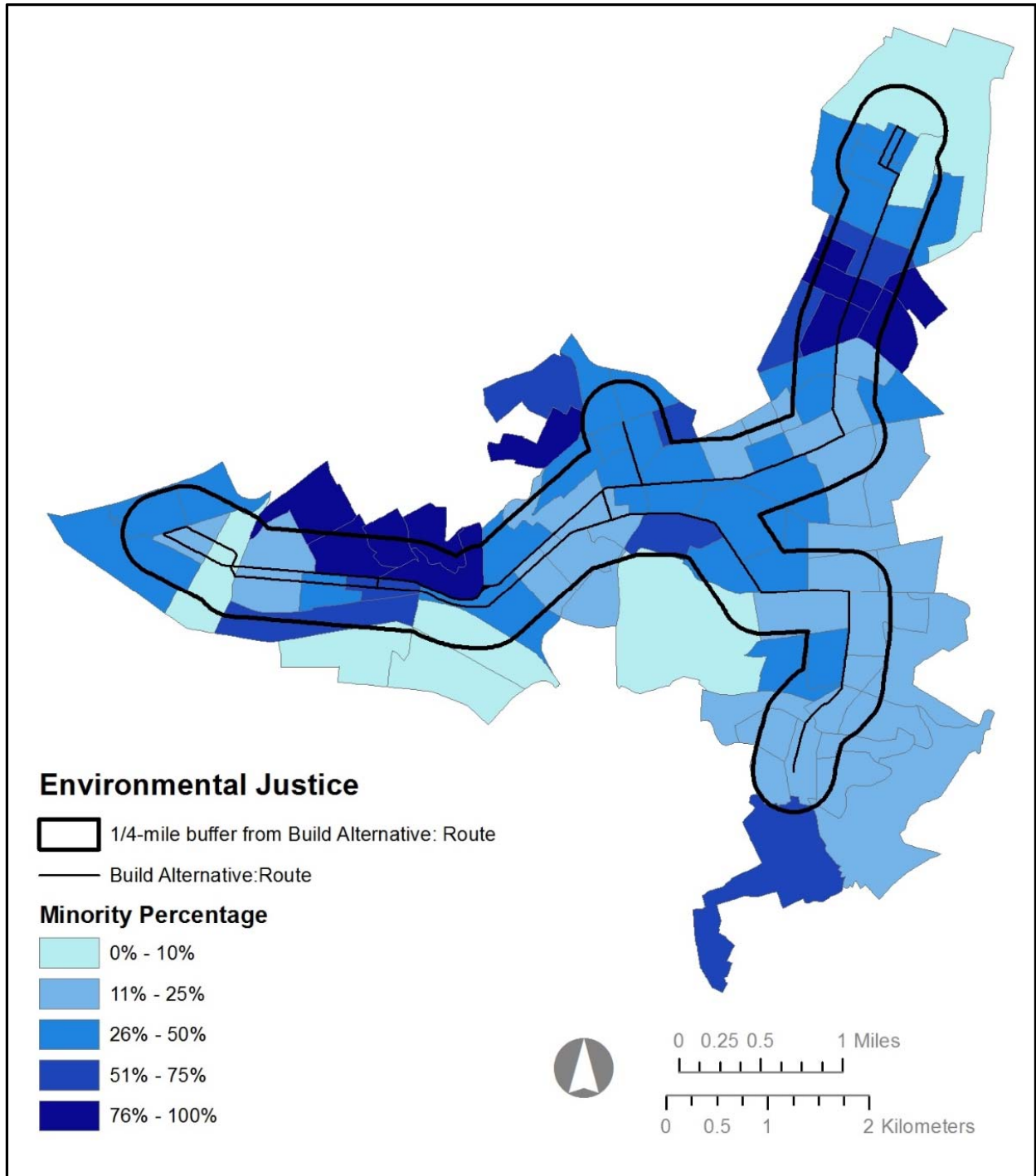
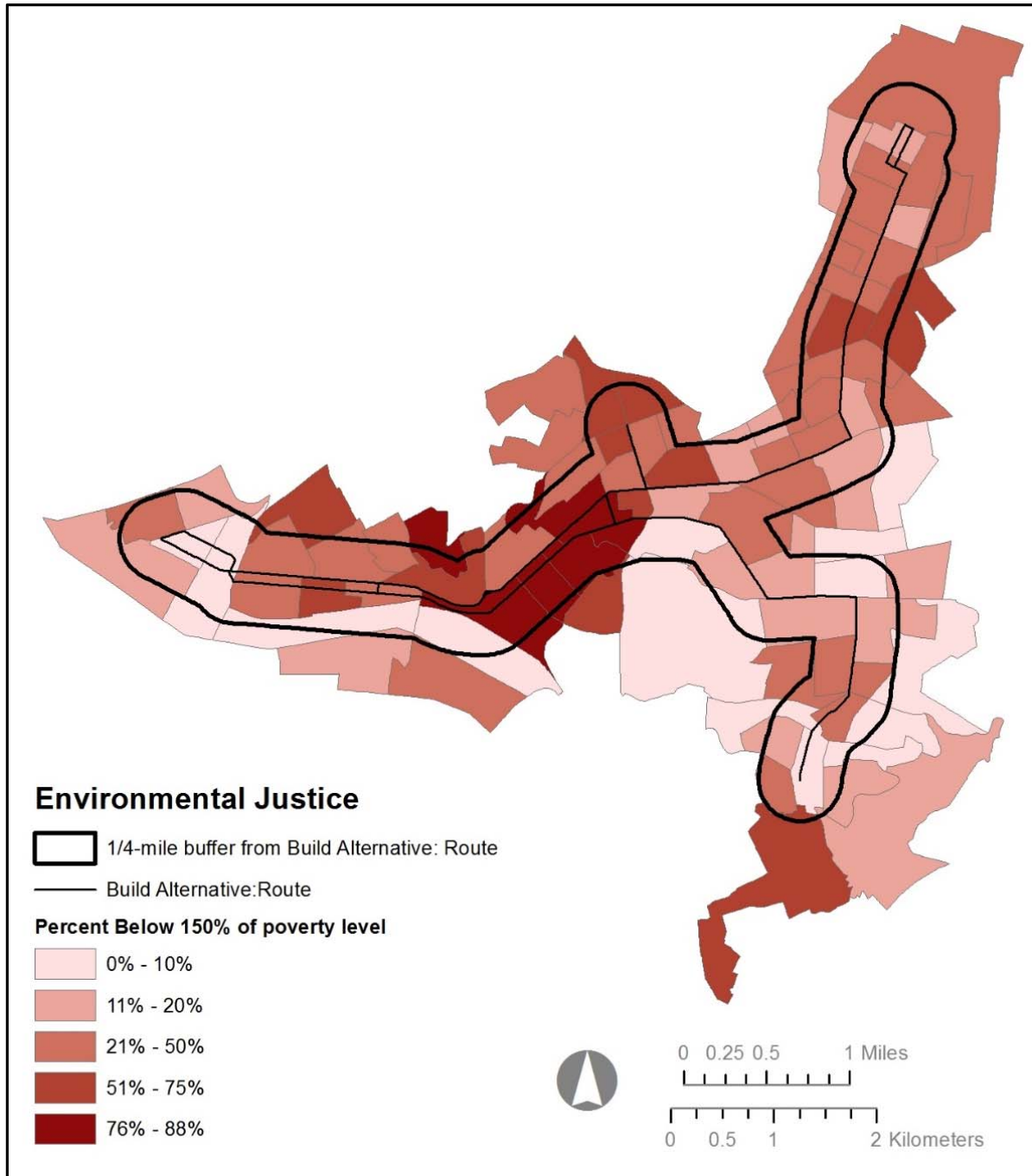


Figure 14. Environmental Justice Low Income Populations



7.2.2. Existing Environment

The proposed project would be built within an urban area that is already highly developed. The existing conditions related to the built environment (e.g. land use, transit, traffic) and the natural environment (e.g. air quality, water quality, threatened and endangered species) are described within each resource section of this proposed project's Categorical Exclusion (CE) document. For more information, please see the respective resource sections in this CE document.

7.2.3. Public Engagement and Outreach Activities

PAAC initiated public engagement and outreach activities to help the project team understand the public's perceptions and concerns about the existing transportation system and facilities; and, provide a venue for stakeholders to share their thoughts about how changes to the existing transportation system and facilities may impact them, both positively and negatively and over the short-term and long-term. Feedback and interaction during this process has helped establish and fine-tune service elements of the proposed BRT plan.

The PAAC has been committed to regularly providing updates and seeking opportunities to listen to a broad representation of citizens and stakeholder groups to develop a proposed project that has the maximum public benefit while also avoiding and minimizing adverse effects to the greatest extent possible. The PAAC has been actively reaching out to the public and project stakeholder groups through a variety of methods over several years, and has been soliciting ideas and feedback from the project's Stakeholder Advisory Group. The Stakeholder Advisory Group consists of the following members:

- ACTION Housing, Inc.
- Allegheny Conference on Community Development
- Allegheny County Transportation Action Partnership
- Allegheny County Labor Council
- Allegheny County Transit Council
- Bike Pittsburgh
- Carnegie Mellon University
- Carlow University
- City of Pittsburgh Department of City Planning
- Committee for Accessible Transportation
- Duquesne University
- East Liberty Development, Inc.
- Federal Transit Administration
- Local Government Academy
- Hill District Community Development Corporation
- Hill District Consensus Group
- Hill House Association
- NAIOP, the Commercial Real Estate Development Association, Pittsburgh Chapter
- Oakland Planning & Development Corporation
- Oakland Transportation Management Association
- Oakland Task Force
- PA Department of Transportation
- PA Interfaith Impact Network
- Pittsburgh Central Keystone Innovation Zone
- Pittsburgh Community Reinvestment Group
- Pittsburgh Downtown Community Development Corporation
- Pittsburgh Downtown Neighborhood Association
- Pittsburgh Downtown Partnership
- Pittsburgh Parking Authority
- Pittsburgh Partnership for Neighborhood Development
- Pittsburgh Penguins
- Pittsburgh Sports & Exhibition Authority
- Pittsburgh United
- Port Authority of Allegheny County
- Southwestern Pennsylvania Commission
- Squirrel Hill Urban Coalition

- Sustainable Pittsburgh
- University of Pittsburgh
- UPMC
- Uptown Partners of Pittsburgh
- Urban Innovation21

Public and stakeholder outreach have occurred throughout the entirety of the project, most recently through the Spring of 2018. This information is detailed in Section 2. Outreach and Engagement.

Project updates and information about upcoming public engagement activities have been advertised in a variety of locations using a variety of methods, including:

- Project website: The PAAC has hosted a project website where the PAAC provides project updates, shares details of upcoming meetings and posts general project information including press releases.
- Email list: This list contains contact information for 84 key stakeholder organizations, including many community organizations.
- Social media: The PAAC posts notices about meetings and events on its Facebook and Twitter accounts. Meeting events, notices, and reminders posted on the Port Authority of Allegheny County's Facebook and Twitter account
- Printed fliers: Fliers were distributed at bus stops, busway stations, and in some neighborhoods before public meetings.
- Print news: Print advertisements were run in the *Pittsburgh Post-Gazette*, the *New Pittsburgh Courier*, and the *Pittsburgh City Paper* before community and public meetings.

The PAAC follows its Language Assistance Plan to determine the need for translation services for its activities, on an as-needed basis (PAAC, 2016). In addition to providing the public with project updates, the PAAC's public outreach activities have gathered a range of comments about the proposed project and its potential beneficial and adverse effects to environmental justice populations. These comments to date, raised by or relevant to environmental justice populations, have been summarized by topic in Table 9.

Table 9. Comments from and Relevant to Environmental Justice Populations

Summary of substantive concern or potential adverse impact	Response
Accessibility	
Ease of use for families with children, disabled and elderly riders, particularly with elimination of one-seat ride to Downtown Pittsburgh.	The PAAC would comply with the Americans with Disabilities Act in development of this proposed project. Local buses and BRT buses would service many of the same stations, allowing same-platform transfers at shared stations. All BRT buses and stations would be accessible, and stations would have a shelter for protection from the elements. Headways between BRT buses between Downtown and Oakland would be short, ranging from about 3 minutes (AM and PM peak period) to about 10 minutes (late night and early morning), minimizing wait time. In response to community concerns, PAAC has made an operational commitment to retaining one seat ride service Downtown on selected bus routes that are not part of the proposed project.
Changes to ACCESS (paratransit) and potential for shared use of BRT lane by ACCESS (paratransit) vehicles	The PAAC and City of Pittsburgh are committed to allowing ACCESS vehicles to use BRT lanes when picking up and dropping off riders as necessitated by availability of accessible entrances along the corridor.
Need a facility that would accommodate a variety of non-motorized uses like pedestrian, bicycle, and wheelchairs.	The PAAC and City of Pittsburgh would comply with the Americans with Disabilities Act in development of this proposed project. Dedicated bicycle facilities are proposed throughout the BRT Core to provide effective multimodal transferability and access. Except for the limited-access East Busway, the three routes of the BRT project would operate on streets that have sidewalks. Signalized intersections would be upgraded to provide accessible ramps, cross walks and traffic signals if they are not already in place. Removal of the contra-flow bus lane on Fifth Avenue would be a safety enhancement for all users of the street.
Distance between stations may prevent ridership, particularly in western Oakland and eastern Uptown, especially for elderly, disabled, families with young children, and in hazardous weather conditions.	BRT stations would be located approximately every 1/3-mile. Currently, bus stops are generally spaced approximately 1/4-mile apart in these areas. This consolidation may require riders to walk slightly further, generally no more than about one to two additional blocks, to reach a BRT stop. Between Uptown and Oakland where there are no adjacent residences, stations would be farther apart. By reducing the number of stops, bus travel times would be reduced and travel made more reliable.

Table 9. Comments from and Relevant to Environmental Justice Populations (continued)

Summary of substantive concern or potential adverse impact	Response
Service changes to existing transit routes and transfers	
<p>Concern about service reductions (e.g. frequency, route options) to/from low-income and/or minority neighborhoods, both in and outside of the project study area.</p> <ul style="list-style-type: none"> --Need connectivity between affordable communities located farther from Downtown Pittsburgh and services (e.g. medical) located in or near Downtown Pittsburgh. --Need connectivity during non-peak travel hours, because low-wage jobs often require employees to be at work before or after the peak travel hours. 	<p>The PAAC regularly reviews and adjusts its service plan, every three months, as an ongoing effort that is separate from this proposed capital improvement project. The PAAC is committed to proactively engaging its riders and a wide range of stakeholders as it considers adjustments to its service plan. Based on public outreach, and continued operational planning, the proposed project would not result in changes as part of the proposed project. No route is proposed to have any reduction in frequency. Thus, the existing service is being maintained within the environmental justice communities of the corridor as well as to the larger Monongahela Valley.</p>
<p>A fee to transfer between bus and BRT would create an economic disadvantage to low-income riders, especially low-income residents living outside the project's study area.</p>	<p>The proposed project would result in new transfers between the routes that would be short turned, such as the 61D, the 71A, the 71C, and the 71D. Riders would have alternatives to these routes for direct service from their communities to downtown, which would provide an alternative to avoid a transfer. The service plan is designed to minimize transfers.</p> <p>The PAAC is also not proposing a change in the fare policy as part of this proposed capital improvement project. The PAAC's current fare policy is available at: http://www.portauthority.org/paac/FareInfo/FareInformation.aspx.</p>
Public outreach and engagement	
<p>Community outreach should cover all affected areas, not just the capital project study area.</p>	<p>As described in Section II Outreach and Engagement, the PAAC has held 13 larger-format public meetings and held more than 45 additional meetings with businesses, neighborhoods and other community groups that may be affected by the proposed project. This includes neighborhoods both inside and outside of the proposed project's study area. Additional meetings outside the study area for the Monongahela Valley were held in April and May 2018.</p>
Station maintenance	
<p>Upkeep of stations and related proposed project infrastructure being poorly maintained in low-income, minority areas.</p>	<p>BRT station upkeep and maintenance would be determined through contractual obligations between the City of Pittsburgh and the entity(ies) contracted by the City to build and maintain the BRT stations.</p>

Table 9. Comments from and Relevant to Environmental Justice Populations (continued)

Summary of substantive concern or potential adverse impact	Response
Affordable housing, residential and business displacements and parking impacts	
<p>Implement affordable housing policies around BRT stations so low-income residents can live in transit oriented development communities. Ensure affordable housing remains in the corridor.</p>	<p>The City of Pittsburgh Affordable Housing Task Force is charged with assessing the current and projected future landscape of housing affordability in the City of Pittsburgh, evaluating current programs and initiatives to produce new affordable units and preserve existing ones, and making recommendations to the Mayor and City Council. For more information, please visit: http://pittsburghpa.gov/dcp/ahtf/index.html.</p>
<p>Concern about transit improvements leading to displacement of existing residents and businesses.</p>	<p>The proposed project would not displace any residences or businesses. The proposed project would be constructed mostly within existing rights-of-way, with only minor sliver acquisitions along the front of some parcels and only one full acquisition of an existing parking lot.</p>
<p>Elimination of on-street parking in low-income, minority communities which may affect residents, whose need for a car is dictated by work, family, age or disability, and local businesses.</p>	<p>Although on-street parking would be reduced, surplus on-street parking would still be anticipated in the environmental justice study area. Parking reductions would be limited to the extent necessary to implement bus lanes and maintain effective traffic flow. A limited amount of on-street parking would be eliminated in commercial areas in Downtown, Uptown and in Oakland, but adjacent streets would have a parking surplus to accommodate demand. A reduction of on-street parking would occur in residential or mixed-use areas of Uptown; however, adequate parking would remain to accommodate neighborhood demand. Minor parking reductions would occur at some locations on the BRT routes in residential and commercial areas of Highland Park and Squirrel Hill.</p>

7.3. IMPACTS

The following sections describe the proposed project's direct impacts, both short-term during construction and over the long-term once construction is complete. Direct effects involve the physical changes in the street's public right-of-way to implement and operate the new BRT infrastructure and are therefore limited in potential effect to these most immediate locations. Since the proposed project improves but also retains bus service, there is limited potential for indirect impacts that would occur farther away from the area of proposed project or later in time, as well as cumulative impacts (which are discussed in Section 19. Indirect and Cumulative Impacts).

7.3.1. Short-Term Impacts

Construction impacts would be focused on implementing physical changes within the existing right of way to reallocate space and create a dedicated transit lane. Construction would last approximately 18 months and would include intermittent lane closures and delays, detours, pavement resurfacing and line striping, installation of lighting, signs and signals, station structures, platforms, installation of a bollard-protected bicycle and pedestrian facility, and potential changes to access points. Reasonable access would be maintained to all neighborhoods and businesses during construction. Construction is not anticipated to include activities such as pile driving or other heavy earthwork activity that would cause noise or vibration.

Within the Downtown area BRT construction would be limited to minor traffic signal modifications, changes in signing and pavement marking, and station construction. Traffic signal modifications and placement of signing and pavement markings would be performed using short-term traffic control measures, with little disruption to the surrounding areas. Station construction is anticipated to involve temporary closures of sidewalks. Pedestrian detours or alternate paths would be provided around work areas.

Within the Uptown area, full reconstruction of streets is proposed including Fifth Avenue and Forbes Avenue, which are major arterials carrying one-way traffic that are typically each 36 feet wide. It is anticipated that reconstruction of the street would be conducted in half widths in order to maintain a single traffic lane. Work is anticipated to occur in four major phases to limit the potential for impacts to traffic, parking, and pedestrian access and would include sidewalk closures, lane closures, and parking prohibition in work areas. During construction, transit and bikes would be sharing the single available lane with general traffic resulting in some increase in delays. The actual order of the phases may vary. To minimize the localized impact of parking prohibitions, work may be scheduled concurrently in alternate blocks. Construction may occur on both Forbes and Fifth Avenues simultaneously.

Additional reconstruction work would be performed on Diamond Street and Boyd Street that would require lane closures. The section of Boyd Street between Watson Street would be closed construct the permanent closure of that segment. A detour would be required and is anticipated to become the permanent condition after construction.

In Oakland, full street reconstruction would be limited to two locations: Forbes Avenue for approximately 700 feet west of Craft Avenue, and Fifth Avenue for approximately 500 feet east of Craft

Avenue, where the roadways would be widened. Roadway reconstruction would be constructed in phases—with a single-lane closure while the widened roadway and sidewalk are constructed offline—and then traffic would be shifted to the widened portion of the roadway while reconstructing the opposite side. Traffic delay impacts can be anticipated due to reduced roadway or street capacity.

Additional information regarding short-term impacts is provided in Section 18.

The proposed project would implement measures described in the resource-specific sections of this document to avoid or minimize short-term, adverse effects to environmental justice populations during construction. The proposed project would not require the closure or taking of any businesses, but there may be some restrictions to access. Considering the narrow right of way, it's likely that there will be sidewalk and roadway closures in front of entrances and driveways. Possible measures to minimize impacts to entrances or driveways include half-width construction, temporary access ramps, time restrictions, and use of alternate access route used to reduce the impact as much as possible. , which include:

- Send and post notices broadly to residents, businesses, and project stakeholders in advance of construction activities to provide information about construction activity schedule, detour routes and any potential access changes.
- Install signs near residential areas to discourage cut-through traffic during construction.
- Maintain pedestrian and bicyclist accessibility to the greatest extent possible. Where construction work zones impact existing pedestrian facilities, ensure that Americans with Disabilities Act (ADA)-compliant alternate routes and detour signage are provided.
- Shield construction lighting and/or focus lighting on work areas to minimize ambient spillover of light into adjacent areas, especially near residences, churches and parks.
- If feasible, incorporate a requirement in the construction contract that contractors utilize a designated percentage of minorities during construction of the proposed project.

7.3.2. Long-Term Impacts

The proposed project's direct impacts, as described in the resource sections of the Categorical Exclusion document, are summarized below in Table 10, including a brief discussion of how those direct impacts would affect the environmental justice study area.

Table 10. Summary of Impacts to environmental justice Populations

Resource	Direct Project Impacts	Impact Findings
Land Use and Zoning	The proposed project would be consistent with existing land use plans, and would not alter or change the character of any of the current land uses.	No adverse impacts to land use and zoning would be anticipated.

Resource	Direct Project Impacts	Impact Findings
Traffic	<p>In some locations, lanes would be widened, in other locations general traffic lanes would be removed. These changes would result in some intersection levels-of-service (LOS) degrading over time, and other intersection LOS improving over time.</p> <p>Generally, BRT would have a neutral effect on traffic in the study area. Intersections with improved LOS and those with degraded LOS are distributed throughout the environmental justice study area, and those with degraded LOS are not concentrated in any residential area. The overall reduction in VMT, enhanced bus travel times, and improved operational reliability could be a beneficial impact</p>	Overall, the change in traffic conditions would be balanced and evenly distributed such that there would not be an overall adverse impact on traffic conditions.
Parking	The proposed project would eliminate on-street parking spaces on Fifth Avenue and Forbes Avenue in Uptown and eliminate some on-street parking in Oakland. However, other streets in the study area would still have sufficient on-street parking to accommodate demand. For the study area, the proposed project would result in a continued surplus of on-street parking.	No adverse impacts
Transit: Transit Travel Times and Reliability	The proposed transit only lane would allow the BRT system to function more efficiently and reliably, giving BRT riders more assurance of travel times to and within the environmental justice study area. Travel routes may change slightly within the environmental justice study area as BRT stops would be spaced differently than bus stops under the existing conditions. Headways between BRT buses between Downtown and Oakland would be short, ranging from about 3 minutes (AM and PM peak period) to about 7 minutes (late night and early morning), minimizing wait time.	There is a transit travel time and reliability benefit riders and beneficial impacts are anticipated.

Table 10. Summary of Impacts to environmental justice Populations (continued)

Resource	Direct Project Impacts	Impacts to environmental justice Populations
Transit: Station Spacing	Along the BRT Core and routes east of the BRT Core, some degree of stop consolidation would occur, with BRT stops spaced approximately 1/3-mile apart in the Core (Downtown, Uptown and Oakland), and approximately 1/4-mile apart in Squirrel Hill and Highland Park. Currently, bus stops are generally spaced approximately 1/6-mile apart in these areas. This consolidation may require riders to walk further, generally no more than about one to two additional blocks, to reach a BRT station. By consolidating stops, transit travel times would decrease (as opposed to lengthening under the No Build Alternative) and service would become more reliable.	No adverse impacts on bus riders is expected as a result of the proposed transit station spacing.
Bicycle and Pedestrian Facilities	The proposed project would not remove current bicycle and pedestrian facilities, so no adverse impacts would occur. The project team is considering ways to expand and improve bicycle and pedestrian connectivity through concepts such as dedicated bicycle lanes. These elements would be determined during final design.	Overall this would result in a beneficial impact for bicycle riders and pedestrians.
Air Quality	The proposed project would include the use of 25 new battery-electric buses (BEBs) and rebranded diesel buses at commencement of service. The proposed project is also expected to improve travel times and reduce vehicle miles traveled. Overall, the proposed project would have no adverse impacts and offers some benefit air quality by reducing energy consumption and polluting emissions.	No adverse impacts

Table 10. Summary of Impacts to environmental justice Populations (continued)

Resource	Direct Project Impacts	Impacts to environmental justice Populations
Energy	The proposed project would result in regional benefits related to reduced energy consumption, as vehicle miles traveled (VMT) would decrease. The Build Alternative would cause VMT to decrease by 12.6 percent, thereby decreasing transportation-related energy consumption.	No adverse impacts.
Floodplains, Water Quality, Navigable Waterways and Coastal Zones	The proposed alignment is located almost entirely within current right-of-way on existing roadways and would not affect surface contours. The addition of impervious surfaces would be minimal and would not affect base flood elevations. Therefore, no adverse impacts to floodplains would be anticipated. The stormwater runoff volume would not increase or add to the existing FEMA Special Flood Hazard Areas. Water quality would not be adversely affected. The proposed project would not increase flooding along the Allegheny, Monongahela, or Ohio River corridors. This proposed project would also avoid any wetlands or marsh areas.	There would be no impacts to navigable waters or coastal zones.
Geology and Soils	This proposed project is in an area with no unique seismic conditions, and there would be no disturbance to native soils. Seismic design requirements would be followed for applicable structures.	No adverse impacts to soils and geology would be anticipated.

Table 10. Summary of Impacts to environmental justice Populations (continued)

Resource	Direct Project Impacts	Impacts to environmental justice Populations
Hazardous Materials	Any potential disturbance of known hazardous materials sites in the environmental justice study area would be determined during final design. However, PAAC would develop construction plans that specify procedures, including best management practices, to be employed for construction of the project. The plans would include direction for spill prevention, control, and countermeasure plans, temporary erosion and sedimentation control plans, and plans for handling and disposal of known and unanticipated contamination. PAAC would also develop a site-specific Health and Safety Plan describing monitoring requirements and the use of personal protective equipment. The removal and disposal of any contaminated soils would be a benefit for those sites potentially disturbed by the proposed project. These are sites that, without the proposed project, may or may not have been cleaned up otherwise.	Overall, there would be no adverse impacts as a result of managing the potential identification and remediation of contaminated materials.
Historic and Cultural Resources	The proposed project would have no adverse effect on historic resources identified within this proposed project's Area of Potential Effect (APE). This includes those cultural resources that have been listed in or determined eligible for listing in the National Register of Historic Places (NRHP).	No adverse impacts
Threatened and Endangered Species	The proposed project is in a built-up urban environment and proposed improvements are consistent with ongoing activities in the corridor.	There would be no adverse impacts to threatened and endangered species.
Noise	The maximum noise exposure levels during operation of the BRT system would be below the minimum FTA Moderate Impact threshold.	No adverse noise impacts are anticipated from operation of the proposed project.

Table 10. Summary of Impacts to environmental justice Populations (continued)

Resource	Direct Project Impacts	Impacts to environmental justice Populations
Vibration	Projected vibration levels would remain below the 72 VdB and 75 VdB impact thresholds applied to Category 2 and 3 land uses, respectively (Section 13 Vibration). BRT buses are supported by rubber tires and suspension systems, which provide vibration isolation, ensuring little vibration is transmitted into the ground.	No adverse vibration impacts would occur.
Property Acquisition and Displacements	The PAAC would comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 as amended. The proposed project would be constructed mostly within existing rights-of-way, with only minor sliver acquisitions along the front of some parcels and only one full acquisition of an existing parking lot. No residents or businesses would be displaced, and there would be no adverse impact from property acquisitions.	No adverse impacts
Parklands and Recreational Areas	All activities related to the proposed project during operation would result in no temporary or permanent effects on any parklands or recreational areas.	No adverse impacts
Visual Quality/ Aesthetics	The proposed project is not expected to change the visual character of the existing urban corridor, and the proposed project would be consistent with current land use plans. Modifications to the visual environment would result from new BRT shelters and changes to the roadway in the form of new pavement markings, updated signage, new and improved pedestrian crossing, protected bicycle facilities, and updated traffic signals.	There would be no adverse impacts to visual quality or aesthetics.

7.3.3. Indirect and Cumulative Impacts

Please refer to Section 20 Indirect and Cumulative Impacts of the CE document for this analysis.

7.3.4. Environmental Justice Determination – Comparison of Burdens and Impacts

As documented in Section 7.2, the majority of the study area includes Census Block Groups with higher concentrations environmental justice populations. Therefore, impacts of the Project would be disproportionately borne by environmental justice populations. Accordingly, the analysis focused on whether such effects would be disproportionately high and adverse to environmental justice populations.

Environmental justice populations within the BRT Core, particularly the Uptown area, Diamond Street, Boyd Street, and the Oakland Area, could experience a higher degree of construction impacts versus those east of the BRT Core. The neighborhoods of Crawford Roberts, Terrace Village, Upper Hill, North Oakland, and West Oakland, have higher concentrations of environmental justice populations and would be within areas experiencing a higher degree of construction related impacts than other areas of the project corridor, particularly West Oakland and the southern edge of Crawford Roberts. However, construction impacts to the rest of Crawford Roberts and to Terrace Village and North Oakland would be minimal as these neighborhoods are sufficiently removed from the sections of the corridor where major construction would occur. Another neighborhood in which construction would occur is the Bluff (located east of Downtown Pittsburgh and south of Crawford Roberts). Constructed related effects, including noise, traffic, air quality, and visual effects, would vary depending on the level and intensity of construction, which could include complete road reconstruction, partial reconstruction, mill & overlay, or simply just signing & pavement markings. Residents within West Oakland could have the greatest potential for proximity effects from construction staging and partial or full road reconstruction. The overall construction timeframe is 18 months and because of the linear nature of the project, impacts would not be expected in any single area for the entire duration of construction as the project would be constructed in segments. Staging or construction laydown areas could last for the entire duration of construction depending on contractor needs and access. Proximity effects from construction could be lower for those within Upper Hill given its boundaries are at the edge of the study corridor area.

Within the Downtown Area of the BRT Core, which is inclusive of the Central Business District from Figure 12, construction would be limited to minor traffic signal upgrades, changes in signing and pave marking, and station construction. Potential construction related effects on environmental justice populations within the Downtown Area would be minor and the overall concentration of environmental justice populations in this neighborhood are relatively low.

East of the BRT Core, the proposed project would consist primarily of improved BRT operations on existing streets with primarily signal and stop improvements and environmental justice populations would experience only minor impacts from construction. Higher environmental justice concentrated areas east of the BRT Core such as Larimer, Hazelwood, Squirrel Hill North, and East Liberty would have minimal construction.

As documented in Table 10, no long-term operational adverse effects of the Project are expected; therefore, the Project would have no long-term disproportionate adverse effects to environmental justice populations. The proposed project would be consistent with existing land use plans, and would not displace any residents or businesses, perceptibly increase existing noise levels along the corridor or decrease the existing air quality. There would be no adverse effects to natural resources, historic or cultural resources or visual quality. Riders may need to walk slightly farther (approximately one to two blocks) in the BRT Core and east of the BRT Core to reach a BRT stop; however, all riders would experience this change, regardless of race and/or poverty status. Stop

Following the implementation of avoidance, minimization, and/or mitigation measures (see **Chapter 21**), the Project could still result in some adverse effects (noise, traffic, air quality, visual, and access to neighborhoods, local businesses, and commercial facilities) during construction. Short-term traffic impacts would include temporary closures of sidewalk or travel lanes with pedestrian detours or alternate paths around work areas. The minimization and mitigation measures for construction would be applied similarly in both environmental justice communities and non-environmental justice communities.

When considering the overall construction impacts of the Project, they could be experienced in greater magnitude to environmental justice vs non-environmental justice populations. However, the environmental justice communities along the corridor would also experience long-term beneficial effects of the project. This includes improved transit service, enhanced neighborhood access and mobility, and better transit reliability and connectivity between residential areas, community facilities, employment centers, and local businesses. These transit access and mobility enhancements in environmental justice communities would offset the adverse effects of construction that would occur. Other benefits include lower VMT, potential improvement to air quality, and energy consumption. The proposed project's transit improvements, such as improved transit reliability and improved accessibility, would benefit all users, but particularly those who are low-income and more likely to be transit-dependent. Low-income workers are also more likely to be shift workers who would benefit from improved transit reliability.

Taking all of these factors, including minimization and mitigations measures, into account and offsetting benefits, the Project would not have disproportionately high and adverse effects on environmental justice populations. Therefore, there would be no disproportionately high and adverse human health or environmental effects on minority and low-income populations.

8. Floodplains, Water Quality, Navigable Waterways and Coastal Zones

8.1. FLOODPLAINS

The Downtown portion of the area of the proposed project is within the FEMA-designated 100-year floodplain.

As Figure 15 shows, the Liberty-Market Station and the Wood Station are immediately adjacent to the FEMA-designated 100-year floodplain. These are the only stations included as part of this proposed project that are within the floodplain. No impacts on floodplains are anticipated. The proposed alignment is located almost entirely within current right-of-way on existing roadways and would not affect surface contours. The addition of impervious surfaces due to new construction would be minimal and would not affect base flood elevations.

8.2. WATER QUALITY

Bus shelters are proposed throughout this proposed project's corridor in the existing transportation right-of-way. The stormwater runoff volume would not increase and water quality would not be adversely affected with there would be no net increase in impervious surfaces.

This proposed project would not have a negative impact or increase flooding along the Allegheny, Monongahela, or Ohio Rivers' corridors. This proposed project would be located in an urban area that is fully developed and mostly impervious. Adding the proposed improvements would not increase stormwater runoff volume or add to the existing FEMA SFHA. This proposed project would also avoid any wetlands or marsh areas.

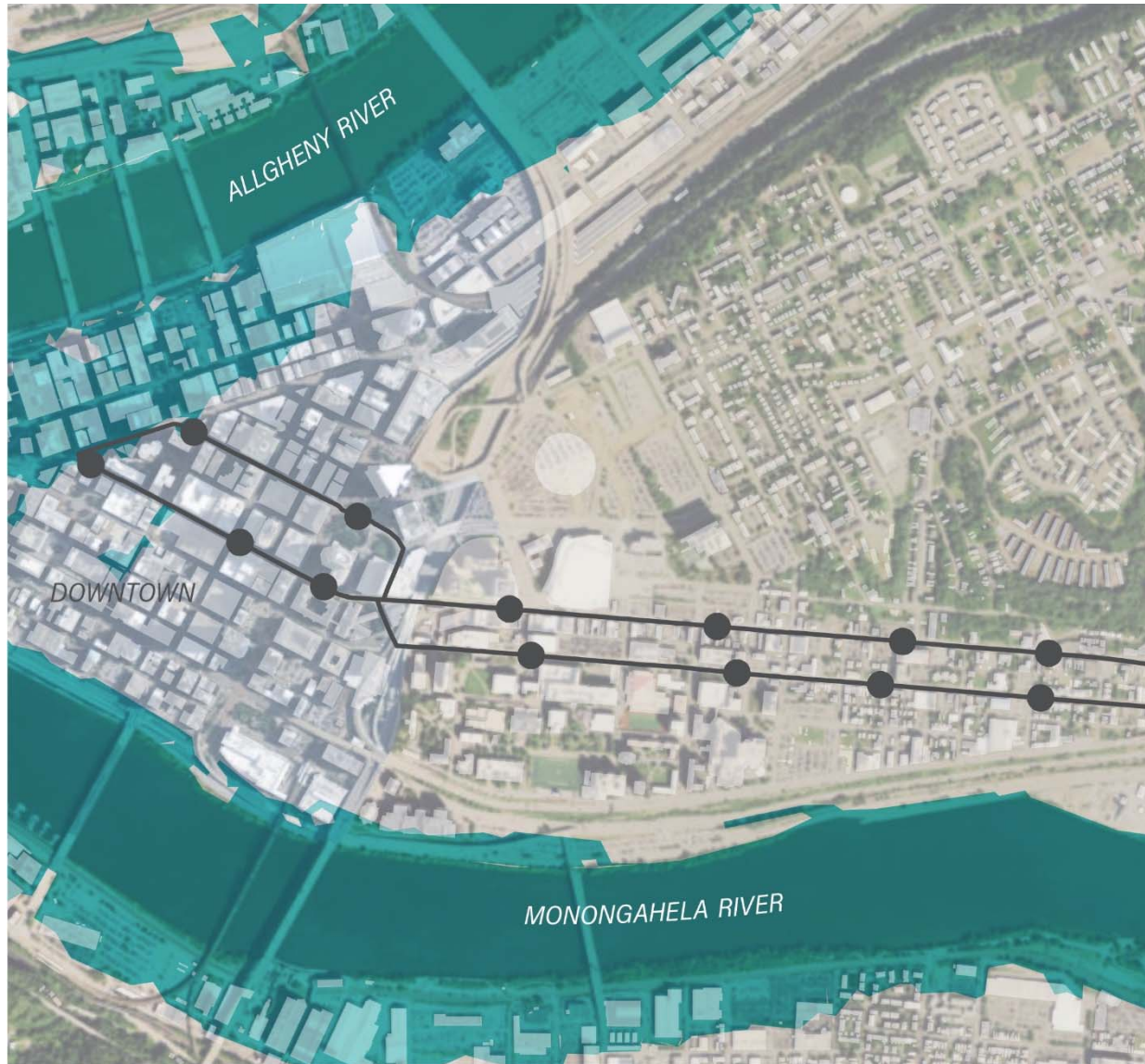
8.3. NAVIGABLE WATERWAYS

This proposed project would result in no impacts to navigable waterways and would not involve the construction of any dams, dikes, or piers. None of this proposed project would be constructed over or excavated under any navigable waterways. No disposal of materials into navigable waterways is assumed.

8.4. COASTAL ZONES

The coastal zone for Pennsylvania is defined by the Pennsylvania Department of Environmental Protection (Pennsylvania DEP) as the "area where the land meets the sea and includes both coastal waters and adjacent shorelands." The coastal zone management locations with the Commonwealth are limited to counties along the Delaware River Estuary (Delaware County, Philadelphia County, and Bucks County) and along Lake Erie (Erie County). The proposed project corridor is not included within the coastal zone boundaries designed by Pennsylvania DEP; therefore, no impacts to coastal zones would occur.

Figure 15. Floodplains (Core: Downtown)

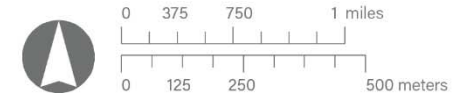


Project Maps
Core: Downtown

- Build Alternative: Route
- Build Alternative: Proposed Stations

Floodplain

- 100-Year Floodplain



9. Geology and Soils

This proposed project is located in an area with no unique seismic conditions. The area proposed for the BRT falls within the existing roadways' rights-of-way, which are existing developed urban land where most of the ground surface is paved or developed. Based on these existing conditions and the known geology of the site, the improvements necessary for the proposed BRT are not expected to result in disturbance to native soils.

Seismicity in the Pittsburgh area is relatively low, with only five earthquakes recorded within a 50-mile radius of the city since 1824, ranging in magnitude from 2.6 to 4.1.¹⁶ As such, seismicity is not expected to affect the proposed BRT, and seismic design requirements would be followed for applicable structures.

¹⁶ Faili, R. T., Miles, C. E., and O'Neill, C. E., *Earthquake Epicenters in and Near Pennsylvania*, Pennsylvania Bureau of Topographic and Geologic Survey, Department of Conservation & Natural Resources, Map 69, 1 sheet, 2004.

10. Hazardous Materials

The potential for hazardous materials contamination within this area of the proposed project was evaluated based upon a review of federal, state, and local environmental databases. These searched records include sites on the EPA's National Priority List (otherwise known as "Superfund Sites"), as well as sites that have hazardous waste generator identification numbers, open dump sites, sites with leaking underground storage tanks, sites having mining permits, sites having state or federal permits, sites having had regulatory compliance inspections, and other environmental record databases. The analysis focused on high priority database listings, evaluated as having the highest potential to impact the corridor of the proposed project.

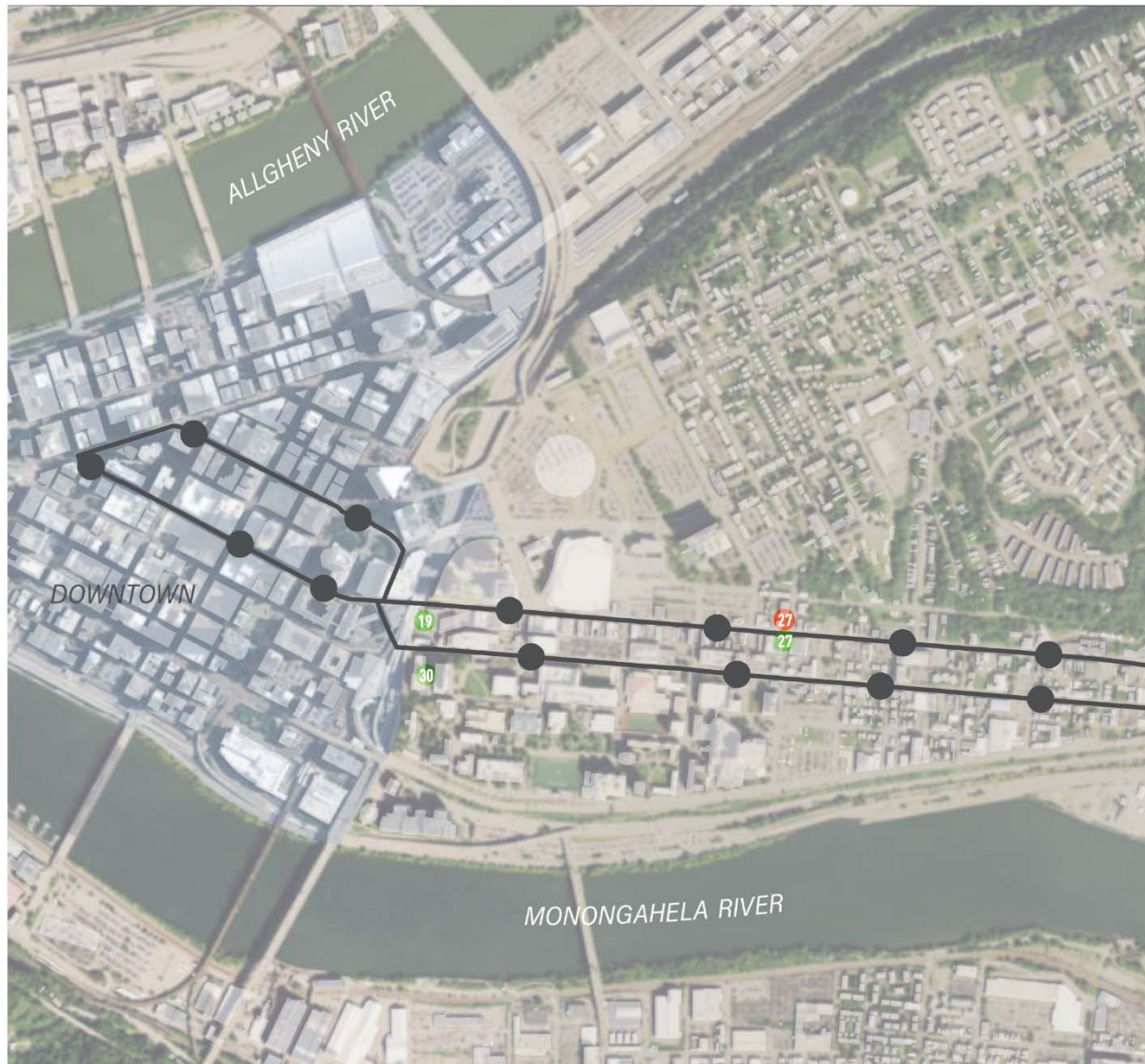
The database analysis identified 17 sites within the area of the proposed project on "high priority" federal and state database records (Figures 24–26). In some cases, multiple sites were identified at the same location. The figures indicate three levels of contamination:

- Sites that are not considered potential environmental contamination concerns due to the current regulatory status of "Cleanup Completed" for past petroleum releases. However, further review during final design may be warranted as adequate due diligence and best management practices to evaluate potential impacts to this proposed project.
- Sites that are considered potential environmental contamination concerns due to uncertain status of existing or former underground storage tanks and/or above ground storage tanks. Further review during final design may be warranted as adequate due diligence and best management practices to evaluate the current tank status and potential impacts to this proposed project.
- Sites that are considered to represent potential environmental contamination concerns due to unknown or open regulatory status, or open remedial measures/case closures. Further review during final design may be warranted as adequate due diligence and best management practices.

The last category applies to the following two sites:

- **Map Locator #8: Unknown Site, 5th Avenue and Ruskin Avenue** – ERNS Database: 25 gallons of hydraulic fluid released from a ruptured line on a trash truck that went onto the asphalt and water drain, affecting water source in July 2016. Current cleanup status is unknown. Based on the database listing, this facility is considered a potential environmental contamination concern; further review during final design may be warranted to evaluate possible soil impacts and as adequate due diligence and best management practices if excavation of soil is anticipated at this location.
- **Map Locator #27: Columbia Architectural Metals Co., 1830 Forbes Avenue** – PA Leaking Underground Storage Tank Database: An underground storage tank containing petroleum product had a release on July 31, 1995 that affected groundwater, and as of January 13, 2011, the facility has an "Interim or Remedial Actions Initiated" status with no case closures. Based on the database listing, this facility is considered a potential environmental contamination concern; further review during final design may be warranted to evaluate the current remedial status as adequate due diligence and best management practices if excavation of soil is anticipated at this location.

Figure 16. HazMat: Facilities within the Area of the Proposed Project (Core: Downtown)



Project Maps
Core: Downtown

- Build Alternative: Route
- Build Alternative: Proposed Stations

Hazmat: Environmental Regulatory Database Review, Facilities within the Project Area

- Cleanup Completed
- Uncertain status of existing or former USTs and/or ASTs
- Unknown or open regulatory status, or open remedial measures/case closures
- 19 Three Mellon Bank
Duquesne Strip/Monessen Dock
Pittsburgh Water and Sewer Authority
Westin WM Penn Hotel
PNC Call Center
Henry W. Oliver Building/Mid-East
Oil Co-Reynoldsville
Elrama Fly Ash Disposal Area
Fisher Scientific Co
Central Blood Bank
Team Rent-a-Car of PGH DBA Budget
- 27 Columbia Architectural Metals Co.
- 27 Brunos Service Center
Unknown Facility (1658 Forbes Ave)
Randall Industries
Milfred Company
- 30 Duquesne University

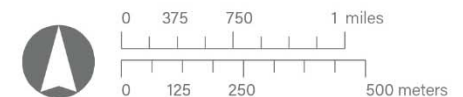
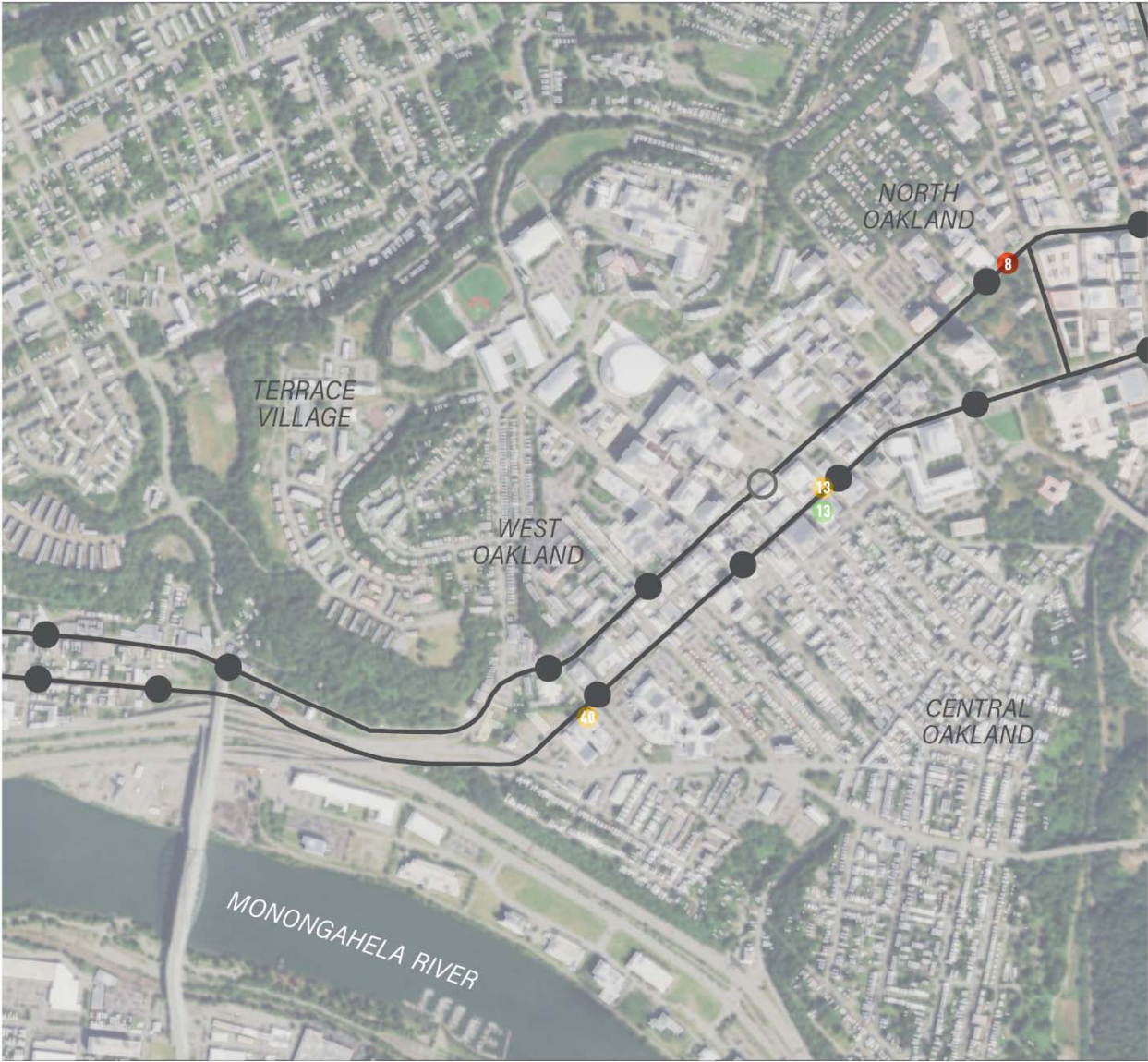


Figure 17. HazMat: Facilities within the Area of the Proposed Project (Core: Oakland)



Project Maps
Core: Oakland

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

Hazmat: Environmental Regulatory Database Review, Facilities within the Project Area

- Cleanup Completed
- Uncertain status of existing or former USTs and/or ASTs
- Unknown or open regulatory status, or open remedial measures/case closures
- 8 Unknown Facility, 5th Ave & Ruskin Rd
- 13 Pittsburgh Wyndham Gardens
Falk Clinic
Children's Hospital
Medical Arts Building
Fisher Scientific
Central Blood Bank
Westin WM Penn Hotel
Magee Women's Hospital
- 13 Wilson Building
Exxon Ras #26936/Forbes Exxon No 219
Montefiore Hospital
New Iroquois Building
- 40 Magee Womens Hospital Research Institute

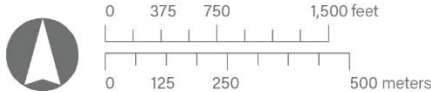
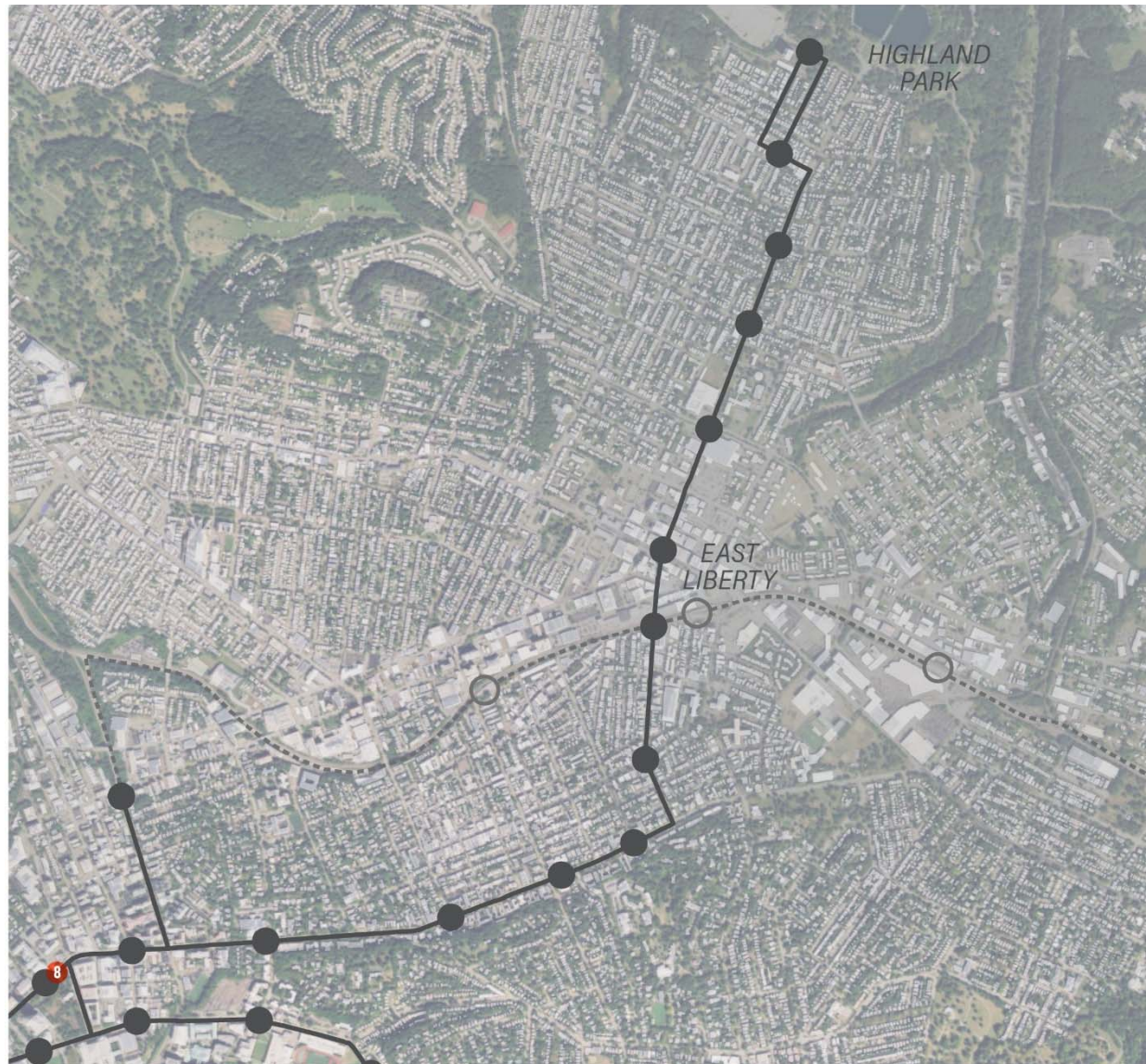


Figure 18. HazMat: Facilities within the Area of the Proposed Project (Highland Park)

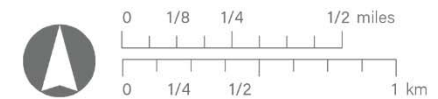


Project Maps
Branch: Highland Park

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

Hazmat: Environmental Regulatory Database Review, Facilities within the Project Area

- Cleanup Completed
- Uncertain status of existing or former USTs and/or ASTs
- Unknown or open regulatory status, or open remedial measures/case closures
- 8 Unknown Facility, 5th Ave & Ruskin Rd



11. Historic and Cultural Resources

The proposed project would have “no adverse effect” on historic resources listed in or determined eligible for listing in the National Register of Historic Places (NRHP) within the Area of Potential Effect (APE). No archaeological resources are located within the current APE, which included a 1,000 foot study area.

A historical and architectural field survey was conducted in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. Full details of the architectural survey and eligibility and effects findings are found in the Appendix. The APE included a 50-foot buffer around proposed bus station and shelter locations to identify the potential for direct effects, as well as properties immediately across the roadway to identify potential indirect effects. The survey resulted in the documentation of 38 extant, previously recorded architectural resources and the identification of 97 previously unrecorded historical and architectural resources. Of the 135 architectural and historical resources located within the APE, 10 are listed on the NRHP, three are previously determined eligible for NRHP listing, and 27 are recommended as eligible for NRHP listing. Four of the NRHP-listed/eligible resources are historic districts in addition to the presence of one National Historic Landmark. The remaining 95 resources have been previously determined ineligible for NRHP listing, or are recommended as not eligible for NRHP listing due to a lack of historic integrity and/or significance.

The effects were assessed for each NRHP-eligible/listed resource, as well as each resource recommended as NRHP eligible to determine if this proposed project would potentially adversely affect historic properties. There would be no adverse direct effects to any of the NRHP-listed, –eligible, or recommended-eligible resources. There would also be no adverse indirect effects, such as noise and vibration or visual effects, as a result of this proposed project. While visual elements, such as new stations, would be introduced, these elements would not adversely affect the NRHP-listed, –eligible, or recommended-eligible resources. The potential for visual impacts on historic resources would be limited since this proposed project would use existing transportation facilities. Apart from road reconstruction, new infrastructure would primarily consist of new stations and shelters. Accordingly, the proposed project is not expected to disturb or alter any of the characteristics that qualify the identified resources for inclusion in the NRHP.

In December 2013, during the Alternatives Analysis phase of planning for the proposed project, consultation was initiated with SHPO/the Pennsylvania Historic and Museum Commission (PHMC). In a conference call, the general scope of the proposed project was discussed, and PHMC outlined expectations and requirements for review of architectural and archaeological resources. In January 2015, the Port Authority of Allegheny County submitted a letter to PHMC transmitting a preliminary mapping of the APE and map overlays showing the area of the proposed project in relation to developed areas. On March 30, 2015, the PHMC provided agreement on the proposed APE, identified the need for further review of historic properties, and approved the area for a Phase 1a archaeological investigation.

Formal Section 106 consultation was initiated by FTA in September 2015 with a letter to potential consulting parties, including PHMC, nine historic and preservation societies identified with potential interest in the study area, and 15 Native American tribes or nations with historic connections to the study area.

On October 21, 2015 FTA submitted the Phase 1a archaeological report to the consulting parties for review in accordance with Section 106. On December 8, 2015, PHMC responded with concurrence with the recommendations of the Phase 1a report and identifying the need for a Phase 1b investigation in certain areas.

Subsequent to that time, planning and engineering for the proposed project continued to advance, and in response to changes in the footprint of the proposed project, a revised APE was submitted to PHMC in November 2017 for concurrence.

On March 6, 2018, FTA updated the consulting parties on changes to the definition of the proposed project, and transmitted an Addendum to the Phase 1a Archaeological Report, documenting the potential for impacts in the extended areas of the APE, as well as the Historic Resources Eligibility and Effects report.

On March 26, 2018, the PHMC, responded to FTA with their concurrence that the proposed project would not have an adverse impact on the identified historic resources, eligible historic resources, contributing resources, and that the proposed project would have no effect on other historic properties within the APE.

On May 4, 2018, SHPO sent a letter agreeing to the recommendations of the Addendum to the Phase 1a Report, noting that in their opinion no further archeological work is necessary for the proposed project.

12. Threatened and Endangered Species

The potential presence of Threatened and Endangered Species or Species of Concern was determined through a Pennsylvania Natural Diversity Inventory (PNDI) analysis. The PNDI process screens for species protected by the Pennsylvania Game Commission (PGC), the Pennsylvania Fish and Boat Commission, and the Pennsylvania Department of Conservation and Natural Resources (DCNR).

The PGC confirmed the presence of the Peregrine Falcon (*falco peregrinus*) within limits of the proposed project. PGC has determined that no further coordination is required on this resource. Correspondence from the Pennsylvania Game Commission confirming this determination is included in the Appendix.

In addition to the Peregrine Falcon, the Pennsylvania DCNR identified two other species in the PNDI within the limits of the proposed project: red-fruited hawthorn (*crataegus pennsylvanica* - Threatened) and the common hop-tree (*ptelea trifoliata* - Threatened). No tree removal is proposed as part of this proposed project; therefore, no impacts are anticipated to these listed species. The proposed project is located in an already built-up urban environment and improvements proposed as part of this proposed project are consistent with ongoing activities in the corridor; as such, impacts are anticipated to be limited due to existing disturbance.

The proposed project does not assume the removal of any trees or potential habitat for this species.

13. Noise

13.1. TRANSIT NOISE EXPOSURE

Based on a review of the land uses within the study area limits, a total of 29 noise-sensitive receptor sites were identified within the BRT Core portion of the corridor. In addition, 18 additional representative noise sensitive properties were identified along the proposed Squirrel Hill and Highland Park routes. The ten receptor sites evaluated along the Highland Park route are identified with a “H” prefix and the eight sites along the Squirrel Hill route with a “S” prefix. Therefore, a total of 47 properties were evaluated for transit noise exposure against the FTA impact criteria. Figure 19 through Figure 21 depict the representative sensitive receptor sites identified along the proposed BRT corridor. Existing day-night (Ldn) noise levels were determined at properties involving places where people sleep (FTA Category 2). Estimates of the peak-hour equivalent noise level (Leq) were determined for several other sites that are limited to daytime use. These daytime limited-use sites are shown with an asterisk in the summary tables.

A summary of the estimated noise exposure from daily weekday BRT transit service operations along the BRT Core, Highland Park, and Squirrel Hill routes are provided in Table 11. The findings indicate that future noise exposure from daily BRT service operations would remain below the FTA Impact Moderate impact threshold at all Category 2 and 3 land uses. The highest absolute day-night noise level projected within the study area of 54 dBA would occur near the Morewood Avenue at Fifth Avenue bus station area adjacent to site R14, where higher bus travel speeds are expected to result in higher noise exposure at nearby residential properties. However, the estimated 54 dBA worst-case noise exposure condition at site R14, is approximately 10 decibels below the FTA Moderate Impact threshold. Therefore, the noise generated from daily BRT service operations would not result in any increase to existing background noise levels and thus would not be perceptible to nearby listeners nor cause annoyance to those living in the area. In addition to the BRT Core area, noise level estimates along the two proposed Highland Park and Squirrel Hill routes were determined assuming diesel BRT vehicles would operate within these routes. The FTA based diesel bus noise emissions are higher than comparable electric bus emission levels and despite these louder buses, the projected noise exposure along the two routes would remain at least 10 decibels below the FTA Moderate impact threshold. Thus, the resultant overall effect is a small imperceptible net increase in noise levels along the Squirrel Hill and Highland Park routes, but both would remain below the FTA Moderate impact thresholds.

Therefore, throughout the BRT operating corridor of the proposed project, the maximum BRT noise-exposure generated by the proposed project is expected to remain below the FTA Severe Impact threshold that would require mitigation consideration and thus because of these findings, no mitigation measures are necessary. The procedures utilized for the Noise analysis is based on the FTA general assessment guidelines contained within Chapter 10 of FTA’s *Transit Noise and Vibration Impact Assessment* manual (May 2006).

Table 11 Comparison of Estimated Transit Noise-Exposure Levels versus FTA Impact Criteria for Proposed Pittsburgh BRT

Site #	Receptor Site Description	FTA Land Use Category	Existing Noise Level L _{dn} (dBA)	FTA Impact Threshold Levels		Projected BRT Noise Exposure from Service Line Operations L _{dn} (dBA)	FTA Impact Determination
				Moderate L _{dn} (dBA)	Severe L _{dn} (dBA)		
R1	Apartment at Macy's	Cat. 2	70	65-69	>69	41	No Impact
R1A	Multi-family Apartment Building at 313 6th Ave	Cat. 2	70	65-69	>69	42	No Impact
R2	Multi-family Apartment Building (Regional Enterprise Tower)	Cat. 2	71	66-70	>70	45	No Impact
R3*	Duquesne University at 718 5th Ave	Cat. 3	70*	70-74*	>74*	41*	No Impact
R3B	Outdoor student seating area	Cat. 3	71*	71-75*	>75*	41*	No Impact
R4	Mixed use multi-story at 1509 5th Ave	Cat. 2	70	65-69	>69	42	No Impact
R4A	Apartment building (Flats on Fifth Ave)	Cat. 2	70	65-69	>69	43	No Impact
R4B	Residence at 13 Marion Street	Cat. 2	70	65-69	>69	42	No Impact
R5	Apartment Building at 1800 5th Ave	Cat. 2	70	65-69	>69	43	No Impact
R5B	Residential at 1726 Forbes Ave	Cat. 2	70	65-69	>69	43	No Impact
R6	2-story Residential building at 2018 5th Ave	Cat. 2	70	65-69	>69	41	No Impact
R6B	Residence 2012 Forbes Ave	Cat. 2	70	65-69	>69	46	No Impact
R7	2-story Residential building at 2327 5th Ave	Cat. 2	70	65-69	>69	45	No Impact
R7B	Residential at 2135 Forbes Avenue	Cat. 2	70	65-69	>69	45	No Impact
R8	Multi-family Apartment Building at 2633 5th Ave	Cat. 2	69	64-69	>69	45	No Impact
R9*	Oakland Dialysis Medical	Cat. 3	72*	71-76*	>76*	46*	No Impact
R9B*	Carlow University Chapel at 3221 5th Ave	Cat. 3	72*	71-76*	>76*	46*	No Impact
R10	Skyvue Apartment Building at 333 Forbes Ave	Cat. 2	69	64-69	>69	41	No Impact

Table 11 Comparison of Estimated Transit Noise-Exposure Levels versus FTA Impact Criteria for Proposed Pittsburgh BRT (continued)

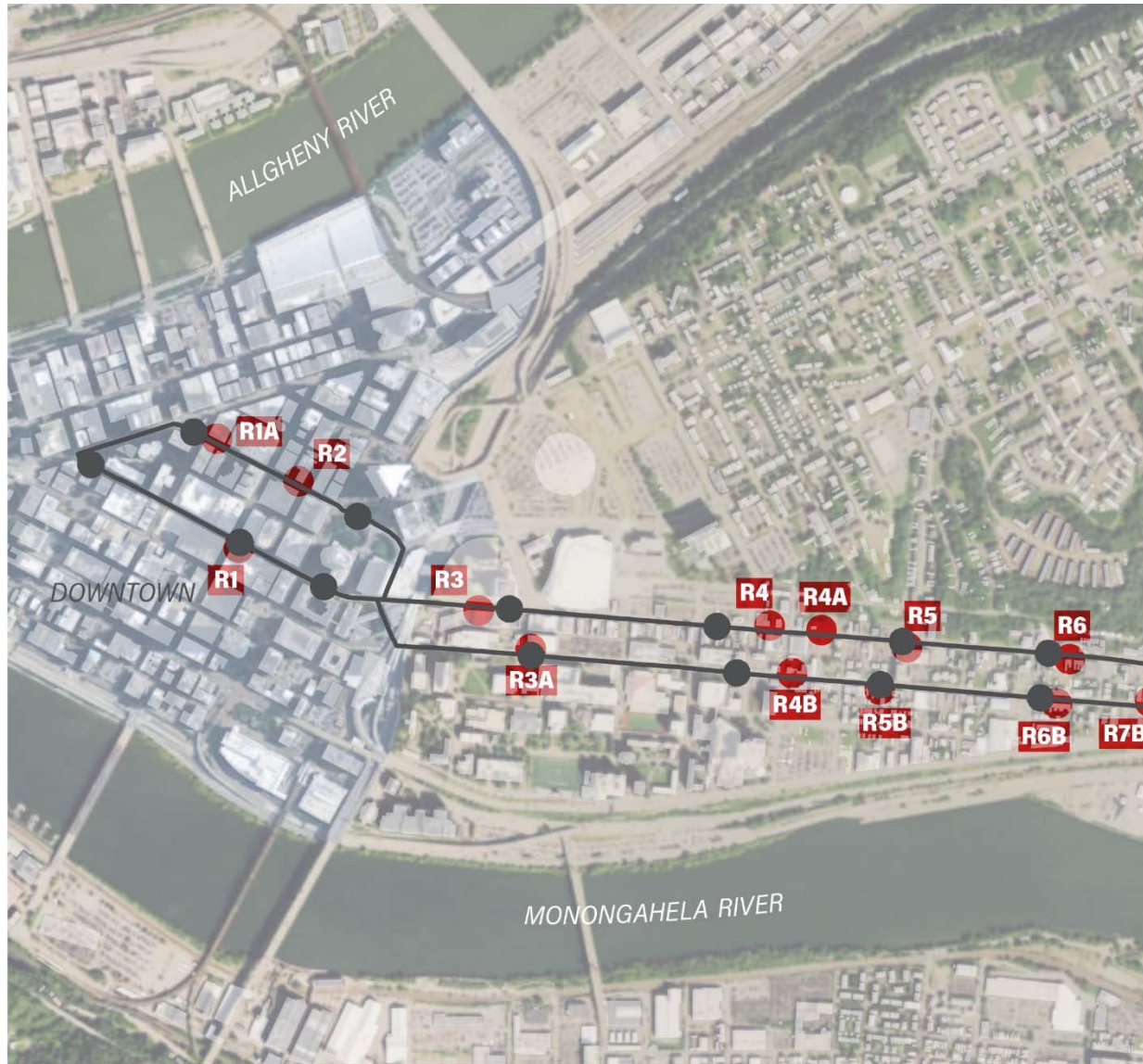
Site #	Receptor Site Description	FTA Land Use Category	Existing Noise Level L _{dn} (dBA)	FTA Impact Threshold Levels		Projected BRT Noise Exposure from Service Line Operations L _{dn} (dBA)	FTA Impact Determination
				Moderate L _{dn} (dBA)	Severe L _{dn} (dBA)		
R10B	Multi-family Apartment Building at 3401 Forbes Ave	Cat. 2	70	65-69	>69	43	No Impact
R11	Mixed use multi-story at 3610 5th Ave	Cat. 2	69	64-69	>69	43	No Impact
R11B	University of Pittsburgh Student Housing (Forbes Hall)	Cat. 2	70	65-69	>69	45	No Impact
R12*	Bellfield Presbyterian Church at 3959 5th Ave	Cat. 3	69*	69-74*	>74*	37*	No Impact
R12B*	Hillman Library	Cat. 3	68*	68-73*	>73*	37*	No Impact
R13	Multi-story residential apartment	Cat. 2	68	63-68	>68	36	No Impact
R13B*	Heinz Memorial Chapel	Cat. 3	69*	69-74*	>74*	41*	No Impact
R14	Residential at 4914 5th Ave	Cat. 2	69	64-69	>69	54	No Impact
R14B	Student Housing at 4531 Forbes Ave	Cat. 2	69	64-69	>69	41	No Impact
R15	Student Housing at 5035 Forbes Ave	Cat. 2	70	65-69	>69	52	No Impact
R15B*	Heinz College at 4902 Forbes Ave	Cat. 3	69*	69-74*	>74*	40*	No Impact
H1	5125 Fifth Ave	Cat. 2	71	66-70	>70	51	No Impact
H2	5757 Fifth Ave	Cat. 2	67	63-67	>67	44	No Impact
H3	413 S Highland Ave	Cat. 2	70	65-69	>69	41	No Impact
H4	358 S Highland Ave	Cat. 2	70	65-69	>69	48	No Impact
H5	116 S Highland Ave	Cat. 3	71*	71-75*	>75*	38*	No Impact
H6	250 N Highland Ave	Cat. 3	69*	69-74*	>74*	34*	No Impact
H7	616 N Highland Ave	Cat. 2	65	61-66	>66	43	No Impact
H8	817 N Highland Ave	Cat. 2	69	64-69	>69	46	No Impact
H9	1218 N Highland Ave	Cat. 2	68	63-68	>68	45	No Impact
H10	5718 Callowhill St	Cat. 2	71	66-70	>70	51	No Impact

Table 11 Comparison of Estimated Transit Noise-Exposure Levels versus FTA Impact Criteria for Proposed Pittsburgh BRT (continued)

Site #	Receptor Site Description	FTA Land Use Category	Existing Noise Level	FTA Impact Threshold Levels		Projected BRT Noise Exposure from Service Line Operations	FTA Impact Determination
				Moderate	Severe		
			L _{dn} (dBA)	L _{dn} (dBA)	L _{dn} (dBA)	L _{dn} (dBA)	
S1	5109 Forbes Ave	Cat. 2	70	65-69	>69	43	No Impact
S2	5285 Forbes Ave	Cat. 2	69	64-69	>69	42	No Impact
S3	5456 Forbes Ave	Cat. 2	69	64-69	>69	42	No Impact
S4	5625 Forbes Ave	Cat. 2	70	65-69	>69	42	No Impact
S5	5738 Forbes Ave	Cat. 3	70*	70-74*	>74*	40*	No Impact
S6	2319 Murray Ave	Cat. 3	71*	71-75*	>75*	41*	No Impact
S7	4015 Murray Ave	Cat. 2	70	65-69	>69	44	No Impact
S8	4134 Murray Ave	Cat. 2	71	66-70	>70	45	No Impact

*Peak hour Leq (1hr) dBA noise level and impact criteria.

Figure 19. Noise and Vibration Receptor Assessment Locations (Core: Downtown)



Project Maps
Core: Downtown

- Build Alternative: Route
- Build Alternative: Proposed Stations

Noise and Vibration: Sensitive Receptors

- Noise/Vibration Receptor

- R1** Apartments at Macy's
- R1A** Multifamily Apartment Building at 313 6th Ave
- R2** Multifamily Apartment Building Regional Enterprise Tower
- R3** Duquesne University at 718 5th Ave
- R3A** Duquesne University Bookstore Outdoor student seating area
- R4** Mixed Use Multi-story Building at 1509 5th Ave
- R4A** Apartment building under construction Flats on Fifth
- R4B** Residence at 13 Marion St
- R5** Apartment Building at 1800 5th Ave
- R5B** Residence at 1726 Forbes Ave
- R6** Two-Story Residential Building at 2018 5th Ave
- R6B** Residence at 2012 Forbes Ave
- R7B** Residence at 2135 Forbes Ave

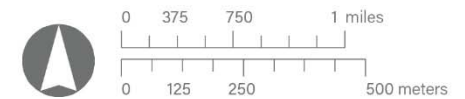
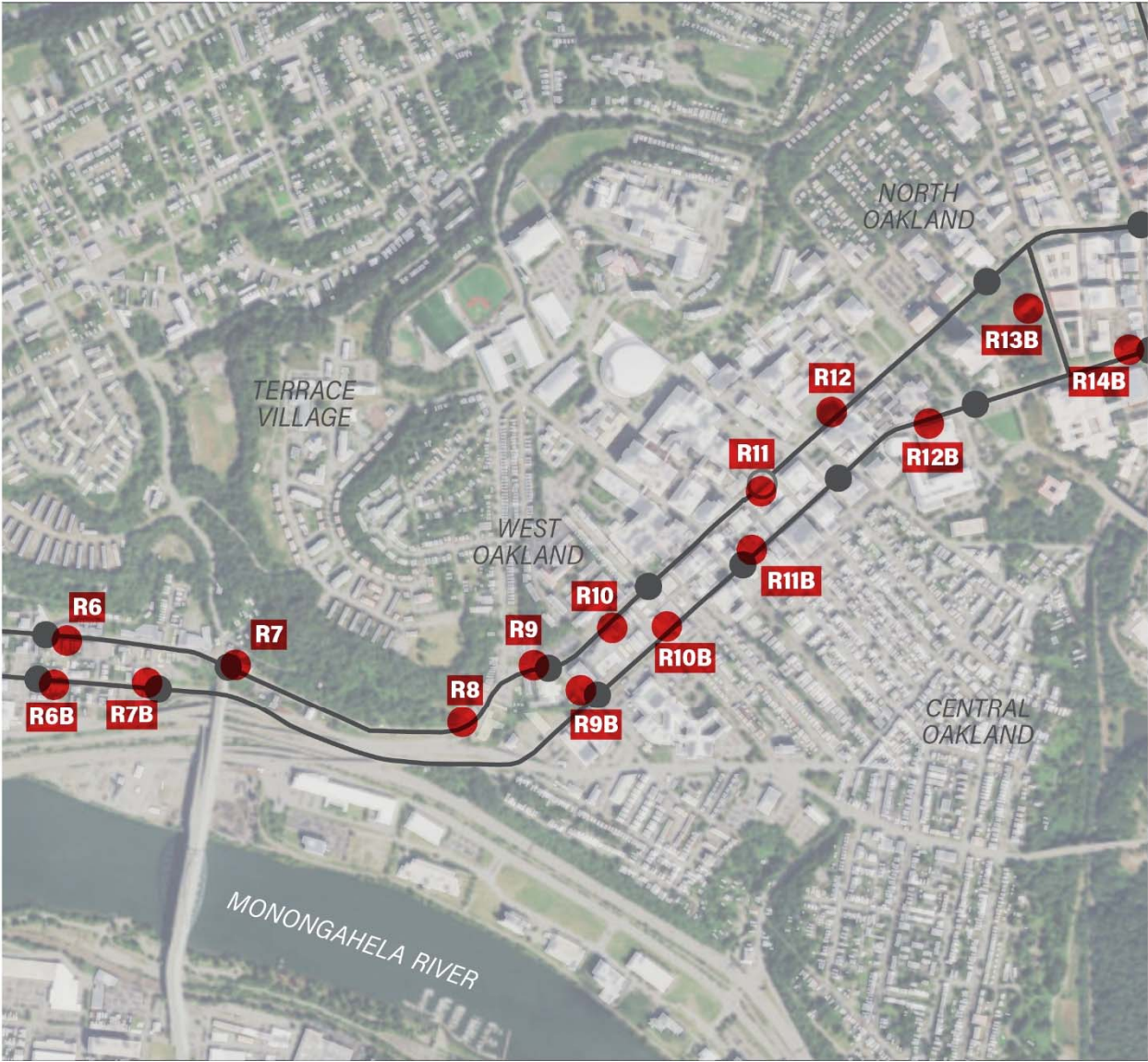


Figure 20. Noise and Vibration Receptor Assessment Locations (Core: Oakland)



Project Maps
Core: Oakland

- Build Alternative: Route
- Build Alternative: Proposed Stations
- Existing Facilities: Route
- Existing Facilities: Stations

Noise and Vibration: Sensitive Receptors

- Noise/Vibration Receptor
- R6** Two-Story Residential Building at 313 6th Ave
- R6B** Residence at 2012 Forbes Ave
- R7** Two-Story Residential Building at 2327 5th Ave
- R7B** Residence at 2135 Forbes Ave
- R8** Multifamily Apartment Building at 2633 5th Ave
- R9** Oakland Dialysis Medical
- R9B** Carlow University Chapel at 3221 5th Ave
- R10** Skyvue Apartment Building at 333 Forbes Ave
- R10B** Multifamily Apartment Building at 3401 Forbes Ave
- R11** Mixed use multistory at 3610 5th Ave
- R11B** University of Pittsburgh Student Housing Forbes Hall
- R12** Bellefield Presbyterian Church at 3959 5th Ave
- R12B** Hillman Library
- R13B** Heinz Memorial Chapel
- R14B** Student Housing at 4531 Forbes Ave

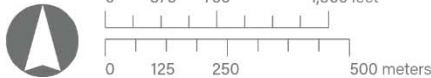
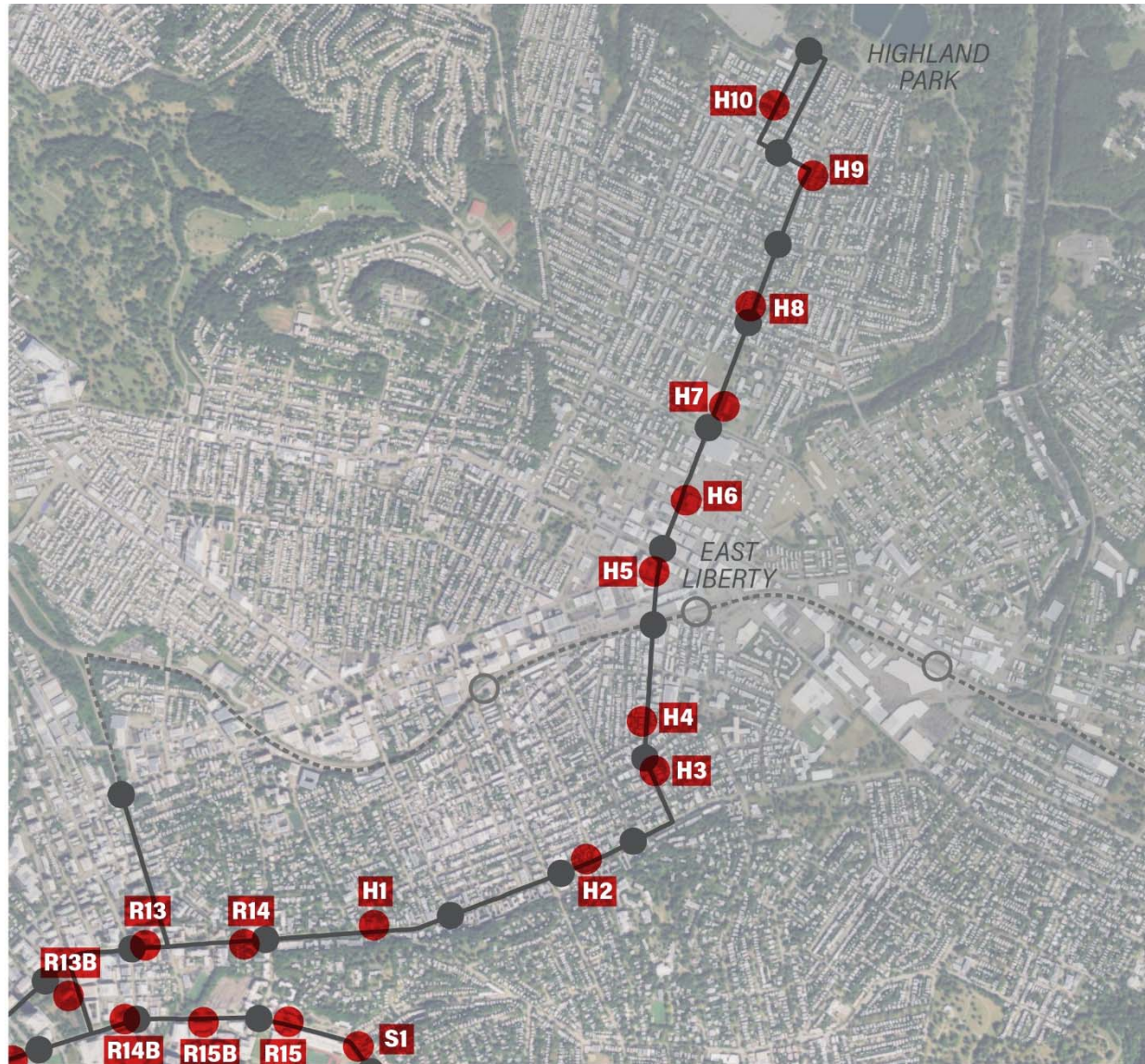


Figure 21. Noise and Vibration Receptor Assessment Locations (Highland Park)



Project Maps
Branch: Highland Park

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

Noise and Vibration: Sensitive Receptors

- Noise/Vibration Receptor
- R12B** Hillman Library
- R13B** Heinz Memorial Chapel
- R14** Residential at 4914 Fifth Avenue
- R14B** Student Housing at 4531 Forbes Ave
- R15** Student Housing at 5035 Forbes Ave
- R15B** Heinz College at 4092 Forbes Ave
- H1** 5125 Fifth Avenue
- H2** 5757 Fifth Avenue
- H3** 413 S Highland Avenue
- H4** 358 S Highland Avenue
- H5** 116 S Highland Avenue
- H6** 250 N Highland Avenue
- H7** 616 N Highland Avenue
- H8** 817 N Highland Avenue
- H9** 1218 N Highland Avenue
- H10** 5718 Callowhill Street
- S1** 5109 Forbes Avenue

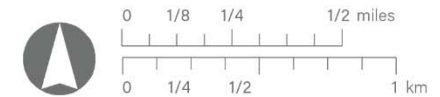
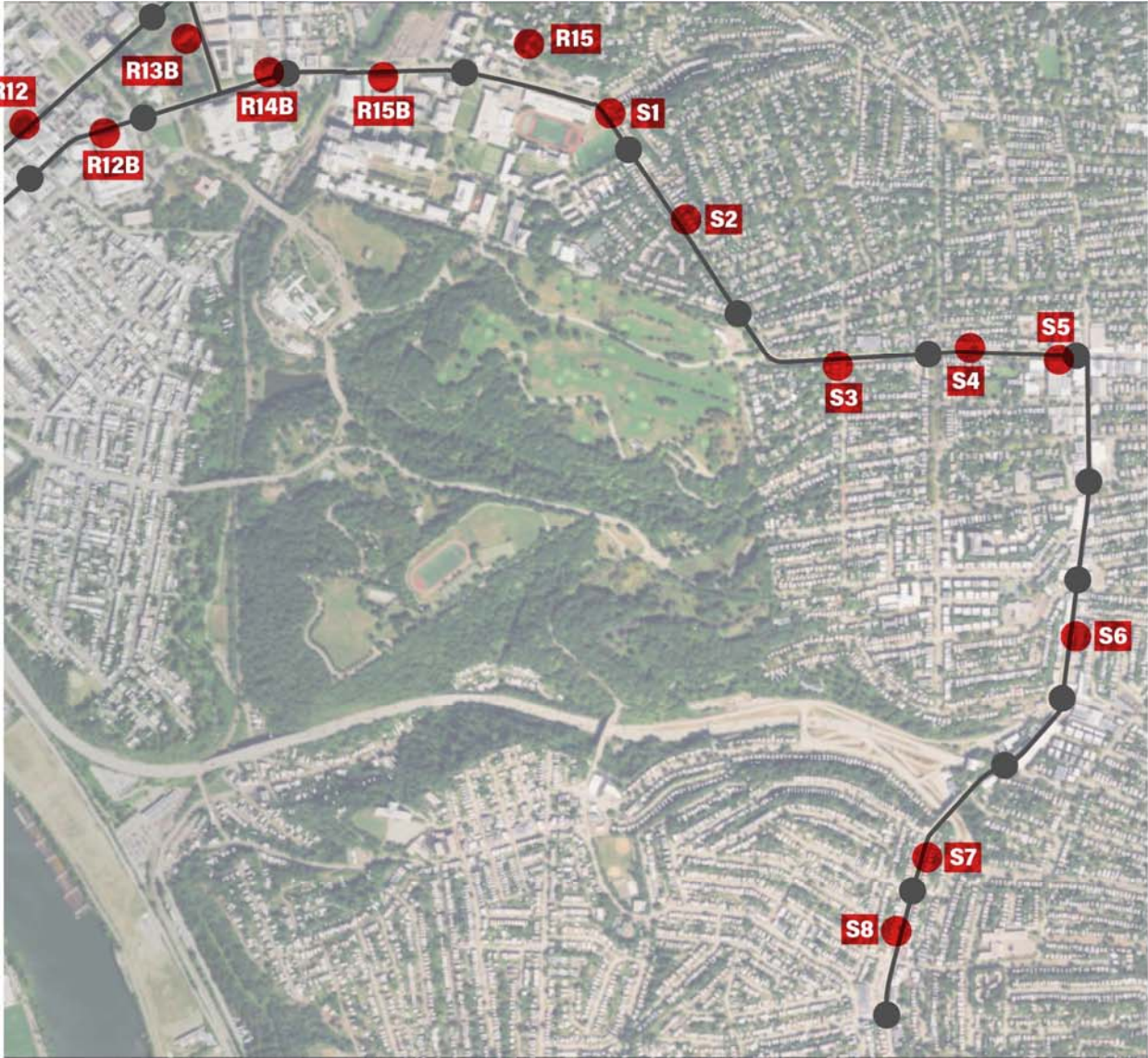


Figure 22. Noise and Vibration Receptor Assessment Locations (Squirrel Hill)

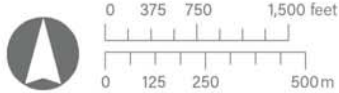


Project Maps
Branch: Squirrel Hill

- Build Alternative: Route
- Build Alternative: Proposed Stations

Noise and Vibration: Sensitive Receptors

- Noise/Vibration Receptor
- R12** Bellefield Presbyterian Church at 3959 5th Ave
- R12B** Hillman Library
- R13B** Heinz Memorial Chapel
- R14B** Student Housing at 4531 Forbes Ave
- R15** Student Housing at 5035 Forbes Ave
- R15B** Heinz College at 4092 Forbes Ave
- S1** 5109 Forbes Avenue
- S2** 5285 Forbes Avenue
- S3** 5456 Forbes Avenue
- S4** 5625 Forbes Avenue
- S5** 5738 Forbes Avenue
- S6** 2319 Murray Avenue
- S7** 4015 Murray Avenue
- S8** 4134 Murray Avenue



13.2. CONSTRUCTION NOISE

The FTA guidelines also provide reasonable criteria to determine any temporary potential noise impact associated with construction activities. Construction activities may result in short-term annoyance to residences and businesses along the immediate construction zone along the proposed BRT corridor. A range of construction activities can be expected during the construction phase including widening of travel lanes, clearing of right-of-way, building station stop, traffic diversions and other activities as described in Chapter 18. The FTA construction noise criteria identifies impact threshold levels for various times of day and acceptable noise levels for various land use types. In urban areas such as Pittsburgh - with generally fairly high ambient noise levels along both Forbes and Fifth Avenues with ambient L_{dn} levels above 65 dBA—noise generated from construction operations should not exceed existing ambient conditions by more than 10 dB. Using these guidelines, a noise impact would occur if noise levels during construction exceed the recommended values shown in Table 12.

Table 12: Federal Transit Administration Construction Noise Criteria

Land Use	8-hour L_{eq} (dBA)		L_{dn} (dBA) 30-day Average
	Day	Night	
Residential	80	70	75(a)
Commercial	85	85	80(b)
Industrial	90	90	85(b)

Source: Federal Transit Administration. *Transit Noise and Vibration Impact Assessment*, Report Number: FTA-VA-90-1003-06, May 2006.

(a) In urban areas with very high ambient noise levels ($L_{dn} > 65$ dB), L_{dn} from construction operations should not exceed existing ambient + 10 dB.

(b) 24-hour L_{eq} not L_{dn}

All construction activities associated with the proposed project are described in detail in Chapter 18 of this report. However, in general construction activities are expected to progress quickly from street to street along the corridor alignment and therefore any annoyance caused at any given property can be expected to be of short term duration. The following general measures would be detailed into a Construction Management Plan prior to the start of construction activities. These measures would help reduce and minimize construction noise annoyance to the adjacent communities during the construction phase:

- Conduct construction activities during the daytime whenever possible.
- Conduct truck loading, unloading, and hauling operations in a manner that minimizes noise.
- Route construction equipment and other vehicles carrying spoil, concrete, or other materials over routes that would cause the least disturbance to residents near the activity.
- Locate site stationary equipment away from residential areas to the extent reasonably feasible within the site/staging area.
- Employ the best available control technologies to limit excessive noise when working near sensitive receptors.
- Adequately notify the public in advance of construction operations and schedules, including methods such as construction-alert publications and a Noise Complaint Hotline to handle complaints quickly.

14. Vibration

The FTA generalized vibration assessment procedure as described in Chapter 10 of Transit Noise and Vibration Impact Assessment Manual was utilized to estimate vibration levels generated from daily BRT service line operations along the corridor of the proposed project. This procedure relies on determining vibration levels, in units of “VdB” based on receptor to BRT roadway distance for a generic rubber-tire BRT vibration curve with additional adjustments made for BRT travel speed. Using this procedure provides an actual estimate of future worst-case projected future vibration levels that can be expected to be generated by BRT travel movements throughout the Pittsburgh BRT corridor and allows for comparison to relevant FTA impact criteria. Whereas the screening procedure outlined in Chapter 9 of the FTA manual does not provide an estimate of BRT vibration levels nor allows a comparison to vibration criteria. The vibration impact assessment was completed at the same receptor sites identified for noise impact. There are no Category 1 land use activities within the Pittsburgh BRT corridor and therefore the impact assessment was limited Category 2 residential land uses where people sleep and Category 3 primarily daytime limited institutional land uses. The vibration impact assessment was completed at a total of 29 noise-sensitive receptor sites identified within the BRT Core operating area. In addition, 18 additional representative vibration sensitive properties were identified along the proposed Squirrel Hill and Highland Park BRT operating segments. The ten receptor sites evaluated along the Highland Park route are identified with a “H” prefix and the eight sites along the Squirrel Hill route with a “S” prefix. Therefore, a total of 47 properties were evaluated and compared to the FTA vibration impact criteria. Figure 19 through Figure 21 depict the approximate location of each vibration assessment site.

Estimated vibration levels at all 47 representative sites identified throughout the BRT operating corridor are projected to remain well below the 72 VdB and 75 VdB impact thresholds applied to Category 2 and 3 land uses respectively. This outcome is not unusual, because unlike rail transit system where train wheels rolling on the rails generate noticeable vibration energy, BRT based transit buses are supported by rubber tires and suspension systems, which provide vibration isolation and considerable damping, thereby ensuring little vibration is transmitted into the ground.

Table 13 Comparison of Estimated BRT Transit Vibration Levels and FTA Impact Criteria for Proposed BRT Transit Service Operations

Site #	Receptor Site Description	FTA Land Use Category	FTA* Impact Threshold (VdB)	Estimated Vibration Levels (VdB re: 1 μ -inch)	FTA Vibration Impact (Yes/No)
R1	Apartment at Macy's	Cat. 2	72	60	No
R1A	Multi-family Apartment Building at 313 6th Ave	Cat. 2	72	59	No
R2	Multi-family Apartment Building (Regional Enterprise Tower)	Cat. 2	72	62	No
R3**	Duquesne University at 718 5th Ave	Cat. 3	75**	61	No
R3B	Outdoor student seating area	Cat. 3	75**	62	No
R3B	Outdoor student seating area	Cat. 3	75**	62	No
R4	Mixed use multi-story at 1509 5th Ave	Cat. 2	72	59	No
R4A	Apartment building (Flats on fifth)	Cat. 2	72	60	No
R4B	Residence at 13 Marion Street	Cat. 2	72	59	No
R5	Apartment Building at 1800 5th Ave	Cat. 2	72	60	No
R5B	Residential at 1726 Forbes Ave	Cat. 2	72	60	No
R6	2-story Residential building at 2018 5th Ave	Cat. 2	72	59	No
R6B	Residence 2012 Forbes Ave	Cat. 2	72	62	No
R7	2-story Residential building at 2327 5th Ave	Cat. 2	72	61	No
R7B	Residential at 2135 Forbes Avenue	Cat. 2	72	61	No
R8	Multi-family Apartment Building at 2633 5th Ave	Cat. 2	72	61	No
R9**	Oakland Dialysis Medical	Cat. 3	75**	63	No
R9B**	Carlow University Chapel at 3221 5th Ave	Cat. 3	75**	66	No
R10	Skyvue Apartment Building at 333 Forbes Ave	Cat. 2	72	57	No
R10B	Multi-family Apartment Building at 3401 Forbes Ave	Cat. 2	72	60	No
R11	Mixed use multi-story at 3610 5th Ave	Cat. 2	72	58	No
R11B	University of Pittsburgh Student Housing (Forbes Hall)	Cat. 2	72	61	No
R12**	Bellfield Presbyterian Church at 3959 5th Ave	Cat. 3	75**	56	No

Table 13 Comparison of Estimated BRT Transit Vibration Levels and FTA Impact Criteria for Proposed BRT Transit Service Operations (continued)

Site #	Receptor Site Description	FTA Land Use Category	FTA* Impact Threshold (VdB)	Estimated Vibration Levels (VdB re: 1 μ -inch)	FTA Vibration Impact (Yes/No)
R12B**	Hillman Library	Cat. 3	75**	56	No
R13	Multi-story residential apartment	Cat. 2	72	51	No
R13B**	Heinz Memorial Chapel	Cat. 3	72	59	No
R14	Residential at 4914 5th Ave	Cat. 2	72	65	No
R14B	Student Housing at 4531 Forbes Ave	Cat. 2	72	55	No
R15	Student Housing at 5035 Forbes Ave	Cat. 2	72	65	No
R15B**	Heinz College at 4902 Forbes Ave	Cat. 3	75**	58	No
H1	5125 Fifth Ave	Cat. 2	72	64	No
H2	5757 Fifth Ave	Cat. 2	72	55	No
H3	413 S Highland Ave	Cat. 2	72	59	No
H4	358 S Highland Ave	Cat. 2	72	60	No
H5**	116 S Highland Ave	Cat. 3	75**	63	No
H6**	250 N Highland Ave	Cat. 3	75**	57	No
H7	616 N Highland Ave	Cat. 2	72	53	No
H8	817 N Highland Ave	Cat. 2	72	58	No
H9	1218 N Highland Ave	Cat. 2	72	56	No
H10	5718 Callowhill St	Cat. 2	72	64	No
S1	5109 Forbes Ave	Cat. 2	72	59	No
S2	5285 Forbes Ave	Cat. 2	72	59	No
S3	5456 Forbes Ave	Cat. 2	72	58	No
S4	5625 Forbes Ave	Cat. 2	72	58	No
S5**	5738 Forbes Ave	Cat. 3	75**	59	No
S6**	2319 Murray Ave	Cat. 3	75**	61	No
S7	4015 Murray Ave	Cat. 2	72	60	No
S8	4134 Murray Ave	Cat. 2	72	61	No

* Based on FTA infrequent pass-by event vibration impact criteria

** Daytime limited FTA Category 3 land use activities allow for higher impact threshold

15. Property Acquisition

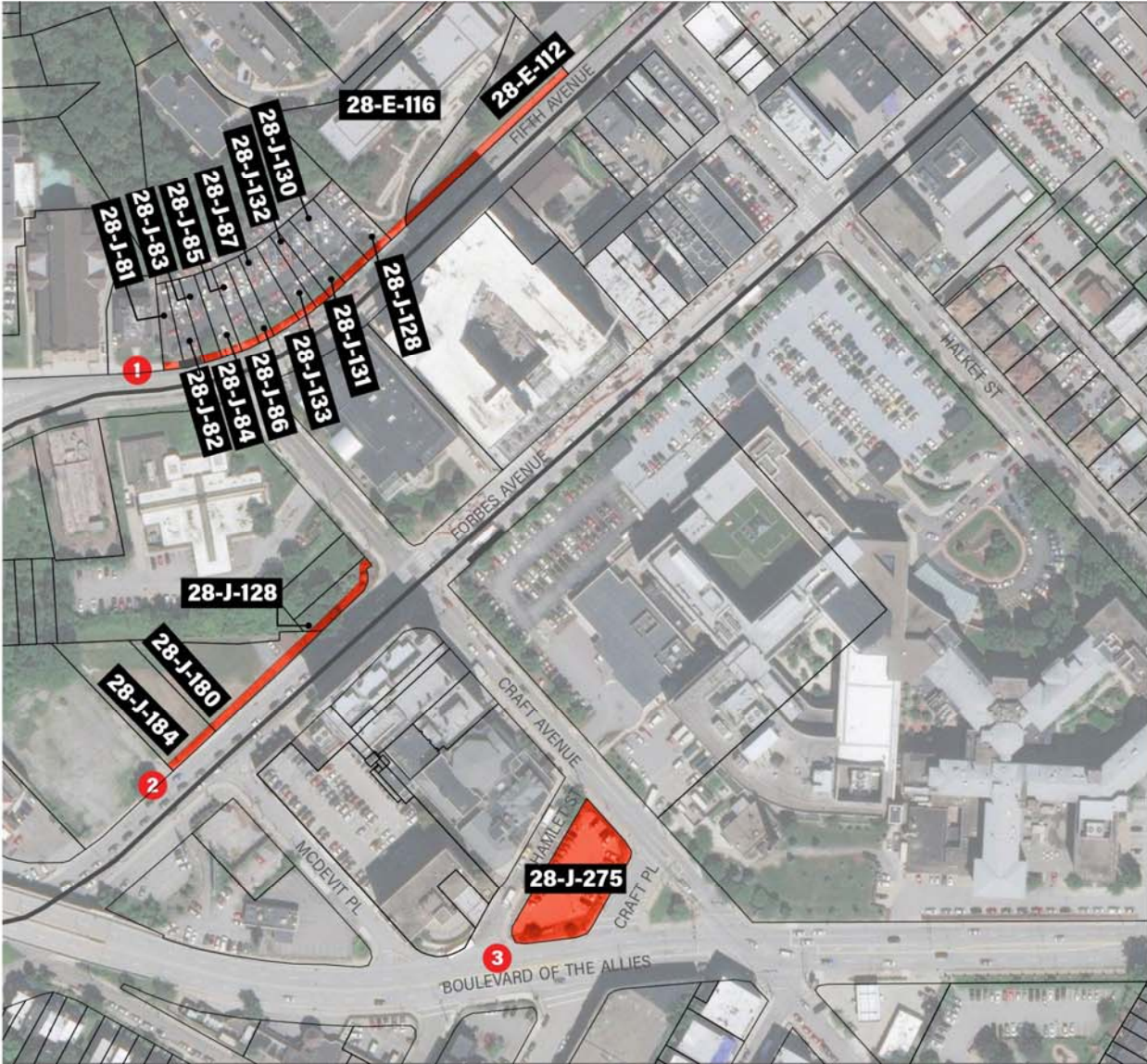
This proposed project would be constructed mostly within existing rights-of-way. Acquisitions beyond the existing rights-of-way are expected to occur only within four small areas:

- Fifth Avenue approaching Craft Avenue from the east (Figure 31) in Oakland
- Forbes Avenue approaching Craft Avenue from the west (Figure 31) in Oakland
- A proposed bus layover facility at Craft Avenue near Hamlet Street in Oakland


Two of three acquisitions would be sliver takes adjacent to the rights-of-way. Property acquisition would not displace or relocate occupied residential or business structures. Acquisitions would comply with the federal Uniform Act, and relocation advisory services would be provided to property owners. Together, the required takings would total 26,300 square feet (0.60 acre) and represent no adverse impacts. The affected properties follow:

- **Fifth Avenue Widening:** This proposed project would widen Fifth Avenue east of Craft Avenue in Oakland to accommodate a five-lane cross section, including two through lanes, a left turn lane, a dedicated bus lane, and a separated cycle track. The existing 40-foot cartway would be widened by 11 feet to 51 feet, which would require an additional 11 feet of right-of-way. This would involve taking a portion of 14 parcels, for a total of about 6,900 square feet. The affected parcels are labeled with tax map locators on Figure 23. Except for 28-E-116, which includes an academic building set back 80 feet from the existing right-of-way, these parcels are vacant, and all are owned by Carlow University or its predecessors Carlow College and Mount Mercy College.
- **Forbes Avenue Widening:** The proposed project calls for widening Forbes Avenue in Oakland to accommodate a five-lane cross section approaching Craft Avenue, including three through lanes, a right-turn lane, and a dedicated bus lane. Much of this can be accomplished by narrowing the existing lanes within the 40-foot cartway, but up to an additional 12 feet would be required to accommodate a 52-foot cross section. Based on Allegheny County Tax mapping, this widening would affect three parcels, with a total of 4,200 square feet. The affected parcels are labeled with tax map locators on Figure 23. All parcels are vacant, and are owned by the University of Pittsburgh Medical Center.
- **Proposed Bus Layover Facility:** The proposed project includes a facility to accommodate bus layovers and turnarounds in western Oakland. The site under consideration is a small block bounded by Craft Avenue, Hamlet Street, Craft Place, and Boulevard of Allies. This location would provide ready access to the Core BRT facilities on Forbes and Fifth Avenues. This facility would involve a full taking of one parcel (28-J-275) for a total of about 15,147 square feet. The parcel is currently in use as a parking lot and is owned by a commercial trust.

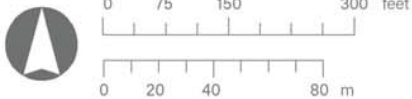
Figure 23. Anticipated Property Acquisitions



Project Maps

-  Preferred Alternative: Route
-  Proposed Station Footprints

- Proposed Takings**
-  Proposed acquisitions
 -  1 Fifth Avenue Widening
 -  2 Forbes Avenue Widening
 -  3 Potential Bus Layover Facility



16. Parklands and Recreational Areas

Twenty parks located within or adjacent to the area of the proposed project. As identified in Table 14 and shown on Figures 26 through 29, 22 parks, playground, and recreational areas are located within a quarter-mile of this proposed project corridor. All activities related to the proposed project during both construction and operation would result in no temporary or permanent effects on any parklands or recreational areas.

Table 14: Parks within ¼ mile of Proposed Project

Map Locator*	Park/Recreation Area
1	Point State Park
2	Liberty Avenue Median
3	Allegheny Riverfront Park
4	Fort Duquesne Blvd Park
5	Market Square Park
6	Thomas Parklet
7	Mellon Square Park
8	Jail Triangle
9	Crosstown Park (proposed)
10	Albert "Turk" Graham Parklet
11	Tustin Playground
12	Kennard Playground
13	Martin Luther King Field
14	Dunseith Playground
15	Lawn & Ophelia Playground
16	Craft Triangle
17	Niagara Parklet
18	Schenley Park
19	Mellon Park
20	Enright Parklet
21	Liberty Park
22	Flynn Parklet
23	Highland Park
24	Davis Parklet

Source: Project Team

*See Figure 24 through Figure 26.

Figure 24. Parks and Recreation Areas (Core: Downtown)



Project Maps
Core: Downtown

- Build Alternative: Route
- Build Alternative: Proposed Stations

Parks and Open Space

- Parks and Open Space
- 1 Point State Park
- 2 Liberty Ave Median
- 3 Allegheny Riverfront Park
- 4 Fort Duquesne Boulevard Park
- 5 Market Square
- 6 Thomas Parklet
- 7 Mellon Square
- 8 Jail Triangle
- 9 Crosstown Park
- 10 Albert "Turk" Graham Parklet
- 11 Tustin Playground
- 12 Kennard Playground
- 13 Martin Luther King Field

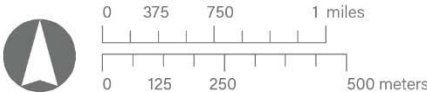
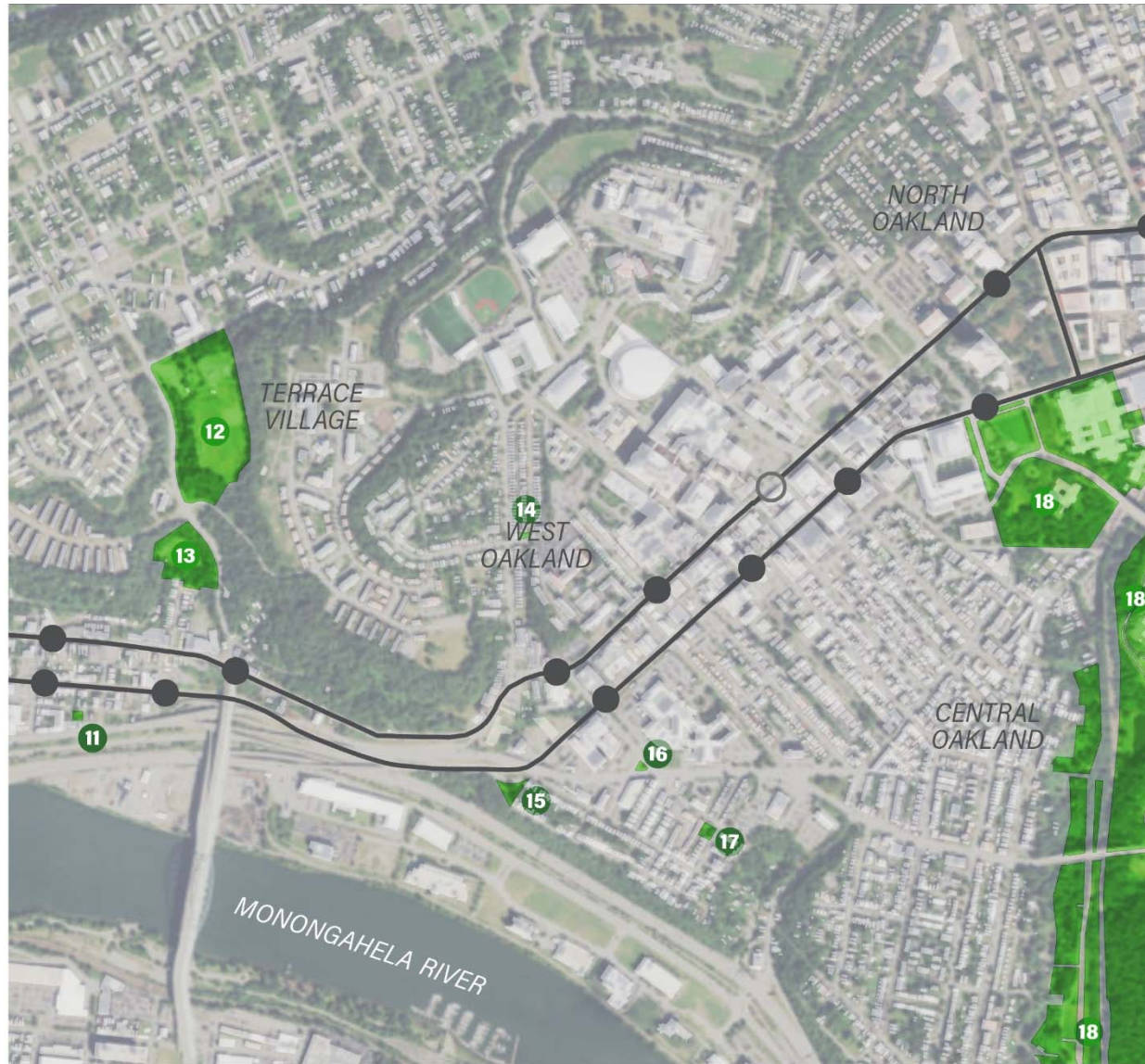


Figure 25. Parks and Recreation Areas (Core: Oakland)



Project Maps
Core: Oakland

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - - Existing Facilities: Route
- Existing Facilities: Stations

Parks and Open Space

- Parks and Open Space
- 11 Tustin Playground
- 12 Kennard Playground
- 13 Martin Luther King Field
- 14 Dunseith Playground
- 15 Lawn & Ophelia Playground
- 16 Craft Triangle
- 17 Niagara Parklet
- 18 Schenley Park

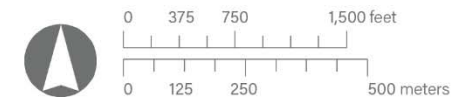


Figure 26. Parks and Recreation Areas (Highland Park)



Project Maps
Branch: Highland Park

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

Parks and Open Space

- Parks and Open Space
- 18 Schenley Park
- 19 Mellon Park
- 20 Enright Parklet
- 21 Liberty Park
- 22 Flynn Parklet
- 23 Highland Park

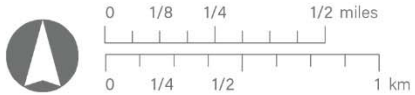


Figure 27. Parks and Recreation Areas (Squirrel Hill)

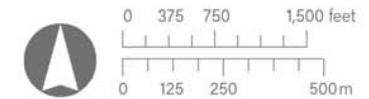


Project Maps
Branch: Squirrel Hill

- Build Alternative: Route
- Build Alternative: Proposed Stations

Parks and Open Space

- Parks and Open Space
- 18 Schenley Park
- 24 Davis Parklet



17. Visual Quality/Aesthetics

This proposed project would include various visual elements to the BRT Core, including dedicated lanes for BRT vehicles, dedicated lanes for cyclists, and the addition of new, branded BRT stations and shelters. In the BRT Core, 24 new stations would be constructed. Along the Highland Park route, 23 new shelters would be constructed. Along the Squirrel Hill route, 22 new shelters would be constructed. Station types would be based upon assumed ridership levels and would range in size from 15 feet by 5 feet for the small neighborhood sidewalk station to 120 feet by 10 feet for a larger transfer station. Other proposed station sizing includes neighborhood stations (30 feet), large neighborhood stations (45 feet), and intermediate stations (60 feet). For planning purposes this proposed project assigned station types to locations based upon assumed ridership; however, final station design and station sizing would be further developed as preliminary engineering and final design advance and public and stakeholder input is received and considered. Stations and shelters would be designed to be consistent with the character of the neighborhood and would minimize any visual impacts.

While the visual character of the urban corridor is not expected to change related to this proposed project, modifications to the visual environment would result from new BRT shelters and changes to the roadway in the form of new pavement markings, updated signage, new and improved pedestrian crossing, protected bicycle facilities, and updated traffic signals. The area of the proposed project contains six existing visual resources and sensitive viewsheds, further discussed below. This proposed project would also install electric charging stations at the Wilkinsburg Station of the East Busway.

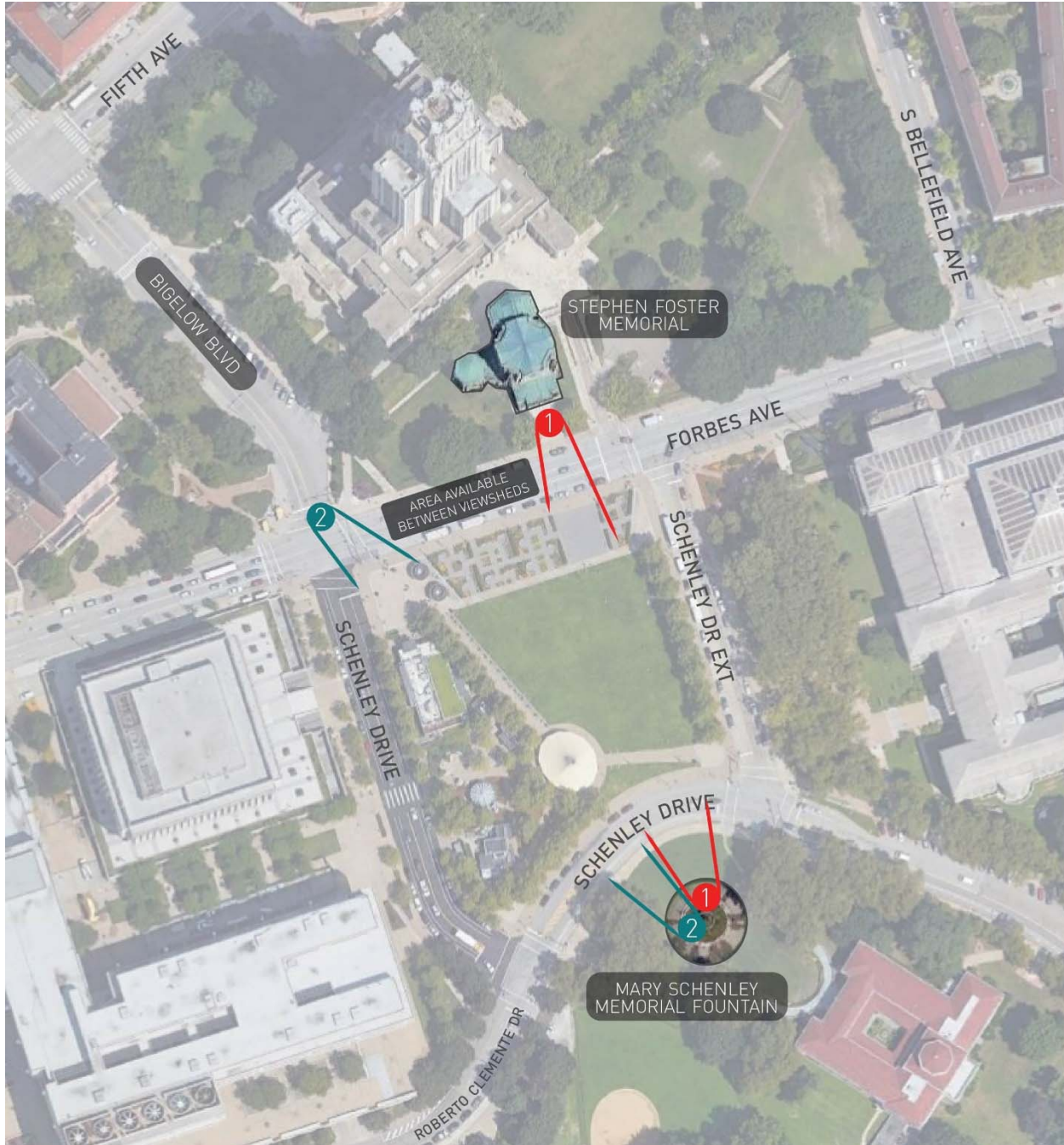
17.1. SCHENLEY PLAZA STATION

This proposed station would be located between two sensitive viewsheds. The first—between the Stephen Foster Memorial and the Mary Schenley Fountain—is an important historical element of the design and location of both facilities, with the steps and main entrance to the memorial on an axis from the plaza. The Stephen Foster Memorial is significant on its own as an excellent example of Gothic Revival architecture, as well as complementing the nearby Cathedral of Learning on the University of Pittsburgh campus, and is also a contributing resource to the Schenley Farms National Historic District. Likewise, the Mary Schenley Fountain is significant not only for its sculptural design, but also as a contributing element to the landscape architecture and history of Schenley Park. The relationship between the Stephen Foster Memorial and the Mary Schenley Fountain was highlighted in the 2003 redesign of Schenley Plaza, which sought to link the fountain to the memorial visually and axially by a pedestrian path through gardens.

The second—from Bigelow Boulevard on an axis with the Mary Schenley Fountain—is an important part of the location of the fountain, and played a key role in the layout of Schenley Plaza, with the axis defining a pedestrian spine along the food kiosks to the tented structure. The tented structure and trees in the plaza and along Bigelow Boulevard block any direct view of the Mary Schenley Fountain from Bigelow Boulevard. The proposed station at this location would be 120 feet in length, long enough to accommodate two articulated buses. Approximately 150 linear feet of curb is available between

these two viewsheds, allowing the station to be positioned without impacting either viewshed. The station canopy and structure may be shorter than the specified 120 feet, providing a buffer at the sides of the viewsheds. Vehicles traveling or parked, including vendor trucks, along Forbes Avenue, including buses, intermittently block the viewshed from the Stephen Foster Memorial to the Mary Schenley Fountain, and this would not change with the implementation of this proposed project.

Figure 28. Stephen Foster Memorial and the Mary Schenley Fountain Viewshed



The proposed station would not adversely affect the continued use of Schenley Plaza and adjacent streets, which are the nexus of an area of high pedestrian activity, driven by the University of Pittsburgh, Schenley Plaza and its attractions, the Carnegie Museums and Libraries, Schenley Park, and other area attractions. The existing bus stop on Forbes Avenue at Bigelow Boulevard is heavily used. The proposed station would serve patrons destined to these areas, and would reinforce the role of Schenley Plaza as a pedestrian hub. The relocation of vendor trucks in this immediate location would remove the trucks as a viewshed barrier.



Vendor trucks at Schenley Plaza

17.2. HIGHLAND PARK STATION

The proposed station would be located at the edge of Highland Park, adjacent to a stone staircase that provides pedestrian access to the Bunker Hill and Memorial trails in the park. Highland Park is significant as one of Pittsburgh's best examples of a late-nineteenth-century landscape park, demonstrating the romantic landscape tradition made popular by Frederick Law Olmsted. It is considered eligible for NRHP listing. The area behind the proposed station is a grassy slope with large, intermittent trees, and a low stone wall behind the sidewalk. The proposed station design would be transparent, allowing the park and the stone wall to be seen.

The proposed station would not adversely affect viewsheds related to Highland Park. The adjacent residential area has been served by transit on these streets since at least the early 1900s. The park is a regional amenity, and attracts patrons from across the city and beyond. The existing stop at this location provides no amenities. The proposed station would improve the community and park access to transit by providing amenities and a designated waiting area.

17.3. MOREWOOD STATION (FIFTH AVENUE)

The proposed inbound station would be located adjacent to Rodef Shalom Congregation, to the east of the historic façade designed by architect Henry Hornbostel and in front of a 1950's-era addition. Views of the main building frontage would not be affected by the proposed station. The proposed station would be visible approaching the building from the east, but would have limited impact due to the station size, placement, massing and the large trees which obscure views of the building.

The proposed station would not adversely affect viewsheds in the immediate area. The existing stop at Morewood Avenue is heavily used but provides no amenities and inadequate waiting area. The proposed location would improve the community's access to transit by providing amenities and a larger waiting area. The proposed station would increase the visibility of transit in this location to congregants of the synagogue and others and may increase the potential of transit tripmaking.

17.4. MOREWOOD STATION (FORBES AVENUE)

The proposed outbound station is located adjacent to the Cut on the Carnegie Mellon University campus. The Cut, formerly a ravine that was filled in, is an important open space on the campus but does not provide significant viewsheds. The Cut is approximately 10 feet higher than Forbes Avenue up a grassy slope. The southern end of the Cut is closed by Hunt Library, a four-story structure that is only marginally visible from Forbes Avenue. The view from the Cut looking north is closed by the undistinguished low-rise side of the fraternity quadrangle buildings. The most notable visual element of the Cut is the 100-foot-tall Walking to the Sky sculpture. An existing shelter is located at the proposed station location and is of similar massing, with a top roughly at the elevation of the Cut. The proposed station would have limited visibility from the Cut, and would not affect views of the sculpture from the Cut, from Forbes Avenue or from Morewood Avenue. The proposed station would not adversely affect viewsheds in the immediate area. The station is surrounded by the Carnegie Mellon University campus, which relies heavily on transit access to meet its mobility goals. The university's master plan specifically notes the need for enhanced amenities and infrastructure for multimodal transportation, including bus riders. The proposed station would provide increased amenities and a larger station area to accommodate the heavy transit demand.

17.5. NEGLEY STATION

The proposed inbound station would be located adjacent to Third Presbyterian Church at the existing stop location. The existing stop at this location is heavily used but provides no amenities and inadequate waiting area. The proposed station would improve the community's access to transit by providing amenities and a larger waiting area and by increasing the visibility of transit.

17.6. MURRAY STATION

The proposed inbound station would be located in front of the Sixth Presbyterian Church. There is an existing bus stop at this location with two shelters. The church sits on a hill approximately 20 feet above street level, above the proposed height of the station. The proposed station would be 60 feet in length, somewhat longer than the existing shelters, but would not extend in front of the church steps. The existing stop at this location is heavily used, and provides a major transit connection between Squirrel Hill, Oakland, and the universities.

18. Construction Impacts

Temporary impacts related to construction would typically be localized and would vary by neighborhood. Temporary road closures, repaving, and new bus shelters would result in impact access to local businesses and residents during construction. Material hauling, construction vehicles, and rerouted or congested traffic may affect broader areas. The construction phase for this proposed project is estimated to take approximately 18 months. Construction activities are summarized below and identified in Figure 29. The proposed project would not require the closure or taking of any businesses, but there may be some restrictions to access. Considering the narrow right of way, it's likely that there will be sidewalk and roadway closures in front of entrances and driveways. Possible measures to minimize impacts to entrances or driveways include half-width construction, temporary access ramps, time restrictions, and use of alternate access route used to reduce the impact as much as possible.

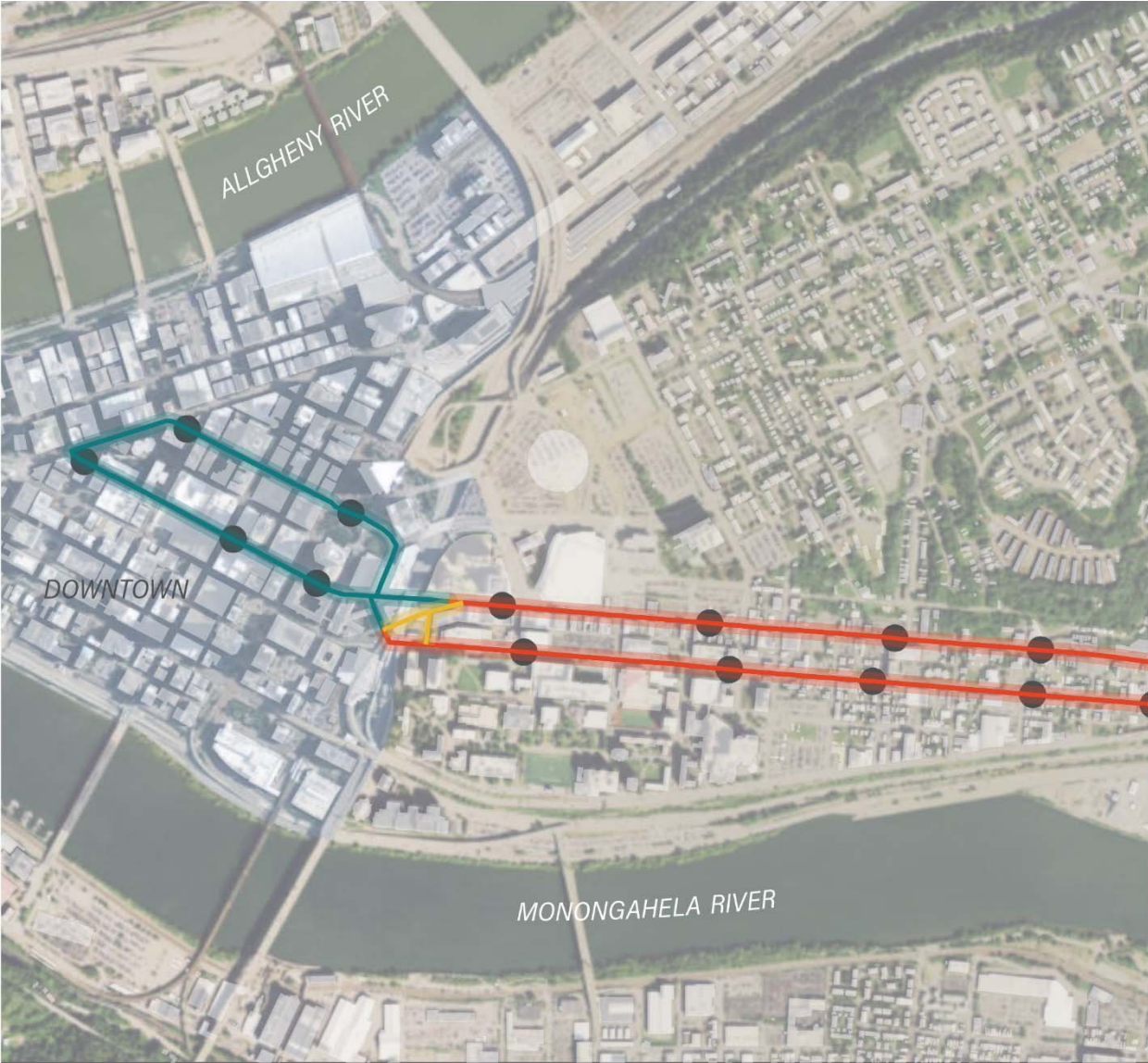
Construction impacts, including complete street construction, partial reconstruction, and milling and overlay, are anticipated in the following areas:

- Within the Downtown area, BRT construction would be limited to minor traffic signal modifications, changes in signing and pavement marking, and station construction. Traffic signal modifications and placement of signing and pavement markings would be performed using short-term traffic control measures, with little disruption to the surrounding areas. Station construction is anticipated to involve temporary closures of sidewalks. Pedestrian detours or alternate paths would be provided around work areas.
- Within the Uptown area, full reconstruction of streets is proposed including Fifth Avenue and Forbes Avenue, which are major arterials carrying one-way traffic that are typically each 36 feet wide. It is anticipated that reconstruction of the street would be conducted in half widths in order to maintain a single traffic lane. Work is anticipated to occur in four major phases to limit the potential for impacts to traffic, parking, and pedestrian access and would include sidewalk closures, lane closures, and parking prohibition in work areas. During construction, transit and bikes would be sharing the single available lane with general traffic resulting in some increase in delays. The actual order of the phases may vary. To minimize the localized impact of parking prohibitions, work may be scheduled concurrently in alternate blocks. Construction may occur on both Forbes and Fifth Avenues simultaneously. During construction, transit and bikes may be sharing the single available lane with general traffic, resulting in some increase in delays.
- Additional reconstruction work would be performed on Diamond Street and Boyd Street that would require lane closures. The section of Boyd Street between Watson Street would be closed construct the permanent closure of that segment. A detour would be required and is anticipated to become the permanent condition after construction.
- In Oakland, full street reconstruction would be limited to two locations: Forbes Avenue for approximately 700 feet west of Craft Avenue, and Fifth Avenue for approximately 500 feet east of Craft Avenue, where the roadways would be widened. Roadway reconstruction would be

18. Construction Impacts

constructed in phases—with a single-lane closure while the widened roadway and sidewalk are constructed offline—and then traffic would be shifted to the widened portion of the roadway while reconstructing the opposite side. Traffic delay impacts can be anticipated due to reduced roadway or street capacity.

Figure 29. Construction Staging (Core: Downtown)

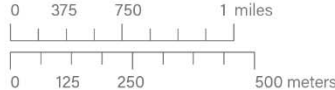


Project Maps
Core: Downtown

- Build Alternative: Route
- Build Alternative: Proposed Stations

Construction Staging

- Complete Reconstruction
- Partial Reconstruction
- Mill & Overlay
- Signing & Pavement Marking Only



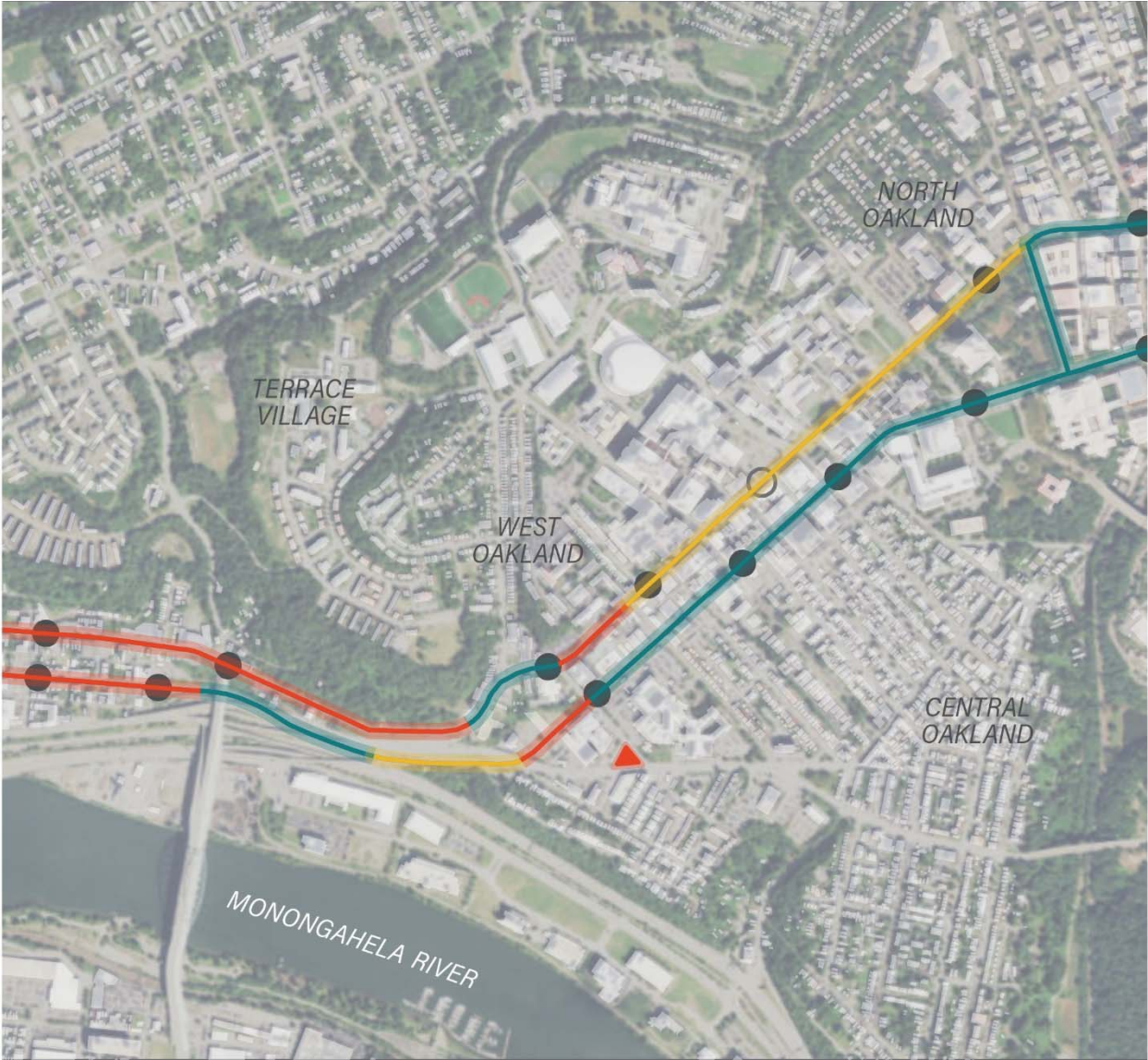
18. Construction Impacts

- The existing bus lane and adjacent sidewalk along the curb lane of Fifth Avenue would be reconstructed from Craft Avenue to Bellefield Avenue. A lane closure is anticipated during this work, and traffic impacts can be anticipated due to reduced traffic capacity. Repaving in the bus lanes on Fifth and Forbes Avenues may require short-term lane closures. Transportation network users may be temporarily redirected to proximate roadways to ensure safety during construction.
- North Neville Street would be milled and repaved from Fifth Avenue to Centre Avenue. Short-term traffic impacts, including detours, can be anticipated during this work.

Additional construction impacts would be experienced across the entirety of this proposed project's corridor, and include the following:

- In the event of lane closures during the construction in Uptown on Fifth Avenue and Forbes Avenue, transit and bikes would be sharing the single lane available with general traffic resulting in some delays. Transportation network users would be temporarily redirected to proximate roadways to ensure safety during construction.
- Throughout the BRT Core, Squirrel Hill, and Highland Park, construction would include minor traffic signal modifications, changes in signing and pavement marking, and station construction. Traffic signal modifications and placement of signing and pavement markings would be performed using short-term traffic control measures, with little disruption to the surrounding areas. Station construction would involve temporary closures of sidewalks or travel lanes. Pedestrian detours or alternate paths would be provided around work areas.
- Temporary impacts would also affect access to neighborhoods, local businesses, and commercial facilities. For example, roadway and lane closures may increase traffic congestion or require detours. Lane and sidewalk construction could affect access to building entrances or driveways. Best construction management practices would be employed to ensure the safety and access of residents, employees, and construction workers.

Figure 30. Construction Staging (Core: Oakland)



Project Maps
 Core: Oakland

- Build Alternative: Route
- Build Alternative: Proposed Stations
- - - Existing Facilities: Route
- Existing Facilities: Stations

- Construction Staging**
- Complete Reconstruction
 - Partial Reconstruction
 - Mill & Overlay
 - Signing & Pavement Marking Only

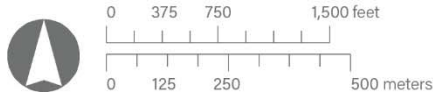


Figure 31. Construction Staging (Highland Park)

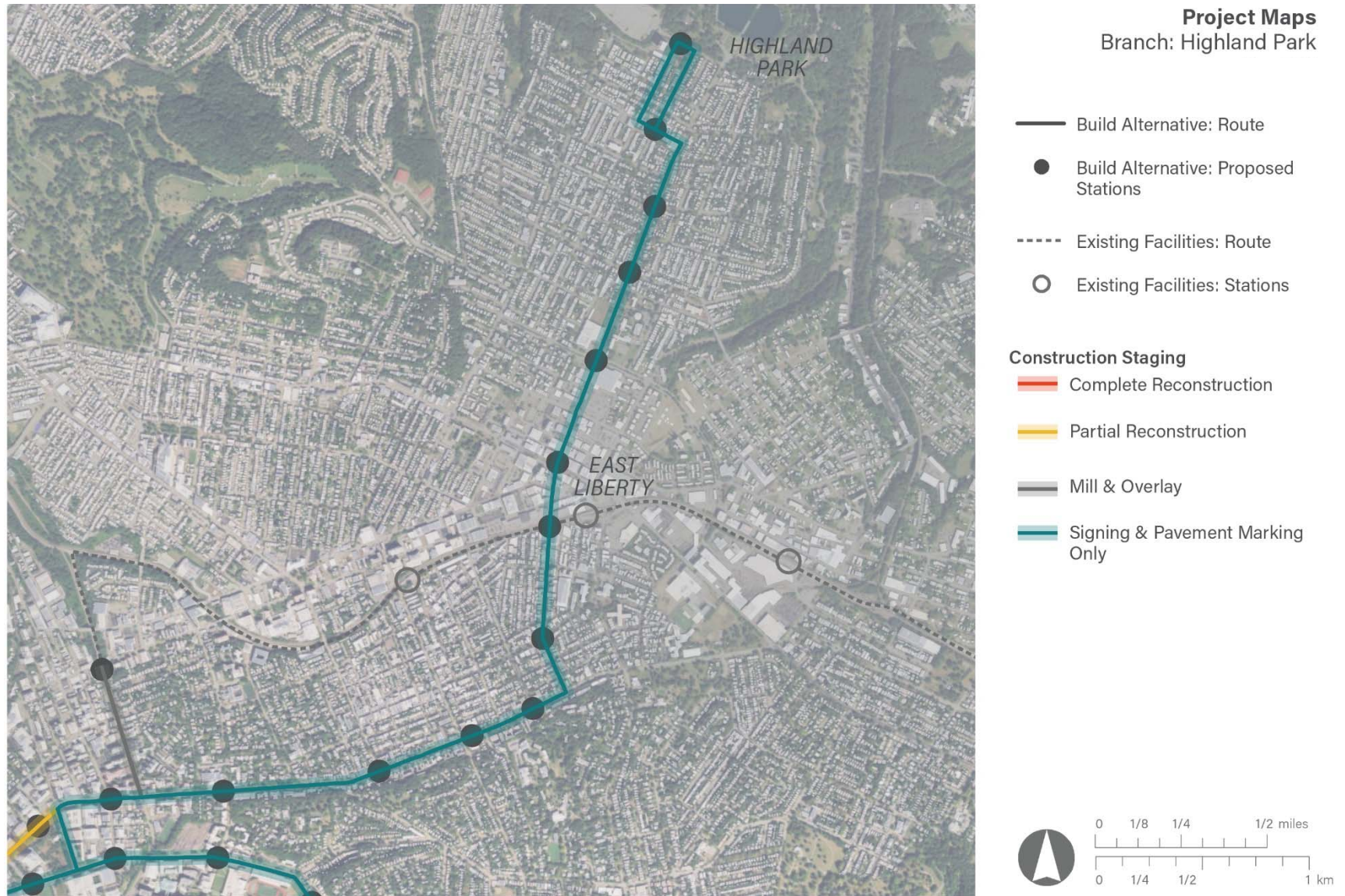
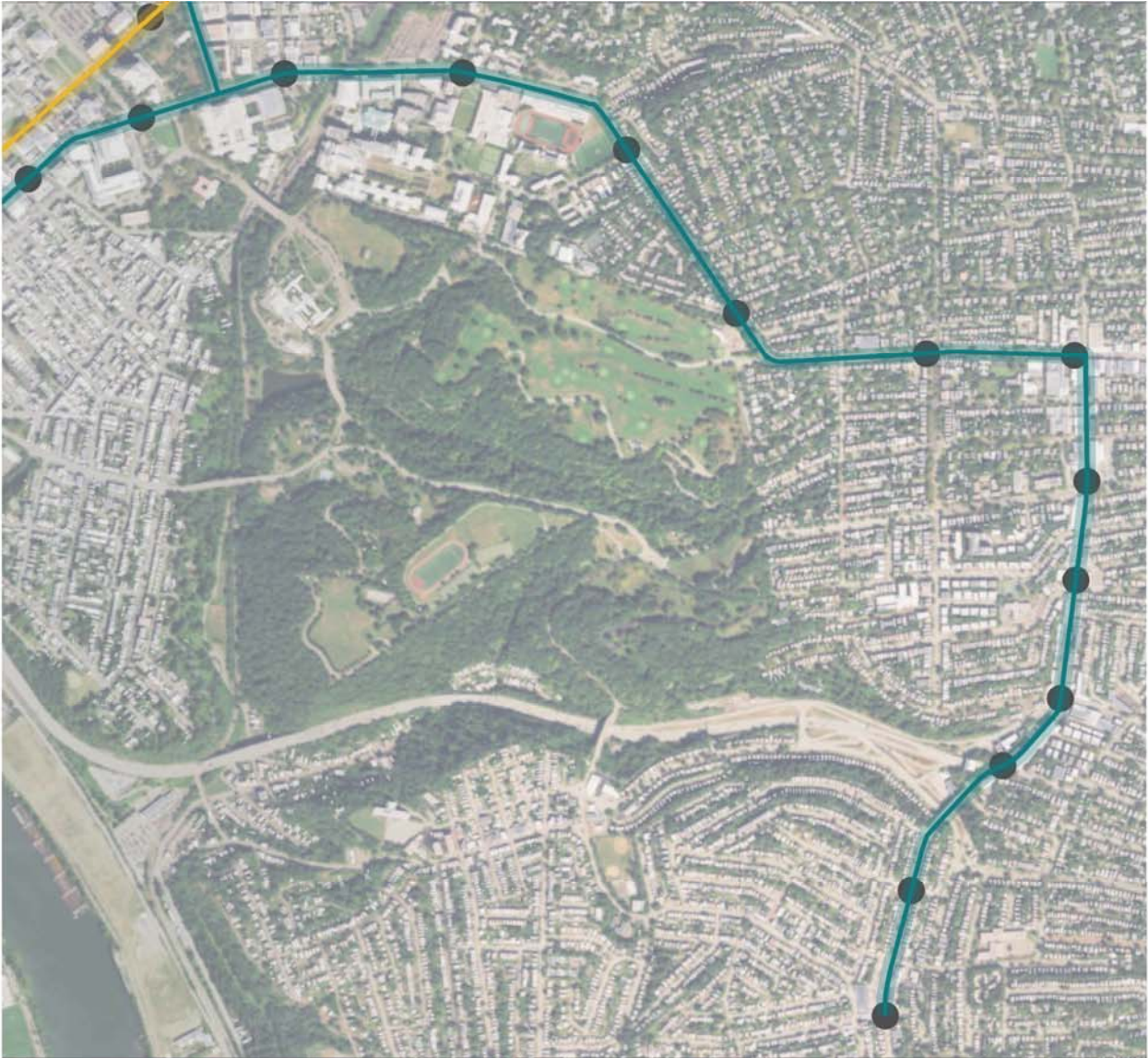


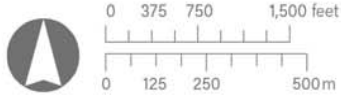
Figure 32. Construction Staging (Squirrel Hill)



Project Maps
Branch: Squirrel Hill

- Build Alternative: Route
- Build Alternative: Proposed Stations

- Construction Staging**
- Complete Reconstruction
 - Partial Reconstruction
 - Mill & Overlay
 - Signing & Pavement Marking Only



19. Indirect and Cumulative Impacts

19.1. INDIRECT IMPACTS

Indirect impacts are those caused by the proposed action but that would occur either later in time or to populations or industries typically beyond the immediate area of the proposed project. Indirect impacts are typically foreseeable and may include changes in the pattern of how land is used, where population and investment are attracted or deterred, and how natural systems such as air quality, water quality, and ecosystems are disrupted. The only resources anticipated to experience indirect impacts as a result of the proposed action are land use and environmental justice; other resources are not discussed in this section.

19.1.1. Land Use

The proposed project may influence property values and make properties near the proposed project more attractive for redevelopment. However, there are no current and reasonably foreseeable actions that would displace residents or affordable housing in the study area. Potential development (and associated growth) are expected to happen regardless of the proposed project.

19.1.2. Environmental Justice

As mentioned in the Land Use section, while the proposed project would not directly displace affordable housing, it may potentially increase property values and make properties near the proposed project attractive for redevelopment. None of the foreseeable development projects in the study area are displacing affordable housing. Potential adverse effects on environmental justice populations stemming from gentrification and/or displacement may be minimized through close coordination with the City of Pittsburgh's Affordable Housing Task Force. The Task Force is charged with assessing the current and projected future landscape of housing affordability in the City of Pittsburgh, evaluating current programs and initiatives to produce new affordable units and preserve existing ones, and making recommendations to the Mayor and City Council. Proactive efforts by the Task Force may potentially address redevelopment that may remove affordable housing along the corridor.

19.2. CUMULATIVE IMPACTS

Cumulative impacts are those that result from incremental impacts of a proposed action when added to past, present, or reasonably foreseeable future actions regardless of who undertakes such action. The cumulative impacts can result from individually minor impacts that ultimately combine into actions over a period of time.

The methodology for analysis of cumulative impacts in this document is generally consistent with the Council on Environmental Quality's *Considering Cumulative Effects Under the National Environmental Policy Act* guidance (1997). Steps taken include: identifying resources that may have cumulative impacts, defining the geographical and temporal timeframe for affected resources, describing the current health and historical context for each resource, identifying direct and indirect effects of the proposed action that may contribute to cumulative impacts, identifying other current and reasonably foreseeable actions and resulting impacts that may contribute to cumulative impacts, assessing the

potential for cumulative impacts and their magnitude and significance, and identifying potential mitigation measures.

According to the U.S. Census Bureau, in 2010 the population of the Pittsburgh Metropolitan Statistical Area (MSA) was approximately 2.36 million and there were approximately 1.03 million jobs. In 2016, the population of the Pittsburgh MSA was estimated at approximately 2.35 million and approximately 1.08 million jobs, a decrease in population of approximately 0.4 percent and an increase in jobs of approximately 4.9 percent over the 6-year period. Currently, the City of Pittsburgh is conducting a comprehensive planning process, and has not projected population or employment. Allegheny County, which encompasses the City of Pittsburgh, estimated a slight increase in population from 1.28 million in 2000 to 1.35 million in 2030 in their 2005 comprehensive plan. It is expected that this slight increase in growth would occur in the proposed project's cumulative impact study area.

Based on the potential direct and indirect impacts of the proposed project, the proposed project may have minor cumulative impacts to land use, transportation, and environmental justice. Other resources are not anticipated to experience notable direct and/or indirect impacts as a result of the proposed project; therefore, the proposed project is unlikely to contribute to cumulative impacts for those resources. The cumulative impact study area for the project generally includes the area within one (1) mile of the proposed Pittsburgh BRT alignment.

Related to this growth in population and employment, other types of reasonably foreseeable actions that are considered in this cumulative impact analysis include commercial development, residential development, roadway improvements, and transit improvements. Specific current and reasonably foreseeable actions within the cumulative impact study area include:

- Conversion of the vacant former Macy's department Downtown into a mixed-use development, a hotel, commercial space, and 311 apartments
- A 97-room hotel on Fort Pitt Boulevard
- A mixed-use development at Ninth and Penn Avenues including 185 condominiums
- A 136-unit apartment building at Eighth and Penn Avenues downtown
- 86-unit condominiums at 350 Oliver Avenue
- Conversion of the vacant Lord & Taylor Store to shared office space
- Redevelopment of the 28-acre former Civic Arena site on Centre Avenue, potentially including housing, office, and commercial space
- 300,000 sf UPMC Vision and rehabilitation Hospital near UPMC Mercy in Uptown
- A 10-story office building at 2242 Fifth Avenue in Oakland
- 620-bed UPMC Heart and Transplant Hospital at UPMC Presbyterian in Oakland
- Conversion of the Pittsburgh Athletic Association clubhouse in Oakland to office and retail space
- Conversion of a vacant auto dealership at 322 Boulevard of the Allies into offices

- 197-unit apartment building on at 3407 Forbes Avenue in Oakland
- Office development at 324 McKee Place in Oakland
- 381-unit apartment building at Centre Avenue and Craig Street in North Oakland
- Tepper Quadrangle at Carnegie Mellon University on Forbes Avenue, which would house the Tepper School of Business, an auditorium, a fitness center, and other campus facilities
- 127-unit apartment building at 5522 Baum Boulevard in Shadyside
- 320,000 square foot office building at Bakery Square on Penn Avenue in Shadyside
- 400,000 square foot UPMC Hillman Cancer Hospital on Centre Avenue in Shadyside
- Replacement or rehabilitation of the South Negley Avenue Bridge
- Forbes Avenue Betterment Project in Oakland and Squirrel Hill, including repaving, minor signal upgrades, and installation of bike lanes
- Repaving of portions of a small number of local roadways in the area of the proposed project as part of the City's annual paving program.
- NRG District Energy Center to provide heating and cooling for UPMC Mercy, Chatham Center, Consol Energy Center, with potential to serve future development in Uptown.
- The Pittsburgh Water and Sewer Authority is designing a major stormwater management project for the Four Mile Run watershed, which encompasses much of Oakland and Squirrel Hill. Major infrastructure improvements are planned in the lower portion of the watershed, outside the area of the proposed project, but a number of runoff control and green infrastructure projects have been implemented in and near the area of the proposed project.

Beyond these specific projects that are currently in progress, a number of commercial and redevelopment projects have recently been constructed in the study area, including the 389-unit Skyvue Apartments in Oakland, the 213-unit Morrow Park apartments in Bloomfield, and 175-unit Bakery Square 2.0 in Shadyside. A number of additional development projects have recently been proposed in the study area, but details and schedules have not been finalized. The City's capital budget anticipates that the Charles Anderson and Swinburne bridges will be rehabilitated or replaced. The City is currently beginning a planning process for transportation improvements in the lower Four Mile Run valley in response to the stormwater management project. The City's annual maintenance programs may include other upgrades in the coming years within the study area, including street repaving, traffic signal upgrades, stormwater management, slope remediation, parks and playgrounds. Similarly, utility companies may conduct a range of maintenance and routine upgrades to facilities within the area of the proposed project as part of their annual programs. The Port Authority of Allegheny County typically implements service adjustments four times per year, which can include minor schedule adjustments, but can include modifications to existing routes, termination of routes, or implementation of new or extended routes.

19.2.1. Land Use

The proposed project would improve transit service and construct infrastructure improvements which would support anticipated population and employment growth and associated land use development in the area of the proposed project. The incremental impact of the proposed project in combination with other past, present, and reasonably foreseeable projects comprises the potential increase in residential and commercial development. This growth would advance in compliance with the City of Pittsburgh's plans and land use regulations and consistent with the ongoing land use planning and economic development plans and programs described in the Land Use section.

19.2.2. Transportation

The proposed project would provide improved transit service along the alignment, which would provide transportation options other than single occupancy vehicles. The proposed BRT and lane reconfiguration are likely to shift congestion within the cumulative impacts study area, but would not impact overall levels of congestion, and improved transit service could offset any increases in congestion by increasing transit ridership. Population and employment within the area of the proposed project is projected to show modest growth, with corresponding small increases projected in congestion. Since a high degree of congestion currently exists at a number of locations, within the study area and on regional roadways which provide access to the study area, improvement in transit service in the corridor would result in an overall benefit to mobility and thus the proposed project would have a positive contribution to cumulative impacts on transportation. On-street parking loss would result from the proposed project, but when considered with overall parking supply in the parking area and the creation of parking from other reasonably foreseeable future projects, no cumulative impacts are expected from the proposed project.

19.2.3. Environmental Justice

The proposed project would provide improved transit shelters and frequent, reliable transit service, with shorter headways, to communities, businesses, and residences in the study area, including those serving environmental justice populations. Additional benefits could include decreased VMT and minor improvements to air quality.

As discussed in 19.1.2, the proposed project could potentially increase property values and make properties near the proposed project attractive for redevelopment. Future redevelopment of this type would occur independently of the proposed project, but it may result in the indirect effect of displacement and the possibility for gentrification of environmental justice residents in the study corridor. There is no current mandate for any of the current and reasonably foreseeable projects listed earlier in Section 3: Land Use to include affordable housing. There are and have been proposed developments in the study area that included affordable housing, but did not go forward or have not been approved, and therefore are not included as reasonably foreseeable actions in the study area. Independent of the proposed project, affordable housing has been developed along the corridor – particularly in Uptown and the Hill District – and several former public housing developments have been redeveloped as a mix of market-rate and affordable housing. The City of Pittsburgh and URA have also recently created an affordable housing trust fund of \$10 million, which may serve as a future source for supporting development of affordable housing in areas where displacement may occur.

Other transit projects, particularly any separate effort by the PAAC to update its service plan and/or revise its fare policy, should include robust public engagement efforts to determine the most effective ways to avoid and minimize adverse effects to minority populations and low-income populations. Examples of such measures may be to implement low-income fare exemptions or to use a consistent transfer fee regardless of payment type (e.g. card vs. cash). When combined with other past, present and reasonably foreseeable actions, the proposed project is expected to have an overall beneficial cumulative impact to environmental justice populations because of the enhanced transit amenities and operations that would serve these populations.

20. Section 4(f) Resources

Section 4(f) (49 USC 303) of the Department of Transportation Act of 1966 applies to publicly owned parks, recreation areas, wildlife and waterfowl refuges, and publicly or privately owned significant historic properties. Section 4(f) prohibits the approval of Federal transportation projects that require a use, as defined by Section 4(f), of publicly owned parks, recreation areas, wildlife and waterfowl refuges, or historic sites unless there is no feasible and prudent alternative and the project includes all possible planning to minimize harm. Under 23 CFR 774.3, Section 4(f) Approvals, the use of a Section 4(f) property may not be approved unless the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant would have a *de minimis* impact. *De minimis* impact is defined in 23 CFR 774.17 as follows:

- For parks, recreation areas, and wildlife and waterfowl refuges, a *de minimis* impact is one that would not adversely affect the features, attributes, or activities qualifying the property for protection under Section 4(f); and
- For historic sites, *de minimis* impact means that the FTA has determined, in accordance with 36 CFR Part 800, that no historic property is affected by the project or the project would have “no adverse effect” on the property in question.

Further, if project review determines that there is no actual use or effect on a 4(f) property, no further review is required.

Section 4(f) properties include:

- Publicly-owned parks open to the entire public during its hours of operation
- Publicly-owned recreational areas open to the entire public during its hours of operation
- Publicly-owned wildlife or waterfowl refuges
- Historic sites on or eligible for the National Register of Historic Places
- Archaeological sites on or eligible for the National Register of Historic Places and which warrant preservation in place

There are no wildlife or waterfowl refuges within the study area; therefore, they were not evaluated for potential Section 4(f) use. There are several publicly-owned parks and/or recreation areas located within the study area as well as several historic sites located within the half-mile study area. These public parks and historic resources were evaluated under the provisions of Section 4(f).

20.1. PARKS AND RECREATIONAL RESOURCES

As detailed in Section 16, above, the study area for parks and recreational areas is a quarter-mile buffer of the proposed project corridor and shown in Figures 22 through 25, the following resources are located in the study area:

- Point State Park
- Liberty Avenue Median
- Allegheny Riverfront Park
- Fort Duquesne Boulevard Park
- Market Square Park
- Thomas Parklet
- Mellon Square Park
- Jail Triangle
- Crosstown Park (proposed)
- Albert “Turk” Graham Parklet
- Tustin Playground
- Kennard Playground
- Martin Luther King Field
- Dunseith Playground
- Lawn & Ophelia Playground
- Craft Triangle
- Niagara Parklet
- Schenley Park
- Mellon Park
- Enright Parklet
- Flynn Parklet
- Highland Park
- Davis Parklet

20.2. HISTORIC RESOURCES

The APE is the geographic area or areas in which an undertaking may directly or indirectly alter the character or use of historic properties, if any such properties exist. Therefore, the APE serves as the study area for Section 4(f) historic properties that are potentially eligible for listing or are listed on the NRHP.

The study area for historic resources is the APE which includes a 50-foot buffer around proposed bus station and shelter locations to identify the potential for direct effects, as well as properties immediately across the roadway to identify potential indirect effects. As discussed in Section 11, Historic and Cultural Resources, the following are historic and cultural resources identified within the Study Area:

Table 15: Historic and Cultural Resources within Study Area

Resource	Status
Pittsburgh Downtown Historic District	Listed
Allegheny Courthouse and Jail Complex	National Historic Landmark (NHL)
Reymer Brothers' Candy Factory	Listed
Fifth Avenue High School	Listed
Cathedral of Learning (University of Pittsburgh)	Listed
Schenley Farms Historic District	Listed
Rodef Shalon Temple	Listed
East Liberty Commercial Historic District	Listed
Highland Park Historic District	Listed
Schenley Park	Listed
Diamond National Bank Building	Eligible
Methodist Residents for Young Women/M.E. Deaconess Home	Eligible
Highland Park	Eligible

20.3. SECTION 4(F) EVALUATION

All historic properties and parklands identified in the Study Area were evaluated to determine if a "use" of a protected resource would occur under Section 4(f) of the U.S. Department of Transportation Act of 1966. As defined in 23 CFR Section 774.17, the use of a protected Section 4(f) resource occurs when any of the following conditions are met:

- Land is permanently incorporated into a transportation facility;
- There is a temporary occupancy of land that is adverse in terms of the statute's preservation purposes; or
- There is a constructive use which occurs when a project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired.

Through collaborative planning with the City of Pittsburgh and Port Authority of Allegheny County, stations locations and project elements were planned to avoid impacts to parks and historic resources particularly along Forbes Avenue near Schenley Drive. Consultation with the City of Pittsburgh and the Pittsburgh Parks Conservancy resulted in the locating of station locations to minimize direct and indirect impacts to these resources. As part of the Section 106 process, FTA consulted with the Pennsylvania State Historic and Preservation Office and the potential for the project to affect historic properties. On March 26, 2018, the Pennsylvania State Historic and Preservation Office sent their concurrence that the proposed project would have no adverse effect on one National Historic Landmark building (the Allegheny Courthouse and Jail Complex) and no effect on other identified historic resources, eligible historic resources, contributing resources, and that the proposed project would have no effect on other historic properties within the APE.

No physical impacts to parks or historic resources are expected, but since the proposed project is close in proximity to Mellon Square, Jail Triangle, Schenley Park, Flynn Parklet and has proposed stations

bordering Schenley Park and Flynn Parklet, there is a potential for proximity impacts such as access, noise, and visual intrusion. Two proposed stations are located on the border of Schenley Park; however, there are no impacts to the accessibility of the Park and the project would not result in adverse traffic noise impacts. Temporary impacts may be generated due to noise and vibration during construction of the stations near Schenley Park. Measures described in the Construction Management Plan as detailed in Sections 13.1 and 21, Noise and Vibration, would reduce and minimize construction noise annoyance during construction. The project area is characterized as urbanized so there would be no changes to the visual character.

The design of the stations and the proposed bus route would be compatible with the historic districts located in the study and the existing urban landscape and land uses in the study area. The streetscape features of signage, traffic signals, queue jumps, and supporting infrastructure would not be visually intrusive or diminish the character of the historic resources and parks in the study area. The Project would not physically alter any contributing elements to the Historic Districts within the study area.

The proposed project would not result in a use of Section 4(f) properties as none of the 4(f) properties would be temporarily or permanently incorporated into the proposed project. Proximity effects from the proposed project would not substantially impair the features and attributes that qualify these properties for protection under 4(f). In summary, the proposed project would not result in the “use,” either direct, temporary, or constructive, of any Section 4(f) properties.

21. Mitigation Measures

MITIGATION MEASURES

The following are avoidance or mitigation measures that will be taken to minimize or mitigate the proposed project's impacts.

Businesses, Residents, and Public Facilities

- Send and post notices broadly to residents, businesses, and project stakeholders in advance of construction activities to provide information about construction activity schedule, detour routes and any potential access changes.
- Temporary impacts would also affect access to neighborhoods, local businesses, and commercial facilities. For example, roadway and lane closures may increase traffic congestion or require detours. Lane and sidewalk construction could affect access to building entrances or driveways. Best construction management practices would be employed to ensure the safety and access of residents, employees, and construction workers.
- Install signs near residential areas to discourage cut-through traffic during construction.
- Maintain pedestrian and bicyclist accessibility to the greatest extent possible. Where construction work zones impact existing pedestrian facilities, ensure that Americans with Disabilities Act (ADA)-compliant alternate routes and detour signage are provided.
- Shield construction lighting and/or focus lighting on work areas to minimize ambient spillover of light into adjacent areas, especially near residences, churches and parks.

Construction contractor(s) shall follow City of Pittsburgh DBE requirements as set forth by the Equal Opportunity Review Commission: <http://pittsburghpa.gov/bac/eorc/index.html>

- Two of three acquisitions would be sliver takes adjacent to the rights-of-way. Property acquisition would not displace or relocate occupied residential or business structures. Acquisitions would comply with the federal Uniform Act, and relocation advisory services would be provided to property owners.
- Final station design and station sizing would be further developed as preliminary engineering and final design advance and public and stakeholder input is received and considered. Stations and shelters would be designed to be consistent with the character of the neighborhood and would minimize any visual impacts.

Transportation System Users

- On Fifth and Forbes Avenues at the western end of Uptown, two general traffic lanes in each direction would be retained to accommodate traffic volumes. Elsewhere in Uptown, Fifth and Forbes Avenues would be reduced to a single general traffic lane in each direction.
- City of Pittsburgh would coordinate with property owners in Downtown Pittsburgh to identify alternative parking locations for loading and valet operations.
- For transit users of services being modified, headways and service would be adjusted based upon demand and operating requirements.
- Signalized intersections would be upgraded to provide accessible ramps, cross walks and traffic signals if they are not already in place. Removal of the contra-flow bus lane on Fifth Avenue would be a safety enhancement for all users of the street.
- Traffic signal modifications and placement of signing and pavement markings would be performed using short-term traffic control measures, with little disruption to the surrounding areas. Station construction is anticipated to involve temporary closures of sidewalks. Pedestrian detours or alternate paths would be provided around work areas.
- In the event of lane closures during the construction in Uptown on Fifth Avenue and Forbes Avenue, transit and bikes would be sharing the single lane available with general traffic resulting in some delays. Transportation network users would be temporarily redirected to proximate roadways to ensure safety during construction.
- It is anticipated that reconstruction of the street would be conducted in half widths in order to maintain a single traffic lane. Work is anticipated to occur in four major phases to limit the potential for impacts to traffic, parking, and pedestrian access and would include sidewalk closures, lane closures, and parking prohibition in work areas. During construction, transit and bikes would be sharing the single available lane with general traffic resulting in some increase in delays. The actual order of the phases may vary. To minimize the localized impact of parking prohibitions, work may be scheduled concurrently in alternate blocks. Construction may occur on both Forbes and Fifth Avenues simultaneously. During construction, transit and bikes may be sharing the single available lane with general traffic, resulting in some increase in delays.
- The section of Boyd Street between Watson Street would be closed construct the permanent closure of that segment. A detour would be required and is anticipated to become the permanent condition after construction.
- Roadway reconstruction would be constructed in phases—with a single-lane closure while the widened roadway and sidewalk are constructed offline—and then traffic would be shifted to the widened portion of the roadway while reconstructing the opposite side.
- The existing bus lane and adjacent sidewalk along the curb lane of Fifth Avenue would be reconstructed from Craft Avenue to Bellefield Avenue. A lane closure is anticipated during this work, and traffic impacts can be anticipated due to reduced traffic capacity. Repaving in the bus

lanes on Fifth and Forbes Avenues may require short-term lane closures. Transportation network users may be temporarily redirected to proximate roadways to ensure safety during construction.

- North Neville Street would be milled and repaved from Fifth Avenue to Centre Avenue. Short-term traffic impacts, including detours, can be anticipated during this work.
- Throughout Downtown, Uptown, Oakland, Squirrel Hill, and Highland Park, construction would include minor traffic signal modifications, changes in signing and pavement marking, and station construction. Traffic signal modifications and placement of signing and pavement markings would be performed using short-term traffic control measures, with little disruption to the surrounding areas. Station construction would involve temporary closures of sidewalks or travel lanes. Pedestrian detours or alternate paths would be provided around work areas.
- The proposed project would result in new transfers between the routes that would be short turned, such as the 61D, the 71A, the 71C, and the 71D. Riders would have alternatives to these routes for direct service from their communities to downtown, which would provide an alternative to avoid a transfer. The service plan is designed to minimize transfers.

Threatened and Endangered Species

- To avoid impacts to the Peregrine Falcon, construction and operation would avoid sensitive nesting areas and avoid construction activities during nesting seasons (February 1 through April 15). The proposed project does not assume the removal of any trees or potential habitat for this species.

Noise

- Conduct construction activities during the daytime whenever possible.
- Conduct truck loading, unloading, and hauling operations in a manner that minimizes noise.
- Route construction equipment and other vehicles carrying spoil, concrete, or other materials over routes that would cause the least disturbance to residents near the activity.
- Locate site stationary equipment away from residential areas to the extent reasonably feasible within the site/staging area.
- Employ the best available control technologies to limit excessive noise when working near sensitive receptors.
- Adequately notify the public in advance of construction operations and schedules, including methods such as construction-alert publications and a Noise Complaint Hotline to handle complaints quickly.

22. References

Department of Health and Human Services (HHS). 2018. HHS Action Plan to Reduce Racial and Ethnic Health Disparities: A Nation free of Disparities in Health and Health Care.

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Port Authority of Allegheny County. 2016. Title VI Program 2016-2018, Language Assistance Plan. June 2016.

U.S. Census Bureau. 2010. 2010 Decennial Census.

Table P5: Hispanic or Latino Origin by Race

U.S. Census Bureau. 2018. Year-Year 5-year Estimates.

Table B02001: Race

Table B17021: Poverty Status of Individuals in the Past 12 Months by Living Arrangement