PORT AUTHORITY OF ALLEGHENY COUNTY

TRANSIT-ORIENTED DEVELOPMENT GUIDELINES

WELCOME

Dear friend:

I am proud to offer you the following document, which brings together many of the ideas that Allegheny County and its constituent communities have put forth in past planning. This effort, to define our expectations for high-quality transit-oriented development, goes beyond anything that currently exists in the county, region, or state. We are proud of this undertaking.

Port Authority of Allegheny County strives to provide excellent transit service by working with all of its partners. It does so, in part, with rapid, fixed-guideway services that deliver transit on dedicated rights of way.

The stations along our busways and light rail lines are opportunities for growth. By encouraging this type of development, we're fulfilling the vision set forth in Allegheny County's comprehensive plan and creating the type of communities seeing high demand across the country. Allegheny County is poised for smart, dynamic growth and transit-oriented development is fundamental to achieving that potential.

I offer these guidelines for your use and reference. Consistent with national best practices and regional context, this document positions Port Authority to work in partnership with a variety of stakeholders to realize a shared vision of strong, vibrant communities where people want to live.

Rich Fitzgerald
County Executive

ACKNOWLEDGEMENTS

Port Authority of Allegheny County (PAAC) provides public transportation throughout Pittsburgh and Allegheny County.

The Authority's 2,600 employees operate, maintain and support bus, light rail, incline and paratransit services for approximately 200,000 daily riders.

Port Authority is governed by an 11-member board – unpaid volunteers who are appointed by the Allegheny County Executive, leaders from both parties in the Pennsylvania House of Representatives and Senate, and the Governor of Pennsylvania. The board and its committees hold regularly scheduled public meetings.

Port Authority's budget is funded by fare and advertising revenue, along with money from county, state, and federal sources. The Authority's finances and operations are audited on a regular basis, both internally and by external agencies.

Port Authority began serving the community in March 1964. In early 2015, the Port Authority began investing in a transit-oriented development program. This document is the result of investment to date, joining ongoing efforts including a newly instated TOD Project Manager and an interdisciplinary working group focused on TOD.

Participants

Port Authority of Allegheny County would like to thank agency partners for supporting the Transit-Oriented Development Guidelines, and all those who participated by dedicating their time and expertise.

This document was stewarded internally by Port Authority's TOD advisory committee, an inter-departmental body established to support the TOD program. Current members include: Mike Cetra, Darcy Cleaver, Lynn Fulton, Bob Phillips, Chuck Rompala, Amy Silbermann, Brad Straight, Todd Tusick, Ed Typanski, and David Wohlwill. This committee and development of the guidelines were managed by Breen Masciotra, TOD Project Manager, and Andrea Elcock, Community Planning Coordinator. Further support was provided by the agency's senior management team, including Ellen McLean, Barry Adams, Mike Cetra, Bill Miller, Jim Ritchie, Peter Schenk, and Keith Wargo.

Guidance was provided by Port Authority's Board. Members include: Robert Hurley, Thomas E. Donatelli, Sen. Jim Brewster, Constance Parker, Jeffrey W. Letwin, Michelle Zmijanac, John L. Tague, Jr., Rep. Dom Costa, D. Raja, Robert Kania, Jr., and Robert Vescio.

These guidelines were developed by the Port Authority of Allegheny County in collaboration with Studio for Spatial Practice (SfSP). All maps and graphics were created by SfSP.

Port Authority

studio for spatial practice

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1.

SETTING THE STAGE

WHY THIS DOCUMENT?

Setting Transparent Expectations

These transit-oriented development (TOD) guidelines are meant to provide the entire community of TOD stakeholders – transit agencies, local governments, regional planners, community groups, developers, and others – with a common vocabulary and frame of reference.

The guidelines contain what Port Authority of Allegheny County (PAAC) consider to be best practice standards for TOD, based on local and national research. PAAC will strive to achieve the outcomes described herein to the best of its ability and expects development partners, private developers, and community developers to do the same. PAAC will work with local governments where possible to facilitate these best practices. This document is intended to facilitate the implementation of existing community-supported planning and provide guidance where new planning occurs.

Well-planned and well-designed TOD attracts residents to neighborhoods and riders to transit stations. When PAAC, along with a variety of partners, takes an active role in creating walkable, mixed-use, and mixed-income communities, it creates a fertile environment in which transit service can grow and thrive.

This document does not supersede laws, regulations, or board-adopted policies applicable to PAAC, and may be amended at PAAC's sole discretion, from time to time, to improve and clarify the TOD guidance provided herein. It should be used to supplement existing local TOD zoning and to guide TOD implementation where local zoning falls short. Furthermore, these guidelines can be used to support appropriate variances to further high-quality TOD.

Port Authority's Role in Development

As a transit agency, one might think that PAAC's sole purpose is running trains and buses. However, the agency's viability depends on its ability to attract riders and raise revenue. Its organizational goals reflect these priorities:

- Maintain and enhance system-wide safety and well-being of riders and workforce.
- Enhance rider experience and public image.
- Support financial sustainability through innovative operations and growth with budget.
- Continuously improve business practices while fostering sustainable operations and economic growth.
- Ensure compliance with regulatory and governing agencies.
- Facilitate greater workforce stability, accountability, and talent growth.

Investments in TOD enable the agency to generate ridership from new uses and revenue from real estate. These guidelines can help PAAC play three important roles in the coming years:

- As a TOD sponsor for joint development (projects built on PAAC property or connected physically or functionally to a busway or light rail PAAC station),
- As a TOD stakeholder for any development occurring within the "zone of influence" of current or future stations (1/2 mile around station, roughly the same area as a walkshed),
- As a TOD advocate for sustainable land use decisions along all of the region's transit corridors, whether undertaken by PAAC or others, as our regional transit network grows.

As the service provider and property owner, PAAC is primarily responsible for improvements to its stations. In general, TOD (i.e., a developer's responsibility) begins at the edge of the station itself and continues into the community. While PAAC will use the concepts outlined herein to guide any improvements to its stations, this document is intended to provide guidance on TOD projects, which act as gateways to transit stations given their proximity.

Educating The Public About TOD

Transit-oriented development is a concept familiar only to a small circle of planning professionals and municipal representatives in the Pittsburgh region. This document can be used as a tool for educating a broader audience about TOD's purpose and value. It can also help our community establish a shared understanding of what TOD is and how to achieve the best possible outcomes with TOD projects.

Integrating Transportation and Land Use

The success of transit is dependent on its ability to draw ridership. Neighborhoods with a high density of jobs and/or residents and reliable service have higher ridership rates than other areas. The density of jobs and residents in a given location is driven by the local development pattern.

Land use factors such as density, mix, and connectivity affect how people travel within a community. Decisions about land use affect the feasibility and effectiveness of various modes of transportation. Similarly, decisions about transportation infrastructure can affect the feasibility and effectiveness of land use decisions.

Development and the policies that influence it significantly impact where transit riders live, work, go to school, and purchase goods and services. Likewise, transportation investments can draw development to new areas. When development is spread out, uses are far apart and the automobile is the predominant mode of transportation out of necessity. When development is compact, uses are proximate, people can access all of their needs in a small area, and walking and taking public transit become easy.

WHAT IS TOD?

Defining TOD

Transit-oriented development (TOD) is deliberately planned higher-density, mixed-use development within walking distance of a transit station.

Transit stations are typically transit stops that are located along fixed guideways and feature more infrastructure and amenities than typical on-street transit stops. In the PAAC system, there are three busways, one incline, and two light rail fixed guideways. TOD is usually focused on fixed-guideway service as the infrastructure of those modes provides more permanence and more ridership capacity. Fixed-guideway stations thereby provide greater certainty and reliability for TOD developers/users and a clearer idea of where the transit goes to and comes from. However, development in areas with excellent on-street transit service can achieve many of the outcomes recommended in this document and provide a ready population to support continued service.

Mixed-use development integrated with transit infrastructure creates a ready-made community of transit riders. The proximity and convenience of transit, combined with the walkability and diversity of services in the immediate area, supports a multimodal, if not car-free, lifestyle for people of all ages and incomes. Over the last decade, transit agencies across the country have come to see the benefits of TOD to their systems and of involvement in TOD advocacy, design, and joint development.

Benefits of TOD

TOD can provide many benefits to the community in which it's located, including: increased transit ridership, economic development, diverse transportation choices, stable property values, and reduced air pollution.

> "One of the primary benefits of joint development is revenue generation for the transit system, such as income derived from rental or lease payments, as well as private sector contributions to public infrastructure. Other benefits include shared costs, efficient land use, reduced distance between transportation and other activities, economic development, increased transit ridership, and improved transit connectivity." – Federal Transit Administration Guidance on Joint Development (2014)

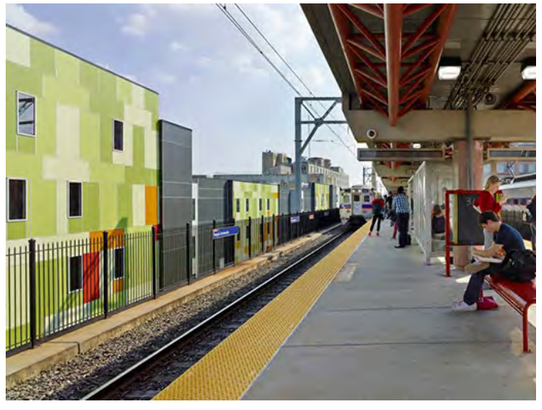
Research shows that TOD results in higher levels of transit ridership, fewer automobile trips, and lower car ownership rates than other types of development.

Examples

Transit-oriented developments are underway along transit systems all over the United States and beyond. Examples of what this document describes can be found near and far.

Here in Pittsburgh, Eastside III is a TOD located at East Liberty Station on the Purple Line (East Busway). The development includes market-rate apartments, retail space, and structured parking. It was designed around a newly-renovated transit station, with a focus on optimizing access to public spaces for those who walk or cycle, including to the station.

In Philadelphia near Temple University, developers Jonathan Rose Companies and Asociacíon Puertorriqueños en Marcha created Paseo Verde, a mixed-use and mixed-income development containing housing and retail adjacent to the SEPTA Regional Rail Temple University Train Station. As part of the construction, SEPTA contributed funds to update the station. This stop is the fourth busiest in the city, providing a couple-minute ride to the center of the city as well as regional stations. With five stories, 120 affordable and market-rate apartments, LEED Platinum designation, and a community technology center within the 30,000 square feet of retail space, Paseo Verde has received national recognition. Built on a 1.9 acre formally-vacant parcel, the project represents the first TOD within Philadelphia.



Paseo Verde station-facing exterior.

Paseo Verde street-facing exterior. Paseo Verde in Philadelphia, PA is a five-story, mixed-use building adjacent to a rail station.

PAAC TOD GOALS & PRINCIPLES

PAAC seeks to enhance its financial sustainability and further other agency goals by supporting TOD that fosters an increase in ridership and generates direct income for the agency, along with revenue from joint development. PAAC will work closely with the jurisdictions within which it operates service to identify TOD opportunities and implement projects.

PAAC recognizes that high quality TOD on and near PAAC-owned properties can be a means for accomplishing the following goals:

- Increase transit ridership.
- Optimize the value of assets and generate long-term investment revenue.
- Increase the stability of PAAC's financial base through value capture strategies.
- Improve the rider experience at stations, including safe multimodal access.
- Improve quality of life at and around PAAC stations, transforming stations from stand-alone infrastructure into assets which enhance the community in which they're located.
- Support the creation of employment centers and other economic development engines.
- Create and promote equitable mixed-income and mixed-use communities around transit, including access to affordable housing.
- Ensure existing plans are respected and stakeholders are engaged.
- Enhance Port Authority, and the Pittsburgh Region, by fostering relationships with local jurisdictions, regional agencies, transit agencies, local businesses, and other stakeholders to support TOD.

Several planning principles are key to informing the type and quality of TOD that would help accomplish these goals. Accessibility, environmental sustainability, affordable housing, public health, and mode priority are principles at the heart of transit-oriented development and should be considered and advocated for within the Pittsburgh region.

Accessibility

PAAC ensures that all of its service complies with the Americans with Disabilities Act (ADA). PAAC is dedicated to providing accommodations for people with disabilities and its approach to development is no different. People of all abilities must be considered when planning and designing new buildings and public spaces. This is particularly true for TOD projects as people with disabilities use transit at a higher rate than the general population.

Considerations should be given to people of all ages and abilities with regard to accessing the site, connecting the site to the transit station, and connecting the street network to the transit station. Furthermore, site and building designs should seek to exceed minimum legal requirements and strive to achieve greater accessibility.

Sustainability

The distribution and use of resources has impacts on the quality of life for people, the planet, and the prosperity of an organization. It is this triple bottom line (social, environmental and economical) that makes sustainability work for everyone.

For public transit agencies, sustainability is a core part of their missions. Providing the opportunity for individuals to leave their personal vehicles behind has numerous environmental and public health benefits.

By combining a density of mixed-use buildings with pedestrian-friendly, accessible, and well-connected site designs, TOD plays an essential role in creating physically sustainable spaces and encouraging sustainability from those who interact with the space. PAAC sees the opportunity for TOD (and public transit use in general) to foster environmental awareness, reduce energy consumption, decrease air pollution, and reduce road congestion. By combining green design with TOD, sustainable lifestyles are welcome and encouraged.

Each individual neighborhood will have unique environmental aspects to consider with regard to sustainability. In many Pittsburgh neighborhoods, for example, stormwater management needs to be a priority in order to create safe, healthy streets and developments. For the developments themselves, developers can achieve sustainable design goals by participating in the LEED certification program. Established by the US Green Building Council (USGBC), Leadership in Energy and Environmental Design (LEED) rating systems set guidelines for measuring the environmental impact of various project types including new construction, building renovations, and neighborhood plans.

LEED certification has become an industry standard for energy efficient green buildings. Studies have shown that LEED-certified buildings command higher rents and have higher occupancy rates relative to similar conventionally-designed buildings. A development's site can greatly impact a project's score, and TOD properties enable developers to accumulate up to 11 LEED points in the Sustainable Sites category simply by being adjacent to transit and other location attributes.

There can be additional up-front costs associated with building sustainably, but long-term economic benefits will be accrued over time through reduced utility loads and resource use, and increased resident/employee comfort and productivity. The notion that environmental approaches compete with financial interests is not necessarily true – sustainable practices can and do support financial responsibility.

Affordable Housing

While Pittsburgh's transit ridership is economically diverse, the need for transit access among low-income populations is significant. Low-income households are less likely to own a car and more likely to depend entirely on public transit for the full range of trips (i.e. work, daycare, shopping, medical care, etc.) that life involves. One of the primary barriers to low-income employment is transportation to and from needed employment. As a result, affordable housing near transit provides much-needed access to jobs and other resources, albeit only if those jobs and resources are also transit accessible.

1. SETTING THE STAGE

Transit influences housing markets, and studies show that property values tend to be higher the closer in proximity they are to fixed-guideway transit lines (i.e. light rail and busway). For this reason, affordable housing is an important consideration for TOD. By providing affordable housing opportunities near transit, the people who most need it will continue to have access to housing and transit in spite of market forces. Building affordable housing near transit ensures a stable housing occupancy and steady employment, supporting the local tax-base and contributing to community assets.

Affordable housing is in high demand, and Pittsburgh has an affordable-housing unit deficit. As a result of that deficit, many low-income residents of Allegheny County are moving to suburbs where transit access is limited by insufficient infrastructure, sparse development patterns, and costly operations. Bringing affordable housing and transit together could have a significant impact on people's lives and on the transit system, ensuring that riders are not lost, but gained, as the result of new development.

Public Health

Living in a walkable or mixed-use neighborhood, such as a TOD, has a dramatic impact on physical activity levels. People walk and bike more in mixed-use developments because they can reach many destinations without a car. The difference in physical activity between individuals living in walkable communities and others is significant. Making a walkable community accessible to transit provides further public health benefits; since all transit trips begin and end with a walk, public transit users generally have higher rates of physical activity and walking than non-users.

By walking, biking, or taking public transit, residents and users of TODs reduce their vehicle miles traveled. Less time spent in personal vehicles means less vehicle emissions and less time idling in traffic, thereby improving air quality. Less reliance on personal vehicles also reduces the need for land-intensive parking, which captures heat and contributes to stormwater runoff, furthering the negative impacts that most cities are working to mitigate.

While mixed-use development can promote health and wellness, walking and cycling in urban areas can be risky, potentially resulting in injuries and even fatalities for those who walk and cycle if the environment is not properly designed to accommodate such activities. Well-designed TOD, by its nature, prioritizes pedestrian access and circulation, and should provide safe pathways and other needed safety measures. Changes to the surrounding area may be needed to protect active transportation users. Solutions for ensuring safety for all modes will depend on factors specific to each unique station area, but TOD should consider all needs to adequately support safe and healthy transportation habits for all.

Mode Priority

Multimodal connectivity is an essential component of successful TOD. Transit stations and TOD destinations must be accessible by all common modes of transportation. When TOD is present, it usually occupies the space between public streets and transit stations. As a result, the mode priority and resulting design of a TOD is critical to ensuring multimodal access to the station. Because there is often limited space around a transit station, especially close to the platform, its is important to balance convenience in transit use with access to development. Tough decisions have to be made with regard to how access is organized.

People must be able to easily get where they need or want to go, and in whichever way they prefer. To facilitate connectivity, PAAC can use mode priority as a guide to make the best use of limited station space. Modes bringing the greatest number of people relative to the space they require and preserving the safety and quality of the pedestrian experience should receive greater priority over others.

This prioritization of modes can also align with the implementation of Complete Streets efforts. Complete Streets are designed and operated to provide safe access for all users, goals that PAAC shares. Complete Streets can be a valuable tool used to ensure riders arrive safely at transit stations.

Since every transit, bicycle, and car trip begins and ends with walking, pedestrians are the top priority in areas surrounding TOD. Safe, direct and attractive pathways are a few key elements of walkable communities. More details are available in the Walkability section of these guidelines.

Cycling is the second priority with regard to mode access to stations and TOD. People who cycle are welcome to bring their bikes on Port Authority vehicles, in designated areas, and many do. On their own bikes, or using the bike share system, many transit riders cycle for the first and last miles of their trips. With the option to store bikes at stations or transport them on the transit vehicle, bike connections and amenities require significantly less space and infrastructure than other mode options.

Transit is the third priority mode in station and TOD areas. Riders arriving at fixed-guideway transit stations need to easily access and connect with on-street bus service, where it is available, and vice versa. When people need to transfer to complete transit trips, making connections as easy as possible helps riders and sustains ridership for the agency; this is a function of good pedestrian connections. In TOD planning and design, consideration should be given to how transit and paratransit services can deliver riders to convenient locations in accessible proximity with the station and TOD. Consideration should also be given to how TOD plans impact transit operations.

Drop-off locations, areas near stations where vehicles dispense or collect a passenger, are a convenient option for multimodal households and a great use of space for station and TOD planners. As the fourth-highest priority in the mode hierarchy, drop-off areas should be given sufficient space to encourage ride-sharing, thereby helping riders save money and reduce their carbon footprint.

Finally, Park and Ride facilities provide a convenient transit access point for people living in communities without good pedestrian connections to transit routes. Park and Rides are particularly valuable in suburban locations where car ownership is high and local bus service is impractical.

This modal hierarchy is a guide and should be considered in the context of each station area. The modes are not exclusive and the first four should be possible to accommodate in all TODs. As is discussed in greater detail later in this document, different station types can have different needs.

TOD IN THE PITTSBURGH REGION

Past Documents

Several studies and planning documents over the past decade or longer have recognized the potential for transit-oriented development (TOD) in the Pittsburgh region. Those efforts helped lay the foundations for the TOD advocacy and implementation that we propose and see today.

In 2006, the Southwestern Pennsylvania Commission (SPC) released its *20/20 Transit Vision Study* along with the accompanying document, *A Toolbox for Transit-Oriented Communities* (*"Toolbox"*). Port Authority of Allegheny County (PAAC), its fellow regional transit providers, and other stakeholders were instrumental in the development of these documents.

"Toolbox," a guide for people thinking about urban planning, clearly outlines how to plan communities that are conducive to transit. It focuses on the land use first, demonstrating ways to organize public and private spaces to encourage the walkable, dense, mixed-use, multimodal communities that accommodate and facilitate transit service.

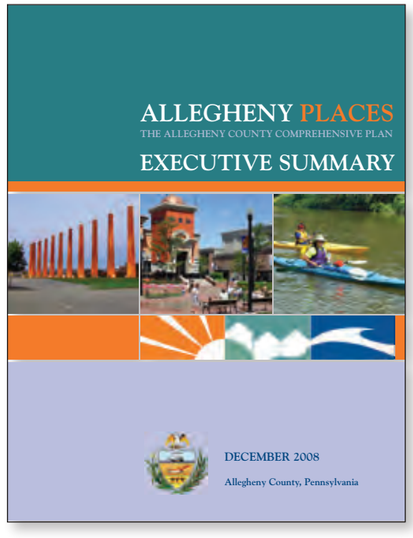
Allegheny Places, the Allegheny County comprehensive plan published in 2008 and updated in 2014, envisions a future where "transit-oriented development stimulates economic activity and relieves congestion on area roadways." The plan identifies Allegheny County's recent history of sprawling development, in which land consumption has greatly outpaced population growth, as "costly, inefficient, and inequitable." It goes on to say that suburban development patterns lack the density to support transit use. Communities without transit access, specifically those that want or need to use transit, are limited in their ability to access equitable employment opportunities.

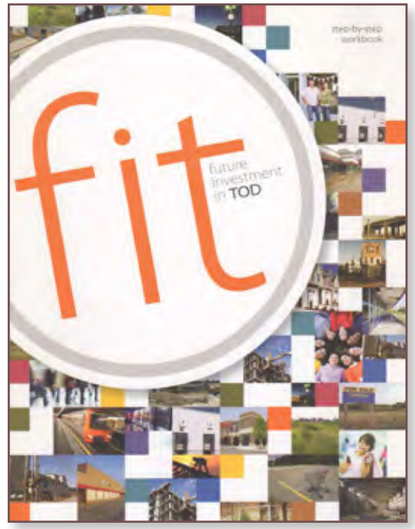
Another useful tool for TOD implementation is SPC's *Future Investment in TOD (FIT)* workbook, which uses success factors to determine whether a site is appropriate for TOD. *FIT* examines connectivity, density, capacity of stakeholders, and economic drivers as factors contributing to the suitability assessment of a potential TOD location. As a follow-up to *FIT*, SPC created a *Future Investment in TOD Zoning (FIT Zoning)* guide, which provides model zoning code standards. This document can be used by advocates, developers, and municipalities alike to ensure that TOD-friendly zoning is in place to encourage transit-based development.

In 2012, Pittsburgh Community Reinvestment Group's GoBurgh program worked with the Center for Transit-Oriented Development to create *Transit-Oriented Development Typology Strategy for Allegheny County*. This document addressed the types of activities that should be pursued by each neighborhood based on the potential for TOD at each station location.

In addition to *"Toolbox," Allegheny Places*, *FIT*, *FIT Zoning*, and GoBurgh's typology, there are many other community-based planning studies that include references to TOD at locations throughout the region. City neighborhoods and suburban municipalities alike have sought to explore TOD opportunities at local bus rapid transit or light rail stations. Too many to list here, these studies are valuable resources to municipal planners, community groups, and developers, not to mention PAAC, as interest in TOD grows.

Several communities have completed Transit Revitalization Investment District (TRID) planning studies to explore the potential for TOD in their neighborhood and the viability of establishing a TRID to finance transit-related infrastructure improvements. Allentown/Beltzhoover/Mount Washington, Beechview, Dormont, East Liberty, Homewood, and Mount Lebanon have all completed TRID studies for areas around their transit stations. These documents have been, and will continue to be, looked to for direction with regard to TOD implementation.





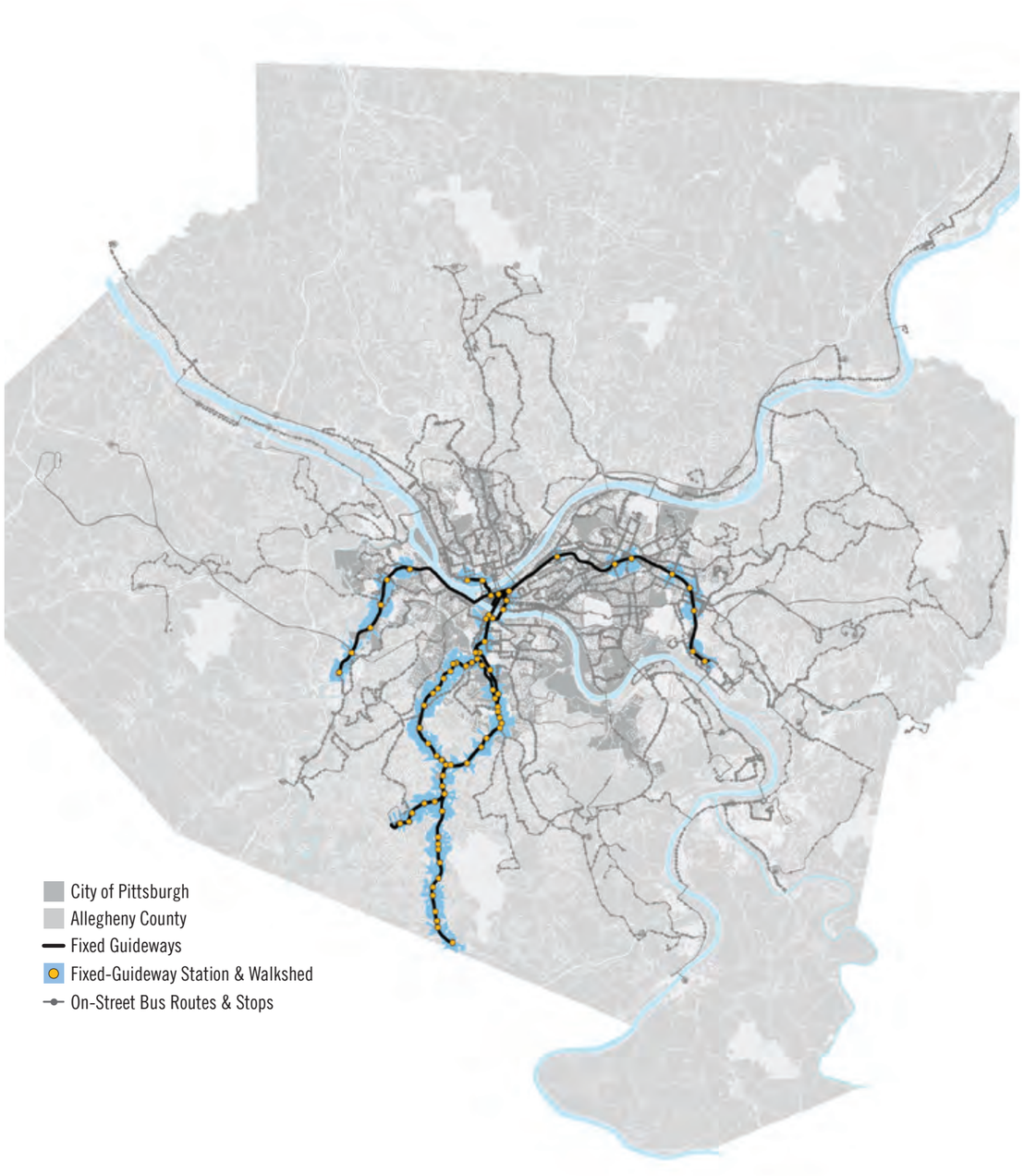
Current Development and Market Momentum

While *Allegheny Places* identified TOD as a top priority in 2008, TOD has yet to be established as a common, sustainable outcome in the Pittsburgh region. At a time when it is experiencing population and job growth for the first time in decades, Pittsburgh has an opportunity to grow intelligently by supporting the type of equitable, healthy, and efficient development patterns that growing demographic groups (e.g. seniors, millennials, etc.) demand. Transportation investments that support this kind of development will see a greater financial return.

Allegheny Places states that "[t]he Port Authority should conduct TOD market, planning and urban design studies for key transit stations, publicize the findings and solicit developers to build on TOD sites." Following site-specific TOD efforts at limited locations, such as East Liberty Station and South Hills Village Station, this document is the next step in advancing that recommendation.

After more than a decade of slowly building momentum, Pittsburgh's current real estate growth, demographic changes, demand for affordable housing, and other trends make now the right time for a concerted effort to expand TOD.

PORT AUTHORITY SYSTEM MAP



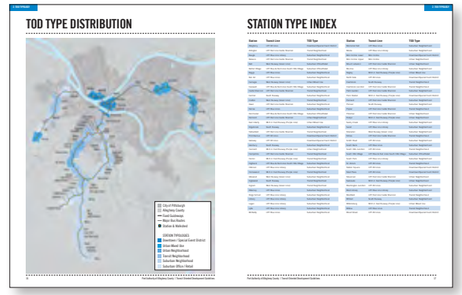
The system map above displays the distribution of fixed guideways and local routes throughout Allegheny County.

HOW TO USE THESE GUIDELINES

These transit-oriented development (TOD) guidelines are meant to provide the entire community of TOD stakeholders – transit agencies, local governments, regional planners, community groups, developers, and others – with a common vocabulary and frame of reference.

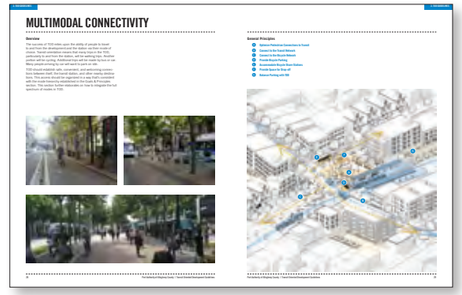
1. Understand the station TOD type.

The stations in Port Authority's system cover a range of locations, neighborhoods, types of transit, amenities, markets, demographics, design styles, topographies, and riders. Stations are classified by six typologies based on a combination of density and use mix. Any TOD project should begin by understanding the current station TOD type as well as the type the community has identified for the future, if applicable. Project scale, density, use mix, and parking strategy will vary depending on the TOD typology. The guidelines also contain general principles that all TOD projects in the region should follow.



2. Explore opportunities to expand multimodal connectivity.

Successful TOD expands and enhances the connection between transit and other modes of travel. Review the Multimodal Connectivity guidelines to understand connectivity principles for different modes. Does the project have opportunities to make new pedestrian or bicycle connections? What is the right role for parking in the project and how can it best be integrated into the planned development?



3. Orient projects around increasing station area walkability.

TOD projects should be designed around the pedestrian. Review the Walkability guidelines, including principles for creating a walkable public realm around the station. How can the TOD project expand and improve pedestrian connections to the station? How can the project shape and enhance public spaces and create safe engaging outdoor environments for people?

4. Design development that integrates and expands transit use.

TOD allows people to integrate transit use into their lives by creating dense, mixed-use places where they can live, work, shop, and play. Review the Development guidelines to understand the appropriate scale, density, and parking strategy for the TOD type being proposed. This section also outlines general principles for relating TOD to the surrounding context and creating sustainable, high-quality urban buildings.

2.

TOD TYPOLOGY

CLASSIFYING TOD TYPES

TOD is not "one size fits all;" the relationship between transit and development is shaped by a variety of local and regional factors. The stations (PAAC-owned property where a fixed-guideway transit service stops) in Port Authority's system cover a range of locations, neighborhoods, types of transit, amenities, markets, demographics, design styles, topographies, and riders. Previous typology-based studies have differentiated between PAAC's 76 fixed-guideway stations using these and other factors. However, for the purposes of this document, it was determined that the relationship between the station and the user is the most important factor in identifying related TOD features.

To understand TOD opportunities and user relationships at each station in the Port Authority system, a typology was created with six station categories. Using a data-driven process, all 76 stations were organized into the categories. With the station typology in place, specific guidelines were created to identify ways to take advantage of TOD opportunities resulting from existing conditions.

Pittsburgh Region Specificity

Pittsburgh's transit system has a historic legacy spanning centuries. Its fixed guideways are the successors of streetcar and commuter railroad lines dating back into the late 1800s. Port Authority's Red and Blue lines, serving southern communities, were streetcar routes for nearly one hundred years before they were converted to light rail. The Green and Purple Lines (West and East Busways) are vestiges of commuter rail lines that served the same communities and had similar stop locations. They also run parallel to active rail lines, which present unique challenges. This transit history correlates to a similarly long history of development along these lines. Unlike many transit systems across the country, seeking to create new communities around transit expansion projects, Pittsburgh's TOD landscape is one of infill and renovation projects – adding density to replace what was once there or building new connections in existing communities.

This legacy also presents challenges, often relating to the visibility of and access to stations that were built in existing, historic rights of way. Many stations are positioned above or below street level, presenting barriers that TOD and related station improvements should make every effort to address. Responsible for much of the Pittsburgh region's natural beauty, its topography is also a challenge, particularly with regard to transportation. The PAAC transit system generally follows the topography, radiating out from Downtown, with lines following ridges or valleys, as dictated by the context.

Methodology

In order to classify the characteristics of the area around a station, a geographical barrier must be identified so data and neighborhood features can be reviewed. The walkable area or 'walkshed' is one method to define the space around a station. An average adult will walk up to 10 minutes to use a fixed-guideway transit service. In those 10 minutes, an average adult covers 1/2 mile. Therefore it is standard practice to use a 1/2-mile radius around a transit station as the walkshed. For the purposes of this evaluation, the 1/2-mile radius was further refined using spacial mapping tools to represent 1/2-mile distances on streets and/or pathways only. This allowed for a better representation of all the places that actually could be reached within a 10-minute walk from each station. True walksheds were created for each station, and are available upon request.

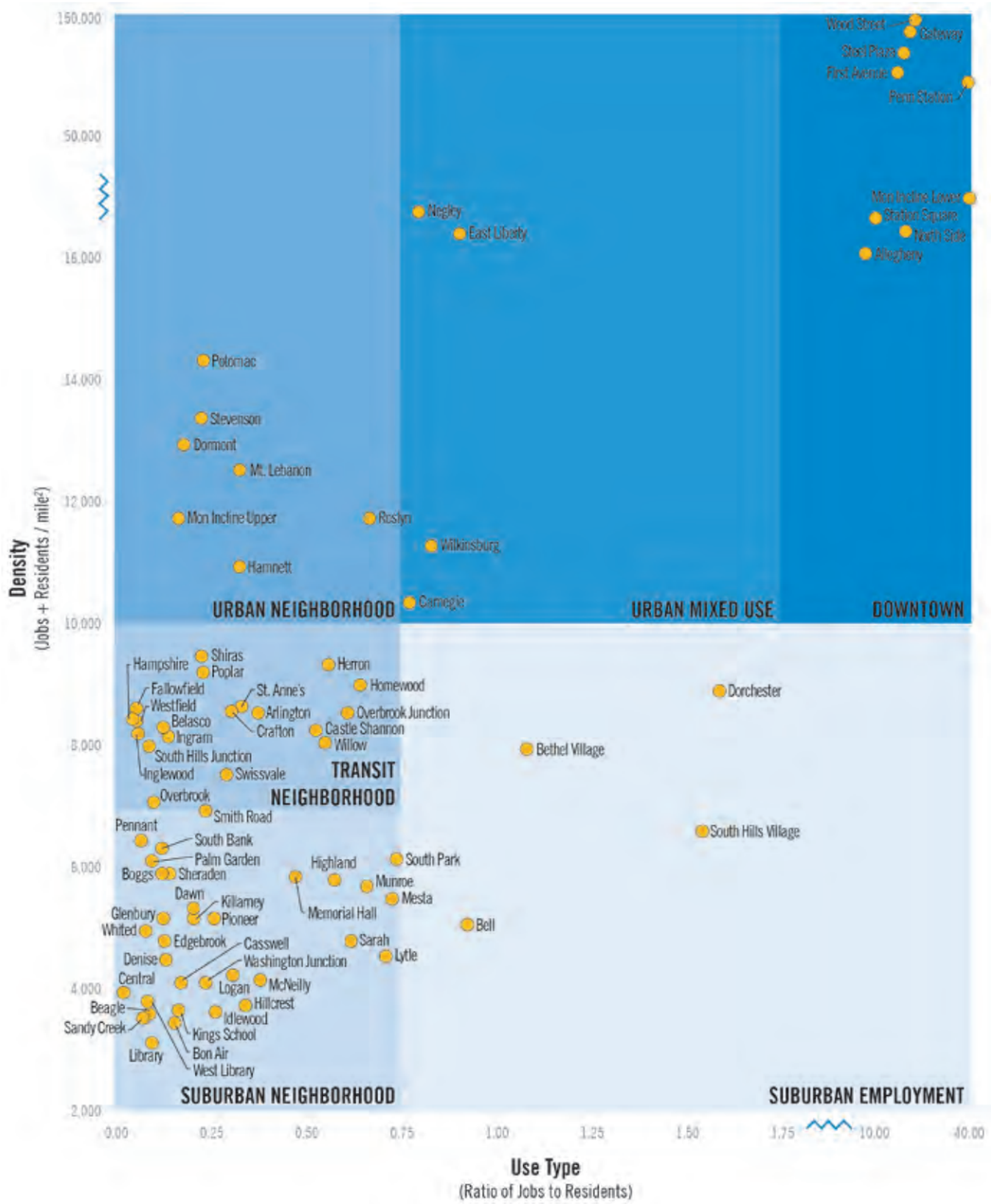
After determining each station's walkshed, Census and other data were overlaid with the walksheds to determine the number of residents, jobs, and various other factors within each walkshed. Some factors are particularly important when categorizing the feel, or type, of a neighborhood surrounding a transit station. Density is a key factor, as increased density directly correlates with the types of residential, shopping, and job-related activities that can be supported by people walking out of transit stations and completing the 'last mile' of their trip – by foot, bike, vehicle or otherwise. Areas can also be uniquely characterized based on the majority of land uses surrounding the station. An area can be mainly comprised of residential or employment-centered uses, or have a mixture of the two. These two main factors, density and the mixture of uses, together allow for a variety of types of stations to be classified. Density and use type (ratio of jobs to residents) were calculated based on data within each defined station walkshed. Six logical groupings emerged from these calculations, forming the different station categories, or "types," in the typology.

System Classification

The result of the data-driven analysis is six types representing all 76 stations in the Port Authority system as they exist today: Suburban Neighborhood, Transit Neighborhood, Urban Neighborhood, Suburban Employment, Urban Mixed Use, and Downtown. With these six station types we can begin to understand how the local community interacts and shapes the use of the transit station, and therefore how TOD can best fit into the current context. The matrix on the facing page appears static, but in reality, neighborhood characteristics change constantly and current neighborhood characteristics do not always represent the communities' intention for the future. As residents and employers move in and out of the area, and as development progresses, individual station classifications will need to be updated. Drastic changes to the system could require the typology to be entirely reorganized, to possibly include new station types. The typology is determined by the relationship between density (jobs and residents per square mile) and mix of uses (the ratio of jobs to residents). Subject to change are the thresholds, types, and characteristics of the types. For now, types are defined by the thresholds outlined below.

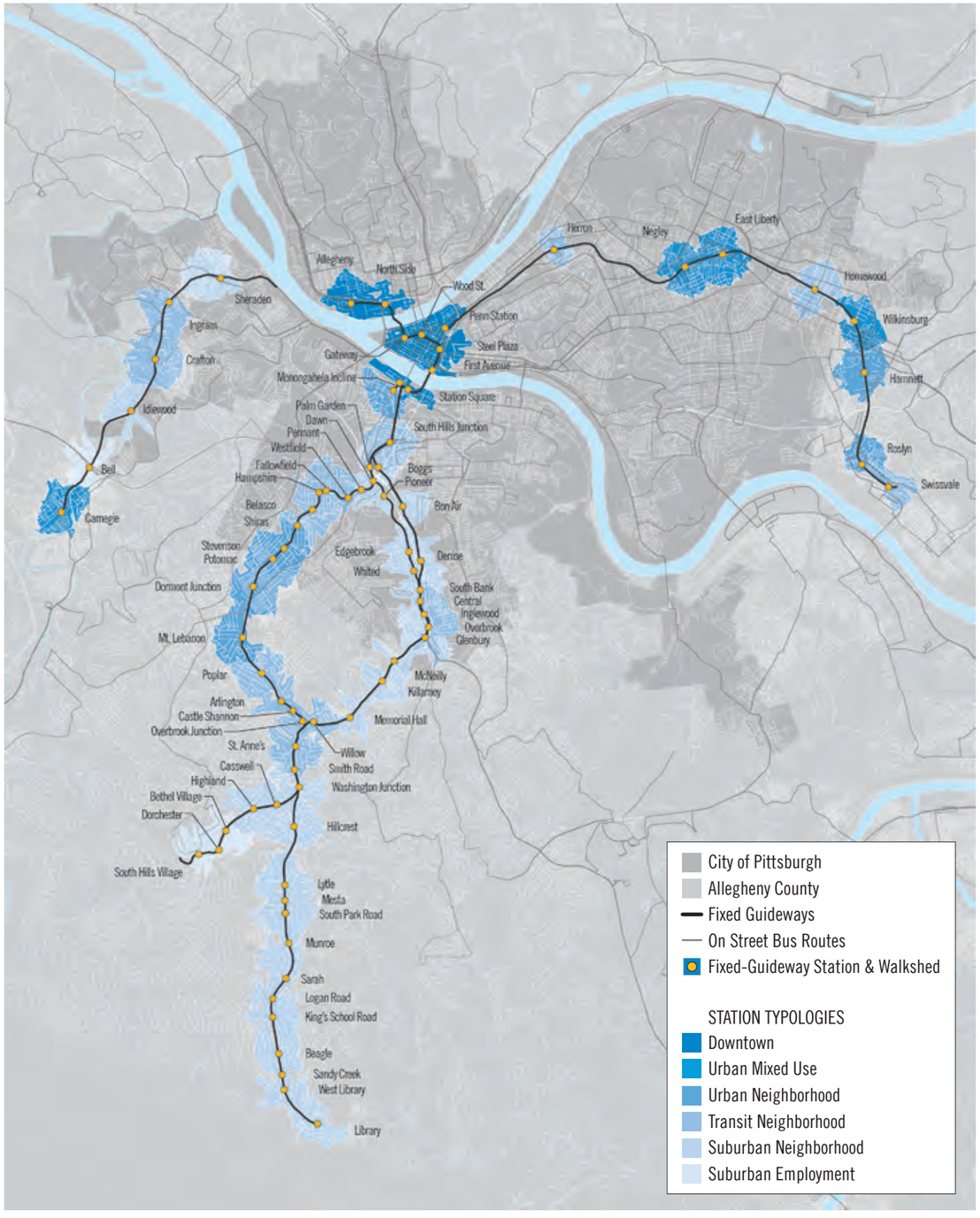
Type	Threshold Definition
Suburban Neighborhood	Mostly residential, least dense (< 7,000/sq. mile)
Transit Neighborhood	Mostly residential, mid-density (7,000-10,000/sq. mile)
Urban Neighborhood	Mostly residential, more dense (> 10,000/sq. mile)
Suburban Employment	High mixed use to high employment, less dense (< 10,000/sq. mile)
Urban Mixed Use	High mixed use, more dense (> 10,000/sq. mile)
Downtown	High employment, most dense (> 10,000/sq. mile)

TOD TYPE MATRIX



The TOD Type Matrix plots station areas based on their density (vertical axis: low to high density) and level of mixed use (horizontal axis: residential to employment use). Depending on the figures of those two factors, the station areas fall into one of six types (represented by the colored blocks). The station area types represented here reflect current data and does not consider the future aspirations and plans of the station area community.

TOD TYPE DISTRIBUTION



STATION TOD TYPE INDEX

Station	Transit Line	TOD Type
Allegheny	Blue and Red Lines	Downtown
Arlington	Red Line	Transit Neighborhood
Beagle	Blue Line	Suburban Neighborhood
Belasco	Red Line	Transit Neighborhood
Bell	Green Line (West Busway)	Suburban Employment
Bethel Village	Blue and Red Lines	Suburban Employment
Boggs	Blue Lines	Suburban Neighborhood
Bon Air	Blue Lines	Suburban Neighborhood
Carnegie	Green Line (West Busway)	Urban Mixed Use
Casswell	Blue and Red Lines	Suburban Neighborhood
Castle Shannon	Red Line	Transit Neighborhood
Central	Yellow Line (South Busway)	Suburban Neighborhood
Crafton	Green Line (West Busway)	Transit Neighborhood
Dawn	Red and Yellow (South Busway) Lines	Suburban Neighborhood
Denise	Blue Lines	Suburban Neighborhood
Dorchester	Blue and Red Lines	Suburban Employment
Dormont	Red Line	Urban Neighborhood
East Liberty	Purple Line (East Busway)	Urban Mixed Use
Edgebrook	Yellow Line (South Busway)	Suburban Neighborhood
Fallowfield	Red Line	Transit Neighborhood
First Avenue	Red and Blue Lines	Downtown
Gateway	Red and Blue Lines	Downtown
Glenbury	Yellow Line (South Busway)	Suburban Neighborhood
Hamnett	Purple Line (East Busway)	Urban Neighborhood
Hampshire	Red Line	Transit Neighborhood
Herron	Purple Line (East Busway)	Transit Neighborhood
Highland	Blue and Red Lines	Suburban Neighborhood
Hillcrest	Blue Line	Suburban Neighborhood
Homewood	Purple Line (East Busway)	Transit Neighborhood
Idlewood	Green Line (West Busway)	Suburban Neighborhood
Inglewood	Yellow (South Busway)	Transit Neighborhood
Ingram	Green Line (West Busway)	Transit Neighborhood
Killarney	Blue Line	Suburban Neighborhood
Kings School	Blue Line	Suburban Neighborhood
Library	Blue Line	Suburban Neighborhood
Logan	Blue Line	Suburban Neighborhood
Lytle	Blue Line	Suburban Neighborhood
McNeilly	Blue Line	Suburban Neighborhood
Memorial Hall	Blue Line	Suburban Neighborhood
Mesta	Blue Line	Suburban Neighborhood
Mon Incline Lower	Mon Incline	Downtown
Mon Incline Upper	Mon Incline	Urban Neighborhood
Mount Lebanon	Red Line	Urban Neighborhood
Munroe	Blue Line	Suburban Neighborhood
Negley	Purple Line (East Busway)	Urban Mixed Use
North Side	Blue and Red Lines	Downtown
Overbrook	Yellow Line (South Busway)	Transit Neighborhood
Overbrook Junction	Red Line	Transit Neighborhood
Palm Garden	Red and Yellow (South Busway) Lines	Suburban Neighborhood
Penn Station	Purple Line (East Busway)	Downtown
Pennant	Red Line	Suburban Neighborhood
Pioneer	Yellow Line (South Busway)	Suburban Neighborhood
Poplar	Red Line	Transit Neighborhood
Potomac	Red Line	Urban Neighborhood
Roslyn	Purple Line (East Busway)	Urban Neighborhood
Sandy Creek	Blue Line	Suburban Neighborhood
Sarah	Blue Line	Suburban Neighborhood
Sheraden	Green Line (West Busway)	Suburban Neighborhood
Shiras	Red Line	Transit Neighborhood
Smith Road	Blue and Red Lines	Suburban Neighborhood
South Bank	Blue and Yellow (South Busway) Lines	Suburban Neighborhood
South Hills Junction	Blue and Red Lines	Transit Neighborhood
South Hills Village	Blue and Red Lines	Suburban Employment
South Park	Blue Line	Suburban Neighborhood
St. Anne's	Blue and Red Lines	Transit Neighborhood
Station Square	Blue and Red Lines	Downtown
Steel Plaza	Blue and Red Lines	Downtown
Stevenson	Red Line	Urban Neighborhood
Swissvale	Purple Line (East Busway)	Urban Neighborhood
Washington Junction	Blue and Red Lines	Suburban Neighborhood
West Library	Blue Line	Suburban Neighborhood
Westfield	Red Line	Transit Neighborhood
Whited	Yellow Line (South Busway)	Suburban Neighborhood
Wilkinsburg	Purple Line (East Busway)	Urban Mixed Use
Willow	Blue Line	Transit Neighborhood
Wood Street	Blue and Red Lines	Downtown

KEY POINTS: GUIDELINES SUMMARY

Station Type	Description	Multimodal Highlights	Walkability Highlights	Development Highlights	Keys to Success	Local Examples
Downtown	Downtown Pittsburgh and the perimeter Most dense High employment: more than 2 jobs for every 1 resident	Enhance pedestrian access to development Park and Ride not appropriate Limit single occupancy vehicle parking Provide infrastructure for a high variety of modes: bike lanes, crosswalks, bus lanes, bike parking, etc.	Connectivity likely strong due to existing street network Maintain and create public space Infrastructure should support high pedestrian use (e.g., wide sidewalks)	High FAR 3-60 stories 80-100% lot coverage Multi-family Building design should support and encourage street-level activity	Attract a 24/7 mix of uses Stress multimodal options Avoid surface parking and utilize structured parking for district-serving purposes only	Gateway Station (Pittsburgh) North Side Station (Pittsburgh)
Urban Mixed Use	Urban feel High density Highly mixed-use	Provide clear connections to on-street transit Connect to or enhance bike network Incorporate car share and bike share connections Park and Ride only appropriate at end of line Provide appropriate, low levels of parking	Provide key pathways to increase connectivity Create and maintain public space Connect developments to pedestrian uses Provide infrastructure to encourage visible, comfortable walking	3-9 stories 70-100% lot coverage Multi-family or townhouses Building design should support and encourage street-level activity	Reduce residential and commercial parking Optimize street level relationships between development and the public realm Consider/ implement district parking strategy	Negley Station (Pittsburgh) Carnegie Station (Carnegie)
Urban Neighborhood	Neighborhood feel High density Mostly residential use	Incorporate shared parking Park and Ride not appropriate except at end of line Connect to side streets in network Provide clear connections to on-street transit Connect to or enhance bike network	Build connections to existing pedestrian networks Maintain public space Provide sidewalks and bicycle infrastructure that connect to main activity centers and public space	3-9 stories 60-80% lot coverage Multi-family or townhouses Orient building design to multiple forms of transit Avoid large surface parking lots	Integrate station with streetscape Do not over-supply parking Make connections to station visible and convenient	Roslyn Station (Swissvale) Potomac Station (Dormont)

BY STATION TYPE

Station Type	Description	Multimodal Highlights	Walkability Highlights	Development Highlights	Keys to Success	Local Examples
Transit Neighborhood	Neighborhood feel - neither distinctly urban nor suburban Medium density Mostly residential use	Enhance multimodal access with infrastructure improvements Park and Ride not appropriate except at end of line Enhance drop-off access at locations near main streets Connect to existing multimodal networks including on-street transit	Provide safe, visible connections around station and neighborhood streets Provide alternative pedestrian routes off fast-moving streets Decrease block size Consider wayfinding	3-5 stories 30-70% lot coverage Multi-family or townhouses Building design should match the feel and needs of the specific neighborhood Build higher density proximit to the station	Market transit connections Rebuild and reconnect pedestrian infrastructure If vacancy is high, plan development and infrastructure for future density	Crafton Station (Crafton) Homewood Station (Pittsburgh)
Suburban Neighborhood	Suburban feel Low density Mostly residential use	Enhance drop-off access for vehicle passengers Park and Ride is appropriate depending on neighborhood Connect to street network Provide connection to any existing transportation accommodations in the area	Provide safe, visible pedestrian connections around the station Provide connections to overcome topography Provide alternative pedestrian routes off of fast-moving streets Consider wayfinding	2-4 stories 20-50% lot coverage Townhouses or single family Building design should match the feel and needs of the specific neighborhood	Provide nearby uses with good pedestrian connections from station and Park and Ride Match development with existing neighborhood Make nonresidential uses attractive to transit riders and community members	Washington Junction (Bethel Park) Lytle Station (Bethel Park)
Suburban Employment	Suburban or industrial feel Low to medium density High employment use	Make station known and visible by pedestrians from work centers and street network Parking for development will be needed Park and Ride is appropriate Connect to street network Provide connection to any existing transportation accommodations in the area	Provide clear connections to employment centers including pedestrian connections through parking lots Ensure connections feel safe and accessible during all local work hours Consider added value of landscaping and public spaces	3-9 stories 40-60% lot coverage Building design should consider all users	Distribute passengers to destination Create pedestrian infrastructure or, if needed, provide additional infrastructure such as shuttles Make transit opportunity clear and convenient Make pedestrians feel safe	Bell Station (Carnegie) South Hills Village (Bethel Park)

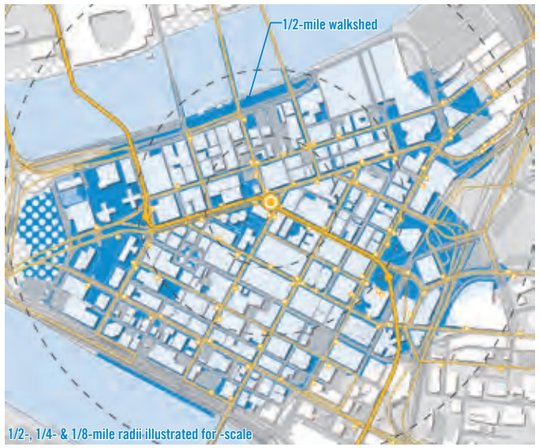
TYPE: DOWNTOWN

Downtown stations are located in or on the perimeter of Downtown Pittsburgh's urban core. Serving as the largest employment center in the region, the area experiences the highest density of ridership in Port Authority's system. The stations in this category consist of three central stations, four stations on the immediate perimeter of central Downtown, and two stations across the river from central Downtown and adjacent to major North Shore attractions: PNC Park, Heinz Field, and Rivers Casino. Due to a lack of permanence and infrastructure, the Downtown on-street bus stops that serve busway routes (such as the P1 and G2) are not included in this type. If, in time, these stops become more permanently integrated, inclusion is possible.

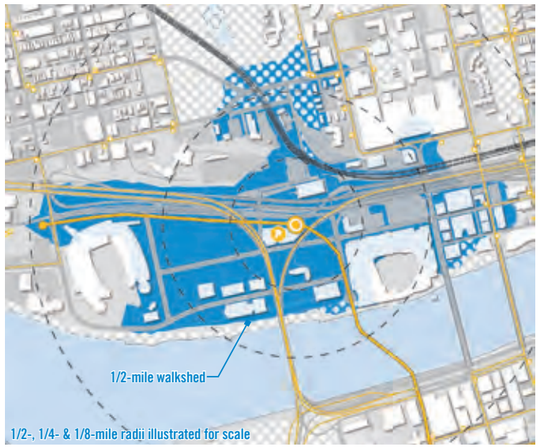
As regional destinations for work and entertainment, these stations experience high levels of ridership. In transit systems where downtown is designated as the central point, as in Allegheny County, connections to local (on-street) and rapid (designated right-of-way) transit are strongest for this station type.

Automobile parking at Downtown stations should not exist because they are the end destination for a large volume of riders, transit is readily available, development opportunities are limited, and there is a density of uses and attractions nearby. High levels of transit service are provided to these stations throughout the work day and during special events, easing the challenges of limited parking and road congestion.

These parking and congestion challenges also highlight the importance of providing robust multimodal access. Pedestrian connections to high-rise, mixed-use development in the urban core is vital to these stations areas. Access and connectivity are generally well-accommodated where the topography is relatively flat and there are small, dense blocks. With a growing cycling culture, it is increasingly important to provide bike access and parking at all Downtown stations. Recently-established and future bike lanes facilitate car-free access to downtown and surrounding areas.



1/2-, 1/4- & 1/8-mile radii illustrated for scale



1/2-, 1/4- & 1/8-mile radii illustrated for scale


Example: Gateway Station

Rebuilt in 2012, Gateway Station is located at the southernmost end of the Allegheny River Tunnel, which connects Downtown Pittsburgh to the North Shore. As with any downtown station, high-rise employment offices are abundant. Unique to Gateway Station is the easy access to Point State Park, home of festivals and recreation, as well as Pittsburgh's Cultural District, which offers arts and entertainment.


Example: North Side Station

North Side Station is one of the newest stations in Port Authority's system. Less than half a block from PNC Park, Pittsburgh's baseball stadium, the area surrounding North Side Station consists largely of highways, parking lots, and businesses catering to game-day crowds. When games are not in session the presence of restaurants, a concert venue, and riverfront parks and trails bring crowds to compliment office and parking uses.

TYPE: URBAN MIXED USE

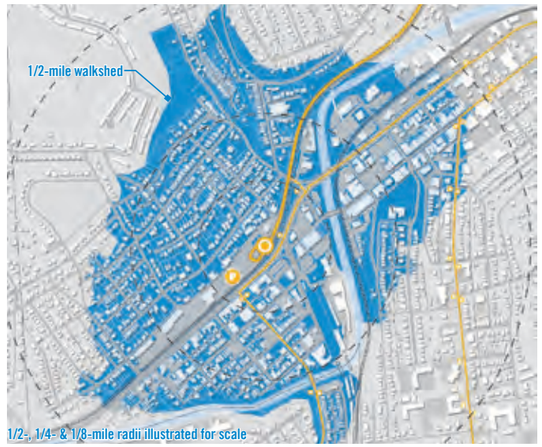
Urban Mixed Use stations serve highly-populated, mixed-use neighborhoods of a considerably smaller scale than Downtown areas. Within this type, mixed use is prevalent: three to six jobs exist for every four residents. These stations serve as both a transit origin and destination due to the variety of land uses. Transit service is likely frequent, provided by fixed-guideway service and various local routes. Pedestrian connections are critical, linking the station to surrounding multi-family residential and mid-rise buildings. Typically, higher-density and smaller blocks support easy travel by foot, but sidewalks and other pedestrian infrastructure may need upgrading.

The need to accommodate automobile access, connectivity and parking varies from station to station. Because the density and type of development within Urban Mixed Use areas is multimodal-friendly, car-centric planning should not be prioritized. For new development, parking should be reduced – if it is needed at all – and a district-serving parking strategy should be implemented rather than a site-by-site approach.

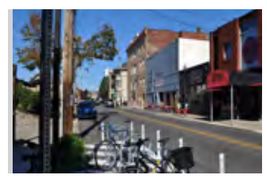
For station planning purposes, the goal is maximizing ridership by providing an appropriate mix of land uses and robust transit access. For most stations this will mean Park and Rides are not appropriate because land is better used for mixed-use destinations. The exception, Carnegie Station, is located near a dense, mixed-use area but it is also an important Park and Ride location: it's the end of the line and demand far outstrips supply. In this case, it is important to develop a TOD solution that balances the needs of transit riders, Port Authority, and the local municipality, as well as market realities.

At the time of this publication, four stations meet the density and mixed use criteria of this category. It is possible for new stations of this type to be built, and for existing stations to become Urban Mixed Use areas as a result of infill development.

1/2-, 1/4- & 1/8-mile radii illustrated for scale



1/2-, 1/4- & 1/8-mile radii illustrated for scale

Example: Negley Station

On the Purple Line (East Busway), Negley Station is located in Pittsburgh's a compact, mixed-use, eastern neighborhood of Shadyside. Shadyside is home to three business corridors, two of which are in the Negley Station walkshed. With limited opportunities for new development, the planning and design of TOD and any station improvements will be critical to ensuring the future success of the station as an asset to both riders, community members, and the Port Authority.


Example: Carnegie Station

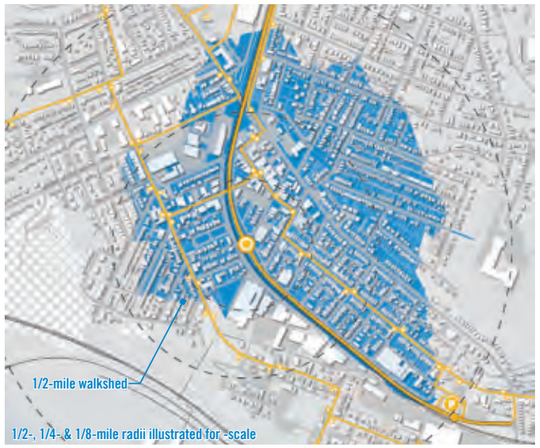
Carnegie Station, the last, southernmost stop on the Green Line (West Busway), opened in 2000. The station sits in the commercial core of Carnegie Borough and includes a large surface Park and Ride lot. A study determined that Carnegie Station is ready for TOD due to its available building stock, infill opportunities and proximity to Pittsburgh, among others strengths. The same study recommended replacing the existing surface parking lot with a structure containing parking and a mix of office and retail uses, a project PAAC is currently pursuing.

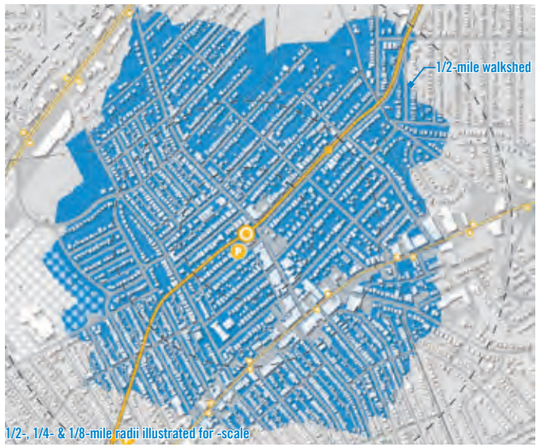
TYPE: URBAN NEIGHBORHOOD

Urban Neighborhood Station areas are largely residential with enough density to create an urban feel. Eight stations, located in Pittsburgh and surrounding municipalities, meet the density and use mix criteria of this category.

Urban Neighborhood areas contain multi-family residential and mixed use development at a neighborhood-scale, usually concentrated along a "Main Street." Moving farther from the main street, lower-density, single- or multi-family residential become more common. The neighborhood activity hub may or may not be well-connected to the transit station by accessible pathways. These main streets may serve as the origin and destination for transit users, and connections from the station allow riders to access neighborhood businesses and housing. Near pedestrian-friendly transit stations, many local businesses can serve residents traveling to and from work.

Urban Neighborhood station infrastructure, including parking, varies from station to station, and should match the pattern and feel of the surrounding neighborhood. Low- to mid-rise buildings are common to these eight station areas, and multimodal access is a priority for residents living nearby. New development should have shared or reduced parking because pedestrian connections are likely to be strong and well-established. Large surface parking lots should generally be avoided because they disrupt the neighborhood density and character. Car access will likely be provided on side streets and possibly along the area's main arterials.





Example: Roslyn Station

The second-to-last stop on the outbound Purple Line (East Busway), Roslyn Station is located in Swissvale Borough. The area is comprised of low- to mid-rise buildings and both single and multi-family residential. Businesses cluster around Monongahela Avenue and Noble Street, the latter of which is within easy walking distance of the station.

Example: Potomac Station

Potomac Station, in the Borough of Dormont, is well positioned to provide access to businesses along Potomac and West Liberty Avenues. Mid-rise and single- to multi-family households dominate the neighborhood, which is laid out in a slightly skewed grid. Due to the density and built nature of this part of Dormont, infill buildings are likely the best opportunity for future development. Strategically-located, under utilized parcels could be combined for larger-scale projects. A small Park and Ride lot is located adjacent to the station.

TYPE: TRANSIT NEIGHBORHOOD

Transit Neighborhood stations are the second most common station type and feature significant diversity. These areas have a moderate density and mix of uses. Residential portions of these neighborhoods can be similar in nature to both Suburban and Urban Neighborhoods. Transit Neighborhoods are unique due to the mid-level density of jobs and residents. Some of the 18 Transit Neighborhoods may be in this category due to vacancy rather than being less dense by design.

Transit Neighborhoods are located within the City of Pittsburgh and in surrounding municipalities. Land use development patterns in these neighborhoods are of a modest density with similar street grids to what one would find in suburban development, albeit with smaller more condensed blocks. While the block sizes and street network accommodate pedestrian access, the primarily residential character of these areas results in greater travel distances to businesses and services. Planning for a diverse range of transportation modes is important at Transit Neighborhood stations to effectively allow people to reach low- and mid-density areas that are not within walking distance.

While the fixed-guideway service remains consistent, local, on-street transit in these areas may be less frequent than in higher density neighborhoods, as riders are more likely to use transit primarily for commuting. Transit Neighborhoods can be destinations unto themselves, but less likely than in areas with a greater density and mix of uses. With less density, parking for new development can be built at low to moderate levels. Large-scale surface lots will likely not fit in with the residential character of a Transit Neighborhood; parking structures could be an efficient way to incorporate that use, depending on the character of the site and surrounding buildings.

Example: Crafton Station

Crafton Station, on the Green Line (West Busway), is located entirely in Crafton Borough. The station itself is located next to the Crafton Borough Building, the Crafton Public Library, the volunteer fire department, two small Park and Ride lots, and a small commercial district. The surrounding area has residential and commercial zoning districts. Small businesses sit throughout the walkshed, which is one of the largest due to high connection opportunities and few physical barriers.

Example: Homewood Station

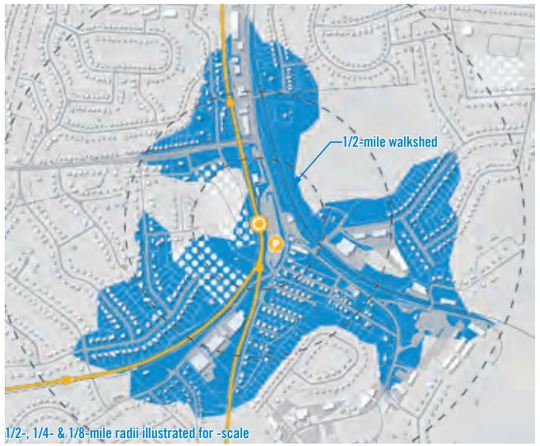
Homewood Station, part of the Purple Line (East Busway), is situated above Homewood Avenue along Norfolk Southern's railroad corridor. The station is located on the shared border of Pittsburgh's Homewood and Point Breeze North neighborhoods. The East Busway has experienced substantial investment and development in recent years, and Homewood Station is now receiving attention. The Homewood Station Transit-Oriented Development Study (2015) examined the area's development potential, and in it residents and local stakeholders identified infrastructure improvements that will support TOD.

TYPE: SUBURBAN NEIGHBORHOOD

Suburban Neighborhoods are the most prevalent type within the Port Authority system, with 33 stations. Classified with the lowest density and lowest levels of non-residential uses, Suburban Neighborhoods generally serve as a transit origin rather than a destination, and have less frequent off-peak on-street transit service than destination areas.

The physical relationship between the transit station and surrounding neighborhood varies widely within this category. Stations such as Smith Road and Munroe are at-grade, with minimal infrastructure. Lytle and Sheridan Stations each include a significant Park and Ride lot and station infrastructure. Many Suburban Neighborhoods are located outside of the City of Pittsburgh and either sit near a main road or are nestled in the middle of a neighborhood. For all stations, mostly single-family homes dominate the walkable area with some low-rise, lower-density, non-residential development.

The level of multimodal connectivity offered at Suburban Neighborhood stations also varies. Pedestrian and bike access is generally limited, especially along main thoroughfares. Some of the communities may have been built without sidewalks, making the transition to a welcoming pedestrian environment difficult and expensive. While pedestrian access should remain a vital feature, with the goal of connecting the station to the entire Suburban Neighborhood area, car access may be necessary to adequately link communities to on-street and fixed-guideway service. Park and Rides are most appropriate in Suburban Neighborhoods but should consider existing development around the station. New development will likely need to include more parking than in Transit and Urban Neighborhoods.



Example: Washington Junction Station

Washington Junction Station serves the red and blue light rail lines in the Municipality of Bethel Park, located approximately sever miles southwest of Pittsburgh. The existing 300+ space Park and Ride lot feels appropriate at this car-dominated station. There is limited pedestrian connectivity between the station and the surrounding neighborhood, which is comprised of a weaving street network full of single-family homes. Transit-oriented development could serve existing riders frequenting the station and attract the new riders with an opportunity to live near high quality, fixed-guideway service.

Example: Lytle Station

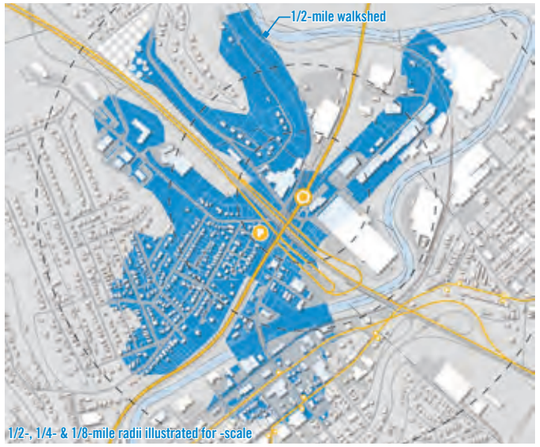
The Blue Line's Lytle Station, also located in Bethel Park, sits between two parallel two-lane streets: West Library Avenue and Brightwood Road. Situated slightly above grade, Lytle Station blends into the street network surrounding the station. Though it lacks pedestrian infrastructure, Lytle Station is located near a strip of businesses to the south and a Park and Ride lot adjacent to the east. Beyond the main streets, the station is surrounded by a neighborhood made up of single-family homes set back in their lots with both front and back yards.

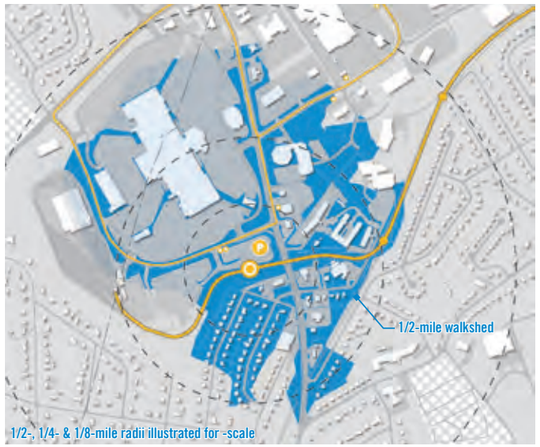
TYPE: SUBURBAN EMPLOYMENT

Suburban Employment stations are located in less dense areas with active employment centers where one would expect to find large, low- to mid-rise buildings. Sources of employment in the four Suburban Employment locations include retail and industrial businesses, and office space could be part of the mix of uses at these station areas.

All Suburban Employment station areas experience sparse, spread-out residential, and the land organization reflects this, usually catering to personal vehicle transportation. Standardized, frequent, fixed-guideway transit service provides an opportunity for these locations to serve as a destination for employees and shoppers alike. Creating pedestrian access to the employment centers from the transit station is a crucial step in making these areas shopping destinations. Building strong pedestrian connectivity access may be a difficult and expensive task, especially given the context of large blocks and surface parking lots. Parking lots are typical for this station type, and new development will also require parking. Pedestrian-oriented parking with clear, visible walkways could be extremely valuable in these areas. Park and Rides in these areas could be the most beneficial land use since multimodal connections tend to be limited in these areas.

Due to the relatively low density of development at Suburban Employment locations, the addition of residential units could change the station type by increasing density and decreasing the jobs-to-residents ratio. Making these areas attractive to residents, as opposed to large-scale employers, would require attention to detail, high levels of investment, and smart planning.





Example: Bell Station

Bell Station is on the Green Line (West Busway). Surrounded by industrial uses, the station is located near the intersection of Bell Avenue and Roslyn Road. The number of residents within the station's walkshed is limited and nearly half of the walkshed is zoned for industrial uses. The raised nature of the busway, in conjunction with the large, block-sized industrial buildings, limits the station's visibility from local and parkway traffic. A small Park and Ride lot, located across the street, provides vehicular access in an area with limited street parking.

Example: South Hills Village Station

South Hills Village Station, located at the southernmost end of the southwestern light rail line, is approximately nine miles from downtown Pittsburgh. The station's 2,200 space, multi-level parking structure is the largest Park and Ride in Port Authority's system. South Hills Village, a two-level shopping mall featuring over 130 stores, is located directly across from the station and parking structure. As a significant employment center, the mall helped to establish this station as Suburban Employment. And in a nod to mixing uses even at the ends of the typology, an upcoming TOD on PAAC property will add residential units to this employment area.

3.

TOD GUIDELINES

MULTIMODAL CONNECTIVITY

Overview

The success of TOD relies upon people's ability to access development and the station via their mode of choice. Transit-orientation means that many trips in the TOD, particularly to and from the station, will be walking trips. Another portion will be cycling, and additional trips will be made by bus or car. Many people arriving by car will want to park on site.

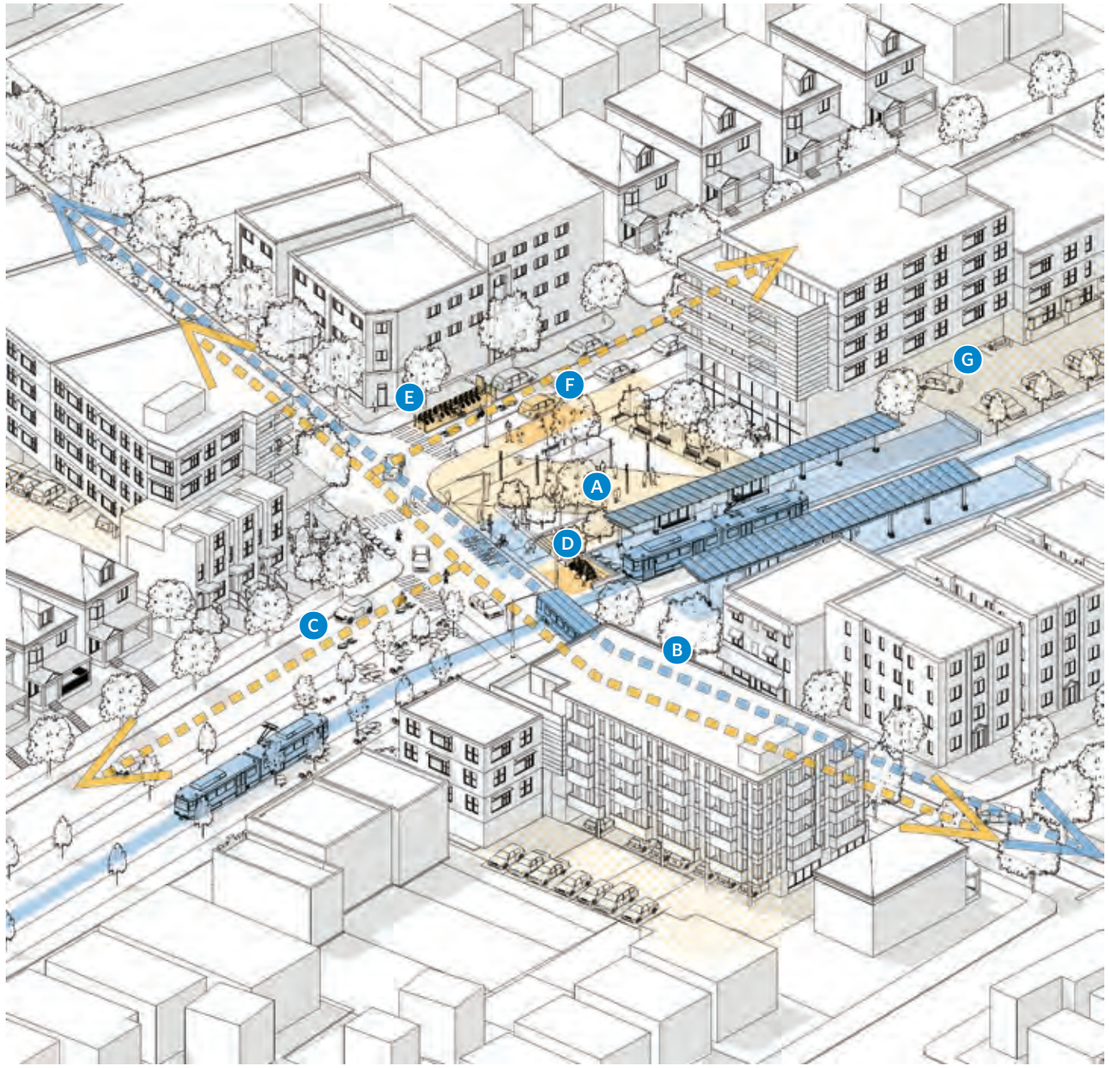
TOD should establish safe, convenient, and welcoming connections between itself, the transit station and other nearby destinations. Access should be organized in a way that is consistent with the mode priorities established in the Goals & Principles section. However, the mode priorities are not necessarily exclusive and the first four should be accommodated in all cases. This section further elaborates on how to integrate the full range of transportation modes into TOD.

Mode Priority

1st	Walking
2nd	Cycling
3rd	Transit Connections
4th	Drop-off
5th	Park and Ride

General Principles

- A Optimize Pedestrian Connections to Transit
- B Connect to the Transit Network
- C Connect to the Bicycle Network
- D Provide Bicycle Parking
- E Accommodate Bicycle Share Stations
- F Provide Space for Drop-off
- G Balance Parking with TOD



MULTIMODAL CONNECTIVITY: BICYCLES

Pittsburgh currently has the greatest percentage increase of cycling use of any city in America. Four times as many people in the Port Authority service area commuted by bicycle in 2015 as compared to ten years before. Cycling is an active, affordable mode of transportation with growing relevance and it should be thoughtfully incorporated into the design of any new TOD.

PAAC is an increasingly bike-friendly transit system. Every PAAC bus is equipped with a two-bike rack, and light rail and incline vehicles allow bikes at any time in designated areas. People who cycle can make any trip, regardless of topographical, weather, or other challenges, without having to leave their bike behind.

With a new bike share system, Healthy Ride operated by Pittsburgh Bike Share, 500 bicycles were recently installed in public places for shared use and another 500 are planned. The availability of bicycles, without the obligations of ownership, provides people with flexibility in how they make their first or last mile trip to and from transit stations. Furthermore, it extends the catchment area for a transit station because the distance one can bike in 10 minutes is farther than that for walking.

Connect to the Bicycle Network

Shared and protected bicycle lanes are gaining a presence on local roads. Bike infrastructure has tripled in the City of Pittsburgh over the last five years. Other municipalities are planning for people who cycle. TOD planning should consider how the development and station, as destinations, can ensure safe cycling connections to the existing bicycle network. This will likely require collaboration and coordination between the developer, transit agency, and local jurisdiction to create safe connections across property lines.

Infrastructure such as bike path crossings, bike signals at intersections, and bike corner turning allowances can be incorporated into developments to get cyclists to/from networks and destinations

Provide Bicycle Parking

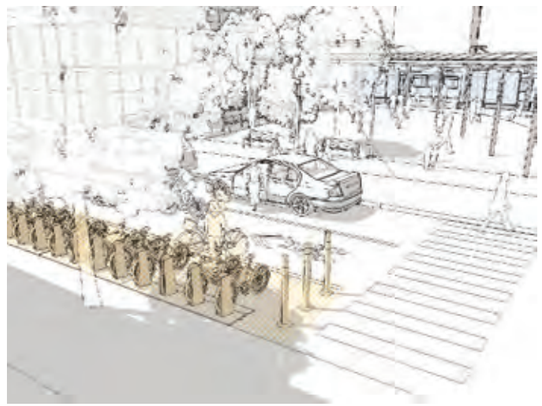
With the prevalence of cycling as a mode of transportation, it's important in the design of any multimodal facility to consider what happens to bicycles when cyclists arrive at their destination.

People who cycle should feel that their property is secure and protected when it is parked. Shelter from the elements is an important first step and will attract a higher level of use. Beyond that, bicycle lockers or bicycle garages (a locked room or structure) are ideal to provide security from theft and keep bikes dry.

As cycling grows in popularity, more space will be required to park bicycles at destinations. Two-bike racks along the street are no longer sufficient. Space should be dedicated within TOD to ensure that bicycles are accommodated and that they do not infringe on valuable public space for pedestrians and other users. Many bike rack designs can help property owners save space, by hanging bikes vertically or stacking them.

Accommodate Bicycle Share Stations

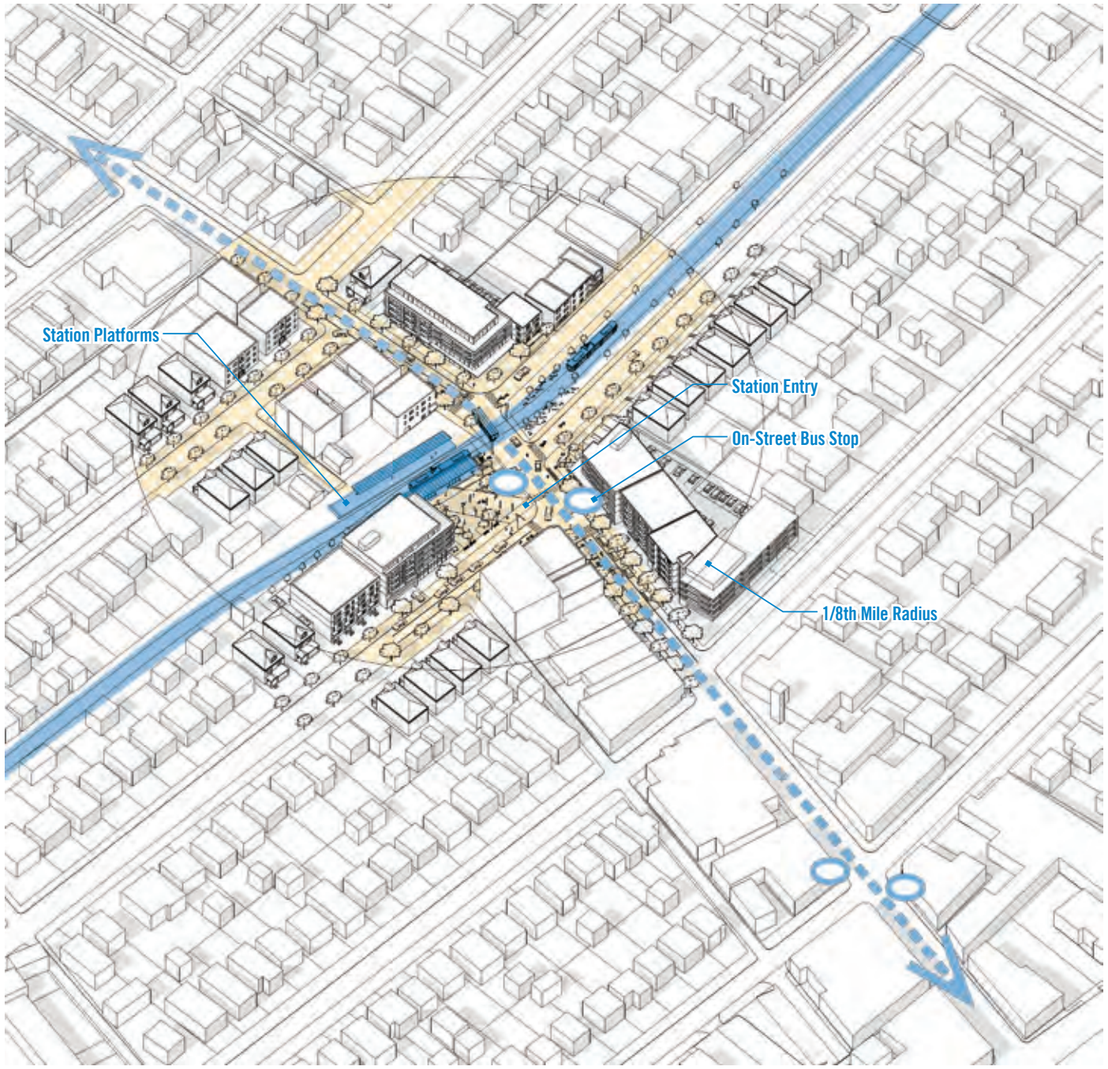
Today, there are 50 bike share stations across the central and eastern areas of the City of Pittsburgh, providing an important connection for short trips. TOD is an ideal context for bike share. By co-locating bike share and transit stations, the area that a transit rider can reach in 10 minutes – and the number of people who can be reached within a 10-minute trip – is expanded. Regardless of bicycle ownership, active individuals can quickly pedal from their origin to a transit station or TOD destination. This expands the options that TOD and transit users have to make short trips without a car.



MULTIMODAL CONNECTIVITY: TRANSIT

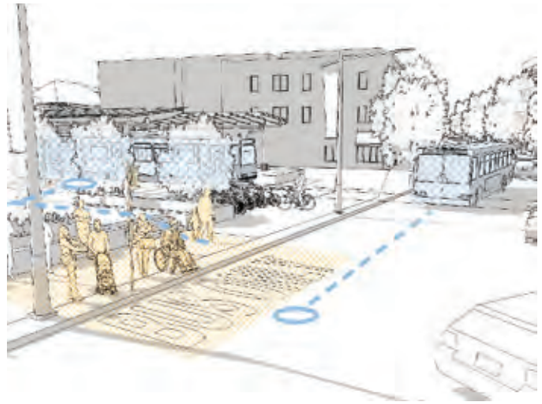
Tens of thousands of people transfer on Port Authority's system every day. Connections between transit routes are critical for many people to get where they need to go. When it is integrated with fixed-guideway stations, TOD should facilitate pedestrian connections between the station and nearby on-street bus routes.

Connections to transit can be strengthened through infrastructure improvements, wayfinding, service coordination, and strategic routing. Not all of these elements are entirely within the purview of new development, but PAAC seeks to work closely with development partners to achieve outcomes to the maximum benefit of transit riders and other TOD users. Collaboration on everything from new or improved pedestrian pathways to effective paratransit drop-off locations will lead to TOD design that makes it easier and more appealing to access and utilize transit stations.



Connect to the Transit Network

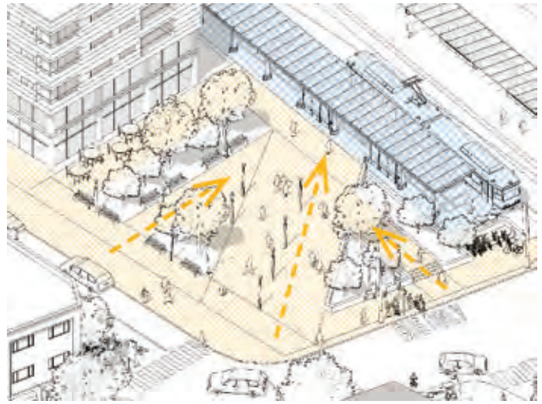
An integrated TOD and station design should facilitate quick and easy transfers through direct and intuitive pedestrian connections, and by intentionally creating access to on-street bus routes. Significant infrastructure may or may not be present for the on-street bus routes at the time of development. If a new building or public space is planned adjacent to an on-street stop, on-street transit stops could be integrated into the development. Simple measures, such as awnings and leaning rails, can be easily incorporated into a limited portion of a development, benefitting transit users who support and use the development.



Optimize Pedestrian Connections to Transit

All transportation trips begin and end with a walking trip. The quality of the pedestrian experience affects travelers' ability and desire to utilize a mode of transportation and visit various destinations. Safe and welcoming pathways encourage walking, not only to and from transportation, but also to access goods and services, encouraging unplanned stops and purchases.

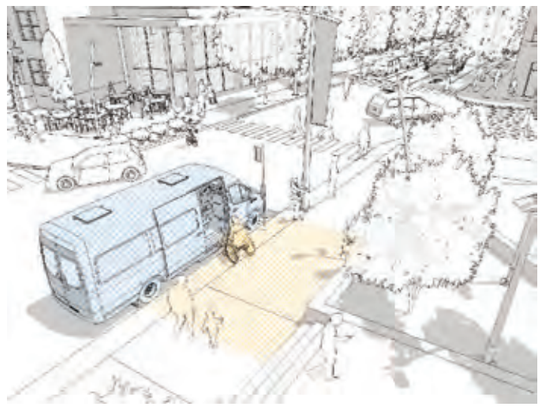
The routes that pedestrians use to access a transit station should be optimized through the creation of TOD. Development may present opportunities for investigating new configurations of pathways, helping to establish more direct and pleasant pedestrian connections for those walking to and from the station.



Provide Access for Other Types of Transit

Paratransit provides an important link for senior citizens and people with disabilities who would otherwise not have the freedom to travel the region. Convenient and safe pick-up and drop-off locations for paratransit are critical for new development, especially when it contains public services, such as retail, medical offices and more.

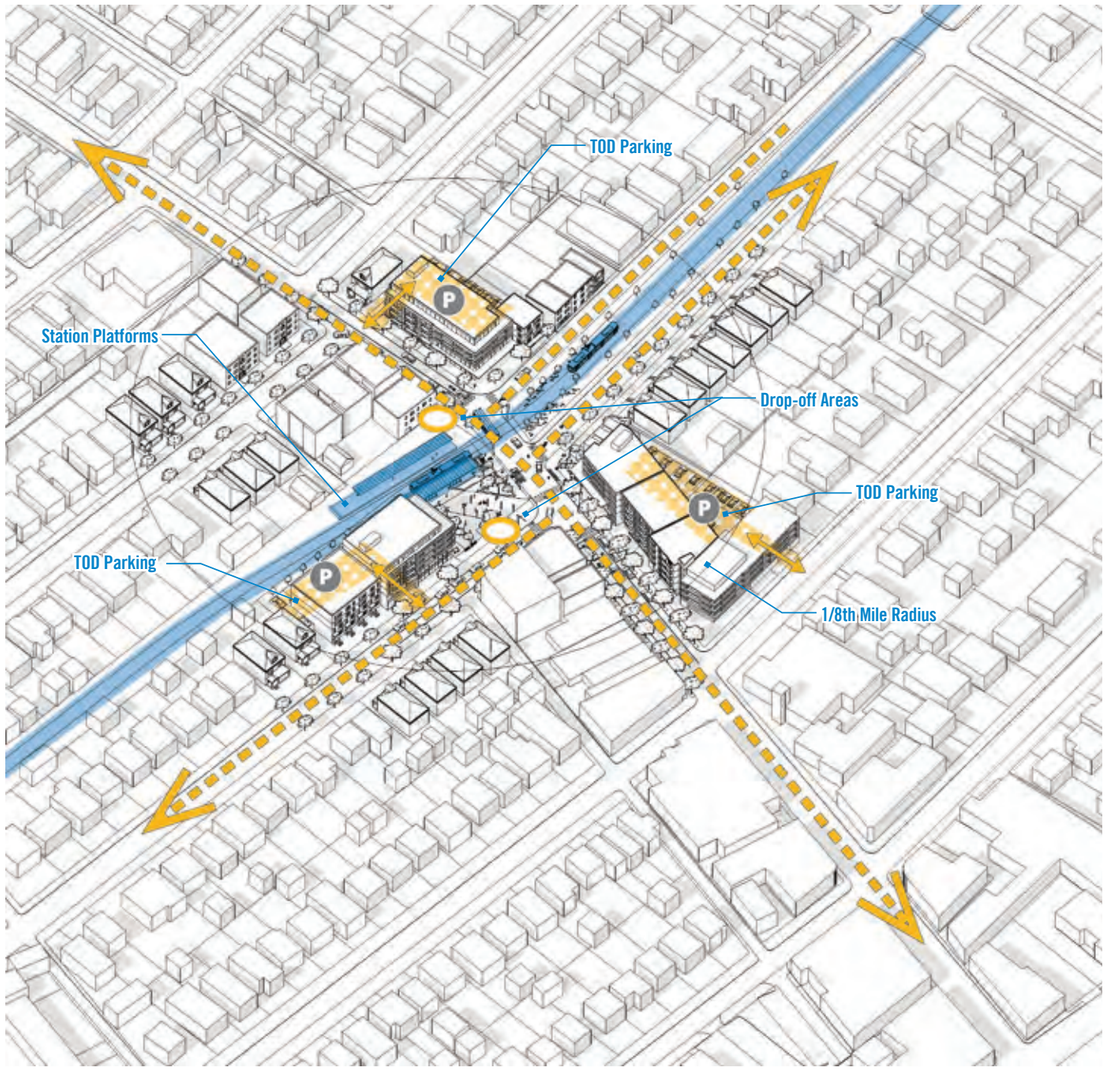
Depending on the location of a TOD, creating space for other public transit carriers (e.g., those from outside Allegheny County) to drop off passengers may be a worthwhile consideration. At certain locations, making connections to national and inter-city transit services may enhance and facilitate riders' experiences.



MULTIMODAL CONNECTIVITY: CARS

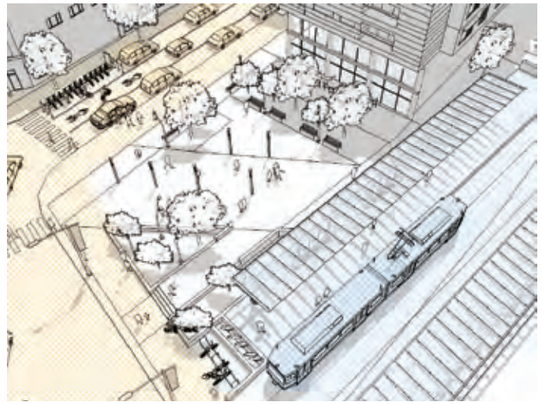
Every transit trip begins with another mode, and the car is no exception. Passenger drop-offs and Park and Ride to transit stations are important. However, it should not be designed so as to unduly limit a station's TOD potential or adversely impact a community's quality of life. Consistent with the mode priorities described earlier, cars should not have access to land closest to the station that could separate the station from TOD and compromise safety for other modes.

Overall, the traditional infrastructure for automobile use should be designed so as to not diminish the pedestrian experience. Considerations should be made to enhance safe and efficient use of streets for cars and all modes, including pedestrians walking from their car to the station. Sidewalks and walkways are critical to pedestrian safety and enjoyment. Traffic calming and lower speeds may actually increase car connectivity while creating a safer environment for those who walk and cycle.



Connect to the Street Network

To be integrated with the larger community, TOD must connect with the local road network. New streets should make pedestrian and vehicular connections to the existing network and restore any historic grid patterns that were interrupted by past changes. Dead-end streets should be avoided, where possible, to maximize the flow of people through and around the TOD. Future development should be considered when designing street connections.



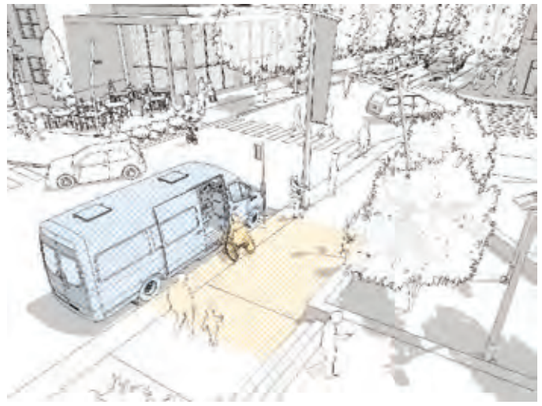
Provide Space for Drop-off / Pick-up

Drop-off activity can be difficult to control as drivers seek the most convenient position relative to the station. Spreading out this activity is ideal. By providing easy access from as many directions as possible, drop-off/pick-up locations can provide a more efficient vehicle access than parking by allowing many vehicle loads throughout the day. These drop-off locations should be arranged with sufficient distance from the station to ensure that non-motorized transportation is prioritized. Drop-offs should be positioned to ensure that they don't create barriers to station access for other transit modes.

Incorporating pull-off areas can also decrease the traffic congestion and confusion that would occur as drivers stop and wait, to pick-up/drop-off riders.

Provide Access for Transportation Services

Where feasible, the station environment should accommodate drop-off by other minor modes of transportation, including paratransit, ride-hailing services, taxis, and university- or employer-run shuttles. These services cannot replace public transit service, but they can compliment it, providing a valuable first- and last-mile connection for riders with disabilities, students, and other transit users who may not be able to walk or bike directly to a station or end destination.



MULTIMODAL CONNECTIVITY: PARKING

Balance Parking with TOD

Park and Rides for transit commuters should be located and managed in a way that supports TOD. If it is not located and designed wisely, a Park and Ride can squeeze out not only TOD, but transit riders using other modes of station access as well. Where Park and Ride and TOD are to coexist in the long term, the location and design of the parking facilities should be guided by TOD principles. The mode priorities apply here, with Park and Ride taking a back seat to other uses in terms of proximity to the station area.

Create Structured & Shared Parking

When parking is necessary as part of a TOD, it should be structured to minimize its footprint and integrated to minimize its visibility. Due to the significant expense of parking (especially structured parking) and limited availability of land, TOD parking facilities should be shared among more than one use to the extent possible. Shared parking involves two entities utilizing the same parking at different times of day. It can be a very efficient way to share costs and maximize the efficiency of a parking operation.

Accommodate ADA Parking

Parking should be compliant with local requirements, the Americans with Disabilities Act (ADA) and the Standards for Accessible Design. Designing parking so it is usable by all persons, including those with disabilities, will mean design goes beyond the parking to allow people to get to their destinations. ADA considerations and design will need to be well-thought out for shared parking with varying final destinations.

Accommodate Car Share

Car share services provide a convenient way for people without a car to have short-term access to a vehicle. As car share services support car-free, transit-based lifestyles, priority parking spaces should be strongly considered near transit facilities.

Accommodate Alternative Energy Vehicles

Hybrid, electric, biodiesel, and other alternative fuel vehicles reduce the impact of vehicles on the environment. Priority parking for these vehicles promotes environmental sustainability and sends a positive message about choices like transit.

Prioritize Parking for Carpool

Carpooling is a cost- and space-efficient way for transit riders to utilize Park and Rides. Because carpools bring more riders for the same amount of parking as single-occupancy vehicles, they should be given priority spaces in Park and Ride lots. An added bonus is that fewer cars on the road mean fewer greenhouse gas emissions.

Provide Park and Ride when Appropriate

When arriving at a transit station by car, many people “Park and Ride.” The amount of parking appropriate at a transit station depends largely on the context in which that station is located. TOD diminishes the availability of land and, more importantly, the demand for parking at the station.

As warehouses for cars, Park and Rides are best suited to stations located in areas where development patterns are not conducive to other modes. As communities along a transit line become more dense and walkable, the station area is better used to connect and attract those who walk, cycle and transfer through TOD that also provides amenities. Park and Rides should be limited to station areas where car access to the transit station dominates, either due to lack of density and walkability or the station being uniquely positioned for it (e.g. end of the line). Park and Rides are not appropriate in dense, urban areas where both use of other modes and traffic are plentiful or where the primary station area transit usage is for community purposes only.

By creating a population of ready riders living, working, or shopping in the station area, TOD generates riders who will use transit at all times of the day for all kinds of trips. This generates more transit activity than Park and Ride users who typically make only two trips per day.

The Park and Ride lots in today’s PAAC fixed-guideway system were established with a focus on generating commuter ridership. As opportunities arise to consider the future of these assets, the appropriateness of Park and Ride lots and the replacement of spaces as part of TOD are questions of both typology and cost-benefit analysis.

LESS APPROPRIATE

MORE APPROPRIATE

Downtown

No replacement

Park and Ride is not appropriate.

The high value and limited availability of land in the downtown core makes parking, and Park and Ride in particular, an undervalued and inappropriate use of land. Although parking is in high demand downtown for commuters, the Downtown stations serve as a primary destination for transit users and therefore the demand for commuting trips starting in these locations is low. Furthermore, Park and Ride lots generate automobile traffic, the proliferation of which is undesirable downtown.

Urban Mixed Use

Partial or no replacement

Park and Ride is not appropriate, except at the end of a transit line.

As TOD improvements such as streetscaping are made in these dense and mixed-use neighborhoods, transit-oriented developments and the station are accessible by many modes. Consequently, introducing a high volume of vehicular traffic to a Park and Ride is undesirable and would create a low value land use that disrupts the high density nature of the neighborhood. The exception occurs with Carnegie Station, an end of the line station that draws demand from a regional area. The amount of Park and Ride users demanding the quality Green Line (West Busway) service could not be substituted by transit-oriented development riders.

- Shared parking should be a top priority if a Park and Ride is present in an Urban Mixed Use neighborhood. Neighborhood uses such as churches and business districts will likely have parking attached and, depending on demand, may provide opportunity for shared uses.
- Parking should be hidden, integrated with other uses, and set back from the street to allow pedestrian activity when required.

Urban Neighborhood

Partial or no replacement

Park and Ride is not appropriate, except at the end of a transit line.

The density and highly residential nature of Urban Neighborhoods means structured or surface parking at the large scale will be incompatible with the surrounding scale and use. Existing parking lots or vacant land serve as an attractive opportunity for transit-oriented development, which draws ridership and activity to the station. However, not all neighborhoods have the real estate market that would encourage development of all station area parcels. In these scenarios, Park and Rides are appropriate, assuming the potential for development will become reality once the market is more attractive and assuming the size and design is not a detriment to the walkability, character, and connectivity of the neighborhood.

- Shared parking should be a top priority for Park and Rides in Urban Neighborhoods. Residential parking can be accommodated at the site during evening and nighttime hours.
- Parking should be hidden and set back from the main street to allow pedestrian activity when required.
- Public spaces should be used to connect the Park and Ride with the station and the community.

Transit Neighborhood

Partial replacement

Park and Ride is not appropriate, except at the end of a transit line.

Transit Neighborhoods require special consideration with regard to Park and Rides. Some Transit Neighborhoods may be less dense than Urban areas due to land use patterns while others may be less dense due to land vacancy. The land use and vacancy of the neighborhood will determine Park and Ride appropriateness. While the current density of these neighborhoods may provide opportunity to provide parking with little impact on surrounding infrastructure or potential development, infill development could render that same structured or surface parking a low value use as density increases around the station. Therefore, Park and Rides are only recommended where conditions are conducive to Park and Ride by agency standards AND where the land has no other current high value community use. In the event that density begins to increase due to development, Park and Rides should be considered for redevelopment.

- Shared parking should be a top priority for Park and Rides in Transit Neighborhoods. Residential parking can be accommodated at the site during evening and nighttime hours.
- Small (less than 20 spaces) well-designed Park and Rides can likely fit the community. Parking should be set back from the main street to allow pedestrian activity when required.
- Public spaces and strong pedestrian connections should be used to connect the Park and Ride with the station and the community.

Suburban Neighborhood

Full replacement

Park and Ride appropriate when located near a main access road only.

Many of the Suburban Neighborhood stations are located on neighborhood streets surrounded by single family detached homes or townhouses. Placing surface or structured Park and Rides in these neighborhoods would be disruptive to residents and not provide the access prioritized by the agency. Where stations exist near heavily-traveled suburban corridors, Park and Rides are appropriate given the right demand.

- Shared parking should be investigated to utilize space not frequented during the work day.
- Passenger drop-off opportunities should be enhanced and carpooling should be encouraged where possible, thereby allowing more space for those who need to park.

Suburban Employment

Full replacement

Park and Ride appropriate where demand exists.

Suburban Employment areas often have land available to provide space for parking. Pedestrian connections are important throughout the site and are critical when parking is not located immediately at the station. Vehicular connections are likely already strong in this area and, if located near a heavily traveled thoroughfare, could provide sufficient demand. At times, these stations and the employment centers they serve are not easily visible or accessible (such as in industrial areas) and may not attract the usage that would justify the maintenance expenses.

- Shared parking should be considered, especially if the office, retail, or industrial centers near the station have available parking during the typical work week.
- Visibility of these stations from major access points should be a priority.

WALKABILITY

Overview

Regardless of the method used to arrive at the station, walking connections are crucial - linking passengers to their multimodal connections and their final destinations. TOD of any sort aims to be the final destination for transit passengers.

Research has shown that most people have limits to how much effort and time they are willing to dedicate to travel. For transit riders, this limit is approximately 10 walking minutes, which the average adult covers 1/2 mile. This 1/2 mile represents the distance a pedestrian is willing to walk to and from rapid transit. Simply locating development within the 1/2-mile distance to the rapid transit station, however, does not ensure the development can be reached by transit-using pedestrians. The ability and willingness to walk is shaped by much more than distance alone.

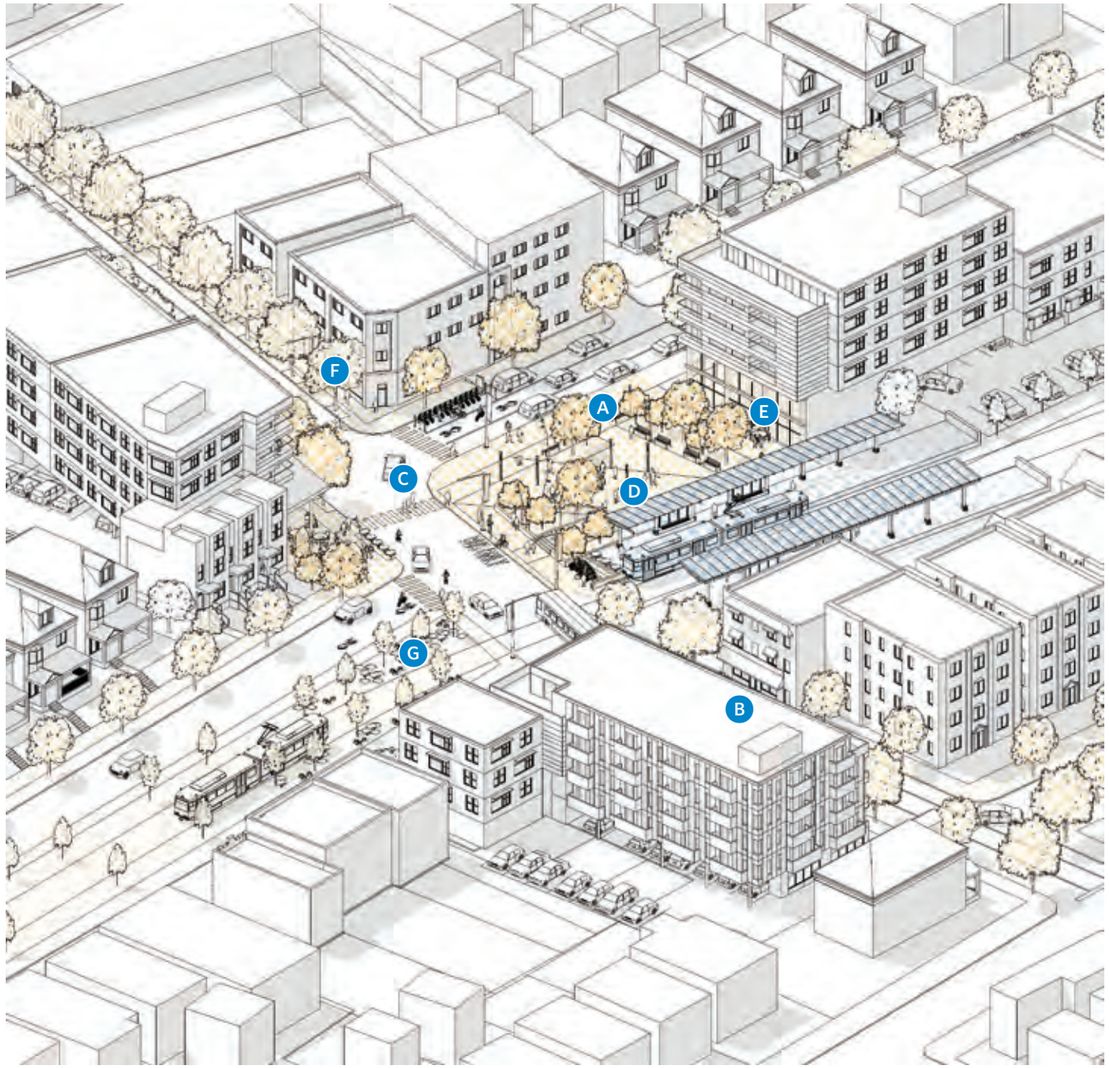
Walkability occurs when physical environments produce a space where walking feels safe, easy, and welcomed. This safety, ease, and comfort drastically impact the real decisions of pedestrian walkers, as does distance. To truly create a TOD, walkability between development and the station is key.

The tools to create a walkable TOD or neighborhood are extensive. To maximize walkability, the streetscape at and around transit stations must have active, dynamic, ground floor frontages with a mix of uses and destinations; an interconnected network of appropriately-sized, accessible sidewalks, crosswalks, and curb cuts; and street trees to provide shade and soften the built environment. Every pedestrian trip to and through a TOD should be safe and efficient, but also memorable and enjoyable. Transit stations should be a key node in the public realm and pedestrian network, with maximum accessibility and visibility from the major street network and surrounding neighborhood. Station entries should connect to active pedestrian spaces that are designed to encourage gathering. Pedestrian connections to feeder transit routes should be visible and well-integrated into the public space network.

Although not inherent in its name, accounting for walkability should also result in providing increased, more convenient access for those with disabilities.

General Principles

- A Organize development to expand the station walkshed through new connections when possible
- B Maximize pedestrian connectivity with short blocks and frequent intersections
- C Provide safe, accessible sidewalks and crosswalks
- D Create a station identity with public open space related to the station entry
- E Activate public space with surrounding uses and pedestrian amenities
- F Create a tree canopy along pedestrian corridors
- G Utilize green strategies and technologies



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.

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.

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.

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.

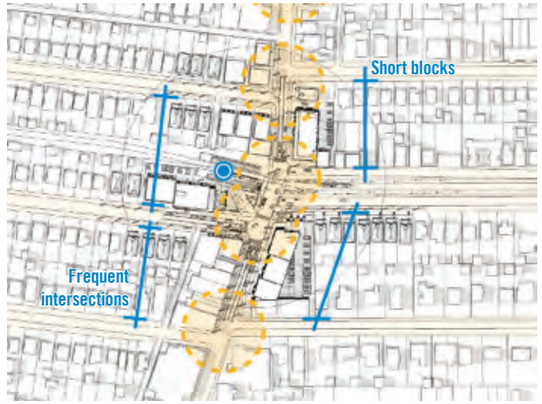
A station's walkshed may be expanded by creating pedestrian links across existing barriers, building a rich pedestrian TOD network in and around the vicinity of the station and designing the TOD site so that the station has many connections with the surrounding neighborhood. People are more likely to 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.

3. TOD GUIDELINES

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

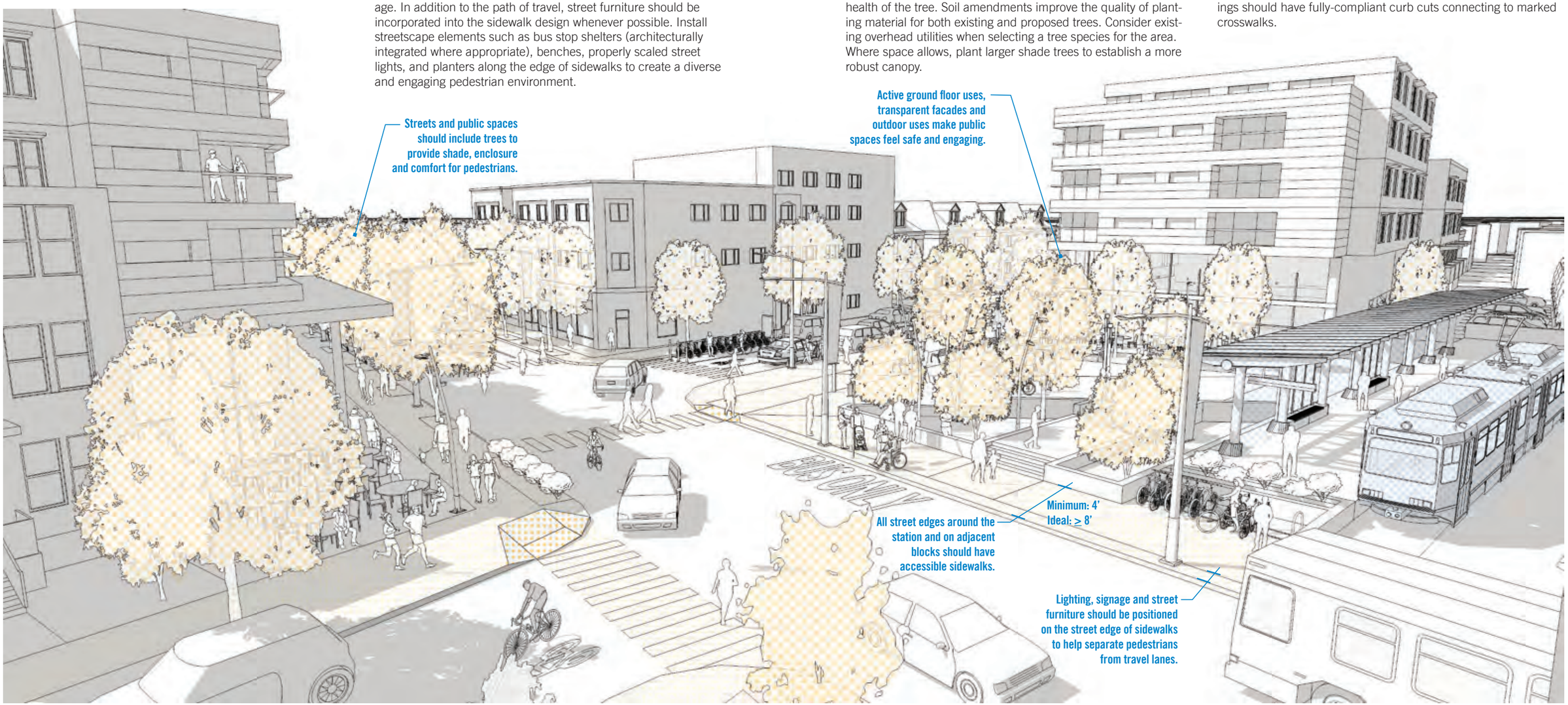
A healthy tree canopy creates a vibrant urban environment that people want to navigate and that city residents feel connected to. Tree canopies offer a myriad of environmental benefits including reduced emissions and energy demand for air conditioning, reduced stormwater pollution, and natural cooling, 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.

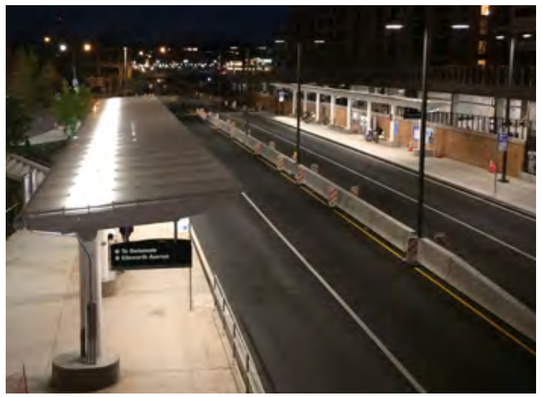


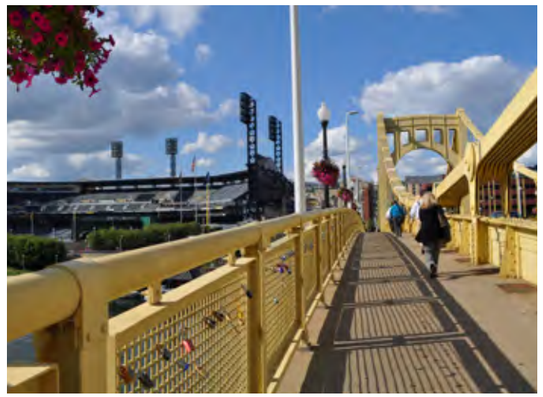
WALKABILITY: PUBLIC SAFETY

Transit-oriented development can be a tool for increasing public safety by creating active places that are busy through the day and evening. With more activity and people, the additional “eyes on the street” help improve real and perceived safety.

The networks of multimodal connectivity and walkability leading to these activity centers are also public spaces where individuals will interact. The design of such spaces has impact on the individual and, when public safety is not adequately accommodated, real or perceived threats can arise. For many, perceived safety threats are a significant deterrent to walkability and use of public spaces, whether or not any danger actually exists.

In addition to specific measures such as visibility, lighting, and crosswalk access, circulation planning should be utilized to enhance the number of choices users have to travel via foot. To the extent that an environment and user demand allows, alternative walkway choices will maximize not only accessibility but will allow users to bypass areas perceived as threatening, avoid entrapment areas, and disrupt predictable patterns of movement that create opportunity for predators. If high street demand does not exist, however, a multitude of access options can be difficult to maintain, and create inactive or isolated spaces that discourage use. The right amount of access options should be provided to ensure users of walkways and public spaces not only are safe but feel safe.





Visibility

The level of visibility is a big indicator of how safe an area feels. Without visual access to other people and activity centers, a feeling of isolation can encourage real or perceived danger. Consequently, the visibility to and from walking connections should be maximized from all angles. By increasing visibility in all directions, surveillance is added to support public safety. Active frontages and ground level transparency contribute to visibility as well. Utilize terrain and directional changes to provide multiple view points as well as multiple escape routes. When a station and development are well-designed, building features can serve as easily identifiable, visible infrastructure that provide a destination for individuals to aim for.

Lighting

Lighting should be significant to allow visibility of walkable areas with particular attention to pathways, stairs, entrances and exits, parking areas, and all areas where individuals may gather such as at station platforms and around ticket vending machines. Lighting should not be too bright so as to create deep shadows, glare, or discomfort for viewers. Light fixtures themselves should not cause obstructions to visibility, but should be at height to allow visibility of the faces of those in the space. Natural lighting should be utilized to the best extent possible for enclosed areas and supplemented where inadequate. Outdoor lighting should be responsive to the changes in natural lighting that occur throughout the day and through various weather patterns.

Street Crossings

With intersecting uses for transit vehicles, drivers, cyclists, walkers, runners, diners, shoppers, and more, streets are activity centers that must balance the safety needs of many uses. Transit-oriented developments will benefit greatly from safety improvements at street crossings. Crosswalks should be stop- or signal-controlled, highly visible, and well-maintained. Visibility and traffic calming measures such as textured or reflective paint, lighting, tactile warning strips, and speed humps can assist in integrating the walker with the numerous other modes crossing the street. The ultimate goal is for those walking to get to their destination safely and conveniently. New Complete Streets initiatives should assist in creating these safe streets; transit-oriented developers should advocate and work with municipalities and the transit agency to ensure development, street, and route design all support safe and efficient streets.

DEVELOPMENT

Overview

Transit-oriented development allows people to integrate transit use into their lives by creating dense, mixed-use places where they can live, work, shop, and play. It is based on the conscious placement of homes, jobs, civic uses, shopping, entertainment, parks, and other amenities close to transit stations to promote the use of multimodal travel options. When development is concentrated around intentionally-planned transit nodes, people have more choices about whether they will walk, bike, or drive to and from destinations and origins.

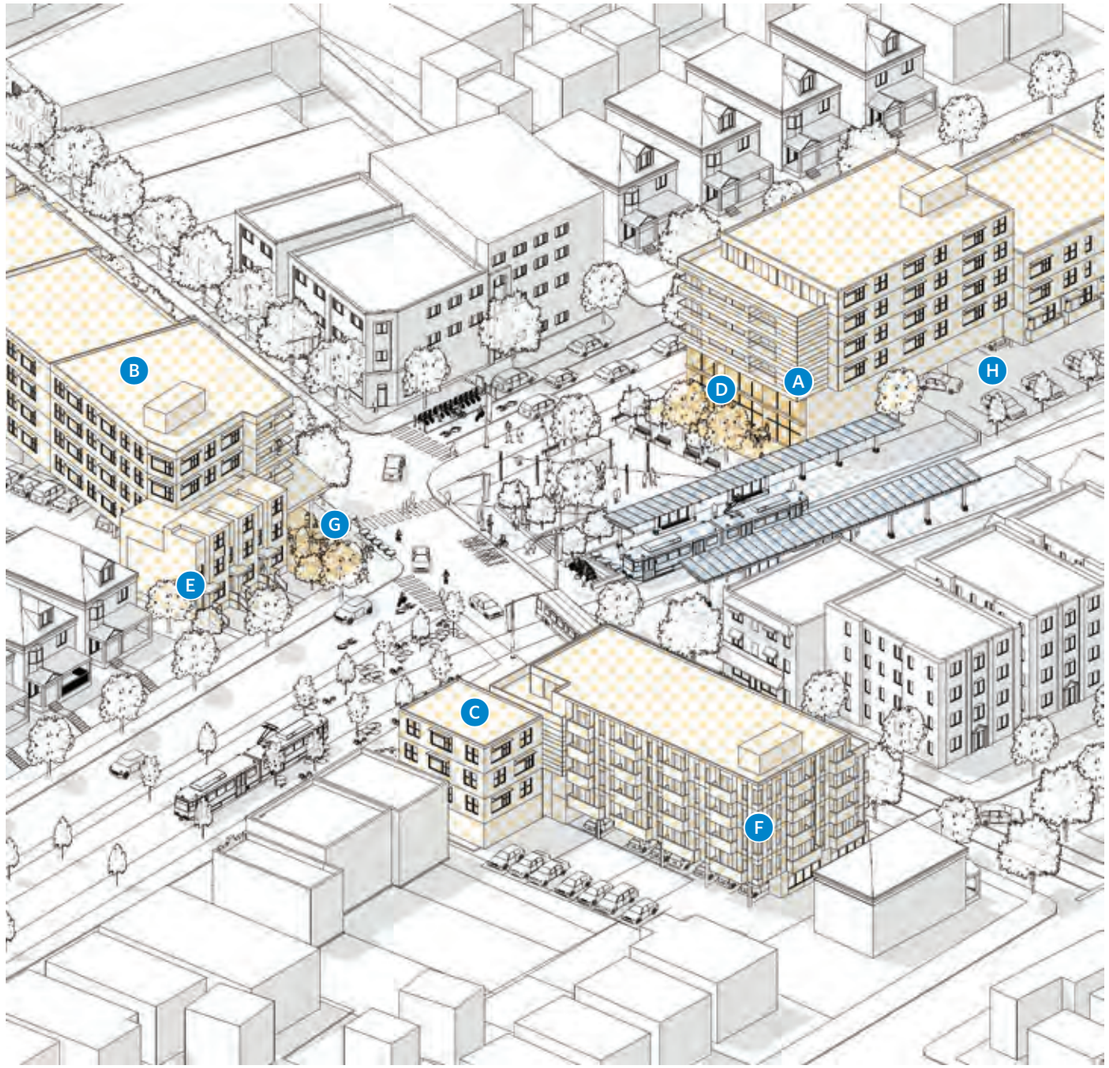
Transit infrastructure and development are integrated in transit-oriented development, maximizing transit use and boosting revenues for transit agencies, municipalities, and other stakeholders investing in real estate at or near stations. It makes sense to get the most “bang for your buck” from public transit infrastructure.

TOD is usually more dense than the surrounding neighborhood. The scale and density of development should be balanced relative to the station type and planning goals of the surrounding community. Furthermore, buildings in TOD should contribute to a lively, pedestrian-friendly environment with vibrant ground floor uses and dynamic building facades.

A range of housing options, including affordable housing, should be part of the mix of uses at TOD destinations. While transit riders include people from across the economic spectrum, low-income households are least likely to own a car and most likely to depend on public transit for all of their daily travel. By including housing and affordable housing as part of the mix of uses, residents will save travel time because they will have immediate, walkable access to the public transit network. People may save money, by forgoing car-ownership and relying on other transit modes, and will even experience health benefits since every transit trip starts and ends with walking.

General Principles

- A Develop buildings with a mix of uses
- B Include affordable housing when possible
- C Break down building massing and relate to the surrounding context
- D Create active transparent facades on key public spaces
- E Include multiple building entrances
- F Use high quality materials and vary facade expression
- G Design for pedestrian scale and comfort
- H Limit parking and minimize its impact on the public realm



DEVELOPMENT: DENSITY & USES

Use Mix

TOD should include a mix of uses with an emphasis on creating places to live and work that are adjacent to transit. Primarily residential projects should include a diversity of unit types and sizes and ideally include complementary uses such as a cafe or small neighborhood-serving retail. Employment-oriented uses should include services useful to a commuting audience, such as places to pick up necessities as well as sit-down and take-out lunches.

TOD should also strive to integrate shopping, restaurants, entertainment, childcare, and other amenities to allow residents or workers to integrate transit use into their daily lives. Retail and service uses should be located along paths between the station platform and residential or employment uses.

Use mix, in the end, should generate pedestrian activity and transit usage throughout the day and evening, seven days per week.

Affordable Housing

Affordable housing should be included in TOD. Equitable TOD incorporates housing for the people who most need access to transit. It ensures that people who would otherwise be priced out due to high land values can live in close proximity to the transit asset that is critical to their ability to access employment, shopping, and other services.

Port Authority supports and encourages mixed-income development along its system. Bringing the people who most need and most use transit to stations encourages the use of transit for more than a commute; it becomes a lifestyle. When people can use transit for all of their trips, they save money while the system grows stronger, ensuring sustainability.

Density: FAR, Height & Lot Coverage

In general, density at a TOD should be higher than the surrounding neighborhood fabric, and greatest in close proximity to the station, to maximize transit use and ridership. However, increased density, lot coverage and height should be balanced with the existing context so as to not overwhelm the surrounding neighborhood.

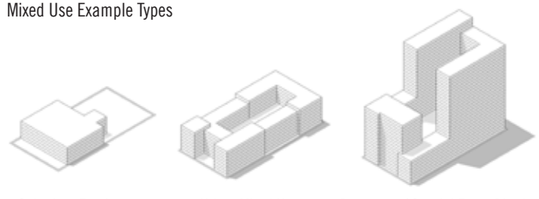
The table on the facing page summarizes recommended ranges for FAR (ratio of total floor area to lot size), height, lot coverage, and parking ratio for each station type. Also indicated are appropriate residential types and density targets. These recommendations are not meant to replace the existing local zoning regulations but are suggested guidelines to support TOD. A series of example building types, following these recommendations, are shown at right. Massing of bigger buildings should be broken up, and buildings should be sited so as to reinforce and define a pedestrian-scaled public realm.

Density is an important feature of TOD and can be successfully integrated into existing development patterns using this guide.

Primarily Residential Example Types

Suburban Neighborhood | Transit Neighborhood | Urban Neighborhood

Mixed Use Example Types



Suburban Employment | Urban Mixed Use | Downtown / Special Event District

		Primarily Residential			Mixed Use		
Category	**Units**	**Suburban Neighborhood**	**Transit Neighborhood**	**Urban Neighborhood**	**Suburban Employment**	**Urban Mixed Use**	**Downtown**
FAR Range	Floor to Area Ratio: Min-Max	1-3	2-4	2-5	3-5	3-5	8-30
Height Range	Number of Stories: Min-Max	2-4	3-5	3-9	3-9	3-9	3-60
Lot Coverage	Desirable % of Building Coverage per Lot	20-50	30-70	60-80	40-60	70-100	80-100
Housing Density (Gross for entire station walkshed area)	Desirable Range of Dwelling Units per Acre*	7-10	10-25	15-30	0-10	20-40	25-150
Housing Types		Townhouse Single Family	Mid-Rise Multi-family / Townhouse	Mid-Rise Multi-family / Townhouse	Mid-Rise Multi-family / Townhouse	Mid-Rise Multi-family / Townhouse	High- or Mid-Rise Multi-family
Parking Ratio**	Space per Housing Unit	1	.5	.5	1	.25	0 (Market Dictates)
	Space per 500 Square Foot of Commercial***	1	1	.75	1	.5	0 (Market Dictates)
Shared Use Parking %	Targeted % of Shared Spaces	0	10	20	20	30	50
Use Mix	Jobs : Residents	<.50	.75-.25	.75-.50	40-10	1.75-.75	40-10
Average Block Size	Acres	3-10	3-8	3-6	5-10	3-5	2-4

* Development density adjacent to transit stations should be greater than surrounding areas and should comply with local zoning ordinances.
** Parking ratios are recommended maximums given close proximity to transit, and may not match local zoning.
*** Spaces per 500 SF above first 2,400 SF. Commercial parking demand will be higher for some retail uses.

Parking Ratio

Transit-oriented development requires less dedicated parking because higher transit usage reduces parking demand as residents, employees and customers arrive and leave via transit. The provision of on-site parking in new development is typically a balance between zoning requirements and the demands of the market. Whenever possible TOD should take advantage of its proximity to transit and utilize lower parking ratios than would be used for a non-transit-adjacent site. Parking ratios for the six TOD types are suggested in the table above, with the lowest ratios in the urban core and the highest in more suburban sites. Some municipalities in the region, such as the City of Pittsburgh, have altered their zoning codes to incorporate transit proximity parking ratio reductions. In cases where TOD zoning exceptions, overlay districts, or zoning districts do not exist or are still under consideration, projects should seek to reduce parking on a case by case basis.

Historic Preservation

TOD in the Pittsburgh area often means development in the context of existing communities and buildings. The historic character of the region's built environment makes the City of Pittsburgh and other Allegheny County communities appealing to residents, businesses, and visitors. Many of these communities were originally developed around streetcar lines so their scale and style is often appropriate for transit-oriented, walkable neighborhoods. Out of respect for the history and character of those communities, careful consideration should be given to the preservation of historic structures. This type of resource conservation is also an important element of environmental sustainability. Reuse often has the lowest environmental impact of any sustainability strategy and as such should be the considered in any project.

3. TOD GUIDELINES

DEVELOPMENT: BUILDING DESIGN

Context

Holistic design should allow a building to be inclusive, adaptive, and sustainable in response to the physical environment, cultural context, and human occupancy. Buildings designed as part of TOD, within the 1/2-mile walkable area around stations, will become more valuable, from a real estate perspective, because of their proximity to transit. They could also benefit from new or modernized infrastructure provided as part of station-related improvements. As part of the larger composition of structures, TOD buildings will be highly visible to commuters, residents, and visitors alike. Not every structure in the vicinity of a station can or should be a "signature" design, but each building should use high-quality building materials, employ sustainable design, and reinforce the identity of the transit station. Building design standards should be established by local municipalities and enacted via TOD zoning districts.

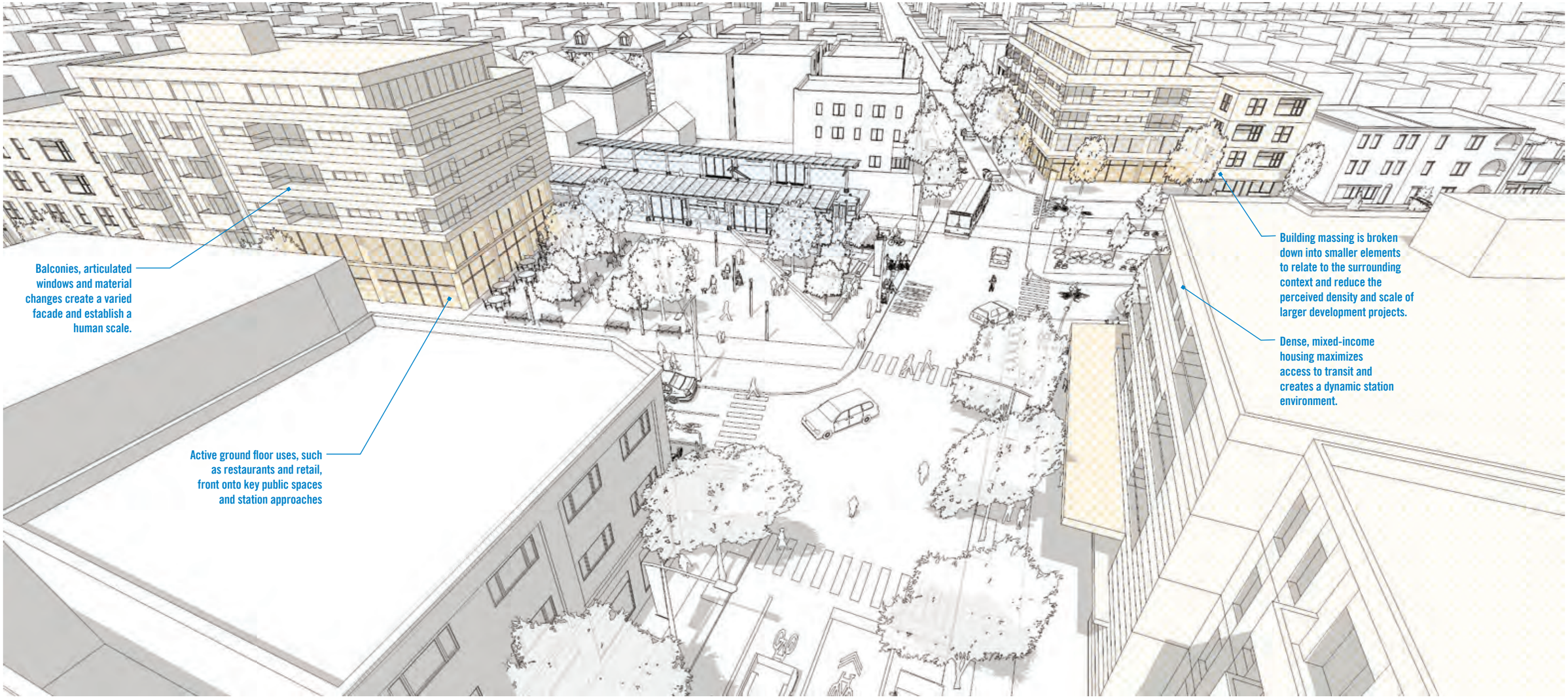
Buildings sited in existing neighborhoods must reinforce walkability, enhance the streetscape environment, and contribute to a positive experience for pedestrians and others passing through the district. At new or underdeveloped station sites, TOD buildings will set the tone for future buildings and will likely become the center of an active, vibrant development node built around transit ridership.

Massing, Scale & Height

While TODs are conducive to higher densities of residential and commercial uses, the form of new buildings should be at a scale that relates to the local, existing context. Avoid monolithic, uniform buildings. Break up the massing into smaller elements. Step down the perimeter of buildings to help activate ground floor uses. Provide a variety of depths and heights to reduce the perceived density of larger developments. Refer to the "Development Station Type" matrix on page 49 for recommended development densities appropriate for each station.

Active Ground Floor Uses

Surround public space at transit stations with attractive, pedestrian-friendly offerings such as ground-level restaurants or retail to attract commuters, residents, and other transit-inclined consumers. Include neighborhood-serving businesses that will be open seven days a week.



DEVELOPMENT: BUILDING DESIGN

Entrances & Transparency

Successful ground floor enhancements of walkable developments around transit hubs depends on creating a visual connection between the public street and interior spaces. Along the ground floor of larger development projects, functional entrances should be frequent and covered. Provide separate entrances and minimal lobbies for upper floor residential units.

Ground floor facades should be transparent with a high ratio of windows and glazing to solid surfaces, with minimal obstructions such as signage, large blinds, or excessive plantings. Entrance doors can utilize non-traditional storefront designs such as revolving doors, glazed garage doors, and sliding accordion walls.

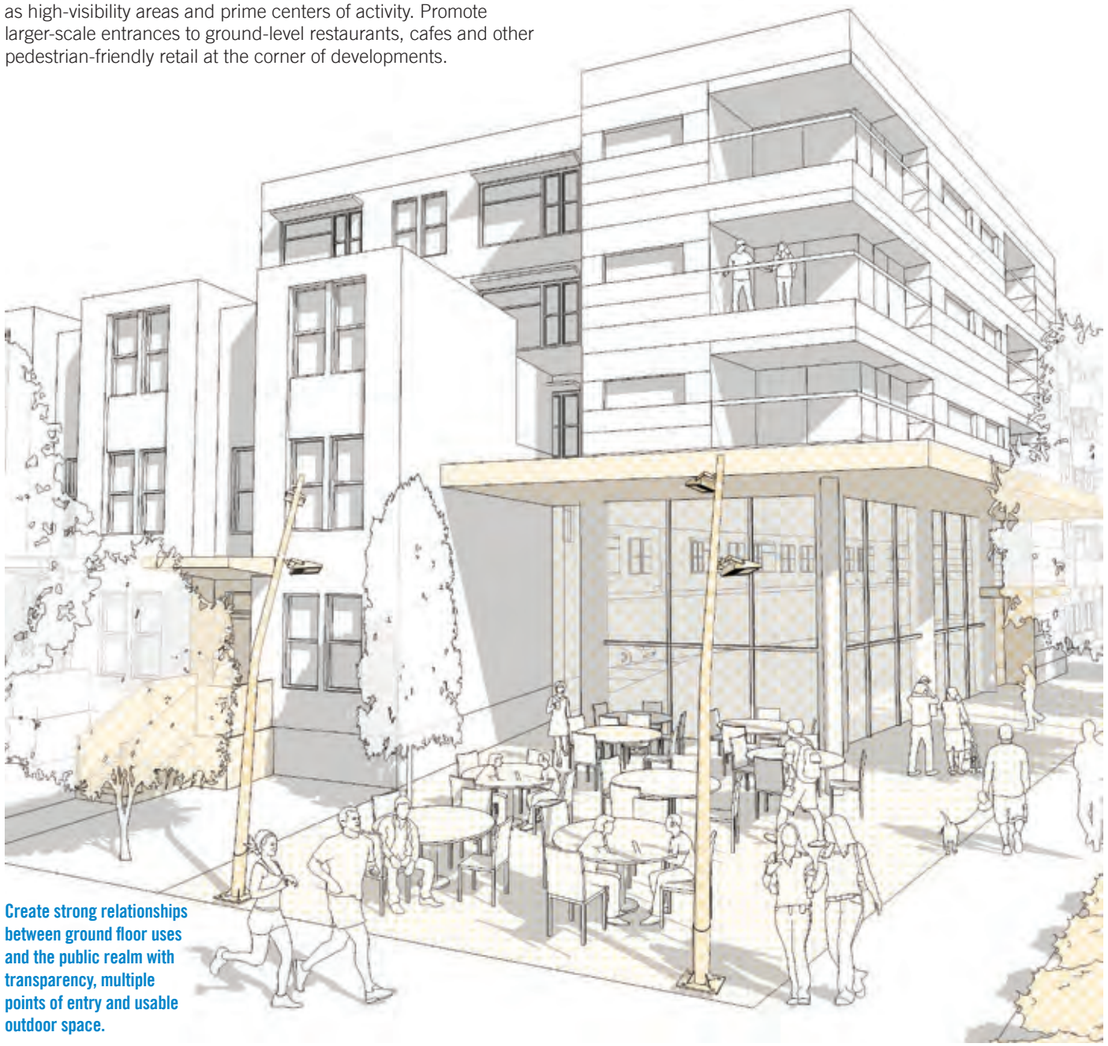
Developments should take advantage of corner block locations as high-visibility areas and prime centers of activity. Promote larger-scale entrances to ground-level restaurants, cafes and other pedestrian-friendly retail at the corner of developments.

Pedestrian Scale & Comfort

Facade elements need to be interesting and transparent at eye-level to create a vibrant and walkable street frontage for TOD developments. Entrances to storefronts and residential lobbies should be maintained at the sidewalk ground level.

In addition to visual comfort, building design should also provide protection from the elements. Awnings and covered walkways provide protection from rain and snow, and the shade also provides visual diversity and depth along facades. Where appropriate, architecturally integrated bus shelters can add cover and interest while facilitating access to on-street buses.

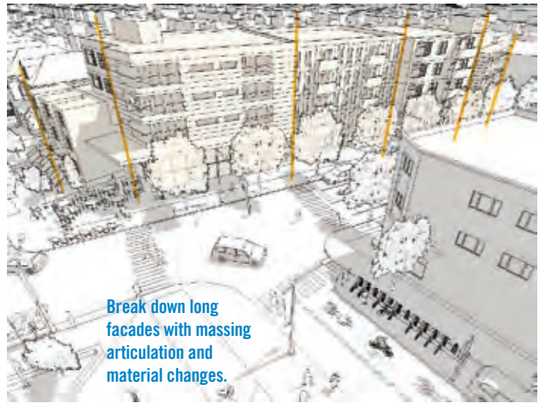
Plantings should be employed for both functional purposes such as shade and drainage and visual relief at the pedestrian scale.



Create strong relationships between ground floor uses and the public realm with transparency, multiple points of entry and usable outdoor space.

Visual Diversity & Interest

Larger, new developments should avoid creating uniform façades that stretch along a block. Instead, break up the exterior building elements in context with existing surrounding buildings with a variety of massing, windows, and material finishes. The diversity of surfaces creates a street frontage that is more conducive for pedestrian activity and walkability. Furthermore, elements such as balconies or awnings provide opportunities for a more engaging façade, increasing the value of residential units with potential outdoor space and porches.



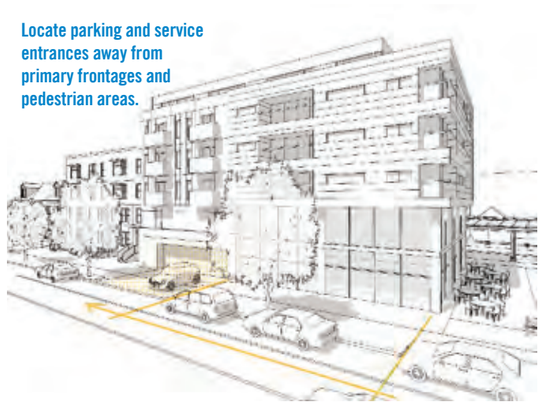
Break down long facades with massing articulation and material changes.

Service & Parking Entrances

Access for vehicular accommodations can be provided while still promoting a safe and walkable environment. Keep driveways that cross sidewalks or pedestrian paths to a minimum to reduce conflicts. Areas for longer-term vehicular parking should be visually shielded from the main streets. At-grade lots and structures should be placed in the rear of buildings, accessed from either a rear entrance or a driveway off of an arterial street at the edge of a development.

Ground-floor openings through developments for vehicular access should be well integrated into the rest of the façade and scaled to the context. Large entrances into traditional parking garages, such as at suburban shopping malls, should be avoided.

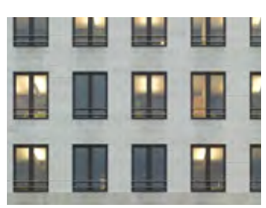
Locate parking and service entrances away from primary frontages and pedestrian areas.

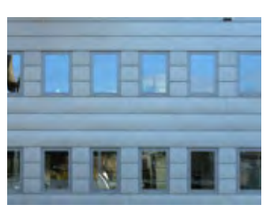


Materials & Quality

High quality materials can contribute to the pedestrian experience of TOD. Doors, windows and storefronts, signs, and lighting all combine to create interest to people passing by. Buildings should have a common design language with a varied palette of quality materials that complement and skillfully contrast one another through color, texture, and scale.

Building exteriors should be made of durable and cleanable materials such as stone, precast concrete, terracotta, finished masonry block, steel and aluminum, and transparent glass with minimal tinting. Stucco and exterior insulation finishing systems (EFIS) should not be used, and natural wood should be used sparingly because it requires ongoing maintenance. Use renewable, recycled-content, locally-sourced, and otherwise environmentally sustainable building products whenever possible.





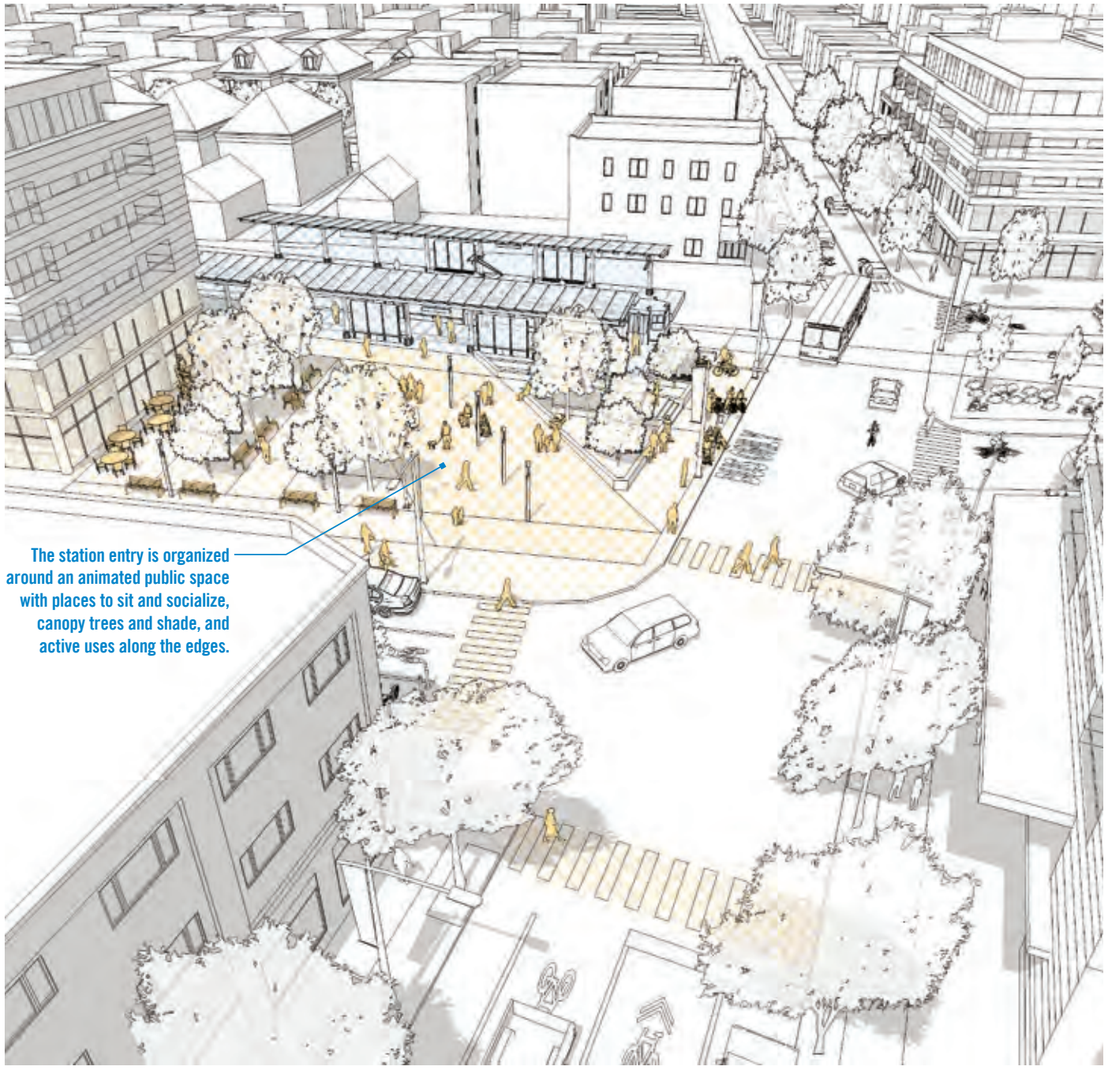
DEVELOPMENT: PUBLIC SPACE

Transit stations and related public open spaces represent a significant investment of public resources and should be designed to go beyond simply providing access to transit infrastructure. Transit-oriented development calls for stations to be situated within dense, pedestrian-friendly environments where public space can be a highly-valued amenity and play an integral role in civic life.

Public space at stations includes formal plazas and pocket parks, but also encompasses sidewalks, pedestrian bridges, building arcades, and other pathways taken to, through, or near transit destinations. Public space also includes building interiors acting as the front door to a transit station: the Main Lobby at Grand Central Terminal, in NYC, for example. Public spaces should be designed as destinations unto themselves.

Many existing Pittsburgh transit stations have challenges. Some are not clearly visible within their environment, located below or behind development sites, or are at the far edge of Park and Ride lots. Such stations are not well-integrated into the surrounding context; functioning in isolation and typically made accessible only by vehicle.

As new stations are built and existing stations are reconfigured in alignment with TOD principles, development should be balanced with high-quality public space that contributes to the vibrancy, integrity and quality of life of its surrounding context.



Activate Public Space

Surround public space at transit stations with active uses such as ground-level restaurants, cafes and other pedestrian-friendly offerings to attract commuters, residents, and other transit-inclined consumers. Encourage people to use public space at stations even if they are not planning to ride transit. Accommodate casual, incidental public space use by providing seating, lighting, bike parking, and landscape amenities. Public space at transit stations should fulfill a need for quality open space within urban and urbanizing areas, and can be an integral part of a community's everyday life.

Utilize Green Strategies and Technologies

Incorporate best practices relating to landscape design and environmental and building systems. Transit stations and associated open spaces are public infrastructure and should be conceived as green campuses. To reduce operating expenses and minimize resource consumption, they should be designed to: take advantage of passive solar design strategies; retain and reuse stormwater; utilize locally-sourced and recycled materials wherever possible; make use of LED lighting; and ultimately go off-the-grid by using wind, solar, and other means to generate power on-site. Public spaces associated with transit stations should utilize time-tested design strategies and cutting-edge technology to create environments that perform, educate and inspire.

Create a Station Identity

Create public space that memorably mediates transit infrastructure with the surrounding area. As the first part of the transit station that many people will encounter, public space must thoughtfully accommodate the movement of people to and from transit destinations. It is equally important to establish a sense of place, or arrival, that is unique to the specific station. This can be accomplished through larger design gestures, with thoughtful landscape and site material choices, and by including public art as an integral part of the overall public space design.

Use public space to integrate transit infrastructure with surrounding development. Coordinate construction materials, lighting, plant palettes, maintenance schedules, etc. Create a true public-private partnership to ensure that the built environment in and around transit stations achieves a degree of coherency and consistency of experience for all visitors.

DEVELOPMENT: PUBLIC ART

Why Public Art?

Since TOD draws from a set of design elements that establish and support a public realm, public art naturally supports and enhances transit-oriented public space and development.

While sidewalks and pedestrian spaces, building facades, and streetscaping create distinct places and livable neighborhoods, attention to context-sensitive elements adds the detail that makes static spaces feel welcoming, interesting, and vibrant. High quality public art is one such context-sensitive tool that can be incorporated into any feature or design.

Appropriate in relationship and history, inspired in design and creativity, and interactive with physical and mental stimulation, good quality art not only adds a sense of vibrancy but also conveys care for those using the space, attracts new people to the space, enhances livability, and increases security.

Integrating Art and Artists

Art in transit-oriented developments, should be encouraged and included whenever possible. New developments are the best opportunity to integrate art into the structural design process. Seemingly standard structural elements, such as lights, walls, and sidewalks, can become works of art while serving a functional purpose. Where structurally-integrated art is not feasible, temporary or long-term art projects can contribute similar, if not the same, benefits. Shared space and public areas, such as at station entrances and public plazas, are excellent opportunities to invite interaction and demonstrate the relationship between transit and the community.

Involving local artists or community members in the art process is best practice that should be pursued in order to capture community perspectives and buy-in. As with good design, art contributes a distinct and unique character, helping to create a sense of place that not only supports the transit station but also serves to inspire employees, residents and visitors to any TOD project.

DEVELOPMENT: INFRASTRUCTURE

Parking Integration

Best TOD practices locate transit stops within walkable mixed-use districts where there is a choice of modes. Uses may be stacked vertically because smart development is often fit into an existing urban or suburban context. When parking is required, integrate it into new development in a manner that minimizes its frontage to the public realm. Parking areas can be provided below buildings, plazas, and open spaces to support an active pedestrian environment and minimize impermeable surfaces.

Because of the relatively high value of land associated with transit access, structured parking is often preferable to surface parking. Treat structured parking as an integral component of new buildings, minimize its frontage to primary street faces, and avoid the construction of standalone parking garages for new development. Instead, integrate parking into buildings as a podium for upper floors or take advantage of grade changes to partially submerge parking structures. Structured parking can be built to allow future conversion into units if parking is over-supplied relative to demand in the present or future. On TOD sites with substantial grade changes, explore treating structured parking as a means for also creating new, accessible pedestrian paths to the station, as shown in the example below. If a TOD requires surface parking, locate it behind buildings, shield it from streets and primary pedestrian paths, and employ best practices for green stormwater management.

When parking structures are visible, incorporate architectural treatments and public art to enhance the parking structures visual appeal.

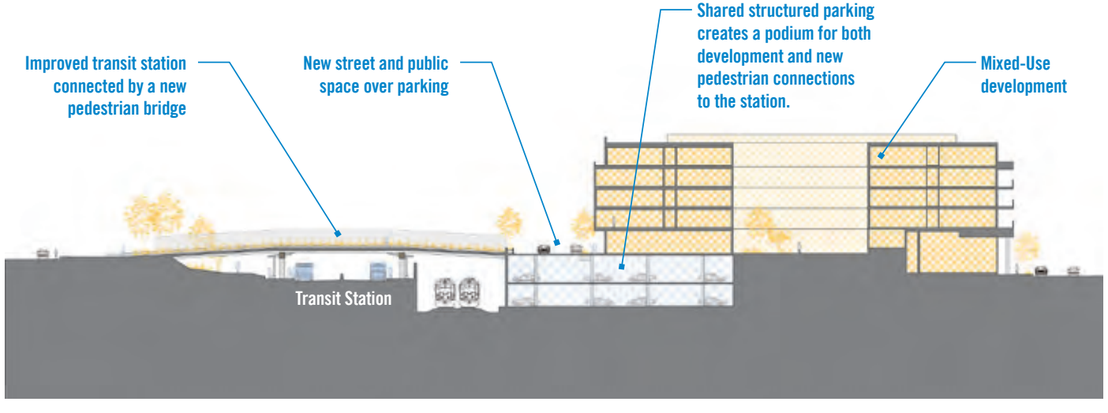
An example of parking integration at the East Liberty Transit Center is shown below and at right. New structured parking acts as a podium for both the new mixed-use development and improved pedestrian, bike, and vehicular access to the station.

Smart & Coordinated Infrastructure

Making infrastructure energy-efficient and integrated into peoples' everyday lives requires a shift in planning paradigms. Where infrastructure at a TOD site is being upgraded, or where a number of new buildings are being constructed, a multi-building or district approach to energy and water infrastructure may be appropriate.

Being energy neutral means only using as much energy as is generated or harnessed on-site, and it comes with a wide list of benefits. A net-zero water district approach looks at local precipitation patterns and tries to maintain consumption at or below that available local supply. Stormwater runoff is ideally treated and kept on-site, protecting downstream water quality.

Building new TODs is a perfect time to take advantage of these benefits through smart and coordinated infrastructure. With smart grid technology, renewable energy sources, demand management, and supportive public policies, a development can create a system of lasting infrastructure that fits people's needs.



DEVELOPMENT: POLICY TOOLS

Use Zoning to Promote and Guide TOD

TOD zoning districts can be created as part of local zoning ordinances to promote the development of a compact, high-intensity mix of uses in areas with strong potential for pedestrian activity, generally within 1/4-1/2 mile of existing and planned transit stations. Higher allowances for building intensity help to foster economic development, encourage pedestrian activity and transit access, improve the quality of the built environment, and reduce reliance on motorized vehicles. The specific mix of uses around a transit station will vary depending on surrounding land use, access, infrastructure, market forces, and other factors. TOD Districts will generally have more intense development than surrounding areas to support transit ridership and promote a sense of place.

Inclusionary zoning may be part of TOD District policy, where the value of transit access can induce a market-rate development to include affordable units, or “in kind” public improvements such as parks or plazas that are conditions of development.

Capture the Value of Transit

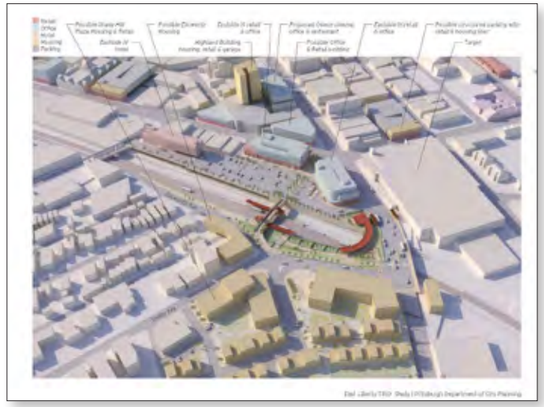
Pennsylvania’s Transit Revitalization Investment District (TRID) law, Act 238 of 2004, establishes a mechanism for creating tax-increment value-capture districts around major transit stations to facilitate infrastructure needed for transit-oriented development. Through a TRID, value capture can be a means to finance necessary infrastructure improvements, encourage higher-quality development, and ensure community benefits such as affordable housing, small business opportunities, and job creation.

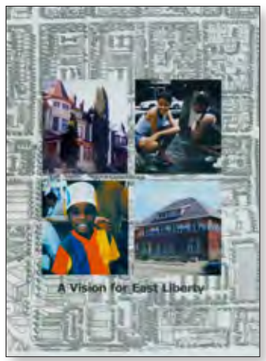
Additional value capture strategies - which harnesses a portion of the value that transit confers to surrounding properties to fund transit infrastructure or related improvements to station areas - can include fiscal policies including property and sales taxes, real-estate lease and sales revenues, fare box revenues, joint development agreements which provide revenues to the transit system, and fees on everything from parking to business licenses. As a stakeholder and TOD land owner, PAAC is interested and flexible in working with developers to find innovative benefits in cost-sharing, ridership, and revenue capture.

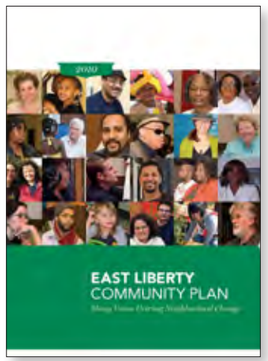
Plan for TOD

Community planning is an important first step toward development that benefits all stakeholders. Plans come in many shapes and sizes, including community plans, business district plans, parking studies, development site plans, and others. Any community plan can include recommendations for transit-oriented development if a transit station is located within the area being examined.

Beyond traditional planning methods, communities can actively engage in TOD-specific planning. A Transit Revitalization Investment District (TRID) planning study, as prescribed by TRID legislation, is a helpful guide for TOD planning, whether actual implementation of a district is intended or not. TRID planning studies must examine both the potential for development as well as the need for infrastructure improvements within the station area. These factors are important to the success of TOD and the transit station itself.







DEVELOPMENT: EXAMPLES

Pearl District - Portland, Oregon

The Pearl District is an example of transit-oriented development at a large, district-scale that meets city-wide goals and objectives. The area, just north of Downtown Portland, was an industrial area that experienced urban revitalization and redevelopment, thanks in large part to the extension of the Portland Streetcar through the neighborhood. The proximity to public transit attracted massive investment in residential uses. Between the start of service in 2001 and 2005, 7,248 housing units and 4.6 million square feet of commercial space was built within 2 blocks of the streetcar line. Another 5,000 housing units are planned near the streetcar extension south of downtown. Properties closest to the streetcar were developed at 90% of the permitted density, compared to areas 3 or 4 blocks away that were developed at 43% of the permitted density. Portland met its 20-year housing goal in just 7 years, using just 10% of the projected land, by building a density of new housing adjacent to reliable transit. Additionally, 25% of all residential units are affordable, creating a new, mixed-income neighborhood.

Main Street and Troost Ave. MAX – Kansas City

Kansas City’s Main Street Metro Area Express known as the MAX began operations in 2005 in its Main Street corridor and expanded in 2011 with Troost MAX. The two lines of bus rapid transit, operate in bus lanes and mixed traffic with signal prioritization. Still, the MAX lines have attracted economic benefits and TOD including the 13.5 acre senior housing and commercial redevelopment at Rockhill Greens, a medical center and university expansion, senior housing development, satellite health clinic, and pedestrian trail connections. Originally focused on corridor TOD, MAX planning brought in streetscaping improvements while governmental and non-governmental organizations in Kansas City helped to bring TOD through measures such as the Greater Downtown Area Plan and zoning code amendments. In late 2015, Kansas City Area Transportation Authority (KCATA) selected a team to redevelop a 1.8-acre downtown site as its first joint development TOD project.

Mockingbird Station - Dallas, Texas

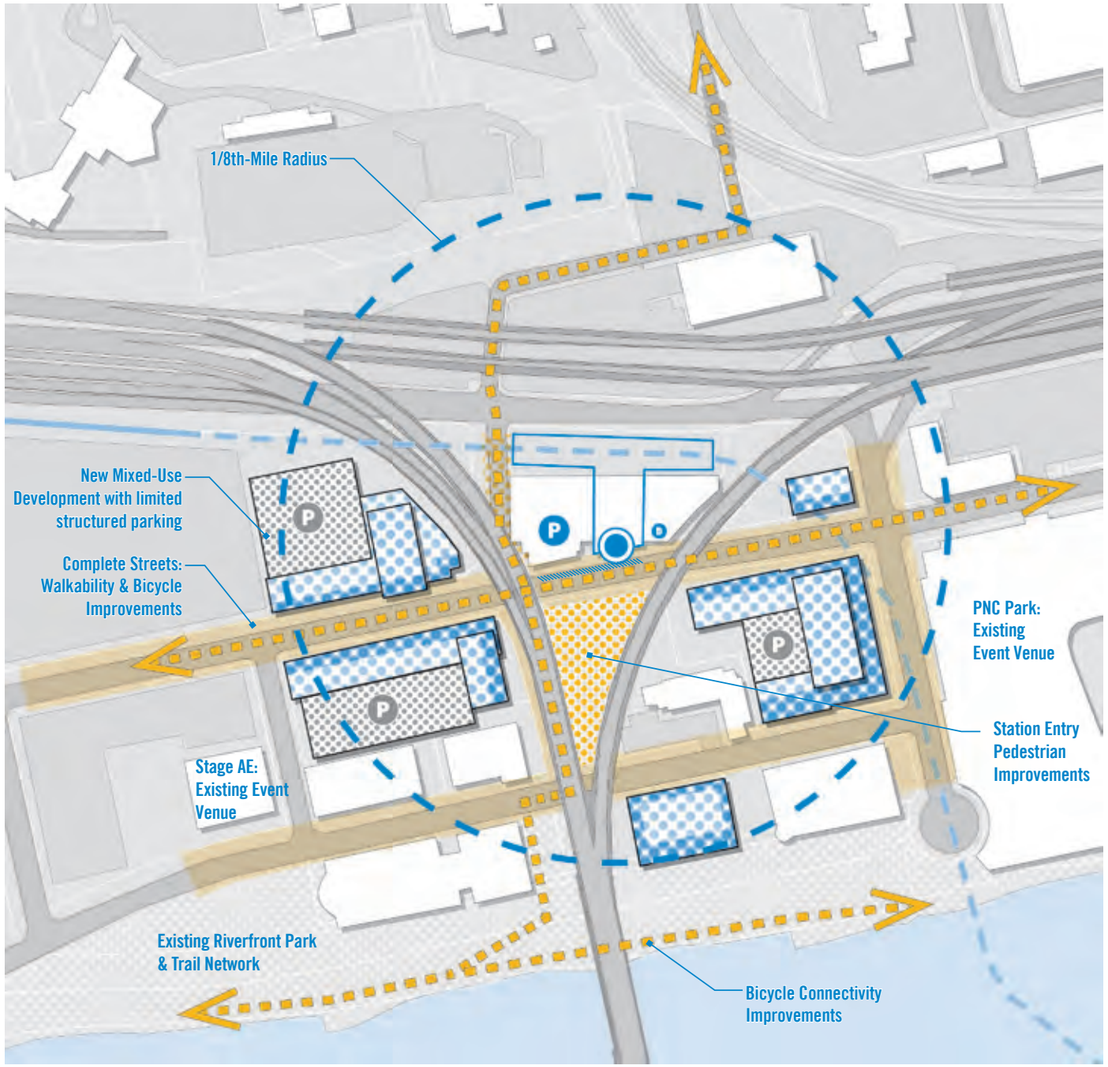
Mockingbird Station is an example of a successful use of TOD to create a new pedestrian oriented node of development around a light rail station in an otherwise automobile-oriented environment. The development includes 211 apartments, 137,000 square feet of office space, and 178,000 square feet of retail space. The project successfully brought new users to the Dallas transit system and introduced higher-density, transit-oriented development to the Dallas region. The station construction also offered a good example of using a combination of station architecture and landscape improvements to connect a grade-separated station to its surrounding urban context.

DEVELOPMENT: DOWNTOWN

These sites should be very dense, with active street-level uses including public open space and a mix of commercial and multi-family residential development. Buildings should have a high Floor Area Ratio (FAR) covering 80-100% of their lot. Attract a 24/7 mix of uses and provide space to accommodate a large peak volume of transit riders during morning and evening rush hours and special events. Emphasize pedestrian access to development and transit with strong street connections to surrounding areas and provide infrastructure for a variety of transportation modes: bike lanes and parking, crosswalks and wide sidewalks, bus lanes, etc. Park and Ride lots are not appropriate and personal automobile parking should be limited. Shown below is North Side Station in Pittsburgh.

Illustrative TOD Improvements

- Transit-Oriented Development Potential
- Active Building Frontages
- Structured Parking
- Surface Parking
- Pedestrian Oriented Public Space
- Walkability Improvements
- Bicycle Connectivity Improvements
- Existing Transit Line
- Existing Station Entry
- Existing Park & Ride
- Drop-Off Area
- Bicycle Parking
- Existing On-Street Bus
- Existing Bus Stop



DEVELOPMENT: URBAN MIXED USE

Development around Urban Mixed Use stations should have an urban feel, with public open space and mid-rise development that includes a mix of retail, commercial, and multi-family apartments and/or townhomes. Ground floor uses should attract and encourage street-level activity. Provide reduced, moderate-low parking levels and incorporate car- and bike-share connections. Park and Ride is most likely not appropriate. Make pathways visible to increase connectivity and link development to pedestrian destinations. Successful development will optimize the street-level relationship between buildings and the public realm to create dynamic and inviting spaces that encourage people to stay. Shown below is Carnegie Station.

Illustrative TOD Improvements

- Transit-Oriented Development Potential
- Active Building Frontages
- Structured Parking
- Surface Parking
- Pedestrian Oriented Public Space
- Walkability Improvements
- Bicycle Connectivity Improvements
- Existing Transit Line
- Existing Station Entry
- Existing Park & Ride
- Drop-Off Area
- Bicycle Parking
- Existing On-Street Bus
- Existing Bus Stop

DEVELOPMENT: URBAN NEIGHBORHOOD

Urban Neighborhood stations have a high level of density that is largely residential. Development will be mixed use, with a bias toward residential, including mid-rise, multi-family apartments, and townhomes. Provide sidewalks and bike infrastructure to connect those who walk and cycle to main activity areas, transit stops, and the surrounding street network. Use streetscape and landscape elements to integrate development into the neighborhood and provide minimal parking. Park and Ride is not appropriate at most stations. Shown below is Potomac Station in Dormont.

Illustrative TOD Improvements

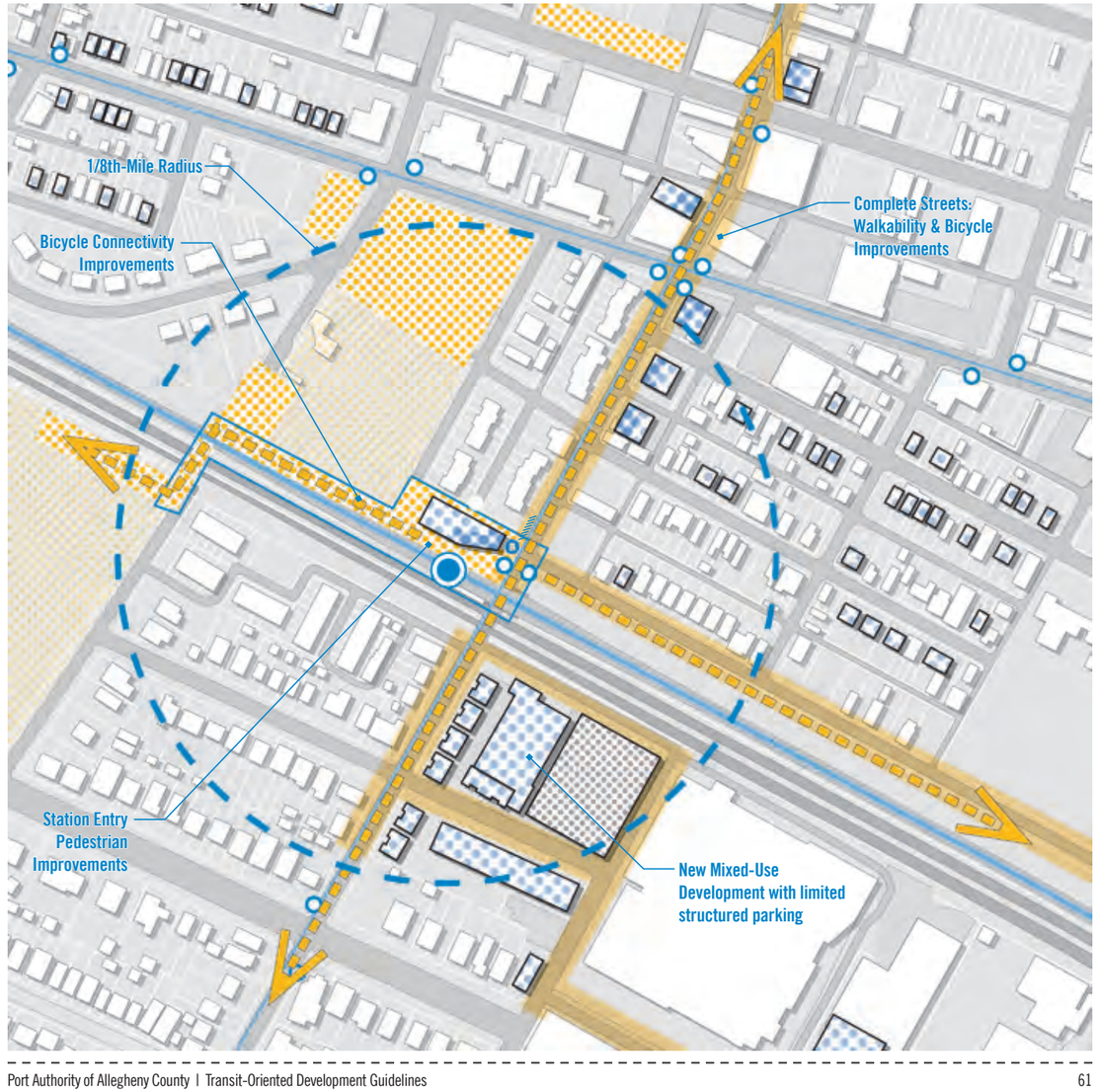
- Transit-Oriented Development Potential
- Active Building Frontages
- Structured Parking
- Surface Parking
- Pedestrian Oriented Public Space
- Walkability Improvements
- Bicycle Connectivity Improvements
- Existing Transit Line
- Existing Station Entry
- Existing Park & Ride
- Drop-Off Area
- Bicycle Parking
- Existing On-Street Bus
- Existing Bus Stop

DEVELOPMENT: TRANSIT NEIGHBORHOOD

Transit Neighborhood buildings should have a mid- to low-rise character, matching the feel of the surrounding context with greater density near the station. These sites are neither distinctly urban nor suburban. Development should be largely residential in nature, including multi-family apartments and townhomes. Extend the reach and accessibility of TOD sites by decreasing block size and improving pedestrian and bike infrastructure. Create drop-off locations at main streets. Park and Ride is not appropriate. Shown below is Homewood Station in Pittsburgh.

Illustrative TOD Improvements

- Transit-Oriented Development Potential
- Active Building Frontages
- Structured Parking
- Surface Parking
- Pedestrian Oriented Public Space
- Walkability Improvements
- Bicycle Connectivity Improvements
- Existing Transit Line
- Existing Station Entry
- Existing Park & Ride
- Drop-Off Area
- Bicycle Parking
- Existing On-Street Bus
- Existing Bus Stop



DEVELOPMENT: SUBURBAN NEIGHBORHOOD

Development around this type of station has a distinctly suburban, residential, low-density character. Match development with the existing neighborhood: mid- to low-rise townhomes and single-family houses. Create drop-off access for vehicles. Park and Ride may be appropriate at this type of location depending upon community preferences and access to main roads. Pedestrian connectivity is key for these stations: provide safe alternative routes away from fast-moving traffic; link to the existing street network and to other transportation modes in the area; overcome topographic challenges to enhance station access; and provide safe, visible, well-lit pathways around the station and through parking lots. Parking should not diminish pedestrian station access. Shown below is Lytle Station in Bethel Park.

Illustrative TOD Improvements

- Transit-Oriented Development Potential
- Active Building Frontages
- Structured Parking
- Surface Parking
- Pedestrian Oriented Public Space
- Walkability Improvements
- Bicycle Connectivity Improvements
- Existing Transit Line
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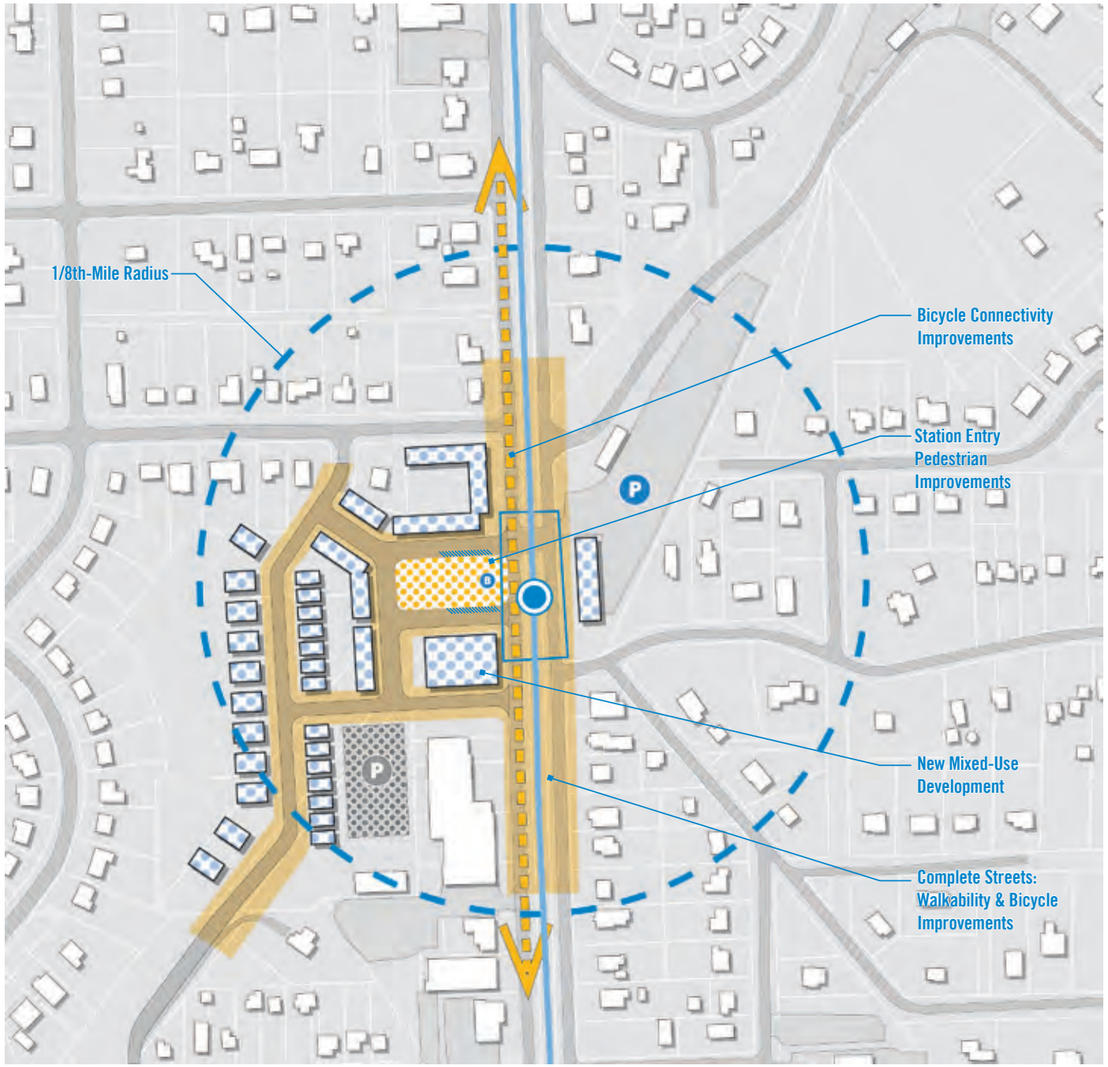
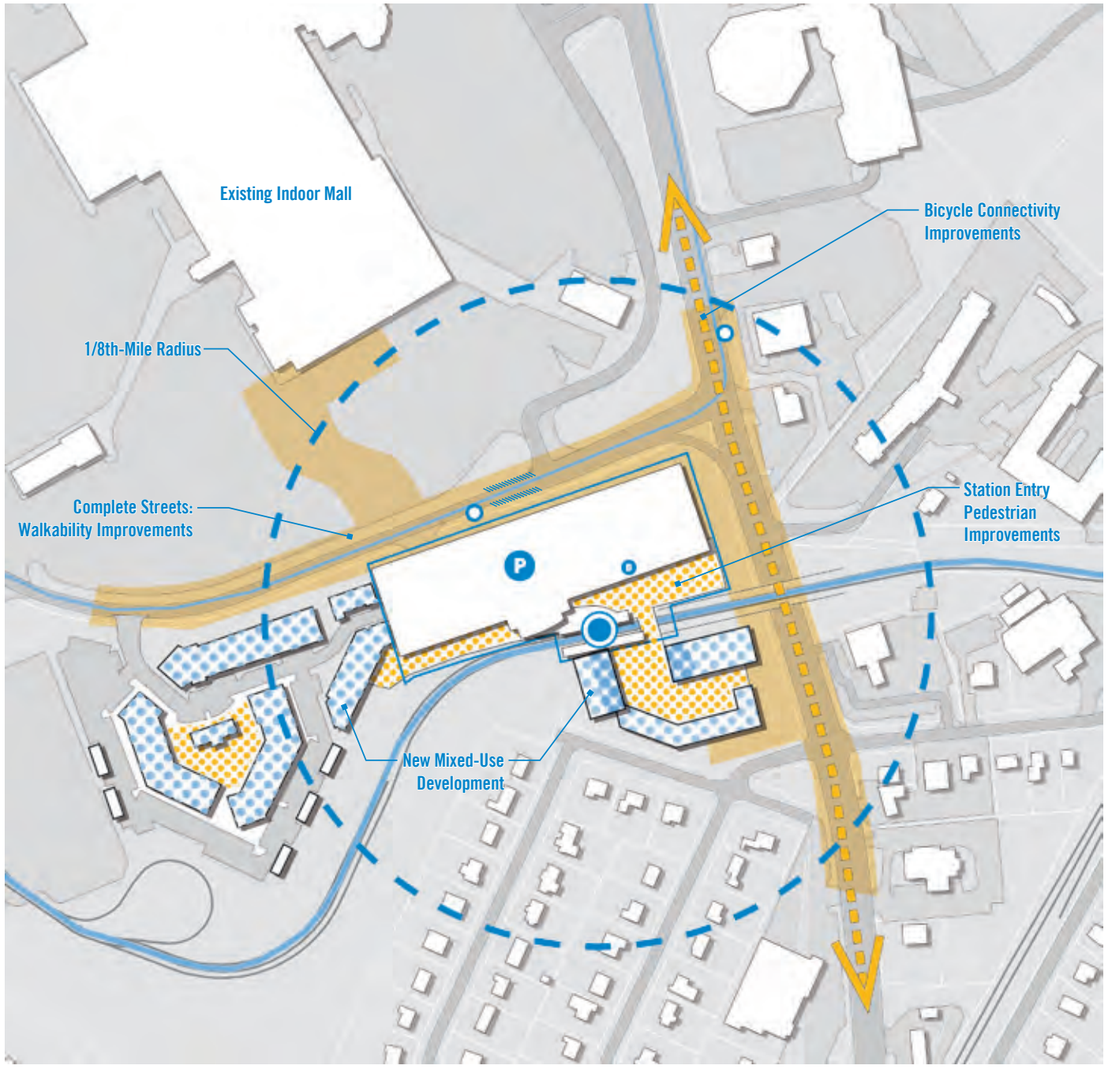


DEVELOPMENT: SUBURBAN EMPLOYMENT

This type of development, focused around a low- to medium-density employment center, has a distinctly suburban or industrial feel. The transit station should be visible from work centers and the surrounding street network. Pedestrian infrastructure, to distribute transit passengers to their end destinations, should include good sidewalks through parking lots and shuttles, if needed. Connections to other transportation networks and existing neighborhoods should be visible and easy to access. Parking will be necessary to support development and Park and Ride is appropriate at Suburban Employment stations. However, parking should not diminish pedestrian station access. Provide trees and landscape to enhance the pedestrian environment and aid in managing stormwater. Shown below is South Hills Village in Bethel Park.

Illustrative TOD Improvements

- Transit-Oriented Development Potential
- Active Building Frontages
- Structured Parking
- Surface Parking
- Pedestrian Oriented Public Space
- Walkability Improvements
- Bicycle Connectivity Improvements
- Existing Transit Line
- Existing Station Entry
- Existing Park & Ride
- Drop-Off Area
- Bicycle Parking
- Existing On-Street Bus
- Existing Bus Stop



4.

TAKING ACTION

CREATING A TOD-READY AGENCY

To create a TOD-ready transit system, Port Authority is putting in place the framework and resources needed for TOD implementation. To start, the agency has established an internal, interdisciplinary working group to provide a diverse set of perspectives on TOD activities and development proposals.

As explained at the beginning of this document, a set of TOD Guidelines is one of the tools Port Authority is using to facilitate high quality TOD. Another key tool is the Station Improvement Program (SIP), which seeks to enhance the agency's fixed-guideway stations to attract ridership and TOD. Identifying and offering development opportunities is another important step in bringing TOD to Pittsburgh's transit system.

As the system expands, it's important to consider the potential for TOD. As stations are built or renovated, public art should be a consideration, providing for community identity and an improved rider experience. Overall, Port Authority seeks to create an environment in which high-quality TOD will thrive.

Station Improvement Program (SIP)

A capital investment program for fixed-guideway stations, the SIP was identified as one of the first steps in pursuing TOD. Making capital investments in transit stations encourages ridership and attracts interest in development near the stations. This program was modeled after a similar effort at Bay Area Rapid Transit (BART) in the San Francisco Bay Area.

Port Authority engaged in an objective, data-driven evaluation process to identify which of the fixed-guideway stations should be prioritized for available funding. The process involved identifying factors contributing to successful TOD locations, creating a methodology for evaluating current stations and surrounding neighborhoods, conducting evaluations, gathering data for all fixed-guideway stations, analyzing findings, and making recommendations.

The result was a replicable, data-driven evaluation method and an extensive database of all fixed-guideway stations containing many TOD-related metrics. This database will have a life beyond the SIP, serving as a warehouse of data that can be used not only to pursue TOD but also to inform decision-making across the agency.

For the purpose of investment, stations are ranked based on TOD potential and station conditions. Stations targeted for the SIP are categorized based on the scale of intervention required and the appropriate action is pursued through the agency's capital program. While some stations may benefit greatly from investments in signage or seating, a smaller group of others require a more thoughtful look at how changes to the station layout and surrounding area will create more visible, accessible, and welcoming places that easily accommodate riders regardless of where they're coming from or how they're getting there.

Development Opportunities

In addition to writing guidelines, planning, and improving stations, further TOD cannot happen on Port Authority property until the agency conducts an evaluation of its property, identifies developable parcels, and thoughtfully crafts requests for proposals.

The agency must take a close look at its real estate assets and determine the highest and best use of each asset or parcel, while taking a number of factors, such as operations and revenue, into account. It must also ensure that TOD opportunities are appropriately considered when acquiring new properties. These assets can be used to leverage the viability of the transit system and add value to surrounding communities. Ongoing policy and development initiatives that direct and concentrate TOD around transit facilities enhance the value of these assets.

When appropriate, Port Authority will pursue station area planning to understand how to improve stations and connect to TOD sites. Studies such as these can also inform the agency's expectations as it seeks proposals for available, developable land.

Ridership, in terms of both transit service operation and the rider experience, is the agency's top consideration for TOD. Generating real estate revenue and lowering operating costs are close behind.

Integrating TOD Opportunities with System Expansion

Fixed-guideway system expansion can mean new opportunities for TOD. Whether it's a new station on an existing line or a new line altogether, there are important considerations beyond right of way availability. Several factors can impact the success of a station and those same factors can impact the TOD potential of that station.

In June of 2015, Port Authority's Board passed Service Guidelines outlining what makes efficient, effective, and equitable transit service. These guidelines are also a useful tool in understanding what factors make a station successful for ridership and TOD. Factors include: the costs and benefits of building, operating, and maintaining the station; the transit-orientation of the surrounding street network; and the needs of the surrounding community. Capital investments in transit infrastructure for system expansion are very costly, and it is critical that Port Authority ensures a return on its investment with revenue generated from ridership and TOD.

Another way that the system can expand its capacity is through new Park and Ride facilities. Port Authority evaluates sites for new Park and Rides using a number of criteria, including proximity to fixed-guideway stations and major road corridors. These characteristics are also valuable in TOD and, as land use development patterns, land values, and market demands change, it may be in the best interest of PAAC to convert Park and Ride facilities into TOD sites. As such, Port Authority should ensure that TOD opportunities are appropriately considered when acquiring new properties and locating new transit facilities.

Percent for Art

The Federal Transit Agency recommends that federally-funded art projects constitute a minimum of 0.5% to a maximum of 5% of the overall costs of a transit project. Transit agencies across the nation have adopted this goal, designating, on average, 1-2% of capital project budgets to public art. Port Authority will consider allocating a similar budget to public art for station development projects; for new stations and for improvements to existing stations. Seemingly standard structural elements, such as lights, walls, and shelters, can become works of art while serving a functional need. Station areas, particularly at entrances and public plazas, are excellent opportunities to invite interaction and illustrate the relationship between transit and the community.

CREATING A TOD-READY REGION

Using This Document

These guidelines are meant to provide the entire community of TOD stakeholders - transit agencies, local governments, regional planners, community groups, developers, others - with a common vocabulary and frame of reference.

Containing what Port Authority of Allegheny County considers to be best practice standards for TOD based on local and national research, these guidelines can facilitate the implementation of existing community-supported planning and provide guidance where new planning occurs. This is a public document that others are welcome to borrow from and reference in their planning.

Land use factors such as density, use mix, and connectivity affect how people travel within a community. Development - and the policies that influence it - significantly impact where transit riders live, work, go to school, and purchase goods and services. Likewise, transportation investments can draw development to new areas. When development is spread out, uses are far apart and the automobile is the predominant mode of transportation out of necessity. When development is compact, uses are proximate and people can access all of their needs by walking, including using public transit to complete their trips. Neighborhoods with a high density of jobs and residents, and reliable service, have higher ridership rates than other areas and that density is driven by the local development pattern.

Transit and neighborhood planning are natural partners essential to one another. Without this coordination, costly impacts can result in falling ridership, isolated developments, and greater public infrastructure needs.

Although an advocate and large stakeholder, PAAC has limited control over land development beyond its own property. The characteristics of high-quality TODs outlined here must be implemented to ensure success in projects on land owned by others. Only with the coordination and collaboration of many entities can these guidelines truly be implemented.

Developer Action

Port Authority will strive to achieve the outcomes described in these guidelines and expects developers to do the same. Development partners, private developers, and community developers should review these guidelines and incorporate the concepts and specific recommendations provided into their projects. Transit access is an asset for developments in general and it's the keystone of successful TODs. Developers can find creative solutions to strengthen development and ensure success by working with PAAC and using these guidelines.

Municipal Action

This document does not supersede laws, regulations, or board-adopted policies applicable to PAAC or its development partners. It should be used to supplement existing local TOD zoning and to guide TOD implementation where local zoning falls short. Furthermore, these guidelines can be used to support appropriate variances to further high-quality TOD.

The local policy that most greatly affects TOD is the municipal zoning code. With 130 municipalities in Allegheny County, and nearly as many unique zoning codes, creating a regulatory environment that is friendly to TOD around the Port Authority system is quite a task. PAAC's fixed guideways (bus rapid transit, light rail, and incline) sit in 12 municipalities, whose policies are key to the TOD potential of stations located there.

Many zoning codes don't allow for the density or mix of uses that have proven successful in TOD. Most zoning codes are based on the concept of defining districts based on uses and often isolating them in the process. Mixing uses instead of separating them is the key to creating vibrant places and growing ridership. There are a variety of resources available for assistance in creating TOD zoning, including model codes included in the *Allegheny Places* and *FIT Zoning* reports referenced earlier.

Municipalities with Fixed-Guideway Stations	Transit Line
1. Baldwin Township	Light Rail
2. Bethel Park Municipality	Light Rail
3. Carnegie Borough	Busway
4. Castle Shannon Borough	Light Rail
5. Crafton Borough	Busway
6. Dormont Borough	Light Rail
7. Ingram Borough	Busway
8. Mt. Lebanon Municipality	Light Rail
9. City of Pittsburgh	Light Rail and Busway
10. South Park Township	Light Rail
11. Swissvale Borough	Busway
12. Wilkinsburg Borough	Busway

For more than a decade, the Pittsburgh community has been studying and preparing for a future with transit-oriented development. Today, there is broad support for the kind of dense, mixed-use, and multimodal development that TOD exemplifies.

When PAAC, along with a variety of partners, takes an active role in creating walkable, mixed-use, and mixed-income communities, it creates a fertile environment in which transit service and development can grow and thrive. Well-planned and well-designed TOD attracts residents to neighborhoods and riders to transit stations. Adherence to best practice standards, as outlined here, and collaboration in implementing those high-quality TODs will lead to inclusive, vibrant, and sustainable communities.

It is only through the transit agency bringing its expertise and assets to the table with local governments, private and community developers, and community stakeholders that this vision can be realized. This document is a critical tool in the process to achieve a shared vision for complete communities.

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