



DESIGNING FOR TRANSIT

Transit-Oriented Development Guidelines

Maryland Department of Transportation Maryland Transit Administration
Office of Planning and Programming

Revised January 2020



Source: MDOT MTA Concept



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INTRODUCTION

Designing for Transit: Transit-Oriented Development Guidelines is designed to assist in the planning and creation of transit-oriented development (TOD) near Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) stations. Regardless of a site's land ownership near an MDOT MTA station, all development projects involve participation by the developer(s), local jurisdictions, and the State of Maryland.

Through experience with transit-oriented development projects and joint development projects, MDOT MTA has identified a need for clear communication of best practices and expectations for transit access, operations, and station area features at TOD project sites.

With the adoption of these guidelines, MDOT MTA offers an understanding of design elements that are necessary and desirable for creating vibrant and successful transit-oriented places along Maryland's various transit systems. To be effective, this guidebook intends to inform the process from the early stages of TOD project development.

Guidebook Organization

- **SECTION 1 - Responding to Context:** Outlines the different TOD Place Types for areas around stations. The TOD Place Types help determine which design guidelines are suitable for a particular transit-oriented development site.
- **SECTION 2 - Successful TOD Design:** Provides guidance and best practices for six primary elements of a TOD project: Transit Station and Infrastructure, Public Open Spaces, Land Uses, Network Connectivity, Parking, and Wayfinding. **These six primary elements contribute to a successful TOD.**

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Station Area Concepts

To supplement this guidebook, MDOT MTA has prepared station area concepts for stations in the MDOT MTA system. These concepts are available on MDOT MTA's website (mta.maryland.gov/transit-oriented-development).

These station area concepts apply the Maryland Department of Transportation Maryland Transit Administration (MDOT MTA) TOD Design Guidelines, providing examples of what transit-oriented development (TOD) could look like in station areas. These concepts can be used in discussions with local jurisdictions, developers, and community members to work towards shared visions for TOD. MDOT MTA has not necessarily allocated any funding for these concepts, and in some cases concepts may not fit with existing local zoning.

USING THIS GUIDEBOOK

This guidebook is designed to assist developers, local jurisdictions, and the state throughout the process of creating transit-oriented development around MDOT MTA stations.

When using this guidebook, the first step is to determine the TOD Place Type of the station's surrounding area. Understanding the nature of the station's setting informs the appropriate design of the various elements of a TOD project.

The second step is to apply the appropriate design guidelines for the various elements of the TOD project. The design guidelines offered in Section 2 of the guidebook vary according to the TOD Place Type of the station. For clarity, the guidebook includes examples of local, regional, national, and international best practices for design.

Developers

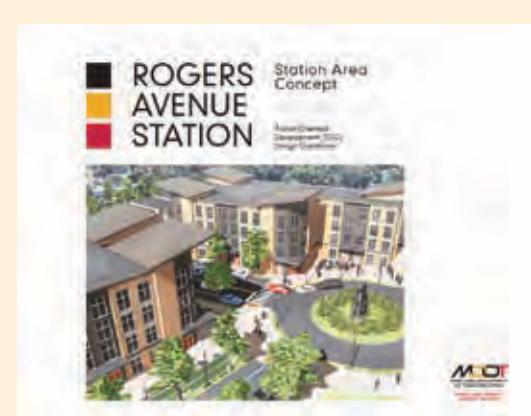
Developers can use this guidebook to design successful TOD projects near MDOT MTA stations that are fully integrated into the existing community and the transit network.

Local Jurisdictions

Local jurisdictions can use the guidebook when planning station areas to ensure consideration is given to the development of sites that support and enhance transit. A critical component of the process is determining the Place Type of the station area; Section 1 of this guidebook aids in determining Place Types.

State of Maryland

The State of Maryland sponsors a Joint Development Program which actively markets state-owned properties for transit-oriented development. This guidebook will assist the state in reviewing projects submitted as part of this program.



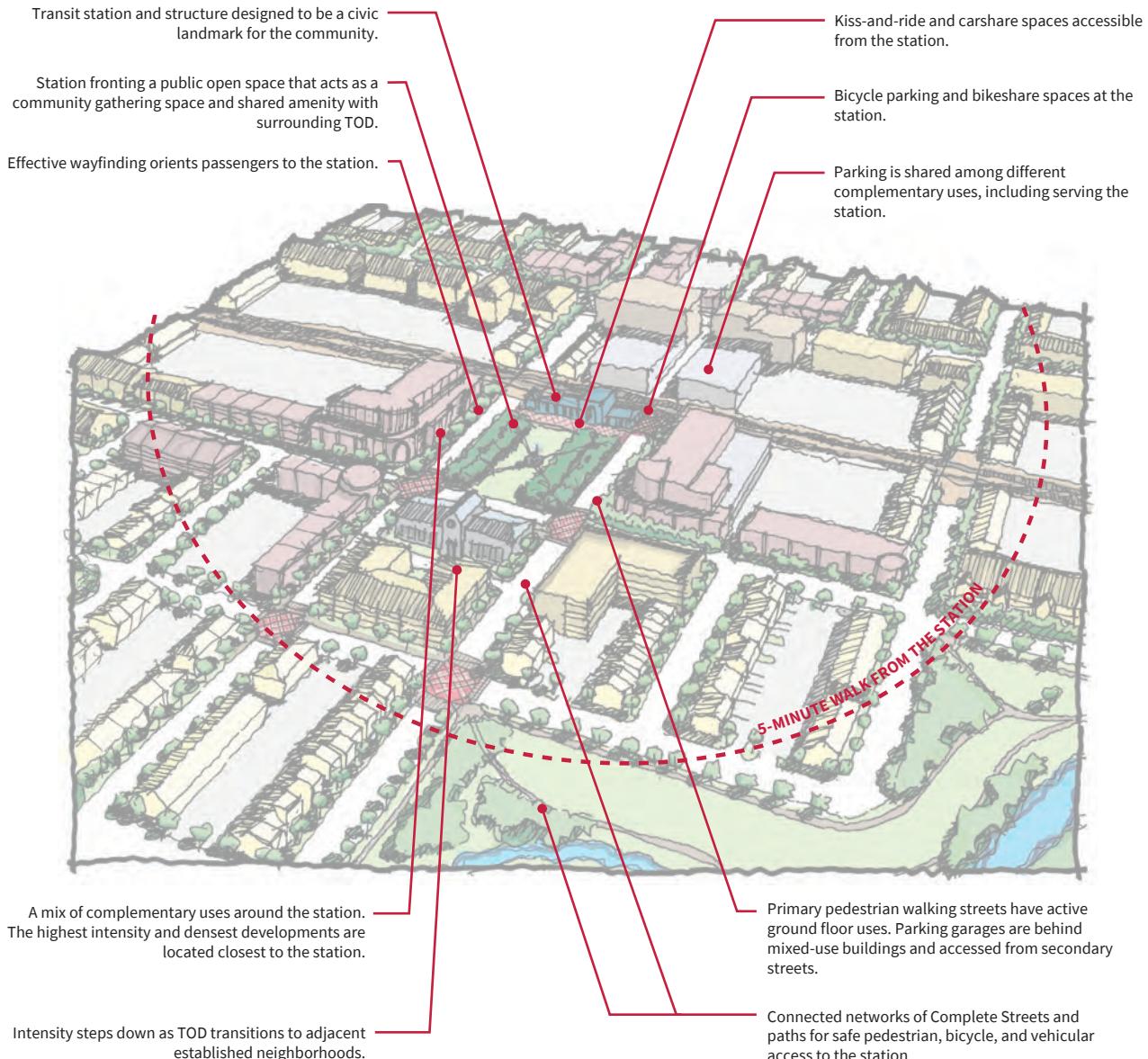
Example of a station area concept available on the MDOT MTA website. Source: MDOT MTA

FEATURES OF A SUCCESSFUL TOD PROJECT

A TOD project at its best creates a place that fully leverages the presence of transit to become a vibrant community node.

As illustrated in the image below, a true TOD project:

- Capitalizes on the synergy that occurs by locating the highest intensity of development in close proximity to transit.
- Utilizes street, site, and building design that prioritizes pedestrians.
- Introduces a diversity of land uses and elements that contributes to a vibrant place.





Source: MDOT MIA Concept

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SECTION

RESPONDING TO CONTEXT

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This section introduces a framework that determines TOD Place Types based upon the land use and transportation characteristics of the station area and the station's transportation and placemaking roles. The four TOD Place Types are:

(1) DOWNTOWN

(2) URBAN NEIGHBORHOOD

(3) TOWN, SUBURBAN, OR EMPLOYMENT CENTER

(4) VILLAGE CENTER OR RURAL TOWN



Source: MDOT MTA Concept

TOD PLACE TYPES

MDOT MTA has identified four distinct TOD Place Types: Downtown; Urban Neighborhood; Town, Suburban, or Employment Center; and Village Center or Rural Town. The table on the following pages summarizes each of the TOD Place Types by form pattern, land use, and transportation characteristics, as well as by the transportation and placemaking roles of stations.

The transportation role of a station describes the level of transit service, the service area of a station, how transit passengers can access the station, and the role of the station in interfacing with other modes. The placemaking role relates to how the station responds to its surroundings, adds to the character and vibrancy of the place, and encourages development over time.

Using these guidelines as a decisionmaking resource recognizes that each station lies within specific and distinct transit, land use, and overall transportation system contexts. The planning and design of TOD projects should result in solutions that balance competing interests and opportunities within each context and capitalize on the distinct potential synergies between transit and its surrounding development.

This section of the guidebook includes profile pages for each TOD Place Type detailing various aspects of each, including land use, parking, regional network, transit connections, public areas/open space, pedestrian access, and bicycle access and parking.

In Section 2, these Place Types are used to inform guidelines on the design and configuration of various elements of a TOD project, including transit station and infrastructure, public open spaces, area land uses, network connectivity, parking for all modes, and wayfinding.

Downtown



Urban Neighborhood



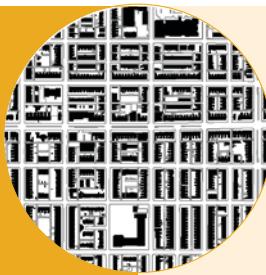
Town, Suburban, or Employment Center



Village Center or Rural Town



TOD PLACE TYPES SUMMARY CHART

TOD PLACE TYPE	FORM PATTERN	LAND USE AND TRANSPORTATION CHARACTERISTICS
Downtown		An area built for high levels of commercial and civic activity. Usually accessible by major highways as well as by interstate and regional transit. These include downtown Baltimore and inner ring satellite cities like Towson and Bethesda.
Urban Neighborhood		Usually residential with modest “main street” neighborhood-serving retail. The street network is interconnected, typically in a grid or partial grid pattern. Older versions of this development pattern were built as streetcar suburbs or as industry-driven worker housing.
Town, Suburban, or Employment Center	 	Areas typically built after 1950 in patterns optimizing auto access, mobility, and parking needs. Land uses are separated and clustered according to residential, retail, office, public open space, and industrial zoning classifications. To work well for transit passengers, these areas need significant attention focused on the details of street connectivity and scale, public open space location and activation, street-level building scale and orientation, and an increased mix of land uses.
Village Center or Rural Town		Traditional towns will typically have a cluster of commercial and civic buildings, a public plaza or green, and low-scale residential surrounded by rural landscapes or suburban development. Creating walkable connections to this cluster will be a primary aspect of the TOD.

STATION TRANSPORTATION ROLE

- Located at the confluence of multiple transit modes
- Easy access by all modes, including walking, bicycling, bikeshare, scootershare, carshare, carpooling, ridesharing, and taxi service
- ½ mile station service area for local service
- Service area of 5 miles or more when station has regional service

STATION PLACEMAKING ROLE

- Strong public and private joint development opportunities
- Includes high quality public open space
- Station fits into existing urban fabric
- Central stations are housed in iconic civic buildings with a strong civic presence

- Major access by walking, bicycling, bikeshare, scootershare, carshare, carpooling, ridesharing, and taxi service
- Local bus service connects the station to local streets, especially to busier residential and neighborhood retail streets
- 1-mile station service area
- Limited or no park-and-ride facilities

- Station design respects neighborhood character
- May have some joint development opportunities

- Major access by driving and by local bus service connecting directly into the station
- Some are end-of-line stations
- Typically have park-and-ride facilities
- 3-mile station service area

- Larger station footprint will include park-and-ride facilities
- Station is expected to be a focus for and catalyst for development
- Station's parking facilities can provide joint development opportunities
- Public open space can be jointly developed

- Major access by driving and by local bus service connecting directly into the station
- Typically at the end of the transit line
- Have park-and-ride facilities
- 5-mile or larger station service area

- Station design respects village context and character
- Can have a high placemaking role
- Larger station footprint might include large park-and-ride facilities and bus transfer facilities
- Station's parking facilities can provide joint development opportunities
- Station is expected to be a focus for and a catalyst for development



Land Use

- Effective, well-integrated balance of mixed residential, office, light industrial/workshop, and retail space within a grid network of streets, sidewalks, and paths that will allow internal capture rates to exceed 5%.
- Station area has buildings of 5 or more stories.
- Residential density of 60+ DU/acre.
- Commercial density (Floor Area Ratio) of 5.5+.

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Parking

- Paid garage parking prevalent on the site.
- 90% of parking is accommodated in garages.
- Parking provided in garages located within 1/8 of a mile of transit station.
- Some dedicated transit passenger parking may be permitted (amount to be determined by MDOT MTA).
- Garages have multiple entrances and exit points to different streets and/or have active first floor uses (retail or office).
- Reduced parking requirements and shared parking should be factored into sizing facilities.

Regional Network

- The TOD impacts are consistent with the existing functionality of the regional network that serves the TOD, and the TOD is accessible by multiple regional connections (such as arterials or freeways).
- Average block sizes are expected to be approximately 200' by 400'.
- Achievable non-auto mode share of 50%+.

Transit Connections

- Served by multiple routes of high-frequency transit.
- Bus-to-rail transfers are immediately adjacent to each other or via an interconnected street network.
- Pathways and sidewalks are wide enough to handle the pedestrian volume.
- Enhanced accommodations for transfers are provided at intermodal stations.

Public Areas/Open Space

- Vibrant public open space that is used for a variety of functions.
- Benches, pedestrian-scale lighting, and landscaping included. Active uses are accommodated in the design (outdoor seating, small performance areas, etc.).
- Station access can be incorporated into development.

Pedestrian Access

- Includes covered walkways, high-quality walkway treatments to increase visibility and aesthetics, direct pedestrian access to station areas from parking, and surrounding neighborhood pedestrian generators.
- The sidewalk width is a minimum of 8' to 10' within 1/4 mile of the station.
- Connections from regional trails are made to the station.
- Intersection density of 100+ intersections per square mile.

Bicycle Access and Parking

- Dedicated bicycle routes (bike lanes, shared use paths, etc.) leading to transit stations and bicycle parking locations.
- Direct connection from regional trails to the station.
- Bicycle racks, corrals, lockers, or covered bicycle parking.



Land Use

- Station area includes an effective balance of residential, office and retail spaces.
- Station area has buildings of 3 or more stories.
- Residential density of 40+ DU/acre.
- Commercial density (Floor Area Ratio) of 5.5+.

Parking

- Paid or unpaid garage parking prevalent on the site.
- Consideration will be given to garages that have multiple entrance and exit points to different streets and/or have active first floor uses (retail or office).
- Reduced parking requirements and/or shared parking should be factored into sizing facilities.
- A minimum of 80% of parking is accommodated in garages.

Regional Network

- TOD impacts are consistent with the existing functionality of the regional network that serves the TOD.
- The TOD is accessible by multiple regional connections (such as arterials or freeways).
- Average block sizes are expected to be approximately 200' by 400'.
- Achievable non-auto mode share of 30%+.

Transit Connections

- Served by high-frequency transit.
- Bus-to-rail transfer areas and paths are wide enough to handle the pedestrian volume.
- Accommodations for transfers such as shelters and benches are provided.

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Public Areas/Open Space

- Adequate lighting to make the space safe, including clear and visible pathways between the station and other TOD uses.

Pedestrian Access

- Direct, low-conflict walking routes to stations oriented to major access points; sufficiently wide sidewalks to accommodate anticipated pedestrian circulation.
- Intersection density of 100+ intersections per square mile.

Bicycle Access and Parking

- Bicycle-friendly routes to station-area land uses; safe and convenient facilities.
- Bicycle parking is provided at the station.

Town, Suburban, or Employment Center



Land Use

- Station area includes a mix of land uses, but has a clear dominance of one or two types, such as residential, office, and/or retail space.
- Target levels include minimums of 20 residential units/acre and 1 job per dwelling unit, or a Floor Area Ratio of 0.5.
- Buildings of 2 or more stories in height.
- Residential density of 20 to 40 DU/acre.
- Commercial density (Floor Area Ratio) of 0.5 to 2.5.

Parking

- Unpaid garage parking is still prevalent, but with a higher percentage of surface parking.
- Surface parking should be located behind buildings or to the sides of buildings with convenient and safe pedestrian access to the development and/or transit center.
- A minimum of 50% of parking is accommodated in garages.

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Regional Network

- The TOD impacts are inconsistent with the existing functionality of the regional network that serves the TOD (lack of viable alternate routes, etc.).
- The TOD is accessible by at least one regional connection (such as an arterial or freeway).
- Average block sizes are expected to be approximately 200' by 800'.
- Achievable non-auto mode share of 15%+.

Transit Connections

- Served by high-frequency transit.
- Bus-to-rail transfers areas and paths are wide enough to handle the pedestrian volume.

Public Areas/Open Space

- Adequate lighting to make the space safe including clear and visible pathways between the station and other TOD uses.

Pedestrian Access

- Pedestrian paths through parking lots; indirect pedestrian connections from parking and surrounding neighborhoods.
- Intersection density of 50 to 100 intersections per square mile.

Bicycle Access and Parking

- Bicycle-friendly routes to station-area land uses; safe and convenient facilities where bicycle demand exists.
- Bicycle parking is provided at the station.

Village Center or Rural Town



Land Use

- Target levels include minimums of 10 residential units/acre and 0.5 jobs per dwelling unit or a Floor Area Ratio of 0.23 or less.
- Residential density of about 2 DU/acre.
- Commercial density (Floor Area Ratio) of 0.23 or less.

Parking

- Surface parking is more prevalent on the site.
- Consideration given to locating surface parking behind buildings or to the sides of buildings with convenient and safe pedestrian access to the development and/or transit center.
- Reduced or shared parking is not considered in the development of the plan.
- Less than 50% of the parking is accommodated in garages.

Regional Network

- The proposed TOD impacts are inconsistent with the existing functionality of the regional network that serves the TOD (designated freight routes, lack of viable alternate routes, etc.).
- The TOD is accessible by at least one regional connection (such as an arterial or freeway).
- Achievable non-auto mode share of 5%+.

Transit Connections

- Served by transit, with peak frequencies of at least approximately every 30 minutes.
- Bus-to-rail transfers are not directly connected or are a significant distance from each other.

Public Areas/Open Space

- Limited public open space.

Pedestrian Access

- Pedestrian paths through parking lots; indirect pedestrian connections from parking and surrounding neighborhoods.
- Intersection density of less than 50 intersections per square mile.

Bicycle Access and Parking

- No dedicated bicycle routes required, but connections should be made to any nearby rural or recreational trails.
- Minimal bicycle parking required at the station; in particularly rural areas railings, fences, and lampposts may be adequate substitutes.



Source: MDOT MTA Concept

SECTION

2

SUCCESSFUL TOD DESIGN

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This section outlines the best practices for public and private partners to successfully vision, plan, design, and implement a TOD project. The guidelines outline the six primary elements where synergistic opportunities exist between transit and land use, and between MDOT MTA and community partners. Each of these elements denote areas where partners must be most cognizant of challenges and conflicts that may limit the full potential of a TOD. These elements are:

(1) TRANSIT STATION AND INFRASTRUCTURE

(2) TRANSIT ACTIVITY SUPPORTING PUBLIC OPEN SPACES

(3) MAXIMIZING AREA LAND USES TO LEVERAGE TRANSIT

(4) NETWORK CONNECTIVITY

(5) PARKING FOR ALL MODES

(6) WAYFINDING



TRANSIT STATION AND INFRASTRUCTURE

The station and infrastructure components that support the operation of transit greatly impact the environments and communities in which they are located. With thoughtful planning and coordination, these important community investments can be leveraged to support and enhance development. The table on the facing page outlines what opportunities exist for transit station and infrastructure components in various TOD Place Types.

TRANSIT STATION AND INFRASTRUCTURE IN VARIOUS STATION TYPES

TOD Place Type	TRANSIT STATION AND INFRASTRUCTURE ELEMENTS
Downtown	<ul style="list-style-type: none">• Intermodal stations can serve as a landmark and focal point for the urban center and as a gateway for the region. Other stations should be integrated into the existing urban fabric and respect the character and scale of the downtown setting.• Station access areas may be located within a building.• Where feasible, new TOD should share and co-locate utilities to minimize overall impact, including the visual impact and footprint of station utilities, substations, and system components.
Urban Neighborhood	<ul style="list-style-type: none">• The station must be integrated into the existing neighborhood context and respect the residential character and scale of the given neighborhood.• Minimize the visual impact and footprint of station utilities, substations, and system components to respect the scale and character of existing neighborhoods.
Town, Suburban, Or Employment Center	<ul style="list-style-type: none">• Larger transit station footprints allow for opportunities for joint development and land uses for future TOD.• The station is a focal point for the community and should help catalyze future development.• Where feasible, new TOD should share and co-locate utilities to minimize overall impact.• Aesthetically treat components that are visually prominent.
Village Center or Rural Town	<ul style="list-style-type: none">• The station is a focal point for the Village Center and/or Rural Town.• The station may provide joint development opportunities.• Minimize the visual impact and footprint of station utilities, substations, and system components to respect the scale and character of existing Village Centers.• Where feasible, new TOD should share and co-locate utilities to minimize overall impact.

TRANSIT STATION AND INFRASTRUCTURE

As the object of orientation for any TOD project, the station should work in conjunction with adjacent development to encourage passengers to linger and visit local destinations on foot, bike, or transit. However, constructing stations, platforms, pedestrian overpasses, and buildings within proximity to rail lines is costly and time consuming due to interference with continuous rail service.

Station Platforms

In most TOD projects, it is unlikely that design of the rail platform will be a factor developers need to consider. However, changes to the station—especially reconstruction of platforms and rail facilities based on projected increases in ridership—may affect how the station facilities are situated in an overall TOD environment and what remaining land is available for development. Developers and local government partners should use the information in this section as a guide to understanding long-term station needs. In addition, MDOT MTA can advise on long-term plans for the station and the forecasted need for platform improvements.

Station Structures

Rail stations and larger bus transfer centers often feature, and are sometimes required to have, buildings that accommodate ticket vending services, food vending and other retail activity, passenger waiting areas, restrooms, and some staff functions such as maintenance, storage, or customer service kiosks.

These kinds of facilities are important to consider in TOD project planning because of the potential for incorporating them into joint development. Station structures should be located immediately adjacent to rail boarding platforms and preferably allow immediate access onto platforms (either on the same level or through stairs, escalators, and/or elevators).

Track Location

Physical characteristics of the track significantly determine the relationship of the station and track to its neighboring land uses. The track and station can either be barriers to overcome or an integral community center. Overcoming barriers around stations may require significant alteration to connect them with their surroundings. Whatever the case, the TOD project design will be expected to contribute to making the station a unifying feature of the area and supportive of a vision of the station as an accessible center of community life and transportation infrastructure.

The railroad track is a primary part of a transit system which comes in close contact with passengers and the environment of the station. The track includes not only the steel rails, but also the entire support structure—typically either ties and ballast rock, or structural concrete. In general, where more pedestrian and bicycle access is required at the station, and between the TOD project and the station, pedestrian and vehicular crossing of the tracks should be accommodated.

Service Type

Much of Maryland's passenger rail service has been built on former and existing freight rights-of-way and on Amtrak's current Northeast Corridor. The type of rail service present has strict implications for how stations are designed. All MARC Train stations on shared Amtrak right-of-way (ROW) require grade-separated pedestrian crossings. In addition, there are required design elements to meet Amtrak and ADA requirements such as fencing, minimum widths and clearances, ramps, elevators, etc.

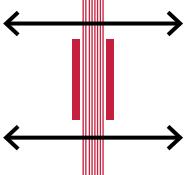
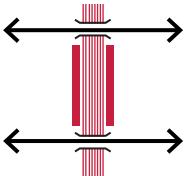
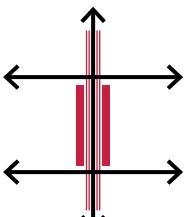
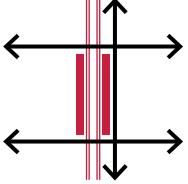
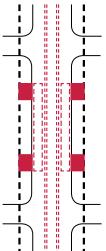
Service frequency and bus connections are also major considerations when understanding how a station is accessed. High-frequency transit provided by Light RailLink and by the Washington and Baltimore Metro SubwayLink systems has the ability to attract considerably more passengers than the typically less-frequent commuter-oriented service provided by MARC Train. Therefore, stations serving the former will require robust bicycle and pedestrian facilities to safely accommodate these passengers.

Relationship to TOD

The table on the facing page shows generalized track characteristics for different transit service types, and shows the influence they have on a station's connectivity to adjacent development.



The original Camden Station headhouse shows how a station can be a landmark in the community. Source: Wikimedia Commons

Service Type	Track Location	Station Location and Relationship to TOD
Commuter Rail	Freight Tracks (Camden, Brunswick, and Frederick Lines)	 <p>The railroad tracks will generally limit area connectivity. Within the station itself, however, pedestrians may be able to cross at-grade at designated spots. However, it is preferred that track crossings be grade-separated.</p>
	Northeast Corridor (Penn Line)	 <p>Where feasible and conforming to the station design and urban form, a TOD project can connect directly to the station above grade, utilizing air rights above the railroad tracks and roadways. All crossings of the tracks in the Northeast Corridor require grade separation for pedestrians and vehicles.</p>
Light Rail / Streetcar / BRT	In Street	 <p>In this condition, potential TOD projects have the most direct physical and visual connections to the station. A TOD project should address the street and the rail alignment, having front doors and main activity nodes facing the rail corridor and the station. In some instances, pedestrian crossing may be restricted or steered to particular channels and access points.</p>
	On Separated Right-of-Way	 <p>A TOD project should capitalize on the connection to transit at the stations by facing main activity nodes and front doors to the rail corridor. Pedestrians can cross at grade at specific designated locations.</p>
Metro / Subway	Below Grade or Above Grade (Elevated)	 <p>Where feasible, the TOD project should incorporate direct access to the metro or subway station below or above grade. All crossings of the track require grade separation.</p>

 Train Platform

 Street

 Train Tracks

 Bridge or Tunnel

 Headhouse

TRANSIT STATION AND INFRASTRUCTURE

Rail infrastructure can act as a barrier or a seam that stitches together the station to surrounding TOD projects. With careful planning, infrastructure components can and should enable successful TODs.

System Components

The system components include cabinets that house traction power substations and major electrical equipment. Depending on the transit technology, traction power substations require relatively large enclosed buildings to house sensitive electrical equipment. Similar in size to a truck-sized shipping container or a single car garage, these can be anything from a prefabricated metal building, to architecturally designed, custom-built structures. Since these main power sources must be located at fairly even spacing along a transit alignment, there is relatively limited flexibility in terms of location choice along a transit corridor. Therefore, in highly visible locations, treatments to the exterior appearances of these facilities are critical.

Overhead Catenary Wires and Poles

In a light rail system, two elements that have the most visual impact are the traction power poles and the overhead contact system (OCS). Catenary systems come in many forms, from simple single-wire “trolley wire” installations to multiple cable “catenary” systems with messenger and contact wires. The OCS requires poles or supports from adjacent structures to hold the wires up at the appropriate location.

Utilities

The construction of new transit systems or new TOD around a station may impact existing utilities and require their redesign and reconstruction. The placement and design of these new utility systems contribute to the overall urban design of the rail system as transit, roads, sidewalks, and setback buffers all vie for space in the right-of-way.

Road Network

Providing sufficient access to transit stations is a careful balance that depends on the station's and station area's needs but also on the surrounding roadway network, especially the roadways providing direct station access. Vehicles should be accommodated in a way that provides simple and convenient access and egress without detracting from the walkability and vibrancy of the area. Even in the most urban settings, vehicle access is needed for buses and drivers picking up and discharging passengers and for businesses receiving supplies and customers.

Driveways to large parking facilities should be planned thoughtfully to avoid interruptions to important pedestrian paths and without overburdening any single traffic facility.

All TODs should use minor streets for access to garages and drop-off locations. Conflicts with bicycles and pedestrians should be managed and minimized.

Developers should coordinate with the Maryland Department of Transportation State Highway Administration (MDOT SHA) on access needs, even when station sites are not directly served by a state road. MDOT SHA will help coordinate access points based on adjacent thoroughfare functional classification and the overall highway system's needs.

ADDITIONAL RESOURCES

Transit Capacity and Quality of Service Manual (TCQSM), 2nd Edition

The TCQSM's chapter on station elements provides guidance on many primary functions—especially related to passenger movement—in stations.

Guide for Geometric Design of Transit Facilities on Highways and Streets (AASHTO)

This guide provides a reference of current practice based on a review of relevant AASHTO, TRB, and ITE documents, as well as design reports provided by various transit agencies.

Station Site and Access Planning Manual (WMATA)

This document focuses on physical design and operational issues to illustrate how station site facilities should be planned to optimize pedestrian and vehicular access.

Adjacent Construction Project Manual (WMATA)

Created by the WMATA Office of Joint Development and Adjacent Construction, this document includes design requirements and sections pertaining to insurance, real estate, and as-built documentation.

Public Project Information (CSX Transportation)

This manual is for construction and improvement projects that may involve the railroad, including highway-rail grade crossings, parallel roads and facilities, and bridges over CSX infrastructure.

BEST PRACTICES

Platform length is based on vehicle length and expected levels of activity.

- Smaller and less frequently used stations can feature shorter platforms; however, more frequently used stations should have platforms that accommodate the expected waiting passengers. Consult with MDOT MTA on existing and projected passenger loads at each station.

Locate land uses to enhance connectivity between the platform and tracks.

- The rail platform and its tracks may create connectivity challenges if they separate disembarking passengers from adjacent development. Thoughtful siting of land uses and pedestrian and bicycle crossings (where safe and feasible) can address this issue.
- While parking functions as an amenity for many stations, opportunities for retail at the TOD may be adversely affected if parking is situated adjacent to the platform.

Provide adequate and attractive canopies for waiting passengers.

- The canopy is the most prominent structure at many stations. Capitalize on opportunities for highlighting local character, architecture, and public art in the design of canopy.
- In addition to providing shelter for passengers, the canopy can be inviting and help create a sense of place if it is thoughtfully designed.

The station structure should serve as a landmark for the TOD project.

- For certain anchor stations, the architecture for the station structures should be iconic and serve as a landmark for the surrounding community; it should be contextual and draw from adjacent architectural character.
- For stations in urban neighborhoods, urban form and character is already well-established. Station architecture should fit into, and not detract from, existing context. Consider the various pedestrian circulation needs within the station and between the station and its platforms.
- Where needed, develop vertical circulation that is safe, convenient, and attractive between platforms.
- Provide adequate wayfinding within the station to direct internal circulation.



The Halethorpe MARC Train Station is an example of a station platform that offers pedestrians safe crossing via the pedestrian bridge. Source: Wikimedia Commons



Note that this platform, while perfectly functional for transit operations and easy to cross at grade, has physically walled itself from surrounding land uses. Source: KAI

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Ample width for circulation and protection from weather help contribute to a comfortable pedestrian environment. Source: MDOT MTA

TRANSIT STATION AND INFRASTRUCTURE

BEST PRACTICES

The station structure should be integrated into surrounding street and block network.

- The appropriate station structure (building, waiting area, shelter, etc.) and related facilities (ticketing, restrooms, vending, etc.) will be determined by the TOD Place Type and the kind of transit provided at the station.
- The station structure should conform as much as possible to the existing street and block network. This integration helps bolster the overall sense of place which helps increase the vitality and success of the adjoining land uses and TOD.

Use structures to create visual interest and funnel passengers to transit.

- Make pedestrian routes through station structures clear, direct, and comfortable. Use effective wayfinding.
- Make sure that detours for passengers with limited mobility are as minimal as possible.

Station structures are an opportunity for small scale retail.

- Vending, coffee, newsstands, and other such small retail uses are appropriate for stations on some transit lines, especially those with very high daily ridership.

Do not obscure operator sight lines approaching the platform.

- Any development, landscaping, or signage added near a rail platform must be situated and maintained so as not to obscure the operator's view of the station as they approach.
- For some transit modes, the operator must be able to see all the way to the end of the platform. MDOT MTA can advise regarding these sight lines.

Provide appropriate space to meet ADA requirements.

- Platforms must have detectable warning surfaces at the platform edges.
- Accessible widths for passages must be at least 36 inches.



Light rail in the street reduces many barriers to pedestrians and bicyclists, while also allowing a robust transit-oriented neighborhood to develop over time.
Source: MDOT MTA



There are often opportunities for collaboration between private entities and transit agencies to tailor station platform structures to reflect a community's character and identity.
Source: Wikimedia Commons



This transit station in Denver, CO provides adequate pedestrian access, a covered canopy over the waiting area, and ADA access to the ticket vending machine.
Source: Flickr/Kyle Gradinger

BEST PRACTICES

For new transit systems, coordinate with MDOT MTA and other state agencies to establish where pedestrian and vehicular traffic between the TOD and the station is expected to be highest, and where embedded track should be considered.

- Ballasted track is the standard track application for Maryland's at-grade rail sections. However, there are some circumstances where ballasted track is undesirable. In areas where a rail line is running within or parallel to a street or a pedestrian pathway, consider embedding the rail track. For light rail systems, with the exception of a very narrow slot on the inside edge of the rails, the track is covered and flush with the pavement material.
- Embedded track is also preferred when running through an urban park or when development is planned to orient to the rail line.
- If embedded track is preferred but is not feasible, ballasted track can be screened from view to discourage pedestrian crossing. Potential screening treatments include landscaping or decorative fencing.

Locate primary walking and bicycling connections between the TOD and the station such that system components are not readily visible.

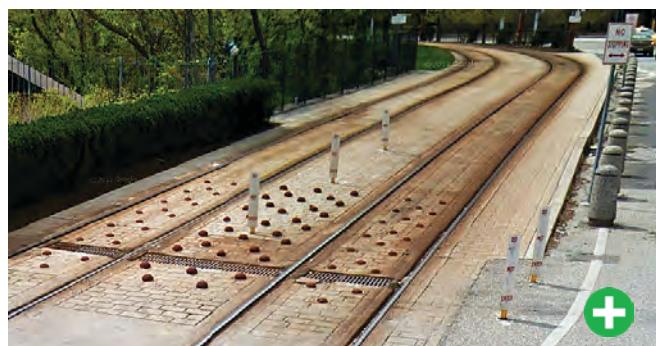
- Thoughtfully situate TOD land uses and pedestrian and bicycle connections to avoid direct view of system components.
- Provide additional aesthetic treatments to system components in highly visible locations or where pedestrian activity is expected or desired.
- Where feasible, consolidate system components with TOD utility facilities to minimize physical impact.
- Incorporate public art such as additional aesthetic treatments to system components when open to public view.



The Gaithersburg MARC Train Station has been designed to be a pleasant place, in addition to providing necessary services like seating and ticket vending. Source: KAI



Embedded tracks integrated with water fountains and park space in downtown Houston. Source: KAI



Embedded tracks are frequently found in urban streets running light rail and streetcar systems. In some places it is acceptable for all modes to share the road right-of-way, but in other areas, the use of bollards or other elements are effective to buffer the rail alignment. Source: KAI

TRANSIT STATION AND INFRASTRUCTURE



Bolton Street is a major pedestrian access point to the State Center Metro SubwayLink Station, but it is unmarked and there is no controlled access across four moving traffic lanes. Source: KAI

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SUMMARY OF TRANSIT STATION AND INFRASTRUCTURE GUIDANCE

	At the Transit Station	Station Environs
Must-Haves	<ul style="list-style-type: none">Opportunities for small-scale retail at the stationConsistent wayfindingSeparate vehicle and pedestrian routesThoughtfully situate and design infrastructure components to enable easy and comfortable pedestrian access to and from the station	<ul style="list-style-type: none">Thoughtful street connections between the TOD and surrounding street networkExplore joint partnership to upgrade infrastructure in primary pedestrian areas of the TODLeverage existing infrastructure at station to support potential TOD utility needs
Desirable	<ul style="list-style-type: none">Additional canopies if not provided by the stationStation should serve as a visual landmark for TODDesign infrastructure components such that visual clutter around the station is avoided	<ul style="list-style-type: none">Adjacent land uses that enhance connectivity between the TOD and station
Avoid	<ul style="list-style-type: none">Obscuring operator sight lines to platformConditions where transit infrastructure limits the potential for TOD because of barriers to connectivity	<ul style="list-style-type: none">Circuitous connections between the TOD and station and obstructions to direct pedestrian connectionsConditions where transit infrastructure limits the potential for TOD because of barriers to connectivity

BEST PRACTICES

For new transit systems and where there is an opportunity to renovate existing catenary poles because of a TOD project, coordinate with MDOT MTA to consider TOD needs when determining the style and placement of catenary poles around stations.

- When a light rail station is in an area where high pedestrian activity is expected or desired, aesthetically treated decorative poles should be considered.
- For rail sections that run adjacent to or within roadways, integrate pole design and placement within the overall streetscape design.
- Minimize the number of wires and poles when a rail line is running parallel to a roadway or a pedestrian path. Where feasible, combine transit poles with other utilities to minimize space consumption and visual impact.

Minimize the visual clutter of utility lines around the public areas of a TOD project.

- Around a TOD and along the pedestrian paths connecting a station to a TOD, locate utilities to allow space for adequate pedestrian facilities.
- Consider placing utilities underground where feasible.
- Design poles to be jointly used to carry multiple utility lines, including transit catenary wires, where feasible.

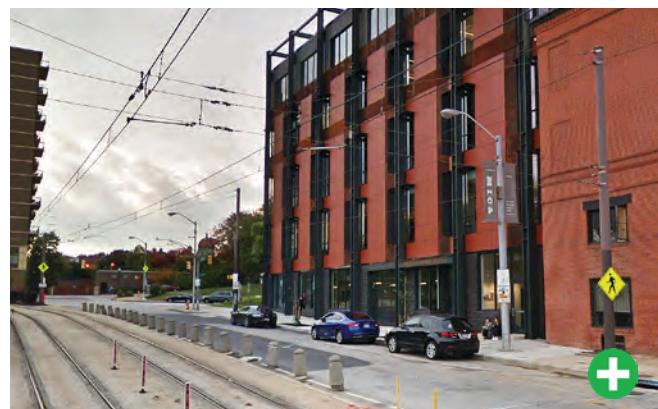


This architecturally-treated system component structure in Portland, OR has design and material finishes that reflect the character of the station area.
Source: Troy Russ



Avoid placement of highly-visible system components lacking aesthetic treatments adjacent to station waiting areas and public open spaces.
Source: KAI

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Decorative light rail poles jointly used for lighting can contribute to the overall streetscape.
Source: KAI



TRANSIT ACTIVITY SUPPORTING PUBLIC OPEN SPACES

The table on the facing page shows how vibrant public open space elements are incorporated into the different TOD Place Types.

PUBLIC OPEN SPACES IN VARIOUS STATION TYPES

TOD Place Type	PUBLIC OPEN SPACE ELEMENTS
Downtown	<ul style="list-style-type: none">• The station's public open space is part of the downtown's signature gathering spaces.• Any existing adjacent urban plazas or public open spaces should be integrated into the transit station site plan.
Urban Neighborhood	<ul style="list-style-type: none">• The TOD project can contribute public open space around a station (especially if none currently exists).• Public open space typically functions as a neighborhood park, plaza, or square for gathering.
Town, Suburban, or Employment Center	<ul style="list-style-type: none">• The TOD project should incorporate new public open space linked to the transit station (especially if none currently exists) and/or consider existing public open space around the station.• Public open spaces are an amenity for transit and TOD and become catalysts for further development.
Village Center or Rural Town	<ul style="list-style-type: none">• The TOD project should incorporate new public open space linked to the transit station (especially if none currently exists) or consider integrating existing public open space around the station.• Public open space typically functions as the "Village Center" or green/gathering space.

PUBLIC OPEN SPACES

Great public open spaces at the station and in the surrounding area are one of the primary elements that help make TODs into vibrant destinations. A thoughtfully designed public open space provides the setting for transit passengers and TOD customers alike to mingle and relax.

Public Plazas and Parks

The public realm is a critical component of TOD, forming the seam between the public facilities of the rail station and private property and the various surrounding land uses. While the station should serve as an iconic landmark for the TOD, the plaza/park should serve equally as the iconic public open space and signature gathering space for civic events. In smaller footprint stations the public open space might be more modest in scale, but still should serve the local neighborhood with a place to gather and exchange. Retail and residential uses work with the public open space to create an authentic sense of place tailored to the local area.

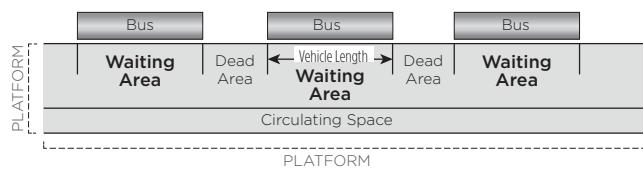
The plaza/park is also a primary element for passenger connection and circulation to the station. It is the access to public transit that sets these spaces apart as major contributors to a community's sense of civic well-being and connectedness.

Passenger Loading and Waiting Areas

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Bus circulating areas, bus stops, and even station structures are often planned as part of or adjacent to a transit station area's public open space. These elements need to have, at minimum, adequate space for passenger boarding and alighting.

As shown in the diagram below, areas where multiple buses stage for boarding and alighting tend to feature a series of "waiting zones" where pedestrians are prone to concentrate and create "dead zones" between them. There are opportunities for developers to leverage these divisions of spaces by incorporating small-scale retail (especially cafes that serve breakfast in the morning and lunch in the afternoon) nearby and encouraging seating or leaning areas in the "dead zones" to enjoy the purchases from the adjacent stores.



Fences, Walls, and Vertical Separations

Retaining walls, sound walls, fences, and other vertical separations leading to the station and platform can enhance or take away from the experience moving between the TOD and the transit station. There are opportunities to enhance these areas by incorporating landscaping, common and recognizable materials, and, in higher pedestrian traffic locations, public art into the vertical separations.

In the design and planning of the TOD, care should be taken to avoid retaining walls and/or embankments that serve as barriers between the TOD area and the residential neighborhoods. If this is an existing condition, look for creative ways to encourage pedestrians to cross under or over these barriers, and/or leverage wayfinding and placemaking to reduce the perception of the barrier.

ADDITIONAL RESOURCES

Transit Capacity and Quality of Service Manual (TCQSM), 2nd Edition

The TCQSM's chapter on station elements provides guidance on many primary functions—especially related to passenger movement—in stations. The manual provides additional useful information and practical examples. Information for this section is based on the recommendations from TCQSM sections on urban areas and high-density town center stations as envisioned for TOD.

Station Area Planning Manual (Reconnecting America and the Center for Transit-Oriented Development)

Reconnecting America provides guidance on creating great public open spaces in Chapter 2, Section 5, some which are part of this document. The manual also offers industry-accepted guidance on many other topics of interest to developers.

Accessibility Policy and Guidelines for Pedestrian Facilities along State Highways (MDOT SHA)

This policy and guidance document provides direction to accommodate persons with disabilities, a routine and integral element of planning, design, construction, operations and maintenance activities for all projects.

Station Site and Access Planning Manual (SSAPM) (WMATA)

The SSAPM provides design guidelines for station site and access planning, for use by WMATA, local government agencies, and WMATA Joint Development partners with interests in planning transit facilities at both new and existing Metrorail stations or proposing development at stations. Public open spaces are addressed in Sections 3.6 and 4.1.

BEST PRACTICES

Placement and design are the focus, not the afterthought.

- Transit station areas need public open space to be their “living room,” the transition between a station area’s many different functions. To this end, it should be designed to reflect a human scale. Even large public open spaces can be designed to feel intimate and inviting.
- Use of design features such as benches, pedestrian-scale lighting along streets and walkways, and landscaping that provides shade can help to establish this human scale.
- Public open spaces should front both the station’s and the TOD’s entrances, where feasible, to encourage interaction between transit and TOD.

Consider joint-use and jointly developed public open space.

- The density of housing and retail present at TODs is enabled and supported by attractive public places to sit, pause, or gather.
- For business owners these public open spaces can both attract customers and allow the use of smaller storefronts if each business doesn’t have to furnish and maintain all of the space necessary for its customers to linger.

Truly vibrant public open spaces can be and are used for a variety of functions.

- The purpose of public open spaces adjacent to transit stations is not simply to provide circulating area, it is also to support civic activity and day-to-day functions that improve the appeal of transit as a mobility choice and help maximize the commuting experience.
- Providing these kinds of activities in conjunction with the public open spaces helps to improve the performance returns of transit. Kiosks, markets and retail space, and facilities for other basic services help commuters satisfy basic needs in the course of their regular transit commute and also support the TOD itself.

Understand the characteristics of transit operations.

- Bus loading and unloading activity, especially at transfer centers, may require a longer wait than expected. Developers can leverage these wait times by providing close-in, small-scale retail that serves the daily needs of transit passengers.



This plaza has ample seating space and good visibility of transit vehicles.
Source: pedbikeimages.org/Hamilton



At Penn Station, public art and movable tables and chairs have been incorporated into the public plaza. These elements help establish place identity for the station area and work in concert with local merchants and other adjacent businesses.
Source: KAI



Public sculpture incorporated into a portion of the public open space around Rogers Avenue Metro SubwayLink Station.
Source: MDOT MTA

PUBLIC OPEN SPACES

BEST PRACTICES

Streets contribute to the overall appeal of a public open space.

- Careful design of streets around and framing a public open space can maximize pedestrian access to the public open space and adjacent transit stations.
- Incorporate appropriate pedestrian-scale streetscape elements, and design streets to optimize pedestrians' ability to walk along and cross the street.

In smaller spaces, make sure that the station remains prominently visible.

- Public open spaces adjacent to the transit station need to facilitate transit access and there should be a clear and visible path to the station entrance.
- Landscaping, fences, furniture, and other design features should not interrupt reasonably direct paths from other parts of the TOD to the station, but rather should frame and support them.

Provide protection from the elements.

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- Incorporate amenities for transit passengers to sit and wait, linger, and socialize.
- Incorporate structures to provide protection against rain, wind, hot sun, and other inclement weather. Activate spaces around transit. Program and encourage regular community activities in public open spaces, depending on community context and TOD Place Type. Programming events such as concerts and farmer's markets can bring people to station areas and associated public open spaces even outside of regular commute times.

Provide appropriate space for meeting ADA accessibility requirements.

- Spaces must be designed to accommodate the needs of passengers in wheelchairs and using other mobility assistance.
- This applies to the surfaces of public open space as well as the walkways and paths connecting to the station and other TOD uses.



The Aberdeen MARC Train Station and rail alignment are a barrier to the nearby development. Source: KAI



Waiting areas can be thoughtfully designed to create attractive locations and a sense of place inseparable from the surrounding neighborhood. Source: MDOT MTA Concept



Streets are sometimes the only public open space element around transit stations. Designing these to maximize walkability is important. Source: MDOT MTA Concept



A fence at the Cultural Center Light RailLink Station separates the station from the street. Buildings near the station are not oriented to the station, limiting the potential physical and functional connections between transit and adjacent development. Source: KAI



A public square with water features, lawns, and sitting ledges provides a community gathering space for popup markets adjacent to a BART station in Contra Costa County, CA. Source: joe-urban.com



Landscaping and benches in close proximity to a transit station help not just the transit passenger, but surrounding TOD activity. Source: MDOT MTA Concept

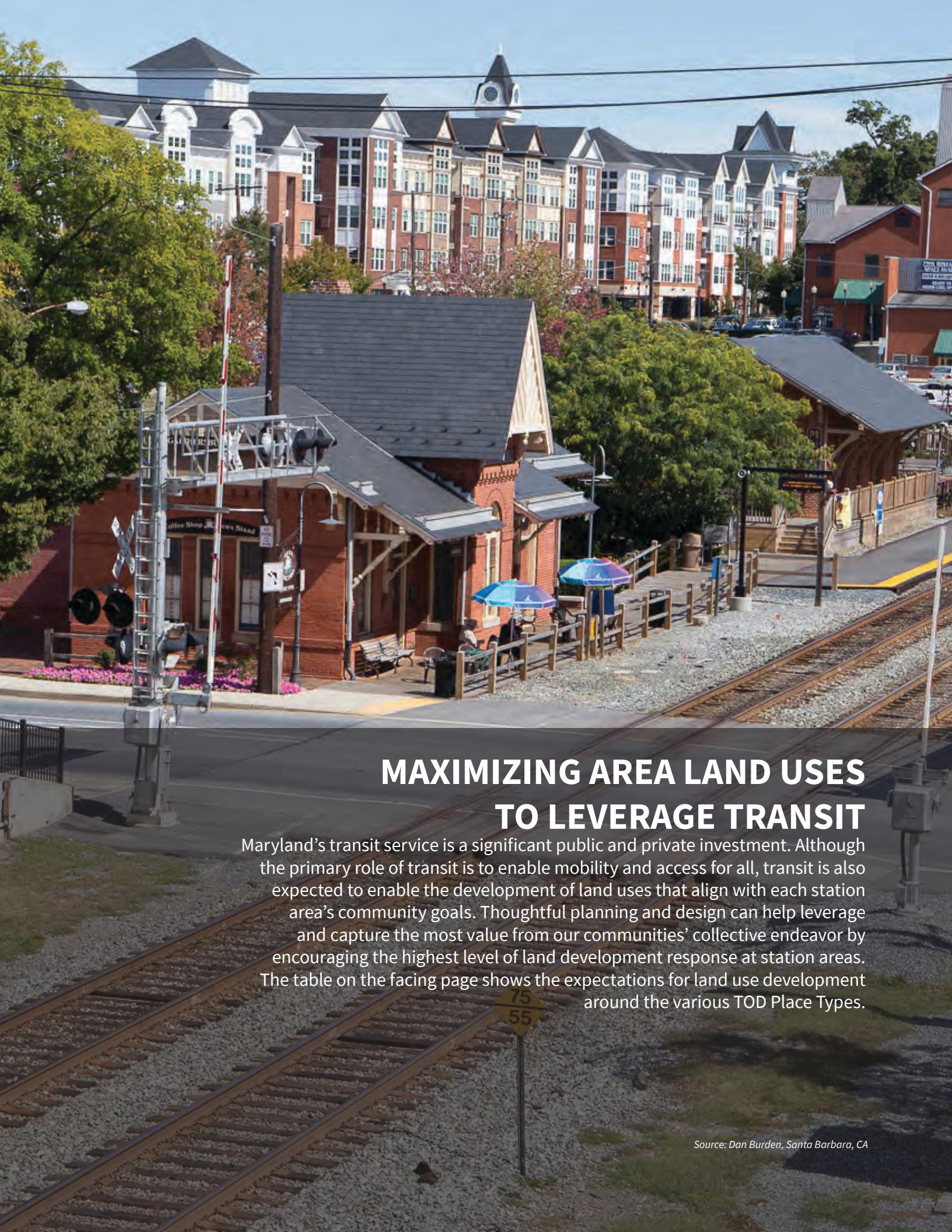
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SUMMARY OF PUBLIC OPEN SPACES GUIDANCE

At the Transit Station

Must-Haves	<ul style="list-style-type: none"> Clear, well-lit, and visible pathways between station facilities and other TOD uses 	<ul style="list-style-type: none"> Design and locate public open spaces where they can be a seam between the station and TOD
Desirable	<ul style="list-style-type: none"> Seating, landscaping, visual interest, and other placemaking amenities 	
Avoid	<ul style="list-style-type: none"> Letting public open spaces feel neglected, unused, or isolated 	

Station Site Context



MAXIMIZING AREA LAND USES TO LEVERAGE TRANSIT

Maryland's transit service is a significant public and private investment. Although the primary role of transit is to enable mobility and access for all, transit is also expected to enable the development of land uses that align with each station area's community goals. Thoughtful planning and design can help leverage and capture the most value from our communities' collective endeavor by encouraging the highest level of land development response at station areas. The table on the facing page shows the expectations for land use development around the various TOD Place Types.

AREA LAND USES IN VARIOUS STATION TYPES

TOD Place Type	LAND USE ELEMENTS
Downtown	<ul style="list-style-type: none">• TOD around the station should have at least 60 dwelling units per acre and/or a commercial Floor Area Ratio greater than 5.5, and provide a mix of uses.• TOD ground floor uses should include retail uses with front entrances oriented toward station access points.
Urban Neighborhood	<ul style="list-style-type: none">• TOD around the station should have at least 40 dwelling units per acre and/or a commercial Floor Area Ratio of 2.5 to 5.5.• TOD around the station should include a mix of uses developed at the scale and character of the existing neighborhood.• TOD uses can include neighborhood commercial/retail uses along primary paths to/from the station.
Town, Suburban, or Employment Center	<ul style="list-style-type: none">• TOD around the station should have 20 to 40 dwelling units per acre and/or a commercial Floor Area Ratio of 0.5 to 2.5.• TOD around the station should consider an employment or residential-based mix of uses adjacent to the transit station at higher densities than the adjoining existing development.
Village Center or Rural Town	<ul style="list-style-type: none">• TOD around the station should have about 2 dwelling units per acre and/or a commercial Floor Area Ratio of 0.23 or less.• TOD around the station should include a mix of uses developed at the scale and character of the existing Village Center and/or Rural Town.• TOD uses can include neighborhood commercial/retail uses along primary paths to/from the station.

AREA LAND USES

The primary goal of TOD is to ensure land uses around station areas are designed with the appropriate diversity, density, and built form to support transit use.

Local Jurisdiction

A critical component of TOD is transit-supporting area land uses adjacent to stations. Local comprehensive plans and small area plans need to support TOD, as well as local zoning and development regulations. These plans and regulations are the sole purview of the local jurisdiction.

Economic Development

Working together, state policies and local jurisdictions' appropriate area land uses can catalyze economic development and expand housing choices. As a part of a regional development framework, area land uses can redefine where and how economic activity will occur and help community revitalization efforts focus around transit stations. Area land uses should include varied types of housing, which appeal to a wide range of residents who may favor alternative modes of transportation, such as homes on smaller lots, condominiums, rowhomes, and apartments.

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State Partnership

The MDOT Secretary's Office, MDOT MTA, and MDOT SHA work together to develop partnerships with local jurisdictions and other stakeholders to support the development of transit-oriented projects by assisting with TOD designation, land assembly, and planning and feasibility studies where appropriate. With regard to area land uses, MDOT strives to increase transit ridership by providing technical assistance in plan development and site plan review to ensure that land use and design decisions support safe and efficient multimodal access to station areas.

BEST PRACTICES

Locate higher densities and intensities immediately within the station area.

- Thoughtfully locate TOD land uses to have the highest densities within a quarter mile walk of the station (5 minute's walking distance).
- Confirm the station area land use density requirements set by the local jurisdiction, and explore the possibility of overlay zoning, PUDs, transfer of development rights, or application of zoning bonuses to achieve a transit-supportive level of density.



A mix of housing types incorporated into existing development.
Source: MDOT MTA Concept



Locate building entrances to front onto transit corridors or onto adjacent streets that lead to transit stations. Source: KAI



Merging Complete Streets with appropriate land uses (including parks) and viewsheds to the transit station can ensure the success of the station. Source: KAI

BEST PRACTICES

TODs at the very basic level should have a pattern of uses (diversity of uses) that encourage travel within the station area by walking and bicycling, as well as destination and origin trips using transit.

- Include a variety of uses within the same parcel and within the same building.
- Discourage uses that are automobile-dependent (e.g., service stations, vehicle repair businesses, and junk yards).
- Encourage special transit trip attractors and generators (e.g., government offices, educational facilities, community centers, and stadiums) and locate them adjacent to the station.
- Include a mix of housing types (e.g., apartments, town houses, and condominiums).

Develop in a manner that is sensitive to the existing residential neighborhood.

- Locate the tallest and highest density uses near the station and transition by “stepping down” building heights and intensity towards established residential neighborhoods.

Use community design to establish a sense of place and community identity for the station area.

- Buildings should orient to the street with a maximum “build-to” distance and minimize walking from the station.
- Avoid “blank walls” by providing windows and doors at ground level and having variety in building massing, texture, and materials.
- Reduce regulatory parking requirements and consider parking maximums.

ADDITIONAL RESOURCES

Station Area Planning: How To Make Great Transit-Oriented Places (Reconnecting America and the Center for Transit-Oriented Development)

Part 2 of this guidebook lays out best practices for TOD principles including guidance on maximizing ridership through appropriate development and creating opportunities for affordable and accessible living.

Transit Supportive Planning Toolkit (Puget Sound Regional Council/Growing Transit Communities Partnership)

Provides examples of TOD supportive principles explained from the policy perspective and supported by case studies.

Transit-Oriented Development Best Practices Handbook (Calgary, CA)

Brief and useful summary of benefits and best practices.

Transit-Oriented Development Best Practices Manual (Greater Cleveland Regional Transit Authority)

Surveys TOD practices from seven successful programs, and applies lessons learned to develop Cleveland’s guidelines.

SUMMARY OF AREA LAND USES GUIDANCE

At the Transit Station

Must-Haves	Desirable	Station Site Context
<ul style="list-style-type: none"> • Relatively higher densities and mix of uses immediately around the station 	<ul style="list-style-type: none"> • Variety of uses, including commercial, at the station building 	<ul style="list-style-type: none"> • Building entrances front streets with minimized walking from station
<ul style="list-style-type: none"> • “Blank walls” without windows or doors, especially at ground level 		<ul style="list-style-type: none"> • Active ground floor uses on primary pedestrian-oriented streets
		<ul style="list-style-type: none"> • Uses that are auto-dependent or that will generate excessive automobile traffic



NETWORK CONNECTIVITY

The table on the facing page shows how street network connectivity works in the different TOD Place Types.

NETWORK CONNECTIVITY IN VARIOUS STATION TYPES

TOD Place Type	NETWORK CONNECTIVITY ELEMENTS
Downtown	<ul style="list-style-type: none">• TOD should be built within the context of the existing street network, it should enhance pedestrian and bicycling connectivity, and it should facilitate seamless connections among all other intermodal transit options.• Access to the station for pedestrians and bicyclists should be given highest priority.
Urban Neighborhood	<ul style="list-style-type: none">• TOD should be built within the context of the existing street network. But the TOD should also look for opportunities to make <i>new</i> connections in the street network where feasible.• Vehicular access to the station is primarily for passengers being dropped off (kiss-and-ride).• Access to the station should consider all modes.
Town, Suburban, or Employment Center	<ul style="list-style-type: none">• Access to the station should consider all modes, including passengers arriving by automobiles and connecting bus routes.• TOD should be built to enhance the existing street network. TODs should also consider new connections to the existing network to help create walkable block sizes. If additional vehicular connections cannot be made within the street network, pedestrian and bicycle trails (connections) are encouraged. Consider “Complete Streets” initiatives.• Station and TOD site plans should allow for efficient transfers between various transit modes.
Village Center or Rural Town	<ul style="list-style-type: none">• TOD should be built to enhance the existing street network. TODs should also consider new connections to the existing network to help create walkable block sizes.• Access to station should consider all modes, including passengers arriving by automobiles and connecting bus routes.• Developers can expect longer passenger wait times and should leverage this time to create a more livable, vibrant place.

NETWORK CONNECTIVITY

An interconnected street network that functions well for all people - particularly pedestrians, bicyclists, and local transit buses - extends the benefits of transit to the adjacent TOD. Combined with a mix of land uses, this synergy helps create successful TODs where many of the needs of daily life can be met within walking or bicycling distance.

Complete Streets

Successful TODs support transit access and travel by walking, bicycle, scooter, and automobile. Carefully designed complete streets that maximize safety, comfort, and convenience for all modes are needed along the access paths to a station.

Pedestrian Connectivity

TOD relies on pedestrian activity to create a vibrant environment in the station area. Since every transit trip begins and ends with walking, a TOD's value is directly linked to the ability of passengers to access the housing, jobs, and retail amenities provided within walking distance of the station. Creating a safe, comfortable, and inviting pedestrian environment is integral to its success.

Development around the station should first consider the experience of the pedestrian. Short block spacing, directness of pathways, and dynamic street frontage all contribute to a sense of place and walkability.

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Americans with Disabilities Act (ADA)

The Americans with Disabilities Act prohibits discrimination against people with disabilities in employment, transportation, public accommodation, communications, and government activities. Where the infrastructure improvements are located within the TOD determines which standards apply. For WMATA and MDOT MTA-controlled stations, all spaces must meet at least Americans with Disabilities Access Guidelines (ADAAG) and Federal Transit Administration ADA Guidelines. Any improvements along MDOT SHA-managed facilities must meet MDOT SHA's Accessibility Policy and Guidelines, which can be found in MDOT SHA's Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways.

Street Connectivity

Distance and character of the walk are two significant determining factors in a passenger's decision to access transit via walking. The straight-line distance between an origin and destination is almost never accessible in a built urban environment; rather, the actual walk distance is determined by block spacing and connectivity. Long blocks and dead-end streets can increase walking distance, whereas closely-spaced streets with good connections shorten the walk to transit.

A well-connected street network reduces travel distance, allows for multiple routing choices, and encourages walking, bicycling, and scootering to the transit station. The street network should be direct and convenient.

Local Transit Circulation and Connectivity

Bus loading areas and stops have different design requirements depending on the location and function of the station. Urban stations are likely to feature on-street bus stops in the sidewalk space, whereas suburban and commuter stations may be more likely to feature a large bus circulation and loading area.

Bus stops in urban areas typically share sidewalk space with other functions of the public right-of-way, especially curbside parking and loading, pedestrian movement and street crossing, and street furniture. Larger bus transfer stops in suburban locations serve multiple bus routes and convene at transfer centers or at rail stations — often the end of the transit line.

Bicycle and Scooter Connectivity

Quality bicycle and scooter access expands a transit station's reach by three to five miles. Providing safe and comfortable bicycle and scooter facilities connects the station area to adjoining neighborhoods.

Traveling by bicycle and scooter also supports TOD as it reduces demand for auto travel and thus the need for onsite parking.

Development around the station should support traveling by bicycle and scooter through on-street facilities, vehicle traffic calming, and a complete grid network of streets and bicycle connections.

Stations that attract passengers on bicycles and scooters provide an additional customer base to adjacent businesses. One important way to capture these potential new customers is to provide bicycle parking and shared use mobility corrals near those businesses (in addition to the station itself).

Intermodal Connectivity

In general, different transit modes and shared use mobility options should be located as closely together as possible so walking distances can be minimized and transit schedules can be synchronized to take advantage of connecting services without requiring excessive passenger waiting times.

BEST PRACTICES

Balance the needs of all roadway users and prioritize pedestrian activity.

- Apply roadway design and performance standards that reflect the importance of pedestrian activity, and the station context and type.
- Encourage reduced automobile speeds in TOD areas.

Create a framework for street hierarchy.

- Design a complete street network with local and collector streets supporting a balanced arterial network.
- Consider where service streets or alleys for deliveries will be and ensure they can accommodate trucks.
- Create a hierarchy of streets within the station area's street network to avoid funneling traffic onto the same one or two streets. Plan locations of parking facilities and access points to the external network to ensure traffic is dispersed.

Design a block pattern to create a connected grid.

- Plan for spacing in TODs with block perimeters of no greater than 2,400 feet. This will ensure walkable blocks of 250 feet to 400 feet by 500 feet to 700 feet.
- Plan TOD streets to enhance the existing street network and provide public connections where street linkages are currently missing.

Avoid dead-ends, cul-de-sacs, and winding streets.

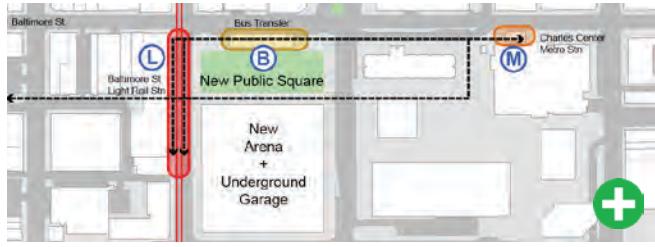
- Dead-ends, cul-de-sacs, and winding and circuitous streets should not be included in the TOD.
- TODs should not close or remove any existing street or path connections.

Locate bus stops as close as possible to rail stations.

- TOD developers should locate bus stops in coordination with MDOT MTA and the local transit provider.



When the Baltimore Arena Light RailLink Station on Howard Street (above) was redeveloped, pedestrian connectivity was preserved through the buildings as a non-motorized continuation of Redwood Street (below). Source: KAI



A new signalized crossing of US-40 will create a direct link between the Aberdeen MARC Train Station and downtown Aberdeen's Public Square. Source: KAI



Avoid the situation above: always provide adequate bus stops and well-maintained sidewalks. Source: pedbikeimages.org/Thomas

NETWORK CONNECTIVITY

BEST PRACTICES

Identify comfortable bicycle and scooter access routes from nearby destinations that accommodate all passengers.

- Consideration should be given to how passengers would access the station by bicycle or scooter from a number of area destinations. Routes should be as direct as possible, and never add more than 25% distance for a bike-friendly route.
- Only a small portion of people on bicycles or scooters will be comfortable riding with vehicular traffic along collector and arterial streets without dedicated facilities such as bike and scooter lanes or paths. Consider protected facilities that have the potential to attract a much wider spectrum of passengers and can significantly increase bicycle and scooter access to stations.

Build trail connections to attract passengers from further distances.

- Multiuse trails (off-street trails used by pedestrians and by people riding bicycles and scooters) can extend the reach of transit even further, particularly when connecting to an activity center just outside the station's reach or to development along a rail corridor.

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Provide ample high-quality bike and scooter parking.

- The most successful bicycle parking feels secure because it is easily visible from storefronts, and not isolated where theft would be more likely to go unobserved. Successful parking is also either covered by a canopy or utilizes the "inverted U" or other high-quality rack design. In narrow spaces within the pedestrian zone, consider converting an on-street parking stall into a shared use mobility corral—thereby keeping scooters off pedestrian paths.

Always design with pedestrian priority in mind.

- Pedestrian access (comfort, safety, and convenience) should represent the highest priority for the station and TOD.
- TOD should emphasize the tenets of great walkability: (1) short block length; (2) grid networks; (3) minimal building setbacks; (4) vibrant street frontage; and (5) wide sidewalks with frontage zones, travel zones, landscape zones, and buffer zones.

Design a network that encourages the tendency of pedestrians to linger in attractive environments.

- TODs that incorporate great public open spaces are more attractive to potential residents, customers, and business owners (see the public open spaces section for details).



In both high and low-density locations, attracting people on bikes and scooters requires intuitive bicycling routes that feel safe and have minimal obstacles and detours. Sometimes multiuse trails can supplement on-street facilities, especially in locations with higher traffic speed and volume. Source: Bikemore



Sidewalk bicycle parking (top) is more appropriate where sidewalk space is less constrained. When all sidewalk space is needed to accommodate pedestrians, consider a shared use mobility corral (below). Source: MDOT MTA and Jed Weeks



BEST PRACTICES

Avoid intermodal transfers that require crossing a street or crossing through a bus circulation roadway.

- Intermodal transfers should be as direct and efficient to make as possible. This involves keeping pedestrians on a relatively straight path, but it also involves avoiding interruptions to this path—both in terms of time and vehicle conflicts.

Use an industry-accepted index to measure TOD street connectivity.

- Two of the most common ways to measure connectivity in the United States are (1) a connectivity index expressed as a ratio of segments to nodes and (2) a density factor that measures the number of intersections per acre or per square mile. The second measure is used in this guidebook in determining TOD Place Types.

Consider street design that supports walkability along a corridor, as well as the “permeability” of the street for pedestrians to cross it.

- Consider “Complete Streets” principles.
- Avoid routing major walking routes between transit and TOD across multilane and high speed (35+ mph) roadways without enhanced consideration for pedestrian crossings.

Provide midblock crossings to improve walkability for pedestrian transit passengers.

- Long blocks should include signalized or yield-controlled pedestrian crossings where pedestrian demand exists (or will be created by the TOD).
- Rapid flash rectangular beacons, pedestrian-activated signals, raised crosswalks, and enhanced signs can improve conditions for pedestrians at unsignalized intersections.

Protect bicyclists from moving traffic.

- Bikeways that create an effective division from traffic and are well-coordinated with traffic signals and intersection design form the basis of an accessible bicycle network.
- Consult the latest industry standards on rapidly-changing guidelines related to protected bicycle lanes and cycletracks.



ADA-compliant ramps and paving emphasize priority for pedestrians around transit stations. Source: www.pedbikeimages.org/Gelline



This bus stop uses a curb extension to provide passenger waiting and bicycle parking space to avoid interfering with pedestrian movements. Source: www.pedbikeimages.org/Burden



Whenever possible, transit modes should be routed, and their stops situated, to minimize conflict with one another. The example above with a bus crossing multiple train tracks to access the train station should be avoided if it is possible to have the bus and train routes run parallel. Source: KAI

NETWORK CONNECTIVITY

BEST PRACTICES

Provide clarity and safety for people on bikes and scooters at intersections.

- Design intersections to reduce the incidence and severity of collisions.
- Design turn lanes, medians, and refuge islands to break down wide or complex intersections into smaller parts that can be crossed in phases.
- Use enhanced treatments, such as bike boxes or bike signals, green lanes, etc., where significant potential for conflict exists.

Consider providing a buffer between sidewalks and vehicles.

- A buffer between traffic and the sidewalk should be a minimum of three feet wide to ensure sufficient space for roadside posts/poles, street trees, and snow storage. Wider buffers are preferred, with street trees and parked vehicles enhancing the walking experience.

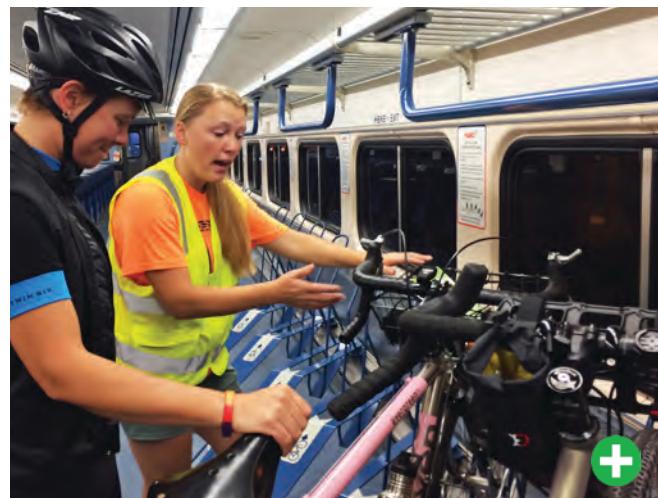
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In Portland, OR, waiting areas often include covered bicycle parking to facilitate bicycle-transit transfers. Source: KAI



The Portland Transit Mall provides a good example for connectivity between modes of transit. In the photo above, the standard city bus and an express bus are visible; they integrate with a light rail corridor in the background. Prominent maps and covered waiting areas are available for both bus and light rail passengers. Source: KAI



MARC Train has provided bicycle storage on Penn Line trains to facilitate bicycle-transit trips. Source: MDOT MTA

ADDITIONAL RESOURCES

Urban Street Design Guide (NACTO)

NACTO (National Association of City Transportation Officials) developed a guidebook that focuses on best practice design approaches to city streets and public open spaces in an urban context. The guidebook emphasizes tenets that support walkability and multimodal mobility, and recognizes that city streets require a tailored approach that is different from non-urban facilities.

Urban Bikeway Design Guide (NACTO)

This guidebook provides guidance on state-of-the-art practices for accommodating bicyclists on urban streets.

Designing Walkable Urban Thoroughfares: A Context Sensitive Approach (ITE/CNU)

Endorsed by FHWA and developed jointly by the Congress for New Urbanism (CNU) and the Institute for Transportation Engineers (ITE), this guidebook focuses on context-based street design, as opposed to the conventional functional classification-driven street design.

Guide for Geometric Design for Transit Facilities

This guide provides summary of current practice in the design of transit facilities on streets and highways, based on a review of relevant AASHTO, TRB, and ITE documents, as well as design reports provided by various transit agencies.

Accessibility Policy and Guidelines for Pedestrian Facilities Along State Highways (MDOT SHA)

This policy and guidance provides direction to accommodate persons with disabilities, a routine and integral element of planning, design, construction, operations, and maintenance activities for all MDOT SHA projects.

Complete Streets, Complete Networks: A Manual for the Design of Active Transportation (Chicago, IL)

A design process for Chicago's Active Transportation Policy, this manual includes comprehensive guidance for all elements of street network design.

TCRP Report 153: Guidelines for Providing Access to Public Transportation Stations

Chapter 7 focuses on pedestrian access to transit stations, including factors affecting walking access and design principles. Chapter 8 focuses on bicycle access to transit stations, including factors affecting bicycle access and design principles.

Transit Agency Security and Emergency Management Protective Measures (FTA)

Under the MAP-21 federal transportation authorization legislation, FTA is able to establish basic safety standards for service and station facilities.

Bicycle Policy and Design Guidelines (MDOT SHA)

This policy and guidance provides direction to transportation planners and engineers for accommodations that improve bicycling in Maryland.

ADA Regulations (FTA)

FTA guidance on ADA regulations that are applicable at the local level.

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SUMMARY OF NETWORK CONNECTIVITY GUIDANCE

At the Transit Station

Station Site Context

Must-Haves	At the Transit Station	Station Site Context
Desirable	<ul style="list-style-type: none">Internal parking lanes and drive aisles that line up with neighborhood streetsDedicated bicycle and scooter facilities leading to platforms and/or parkingCovered walkways and high-quality walkway treatments to increase visibility and aestheticsKeep connecting distances between modes to no more than 500 feet	<ul style="list-style-type: none">High-quality shared use facilities, such as buffered lanes and cycletracks, where traffic conditions warrantCurb extensions at bus stops to provide passenger waiting areasHigh-activity land uses as close to the station as possible
Avoid	<ul style="list-style-type: none">Long blocks or infrequent network intersections around the stationPedestrian paths through parking lotsHigh-speed auto movements such as channelized right turns at intersections	<ul style="list-style-type: none">Cul-de-sacs, dead-ends, and winding streetsHigh-speed roads and long traffic signal cyclesIntermodal connections that require crossing streets or the bus circulation roadwayDirecting bicycles through complex auto or bus circulation areas



PARKING FOR ALL MODES

The table on the facing page shows how parking layout can effectively work in the different TOD Place Types. Succeeding pages discuss long and short-term parking based on (1) bicycle parking and bicycle sharing, (2) parking areas and ridesharing, and (3) bus layover areas.

BICYCLE, VEHICULAR, AND BUS PARKING IN VARIOUS STATION TYPES

TOD Place Type	PARKING AND BUS LAYOVER AREA ELEMENTS
DOWNTOWN	<ul style="list-style-type: none">• No dedicated station automobile parking will be provided. Parking is a shared resource in the downtown setting.• Layover and parking areas for local transit, bicycles, scooters, and carsharing should be incorporated into the station. These dedicated parking spaces can also function as a shared resource for the downtown area.• Any parking provided should be structured.
URBAN NEIGHBORHOOD	<ul style="list-style-type: none">• Any dedicated automobile parking should serve only the station and should include kiss-and-ride, carshare, scooter, and bicycle parking.• If small park-and-ride lots are provided, these should be developed in the character and scale of the existing neighborhood.
TOWN, SUBURBAN, OR EMPLOYMENT CENTER	<ul style="list-style-type: none">• Dedicated parking for the transit station will include carsharing, bicycle parking, and dedicated park-and-ride spaces. Kiss-and-ride will also be included.• TOD should consider sharing and jointly developing park-and-ride lots.• Park-and-ride lots should be designed to allow future infill development by being incorporated into structures where feasible.
VILLAGE CENTER OR RURAL TOWN	<ul style="list-style-type: none">• Structured parking facilities should be designed to respect the character and scale of the Village Center or Rural Town.• Dedicated parking for the transit station will include carsharing, bicycle parking, and dedicated park-and-ride spaces. Kiss-and-ride will also be included.• TOD should consider sharing and jointly developing park-and-ride lots.• Park-and-ride lots should be designed to allow future infill development.• Larger park-and-ride facilities are typical at commuter and end-of-line stations.

BICYCLE PARKING AND SHARED USE MOBILITY

Bicycle facilities should be provided and located close to primary station entrances or well-integrated into other parts of a TOD area. They should be covered and secured where possible.

Bicycle Parking

While bicycle parking should be distributed throughout a TOD area, this section primarily considers bicycle parking for passengers using bicycles to access transit. These bicyclists are often commuters who will be leaving their bicycle unattended for extended periods of time. Thus, many of these recommendations focus on making their bicycle parking safe and secure, and protecting bicycles from the weather.

Providing adequate bicycle parking can be essential to expanding a station's reach and the number of people who can access the transit and the TOD, without having to devote as much space to automobile parking.

Shared Use Mobility

Shared use mobility, such as bikesharing and scootersharing, may be considered in activity centers. Provision of space for bikesharing and scootersharing will be evaluated on a case-by-case basis. Shared use mobility programs are operated by private entities who study usage patterns and market demand and make decisions for locating stations on this basis.

The siting of bikesharing stations must therefore be a cooperative effort between TOD developers, transit officials, and the operators of the bikesharing system. For dockless systems, shared use mobility corrals can help encourage passengers to park the vehicles out of the way of pedestrians.

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ADDITIONAL RESOURCES

San Francisco's Bay Area Rapid Transit (BART)

BART has separate policy guidelines to accommodate bicycles at stations, some of which are recommended here.

Portland's Tri-County Metropolitan Transportation (TriMet)

TriMet provides four main bicycle parking options to commuters. These include secure and enclosed parking with keycard access, e-lockers with keycard access, regular lockers for rent, and bike racks.

BEST PRACTICES

Select bicycle parking products that protect bicycles from theft and easy damage.

- Provide parking areas that include rack types that allow bicycle frames to rest against the rack in more than one location (which helps the bicycle to remain balanced) and that do not force a cyclist to secure a bicycle solely by one of the wheels. Inverted "U" racks with 2" O.D. square tubing are often the best solution for reducing vandalism and theft.
- Provide capacity for at least four bicycles at each station or transit center, with additional capacity recommended for busier stations such that bicycle capacity is approximately 2% of average AM peak ridership.

Provide shelter or cover over bicycle parking areas wherever practical.

- Bicycle storage should not expose bicycles to rain, wind, or strong sun for long periods of time.
- TOD-provided bicycle parking should be covered, secure, and well-lit.

Dock or station-based sharing facilities should not require difficult pedestrian paths.

- Washington's Capital Bikeshare and other systems around the United States and Canada with stations in the public right-of-way typically situate them in curbside parking spaces and along facing sidewalks. This is a useful way for bikeshare operators to circumnavigate the many different arrangements that would be needed to use private properties, but it does limit where stations can be located.
- In transit stations, this may mean the main transit facility and the bikesharing location are separated. Carefully consider the pedestrian path that connects the bikeshare station and the transit station.



Bike parking under the elevated rail at the MacArthur BART Station in Oakland, CA is covered, close to the station platform, and observable by staff and passengers alike — so it is well used! Source: KAI



The bicycle parking at Penn Station includes multiple types of bicycle racks and canopies to give commuting cyclists choices at the station. Source: KAI



Example of a solar-powered payment kiosk at a bikeshare station. Source: KAI



This bikeshare location is close to a transit station headhouse and the surrounding development. The location also does not block pedestrian passage. Source: KAI

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Mondawmin Metro SubwayLink Station has bike lockers. These provide a single or double, secure, covered bicycle parking spot. Source: MDOT MTA

SUMMARY OF BICYCLE PARKING AND SHARED USE MOBILITY GUIDANCE

	At the Transit Station	Station Site Context
Must-Haves	<ul style="list-style-type: none"> Adequate bicycle parking that is safe and secure Bicycle parking hardware that is durable Shared use mobility corrals for bikes and scooters 	<ul style="list-style-type: none"> Bike and scooter routes and shared use lanes on necessary streets to create a network of shared use mobility access
Desirable	<ul style="list-style-type: none"> Shelters and canopies for bicycle parking facilities Place bicycle parking in sight of the station manager Shared use mobility programs can enhance the overall TOD experience by allowing visitors without their own bicycles to explore a new area 	<ul style="list-style-type: none"> Encourage commercial and apartment properties to accommodate people on bikes and scooters by providing parking areas and safe places to lock bicycles
Avoid	<ul style="list-style-type: none"> Creating conflicts with pedestrians, especially on ADA ramps and near entrances to transit operation facilities 	<ul style="list-style-type: none"> Barriers within the TOD site such as roadways or intersections that are too large to navigate for the typical bike or scooter

VEHICULAR PARKING AREAS AND RIDESHARING

Parking near stations meets the demand of non-station uses, including adjacent TOD and nearby neighborhood needs. Understanding how parking can be shared and optimized is crucial to successful TOD.

Surface Parking

Surface parking at a TOD is discouraged. It takes the lowest priority. When possible, paths from the parking areas to the station entrance should be made as clear and direct as possible.

On-Street Parking

The presence of on-street parking serves to enhance the pedestrian environment by providing a buffer between pedestrians and traffic while also providing convenient access to adjacent businesses. The coming-and-going facilitated by the parking helps contribute to the sense of vibrancy of the place, in addition to the physical protection for pedestrians and traffic calming impacts.

On-street parking can also create a buffer for a shared use mobility lane or cycletrack. These separated facilities are extremely attractive for people on bikes or scooters, and if they are well-connected to a larger network they are typically more heavily used than standard painted lanes.

Structured Parking

Garages have the potential to increase the station's reach by allowing larger numbers of automobile commuters to conveniently access the station. However, because of their typical large massing, they can disrupt the traffic and pedestrian flow within the TOD if they are not properly located.

Emerging practice in TOD planning and design calls for parking structures that can serve both the station and the other land uses within the station area. This allows the cost of providing a parking structure to be distributed among a variety of customers and owners, and it allows for public-private partnership opportunities in TOD implementation.

Parking garages that have some level of financial involvement from MDOT MTA shall be constructed according to the standardized systemwide facilities guide for parking structures.

Kiss-and-Ride

Passenger drop-offs and pick-ups, commonly referred to as "kiss-and-ride" facilities, are commonplace at some stations that feature onsite parking and emphasize automobile access. These spaces can be used by passengers being dropped off/picked up at stations by private vehicles, shuttles, carpools, ridesharing services, and taxis. They fill the gap between the many origins outside a walkable or transit-served area and a passenger's preference not to drive.

Ridesharing

Ridesharing, when combined with kiss-and-ride access, can help passengers outside the vicinity of the TOD reach the station for a part of their daily commute. Reserved parking should be provided for passengers in carpools and vanpools and located within parking facilities that prioritize these passengers.

Carsharing and ridesharing services (e.g. Zipcar, car2go, Uber, Lyft) are relatively new options in urban mobility, and there is not yet an industry standard regarding how many vehicles are desirable at a given location. The operators of these services are private companies or individuals and they make (and continually revisit) decisions on vehicle supply at a given location based on the amount of vehicle use, the patterns and duration of uses, and the types of vehicles needed.



This public art installation on a parking garage in Charlotte, NC sways in the wind, makes noise, and draws attention (note the catenary wires from the light rail below). Source: KAI

BEST PRACTICES

Surface parking is an “interim” land use.

- Avoid surface parking if possible. Surface parking is one of the most disruptive elements to the pedestrian environment and experience.
- Situate and build TOD buildings and parking lots such that they can later accommodate infill development once some of the current surface parking is consolidated within parking structures and the demand for surface parking decreases.
- No primary walking streets approaching the station through the TOD should be fronted with surface parking.

Design parking for the urban block.

- Where larger areas of surface parking exist, introduce a street and block pattern within parking lots to enhance pedestrian access and introduce sidewalks and streetscaping treatments.
- Establish maximum curb cut widths for driveways and parking facility entrances to minimize interruptions to the sidewalk. Minimize the impacts to the pedestrian realm and create more consistent walking paths.

A series of smaller parking lots are more effective than one large lot.

- Locate these lots to the sides and rear of buildings, and separate them with landscaped walkways.
- Provide shaded walkways to the station where possible.

Minimize the visual impact of parking.

- Integrate landscape buffers and stormwater management within parking lots.
- Screen at-grade parking lots along the street with landscaping or architectural elements to reduce visual impact.

Provide lighting and security for parking facilities.

- Parking lots and garages must be well-lit and equipped with security and surveillance systems for MDOT MTA and other responsible agencies to monitor and respond to service needs. Refer to MDOT MTA’s standards on security for details on surveillance equipment.



Surface parking concentrated in the interior of blocks can be infilled with additional development later. Source: Galina Tachieva/DPZ



This parking lot has long bays of parking and little landscaping, sidewalks, or pedestrian-scale lighting. Parking areas like this feel unsafe and tend to discourage transit passengers. Source: KAI



This parking lot utilizes code-required landscaping for bioswales and other innovative stormwater collection mechanisms while also providing a central sidewalk with signage and wayfinding. Source: SvR Design

VEHICULAR PARKING AREAS AND RIDESHARING

BEST PRACTICES

Long-term parking can be situated near but not immediately adjacent to the station.

- Since long-term parking (including park-and-ride) does not need to be accessed by pedestrians frequently, a longer walk from parking to transit is acceptable, especially if it allows for other land uses closer to the station area.
- Safe, attractive, and comfortable pedestrian walkways should still be provided from these locations to the station.

Provide on-street parking on primary retail streets.

- On-street parking can be important to retailers and can serve as a buffer between pedestrians and traffic, contributing to an active and vibrant street environment.
- Where appropriate, on non-retail streets evaluate the tradeoffs between providing on-street parking that could otherwise be used for additional restaurant seating, shared use parking, landscaping, and/or stormwater management.

Price parking at market rates.

- To be most effective, on-street parking should turn over frequently and be available as vehicles arrive.
- Pricing, variable throughout the day, helps control the supply and demand so parking can support both short-term and long-term customer use. Pricing controls will also manage spillover parking effects from the station.
- Market-based on-street parking pricing will ensure vacancy for drivers and other visitors to the area.
- MDOT MTA may consider paid commuter parking on a case-by-case basis.

Do not isolate the station when placing garages.

- Garages intended primarily for commuters should be located near station entrances to create a more efficient process to reach the platform, however, station visibility from afar is important.
- Garages should not be situated to obstruct views of the station; they require clear and direct paths to the station from other parts of the TOD and/or station area.

Distribute parking traffic across the street network.

- Orient parking garage vehicular access points toward side streets, alleys, and “B” streets to reduce the potential for conflict with the pedestrians on busy “A” streets.



Wrapped structured parking provides transit-oriented housing not far from the Johns Hopkins Hospital Metro SubwayLink Station. Source: MDOT MTA



Structured parking above retail in Harbor East creates a more active street presence. Source: MDOT MTA

Provide separate entrances and exits depending on the uses being served.

- The most effective way to serve multiple customers of a garage is to divide it into zones that allow parking for station passengers to be completely separated from parking for TOD customers.

Avoid the “blank wall” parking garage.

- Along primary pedestrian paths, consider incorporating active ground floor uses into the garage and/or incorporating architectural details, windows, and public art.

Consult MDOT MTA on structured parking standards.

- MDOT MTA has developed standards for structured parking garages and requires that these standards be used in the following instances: when a garage is to be built by MDOT MTA, when a garage is to be built by a developer and turned over to MDOT MTA, and when there is any MDOT MTA financial commitment other than leasing.

BEST PRACTICES

Place kiss-and-ride lanes close to station entrances.

- Kiss-and-ride parking and loading areas are used for short-term circulation in surface lots or garages, so close proximity is critical. However, this should not interfere with local bus or transit circulation.
- Differentiate kiss-and-ride from other parking with signs that clearly mark these spaces. Designate time limits for parking. This will encourage faster turnover of kiss-and-ride spaces.
- The design of kiss-and-ride facilities should emphasize circulation and facilitate smooth entry and exit. Cars leaving kiss-and-ride lanes should not substantially impede other vehicles trying to enter or exit.

Utilize advanced parking management technologies.

- Complementary land uses that have periods of peak use different from the transit station are ideal shared use parking partners. This will require more advanced parking management to ensure that critical amounts of parking are available for both the station's needs and those of the TOD.
- Employ ITS (Intelligent Transportation Systems) when managing parking use and pricing.

Use priority parking to encourage different access modes.

- Once vehicle parking is at a premium for a transit station, providing and prioritizing different kinds of parking can incentivize types of driving that allow more transit passengers to access the station and the TOD, such as carpools and vanpools. Priority parking can also incentivize types of vehicles such as electric cars, if that is a goal of the locality.
- Providing carsharing customers with priority parking at their destination makes using carsharing easier and more practical.



Kiss-and-ride allows more passengers to access transit, per unit of space, than parking. It should be given a higher priority as an access mode to the transit station. The placement of the kiss-and-ride lane closer to the station entrance than the parking reflects this prioritization. Source: MDOT MTA



A parking stall is reserved for electric vehicle charging. Source: KAI



Prime parking spaces adjacent to the Gaithersburg MARC Train Station are both free and not restricted to special passengers. Source: KAI

VEHICULAR PARKING AREAS AND RIDESHARING

ADDITIONAL RESOURCES

Systemwide Facility Design Guide (MDOT MTA)

This guide is intended as a tool for the design and maintenance of parking structures located adjacent to, or remote from, transit stations operated by MDOT MTA. The information in the guide is gathered from parking industry associations and hands-on experiences unique to MDOT MTA facilities procurement, design, operation, and maintenance of parking structures.

Station Site and Access Planning Manual (SSAPM) (WMATA)

The SSAPM provides design guidelines for station site and access planning, for use by WMATA, local government agencies, and WMATA Joint Development Partners with interest in planning transit facilities at both new and existing Metrorail stations, or in proposing development at stations. Parking is addressed in Section 3.9.

Parking Management Guide (VTPI)

Published by the Victoria Transport Policy Institute, the guide reviews policies and programs to more efficiently use parking resources.

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SUMMARY OF VEHICULAR PARKING AREAS AND RIDESHARING GUIDANCE

	At the Transit Station	Station Site Context
Must-Haves	<ul style="list-style-type: none">When provided, garages must meet agreed-upon levels for parking replacement for existing station facilities and must follow MDOT MTA design and construction standardsProvide designated spaces for drivers with disabilities in accordance with ADA requirements	<ul style="list-style-type: none">Parking demand from TOD development should be met to avoid undue neighborhood spilloverComfortable street and path network connections between the shared use mobility locations at the station and within the more extended TOD area
Desirable	<ul style="list-style-type: none">Multiple garage entrance and exit points at different points along the station area street network to minimize traffic congestion issues related to station accessPlacement of kiss-and-ride spaces should be within 800 feet of the primary station entranceShared use mobility locations in prominent, attractive areas situated near the station, retail, and/or pedestrian amenities	<ul style="list-style-type: none">On-street parking in front of retail and restaurant uses at the TODWayfinding to the transit station from within the garage to make connections to the station as simple and intuitive as possibleConsider opportunities to share parking between the transit station and TOD, with the provision of spaces for special passengers situated closer to both the station and TOD
Avoid	<ul style="list-style-type: none">Unmarked kiss-and-ride spaces that may be misused for long-term parkingGarages with single exit/entry points	<ul style="list-style-type: none">Too much surface parking, especially along primary pedestrian routesUsing on-street parking as a substitute for actual station parkingPlacement of garages that block views of the station

BUS LAYOVER AREAS

Bus Layover Areas

Buses laying over between trips, commonly for driver breaks and the scheduled waits at terminal stops, need a place to wait outside the flow of moving transit vehicles where they can still respond to service needs quickly and safely.

There are two principal types of layover spaces that may be included in station areas: (1) a basic non-revenue layover that is typically scheduled between trips or that occurs when drivers need to take short breaks, and (2) a “contingency” layover associated with minor schedule delays from connecting transit.

The latter may occur when buses beginning their route at a rail station choose to wait for a late-running train or when early buses arrive before an on-time train has arrived. Buses on scheduled layovers should be given space near the circulating area but they are not expected to use a regular bus bay for passenger boarding and alighting.



The West Baltimore Transfer Center adequately separates bus routes and provides a direct pedestrian connection to the MARC Train station. Source: MDOT MTA Concept

BEST PRACTICES

Provide bus layover areas away from station entrances.

- Idling buses create an uninviting pedestrian environment.

Identify suitable space for layovers early in the design process.

- Space for bus layovers should be identified early in station area planning to permit the station to serve as an effective place for bus schedule adherence and operator breaks.

Provide efficient bus circulation into the passenger pickup area from the separate layover.

- Ensure efficiency of bus circulation and pedestrian movements.



This bus layover facility in Kalamazoo, MI, has the buses “plug in” to a center promenade that facilitates pedestrian access to the station. Source: KAI

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SUMMARY OF BUS LAYOVER AREAS GUIDANCE

	At the Transit Station	Station Site Context
Must-Haves	<ul style="list-style-type: none">• Layover areas that allows waiting buses to move from bus bays at busy stations• Consistent signage throughout the transit system displaying important aspects of service and schedule	<ul style="list-style-type: none">• Direct routing to/from the station
Desirable	<ul style="list-style-type: none">• Layover areas screened from direct visibility of pedestrian gathering and waiting areas	<ul style="list-style-type: none">• Use of lighting, architecture, and surface finishes for prominent layover area visibility• Clear signs that direct TOD visitors to the primary transit operations and nearby auxiliary facilities
Avoid	<ul style="list-style-type: none">• Layover areas immediately adjacent to primary pedestrian gathering areas or entrances to stations or TOD buildings	<ul style="list-style-type: none">• Expansive bus layover areas limiting the feasibility of effective TOD



WAYFINDING

The table on the facing page shows different ways that signage and wayfinding are coordinated with the TOD and station at the different TOD Place Types.

WAYFINDING IN VARIOUS STATION TYPES

TOD Place Type	WAYFINDING ELEMENTS
DOWNTOWN 	<ul style="list-style-type: none">• Clear and legible signage internal to the station giving adequate direction for each transit line as well as clear direction to access the various station environs.• Signage to the station should be oriented to pedestrians and to people on bikes and scooters.• Coordinated signage with local municipalities clearly directing to station locations within a 1/4 mile radius.• Coordinated signage for transit passengers exiting the station to local area designations.
URBAN NEIGHBORHOOD 	<ul style="list-style-type: none">• Coordinated signage with local municipalities clearly directing to station locations within a 1/2 mile radius.• Signage to the station should be oriented to pedestrians, people on bikes and scooters, and automobiles.• Coordinated signage for transit passengers exiting the station to local area designations.
TOWN, SUBURBAN, OR EMPLOYMENT CENTER 	<ul style="list-style-type: none">• Station signage should begin occurring within 1 to 2 miles of the station and should include signage directing passengers from major arterials and highways.• Signage should be oriented to pedestrians within 1/2 mile, and within 1 to 2 miles for people on bikes and scooters, and automobiles.• Coordinated signage for transit passengers exiting the station to local area designations.
VILLAGE CENTER OR RURAL TOWN 	<ul style="list-style-type: none">• Station signage should begin occurring within 3 to 5 miles of the station and should include signage directing passengers from major arterials and highways.• Signage should be oriented to pedestrians within 1/2 mile, and within 1 to 2 miles for people on bikes and scooters, and automobiles.• Coordinated signage for transit passengers exiting the station to local area designations.

WAYFINDING

Effective wayfinding at a transit station can be an element that ties the station to the rest of the TOD.

Successful wayfinding strategies utilize and integrate signs, spatial planning, lighting, architecture, and surface finishes to create a coherent and legible public realm. Comprehensive planning emphasizes minimalist principles targeted at the most effective locations to avoid overwhelming the public landscape.

Wayfinding routes should direct pedestrians along the shortest, most convenient paths and minimize conflicts with other modes. Area maps should be used to help pedestrians quickly and easily orient themselves to likely destinations. Where possible, maintain openness and visibility of pedestrian routes to enhance security and comfort, and maintain visibility of prominent station features to support pedestrian orientation.

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Clearly and concisely conveying information is essential for transit passengers to be able to effectively use transit and orient themselves in relation to the nearby TOD. Visual communication aides such as maps should supplement written signs and schedules.

Wayfinding should incorporate directional arrows, information on walls or floors, and audio/tactile information for visually impaired passengers.



Wayfinding signs direct passengers to primary station facilities.
Source: MDOT MTA Concept

BEST PRACTICES

Provide wayfinding for all transit access modes.

- Wayfinding should be designed and placed with the needs of pedestrians, people on bikes and scooters, drivers, and connecting transit passengers all carefully considered.
- Signs directing people to bike and scooter amenities, for example, should be placed near the most heavily used routes at an appropriate height for people on bikes and scooters to easily see.

Design wayfinding to be accessible.

- The standard approach is to provide backlit sign fixtures, which require electrical conduits in the portions of the station and station area where signs are located.
- Provision of detectable warnings along platform edges is a crucial safety precaution for visually impaired transit passengers, and tactile signs and audible information help supply them and others with important service information.
- Design legible wayfinding signs. Typefaces should be large and simple enough to be legible from a distance and signs should not be obscured by other signs or equipment.

Wayfinding measures should be held consistent throughout the extents of the transit service.

- While each station will have some context-specific features, in general, wayfinding practices should be very similar throughout a transit provider's service area.

Ensure wayfinding design and location are distinct from advertising.

- While advertising is a valuable revenue source for transit agencies, it is important to keep critical information that is part of a wayfinding system distinct from advertising signage to avoid passenger confusion.

Follow Manual of Uniform Traffic Control Devices (MUTCD) standards and local codes and policies.

- The MUTCD provides standards for wayfinding signage, but local codes and policies may require additional standards.

BEST PRACTICES

Wayfinding is best combined with other safety-enhancing design features.

- Lampposts, call boxes, kiosks, and other station design features that help promote safety at the station can also be natural anchors for wayfinding materials.

Avoid sign clutter.

- Plan the placement of informational signs so that the most relevant are most visible at any given location in or around the station.

Signs are important but should not be relied upon for all wayfinding.

- Wayfinding is often thought to consist primarily of signs and message boards, but use of open ceilings, glass, and other ways of increasing visibility can help passengers quickly orient themselves in the station. In addition, color coding through the construction materials used (such as furniture, wall panels, and wall and floor tiles) can help guide passengers through a station without text-based signs.

Dynamic LED or other electronic signs can be appropriate for some settings.

- Transit stations where different services often use the same platforms or bays can use programmable signs to make sure wayfinding is accurate to direct passengers to their service's current location.

Place wayfinding signs within sidewalk furnishing zones and emphasize direct paths.

- To minimize disruption of pedestrian movements, place signs and maps just outside of direct circulation areas.
- Design routes from multiple access points to provide safe and direct ingress and egress.

Provide quick and easy passenger orientation.

- Include simple proximity maps at all stations with consistent systemwide branding.



Local area maps help orient passengers accessing or leaving the station.
Source: MDOT MTA Concept



Point of interest wayfinding can be integrated into transit structures so the two become thoroughly linked in the passenger's mind. Source: MDOT MTA Concept



This sign at the new Camden MARC Train Station effectively indicates the location and direction of nearby destinations and transit amenities, and has distinctive branding. Source: MDOT MTA Concept

WAYFINDING



Detectable warning strips are used to alert passengers of a track crossing. Source: KAI



An example of a crosswalk that uses pavement textures to indicate change and create an easy-to-follow path. Source: KAI

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ADDITIONAL RESOURCES

Transit-Oriented Communities Design Guidelines (TransLink)

TransLink in Vancouver developed these guidelines to promote development of transit-oriented places around its stations. It offers guidance both on wayfinding in station facilities and in the larger station environment.

Maryland MUTCD

The MdMUTCD provides clear direction on all traffic control devices (signals, signage, and pavement markings) to be installed on any state roadway, highway, or bikeway.

Signage Standards Manual (WMATA)

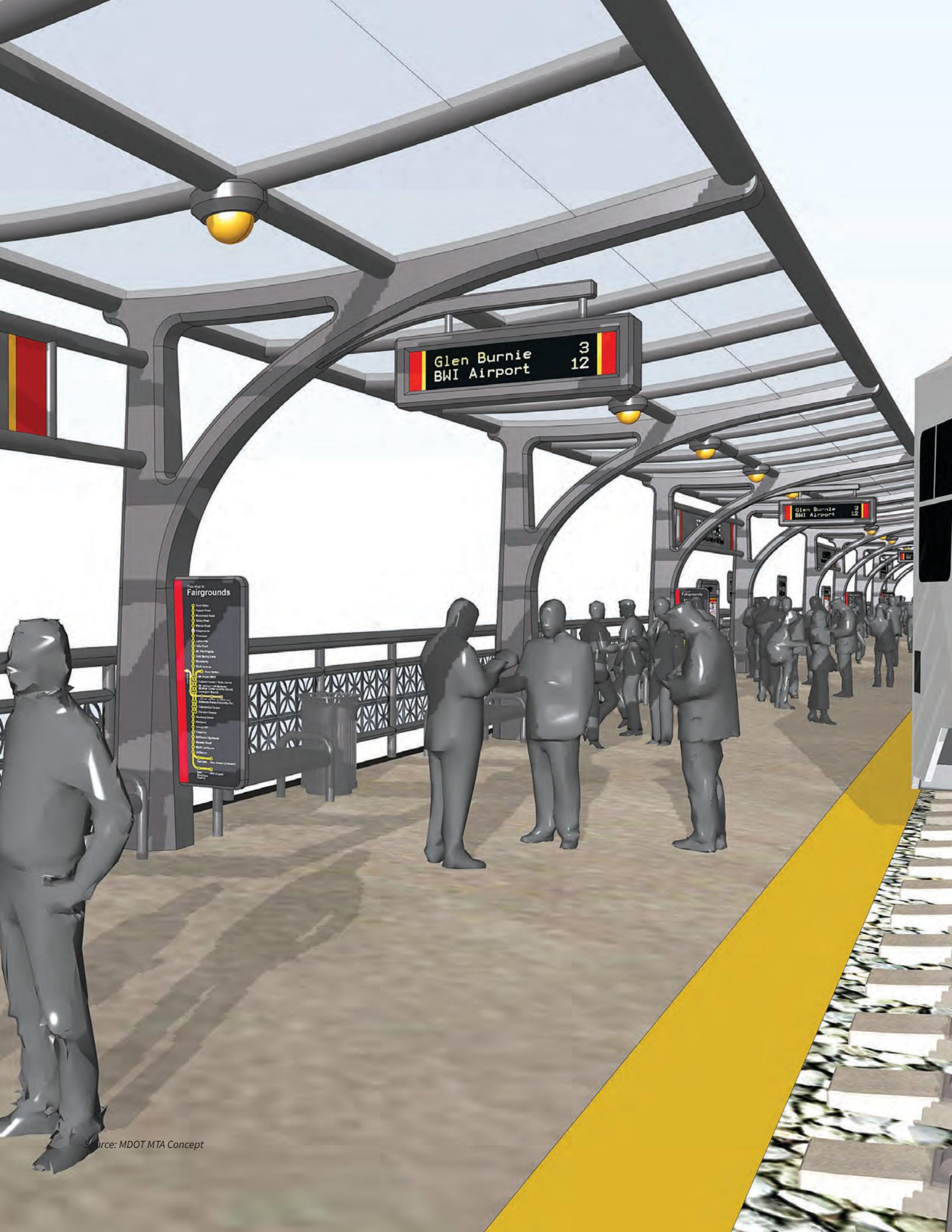
This document provides guidance for station signs at WMATA Stations.

MDOT MTA Wayfinding Recommendations and Templates

MDOT MTA's Office of Planning has prepared numerous recommendations and templates for wayfinding at bus transfer centers and at Metro SubwayLink, Light RailLink, and MARC Train stations, and these recommendations should guide the creation of wayfinding for future stations and TOD projects.

SUMMARY OF WAYFINDING GUIDANCE

	At the Transit Station	Station Site Context
Must-Haves	<ul style="list-style-type: none">Consistent signage throughout the transit system displaying important aspects of service and scheduleKiss-and-ride signs should clearly differentiate from bus circulation or other parking	<ul style="list-style-type: none">Directional signs leading to the station from primary originsDirect routing to/from the station
Desirable	<ul style="list-style-type: none">Dynamic LED and other electronic signage that can provide variable transit and other information	<ul style="list-style-type: none">Use of lighting, architecture, and textured surfaces to support wayfindingClear signs that direct TOD visitors to the primary transit operations and nearby auxiliary facilities
Avoid	<ul style="list-style-type: none">Only using signs for directional guidance	<ul style="list-style-type: none">Sign clutter; circuitous or isolated routesInformational signs that are obscured by utilities or plantings, or look like advertising



Source: MDOT MTA Concept



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