



DOWNTOWN- UPTOWN – OAKLAND – EAST END BUS RAPID TRANSIT PROJECT

PURPOSE AND NEED STATEMENT REPORT

PORT AUTHORITY OF ALLEGHENY COUNTY
PITTSBURGH, PA



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DOWNTOWN – UPTOWN – OAKLAND – EAST END BUS RAPID TRANSIT STUDY PURPOSE & NEED STATEMENT

1.0 Background

The Pittsburgh Urban Redevelopment Authority (URA), in cooperation with the Port Authority of Allegheny County, the City of Pittsburgh, and Allegheny County, is proposing to develop a new Bus Rapid Transit (BRT) project between Downtown Pittsburgh and Oakland along Fifth and Forbes Avenues and extending to several neighborhoods east of Oakland. The project, known as the Downtown – Uptown – Oakland – East End BRT Project, would provide higher quality, reliable transit service between the region’s two major employment centers (Downtown Pittsburgh and Oakland) and the residential communities to the east.

Downtown Pittsburgh (known locally as “The Golden Triangle”) and the nearby eastern neighborhood of Oakland areas are, respectively, the first and second greatest activity centers in the Pittsburgh region. These areas are also the second and third largest traffic generators in the Commonwealth of Pennsylvania, the major hubs of office, commercial and retail employment. These areas also contain major universities such as the University of Pittsburgh, Carnegie Mellon University and Duquesne University, and several hospitals, as well as other cultural venues and major sports arenas.¹

The Port Authority operates the nation's 26th largest public transportation system, a county-wide transit system that serves the City of Pittsburgh and over 90 municipalities in Allegheny County as well as several communities in surrounding counties. Serving over 64 million transit riders per year, these transit services are comprised of 98 bus routes, three light rail lines, and two inclined planes/funicular railways. The Port Authority operates bus service on local streets and regional arterials as well as along three exclusive bus-only roads (busways) and a high-occupancy vehicle lane.

Proposals for rapid transit investment in the Downtown – Uptown – Oakland – East End corridor have evolved over many years to define BRT as the preferred mode in this corridor. Initial studies conducted in the 1990s and early to mid-2000s analyzed and compared options for extending the existing light rail system east of Downtown Pittsburgh or by providing express bus services or BRT. In addition, in 2009, the Port Authority completed a short-range Transit Development Plan (TDP), which assessed how to reorganize the existing bus route network to provide more effective, efficient, and improved service within available financial resources. One of the TDP’s major recommendations was to implement a BRT service in the Downtown – Oakland – East End corridor.

While both light rail extension and BRT investments are identified in the region’s long-range transportation plan vision, given the very high costs and long implementation period for constructing a light rail extension, technical engineering feasibility considerations in the corridor, and relative benefits that could be obtained through more cost-effective investment in BRT in this corridor, BRT was ultimately identified by the Southwest Pennsylvania Commission and the Port Authority as the preferred mode for improvements and has been adopted into the region’s long-range transportation plan.

In 2011, Port Authority began an Alternatives Analysis of BRT in the corridor. Through technical analyses, and public and stakeholder review and input, and a two-level screening process, two major build alternatives were identified as the most feasible for this corridor: constructing dedicated bus lanes on

¹Southwestern Pennsylvania Commission, *Mapping the Future* (Regional Long Range Transportation Plan), June 2016.

Fifth Avenue in both directions or constructing a westbound (Oakland to Downtown) Fifth Avenue dedicated bus lane and an eastbound (Downtown to Oakland) Forbes Avenue dedicated bus lane. Both alternatives are also proposed to incorporate bicycle lanes and pedestrian amenities where feasible, consistent with a “complete streets” approach to multimodal mobility improvements.

With the election of a new mayor in 2013, the City of Pittsburgh assumed a more prominent role in the project. This led to an October 2014 Memorandum of Understanding among the City of Pittsburgh, Urban Redevelopment Authority, Allegheny County, and Port Authority which further delineated agency roles for the BRT project. Additional engineering analysis and traffic analyses, as well as public and stakeholder outreach were conducted from 2014 to 2016 to further refine the project and alternatives. As the Uptown neighborhood is one of the communities in the project corridor, additional BRT planning was coordinated with planning for the Uptown Eco-Innovation District which began in 2015.

This report documents the purpose and need for the project, including information about why transit improvements are needed in this corridor and how the recommended improvements will be measured in selecting a locally preferred alternative (LPA).

1.1 Project Description

This project proposes to connect Downtown Pittsburgh with Uptown, Oakland, and other East End neighborhoods. The project includes changes to both physical infrastructure and transit operations along the Downtown-Uptown-Oakland portion of the corridor (BRT Core) along with changes to transit operations in the East End portion of the corridor – Highland Park, Squirrel Hill, and the East Busway – and provision of stations along the Highland Park and Squirrel Hill branches. **Figure 1** and **Figure 2** illustrate the proposed infrastructure and routing changes, respectively, and are further discussed below.

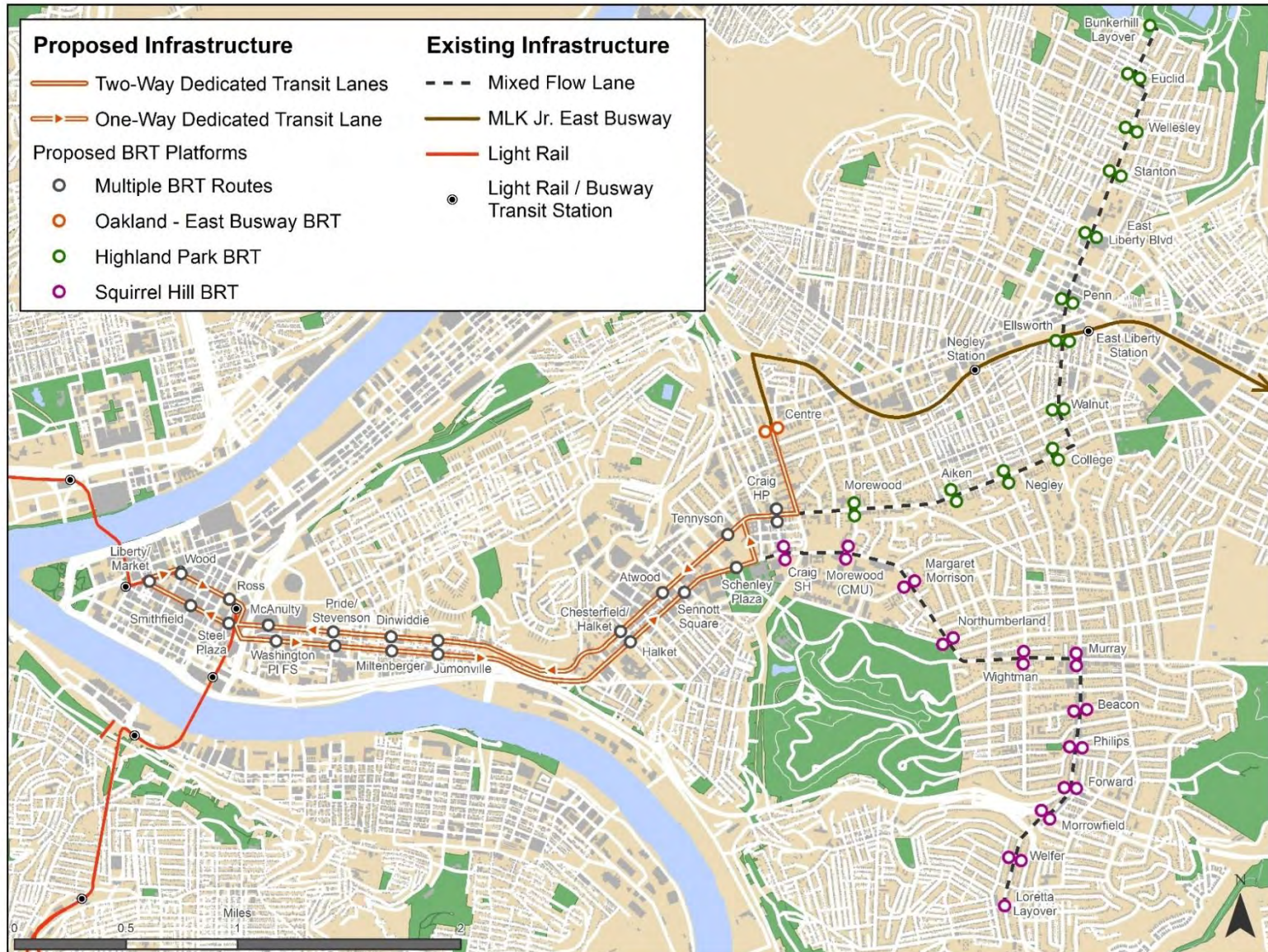
1.1.1 Infrastructure

The BRT Core corridor alignment would extend east from Liberty Avenue in Downtown Pittsburgh to Neville Street at Centre Avenue in North Oakland, primarily using Fifth and Forbes Avenues. Dedicated transit lanes and BRT stations would be installed along this portion of the project corridor.

At the eastern limit of the BRT Core corridor, the proposed improvements would also provide a new and direct connection between the BRT corridor and the Martin Luther King, Jr. East Busway, an existing two-lane bus-only highway serving the City of Pittsburgh’s eastern neighborhoods and suburbs. Additionally, BRT service would be extended to both the Squirrel Hill and Highland Park neighborhoods, operating in mixed-flow lanes with BRT stations and select queue jump lane locations.

As shown on **Figure 1**, 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 extend for 3.62 miles and westbound physical improvements from Neville Street/Centre Avenue to Liberty Avenue/Fifth Avenue extend for 4.05 miles, respectively.

Figure 1: Project Infrastructure Overview Map



The following major capital improvements are proposed as part of the project:

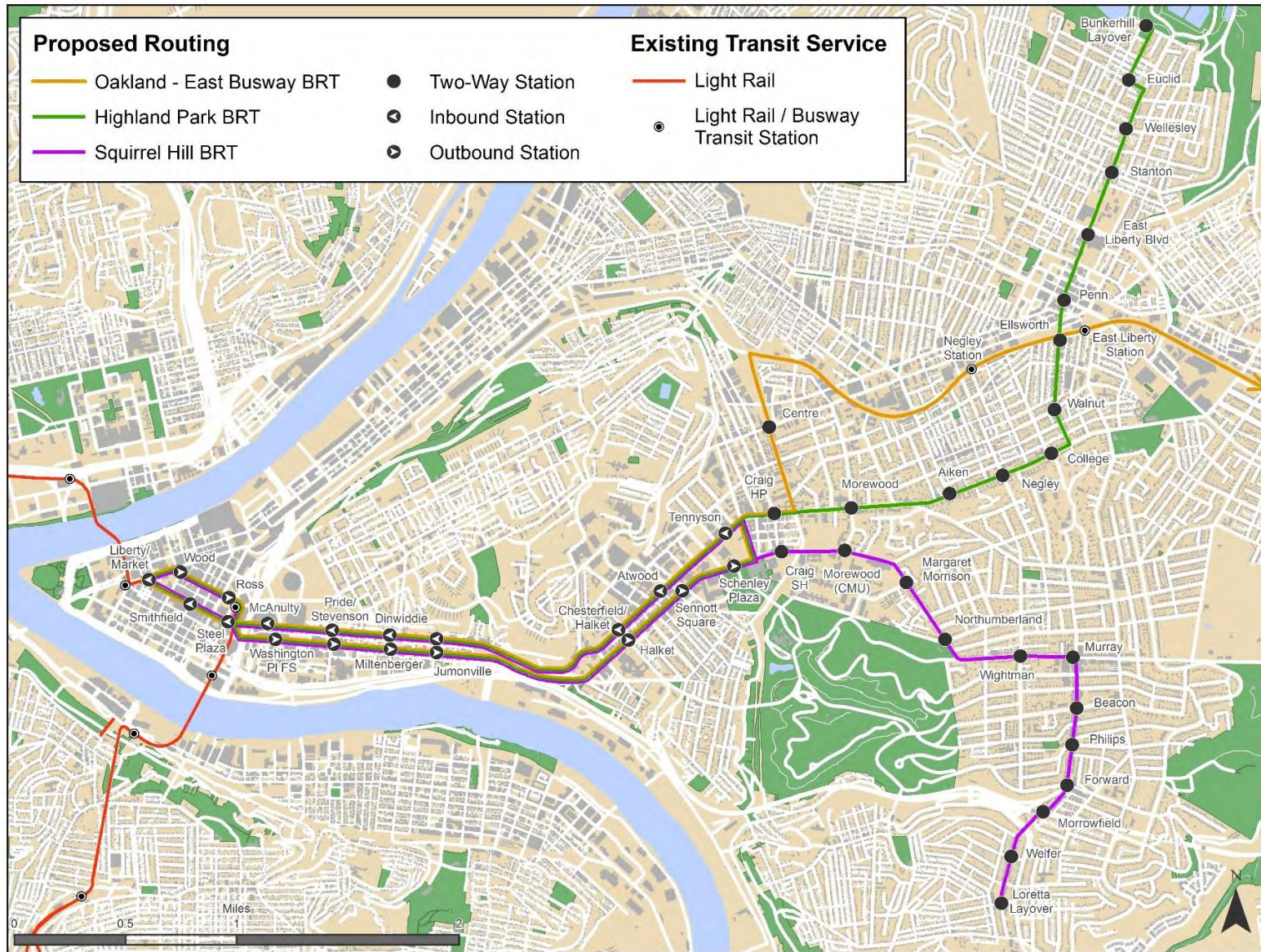
- **Dedicated Lanes:** Curbside running, dedicated bus-only lanes are proposed throughout the length of the corridor within the BRT Core corridor.
- **Queue Jumps:** Queue jumps may be considered at certain locations within the BRT Core corridor as well as east of Oakland to further facilitate fast and reliable bus operations.
- **Enhanced/Branded Stations:** Twelve enhanced and branded BRT station pairs (a total of 23 platforms) are proposed along the BRT Core corridor. An additional 12 stations (a total of 24 platforms) and 12 stations (a total of 24 platforms) are proposed along the Highland Park Branch and Squirrel Hill Branch, respectively. The 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.
- **Traffic Signals:** Forty-six traffic signal modifications or replacements are proposed along the corridor. Changes may include altering existing geometric and striping plans, upgrading controller equipment, or adding transit signal priority (TSP) to improve traffic progression, provide bus priority, improve bus service reliability, and to reduce delays.
- **Battery Electric, Branded Buses and Supporting Infrastructure:** Battery electric, articulated buses are proposed for the BRT Core service; the Squirrel Hill and Highland Park branches would be operated with diesel buses. New charging stations and retrofitting of existing maintenance facilities to house and support this new fleet technology are also proposed. The number of buses to be requested will be determined based on finalized reconfiguration of existing routes that will utilize the BRT corridor, and integration of the new fleet with system-wide vehicle fleet maintenance schedules. All vehicles, which in a shorter timeframe may not be battery electric, would still be branded to distinguish the BRT buses.

Other physical improvements being investigated include potential for upgraded and new signals to facilitate efficient traffic. Dedicated bicycle facilities are also proposed throughout the BRT Core corridor to provide effective multimodal transferability and access in the corridor.

1.1.2 Routing

As shown on **Figure 2**, the routing changes would extend outside of the BRT Core corridor along three branches – Highland Park BRT (alignment along existing 71B route), Squirrel Hill BRT (alignment along existing 61D route), and East Busway BRT (alignment along existing P3 route). The proposed BRT operations would enhance existing services for the 61 series (Routes 61A, 61B, 61C, and 61D), the 71 series (Routes 71A, 71B, 71C, and 71D), and P3 routes. The Port Authority is currently developing a comprehensive operational plan to consolidate and streamline these services efficiently and further coordinate other connecting bus service within and adjacent to the corridor.

Figure 2: Proposed Routing Overview Map



The proposed BRT service within the BRT Core corridor would operate at least 18 hours per day, seven days a week, with an effective 4- to 5-minute headway for buses during weekday peak periods and an effective 8- to 10-minute headway for buses during weekday off-peak periods. Weekend service would operate with 10-minute headways. These effective headways would be achieved by overlapping the Highland Park BRT, Squirrel Hill BRT, and East Busway BRT services within the BRT Core corridor. Specific operating plans for each branch are under development.

1.1.3 Implementation

The project may be implemented in phases, depending on funding availability. The first phase would include the BRT Core corridor infrastructure improvements and Oakland – East Busway BRT service. The Highland Park and Squirrel Hill BRT services and associated stations could be implemented as later phases.

1.2 Study Area Context

1.2.1 Existing Transit Service

Within the project area, the Port Authority currently operates eight existing high-frequency routes that connect Downtown Pittsburgh, Oakland, and East End neighborhoods along the entire length of the corridor (61A, 61B, 61C, 61D, 71A, 71B, 71C and 71D), as well as the P3 which connects Oakland to the East Busway which would be restructured to form the proposed BRT Core service. As shown in **Table 1**, the average weekday ridership along these routes varies between 42,900 and 49,300 riders when the universities are in session, representing almost a quarter of the total system average weekday riders.²

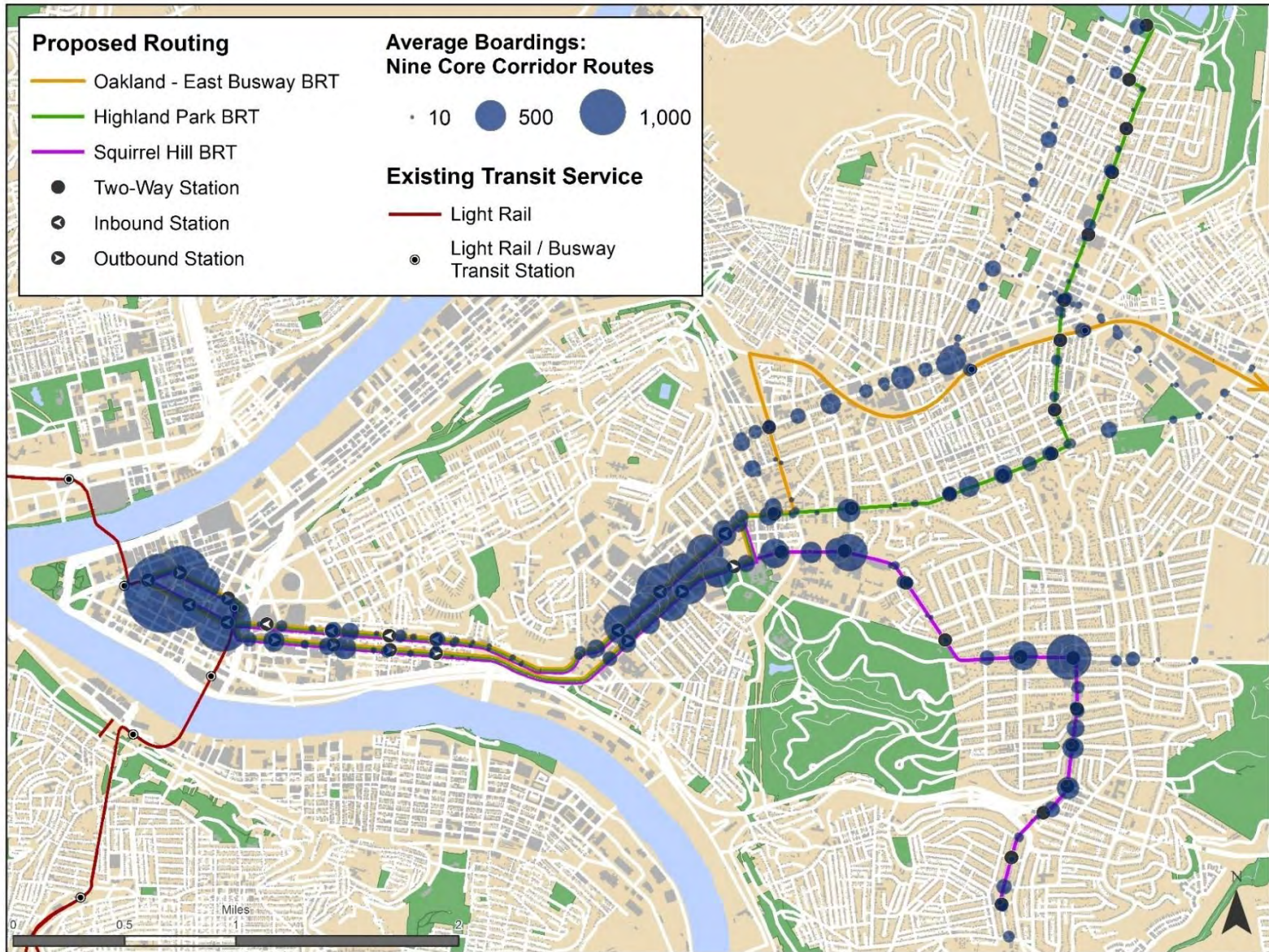
Table 1: Average Weekday Ridership for Nine Core Corridor Bus Routes

Route	2016 Average Weekday Ridership	2016 Average Peak (October) Weekday Ridership
61A	3,955	4,464
61B	4,687	5,323
61C	6,228	6,864
61D	5,099	5,920
71A	5,708	6,552
71B	4,686	5,704
71C	5,477	6,209
71D	4,361	5,164
P3	2,712	3,153
Total	42,913	49,323

As shown on **Figure 3**, the majority of average weekday boardings occur either in Downtown Pittsburgh or Oakland. There are an additional 10 routes that provide service through Oakland along portions of the proposed BRT corridor (28X, 54, 58, 65, 67, 69, 75, 81, 83, and 93) which could also be reorganized after implementation of the BRT service.

² Port Authority of Allegheny County, 2016 Calendar Year Ridership Data, 2017.

Figure 3: Average Daily Boardings for Nine Core Corridor Bus Routes



1.2.2 Existing Demographics

Based on 2015 U.S. Census data, the study area is home to 59,830 residents, including college students, (approximately 19 percent of the city’s population), 22,547 households (approximately 17 percent of the city’s households), and 141,500 jobs (almost 51 percent of the city’s total jobs).³ Minority populations comprise approximately 33 percent of the study area population, which is similar to city-wide composition (36 percent). Notably, the proportion of zero-car households and households below the poverty line are higher within the study area compared to city-wide demographics. While zero-car households make up approximately 25 percent of the total households within the city, 28 percent of households within the study area are zero-car households. Households below the poverty line comprise approximately 21 percent of all households citywide, but within the study area approximately 25 percent of households are below the poverty line.⁴

A summary demographic profile of the study area (BRT Core corridor, Highland Park BRT branch, and Squirrel Hill BRT branch) within ¼-mile of the project and comparative city-wide data are provided in **Table 2**.

Table 2: Study Area and City of Pittsburgh Demographic Summary

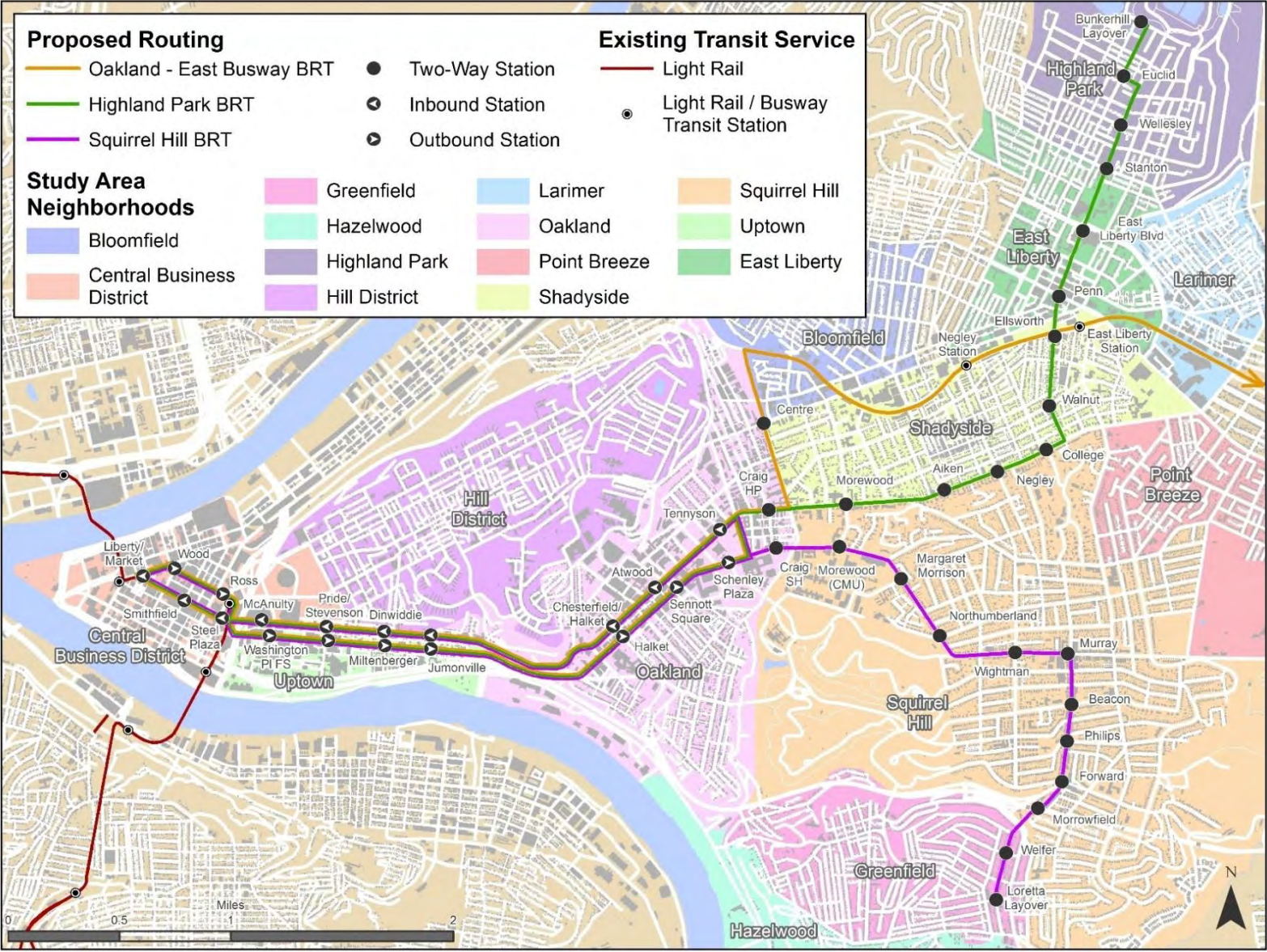
Variable	Within 1/4 Mile			City of Pittsburgh			% of City Total Within 1/4 Mile
	Count	Density	% of Total	Count	Density	% of Total	
Population	59,830	28,468	-	309,327	6,027	-	19%
Minority Population	19,599	9,326	33%	110,098	2,145	36%	18%
Youth Population (0-17)	5,871	2,793	10%	49,778	970	16%	12%
Senior Population (65+)	7,169	3,411	12%	43,055	839	14%	17%
Total Households	22,547	10,729	-	133,933	2,610	-	17%
Zero Car Households	6,382	3,037	28%	32,916	641	25%	19%
Households Below Poverty Line	5,602	2,666	25%	28,793	561	21%	19%
Employment	141,500	67,329	-	279,278	5,442	-	51%
Area (sq. mi.)	4.79	-	-	51.32	-	-	9%

The study area boundaries extend through the Central Business District (Downtown Pittsburgh) as well as 12 other distinct neighborhood areas, as shown on **Figure 4**.

³ U.S. Census, 2015 ACS Survey 5-Year Data, B01001 and B25044. LEHD Origin-Destination Employment Statistics, Workplace Area Characteristics, 2014.

⁴ U.S. Census, 2015 ACS Survey 5-Year Data, B03002, B25044, B25044, B17017.

Figure 4: Neighborhood Areas within ¼-Mile of Corridor



There are four major neighborhoods located within ¼-mile of the BRT Core route:

- **The Central Business District (Downtown Pittsburgh)** is Southwestern Pennsylvania’s major office center and continues to be a major retail center. It is also the location of several large hotels, many restaurants, the David L. Lawrence Convention Center, the Cultural District with three major performance halls, Point Park University, Robert Morris University, the Greyhound Terminal and Amtrak Station, and Point State Park.
- **Uptown**, located just east of Downtown Pittsburgh, is a residential area with Mercy Hospital, Duquesne University, and PPG Paints Arena along with small-scale commercial development dominating the western end of the neighborhood. Uptown makes up the majority of the Uptown-Oakland Eco-Innovation District, located between the Central Business District and large employment centers in Oakland. With more than ⅓ of its properties either currently vacant or underutilized, the Uptown-Oakland Eco-Innovation District presents opportunities for redevelopment and new development.⁵
- **The Hill District** is located north of Uptown and Oakland and is made up of five smaller neighborhoods: Crawford-Roberts, Terrace Village, Middle Hill, Upper Hill, and Bedford Dwellings. The Hill House is the neighborhood’s community center and efforts are underway to develop Centre Avenue into a commercial corridor. Aside from Pittsburgh Veterans Administration (VA) Hospital, located near the Oakland border, the Hill District is a predominantly residential area where 9 out of 10 residents identify as a racial minority and 43 percent of households fall below the poverty line. A large number of residents are likely to depend on public transit; 23 percent of the population is under 18 years old and 20 percent is 65 years old or older. Fifty-seven percent of all households in the Hill District do not have access to a personal vehicle.
- **Oakland** is Pittsburgh’s educational and medical hub and includes Carlow University, the University of Pittsburgh, Carnegie Mellon University, Magee-Women’s Hospital, University of Pittsburgh Medical Center (UPMC) Presbyterian, UPMC Montefiore, and Western Psychiatric Institute, among other health services and facilities. Oakland is also considered Pittsburgh’s civic “center” due to the presence of several cultural attractions such as the Carnegie Museums of Art and Natural History, the Carnegie Library, Carnegie Music Hall, the Cathedral of Learning/Nationality Rooms, and the Stephen Foster Memorial. Forbes Avenue is Oakland’s major commercial corridor with bars, restaurants and shopping located throughout the corridor. Craig Street is a secondary commercial street with restaurants and specialty shops. Due to the presence of these educational, medical, and cultural resources, Oakland is the city’s second largest employment hub, with nearly 65,000 jobs located within less than 1.5 square miles. Within ¼-mile of the project, there are 56,572 employees.

Along the northeastern portion of the extended BRT corridor (Highland Park Branch), there are six neighborhoods located within a ¼-mile of the corridor: Shadyside, Bloomfield, East Liberty, Point Breeze, Larimer, and Highland Park. Combined, there are over 20,000 people, 10,000 households, and over 8,000 jobs within ¼-mile of the proposed corridor. Minority populations (38 percent), households below the poverty line (19.6 percent), zero-car households (24.4 percent) as well as youth (14.4 percent) and senior (13.4 percent) populations within a ¼-mile buffer of the corridor in these neighborhoods are similar to city-wide averages. Notably, within the ¼-mile buffer, both Shadyside and Highland Park contain high population densities comparative to other neighborhoods in the BRT corridor, with the exception of Uptown and Oakland in the BRT Core area.

⁵ Eco-Innovation District, Uptown-Oakland, “What Are We Learning? Vacancy + Underutilized Properties”. Accessed at www.ecoinnovationdistrict.org on February 8, 2017.

Along the southeastern portion of the extended BRT corridor (Squirrel Hill Branch), there are three neighborhoods located within a ¼-mile: Squirrel Hill, Greenfield, and Hazelwood. Combined, there are approximately 18,500 people, 6,892 households, and over 5,500 jobs within ¼-mile of the proposed corridor. Minority populations (25 percent), households below the poverty line (16.3 percent), zero-car households (17.4 percent) as well as youth (14 percent) populations within a ¼-mile buffer of the corridor in these neighborhoods are somewhat lower than city-wide averages. Senior populations (14.6 percent) within a ¼-mile buffer in these neighborhoods are similar to city-wide averages. Population densities in both the Squirrel Hill and Greenfield neighborhood are generally high compared to other neighborhoods within the entirety of the BRT corridor, with the exceptions of Uptown, Oakland, and Shadyside.

2.0 Problem Definition

Analyses of conditions within the corridor have identified several problems which define the overall need for transit service improvements. These factors, along with other planning initiatives in the corridor, such as economic development strategies, help to define the purpose of the project, as further described in **Section 3**.

2.1 Regional Travel Demands Converge on the Downtown Pittsburgh and Oakland Employment Hubs, Leading to Congestion

The concentration of employment in Downtown Pittsburgh and Oakland places large regional travel demands on access within the corridor. This contributes to congested traffic conditions for both buses and automobile traffic. Of the approximately 279,000 jobs within the City of Pittsburgh, 75 percent of those employees currently live outside of the city limits and commute into the city daily for work. For the 131,627 employees living within the city itself, over half of those commuters are also commuting within the city daily for work. These travel demands are concentrated within the ¼-mile study area – which collectively provides 50 percent of all jobs in the city.⁶

Average daily traffic along the corridor in Uptown is approximately 8,850 vehicles on Fifth Avenue and 9,940 vehicles on Forbes Avenue, totaling 18,790 vehicles.⁷ Average daily traffic along the corridor in Oakland at Atwood Street is approximately 16,080 vehicles on Fifth Avenue and 13,790 vehicles on Forbes Avenue, totaling 29,870 vehicles.⁸ There are 42 signalized intersections along the corridor; 33 signalized intersections currently operate at acceptable levels of service (Level of Service A, B, C, or D).⁹ As a result of dispersed regional origins of traffic demand and automobile traffic entering and exiting the corridor, nine signalized intersections along the corridor (shown in **Table 3**) currently operate at unacceptable levels of service (Level of Service E or F) during morning and/or evening peak commuting periods.

⁶ Longitudinal Employer Household Dynamics, Inflow Outflow Patterns - All Jobs, 2014.

⁷ PennDOT ITMS Site 8057: Eastbound Forbes between Seneca Street and Moultrie Street (2013) and Site 27375: Westbound Fifth Avenue between Stevenson Street and Magee Street (2012).

⁸ PennDOT ITMS Site 19400: Eastbound Forbes Avenue between Atwood Street and Oakland Avenue (2013) and Site 38682: Westbound Fifth Avenue between Atwood Street and Meyran Avenue (2010).

⁹ Port Authority of Allegheny County, *Downtown-Uptown-Oakland East End Bus Rapid Transit Fatal Flaw Analysis*, 2017.

Based on recent regional forecasts, traffic demand in Uptown is anticipated to remain relatively stable. However, traffic demands in Oakland are expected to increase by up to 10 percent to 12 percent by 2035.¹⁰ With many key intersections already at capacity, the period of peak congestion each day can be anticipated to increase in duration.

Table 3: Existing Intersections with Unacceptable Levels of Service

Intersection	Neighborhood	AM Peak	PM Peak
Liberty Avenue/Fifth Avenue	Downtown Pittsburgh	E	C
Forbes Avenue/Liberty Bridge/Sixth Avenue	Downtown Pittsburgh	F	D
Forbes Avenue/Chatham Square	Uptown	F	C
Fifth Avenue/Birmingham Bridge	Uptown	E	F
Forbes Avenue/Bellefield Avenue	Oakland	F	C
Forbes Avenue/Craig Street	Oakland	F	D
Fifth Avenue/Craig Street	Oakland	F	F
Forbes Avenue/Morewood Avenue	Oakland	E	F
Fifth Avenue/Morewood Avenue	Oakland	C	E

2.2 Direct Connections to these Major Employment Hubs is Lacking

Although there are other high speed roadways located south and north of Fifth and Forbes Avenues, these roadways do not provide direct access to most of the major trip generators in Downtown Pittsburgh and Oakland and are also congested in peak travel hours. Further, dense development and other transportation infrastructure along the corridor limit the ability to widen roadways any further and topographic features limit the ability of other roadways to serve demands in the corridor. As a result, both automobiles and buses must operate in mixed-flow lanes, causing additional delays to travel flow in the corridor.

While a number of buses operate within and connecting to the corridor, the effectiveness of bus services is currently limited by a lack of high speed connectivity between these major employment markets in Downtown Pittsburgh and Oakland. The high-speed Martin Luther King, Jr. East Busway is located to the north of the corridor, but its alignment is located too far from Fifth and Forbes Avenues to serve Uptown and many of Oakland’s major trip generators. Additionally, a bus routed between Downtown Pittsburgh and Oakland on the East Busway would need to access Oakland via the Neville Ramp which is located at the northeastern corner of Oakland. Such a route would require “backtracking” to provide access to many of Oakland’s major trip generators, resulting in circuitous routing that provides limited to no travel time benefits over existing services.

2.3 Current Transit Demands are High and Capacity is Limited

The Port Authority currently operates nine core routes within the corridor limits as well as 10 connecting bus routes in the ¼-mile study area that provide transit connections throughout the county to this corridor. These nine core routes provide access between Downtown Pittsburgh and Oakland today and serve between 42,900 and 49,300 average weekday riders, when the universities are in session. Ridership on these routes alone represents almost a quarter of the total system average weekday riders.

¹⁰ Southwestern Pennsylvania Commission (SPC), SPC Cycle 9 Forecasts, 2011.

As shown in **Table 4**, existing scheduled transit service along these routes is frequent and the effective frequency along the corridor between Downtown Pittsburgh and Oakland is approximately 2 minutes during peak and mid-day periods and 3 minutes during the evening.¹¹

Table 4: Existing Average Weekday Frequency for Nine Core Corridor Bus Routes

Route	AM Peak Frequency	Mid-day Frequency	PM Peak Frequency	Evening Frequency
61A	15	20	15	30
61B	15	20	15	30
61C	15	20	15	30
61D	15	20	15	30
71A	15	15	15	30
71B	15	15	15	30
71C	15	15	15	30
71D	15	15	15	30
P3	10	30	10	30
Combined/Effective	2	2	2	3

Although service is frequent in the corridor, delays due to congested conditions and buses operating in mixed-flow lanes cause buses to “bunch” (operate in uneven intervals). This results in overcrowding of the first vehicles in a platoon and underutilization of buses at the end of a platoon. A recent Carnegie Mellon University study found up to 80 percent of peak hour buses along the corridor operate within 800 feet of another bus servicing the same line in the same direction.¹² The uneven distribution of loads reduces both customer satisfaction and operational efficiency and increases operating costs.

Crowded trip conditions, when the number of riders exceeds 100 percent of the seated capacity, occur frequently on these routes. As shown in **Table 5**, 13 percent and 18 percent of average weekday and peak hour trips are crowded, respectively.¹³ Additional bus trips can be added to the corridor to increase capacity to offset the common crowding, but this would not be an effective approach. Additional buses would increase operating costs while overcrowding would continue to occur due to delays associated with operating in mixed-flow lanes.

¹¹ Port Authority of Allegheny County, 2016 Calendar Year Schedule, 2017.

¹² Students for Urban Data Systems at Carnegie, “Do Pittsburgh’s Buses Bunch?”, 2016.

¹³ Port Authority of Allegheny County, 2014, 2015, and 2016 Calendar Year Transit Operations Data, 2017.

Table 5: Average Weekday and Peak Hour Crowded Trips for Nine Core Bus Routes

Route	Average Weekday Trips	Average Weekday Percent Crowded Trips	Average Peak Hour Trips	Average Peak Hour Crowded Trips
61A	108	10 %	48	12 %
61B	114	11 %	48	14 %
61C	114	23 %	48	24 %
61D	131	17 %	48	24 %
71A	142	12 %	48	19 %
71B	134	9 %	48	15 %
71C	128	11 %	48	14 %
71D	134	10 %	48	17 %
P3	115	12 %	44	28 %
Combined/Effective	1,120	13 %	428	18 %

2.4 Current Bus Travel Times are Slow and Unreliable

As shown in **Table 6**, the average weekday bus travel speed along the proposed BRT corridor are well below the typical 25 miles per hour posted speed limits.¹⁴ The average speed for buses operating along the corridor decreased by approximately 6.6 percent from 2012 to 2016. This is largely due to increasing traffic congestion. Despite the high transit ridership in the corridor, these comparative commute times indicate that public transit does not currently provide a competitive travel option compared with the automobile. Bus service along the corridor is slow for the following main reasons:

- Buses must share mixed-flow lanes with general purpose traffic
- Buses make frequent stops
- Long dwell times at stops due to slow passenger boarding and on-board fare collection
- No traffic signal priority at major signalized intersections
- Congestion due to high automobile volumes

¹⁴ Port Authority of Allegheny County, 2016 Calendar Year Transit Operations Data, 2017.

Table 6: Existing Average Weekday Speed for Nine Core Corridor Bus Routes

Routes	2016 Average Speed (mph)	2012 Average Speed (mph)	Change in Speed Between 2012 and 2016
61A	9.85	11.05	-10.9 %
61B	10.40	10.85	-4.1 %
61C	11.95	12.65	-5.5 %
61D	10.20	11.00	-7.3 %
71A	8.25	8.80	-6.3 %
71B	8.55	9.05	-5.5 %
71C	8.35	9.25	-9.7 %
71D	9.40	10.40	-9.6 %
P3	17.60	18.14	-3.0 %
Average	11.24	10.51	-6.6 %

The factors that contribute to slow bus speed can vary based on time of day and traffic congestion, resulting in unpredictable impacts to bus operations that greatly impact the ability to maintain on-time performance. As shown in **Table 7**, for the nine core routes, only approximately 61 percent of all bus trips arrive on-time (between one minute ahead of schedule and six minutes behind schedule) while approximately 32 percent of all bus trips arrive late (greater than six minutes behind schedule).¹⁵ The on-time arrival, approximately 61 percent, along the corridor is well below the Port Authority's individual route goal of 73 percent.

Because bus transit service in the corridor remains slow and unreliable, it does not present a competitive travel mode compared to automobiles.

¹⁵ Port Authority of Allegheny County, 2016 Calendar Year Transit Operations Data, 2017.

Table 7: Existing Average Weekday On-Time Performance for Nine Core Bus Routes

Routes	Early Performance (Arrive Earlier Than 1 Minute Ahead of Schedule)	On-Time Performance (Arrive Between 1 Minute Ahead of Schedule and 6 Minutes Behind Schedule)	Late Performance (Arrive Later Than 6 Minutes Behind Schedule)
61A	7 %	61 %	32 %
61B	6 %	62 %	34 %
61C	9 %	60 %	31 %
61D	8 %	65 %	29 %
71A	5 %	56 %	38 %
71B	10 %	57 %	32 %
71C	6 %	57 %	36 %
71D	5 %	59 %	36 %
P3	7 %	80 %	13 %
Average	7 %	61 %	32 %

2.5 A High Number of Transit Dependent Riders Rely on Transit Service to Meet Travel Needs

Many of the transit users in the corridor are reliant on public transportation for most or all of their mobility needs. While the study area comprises only 17 percent of all households in the city, it constitutes 19 percent of all zero-car households.¹⁶

Investing in premium transit in this corridor will benefit existing transit dependent riders, and providing greater access to jobs along the corridor.

3.0 Project Purpose and Need

The purpose of this project is to improve access to and within the Downtown – Uptown – Oakland – East End corridor with faster, more reliable, and easy to use transit service that improves regional, neighborhood, and job connectivity. Fast, reliable transit investment in this corridor will support integrated transportation, land use, and economic goals in the region in a cost-effective manner that maximizes existing capacity along the corridor. The following provides major purpose statements for the proposed BRT corridor improvement.

3.1 Develop Premium East-West Transit Service to Streamline Existing Services and Effectively Improve Regional, Neighborhood, and Job Connectivity

Average daily traffic along the corridor in Uptown is approximately 8,850 vehicles on Fifth Avenue and 9,940 vehicles on Forbes Avenue, totaling 18,790 vehicles.¹⁷ Average daily traffic along the corridor in

¹⁶ U.S. Census, 2015 ACS 5-Year Data, Tenure by Vehicles Available (B25044), Poverty by Status by Household Type (B17017).

Oakland at Atwood Street is approximately 16,080 vehicles on Fifth Avenue and 13,790 vehicles on Forbes Avenue, totaling 29,870 vehicles.¹⁸ The 561 daily bus trips in the corridor represent only 2.9 percent and 1.8 percent of the traffic stream in Uptown and Oakland, respectively. However, they carry 8,980 and 13,160 riders along the corridor in Uptown and Oakland, respectively. The transit ridership represents approximately 32 percent and 31 percent of the people traveling along the corridor in Uptown and Oakland, respectively.¹⁹ Developing premium transit service that directly connects the major employment centers in the region with surrounding neighborhoods and connecting transit services will maximize the existing roadway capacity and provide time-competitive transit options within the corridor to move people more efficiently.

3.2 Enhance Transit Reliability, Travel Speed, and Ease of Use

The project will provide dedicated bus lanes along the corridor and enhanced, branded, and include appropriately spaced station locations along the corridor, which will improve transit reliability and speed. The project will also make the system easier to use by building a dedicated facility that will enhance bus capacity issues and streamline direct connections throughout the corridor.

3.3 Provide Premium Transit Solutions that Support Transportation, Land Use, and Economic Development Goals

Several community planning initiatives in the corridor have been developed or are currently underway, and transit improvements will need to consider and coordinate with these plans to provide integrated transportation, land use, and economic development solutions in the corridor.

Most notably, the City has recently undertaken an *Eco-Innovation District Plan* for the Uptown and West Oakland neighborhoods. This strategic plan is being developed to attract and guide redevelopment in these neighborhoods, enhance community identity and multimodal transportation options through complete streets and place-making strategies, reduce environmental footprints, and improve equity and access to jobs. In addition, other master planning efforts, such as *Envision Downtown*, the *Oakland 2025 Plan*, and the *Hill District Master Plan* as well as the City's recently adopted Complete Streets Policy will need to be coordinated with proposed transit design solutions to ensure coordinated and consistent planning in the corridor.^{20,21, 22, 23}

Finally, implementation of the project will be consistent with *Allegheny Places*, Allegheny County's comprehensive plan, and *Active Allegheny*, the County's pedestrian and bicycle plan.

¹⁷ PennDOT ITMS Site 8057: Eastbound Forbes between Seneca Street and Moultrie Street (2013) and Site 27375: Westbound Fifth Avenue between Stevenson Street and Magee Street (2012).

¹⁸ PennDOT ITMS Site 19400: Eastbound Forbes Avenue between Atwood Street and Oakland Avenue (2013) and Site 38682: Westbound Fifth Avenue between Atwood Street and Meyran Avenue (2010).

¹⁹ Port Authority of Allegheny County, 2016 Calendar Year Ridership Data, 2017.

²⁰ *Envision Downtown*, www.envisiondowntown.com.

²¹ *Oakland 2025 Master Plan*, www.opdc.org/oakland2025.

²² *Hill District Master Plan*, www.hilldistrict.org/greaterhilldistrictmasterplan.

²³ City of Pittsburgh Complete Streets Policy, www.pittsburghpa.gov/dcp/completestreets.

3.4 Develop Premium Transit Solutions that Effectively Address Physical and Financial Constraints

Prioritizing an alternative that best addresses both physical and financial constraints will be necessary to develop feasible, implementable solutions.

The feasibility of alternatives will need to be evaluated based on their ability to address both physical and financial constraints. Physical constraints include factors such as right-of-way, intersection spacing, existing ramps and transportation infrastructure, as well as topographical constraints and constructability challenges.

Financial constraints include factors such as capital costs for constructing premium transit services and operating and maintenance costs to operate the premium transit service and reorganized local service. Uncertainty associated with the availability of federal, state, and local funding is an additional financial constraint.

The proposed project design will address physical constraints to provide efficient transit operations that serve the transportation needs of the surrounding community while providing a project that is financially feasible and allows the project to move forward in an effective and time efficient horizon.

4.0 Goals and Objectives

The purpose statements above have been developed to guide the alternatives evaluation process. Using these five statements, a set of goals and objectives were developed below to provide a comparative analysis of alternatives for this project.

- 1. Strengthen the connections to other routes in Port Authority's network and to services provided by other operators while improving regional, neighborhood and job connectivity.**
 - Expand Premium Transit Network
 - Improve Pedestrian Access
 - Design Interconnectivity with other Port Authority and regional carriers' Transit Routes
 - Integrate Local Bus Service with Premium Service

- 2. Provide a high-quality bus travel experience by improving reliability, travel speeds and ease of use.**
 - Improve Transit Speed
 - Improve Transit Service Reliability
 - Improve Waiting and Boarding Experience for Transit Users
 - Improve Pedestrian Safety

- 3. Provide a BRT alternative that supports transportation, land use and economic development goals.**
 - Use Existing Rights-of-Way to Improve Multimodal Access and Meet Travel Demands
 - Enhance Integration with Adjacent Land Uses and Planned Redevelopment
 - Enhance Streetscape and Provide Complete Streets, where possible
 - Minimize Impacts to On-Street Parking and Loading

- 4. Develop premium transit solutions that effectively address physical and financial constraints.**
- Minimize Implementation Time
 - Minimize Capital Expense Costs
 - Minimize Bus Operating Costs