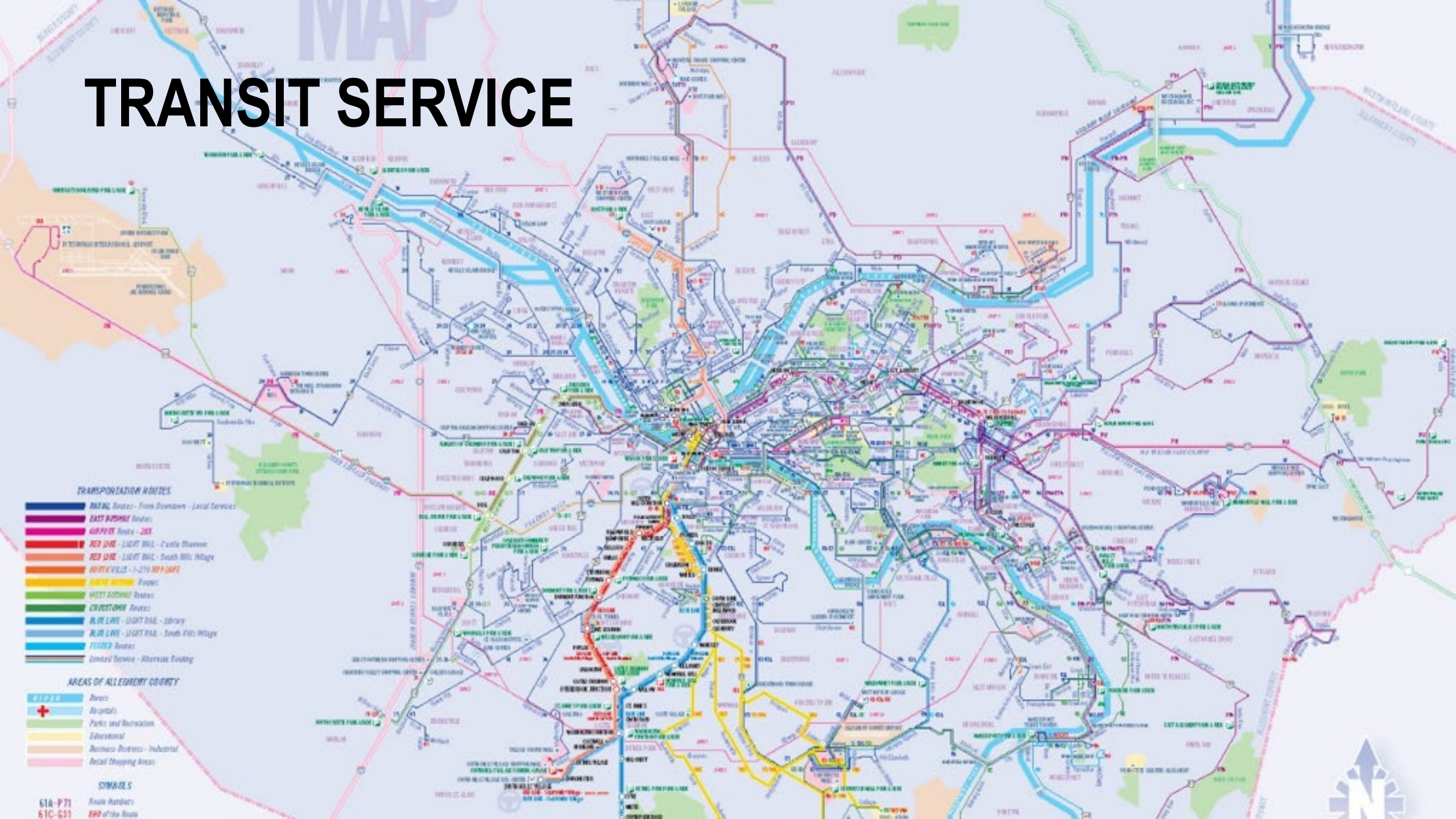


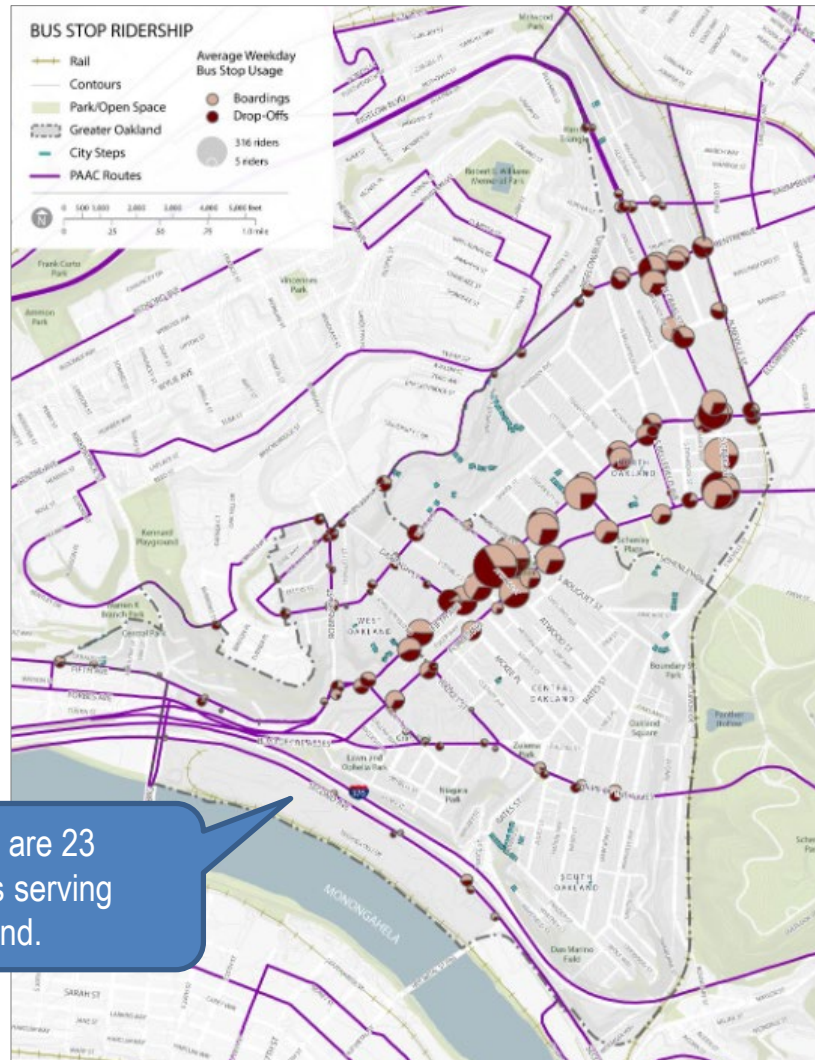
# TRANSIT-ORIENTED OAKLAND

# TRANSIT SERVICE

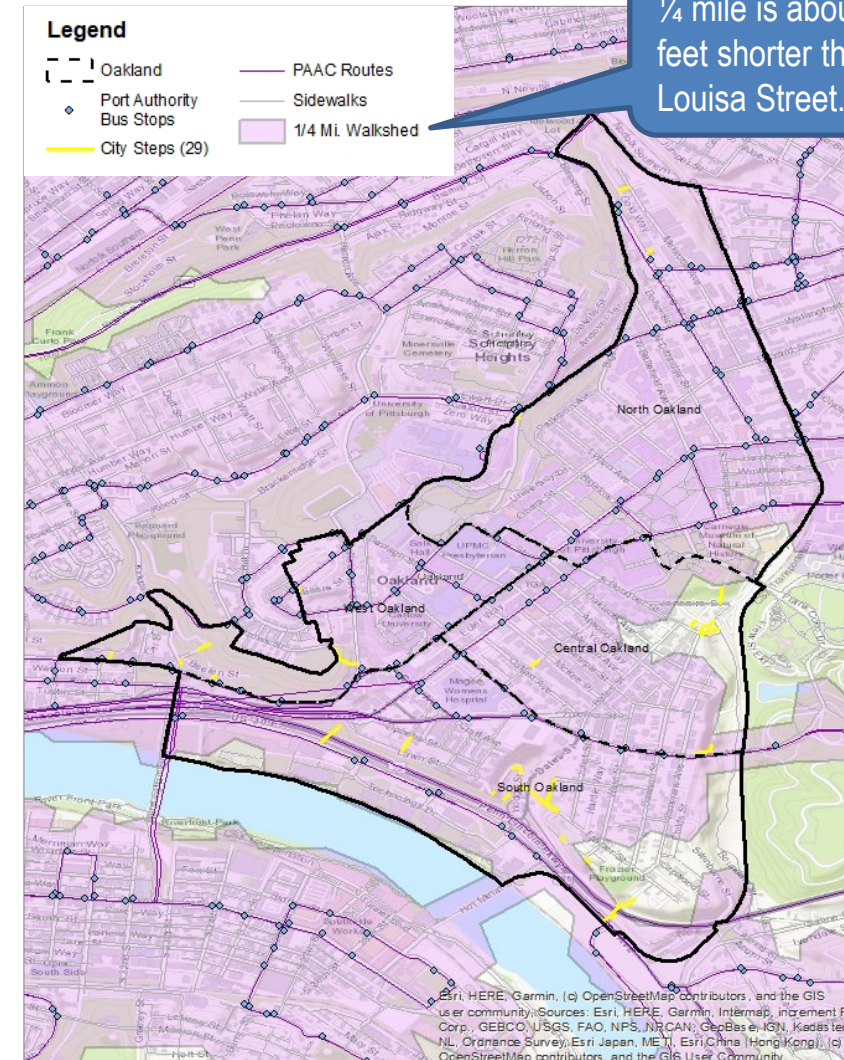




# TRANSIT SERVICE



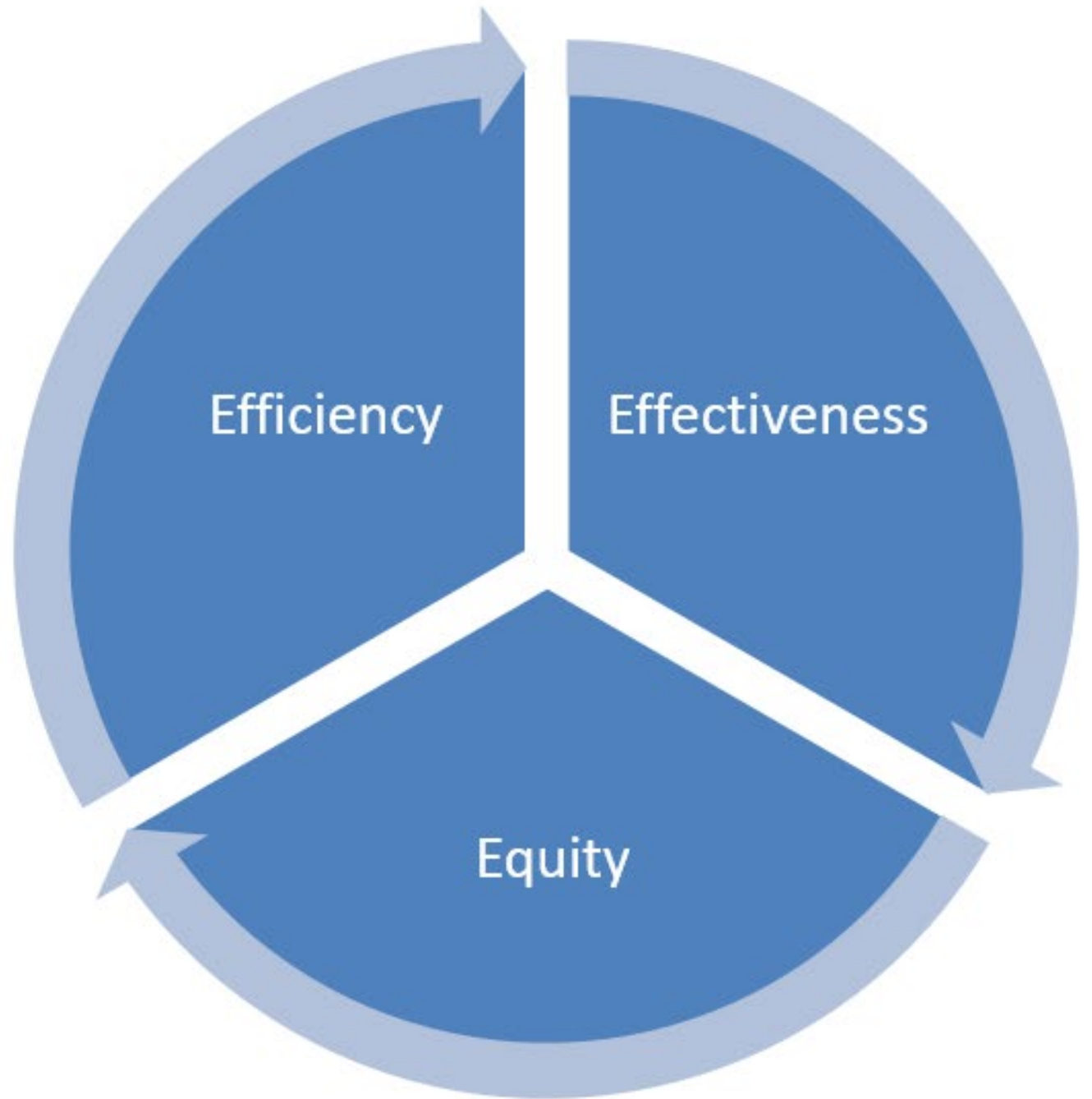
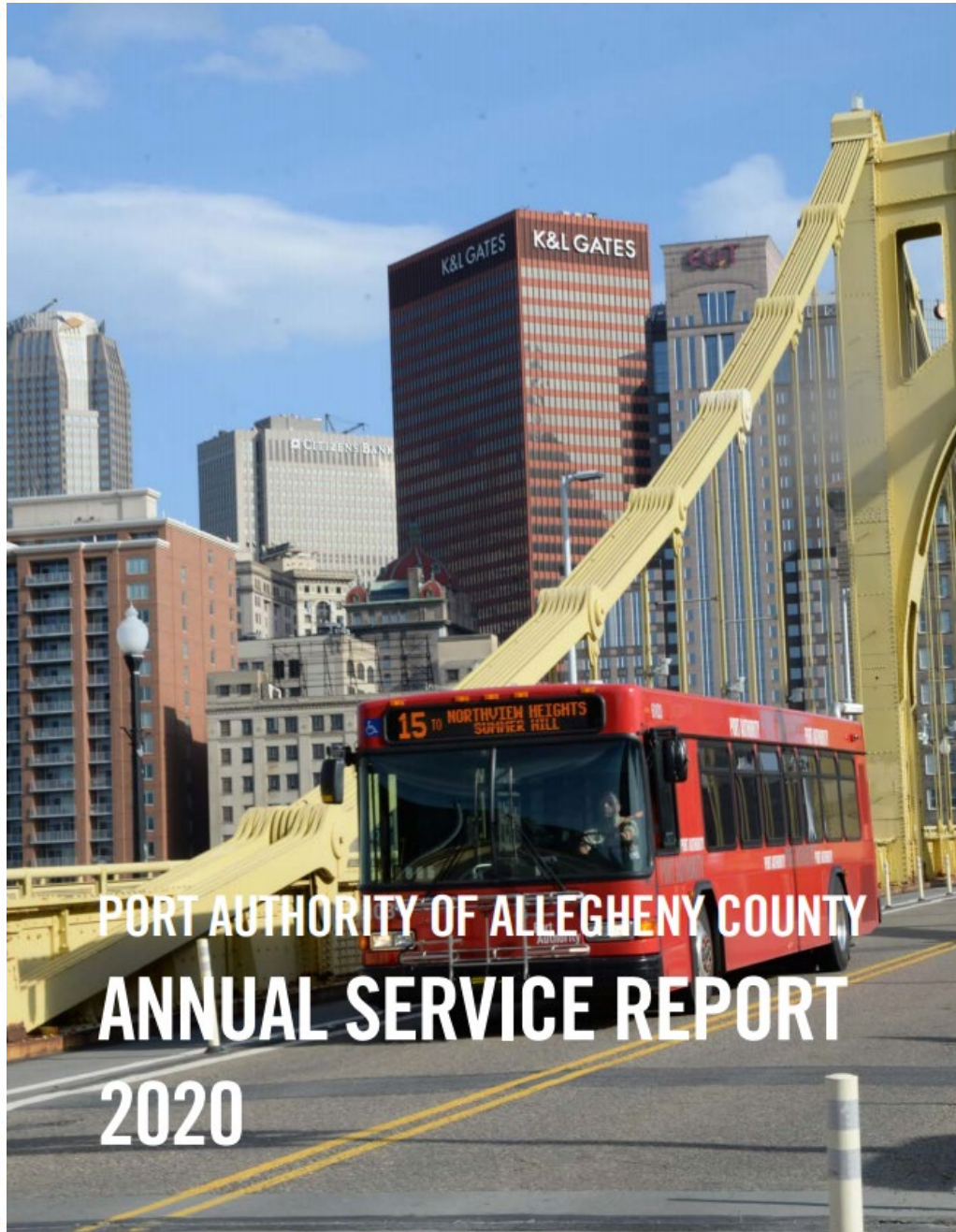
There are 23 routes serving Oakland.



1/4 mile is about 50 feet shorter than Louisa Street.

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community; Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeBCo, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community





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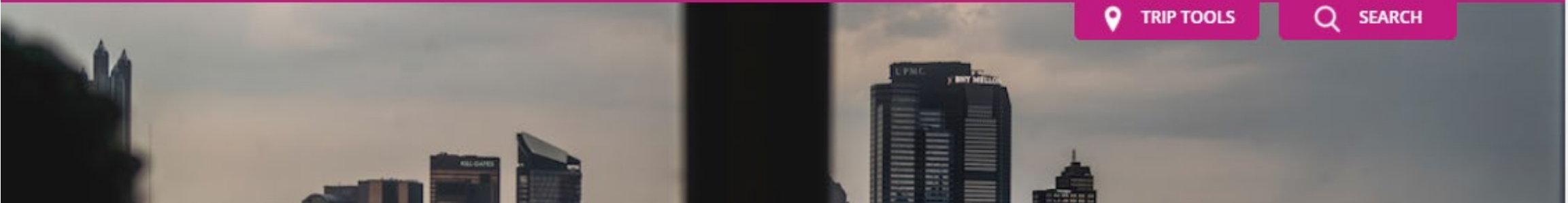
Commuter Services





TRIP TOOLS

SEARCH

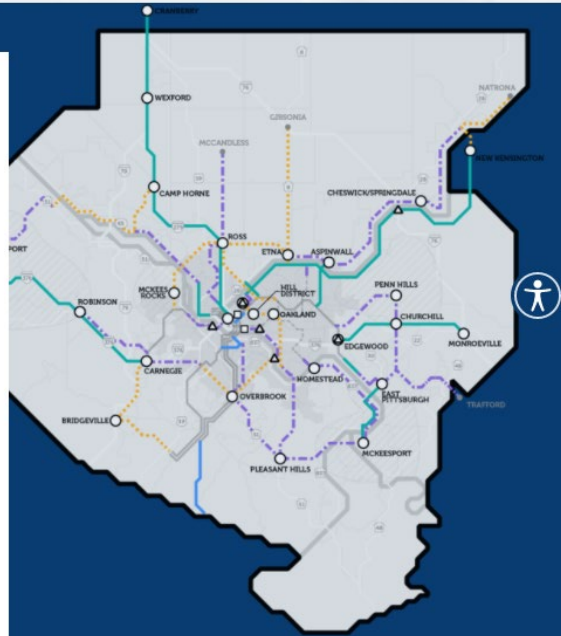


# LONG-RANGE PLANNING

NEXTransit is the 25-year plan for Port Authority of Allegheny County.

Together, we are putting our future on the map!

**Thank you** to everyone who participated and shared input in the Theme 4 meetings and surveys.



Bus Stop Optimization  
Universal Fare System  
All Door Boarding  
Improved Route Performance  
Accessibility

Service Connections  
Regional Collaboration  
Bus Rapid Transit Expansion  
East Busway Extension  
Visible Stops and Park and Rides

Parking Fees  
Light Rail Downtown Fare  
Bus to Mechanic Ratio  
Public/Private Partnerships

Light Rail Vehicle Replacement  
Bus Maintenance Facility  
Fleet Electrification

Increase Visibility  
Public Relations/Branding  
Education Programs  
Outreach  
Equity Initiatives

Bus Rapid Transit (short-term)  
Light Rail Service (long-term)  
Coordination with Public Officials

Centralized Location  
Transit-Oriented Communities  
Regional Efficiency





# CORRIDOR PLANNING

**Downtown – Uptown – Oakland – East End**  
**Bus Rapid Transit (BRT) Project**  
**Final Design Review Meeting**  
**Project Stakeholders**

# TRANSIT AMENITIES

- Bus Stop and Street Design Guidelines > > >
- Signs, shelters, bike racks, etc.
- Park and ride facilities





# BUS STOP + STREET DESIGN GUIDELINES

## STOP TYPOLOGY

PAAC has categorized its stops into four main types: Basic Bus Stop, Bench Stop, Shelter Stop, and Station. These stops are described further on the following pages. PAAC recommends basic amenities to be included at each stop within the system. The amenity matrix includes amenities that can be included based on a variety of factors, including ridership, stop location, stop area, and others.

### AMENITY MATRIX

	Sign	Pad	Sidewalk	Bench	Trash	Shelter	Light	Bike Rack	Route Info	System Info	Ticket Vending	Real-Time Sign
BASIC												
BENCH						✓	✓	✓	✓	✓		
SHELTER								✓	✓	✓	✓	✓

■ - Basic Requirement      ✓ - Recommended Amenity

### Bus Stop Type Selection Considerations

The type of stop provided is primarily driven by ridership volumes and available space. The following tables show the recommended attributes for stops based on their type and location. PAAC staff will assist developers or municipal agencies in determining the appropriate stop on a case-by-case basis.

### Stop Length

The design of bus stops has a significant influence on construction costs, parking restrictions, traffic flow and bus operating speeds. All stop locations should be examined to determine traffic volumes, traffic speeds, passenger volumes, bus frequencies, bus dwell times, pedestrian and bicycle facilities, roadway infrastructure, accessibility, and planned roadway improvements as these elements can affect the length needed for a bus stop.

### DESIRED MINIMUM PLATFORM LENGTH BY VEHICLE DIMENSION (in feet)

	Pull-Out Stop Applies to Curbside Stops in a Parking Lane and Bus Bays				In-Travel Lane Stop Applies to Curbside Stops without Parking in a Travel Lane, Bus Bulbs, and Boarding Islands			
	40' Bus	60' Bus	2 x 40' Bus	2 x 60' Bus	40' Bus	60' Bus	2 x 40' Bus	2 x 60' Bus
Near-Side	100	120	145	185	35	55	80	115
Far-Side	90	100	125	165	45	65	90	130
Far-Side, after right turn	140	160	140	230	-	-	-	-
Mid-Block	120	145	185	210	35	55	80	115

## STOP TYPOLOGY

### BASIC STOP ELEMENTS

#### 1. Loading Pad

5 ft. long x 8 ft. deep; per ADA requirements, a pad must be firm, stable, and slip resistant, and connected to the pedestrian path. Provides a 5 ft. diameter clear turning radius for wheelchair users.

Sign should be located adjacent to the loading pad to clearly indicate bus stop.

#### 2. Waiting Area

7 ft. long x 4 ft. deep; waiting area can be accommodated in the pedestrian path if pedestrian volumes are low. The suggested passenger waiting area should be 7 SF per person. This configuration provides enough area for 4 passengers at 7 SF per person, 28 SF total.

#### 3. Stop Area

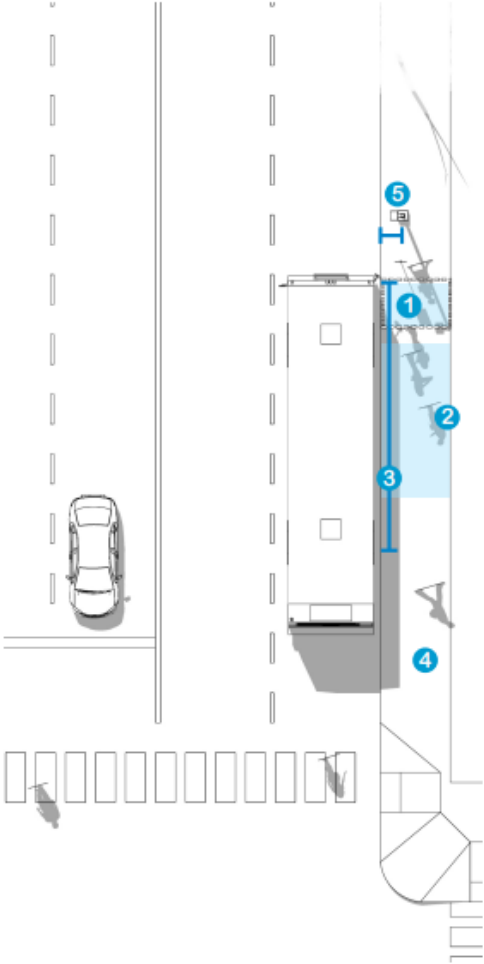
A 12 ft. area along the curbline should be kept free from obstructions. The length should provide free access to the vehicle's front doors.

#### 4. Pedestrian Clearway Zone

Minimum 4 ft. deep pedestrian path, or wider, as called for by local sidewalk standards, along a sidewalk or similar walkway. Should be a firm, stable, and slip resistant surface connected to the loading pad. Wider path is desirable to provide space for passing. This area should also be free of all obstructions up to 80" high.

#### 5. Clear Area

An area 2 ft. from the curb edge and 11 ft. minimum height that provides clearance so that the bus mirror does not hit any fixed objects in its path as it pulls up along a stop.



# BUS SHELTERS

City of Pittsburgh Shelter



Port Authority Shelter



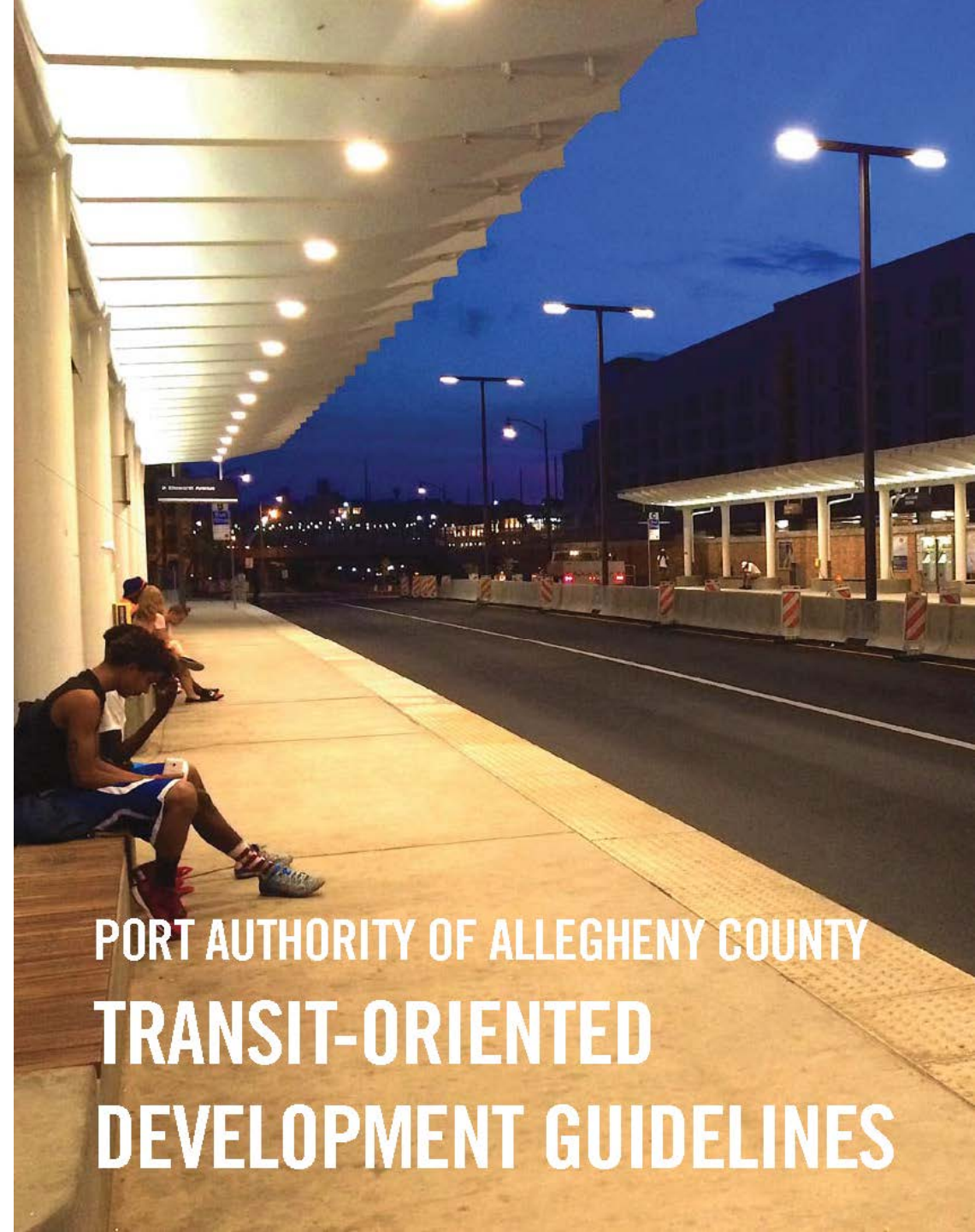


# TRANSIT-ORIENTED COMMUNITIES

- Transit-Oriented Development
- First and Last Mile
- Community planning

# TRANSIT-ORIENTED DEVELOPMENT

- TOD Guidelines > > >
- Station Improvement Program
- TOD zoning
- Joint development



PORT AUTHORITY OF ALLEGHENY COUNTY  
**TRANSIT-ORIENTED  
DEVELOPMENT GUIDELINES**



## WALKABILITY: CONNECTIVITY

Successful TOD creates a vibrant, mixed-use environment that supports all modes of travel, but especially promotes walking as a way to get to and from transit stations and other destinations. To encourage walking as the preferred mode of travel, transit stations must be well-connected to adjacent public spaces, buildings, streets, sidewalks, and surrounding neighborhoods outside of the TOD.

TOD walkability and connectivity rely on several factors. Transit stations usually draw riders from within a specific walking distance, and any physical improvements or linkages that can make the station accessible to more people - expanding the effective walkshed - should be considered.



### Walkshed Expansion Example: Sarah Station

At Sarah Station the size of the current walkshed is limited by poor quality or absent pedestrian pathways between disconnected parts of the street grid. Adding or enhancing pedestrian connections could expand the size of the walkshed and increase the number of people within a short walk from the station.

In the example shown, residential streets to the east of Library Road cannot traditionally access the station due to private, single-family home parcels and no connections. If pedestrian connections were provided on either side of the station to extend through and past the private parcels lining Library Road to the neighborhood streets, significantly more residents would be included in the walkshed.

The design of a TOD street and block network is also fundamental to ensuring that the district is inter-connected and pedestrian-friendly. Areas with small blocks and a high density of intersections enable people to have shorter, more-direct routes to their destinations, regardless of their travel mode. An environment with high intersection density and a small-block structure will also have a greater number of corner properties. Those spaces can be occupied at the ground floor level, by pedestrian-oriented businesses and other destinations, helping to create an active and inviting streetscape atmosphere.



### Intersection Density Targets

Downtown	Greater than 400 / Sq. Mi.
Urban Mixed Use	Greater than 350 / Sq. Mi.
Urban Neighborhood	Greater than 300 / Sq. Mi.
Transit Neighborhood	Greater than 200 / Sq. Mi.
Suburban Neighborhood	Greater than 90 / Sq. Mi.
Suburban Employment	Greater than 90 / Sq. Mi.

Include the following in the intersection count: all intersections of publicly accessible streets with sidewalks, publicly accessible alleyways, publicly accessible sidewalk or stair intersections that are not part of a street (i.e., a sidewalk through a park, or a hillside staircase). Exclude intersections in gated residential or commercial areas and intersections that lead only to a dead end or cul-de-sac.

### Expand the Walkshed When Possible

A walkshed is a map-based representation of the distance a pedestrian can walk within a given time period. For TOD purposes, 1/2-mile walksheds, equivalent to 10 minutes of walking for an average adult, are commonly used to graphically predict the "reach" of transit ridership for a specific station. Walksheds using simple circles, originating at the station and extending equally into the surrounding neighborhood fabric, do not take into account pedestrian barriers such as highways, rivers, railroads, and even dangerous intersections. Realistic, irregularly-shaped walkshed areas can be mapped by acknowledging those obstacles and also incorporating the entire walking network: sidewalks, pedestrian paths, off-street trails, and pedestrian bridges.

A station's walkshed may be expanded by creating pedestrian links across existing barriers, building a rich pedestrian TOD network in and around the vicinity of the station and designing the TOD site so that the station has many connections with the surrounding neighborhood. People are more likely to use transit, even if they live beyond a predicted walkshed area, if their walk to the station is pleasant, clean, accessible, and safe.

### Maximize Intersection Density

Intersection density is a predictor of a community's walkability. Intersection density measures the connectivity of an area's roadway system, and closely reflects the sidewalk and bike lane system as well. Areas with high intersection density require less indirect travel to get from one destination to another: travel distances are shorter and support more walking, bike, and transit trips.

Intersection density is a key consideration when choosing to walk or bike to work, transit, and other destinations. It can be maximized in a TOD by designing a rich, accessible, interconnected road and sidewalk network with multiple paths to take from point A to point B. Small blocks, discussed below, will also increase the intersection density of a TOD because they result in a greater frequency of intersections at street crossings.

To determine the intersection density of a station area, count the number of intersections in the square mile centered around the station platforms. TOD projects should increase the intersection density of the station area, bringing it closer to the minimum target density if the existing station area is below. Calculation details and ideal station area minimums for each TOD type are indicated on the facing page.

### Create Small Blocks

Minimizing the block length of local streets allows better access for people who walk, cycle, or drive. Smaller blocks are more likely to accommodate pedestrian-friendly uses with concentrated building footprints. Small blocks also create more intersections, resulting in a greater number of highly-visible corner block locations that can become prime centers of activity and contribute to the overall quality of life of transit-oriented development.

The appropriate block length for a TOD may be determined by a typical block length based on contextual area precedents. Many walkable cities have block lengths between 200 and 400 feet. Unsafe mid-block pedestrian crossings should be avoided by adhering to a maximum length of 400 to 600 feet.





## WALKABILITY: STREETSCAPE

### Create Active Frontages

Buildings directly impact the perceived walkability and attractiveness of adjacent sidewalks, plazas, and courtyards spaces. Ground floor spaces in TOD should have windows and other glazing so that building interiors are visually connected to the life of the street. Non-traditional storefront designs may include glazed garage doors and sliding accordion walls, where appropriate, creating dynamic facades and activating sidewalks with restaurants and cafes. Ground floor facades should be lit at night, contributing to a safe and secure pedestrian environment even after businesses are closed.

### Provide Walkways

A safe and attractive pedestrian walkway, separate from the vehicular street, is essential in improving the use of any transit amenity. Specifically in TOD areas, sidewalks and other walkways play an even more important role as connections between transit users and new mixed-use developments. To increase the walkability around transit hubs, create a safe and secure sidewalk or walkway that is well lit, highly visible, and free of potential vehicular conflicts.

Provide a minimum 4-foot (ideally 8-foot) clear and obstacle-free path of travel, accessible by all users. Paving materials should be of high quality and high grade, incorporating proper drainage. In addition to the path of travel, street furniture should be incorporated into the sidewalk design whenever possible. Install streetscape elements such as bus stop shelters (architecturally integrated where appropriate), benches, properly scaled street lights, and planters along the edge of sidewalks to create a diverse and engaging pedestrian environment.

### Create a Tree Canopy

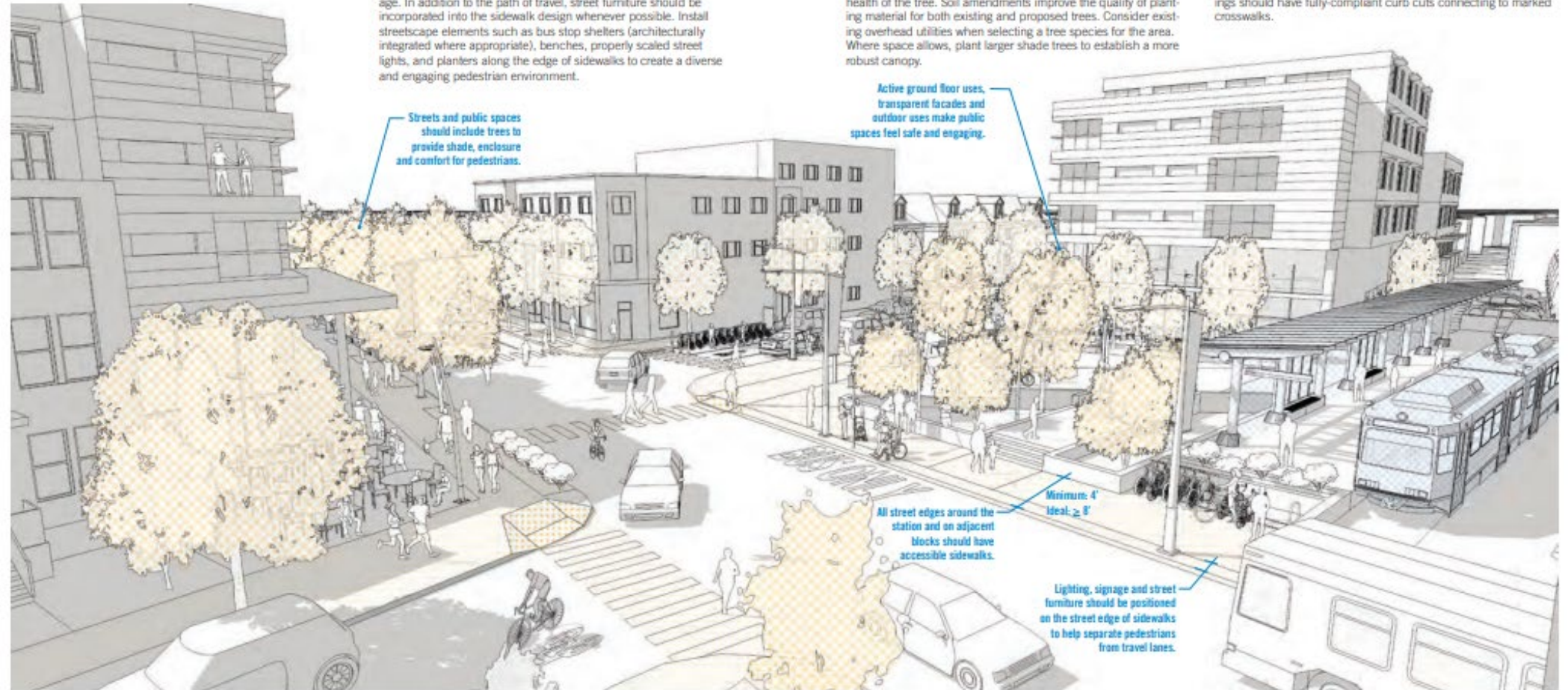
A healthy tree canopy creates a vibrant urban environment that people want to navigate and that city residents feel connected to. Tree canopies offer a myriad of environmental benefits including reduced emissions and energy demand for air conditioning, reduced stormwater pollution, and natural cooling, which also protects pedestrians from the sun on very hot days.

Tree canopies improve public health by cleaning the air, reducing particulate pollution, and also positively impact resident happiness through reduced stress levels and improved walkability in the neighborhood. Plant street trees in continuous planting beds, where possible, allowing for additional root growth and general health of the tree. Soil amendments improve the quality of planting material for both existing and proposed trees. Consider existing overhead utilities when selecting a tree species for the area. Where space allows, plant larger shade trees to establish a more robust canopy.

### Ensure Accessibility

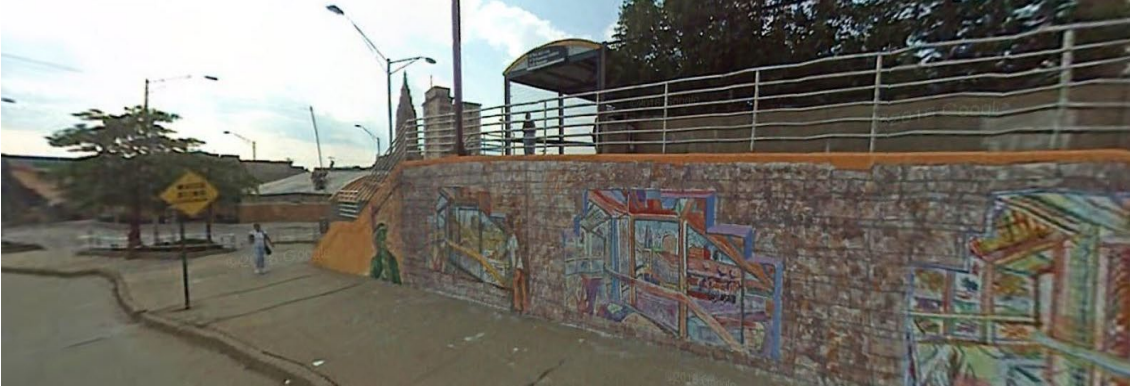
Transit is an essential regional asset and all people must be accommodated when planning and designing new TOD buildings and public spaces. The primary path to the transit station should be accessible and well-integrated into the surrounding street and sidewalk network.

Consider people of all ages and abilities with regard to accessing the site, traveling to the transit station, and connecting to the street from the transit station. For site and building designs, seek to exceed minimum legal requirements and achieve broad accessibility. Sidewalks within the TOD area should have a grade of less than 5%, wherever possible. All corners and pedestrian crossings should have fully-compliant curb cuts connecting to marked crosswalks.





# TOD is FLM.





# FIRST AND LAST MILE

- Program Plan > > >
  - User experience
  - Station context
  - Equity





## FIRST AND LAST MILE TOOLBOX

PAAC has developed a Toolbox as part of the FLM Program. Inspired by project ideas found through industry best practice documents such as National Association of City Transportation Officials (NACTO) guidelines and tools used by other transit agencies and municipalities, the Toolbox offers suggestions about what to look for when addressing barriers within the first and last mile of a rider's commute.

### REFERENCE GUIDES

There are numerous documents already in place that detail improvements for some of the challenges to transit connectivity referenced in this FLM Plan. Use these guidelines to find detailed recommendations for solutions to improve first and last mile connections:

- [National Association of City Transportation Officials \(NACTO\) Transit Street Design Guide](#)
- [NACTO Urban Bikeway Design Guide](#)
- [National Cooperative Highway Research Program \(NCHRP\) Systemic Pedestrian Safety Analysis](#)
- [University of North Carolina Highway Safety Research Center \(HSRC\) Pedestrian and Bicycle Information Center](#)
- [Pennsylvania Department of Transportation \(PennDOT\) Traffic Calming Handbook](#)
- [Pittsburgh Bicycle Parking Guidelines](#)
- [U.S. Department of Transportation Federal Highway Administration Pedestrian Safety Guide for Transit Agencies](#)
- [Southwestern Pennsylvania Commission Active Transportation Research Center](#)

The following guidelines created by PAAC staff for external partners should also be reviewed and used when applicable. Additionally, external partners should coordinate with PAAC staff to ensure projects are consistent with standards used by PAAC's Engineering, Service Development and Road Operations Departments.

- [Transit-Oriented Development Guidelines](#)
- [Station Area Plans](#)
- [Bus Stop Design and Street Design Guidelines](#)

### BEST PRACTICE TOOLBOX

The Toolbox is not an exhaustive list of every possible suggestion for transit-friendly communities and is not intended to provide detailed plans for specific stations in the PAAC system. When undertaking projects to fix connection barriers, each station will have unique needs and challenges. The FLM Toolbox is meant to offer guidance on best practices to remove such barriers and improve access. A successful FLM project will incorporate many of the suggestions offered in the Toolbox, using these methods to help build a safer, more transit-friendly walkshed.

PAAC'S FLM Program and the Toolbox do not supersede laws, regulations, or Board adopted policies applicable to PAAC or its municipal and implementation partners. Rather, the FLM Program and the Toolbox should be used to supplement existing standards (e.g. design guidelines, zoning, building code, etc.) and to guide access improvement where other standards do not.

In the Toolbox, improvement suggestions are split into 5 categories based upon mode prioritization:

1. Pedestrian
2. Bicycle
3. Transit
4. Drop-off
5. Park & Ride

Every transit rider is ultimately a pedestrian, walking at the very beginning or end of their commute. Therefore, pedestrian infrastructure improvements will positively impact users of all modes at some point in their trip. Pedestrian improvements are outlined in the "Pedestrian" section of the Toolbox but should be considered in tandem with other modes. Above all, a successful mobility environment must be safe, visible, comfortable, accessible, and connected. These principles apply to every mode of transit.

The following checklist contains qualities to look for when aiming to enhance mobility and tools that could be deployed to provide those qualities.

### 1. Pedestrian

#### □ Minimize Crossing Distances

- [Curb extensions](#) promote traffic calming and increase visibility.
- [Pedestrian islands](#) protect pedestrians from traffic at large intersections.

#### □ Clarify Crossing Locations

- [Crosswalk maintenance](#) ensures that the paint remains bright and unbroken.
- [Piano key stripes](#) increase visibility of crosswalk.
- [Tactile warning strips](#) help the visually impaired to locate the crossing.

#### □ Clarify Crossing Expectations

- [Countdown timers](#) help pedestrians know when it is safe to cross.
- [Leading signals](#) give pedestrians time to establishing themselves in the intersection while cars are stopped.

#### □ Connect Sidewalk Network

- [ADA compliance](#) ensures that sidewalks are wide enough for wheelchairs and are ADA compliant.
- [New sidewalks](#) minimize missing links in sidewalks.
- [Sidewalk maintenance](#) repairs broken, cracked sidewalks.

#### □ Adequately Light Walkways

- [Even spacing](#) ensures that lights are appropriately dispersed along pedestrian walkways to minimize dark spots.
- [Smart location of lights](#) ensure that wayfinding tools and transfer locations are highly visible.
  - Light narrow stairways and other isolated locations.
  - Add extra lighting to areas with a history of crime.
  - Add uplighting to minimize glare.

## FIRST AND LAST MILE TOOLBOX

- [Signage](#) informs cyclists of where the runnel is and how to use it to transport a bike.

#### □ Promote Bikes on Transit

- [Signage](#) clarifies bike boarding process for bus and light rail vehicles.
- [Transit wayfinding](#) on bike facilities raises awareness of and supports bikes connections to transit.

#### □ Collect Bike Data

- [Counting methods](#) should be chosen based upon which type is best for each specific route.
- [Popular routes](#) should be targeted to identify and analyze the areas with the highest bike traffic.

#### □ Provide Repair Space

- [Adequate lighting](#) maximizes safety at repair station and prevents theft and vandalism.
- [Installation location](#) of repair stations should be near bike storage and busy bike corridors.

Future guidance is being developed for Port Authority property.

### 3. Transit

As noted previously, the line between transit transfers and first and last mile trips is undefined. Some riders may make transfers simply to complete the last leg of their journey more quickly, while others require the transfer to get where they are going. The tools in this section, therefore, are generalized to promote better transit for all users. To improve transit as either a primary mode of travel or as a FLM service, support from agency partners in the following ways can greatly improve the rider's journey.

#### □ Dedicate Right-of-way for Buses

- [Painted bus lanes](#) make lanes stand out from traffic.
- [Peak-only bus lanes](#) target areas with bad congestion at certain times of the day, such as rush hour.

#### □ Minimize Conflict between Buses and Other Vehicles

- [Appropriate turning radii](#) ensures that buses have enough space to navigate tight intersections without imposing on curb space.
- [Boarding islands](#) minimize bus-bike conflicts and give pedestrians a protected place to wait for bus.
- [Transit signal priority](#) detects bus presence and coordinates signals to give buses right-of-way.
- Refer to Port Authority's Bus Stop Design and Street Design Guidelines

#### □ Make On-street Bus Stops Comfortable

- [Lighting](#) makes the stop feel safe at all hours of the day.
- [Shelters, benches, trash cans, and recycling bins](#) provide amenities for riders at stops.
- [Signage](#) informs riders of routes at the stop, when buses will arrive, and how to contact customer service.
- Refer to Port Authority's Bus Stop Design and Street Design Guidelines.



Bike racks like these on municipal property adjacent to Mt. Lebanon Station offer a safe place for riders to store their bikes.



Unique bike racks in the Cultural District of Downtown Pittsburgh add art to the public space while serving a functional purpose.



Dedicated bus lanes, such as this one on Liberty Avenue, separate buses from traffic and are especially beneficial at rush hour. Bright red paint helps the bus lanes stand out even more.

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### Administrative Offices

345 Sixth Ave, 3rd Floor  
Pittsburgh, PA 15222

**412.566.5500**

**Downtown Service Center**

623 Smithfield Street  
Pittsburgh, PA 15222

Open weekdays  
8:30AM - 4:30PM

Long-Range Plan -- <https://nextransit.network/>



# QUESTIONS?

# TOD is DENSE. MIXED-USE. WALKABLE.

