WASHINGTON METROPOLITAN AREA TRANSIT AUTHORITY

STATION SITE AND ACCESS PLANNING MANUAL

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STATION SITE AND ACCESS PLANNING MANUAL

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1 INTRODUCTION

The purpose of the Station Site and Access Planning Manual is to provide clear, concise design guidelines for station site and access planning, for use by WMATA, local jurisdictional planners, related 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. The primary objective of the Manual is to illustrate how station site facilities should be planned to optimize pedestrian and vehicular access to the station for all modes of arrival, with focus on physical design and operational issues.

These guidelines are not meant to definitively define the range of possible solutions to meeting WMATA's transit access needs. Indeed, WMATA welcomes creative approaches to meeting the competing needs of each access mode in the context of each transit station's unique setting and characteristics, as these station areas exist today and as they evolve over time. To support WMATA's station access needs, these guidelines are intended to illustrate key transit access principles, approaches, and parameters in enough detail to support effective station access planning and with enough flexibility to allow individualized solutions at each station and to accommodate the evolution of a station from one typology to another (i.e., terminus to mid-line to urban). However, it is imperative that any design solution meets WMATA's transit access needs and criteria for effective transit operations.

This planning document is focused on station site facilities located on WMATA-owned property. However, the master plans for any new station, Joint Development, or improvements to existing station facilities should be closely coordinated with the jurisdictional and state authorities, per the requirements of the Master Agreement between WMATA and the jurisdiction, to assure that access to the station and the functionality of the local transportation system is maintained.

The Manual is meant to be a living document that may evolve much like WMATA station areas. Where areas of ambiguity may exist in these guidelines, WMATA will work to further update and refine the Manual as needed. It should be noted that WMATA supports an ongoing station access planning program, and that the Manual will inform each of these access planning studies, and that each of these individual studies is expected to yield lessons learned that will contribute to the refinement of the Manual.

This chapter outlines the purpose of the Manual, identifies access needs, defines the role of access in site and station planning, presents the overall access hierarchy, and discusses other regulations and controls involved in the planning, design, and construction of WMATA site facilities. In Chapter 2 the specific recommendations and guidelines for each mode are presented, organized by the access hierarchy. Chapter 3, which focuses on WMATA's Joint Development program, provides the framework for addressing context-sensitive design and the trade-offs that must be addressed during the planning process. Perhaps the most critical point this Chapter makes is that to create well designed station areas that meet land use and transit goals, each viewpoint and its related goals, objectives and criteria, must be addressed and issues resolved at the earliest stages of the planning process. Finally, Chapter 4 presents design guidelines and information on landscaping, wayfinding, and security.

The WMATA Station Site and Access Planning Manual was developed with a task force consisting of WMATA architects, engineers, operations planners, and consultants. The first task of the process began with an extensive review and evaluation of existing WMATA Standards and Criteria (listed in Section 1.5) that are relevant to station site and access planning in addition to WMATA's Joint Development Policies and Guidelines. Literature related to transit access planning and transit-oriented development, listed in Appendix A, was also reviewed. The second task included a best practice review and evaluation of existing station access planning guidelines and staff interviews of other transit agencies including; Bay Area Rapid Transit (BART), Dallas Area Rapid Transit (DART), Tri-County Metropolitan Transportation District of Oregon (Tri-Met), Metropolitan Atlanta Rapid Transit Authority (MARTA), Miami-Dade Transit (MDT), and New Jersey Transit (NJ Transit). The lessons learned from each task were used to expand upon WMATA's existing design criteria for station site and access planning in coordination with the "institutional knowledge" from WMATA's task force that included, among other things: requirements for pedestrian and vehicular access; traffic procedures; and transit operational requirements.

1.1 ACCESS NEEDS

In March 1999, the WMATA Board of Directors adopted the Transit Service Expansion Plan, which commits Metro to increasing system capacity to meet future growth in ridership. Projections for population and job growth in the Washington metropolitan region over the next quarter century point to the crucial need for expanded public transportation to sustain the region's mobility, economic vitality, and quality of life.

The Transit Service Expansion Plan calls for:

- Improving access to and capacity of the Metrorail system;
- Improving bus service levels and expanding bus service areas;
- Selectively adding Metrorail stations, entrances and station capacity at existing stations and along extensions of the Metrorail system;
- Providing more Metrobus service to under-served areas and expansion into new areas.

Steady growth in the region, particularly around Metrorail stations, has generated increased transit ridership, but has also led to more vehicle traffic in station areas. As a result, the different modes of access often come into conflict in station areas. WMATA and local jurisdictional planners have recognized that many existing Metrorail stations, designed twenty to thirty years ago, need an assessment to determine if existing conditions for pedestrian access, bus operations, and vehicular traffic are adequate to meet existing capacity and future demand. WMATA has conducted studies that identify deficiencies at selected Metrorail stations that may include pedestrian/vehicle conflicts, capacity constraints, and multi-modal connectivity. These studies present recommendations for facility improvements for station access.

Improving access to and from Metro is critical to meeting ridership goals and serving customer needs. Potential riders may be lost or choose other means of travel if any of the following conditions exist:

- Pedestrian paths are indirect and fragmented;
- High traffic volumes and traffic conflicts exist in and around the station;
- Bus service is unavailable due to a lack of bus bays and storage space;
- Pick-up/drop-off space is inconvenient or limited and access is not provided for shuttle buses;
- Short-term and long-term parking are full or unavailable.

Potential riders may also be lost if access constraints mean that the door-to-door journey involving Metro becomes more expensive, time consuming, unreliable or frustrating than an alternative means of travel, such as driving. Ultimately, the goal of improving station access is to better serve existing customers while attracting additional customers by:

- Enhancing the pedestrian experience with a safer and more attractive walking environment;
- Maintaining a good level of service for transit access to the site for buses and other transit vehicles;
- Accommodating future access needs, which include vehicular traffic growth;
- Making transit use more convenient and attractive.

Given the increased interest in WMATA's Joint Development program, projections of continued ridership growth, and the introduction of new transit modes to the WMATA system, it is crucial that good access to Metrorail stations is maintained, and even improved. WMATA has received increased interest in its Joint Development program from the development community, as well as local jurisdictions interested in promoting transit-oriented development (TOD) at Metrorail Stations. Metrorail ridership is expected to grow significantly with planning for several new stations located along the Dulles Corridor Metrorail Extension.

1.2 DEFINING ACCESS

For the purpose of these Guidelines, we define *mode of access (access mode*) as a way or a means of traveling to or from a Metrorail station site, or to or from the station entrance. The term *mode of access* can also be referred to as *mode share*, but is more frequently referred to as *mode of arrival, or mode of departure*. For instance, the mode of arrival for a customer traveling to a station can be “Bus” or “Park & Ride”, but when the customer leaves their vehicle, the method of access to the *station entrance* becomes walking, or the “walk mode”.

Planning for station facilities relies on actual planning factors, which may include: existing use, operational requirements, existing ridership, available land, mode share, growth projections, the surrounding land use, and access potential. In general, the Metrorail system is a regional system with several types of stations, each with different characteristics. The station type may change over time due to local or regional growth or changes in the transportation system. Typical station types include:

- Core Stations: These are stations located in a high-density, downtown areas, such as Washington DC, Rosslyn, and Crystal City, where other Metrorail stations serve the adjacent area. These stations are accessible primarily by walking, bicycling, and bus.
- Mid-Line Stations: Mid-line stations are typically located in areas with low to medium density and are usually accessed by Park & Ride, Kiss & Ride, bus, bicycling, and walking modes. Mid-line stations are located in areas where other Metrorail stations are further away and serves a greater area, thus many customers must rely on the non-walking mode to access the station.
- Terminus Stations: Terminus stations are located at the end of Metrorail lines. Typically, terminus stations are accessed by Park & Ride, bus, Kiss & Ride, then walking. However, comprehensive regional planning that improves pedestrian and bicycle access to the station could increase the walking and bicycle mode. Terminus stations typically serve a wide geographical area that normally extends beyond the greater Washington area, creating a high demand for Park&Ride mode.

It can be helpful in station planning to classify these station types for the purpose of determining which transit site facilities may be expected for a particular geographical area. However, the combination of all station facilities should always be determined by the actual planning factors on a case-by-case basis.

1.3 ACCESS HIERARCHY

Since all modes of access to a station cannot be given equal priority, a hierarchy has been established to provide a rationale for station site planning and design. Providing access for persons with disabilities should be planned for all modes of access and accorded the highest priority. No matter which mode of access is used, WMATA facilities should be designed to meet the needs of mobility and sensory-impaired passengers. Accessible design provides benefits that will often assist other passengers, such as parents with young children in strollers or passengers traveling with luggage or other packages, and generally optimizes conditions for pedestrians.

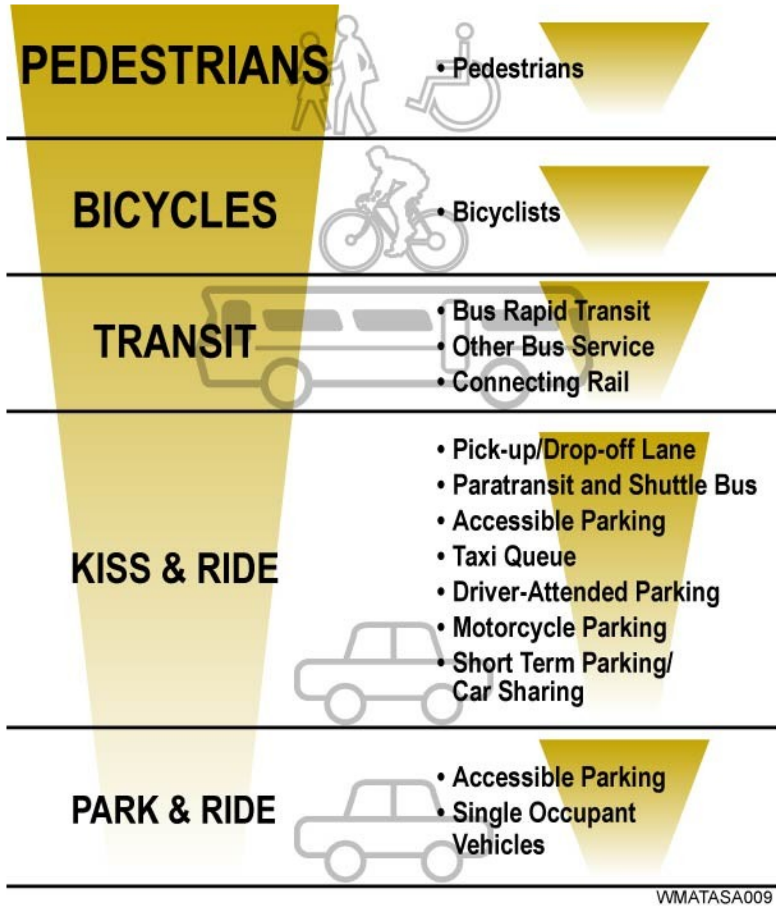
The access hierarchy, established in these Guidelines and illustrated in Figure 1-1, applies to station site planning for any new Metrorail station or any existing station where transit facilities are modified to accommodate Joint Development or other station site improvements on WMATA property.

Figure 1-1 shows the mode of access with the highest priority at the top and the lowest priority at the bottom. An explanation for the reasoning behind the hierarchy follows:

1.3.1 Pedestrians: For the safety of all transit customers, pedestrians should be provided the highest priority in station site and access planning. Previous station planning efforts did not always provide priority access for pedestrians. At many existing suburban stations, pedestrians must cross bus bays, parking lots, and vehicular lanes to reach the station entrance. For pedestrian pathways connecting to a station site, it is generally recognized that providing a safe and convenient walking environment that includes clear, un-fragmented, and integrated pedestrian paths to the station will encourage more customers to walk. WMATA will endeavor to work with all jurisdictions to promote the walking access mode, which can increase transit ridership without the need to provide additional parking facilities or increase bus service.

1.3.2 Bicycles: To encourage the use of this efficient and environmental friendly mode of access, bicycles are given priority over all motorized vehicular access. In the transit area, bicycles have the right-of-way over buses and automobiles, but do not have the right-of-way over pedestrians.

FIGURE 1-1: ACCESS HIERARCHY



1.3.3 Transit: Since buses and connecting rail generate a higher share of concentrated pedestrian activity on station sites, the transit mode should be given priority over all other vehicular modes of access. At some stations, the number of bus boardings actually exceeds the number of rail boardings at the station.

1.3.4 Kiss & Ride: Because a Kiss & Ride facility requires proximity to a station entrance for optimum function, it is afforded a higher access priority than Park & Ride access. Kiss & Ride areas include facilities for passenger drop-offs and pick-ups by automobile, as well as spaces for short-term parking. A curbside lane for a taxi stand, private shuttle buses, and automobiles dropping off or picking up passengers should be located closer to the station entrance than short-term parking.

1.3.5 Park & Ride: Park & Ride facilities are generally used as all-day commuter parking. Park & Ride is considered an important transit mode share to Metrorail and the regional transportation system and should be accommodated. Available parking at stations can divert drivers from the region's road system to transit and provides an opportunity for customers to use the Metro system who may not be able to use other modes to access a station. However, Park & Ride provides a low share of transit riders per vehicle and can detract from other more efficient modes of access. Therefore, Park & Ride ranks below all other modes of access in the station access hierarchy.

1.4 REGULATIONS AND CONTROLS

In addition to compliance with applicable code and jurisdictional requirements, the planning, design, and construction of WMATA facilities should conform to the requirements of the latest WMATA Standards and Criteria. This Manual is a supplement to the WMATA Manual of Design Criteria. WMATA Standards and Criteria include:

- *WMATA Manual of Design Criteria –Facilities*
- *WMATA Manual of Design Criteria-Systems*
- *WMATA Standard Specifications, Standard Drawings and Design Directive Drawings*
- *WMATA Manual of Graphic Standards*
- *WMATA Tram/LRT Guideline Design Criteria*
- *WMATA ADA Accessibility Checklist Forms* in *Section 01112: General Requirements of the Specifications*
- *WMATA Adjacent Construction Design Manual*

The latest WMATA Standards and Criteria may be obtained from WMATA's Office of Chief Engineer–Facilities and the Office of Chief Engineer-Systems. All design and construction of new facilities, as well as alterations and relocations of existing facilities should comply with Federal Transit Administration (FTA) accessibility requirements as described in the FTA's *Accessibility Handbook for Transit Facilities* and *Americans with Disabilities Act Accessibility Guidelines (ADAAG)*.

This Manual promotes a safe and accessible pedestrian environment that goes well beyond the minimum requirements of ADAAG. People with disabilities that are unable to operate an automobile or use inaccessible taxi service have adopted transit as their primary mode of transportation. All transit agencies, including WMATA, are required by federal law to provide accessible bus, rail, and alternative paratransit services. The designer is advised that all matters related to accessible pedestrian facilities fall under federal regulations and should not expect flexibility when planning transit site facilities and their pedestrian connections, whether on WMATA-owned property or on private-owned property adjacent to transit facilities. The designer should utilize the WMATA *ADA Accessibility Checklist Forms* when planning station facilities.

1.4.1 Reference Documents

Many elements of the Manual are subject to other regulations, including local jurisdictional design standards, zoning ordinances, and development codes. Other documents to review include:

- *Accessibility Handbook for Transit Facilities*, Federal Transit Administration
- *Americans with Disabilities Act Accessibility Guidelines (ADAAG),* U.S. Department of Justice and U.S. Department of Transportation (USDOT)
- *Manual on Uniform Traffic Control Devices*, Federal Highway Administration (FHWA)
- *A Policy on Geometric Design of Highways and Streets,* American Association of State Highway and Transportation Officials (AASHTO)
- *Design and Safety of Pedestrian Facilities,* Institute of Traffic Engineers (ITE)
- *Designing Sidewalks and Trails for Access, Part I of II: Review of Existing Guidelines and Practices*, FHWA
- *Guide for the Planning, Design, and Operation of Pedestrian Facilities*, AASHTO
- *Guide for the Development of Bicycle Facilities*, AASHTO
- *Guide for the Design of Park & Ride Facilities*, AASHTO
- *Transit Capacity and Quality of Service Manual*, *2nd Edition,* Transit Cooperative Research Program
- *NFPA 130: Standard for Fixed Guideway Transit and Passenger Rail Systems,* National Fire Protection Association

1.5 PROCEDURES

As discussed in the Introduction section of this Chapter, the need may arise in the planning process for deviations from the WMATA Standards and Criteria to meet the requirements of a particular design problem, site or budget constraints; however, all deviations should be referred to WMATA for consideration and approval. It is the responsibility of the Designer to justify any deviation from the established WMATA Standards and Guidelines and to secure the necessary approvals prior to proceeding with final design and construction. Refer to the *WMATA Manual of Design Criteria – Facilities* for the process.

2 STATION SITE FACILITIES DESIGN

This chapter provides guidelines for station site and access planning according to mode of access. The Guidelines include basic planning considerations specific to each access mode (Pedestrians, Transit, Kiss & Ride, and Park & Ride), specific criteria for the layout of facilities, and references to methods or techniques that are applicable to typical station planning requirements. More detailed methodologies are included in the Appendices. The chapter ends with a discussion of vehicular access, traffic controls, and circulation.

2.1 GENERAL DESIGN CONSIDERATIONS

The station site plan should respect the existing topographic conditions, including existing natural vegetation, with the goal of minimizing grading and the destruction of the existing natural conditions, as well as existing structures. Stations can and should be designed to enhance the communities where they are located. A well-designed station will easily fit within the fabric of the adjacent community. Occasionally, stations might have a few negative effects on their neighborhoods, which may warrant special design attention, buffering, and landscaping. Station site facilities (bus bays, other connecting transit facilities, Kiss & Ride, and Park & Ride) should be interconnected by pedestrian paths, which should include accessible routes between the station entrance, site facilities, and to the adjacent municipal sidewalk system. Access for persons with disabilities should be addressed at each stage of the planning and design process. The Designer shall use the WMATA ADA Accessibility Checklist Forms when planning all site facilities. All transit facilities, pedestrian waiting areas, and accessible paths shall meet the requirements of the FTA *Accessibility Handbook for Transit Facilities*.

The physical layout of the site should also be consistent with the access hierarchy discussed in Chapter 1. While every site is unique, a sample site plan has been developed (Figure 2-1) to illustrate how the access hierarchy applies to the layout of station facilities. As shown in the sample site plan, the bus bays are located closest to the station entrance, while the Park & Ride facilities are located farthest from the station entrance. The sample site plan also illustrates the separation of modes with each area of the site having separate access. More detailed diagrams of sample bus bays, Kiss & Ride, and Park & Ride facilities are included later in this chapter with the discussion of each mode of access.

Figure 2-2 illustrates the maximum distance that any facility should be located from a station entrance, measured along the pedestrian path.

FIGURE 2-1: SAMPLE SITE PLAN

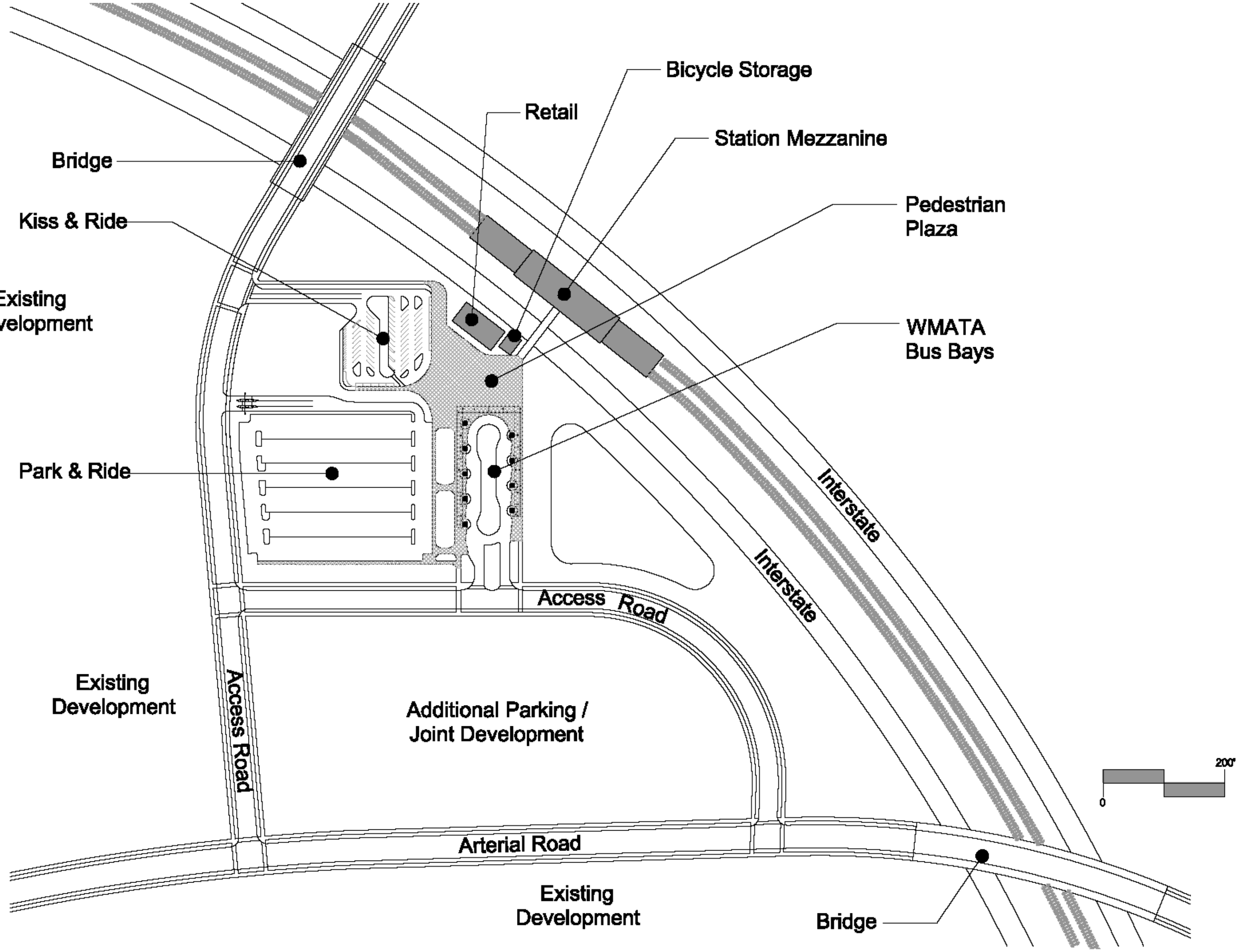
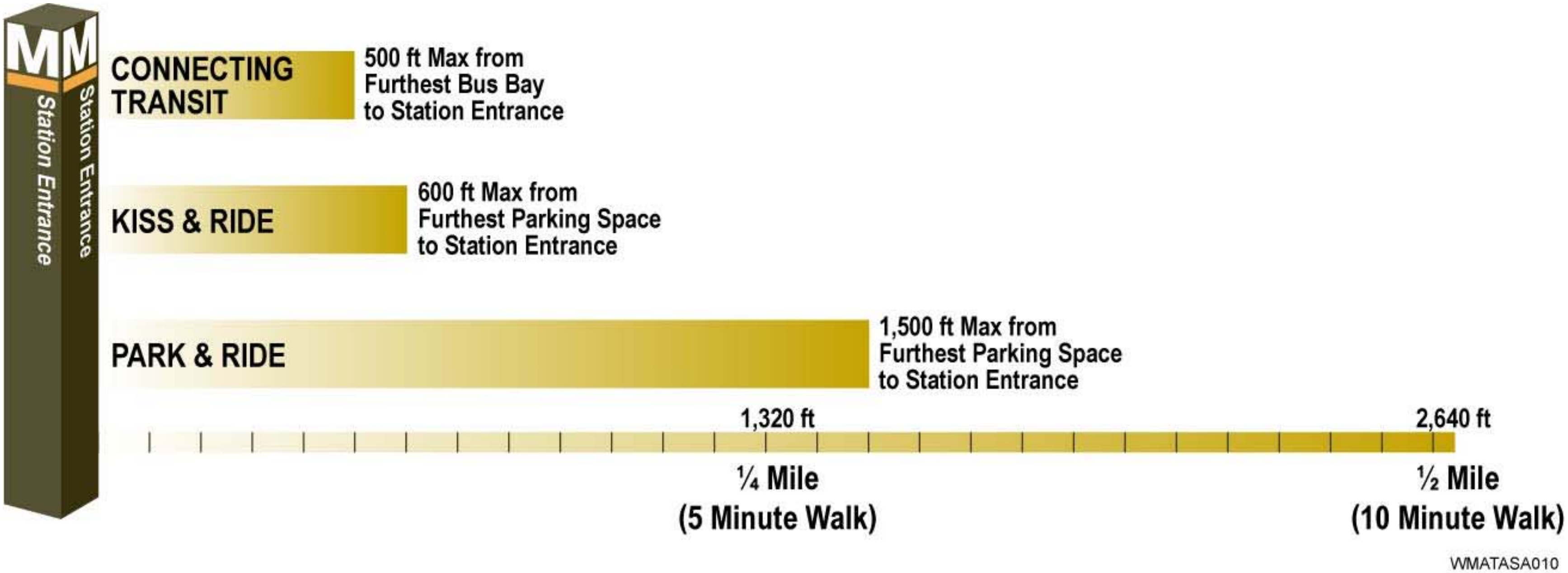


FIGURE 2-2: ALLOWABLE WALKING DISTANCES OF STATION FACILITIES FROM STATION ENTRANCE



NOTE: Distances shown reflect the maximum horizontal distance allowed as measured along the actual pedestrian path. Shorter walking distances are preferred. Estimated walking times may vary and are based on average pedestrian speeds of 4.5 feet per second.

2.1.1 Walkway Widths: The minimum unobstructed walkway width along bus platforms are provided in Table 2-1. Additional guidance on required widths for walkways is provided in Appendix D and Table 2-2, which summarizes site design standards for several types of facilities. The Designer should increase the minimum unobstructed walkway width along the bus platform when the platform is combined with other pedestrian traffic. Refer to Appendix D to calculate the additional walkway width. Detailed guidelines for station facilities are provided in later sections of this chapter.

TABLE2-1: MINIMUM UNOBSTRUCTED WALKWAY WIDTH ALONG BUS PLATFORM

Number of Bays in Array	Minimum Unobstructed Walkway Width (Feet)
1	6
2	6
3	8
4	8
5	10
6	12

TABLE 2-2: SITE DESIGN STANDARDS

Ref. No.	Facility	Standard
2.1.1	Pedestrian Walkways	Width varies according to procedures described in Appendix D. The minimum width for walkways is 6'-0" plus an additional 1'-6" buffer from building edges or street curbs.
2.1.1 2.5.1-3 4.1.3	Pedestrian Waiting Areas at Bus Platforms	The minimum unobstructed walkway widths along bus platforms are as indicated in Table 2-1 and as shown in Figure 2-4. For bus platforms that share sidewalk space with non-bus passenger traffic, the minimum width must be calculated according to procedures described in Appendix D and with the minimum widths indicated in Table 2-1.
2.6.2 4.1.3	Pedestrian Waiting Areas in Kiss & Ride Drop-Off/Pick-Up Zones	Width varies according to procedures described in Appendix D. The minimum unobstructed sidewalk width is 6'-0" plus an additional 1'-6" buffer from building edges.
2.4.1	Bicycle Path	8'-0"-minimum width
2.4.2	Bicycle Lockers	3'-2" x 6' with a 6' aisle at either end (2 lockers back to back)
2.3.3	Crosswalks and Curb Cuts	Minimum width same as walkway required at all walkway/road intersections
2.5.2	Sawtooth Bus bays (Standard Bus)	70' length with 6' indent as shown in Figure 2-4
2.5.2	Sawtooth Bus Bays (Articulated Bus)	'96 length with 6' indent as shown in Figure 2-4
2.5.1	Tangent Bus Bay (Standard Bus)	15' x 44' + *48' taper at rear of bus bay array and 70' taper at front of bus bay array* (Figure 2-3)
2.5.1	Tangent Bus Bay (Articulated Bus)	15' x 66' + *48' taper at rear of bus bay array and 70' taper at front of bus bay array* (Figure 2-3)
2.5.1	Bus Lane Widths	15' through lane as shown in Figures 2-3 and 2-4. See Figure 2-5 for turning lane widths.
2.5.2	Bus Storage Bays	Same as tangent bays.
4.1.3	Bus Shelter	Minimum equivalent of one 6'x12' or 6'x24' shelter per bus bay, as directed by WMATA. (Fig. 2-4)
2.5.1	Bus Loop Radii	60' outside radius to curb, 45' centerline radius, 30' inside curb radius (Figures 2-5 and 2-6)
2.8.3	Automobile Turning Radii	23' outside curb radius on access roads, 15' curb radius in parking facilities
2.6.6	Motorcycle Parking Spaces	4' x 8'
2.6.2	Kiss & Ride Curb Side Pick-Up/Drop-Off Lane	Automobile spaces: 8' x 30'; Shuttle Bus spaces: 8 'x 25', Taxi spaces: 8' x 22'
2.6.3	Kiss & Ride Parking Spaces	ADA and Driver-Attended: 9' x 18' (45 degree); Short-Term: 8.5' x 18' (angled or 90 degree)

TABLE 2-2: SITE DESIGN STANDARDS

Ref. No.	Facility	Standard
2.6.5		
2.7	Park & Ride Spaces	8.5’ x 18', 24' aisle between rows or jurisdictional requirements, whichever is more stringent
2.8.3	Access Roads - Vertical Clearance	16’-9” minimum
2.8.3	Access Road Lane Width (Single Lane Road)	15’ for roads with automobile traffic only; 18’ for roads with buses and automobiles.*
2.8.3	Access Road Lane Width (2 or More Lanes)	11’ per lane*

*Additional lane widening is required in curved sections per AASHTO design standards - add one foot each side of roadway for curb and gutter section.

2.2 SEPARATION BETWEEN MODES

Due to the different needs and priorities assigned to each of the access modes, separation of modes is necessary to reduce conflicts and ensure adequate access and circulation in accordance with the established hierarchy. Separation between the different modes should be provided in the following order of priority whenever possible:

2.2.1 Pedestrians: Pedestrian safety is provided the highest priority in site planning. Pedestrian pathways shall be separate from vehicular traffic wherever possible.

2.2.2 Bicycles: Marked bicycle lanes should be designated on or along primary streets in the transit area. Bicyclists should also be directed to dismount from their bicycles, by posted sign, in order to avoid conflicts with pedestrians in areas of heavy pedestrian traffic, such as near the station entrance.

2.2.3 Transit and Other Modes: Transit vehicles have the highest access priority of any motorized mode of transportation. Other modes of motorized access should not compromise access for transit vehicles. Transit flow through the site should be separated from other traffic whenever possible and bus lanes should be designed to flow in one direction through the site.

2.2.4 Kiss & Ride / Park & Ride: Kiss & Ride vehicular traffic should not be routed through Park & Ride areas. Nor should Park & Ride vehicular traffic be routed through Kiss & Ride areas. Kiss & Ride traffic may be combined with Park & Ride traffic along access roads, as long as an adequate functionality is maintained.

2.3 PEDESTRIANS FACILITIES

Good pedestrian access to station entrances is essential in station site and access planning since all transit customers eventually become pedestrians when transferring between modes. The following guidelines are provided to improve pedestrian access at Metrorail stations.

2.3.1 Pedestrian Network

- Minimize pedestrian conflicts with other modes. Pedestrian paths should not cross vehicular access roads and bus lanes unless unavoidable. If a pedestrian crossing is unavoidable and grade separation is not practical, a clearly marked crosswalk should be provided and it should be signalized if WMATA determines that the volume of pedestrian crossings warrants traffic controls.
- Direct and safe approaches for pedestrians should be provided from all adjacent streets into the station area. Minimize unnecessary changes in direction. (*The directness of a path can be evaluated according to a "Coefficient of Directness", which is determined by dividing the aerial or straight-line distance between any two points by the length of the available path between those same points. The coefficient of directness for any pedestrian path is 1.2.)*
- Create an interconnected path system within the station area. Avoid dead end paths. Pedestrian walkways should connect to the surrounding street sidewalk system without having to pass through parking areas. Mid-block crossings may be used when intersections are spaced more than 400 feet apart and when approved by WMATA.
- Pedestrian paths should be located in highly visible, well-lit areas to enhance the safety of transit patrons. Avoid locating pedestrian paths behind structures or in areas with low visibility. (*Pedestrians feel safer in a well-traveled environment.*)
- Accessible routes should connect between all transit facilities and public spaces. Street furniture, lighting fixtures, signposts, newspaper stands, trash receptacles, and other elements, including hand rails along the edge of the pathway, must be located outside of the accessible route. Avoid locating grates along accessible routes, which may cause problems for the visually impaired using canes or people using mobility aids.
- Where site stairs are required, they shall be located outside of the accessible route. Stairs shall be the same width as the required walkway width, with 12 inch maximum treads, 6 inch maximum closed risers, rounded and slip resistant tread nosing, and a continuous handrail on both sides.
- Pathways should be carefully planned to concentrate pedestrian egress. For example, bringing multiple pedestrian paths into a single exit from a station facility rather than allowing them to disperse through numerous exits improves the ability for pedestrians to see and be seen by others, thus improving pedestrian safety. However, concentrating access should be balanced with the need to accommodate direct pedestrian routes, and

most important, to comply with requirements for emergency egress.

- Avoid designing pathways with severe changes in elevations that create particularly difficult conditions for persons with disabilities. Curbs, steps, and stairways create obstacles for persons in wheelchairs, as well as persons with strollers or wheeled luggage. Curb ramps shall be provided to allow access for wheeled devices up onto and down from areas raised and separated by curbs.
- Vertical clearance of at least 8 feet should be provided along all accessible routes. Vertical clearance is necessary to accommodate taller persons and cyclists and to allow an area free of obstructions that might be hazardous to people with visual impairments.
- Provide resting areas for people with lower stamina or health impairments every 300 feet along longer distance paths. Resting areas may include benches, seating walls, resting posts, and railings.
- When possible, design for right-hand pedestrian flows to avoid cross flows, as pedestrians tend to keep to the right.

2.3.2 Walkway Surfaces, Stairs, and Egress

- The surface of a walkway should be firm and stable enough to support the higher point loads of wheelchair wheels, crutch tips and other mobility aids. Monolithic, paved surfaces, such as asphalt or concrete, are preferred in areas of high volume traffic. Unit pavers may be used if they can provide a stable and level surface that meets ADAAG requirements. Do not use beveled pavers. Architectural style and appearance should always be balanced with the importance of accessibility and the need for a stable, firm and slip-resistant surface.
- If stairways are provided, make sure that they are wide enough to allow faster pedestrians room to pass. Provide a bike channel, running at the same angle as the steps, for customers to walk a bike along the stairway where appropriate.
- If a stairway is located along the path of egress from a station entrance, stairs should meet emergency station egress requirements.

2.3.3 Intersections, Crosswalks, and Medians

- Pedestrians should have the right-of-way over all motorized and non-motorized vehicles in station areas and crosswalks should be located at all vehicular crossings and accentuated with textured pavement, color, or striped markings. Avoid using raised pavement at crosswalks on access roads used by transit vehicles, which may inhibit operations.
- All crosswalks should be well lit.
- Pedestrian activated crosswalk lighting with countdown displays should be provided for high traffic areas, such as signalized intersections immediately adjacent to the station.
- The highest degree of safety must be applied along accessible routes, as many persons with disabilities, such as persons in wheelchairs, are less visible to drivers than other pedestrians.

- Two curb ramps per corner should be provided at intersections, one in the direction of each crosswalk. Providing only one curb ramp at the apex may unintentionally direct visually impaired pedestrians or persons using wheelchairs into the center of the intersection, rather than toward the crosswalk. Appropriate tactile paving surfaces and audible signals should be installed at all controlled and uncontrolled roadway crossings along accessible routes.
- Curb cuts at street crossings for multi-use pathways should be the full width of the pathway.
- Medians should be used to provide a refuge island for pedestrians on any street wider than four lanes. Angled crosswalks located within the median should be incorporated to provide more space for bicyclists and direct pedestrians to look at oncoming traffic.

2.3.4 Grade Separated Crossings and Pedestrian Tunnels

- Ground level pedestrian paths are preferred in order to reduce infrastructure costs and to support street retail in station areas with Joint Development.
- Bridges and tunnels may be used to avoid conflicts with other modes, or to take advantage of changes in topography that would reduce the use of stairs and enhance access for persons with disabilities and senior citizens. Bridges and tunnels may be most beneficial when there is high pedestrian demand to cross a freeway or expressway or if young children must regularly cross a high-speed or high-volume roadway.
- Due to security concerns, tunnels should generally be avoided, but if necessary, should be well lit with a minimum 18 foot wide cross-sections for visibility and user comfort.

2.4 BICYCLE FACILITIES

Bicycle access within the station area should be connected to existing and planned bicycle paths where possible. WMATA encourages bicycle access to Metrorail by providing bicycle storage at the stations, bike racks on buses, and by permitting bicycles on rail cars during non-peak hours and on weekends.

2.4.1 Bicycle Access

- Encourage bicycle access to stations as a means of increasing ridership through partnerships with local jurisdictions and bicycle advocacy groups.
- Provide connections to bicycle paths or facilities within the station area to expand the catchment area for bicycles. Connections should take into account the needs of different bicycle user types.

- Include information about bicycle routes in the area on posted signs and with wayfinding information.
- Provide direction to bicycle parking.
- Bicycle access should not interfere with pedestrian movements.
- Avoid designing bicycle routes that require traversing stairs or escalators.
- Bicycle paths should be designed according to AASHTO's *Guide to the Development of Bicycle Facilities* and local standards.

2.4.2 Bicycle Parking

- Bicycle racks and lockers should be provided at all stations where demand exists.
- The number of racks or lockers should be determined based on existing demand and recommendations from the local jurisdictional bicycle coordinator for projected demand. *(Demand is affected by surrounding land use, terrain, and availability of bicycle paths or routes. Denser land uses will have a greater potential to generate bicycle usage, as will specific land use types, such as college campuses, activity centers, residential neighborhoods, and public buildings. Additionally, if vehicular parking is constrained or unavailable, some persons may use bicycles as a second option.)*
- Bike racks should be located in a well-lit, visible area to discourage theft and vandalism. Bicycle racks should be located within sight of the station manager, where possible, at a minimum 2 feet clear from the station security grille. Bicycle lockers and racks should not be located so as to impede pedestrian movements.
- The Designer should refer to the Association of Pedestrian and Bicycle Professionals document *Bicycle Parking Guidelines* for placement and selection of bicycle racks.
- Provide cover over bicycle racks with a canopy or under structure, when possible, to provide weather protection. For security purposes, bicycle lockers should not be placed below structures, such as bridges or buildings.
- Bicycle racks and lockers are not permitted in WMATA parking structures.

2.5 TRANSIT FACILITIES

Transit modes of access to Metrorail include bus and connecting rail. Transit may include Metrobus, the local jurisdictions' bus operations, commuter bus services, and future Streetcar/Light Rail Transit (LRT). Transit provides access to Metrorail for persons who are transit dependent, eases access for persons with disabilities, and moves a large number of passengers efficiently.

Bus transfers provide the largest number of vehicular based transfers to Metrorail. Metrorail trips originating from bus transfers are projected to increase more than any other vehicular mode. Numerous bus routes either terminate or converge at Metrorail stations making them logical bus-to-bus transfer locations. Accommodating transfers between all modes should have appropriate consideration in station access planning.

The following guidelines are provided to improve transit access at Metrorail stations.

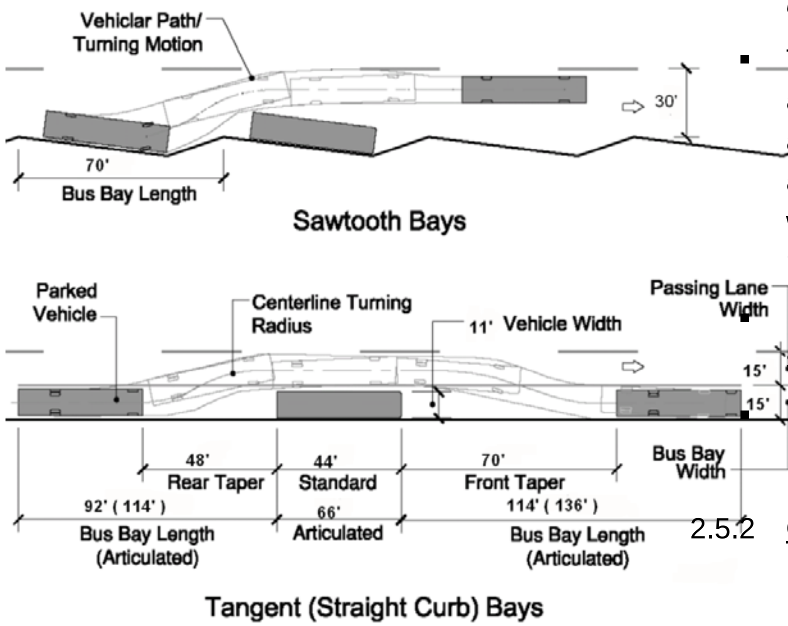
2.5.1 General Access Considerations

- Transit facilities for loading and unloading passengers should be located closer to the station entrance than any other vehicle mode. Transit passengers should not have to cross any vehicle lanes in order to access the station entrance. If pedestrian crossings of bus lanes are unavoidable, they should be well marked, lighted, and clearly identifiable for bus drivers. Provide clear pedestrian paths and a visual connection between transit loading/unloading areas and the station entrance.
- Consolidate transit facilities to one area of the station site to facilitate bus-to-bus transfers.
- Bus traffic should be separate from automobile traffic wherever possible and should be designed to flow in one direction through the station site. Other modes of motorized access should not negatively impact the operations of transit vehicles.
- Transit priority improvements, such as signal priority or exclusive lanes, that provide faster and more reliable service should be applied when appropriate.
- With few exceptions, transit facilities should be designed to accommodate transit vehicle access and capacity demand during the PM peak hour period. The PM peak hour period is used for planning transit facilities when transit headways are more frequent and passenger boardings are highest. Vehicle dwell times may be longer during the PM period when queuing lines tend to form as passengers board the buses and pay the fare.
- Provide an ADA-accessible route from all transit loading areas to the station entrance. Minimize level changes between transit-to-Metrorail connections to facilitate transfers for persons with disabilities, riders with luggage, and senior citizens.
- To provide bus customers with equal facilities to Metrorail customers, bus platforms should be covered with a continuous canopy. The canopy should extend to the station entrance via the pedestrian pathway wherever possible. The canopy should completely cover the walkway, the bus shelters, and extend above the front door of the bus as shown on Figures 2-4, 2-5, and 2-6. Walkway canopies are not required to extend over access roads where vertical clearance requirements may make weather protection ineffective. Canopies are not required to tie-in with the escalator canopies. The canopy column supports should not be located where they may impede pedestrian movement.
- Bus bays should be designed for passenger boardings and alightings on the right side of the bus where doors are located. Sawtooth bays are the standard design for WMATA bus facilities. Sawtooth bays allow buses to maneuver in and out of a berth easily and safely and also

require significantly less curb space than tangent bays (see Figure 2-3). Tangent bays are permitted where adequate curb space is available.

- Angled or diagonal bays, typically used in intercity bus terminals that require back-outs are prohibited.

FIGURE 2-3: BUS BAY COMPARISON



- The standard layout for sawtooth and tangent bus bays are designed to allow buses to pull into a space parallel with the curb so passengers can easily step onto the bus platform from either door and provide adequate lay down area for the bus's wheelchair lift. If there is inadequate curb space for a bus to properly alight, the back end of the bus may encroach into the passing lane, blocking traffic flow and disrupting bus service.

- The number of bus bays needed will be determined by WMATA. (*For off-street bus bays, a general rule of thumb is to provide one berth for six buses per hour with no more than two to three connecting services per boarding berth. The capacity of a berth is generally dependent upon bus dwell time and clearance time*.)

- Travel lanes shall have a 15-foot minimum width to allow adequate clearance for buses to safely maneuver around another bus parked in a bay without encroaching on the adjacent lane or sidewalk curb. Turning lanes shall be wider to allow clearance for the wide turning radius required for buses as shown on Figure 2-5.

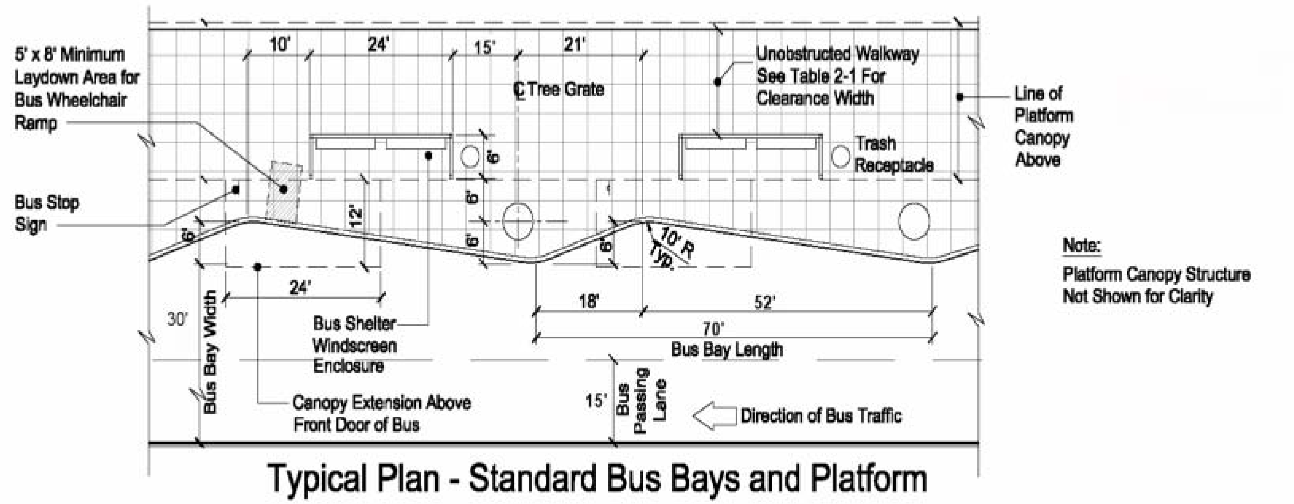
- Requirement for a bus dispatcher's booth and its location shall be determined by WMATA.

- Refer to Chapter 4 for pedestrian shelter requirements.

2.5.2 Off-Street Bus Bays

Off-street bus facilities with sawtooth bays are preferred when multiple bus bays are required and there are a significant number of terminating routes and bus-to-bus transfers. Bus bays should be designed in conformance with WMATA Standards and Guidelines (see Figure 2-4 for diagram).

FIGURE 2-4: SAWTOOTH BUS BAY CONFIGURATION



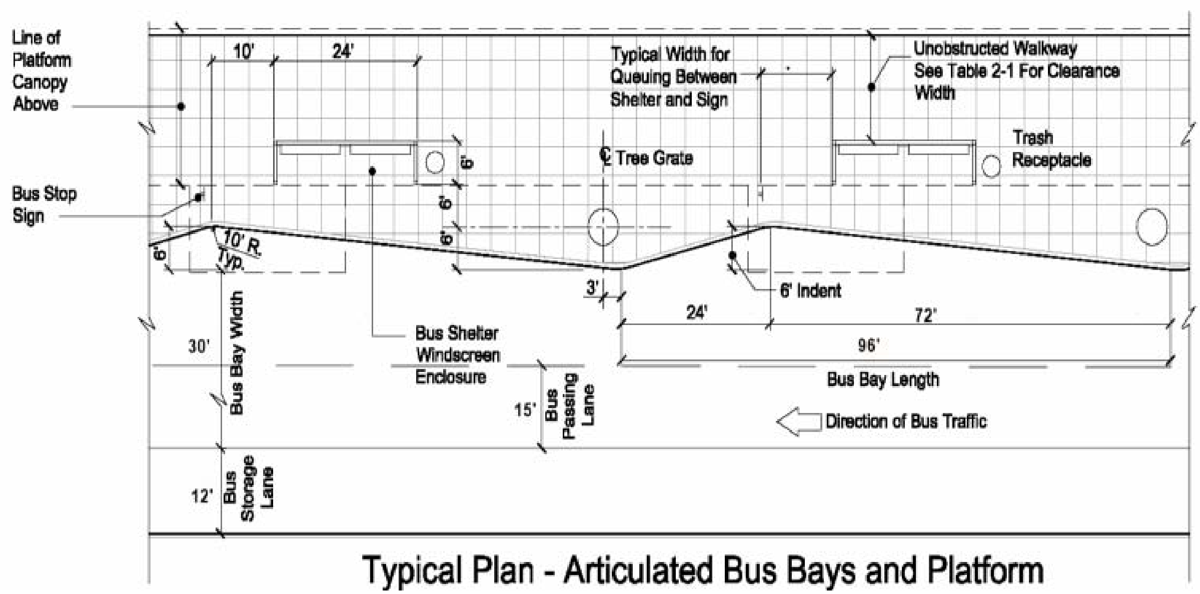


FIGURE 2-5: SAMPLE BUS FACILITY (STANDARD LOOP)

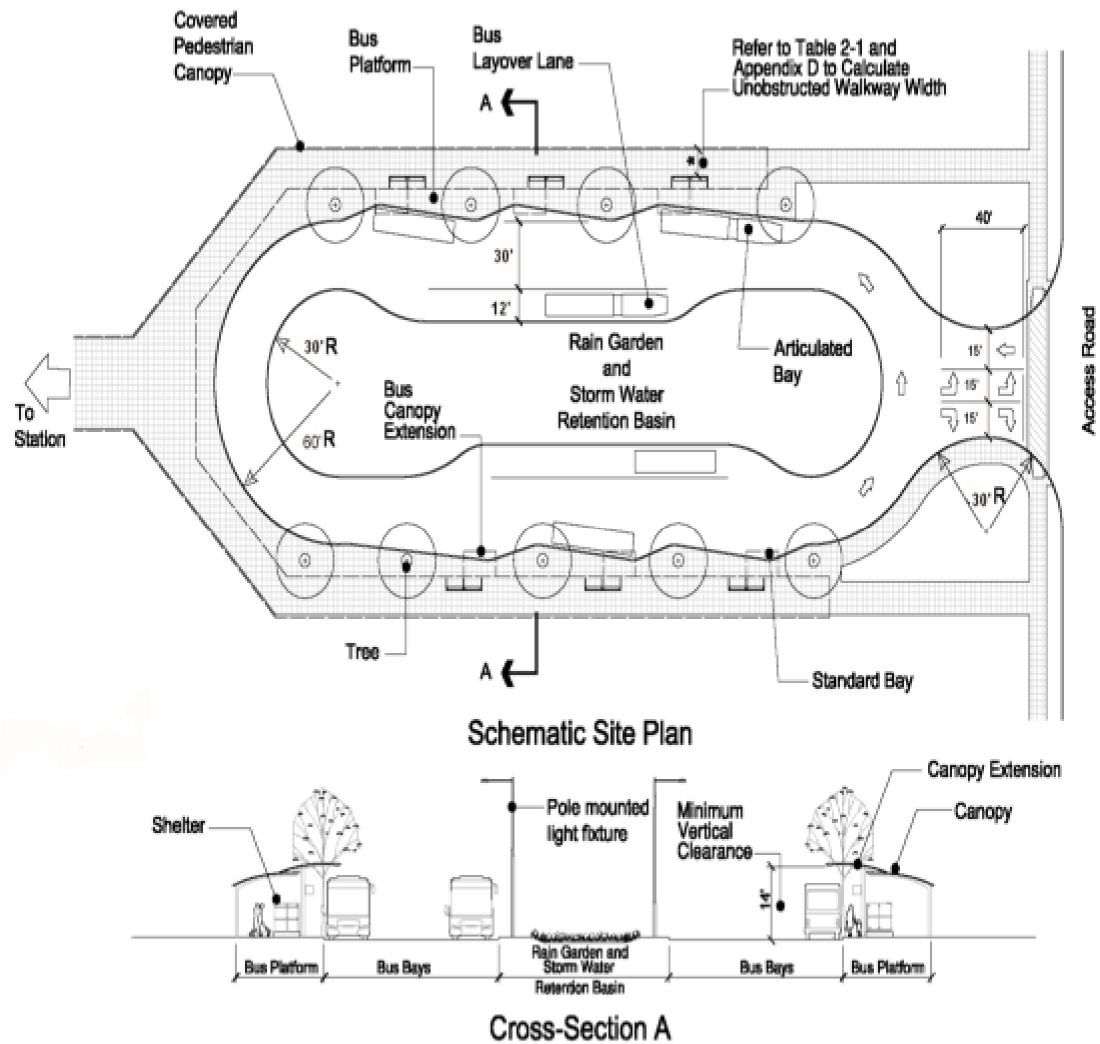
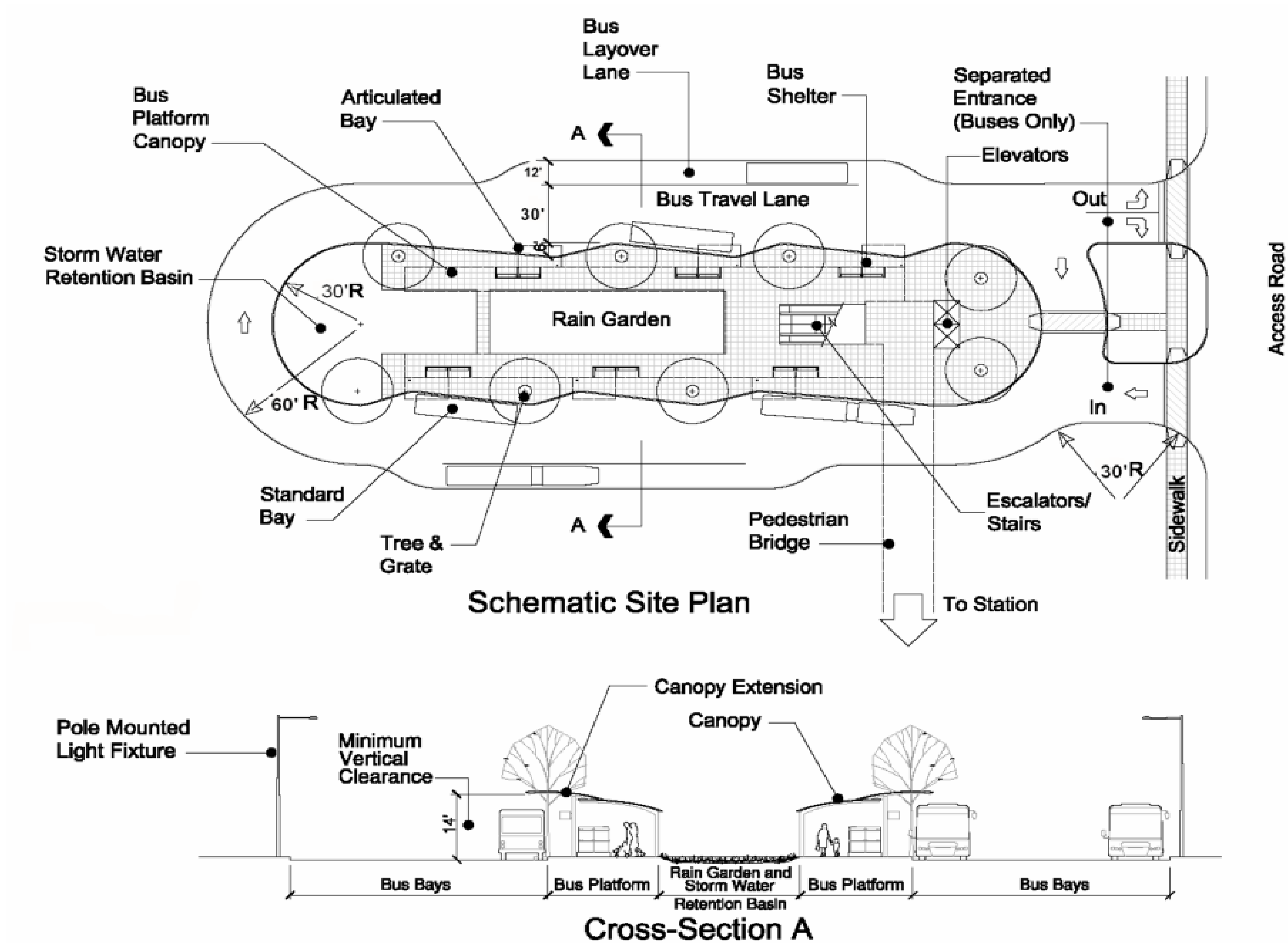


FIGURE 2-6: SAMPLE BUS FACILITY (CENTER PLATFORM)



- A one-way counter-clockwise loop is the preferred layout for bus facilities, so that buses are able to re-circulate within the bus terminal. Two-way circulation should be avoided unless required due to unusual site constraints. Lanes for bus storage should be located in proximity and within view of the bus bays to allow layover buses to move to their assigned bay when it becomes vacant or at the scheduled time for boarding. (See Figure 2-5 for a sample bus loop.)
- Center island bus bays should be used for facilities with significant bus-to-bus transfers (see Figure 2-6). As an example, the Suitland Metrorail station has a center island bus bay, which uses a grade separated crossing that provides direct access from the bus platform to the station entrance so pedestrians do not have to cross the bus bays.
- Pedestrian crossings of the bus lanes should be avoided. Pedestrian barriers (fencing/ landscaping) should be provided to discourage or prevent crossings at undesignated areas. Barriers should not impede visibility. If pedestrian crossings of bus lanes are unavoidable, then crosswalks should be located at the end of bus arrays, rather than in the middle, where they are less likely to conflict with bus operations. Crosswalks should be clearly marked, well lit, and highly visible from the roadway.

2.5.3 On-Street Bus Bays

- On-street bus bays are acceptable for mid-line stations in an urbanized area where re-circulation of buses is possible on local streets. On-street bus bays are sometimes preferable for non-terminating through routes. Every bus platform must conform to the ADAAG requirements for a level walking surface and an accessible path to the station entrance, even when located on a public sidewalk.
- On-street bus bays should be located as close to the station entrance as possible.
- On-street bus bays should be located to avoid or reduce needless route diversions. Transit stop locations should not require buses to “backtrack” or cause the buses to take an indirect approach to the bus bays, which can delay service, negatively impact schedules and increase operation costs.

2.5.4 Bus Facilities Understructure

- The Designer should coordinate all system requirements associated with Compressed Natural Gas (CNG) powered vehicles in transit facilities understructure with the jurisdictional Fire Marshall.
- In a bus facility located below structure, provide a minimum 14’-6” clear, vertical height to allow adequate free air space above the buses for CNG emissions.

2.5.5 Connecting Rail

- LRT or streetcar platforms and connections to other modes should be designed in accordance with the *WMATA Tram/LRT Guideline Design Criteria*.
- LRT or other rail connections to Metrorail should be located as close to the station entrance as possible. Pedestrian crossings of vehicular travel lanes between transit loading/unloading areas and the station entrance should be avoided.
- Provide covered walkways from connecting rail to the station entrance whenever possible (see requirements for bus platform canopies).

2.6 KISS & RIDE FACILITIES

The Kiss & Ride lot is primarily used for dropping-off and picking-up Metrorail passengers. Kiss & Ride facilities typically include taxi stands, motorcycle parking, provisions for paratransit vehicles and private shuttle buses, short-term parking, and parking for car sharing vehicles. The Kiss & Ride facility should be designed to maximize vehicle turnover, facilitate traffic flow and avoid traffic conflicts.

The following guidelines are provided to improve Kiss & Ride access at Metrorail stations. Two sample Kiss & Ride layouts are illustrated in Figures 2-7 and 2-8.

2.6.1 General

- All Metrorail stations that have Park & Ride facilities should also have separate Kiss & Ride facilities. At mid-line and core stations in areas with high density, the Kiss & Ride function may be accommodated by a passenger drop-off lane and a taxi stand on an adjacent municipal street, subject to the review and acceptance of the local jurisdiction.
- For optimum function, the Kiss & Ride facility should have a direct visual connection with the station entrance, where a driver waiting in an automobile can quickly locate their passenger exiting the station. 1Kiss & Ride facilities must be convenient for both pedestrians and automobiles to encourage use. Kiss & Ride facilities that are not convenient to use, too congested, too remote from the station entrance, or having poor visibility, will encourage motorist and taxis to find another location near the station entrance for pick-up/drop-off activity that may cause undesirable conflicts with other traffic, particularly in a Joint Development site.
- The walking distance from the farthest Driver-Attended space in the Kiss & Ride area to the station entrance should not exceed 600 feet, measured along the actual walking path. Refer to Figure 1-1 for the hierarchy of Kiss & Ride.
- The Kiss & Ride facility should typically be designed for one-way traffic flow and allow for re-circulation within the facility.
- 2In a Kiss & Ride facility, provide capacity for twice the average PM peak hour Kiss & Ride arrivals (N) for two (2) consecutive trains. To consider the impact of peak surge condition, use the peak hour factor of .85 to reflect real-

world conditions. Capacity for Kiss & Ride facilities should be determined using the formula: (2)(N/Number of trains per hour/peak hour factor).

<u>Example</u>: At the Dunn Loring-Merrifield station there are 1,085 exits in the PM peak hour. Using a 17% Kiss & Ride mode share (Table C-2, Appendix), approximately 185 customers would be picked up in the PM peak hour. There are 15 trains arriving in the peak hour.

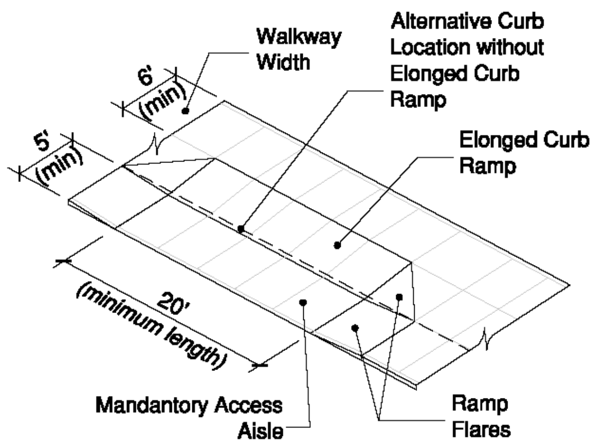
3*(2)(185/15/0.85) = 29 Kiss & Ride spaces required (Required number of spaces includes: ADA; driver-attended; and short-term parking spaces. Excludes: curb side spaces for automobile pick-up/drop-off, taxi queue; shuttles, and motorcycles spaces.)*

- Refer to Chapter 4 for guidelines on landscaping, waiting shelters, and amenities.

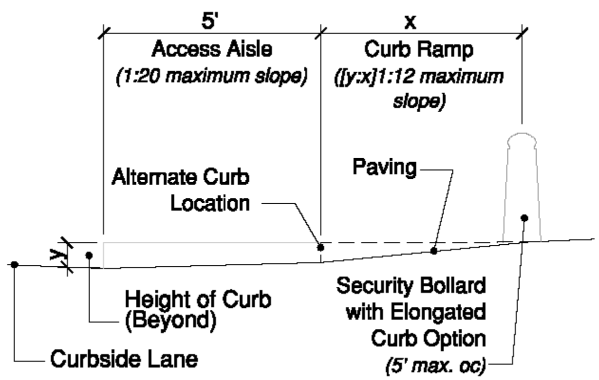
2.6.2 <u>Pick-Up/Drop-Off Zones</u>

- Curbside pick-up/drop-off zones should be located on the right side of the road to discharge passengers at the curb, away from through traffic. Refer to Table 2-2 for area requirements of each curbside space.
- Locate the pick-up/drop-off zone for private automobiles closest to the station entrance. Provide one curbside space for every six Kiss & Ride spaces required (rounded to the nearest whole number).
- Pick-up/drop-off zones should be accessible for persons with disabilities. Provide an access aisle parallel to the taxi queue and the automobile pick-up/drop-off lane that is connected to the walkway as shown on Figure 2-6. Paratransit vehicles should be able to use the pick-up/drop-off lane but may be located adjacent to a curb.
- Roads should be single lane with a minimum width of 24 feet along curbside pick-up/drop-off zones to allow space for maneuvering around stopped vehicles.
- 4To better manage traffic flow at areas of potential traffic conflict, usually at the point nearest the station entrance, direct pedestrians to designated waiting areas away from restricted curb lanes using pedestrian guards that may also be used as vehicle barriers. Continuous walkway canopies may also be used to direct pedestrians to waiting areas. To encourage their use, waiting areas should have benches, trash receptacles, and shelters.
- For private shuttles, provide a minimum of 5one curb-side space for every ten Kiss & Ride spaces required (rounded to the nearest whole number).

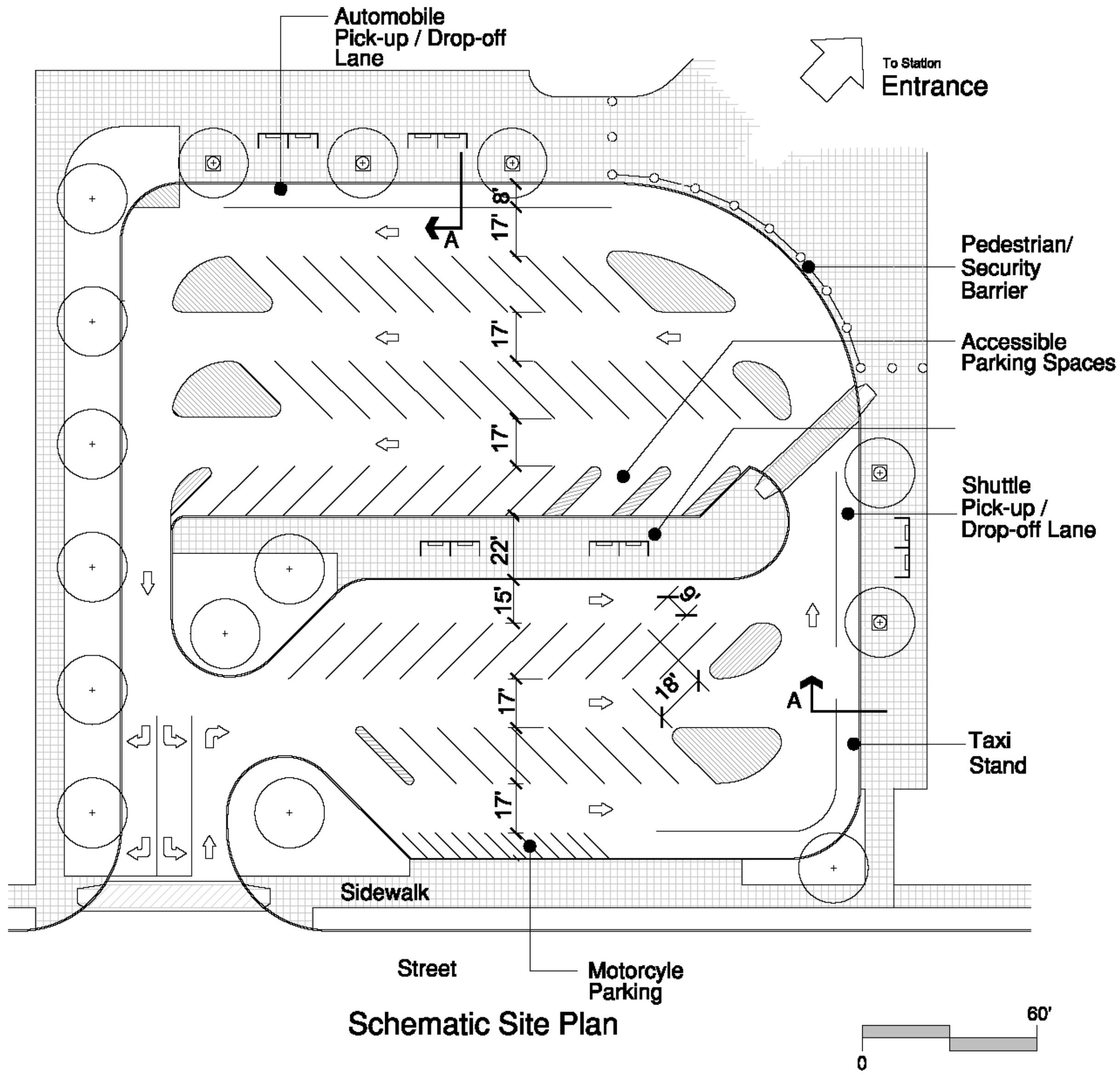
Figure 2-7: Sample Kiss & Ride Facility



Elongated Curb Axonometric

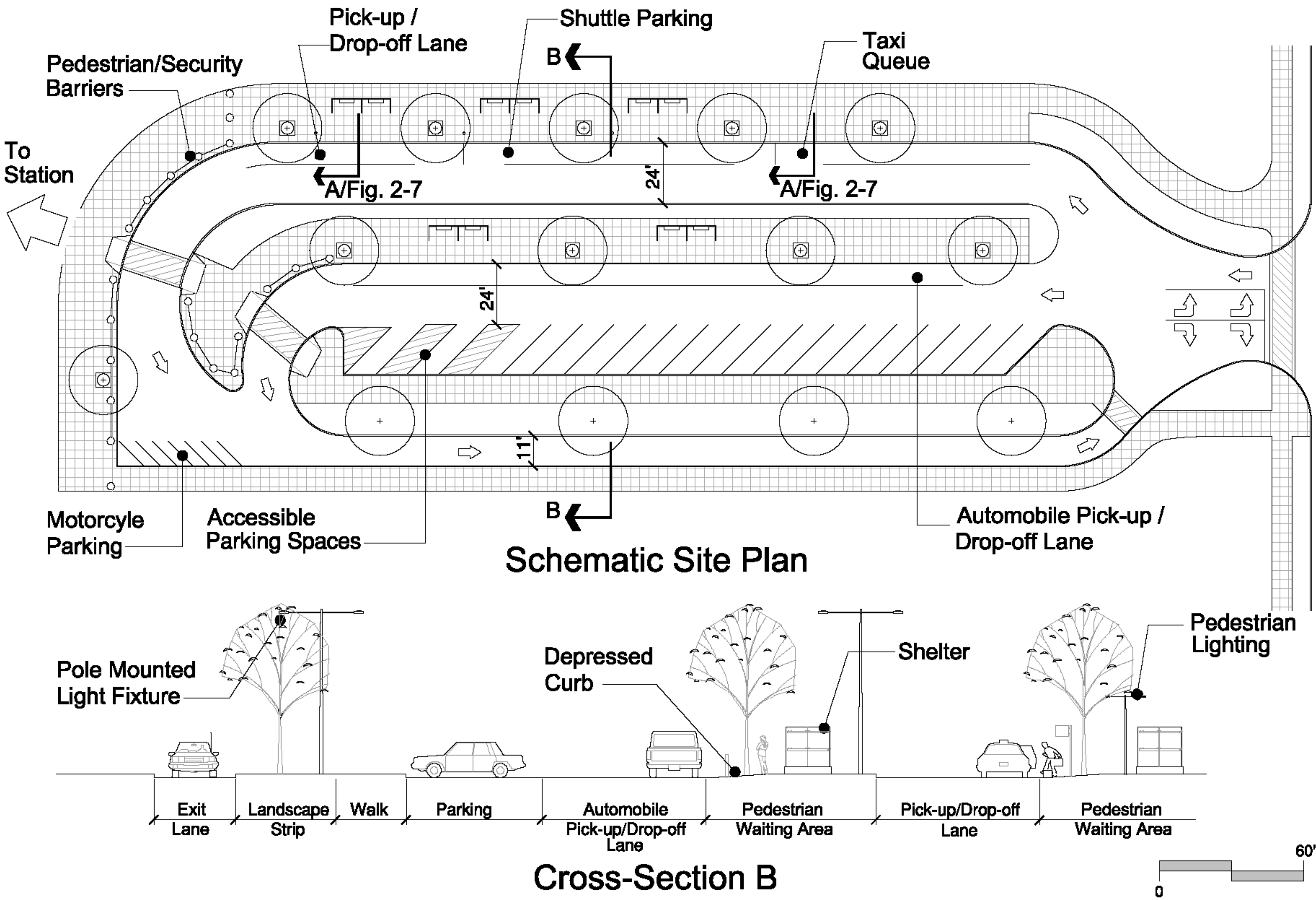


Section A:
Access Aisle Detail
at Pick-Up/Drop-Off Lane



Schematic Site Plan

FIGURE 2-8: SAMPLE KISS & RIDE FACILITY (LINEAR OPTION)



- A taxi queue lane should be provided near the station entrance with the first space located at a natural point of concentration of pedestrian traffic exiting the station entrance. Provide one curbside space for every six Kiss & Ride spaces required (rounded to the nearest whole number).

2.6.3 Driver-Attended Parking

- Accessible parking spaces shall be located closest to the station entrance via an accessible path.
- Half of the number of Kiss & Ride spaces required should be dedicated for driver-attended spaces, including accessible spaces. Driver-attended spaces shall be angled spaces since they allow automobiles to maneuver into and out of the space quickly, increasing traffic flow. Some of the driver-attended parking shall be for dual-use with metered spaces and posted for short-term parking as stipulated by WMATA policy.

2.6.4 Motorcycle Parking

- Provide one space for every five Kiss & Ride spaces required (rounded to the nearest whole number).

2.6.5 Short-Term Parking

- Half of the number of The Kiss & Ride spaces required shall be dedicated to exclusive short-term, metered parking.

2.6.6 Kiss & Ride Facilities Under Structure

- Kiss & Ride facilities may be located within a parking structure only when approved by WMATA.
- Kiss & Ride facilities should be located on the level of the structure with the most direct pedestrian access to the station entrance and must have direct vehicular access to an adjacent street.
- Kiss & Ride facilities located within parking structures should be clearly visible from the street and other areas of the site to enhance patron safety and have good ventilation.
- Kiss & Ride facilities located in parking structures must provide separate access and egress from Park & Ride vehicles.
- Kiss & Ride facilities where private shuttle buses travel under structure should have a 12-foot minimum vertical clearance.

2.7 PARK & RIDE FACILITIES

Park & Ride provides vehicle access to Metrorail for persons located beyond reasonable walking distance from the station or unable to utilize other access modes. Park & Ride facilities include all-day parking for private vehicles.

The following guidelines and criteria are provided to ensure adequate access is provided to Park & Ride facilities at Metrorail stations. A sample Park & Ride lot is illustrated in Figure 2-9.

2.7.1 General

- Provide an efficient, clearly defined, and safe circulation system, with an emphasis on minimizing pedestrian/vehicular conflicts. Driving aisles should be aligned in the direction to the station entrance so pedestrians do not have to walk between parked cars. In the absence of sidewalks, pedestrians should be encouraged to walk in the driving aisles.
- Park & Ride facilities should be located within easy walking distance to the station entrance. The generally accepted walking distance from the station entrance to the farthest parking space in a Park & Ride facility is 1,500 feet measured along the actual pedestrian route of travel**,** excluding travel distance where elevator service is available.
- ADA-accessible parking in the Park & Ride areas should be located closest to the station entrance and provided with an accessible path. Walkways should be carefully planned so that persons using the accessible parking do not have to walk or wheel behind parked cars to reach entrances, ramps, walkways, or elevators.

2.7.2 Park & Ride Size

- The amount of parking spaces should be based on the projected parking demand at the station factored with the amount of available land, the demand at parking facilities at other stations along the rail line, the quality of vehicular access from the regional roadway system, and the capacity of the surrounding street system.
- The number of accessible parking spaces must meet the minimum requirements of ADAAG and any local ordinances. If past trends shows that demand for accessible parking exceeds the number of available spaces at an existing station, WMATA may require additional accessible spaces be provided with any new parking facility at that station.
- In general, large parking areas should be subdivided into sections to reduce the scale. Parking lots should be divided into parking areas of not more than 500 spaces each separated by a landscape buffer. Refer to Chapter 4 for landscaping requirements.

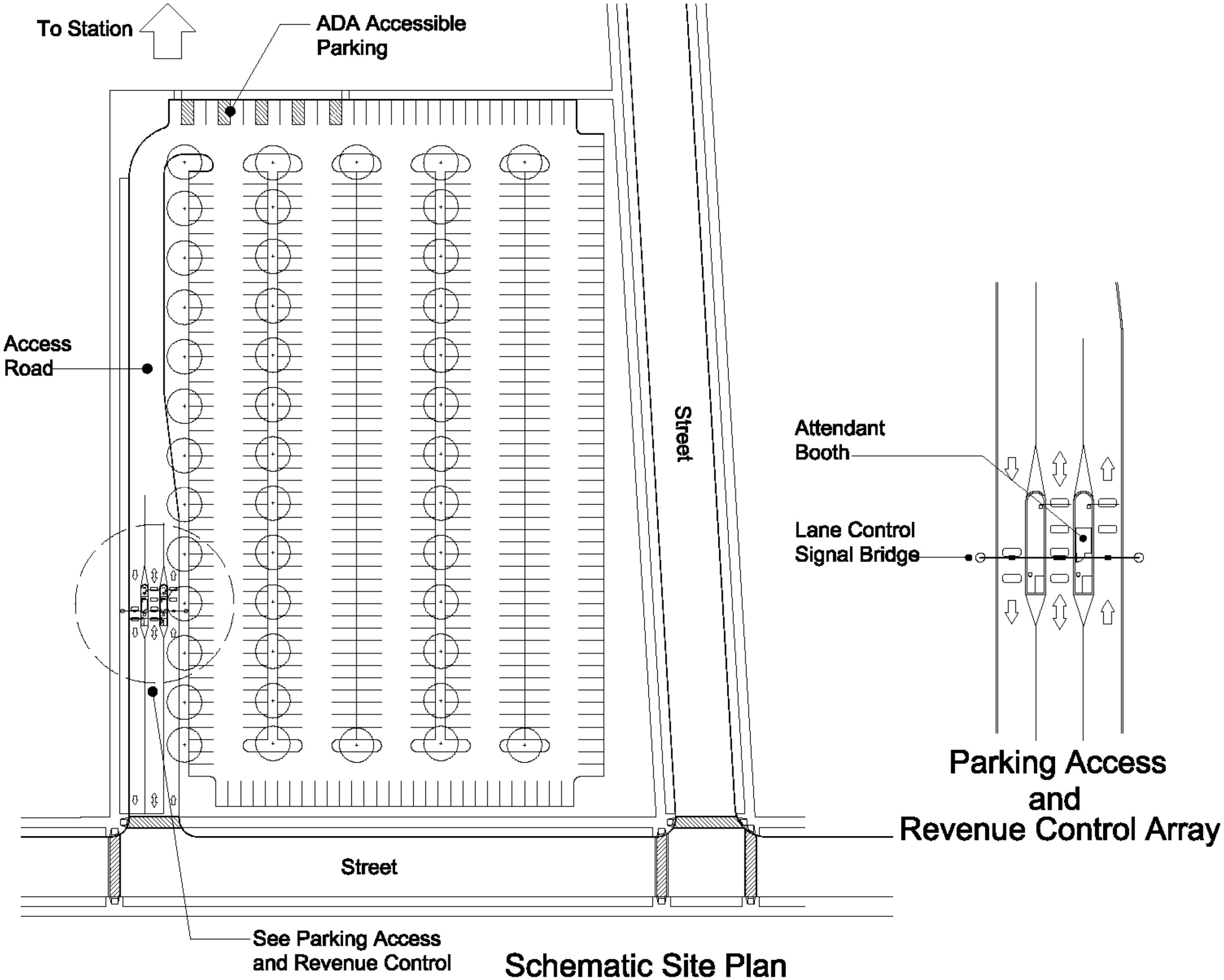
Park & Ride Layout

- Parking aisles should be oriented towards the station entrance in the direction of pedestrian flow for improved safety. Aisle lengths should not exceed 400 feet. Parking may be designated adjacent to the cross aisles, except where provision of parking will interfere with pedestrian flow between the station entrance and the Park & Ride facility. Internal parking lot circulation should encourage use of the entire lot, with a minimum of dead end parking areas.
- Ninety degree parking is the standard with parking aisles designed for two-way traffic. Avoid dead-end parking areas.
- Design speed within Park & Ride lots should assume a posted speed of 5 mph.

2.7.4 Parking Access and Revenue Control

- Park & Ride facilities should be designed to provide adequate queuing for both pay-on-exit and pay on-entry system. The preferred payment system is a cashless, pay-on-exit system employing entrance and

FIGURE 2-9: SAMPLE PARK & RIDE LOT



exit gates at each point of entry and exit. Provide adequate storage distance for automobile queuing between the access control gates to a Park & Ride facility and the adjacent intersection. The storage distance should be factored by the number of automobiles entering and exiting the access point in the peak hour, the level of service of the intersection, and the timing of the traffic signal, if one is present.

- The Parking Access and Revenue Control array should consist of a minimum of two exit lanes at all parking structure exit points, even where one lane would be sufficient to accommodate the demand. Two-lane exits help assure that the exit remains in service even when construction, maintenance, or a stalled vehicle temporarily blocks one lane. The three-lane reversible configuration, as shown on Figure 2-9, is recommended because of the high directional split differences between morning and evening peak travel periods.
- Whenever possible, parking lot access points should be located upstream of heavier inbound traffic congestion.
- Contra-flow lanes at exit/entry points should be used to increase throughput capacity for each of the peak periods.
- Because each parking facility is unique with different conditions for access, the number of access control points should be decided on a case-by-case basis as determined by WMATA.
- Provide one attendant's booth at each PARC array location for staff to assist customers with the cashless system.

2.7.5 Signage

Regulatory signs should be provided to control traffic flow, particularly at pedestrian/bicycle/vehicle conflict points and at parking entrances.

2.7.6 Parking Structures

- The design and construction of parking structures must conform to the more restrictive requirements of either WMATA Design Criteria or local jurisdictional requirements.
- Provide a continuous covered walkway or pedestrian bridge from the parking structure to the station entrance. Walkway canopies are not required to extend over access roads where vertical clearance requirements may make weather protection ineffective.

Refer to Chapter 3 for additional planning guidelines for structured parking.

2.8 VEHICLE ACCESS AND CIRCULATION

The successful functioning of the station site facilities depends on good access for vehicles to the existing roadway network. Traffic impact studies should be prepared for all major changes and developments that may affect access routes within the station area. For any traffic study, levels of service (LOS) at signalized intersections should be analyzed in accordance with procedures specified in the most current version of the *Highway Capacity Manual (HCM)*, the industry-accepted standard for roadway and intersection capacity analysis. The designer should utilize traffic simulation software when planning station site facilities, such as bus bays, Kiss & Ride lots, internal access roads, and intersections.

Any changes to the surrounding street network should consider the potential impact on transit access. Some traffic calming measures, such as street narrowing, road closures, or chicanes, may be beneficial in some cases and improve pedestrian access to Metrorail, but they could also impede access for transit vehicles if they are located along transit routes. The following guidelines are provided to improve vehicle access and circulation between WMATA facilities and adjacent areas.

2.8.1 General Access

- Access roads should be kept to a minimum, providing the clearest, most direct access to a site facility. Where access roads have a combined use, with bus and automobile traffic mixed, entrance and exit conditions from each facility should be carefully studied to minimize turning movement conflicts.
- Transit improvements should seek to increase neighborhood livability. Examples include building bus stops that are pleasant pedestrian spaces and introducing turn restrictions that reduce transit delays and reduce neighborhood cut-through traffic.
- In addition to transit vehicle access, access for station facility, maintenance, police, and emergency vehicles should also be considered.
- Clearance over a roadway should conform to or exceed the minimum vertical clearance requirements as stated in Table 2-2.
- Existing road networks, traffic patterns, traffic signals, and all proposed road improvements by others should be identified and evaluated at the outset of design.
- To reduce security risks to our transit facilities and to our customers, access of unauthorized vehicles into sensitive areas of the transit environment, such as a station entrance, should be restricted as discussed in Chapter 4.

2.8.2 Vehicle Connections

- Automobile access to Metrorail stations should be provided from collector streets or access roads that intersect with arterial roadways. These roads should be designed in accordance with AASHTO design standards and local jurisdictional requirements. When it is necessary to provide direct access to an arterial route, the access point should be spaced properly to avoid long queues from nearby intersections or interchanges. Avoid increasing congestion on adjacent arterial roadways or freeways, whenever possible.
- Vehicular access to the station site that requires or increases travel through primarily residential or neighborhood streets should be prohibited.
- Connections should be designed to prevent encroachment of bus turning movements into opposing traffic lanes. Traffic volumes, existing signalization, available rights-of-way, street widths, and other design elements should be evaluated when considering channelization to eliminate encroachments of bus turning movements into traffic lanes moving in the same direction.

2.8.3 Access Roads

- All WMATA road designs should follow AASHTO guidelines. Refer to Table 2-2 for minimum access road widths and roadway clearances.
- Access roads are not to be designed to accommodate through traffic. WMATA policy is to provide access roads for traffic connecting to the local highway road system. In general, access roads should not tie into low volume residential streets, but should instead join collector or arterial street systems, in order to keep Metro traffic out of the surrounding neighborhood unless otherwise approved by WMATA.
- Roadway lane width is based upon anticipated traffic volume. The number of lanes assigned to ingress, egress and turns are determined by traffic analysis developed or approved by WMATA. Construction, maintenance, police, and emergency vehicle access shall be considered when planning roadways.

2.8.4 Location of Access Points

- Existing road networks, traffic patterns and traffic signals shall be evaluated, and all proposed road improvements by others shall be identified at the outset of design. The successful functioning of a station depends on good access for vehicles to the existing roadway network. Station access roads shall connect with the existing arterial street system, and if possible, to the limited access highway system as well.
- Coordinate all WMATA access roads connecting the station facilities to the municipal road system with State and local authorities in providing dedicated routes from adjacent major roads. At intersections, good sight lines, unrestricted by grade change, blind curves, vegetation, and adequate queuing distance for vehicles turning from one roadway to another are required.
- Minimize the number of access points. Access points should be spaced at least 150 feet apart. A distance of 350 feet is considered desirable. A sufficient number

of entrances should be provided so that traffic operates at LOS D or better at adjacent intersections.

- When possible, locate access points on the right side of the roadway for inbound traffic to eliminate crossing movements. Maximizing accessibility for inbound trips may be more effective in attracting users than improvements aimed at exiting traffic.
- Unsignalized intersections should be located so that signal control could be installed at a later time if necessary.
- An exclusive right-turn lane should be provided only when the lack of an exclusive lane would result in unacceptable traffic operations. An additional turn lane may lengthen pedestrian crossings. If used, the lane should be a tapered section with sufficient width to accommodate the required traffic, which may include buses.
- Left-turn storage pockets are recommended, when they can be shown to noticeably improve traffic conditions and reduce conflicts with through traffic flows.
- Avoid locating exits directly across from highway off-ramps to discourage wrong-way entry onto freeways.
- New street profiles should be “benched” at intersections and mid-block crossings to maintain a crosswalk cross slope (or profile grade on the street) of 2 percent or less. In addition, crown slopes on streets should be kept as low as possible, but no more than 2 percent, to provide access for persons with disabilities. Wheelchair users should not be forced to travel uphill at steeper grades across the street.
- Whenever an entrance must be located near a “T” intersection, it should be placed directly at the intersection. Offset intersections are not acceptable. If an offset distance is unavoidable and provision for left turn movement is not required, the distance between the street centerlines should be a minimum of 150 feet.
- Entrances to bus facilities must provide adequate lane widths and stacking distances to allow simultaneous entering and exiting of buses to easily negotiate the areas.

2.9 SITE AND ROAD GRADING

- Grading design shall not impact existing trees to be preserved. Existing topography shall be respected both to minimize site grading and to preserve areas of natural vegetation.
- Maintain AASHTO guidelines for horizontal and vertical sight lines on access roads, particularly at intersections.
- Site grading shall meet existing grade within WMATA property line and meet existing grade at all structures.

- Cut and fill of roadway or parking lot side slopes shall not extend outside the WMATA ROW line.
- For site drainage on roadways and parking facilities, refer to AASHTO guidelines for minimum and maximum slopes.
- Refer to the WMATA Design Criteria for right-of-way fencing.

3 JOINT DEVELOPMENT

3.1 INTRODUCTION

Transportation systems are the lifelines around which communities grow and change. By working in partnership with local communities, transportation facilities can be the catalyst for creating transit oriented developments and neighborhoods -- places where people live and work, and where they can easily and safely walk to a transit station or bus stop.

This chapter is intended to help guide planning in and around WMATA transit stations in order to create an equitable fit between development requirements and transit requirements that will result in better access for both pedestrians and vehicles. During the Joint Development process, the need to compromise on issues such as access priority, provision of parking, etc. will frequently arise. Planners should expect to spend considerable time coordinating their master plan with WMATA, and local jurisdictional transit operators, on matters concerning operational needs and trade-offs with development requirements. If a plan conflicts with WMATA Standards and Guidelines, then an exception must be obtained from WMATA (see Chapter 1 for Procedures). To this end, the stated goals of WMATA's Joint Development program are to:

- Promote Transit-Oriented Development (TOD) by giving priority to Joint Development proposals which contain the following smart growth development principles: reduce automobile dependency, increase pedestrian/bicycle originated transit trips, foster safe station areas, enhance surrounding area connections to transit stations including bus access, provide mixed use development including housing and commercial office space in compliance with local regulations, and offer the opportunity to obtain goods and services near transit stations that result in active public spaces.
- Attract new riders to the transit system by fostering commercial and residential development projects on WMATA owned or controlled land and on private properties adjacent to Metro stations.
- Create a source of revenue for the Authority to operate and maintain the transit system by expediently negotiating Joint Development agreements between WMATA and public or private development entities.
- Assist WMATA local jurisdictions to recapture a portion of their past financial contributions and to continue making subsidy payments by expanding the local property tax base and adding value to available local revenue.

The creation of a genuinely transit-oriented community requires attention to design that supports the creation of a genuine sense of place. To achieve this goal, Joint Development plans must be developed in a manner that is consistent with the prevailing local plans for the area and with plans developed by WMATA for the transit station facility including bus and all related transit access.

3.2 TRANSIT ORIENTED DEVELOPMENT

Transit-Oriented Development (TOD) is commonly defined as moderate to higher-density development within an easy walk of a transit stop. A TOD project generally includes a mix of uses including residential, employment and retail opportunities that are planned primarily for pedestrians in lieu of a center planned primarily for the automobile. WMATA encourages mixed uses at stations as a means to increase station area activity, which supports local businesses and improves customer security. However, in order to create pedestrian-oriented developments, TOD also includes the careful design and orientation of the sidewalks, streets, bikeways, bus facilities, and open space within the immediate station area, and their connection to surrounding neighborhoods. TOD can be a new development or the redevelopment of low-density buildings whose design and orientation facilitate and encourage transit use.

In general, TOD areas are defined as about one-quarter to one-half mile radius from the transit station, or an easy five to ten minute walk. However, in a well-designed, pleasant and safe environment, people may consider a longer walking distance between the transit station area and its adjacent properties and neighborhoods.

3.3 WHAT IS TOD ACCESS?

TOD projects can differ greatly depending upon their intended function within the larger geographic area and their response to the demands of the marketplace. Such differences can have a profound effect on the type and quality of transit access, and the ability of TOD projects to successfully achieve WMATA's TOD policies and goals.

The density and diversity of land uses within the transit station area will also significantly affect the ability of the TOD to increase pedestrian/bicycle originated transit trips and reduce automobile dependency. For example, the intensity of residential and employment density within an urban center versus a traditional town center will affect the intensity of pedestrian and vehicular activity within the TOD.

The geographic location of the transit station in relation to the surrounding municipality or TOD market area may also affect the quantity and quality of access to the transit station.

3.4 OVERARCHING ISSUES

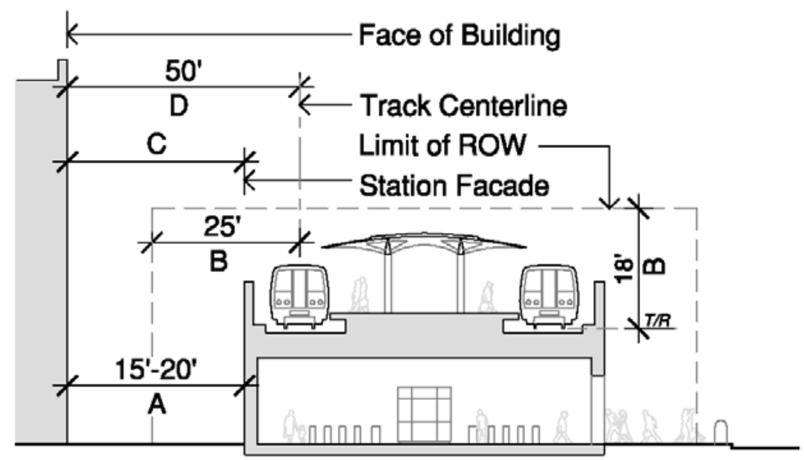
Two overarching issues must be addressed when thinking about TOD since it is intended to integrate two differing viewpoints: the land development viewpoint and the transit management viewpoint. In the case of creating well designed and properly oriented TOD projects, each viewpoint, and its related goals, objectives and criteria, should be addressed and issues resolved at the earliest stages of the planning process.

In addition to the land use required for development, the development community must address transit access as a land use in its own right. WMATA's main purpose is to move people and to serve the transit customer. Customer service is what drives WMATA's planning process, decision making, and use of resources. That being the case, the Joint Development partner must fully integrate WMATA transit access requirements, standards, and guidelines into the overall TOD master plan. Transit stations may include facilities for buses, shuttles, taxis, short- and long-term parking, access roads, sidewalks, bicycles, and landscaped open spaces. This array of uses can create a highly congested station area that can take up to 40% or more of the gross land area of a TOD site. The ability to successfully integrate and interconnect development uses with transit uses, and vice-versa, will make the difference between a successful and less than successful TOD.

3.4.1 Development Adjacent to Metrorail

When planning development on WMATA property adjacent to a station or the rail right-of-way, adjacency issues that can affect the overall quality and character of the development should be addressed early in the planning process for coordination with WMATA and the local jurisdictional authorities. These adjacency issues may include, but are not limited to, building setback requirements necessary to maintain WMATA maintenance operations, potential impact of a building structure to WMATA facilities located underground, and the fire separation requirements for a building in proximity to a rail station. Transit and non-transit uses shall be separated with fire-rated construction and/or by fire separation distance as required by NFPA 130 and applicable building codes, or with an equivalent protection as accepted by the authority having jurisdiction. Since all projects are unique, any plans for projects adjacent to or on WMATA property will be reviewed on a case-by-case basis. Figure 3-1 provides guidelines for setback distances to illustrate some of the challenges involved when locating a building adjacent to Metrorail stations and tracks. The Designer should refer to Section 9 of the *WMATA Manual of Design Criteria–Facilities*

FIGURE 3-1: MINIMUM BUILDING SETBACK DISTANCES



A. Setback for Fire Lane per Local Jurisdictional Requirements
B. Setback for WMATA Right-of-Way (ROW) Limits (1)
C. Fire Seperation Distance per NFPA 130 and Building Code(2)
D. Setback From Operable Window or Balcony Edge (3)

(1) Refer to Section 9 of the WMATA Manual of Design Criteria-Facilities
(2) Applicable Adjacent to Station Only. Not Applicable Along Track
(3) Minimum Setback Distance per WMATA. Refer to Local Codes if Applicable.

and WMATA's Adjacent Construction Manual when planning projects adjacent to or on WMATA property. The developer should also consider that some building types or uses are more or less compatible than others for locations adjacent to a Metrorail station, where the rail right-of-way may be combined with other rail lines used for commercial freight and passenger rail services. For instance, noise generated from train operations would be less likely to have a negative impact on a commercial office building than it would a residential building. For security purposes, the generally accepted minimum horizontal distance from balconies and operable windows to the centerline of the nearest Metrorail track or the edge of a station platform is 50 feet, subject to WMATA approval. The developer should also consider that rail and bus revenue hours extend into the early morning hours on weekend nights and that maintenance operations extend throughout the morning hours during the non-revenue period. A parking structure, however, located adjacent to rail tracks can absorb sound transmissions and reduce the negative impact from noise to the rest of the development.

3.4.2 Locating Transit Facilities

As a general rule in TOD planning, real estate and urban design opportunities must be taken into consideration by transit agencies when planning for transit solutions. Opportunities for creating higher densities and for mixing product types to market to a broader spectrum of incomes should be sought out during the early planning phase for transit projects. To help these projects succeed, transit planning must be attuned to the needs of development, especially development created by or in partnership with the private sector. For example, design and plan surface lots to convert to other uses over time. The amount of land devoted to surface lots could be reduced over time if redevelopment is considered in advance. As land values increase, the redevelopment of parking areas to more intensive land uses or to structured parking is more likely. Building structured parking in the middle of a surface parking lot helps to solve parking demand but will likely reduce opportunities for creating larger parcels of land that could be developed in the future.

While TOD is generally intended to improve transit access by creating a more walkable environment and bringing jobs and housing closer to the station, Joint Development should not displace essential transit facilities in a manner that would impede transit access and operations. The realignment and relocation of existing bus facilities and temporary facilities during construction should be carefully planned and coordinated with WMATA and the local jurisdictional bus operators. Poorly planned bus facilities and bus access could make bus-to-bus and bus-to-rail transfers more confusing, increase walking distances, and cause conflicts between transit operations and local traffic, potentially inconveniencing significant numbers of bus customers especially those with physical disabilities and visual impairments.

In addition, many developers, local citizens, and retail operators do not want buses located at on-street locations, such as in front of residences or businesses where they may reduce visibility, take-up valuable curb-side space, or idle for significant periods of time. All potential Joint Development proposals must recognize that existing transit customers, including Metrobus users, are as important to WMATA as any new transit customers that TOD may generate. Because bus ridership accounts for nearly half of all daily transit trips on the Metro system, bus customers should be afforded the same conveniences, amenities, and access opportunities as other Metrorail customers.

A sample assessment, included in Appendix E, of the Suitland Metrorail station illustrates how TOD can be incorporated into a Metrorail site while maintaining or improving access to the station for all modes.

3.5 SIDEWALK ACCESS AND THE PEDESTRIAN EXPERIENCE

Creating safe, enjoyable, and attractive pedestrian access to Metro stations is the highest priority in planning TOD areas. The layout of the TOD site plan and the design of the public realm, the streets, and areas between buildings are key elements in providing appropriate pedestrian access that serves both transit and development objectives and goals. The following guidelines are provided to improve pedestrian access and the walking experience.

- Locate buildings to create direct pedestrian routes to the transit station that minimize conflict with other means of transportation.
- Encourage clustered development: locate the highest density of buildings and sidewalk level uses within close walking distance of the transit facility and taper off the intensity of development away from the station area to create an appropriate transition and interface with the surrounding community. By clustering buildings near a station entrance, pedestrian use can be optimized by offering a “one-stop” opportunity to conveniently access a variety of destinations on foot.
- Create continuous pedestrian connections that discourage circuitous pedestrian routes between the station entrance and other pedestrian destinations, both within the TOD area and between the TOD area and surrounding neighborhoods.
- Design the pedestrian path from the surrounding street system to the station entrance and all other transit services such as bus bays and shuttle stands to be as direct as possible.
- Buildings located along sidewalks that lead to the station entrance should open directly onto the pedestrian path, with transparent ground-floor display windows and good views of the path from the upper floors. TOD should focus street-facing windows and “active” uses such as storefronts along primary pedestrian routes. It is generally recognized that a good building-to-sidewalk relationship can create an attractive pathway which will attract more pedestrian use by offering an enjoyable and stimulating experience in an environment that is perceived as safe. In addition, sidewalks that are bounded by stores and shops allow WMATA patrons to multi-task their transit trip by providing opportunities to fulfill errand and

shopping needs while walking to or from the transit station.

- Locate walkways in a manner that provides unimpeded access to commercial buildings, residences, and commercial or retail uses from transit stations, or streets with a transit stop.
- Ground level pedestrian routes are preferred in order to support retail uses and encourage activity in the TOD.
- Minimize pedestrian/vehicular conflicts by separating vehicular and pedestrian functions with a minimum number of points of conflict, but use grade changes only when the volume of the pedestrian crossing would impede bus and automobile traffic, or would create a hazard for the pedestrian.
- Provide convenient, readily identifiable appropriately sized crosswalks, and traffic signals phased to accommodate pedestrian street crossing.
- Driveways serving private parking garages should avoid crossing main pedestrian circulation and bus routes within the TOD area.
- Design pedestrian routes that are universally accessible to wheelchairs, strollers, scooters and other mobility aids with flat rollable surfaces per ADAAG and FTA requirements.
- Transit stations should not interrupt pedestrian routes. Where there are pedestrian routes on either side of the station, they should continue through the TOD area allowing non-riders to take the most direct route through the area.
- Promote amenities at the sidewalk level that will serve and attract pedestrians moving to or from the transit station such as landscaping, weather protection, public art, street furniture, street lighting, public phones, and convenience retail, such as drugstores, markets, coffee shops, news stands, and dry cleaners. Locate such activities as close as possible to the transit station without interfering with transit access within the immediate station area.
- In densely populated urban areas, consider the potential for dedicated pedestrian entrances to buildings above or immediately adjacent to Metro station fare gates such as the underground entrance to a major department store from Metro Center station. However, care should be taken not to drain large volumes of pedestrians from public spaces and sidewalks, where they are critical to providing a vibrant street environment that supports retail and improves perceived safety.

3.6 PLACE MAKING

Create a sense of place by designing the transit facility within a community context, an entire area of visual and functional interest and attraction. TOD should not simply locate development next to transit, but should incorporate the two elements into a coherent whole that fully integrates the transit within development, and development around transit. Local jurisdictional planners should be fully involved with WMATA throughout the planning process. The following guidelines are provided to help create a sense of place in station areas.

- Encourage attractive public open spaces near or adjacent to the transit station entrance to emphasize the station as a public space and to provide space for comfortable waiting and drop-off areas.
- Utilize appropriately sized and designed public open space as an organizing element to help define the station area within a larger center of activity or as a focal point for the community. Conversely, design and position the station to foster the creation of an activity center that surrounds the station on all sides.
- Make the transit facility a focal point of activity within the larger TOD area. This will encourage "trip linking," which is the ability to visit several destinations during one journey. To help enhance the station as an activity center, consider locating public facilities such as libraries, post offices, police sub-stations, government or municipal buildings, daycare centers, or educational facilities adjacent to it. Additionally, some of these facilities could also attract additional transit riders, which would reduce traffic on local streets.

3.7 STREET PATTERN

The design of the street pattern is a critical element in creating a successful TOD. In most cases, to increase transit ridership, development around transit benefits from higher density. Consequently, suburban-oriented traffic standards that are created to limit density and relieve congestion should be avoided. Rather, more urban standards that are designed to concentrate and centralize development and to accept a desirable level of congestion should be considered. Generally, suburban standards for parking and road access are considered excessive for development around transit stations due to their ability to reduce pedestrian use and dilute the creation of a central place. Guidelines for improving the street pattern in TODs include the following.

- Create small walkable development blocks that result in a circulation system that will facilitate access within the transit facility and throughout the TOD, increase the efficiency of transit circulation, and offer more choices for pedestrians.
- Establish a street hierarchy for the design of streets and circulation patterns to suit their specific access function throughout the TOD area with preference given first to pedestrians and bicyclists, then to transit, and lastly to automobiles.
- Design the street plan and street cross-sections to reflect this hierarchy. For example, the street network should be designed with narrow secondary and local streets that contain on-street parking. Transit vehicles should be accommodated on arterial, collector, and primary streets. On-street parking should be located so that it does not conflict with transit vehicle operation.
- All access roads within the TOD area for accessing station facilities should conform to standards for traffic

and infrastructure planning established in Chapter 2 of the Manual.

- Create multiple direct, clearly marked and safe vehicle and pedestrian connections or links between the station area and the surrounding neighborhood to produce a seamless and continuous pedestrian and vehicular access to transit from these surrounding areas.
- Design "traffic calming" measures for streets and intersections to accommodate and give preference first to pedestrians and bicycles, and second to vehicles. "Traffic calming" street design may include narrow streets, bulb-outs, and on-street parking, among other design elements, and can help to slow traffic, reduce crossing distances, provide space for landscaping and bike access, and ultimately create an enjoyable and safe pedestrian experience. Careful consideration is necessary to ensure that traffic calming measures should not impede transit vehicle access and operations within the TOD.
- Encourage landscaping such as tree-lined streets, decorative street lighting, banners, and public art to distinguish primary access streets from secondary streets.
- Avoid creating physical pedestrian barriers such as berms, walls, or fences between the surrounding neighborhood or TOD commercial developments and transit stops.
- Plan the use of simple grid systems with multiple cross connections and access options to the transit facility. In general, avoid dead-end streets or cul-de-sacs.

3.8 BUSES, TAXIS, AND BICYCLE FACILITIES THROUGHOUT THE JOINT DEVELOPMENT AREA

Large, high-density areas of Joint Development on a station site may require bus, taxi, and bicycle facilities located outside the immediate transit facility.

- Coordinate location of bus stops with WMATA and the local jurisdictional bus service provider. Coordinate facilities for bicycle storage with the local jurisdiction bicycle coordinator.
- Bus stops and taxi stands should be provided at key locations throughout the TOD area especially within short walking distances of the front door of offices and large retail uses. Consider the need to make the walk to the bus stop shorter than the walk to the nearest parking space.
- To prevent damage to asphalt paving from buses manuvering into a bus stop, provide a minimum 9 foot by 60 foot concrete pad adjacent to the curb at each street stop.

3.9 PARKING

The type, size and location of parking facilities can significantly impact the quality of a TOD area. Where and how parking facilities are located and how they are designed can greatly influence traffic patterns and congestion, pedestrian access to the station facility, and ultimately the economic and social success of the TOD. In general, parking location and design that allows for the productive reuse of land and integrates parking into TOD in an unobtrusive manner should be encouraged.

WMATA's transit parking should be located with the goal to maintain a convenient opportunity for customers to park their automobiles and ride transit. The location of the WMATA parking facility is subject to the criteria for an accessible path to the station entrance and for maximum walking distances as discussed in previous Chapters.

3.9.1 Surface Parking Lots

- Locate surface parking lots for private development off of main streets, away from front lot lines in TOD, behind buildings, or in the interior of a block in order to alleviate their negative visual impact and to prevent pedestrians from having to walk through lots to access a building's main entry.
- Encourage the use of alleys or driveways off side streets, away from the main pedestrian paths to the station entrance, for access to parking lots located at the rear of buildings.

3.9.2 Shared Parking

- Size and locate parking facilities throughout the TOD to enhance shared-use strategies that are convenient to both commuters and local businesses. Long-term parking serving commuters and local patrons can increase both transit ridership and store revenues by combining potential markets.
- WMATA-owned parking facilities shared with development use must be compatible with WMATA's SmarTrip-only Collection Policy.

3.9.3 Structured Parking

- Parking structures, which are to be operated and maintained by WMATA, should be designed in accordance with criteria included in the WMATA Manual of Design Criteria-Facilities.
- Where demand warrants, provide well-designed, structured parking integrated and dispersed within the station area, to support local businesses and residential uses throughout the TOD. Design parking structures so as to not overwhelm the station area or the TOD.
- Providing separate access to each parking area may reduce peak rush-hour congestion. Distinctions should be made between daily parking and short-term parking.
- Create direct pedestrian access to parking structures located within commercial, retail or residential buildings adjacent to the transit facility—when possible incorporate short- and long-term parking within such buildings.

- Locate driveways to off-street parking areas on secondary streets and alleyways to avoid conflict with transit vehicles that operate on primary streets.
- Parking facilities should “feed” pedestrians onto primary pedestrian routes and should be located to promote retail opportunity along these routes, especially between the station entrance and parking structures.
- Whenever possible or viable, “wrap” parking structures with retail or other non-parking “active” uses along their main and secondary street façades. Wrapped parking structures will improve the casual monitoring and appearance of the main pedestrian routes, and encourage development on street-side edges of parking structures.
- WMATA parking structures that are wrapped with development must also conform to the requirements for an open parking structure per the WMATA Manual of Design Criteria-Facilities. For the security of transit customers, every elevator hoistway and stair tower in a WMATA parking structure shall have glazed walls that are located in view of a street, alley, or station platform.
- For security purposes, any portion of a parking structure located within 50 feet from a Metrorail station or the rail right-of-way should incorporate physical barriers in the design at all fenestrations and along the parapet on the top parking level. A wire mesh partition can prevent debris being thrown from the parking structure onto rail tracks while maintaining open-air requirements.
- Provide parking to support the TOD to meet the local jurisdictions minimum zoning requirements for parking spaces. Providing additional parking spaces beyond the minimum requirements may discourage transit use if automobile use is perceived as a more attractive travel option. Additional parking may impact the Level of Service on the street infrastructure in the station area, which could also have a negative impact on transit operations.
- At stations where WMATA has plans to expand parking structures to meet future demand, provide land adjacent to the structure for horizontal expansion. WMATA parking structures cannot operate during periods of construction for vertical expansion.
- Parking structures for transit use shall be separated from the station with fire-rated construction and/or by fire separation distance as required by NFPA 130 and applicable building codes, or with an equivalent protection as accepted by the authority having jurisdiction.

3.9.4 On-Street Parking

- On street parking provides direct access to sidewalk retail uses and helps to buffer pedestrian activity from vehicular traffic. Parking meters should be used to discourage all-day parking along streets intended for short-term parking.

- Limit on-street parking and driveways at key points near the transit station that might hinder the efficient movement of pedestrians, transit, or other vehicles accessing any station facility.
- Use on-street parking as a means to reduce vehicular speeds.

4 LANDSCAPING, WAYFINDING, AND SECURITY

This chapter outlines guidelines for landscaping, customer amenities, wayfinding signage, and security for station site and access planning.

4.1 LANDSCAPING AND AMENITIES

Landscaping and customer amenities are necessary to ensure that WMATA station sites are both attractive environments and functional. All landscaping should conform to these guidelines and local jurisdictional criteria. The following guidelines are recommended to improve the visual character and environmental conditions at station sites.

4.1.1 General

- Use context-sensitive design to reflect the character of the area.
- Retaining walls and guardrails should be designed to reduce the aesthetic/visual impact to structural and/or natural features.
- Install new or replacement trees using a planting ratio with a low-maintenance program that will ensure plant establishment and long-term success.
- Coordinate landscape design with WMATA and the local jurisdictional authorities.
- Ensure that species do not obscure views or negatively impact wayfinding and security. For security reasons, avoid creating potential hiding spaces with landscape materials.
- Trees and other landscaping elements shall not interfere with drivers' sight lines, especially between the station entrance and the Kiss & Ride lot and at street intersections. Limit height of shrubs and hedges to 3 feet.
- Re-vegetate all fill slopes with trees and shrubs where appropriate.
- Grade landscaped areas to the minimum/maximum slopes as shown on Table 4-1.

TABLE 4-1: SITE GRADING

	Minimum Slope	Maximum Slope
Grassy Lawn	50:1	4:1
Ground Cover	50:1	1 ½:1
Dumped Rip-Rap	3:1	1:1
Paved Block	3:1	1:1

NOTE: 1 ½: 1 absolute maximum slope is only permitted with approval of WMATA supported by geotechnical conditions.

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- Use of landscaping stones or crushed rock in planters is prohibited adjacent to a station entrance, bus facility, or Kiss & Ride facility where glazed structures are located.
- Stormwater management system should conform with local jurisdictional requirements, but should also be designed to meet current "best practice" standards in environmental design.

4.1.2 Pedestrian Paths

- Plant trees along pedestrian paths to provide shade and a pleasant walking environment. Avoid species of trees that obscure visibility. The lowest branch of any tree should be a minimum 8 feet above pedestrian paths.
- Street furniture, such as benches, trash receptacles, newspaper stands, and wayfinding information should be provided along pedestrian paths, but not within the route of travel.
- Barriers or buffers should be provided between pedestrian paths and motor vehicle traffic to improve safety and enhance the pedestrian environment. Examples of barriers include landscaped buffers or on-street parking.
- Design landscaped areas where they will not be used as pedestrian paths. For pedestrian barriers, provide hedges with a 5' minimum width and/or use 4 foot high chain-link fencing. Provide a minimum six -inch high curb around landscape areas or planter boxes adjacent to walking surfaces.

4.1.3 Pedestrian Waiting Areas

- For weather protection, provide shelter in all pedestrian waiting areas, including bus and Kiss & Ride facilities. Reference section 4 of the WMATA Manual of Design Criteria-Facilities for lighting criteria in shelters.
- Shelters should be designed and located to accommodate all types of users, including those using wheelchairs or strollers.
- The size of waiting areas should be determined based on procedures outlined for pedestrian waiting areas in Appendix D.
- Waiting areas on bus platforms should be covered by a continuous canopy, and should be equipped with two benches per bus stop. Shelters under canopies should be designed to provide protection from wind and made of transparent materials to enhance visibility and security.
- Kiss & Ride facilities should include a minimum of one shelter for every 3 curbside pick-up/drop-off spaces for automobiles, one shelter for every pick-up/drop-off zone for private shuttles, and one shelter for the taxi stand.

- Provide a minimum of one pay phone in the Kiss & Ride facility and a minimum of two pay phones at the station entrance.
- In the Kiss & Ride facility, provide a minimum 5% green space that may include sidewalk planter boxes for street trees. Refer to the local jurisdictions requirements for the quantity and type of landscape materials to be used in planning parking facilities.

4.1.4 Parking Areas

- In accordance with WMATA Board of Directors Resolution 1972-27 adopted November 16, 1972**,** parking areas (for more than five vehicles) should be effectively screened from surrounding development (on each side which adjoins or faces a residential zone or institutional premises) unless already effectively screened by a natural terrain feature, a railroad track on elevated ground, change in grade or other permanent natural or artificial screen, or (is separated therefrom by) a road whose width of right-of-way is 120 feet or more.
- Not less than 5 percent of the total parking areas of any lot should be devoted to internal landscaping and interior parking separation areas. Ten foot wide landscaped areas, located every second parking aisle and bordered on each side by concrete mowing strips will satisfy this requirement. Use landscaped strips to make grade adjustments in the site. Adequate lighting is necessary to discourage vandalism and provide a safe environment for patrons.
- Refer to the local jurisdictions requirements for the quantity and type of landscape materials to be used in planning parking facilities.
- Fencing or landscaping should be used to discourage unlawful use or lingering in parking areas. Encourage active uses adjacent to parking areas to reduce perceived isolation of parking lots.
- Collector sidewalks leading to the station should be located perpendicular to the driving aisles and sized to accommodate the areas they serve.

4.2 WAYFINDING

The station area should provide a sense of order and orientation through station area design and wayfinding signage. For specific signage and graphics design requirements on WMATA property, refer to the *WMATA Manual of Graphics Standards*. Requirements for wayfinding signage off of WMATA property should be coordinated with the local jurisdictional authorities and WMATA. Refer to Chapter 3 for additional guidelines that apply to Joint Development on station sites. The following wayfinding guidelines are provided to improve access to Metrorail stations.

- Create a sense of arrival and clear visual orientation within the Station Area along pedestrian routes between origins and destinations. Transit users, whether walking out of a station or deboarding a bus, should be able both to quickly orient themselves to the station area.

- Provide clear and highly visible wayfinding signage throughout all transit areas directing customers to and from the station entrance, all transit site facilities, to nearby points of interests outside the transit zones, and to local roadways. Directions should be clearly signed whenever a patron has to make a decision about which direction they should choose.
- Post signage for bus routes, timetables, and provide maps of the station area and vicinity. Routes should be clearly and consistently identified. Provide one LED dynamic-display sign at each bus bay for real-time bus arrival information.
- Implement a convenient and legible sign system to direct pedestrians to and from a transit facility and throughout the station area. Signs should be legible and clear of obstructions. Signs should follow a consistent hierarchy, providing increasingly detailed information about a mode as a passenger moves closer to it. Signs should use recognizable symbols to assist passengers unfamiliar with written English.
- Use innovative wayfinding techniques, such as painting arrows on floors and use of color in architectural finishes.
- Provide wayfinding signs on streets within several blocks of the station, particularly if the station is not very visible from these areas.
- Wayfinding information should be consistent on a system-wide level with neighborhood maps for each station area, showing transit stops, bus routes servicing the area, as well as bicycle connections.
- Post signs guiding vehicles, pedestrians, and bicycles along principal municipal streets to direct traffic to the station site.
- Traffic signs must be developed in accordance with current edition of the Manual on Uniform Traffic Control Devices (MUTCD).
- Trailblazer signs directing traffic from major highways to stations should use the Metrorail logo, station name, and directional arrows.
- Signs pertaining to moving traffic should be reflective, and some signs, station site entrance signs for instance, may be illuminated.
- Signs should be placed along bicycle routes to direct bicyclists along designated bicycle routes and to bicycle parking facilities (if available).

4.3 SECURITY OF PATRONS

It is generally recognized that a station environment, which is perceived as safe and secure, enhances patrons' comfort and is necessary to maintain and improve transit ridership. The concept of *Crime Prevention Through Environmental Design* (CPTED) is particularly applicable to Metrorail station planning due to crime prevention principles based on natural surveillance, access control, and territoriality (i.e., sense of control over an environment). The following guidelines are provided for station site planning to enhance the security and safety of transit patrons.

- Reinforced, heavy-duty vehicle barriers should be incorporated into the station site plan where necessary to control risks from unauthorized access of vehicles into sensitive transit areas and into pedestrian walkways.
- When transit site facilities are being planned with mixed-use facilities, such as in a Joint Development master plan, comprehensive strategies should be developed early in the planning process to integrate traditional access management techniques and security-oriented site design into the TOD environment. For instance, a service entrance to private facilities where large vehicles will need access would be better located away from transit facilities for security purposes.
- An important security feature is lighting. Lighting codes should meet the standards of the Illuminating Engineering Society of North America. Ensure that all areas of the site accessed by passengers are well lit and visible from other areas of the site. Adequate lighting is also necessary to deter vandalism. The Designer should refer to the Section 4 of the WMATA Manual of Design Criteria-Facilities for planning lighting.
- Provide open designs of transit facilities to allow the greatest visibility of passenger waiting areas and paths.
- Remove the opportunity for crime through structural measures such as eliminating hiding areas or recesses, such as fencing off areas beneath stairs or other places where people can hide. Avoid any landscaping that obscures sight lines or provides hiding spaces.
- Use materials that can be easily cleaned of graffiti for all architectural systems within the station site.
- Encourage active uses adjacent to parking areas to reduce perceived isolation of parking lots. Retailers or restaurants in the station area generate activity, thereby increasing natural surveillance of the property. The owners and employees of these businesses would also have a vested interest in the security of the parking.
- Exterior elevator and stair towers in any transit facility should have glazed exterior walls and be located to permit natural surveillance from exterior public areas, streets or alleys.
- Bike lockers should be located within sight of the station entrance, but should not to be located under track girders or near station entrance structures due to security concerns.

- For best visibility, no berms or plant-material barriers should obstruct views within the lots or at drive aisles and roadway exits.
- Locate trees that, when foliated, may block light on walkway surfaces away from exterior lighting fixtures.
- Corners and edges of retaining walls should be rounded to avoid potential hiding spaces.
- Parking attendant booths and bus supervisor booths should have ballistic resistant construction.
- Provide one emergency telephone for each PARC array location.

APPENDIX A: LIST OF REFERENCES

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APPENDIX B: ACCESS CHECKLIST

The following checklist is designed to assist WMATA planners, localities, and the development community in analyzing proposed changes in access patterns, transit facilities, and land development activities (either as part of the Joint Development program or off-site Transit-Adjacent Development) in station areas. This checklist is provided for guidance only and shall not be used as a substitute for fulfilling all of the requirements for station site and access planning that are part of this Manual. For accessible design, the Planner shall use the WMATA ADA Accessibility Checklist and should also refer to the FTA Accessibility Handbook for Transit Facilities.

General

Is the priority of access hierarchy achieved and/or maintained?

Is the signage clear?

Pedestrian Mode

Is the access plan and/ or site designed to facilitate safe, convenient, and comfortable pedestrian circulation?

Are the pedestrian paths direct and oriented towards the station entrance?

Does the circulation system minimize pedestrian conflicts with other modes?

Are sidewalks and stairwells designed to an adequate width for pedestrian demand?

Does the wayfinding system direct pedestrians to the most direct route?

Is the pedestrian circulation system designed to enhance pedestrian usage and properly landscaped and include pedestrian amenities such as shelters, trash receptacles, medians, and buffers?

Is the pedestrian system designed to be safe, with clear lines of sight, elimination of blind corners, and adequate pedestrian scale lighting?

Bicycle Mode

Is the site designed to facilitate safe, convenient, and comfortable bicycle circulation?

Are the bicycle circulation system's functional standards consistent with AASHTO recommended standards?

Are there bicycle amenities provided such as properly sited bicycle racks and storage areas?

Is there signage for directions to bicycle parking and access routes?

Transit Mode

Are the transit flows separated from other single occupant vehicle flows and designed to provide the most direct connection to the station among motorized modes?

Are the bus bays designed to minimize pedestrian conflicts?

Does the design of the bus bays include the provision of transit information, shelters and refuge areas, and adequate room for queuing?

Does the access plan include any transit prioritization such as signal priorities?

Does the transit circulation pattern connect directly with the pedestrian and bicycle networks?

Kiss & Ride Facilities

Does the Kiss & Ride design include drop-off/pick up areas, taxicab queues, motorcycle parking, short-term parking, accessible spaces, and carsharing spaces?

Are the drop-off /pick-ups areas separate for private vehicles and taxicabs and oriented in a manner to maximize clear sight distances to drop-off/pick up waiting areas and the station entrance?

Does the design of the facilities allow for one-way flow and re-circulation?

Is there adequate parking capacity?

Is there adequate queuing space for waiting vehicles and at entrances and exits?

Park & Ride Facilities

Does the design of the Park & Ride facility facilitate pedestrian access to the station?

Are the streets and facilities designed for the safe interaction of all users?

Are the parking aisles oriented towards the station?

Is accessible parking provided closest to the station?

Does the parking facility create barriers to the station access?

Has a traffic impact statement been prepared as part of the analysis of changing Park & Ride facilities or site plan to ensure adequate capacity of the parking facility and access points?

Are the Park & Ride facilities located within acceptable walking distance to the station entrance and designed to enhance pedestrian experience and promote safety with adequate landscaping and lighting?

Station Site Roadways

Are pedestrian amenities included in all access designs?

Does the design of the access roadway consider all modes of arrival?

Does the access roadway provide adequate capacity to the transit station, while balancing the need to maintain pedestrian and transit vehicle priorities?

Are access points adequately spaced and designed so that signal control can be implemented if needed?

APPENDIX C –METRORAIL BOARDINGS BY STATION AND MODE

Methodology:
Table C-1 provides the projected boardings for all Metrorail stations by mode of access. Data is provided for the year 2005. The total number of daily boardings at each Metrorail station in 2005 reflects actual faregate data collected in April 2005 and provided by WMATA. Boardings at each station were allocated to an access mode according to the modal information collected as part of the 2002 Metrorail Ridership Survey. Bicycle access is included in the walk mode.

Table C-2 presents the mode share percentage for each Metrorail Station in 2005. Mode shares were calculated from Table C-1 by dividing the boardings for each mode, by the total boardings for each station and year.

Table C-1: Daily Metrorail Boardings by Station and Mode of Access, 2005

Station	Walk/Bike	Bus and Connecting Rail	Drop-offs	Drove and Parked	Total (all modes)
Addison Road-Seat Pleasant	190	1,610	720	1,360	3,870
Anacostia	870	4,430	650	1,330	7,290
Archives-Navy Memorial-Penn Quarter	8,430	370	10	130	8,950
Arlington Cemetery	1,980	240	10	70	2,310
Ballston-MU	8,340	1,760	690	1,250	12,040
Benning Road	1,680	720	440	420	3,260
Bethesda	7,330	1,080	650	1,020	10,080
Braddock Road	2,700	960	580	160	4,400
Branch Avenue	70	560	840	4,840	6,310
Brookland-CUA	3,910	2,000	460	680	7,050
Capitol Heights	510	330	470	720	2,040
Capitol South	8,470	240	90	140	8,940
Cheverly	220	260	260	810	1,550
Clarendon	2,880	110	260	590	3,830
Cleveland Park	4,170	230	160	290	4,850
College Park-U of Md	1,350	1,200	510	1,060	4,120
Columbia Heights	5,650	790	140	50	6,630
Congress Heights	990	910	310	180	2,400
Court House	7,110	110	150	320	7,680
Crystal City	11,260	1,140	500	580	13,480
Deanwood	790	330	120	580	1,820
Dunn Loring-Merrifield	940	700	890	2,730	5,260
Dupont Circle	20,640	2,440	260	500	23,840
East Falls Church	1,600	610	690	1,320	4,210
Eastern Market	4,710	420	240	240	5,620
Eisenhower Avenue	1,370	140	200	110	1,810
Farragut North	24,290	860	400	410	25,960
Farragut West	23,050	1,020	210	490	24,770
Federal Center SW	5,430	90	10	100	5,630
Federal Triangle	11,330	230	140	310	12,000
Foggy Bottom-GWU	18,820	2,050	420	380	21,680
Forest Glen	800	90	330	900	2,120

Station	Walk/Bike	Bus and Connecting Rail	Drop-offs	Drove and Parked	Total (all modes)
Fort Totten	1,210	2,940	860	1,240	6,260
Franconia-Springfield	550	1,390	1,060	6,770	9,770
Friendship Heights	6,200	1,390	620	1,310	9,520
Gallery Place-Chinatown	17,840	1,190	380	690	20,110
Georgia Avenue-Petworth	2,500	1,620	160	150	4,430
Glenmont	550	870	720	3,560	5,700
Greenbelt	310	1,300	660	5,110	7,370
Grosvenor-Strathmore	1,730	540	1,250	1,990	5,510
Huntington	1,230	1,820	1,080	4,440	8,570
Judiciary Square	10,280	160	150	310	10,900
King Street	5,260	1,940	970	290	8,460
Landover	200	380	330	2,020	2,950
Largo Town Center	210	1,810	810	1,530	4,350
L'Enfant Plaza	18,610	2,780	630	840	22,870
McPherson Square	15,300	580	190	320	16,390
Medical Center	3,390	1,140	370	250	5,160
Metro Center	27,170	1,160	600	880	29,810
Minnesota Avenue	1,130	1,020	300	780	3,220
Morgan Boulevard	160	320	230	390	1,090
Mt. Vernon Sq/7th St-Convention Center	3,250	80	50	410	3,800
Navy Yard	2,590	200	180	170	3,140
Naylor Road	630	1,110	430	1,030	3,200
New Carrollton	810	2,020	1,210	5,490	9,520
New York Avenue	1,270	450	140	320	2,180
Pentagon	4,760	9,150	850	620	15,380
Pentagon City	11,260	2,020	1,310	1,680	16,270
Potomac Avenue	1,760	1,320	160	300	3,540
Prince George's Plaza	1,650	800	340	1,900	4,690
Rhode Island Avenue	1,190	2,260	620	1,510	5,580
Rockville	1,040	1,230	630	1,460	4,360
Ronald Reagan Washington National Airport	3,310	590	710	1,180	5,790
Rosslyn	12,220	2,670	1,090	910	16,890

Station	Walk/Bike	Bus and Connecting Rail	Drop-offs	Drove and Parked	Total (all modes)
Shady Grove	450	3,950	1,880	7,340	13,610
Shaw-Howard University	3,190	390	100	280	3,970
Silver Spring	7,010	4,010	670	1,550	13,250
Smithsonian	14,660	490	410	590	16,150
Southern Avenue	530	1,760	440	3,200	5,940
Stadium-Armory	4,880	1,020	430	1,820	8,150
Suitland	1,010	1,210	510	3,470	6,210
Takoma	2,710	2,160	490	890	6,250
Tenleytown-AU	5,380	1,260	620	470	7,720
Twinbrook	1,700	630	440	1,870	4,650
U Street/African-Amer Civil War Memorial/Cardozo	3,010	1,590	130	100	4,830
Union Station	28,100	1,170	1,290	2,190	32,740
Van Dorn Street	580	1,560	700	1,070	3,910
Van Ness-UDC	6,670	470	240	310	7,690
Vienna/Fairfax-GMU	1,690	2,270	1,390	8,090	13,440
Virginia Square-GMU	2,890	60	180	290	3,420
Waterfront-SEU	3,000	150	80	100	3,320
West Falls Church-VT/UVA	880	5,100	1,080	5,100	9,810
West Hyattsville	1,400	620	470	900	3,390
Wheaton	1,070	620	460	2,250	4,390
White Flint	1,380	550	320	1,450	3,700
Woodley Park-Zoo/Adams Morgan	7,440	320	170	160	8,090
TOTALS	451,560	104,590	44,210	116,840	717,200

Source: WMATA

Table C-2: Metrorail Station Access Mode Share Percentages, 2005

Station	Walk/Bike	Bus and Connecting Rail	Drop-offs	Drove and Parked
Addison Road-Seat Pleasant	5%	41%	19%	35%
Anacostia	12%	61%	9%	18%
Archives-Navy Memorial-Penn Quarter	94%	4%	0%	1%
Arlington Cemetery	86%	10%	1%	3%
Ballston-MU	69%	15%	6%	10%
Benning Road	52%	22%	13%	13%
Bethesda	73%	11%	6%	10%
Braddock Road	61%	22%	13%	4%
Branch Avenue	1%	9%	13%	77%
Brookland-CUA	55%	28%	7%	10%
Capitol Heights	25%	16%	23%	36%
Capitol South	95%	3%	1%	2%
Cheverly	14%	17%	17%	52%
Clarendon	75%	3%	7%	15%
Cleveland Park	86%	5%	3%	6%
College Park-U of Md	33%	29%	12%	26%
Columbia Heights	85%	12%	2%	1%
Congress Heights	41%	38%	13%	7%
Court House	92%	1%	2%	4%
Crystal City	84%	8%	4%	4%
Deanwood	44%	18%	7%	32%
Dunn Loring-Merrifield	18%	13%	17%	52%
Dupont Circle	87%	10%	1%	2%
East Falls Church	38%	14%	16%	31%
Eastern Market	84%	8%	4%	4%
Eisenhower Avenue	75%	8%	11%	6%
Farragut North	94%	3%	2%	2%
Farragut West	93%	4%	1%	2%
Federal Center SW	96%	2%	0%	2%
Federal Triangle	94%	2%	1%	3%
Foggy Bottom-GWU	87%	9%	2%	2%
Forest Glen	38%	4%	16%	42%
Fort Totten	19%	47%	14%	20%

Station	Walk/Bike	Bus and Connecting Rail	Drop-offs	Drove and Parked
Franconia-Springfield	6%	14%	11%	69%
Friendship Heights	65%	15%	6%	14%
Gallery Place-Chinatown	89%	6%	2%	3%
Georgia Avenue-Petworth	56%	37%	4%	3%
Glenmont	10%	15%	13%	62%
Greenbelt	4%	18%	9%	69%
Grosvenor-Strathmore	31%	10%	23%	36%
Huntington	14%	21%	13%	52%
Judiciary Square	94%	2%	1%	3%
King Street	62%	23%	11%	3%
Landover	7%	13%	11%	69%
Largo Town Center	5%	41%	19%	35%
L'Enfant Plaza	81%	12%	3%	4%
McPherson Square	93%	4%	1%	2%
Medical Center	66%	22%	7%	5%
Metro Center	91%	4%	2%	3%
Minnesota Avenue	35%	32%	9%	24%
Morgan Boulevard	15%	29%	21%	35%
Mt. Vernon Sq/7th St-Convention Center	85%	2%	1%	11%
Navy Yard	83%	6%	6%	5%
Naylor Road	20%	35%	13%	32%
New Carrollton	8%	21%	13%	58%
New York Avenue	58%	21%	6%	15%
Pentagon	31%	59%	6%	4%
Pentagon City	69%	12%	8%	10%
Potomac Avenue	50%	37%	4%	8%
Prince George's Plaza	35%	17%	7%	40%
Rhode Island Avenue	21%	40%	11%	27%
Rockville	24%	28%	14%	33%
Ronald Reagan Washington National Airport	57%	10%	12%	20%
Rosslyn	72%	16%	6%	5%
Shady Grove	3%	29%	14%	54%
Shaw-Howard University	81%	10%	3%	7%
Silver Spring	53%	30%	5%	12%

Station	Walk/Bike	Bus and Connecting Rail	Drop-offs	Drove and Parked
Smithsonian	91%	3%	3%	4%
Southern Avenue	9%	30%	7%	54%
Stadium-Armory	60%	12%	5%	22%
Suitland	16%	20%	8%	56%
Takoma	43%	35%	8%	14%
Tenleytown-AU	70%	16%	8%	6%
Twinbrook	37%	14%	9%	40%
U Street/African-Amer Civil War Memorial/Cardozo	62%	33%	3%	2%
Union Station	86%	4%	4%	7%
Van Dorn Street	15%	40%	18%	27%
Van Ness-UDC	87%	6%	3%	4%
Vienna/Fairfax-GMU	13%	17%	10%	60%
Virginia Square-GMU	85%	2%	5%	8%
Waterfront-SEU	90%	4%	2%	3%
West Falls Church-VT/UVA	9%	52%	11%	28%
West Hyattsville	41%	18%	14%	27%
Wheaton	24%	14%	10%	51%
White Flint	37%	15%	9%	39%
Woodley Park-Zoo/Adams Morgan	92%	4%	2%	2%

Source: WMATA

APPENDIX D – PROCEDURES FOR CALCULATING PEDESTRIAN LEVEL OF SERVICE

This appendix summarizes procedures for calculating the minimum capacity requirements needed for pedestrian facilities, which include walkways, stairways, and waiting areas. The pedestrian levels of service (LOS) concepts and methods for estimating required capacity are based on those provided in the *Transit Capacity and Quality of Service Manual—2nd Edition (Part 7/Stop, Station, and Terminal Capacity)*, which should be consulted for a fuller description and illustration of these concepts and procedures.

The capacity requirements are intended to identify the minimum widths necessary to move people through the site. However, in order to provide an attractive, safe, and high quality pedestrian oriented environment, wider sidewalks, stairways, and other amenities must also be considered. For planning purposes, all pedestrian facilities should be designed to provide an adequate level of service (LOS) during the period of greatest activity. For walkways and stairways, this will generally be a.m. peak-period. For pedestrian waiting areas, the heaviest period will typically be in the p.m. peak when pedestrians are more likely to be waiting for ride or bus to arrive.

Walkways: The LOS of walkways is based on the walkway width and the volume of pedestrians and any obstructions. Walls (1½ foot per side), trash receptacles, or other obstructions reduce the usable space of walkways. In addition, the use of wheelchairs, strollers, or luggage carriers requires more walkway space. The LOS concept for walkways is based on the average walking space available and the average flow rate as demonstrated in the following table.

Table D-1: Pedestrian LOS on Walkways

LOS	Pedestrian Space (ft^2/peds)	Avg. Speed, S (ft/min)	Flow per Unit Width, v (peds/ft/min)
A	> 35	260	0-7
B	25-35	250	7-10
C	15-25	240	10-15
D	10-15	225	15-20
E	5-10	150	20-25
F	< 5	< 150	Variable

Source: Transit Capacity and Quality of Service Manual—2nd Edition (Part 7/Stop, Station, and Terminal Capacity)

In general, a LOS of C or better is considered acceptable for pedestrian paths during peak periods. For designated accessible routes, a LOS of B (or better) is desirable in order to accommodate persons with disabilities who require more space. The following methodology can be used to determine the width of a walkway to achieve the desired LOS:

1. Estimate the peak 15-minute pedestrian demand for the walkway.
2. Choose a target maximum pedestrian flow rate (v) that corresponds to the appropriate LOS.
3. Compute the design pedestrian flow (p/min) by dividing the 15-minute demand by 15.

4. Compute the required effective width of walkway by dividing the design pedestrian flow by the maximum pedestrian flow rate.
5. Compute the total width of walkway by adding 3 feet with a 1½-foot buffer on each side of walkway.

Stairways: Pedestrians generally slow down when using stairways, so stairways must be wider than sidewalks to achieve the same LOS. The LOS concept for stairways is based on the average pedestrian space available and the average flow rate as demonstrated in Table D-2.

Stairways should be designed to operate at LOS C (or better) during the peak 15-minute period. The following methodology can be use to determine the width of a stairway need to achieve the desired LOS:

- Estimate the peak 15-minute pedestrian demand for the walkway.
- Choose a target maximum pedestrian flow rate (v) that corresponds to the appropriate LOS.
- Compute the design pedestrian flow (persons/minute) by dividing the 15-minute demand by 15.
- Compute the required width of stairway by dividing the design pedestrian flow by the maximum pedestrian flow rate.

Table D-2: Pedestrian LOS on Stairways

LOS	Average Pedestrian Space (ft^2/peds)	Flow per Unit Width (peds/ft/min)	Description
A	>20	>5	Sufficient area to freely select speed and to pass slower-moving pedestrians. Reverse flows cause limited conflicts.
B	15-20	5-7	Sufficient area to freely select speed with some difficulty n passing slower-moving pedestrians. Reverse flows cause minor conflicts.
C	10-15	7-10	Speeds slightly restricted due to inability to pass slower-moving pedestrians. Reverse flows cause significant conflicts.
D	7-10	10-13	Speeds restricted due to inability to pass slower moving pedestrians. Reverse flows cause significant conflicts.
E	4-7	13-17	Speeds of all pedestrians reduced. Intermittent stoppages likely to occur. Reverse flows cause serious conflicts.
F	<4	Variable	Complete breakdown in pedestrian flow with many stoppages. Forward progress dependent on slowest moving pedestrians.

Source: Transit Capacity and Quality of Service Manual—2nd Edition (Part 7/Stop, Station, and Terminal Capacity)

- Increase the stairway width by a minimum of one traffic lane (30”) when minor, reverse-flow pedestrian volumes occur frequently.
- Adequate space for queues at both ends of stairways should also be considered.

Waiting Areas: The following procedures apply to all pedestrian waiting areas at station sites, which include waiting areas in the Kiss & Ride lot and at all transit loading areas. The presence of other pedestrians or obstructions, such as trash receptacles, reduces the usable space of a waiting area.

The actual usable space is also reduced by 1½ foot from any walls (higher than…). In addition, the use of wheelchairs, strollers, or luggage carriers requires more walkway space. The LOS concept for waiting areas is based on the average pedestrian space available.

Waiting areas should be designed to operate at LOS C (or better) during the peak period, which will generally occur in the afternoon for Kiss & Ride and off-street bus stops located at Metro stations. The recommended minimum size for waiting areas can be calculated based on the following method:

- Estimate the maximum demand of passengers waiting for a bus during the pm peak.
- Calculate the effective waiting area required by multiplying the average passenger space by the maximum passenger demand.
- Calculate the total required waiting area by adding a 1½-foot buffer width from the roadway and any walls to the effective waiting area.
- The calculation for waiting areas does not include passenger circulation areas that are needed, such as sidewalks. The total space for waiting areas must include pedestrian walkways required to access waiting areas.

Pedestrian LOS standards for waiting areas are provided in table D-4.

Table D-3: Pedestrian LOS for Waiting Areas

LOS	Average Pedestrian Area (ft2/p)	Average Inter-Person Spacing (ft)
A	>13	>4.0
B	10-13	3.5-4.0
C	7-10	3.0-3.5
D	3-7	2.0-3.0
E	2-3	<2.0
F	<2	Variable

Source: (Transit Capacity & Quality of Service Manual—2nd Edition)

APPENDIX E: SAMPLE STATION STUDIES

This Sample Station Study was conducted as part of the WMATA Site and Access Planning Manual program to assist the Designer of any future Station Access Improvement Study or Joint Development project with a sample of tasks to be performed in the early phases of the station site planning process.

The planning process for any actual study or Joint Development project shall meet the full requirements of the Manual as described in the previous Chapters. Three existing Metrorial stations were selected to be part of the Sample Station Study that would give a full range of station types for assessment: a terminus station (Glenmont), a mid-line station (West Falls Church-VT/UVA), and a potential Joint Development site (Suitland).

As discussed in Chapter 1, steady development growth in the region, particularly around Metrorail stations, has generated increased transit ridership, but has also led to more vehicle traffic in station areas. As a result, the different access modes often come into conflict in station areas and overall access to the station site may be constrained by local traffic. WMATA and local jurisdictional planners have recognized that many existing Metrorail stations need a new assessment to determine if existing conditions for pedestrian access, bus operations, and vehicular traffic are adequate to meet existing capacity and future demand.

The sample station studies first identify any deficiencies with the site facilities: pedestrian and vehicular access, capacity constraints, and multi-modal connectivity. Then general recommendations for facility and infrastructure improvements are presented.

The station assessment process began with site visits to the selected stations to review existing conditions and access conflicts between modes at the stations (the reader is advised that existing conditions at the stations may change from the time this study was conducted). Existing master plans and transportation studies of the station areas were reviewed and evaluated with existing and projected ridership to assist the planning process for current access needs. An assessment of existing bus service, bus operations, and bus facility capacity was not conducted for this study, but would be required with any other station study or Joint Development Proposal.

For the purposes of this study, ridership projections for Metrorail boardings in year 2025 were developed from the forecasts prepared as part of the 2004 Dulles Corridor Metrorail Project EIS and the WMATA 2001 Core Capacity Study. The projected rail boardings for each mode of access at each sample station were then applied to the 2005 mode share data from Appendix C.

The amount of existing parking provided at the three sample stations is listed in Table E-1. All three stations also provide bicycle parking in the form of racks and lockers. The West Falls Church station currently has dedicated a parking space for one Flexcar vehicle. There are no carsharing vehicles currently located at the Glenmont or Suitland stations.

Table E-1: Existing Parking and Bus Routes at Sample Stations

	Glenmont	Suitland	West Falls Church-VT/UVA
All-Day Parking Spaces	1,781	1,890	2,009
Short-Term Parking Spaces	69	175	53
Other Parking	Not Available	HOV parking	68 metered
Metro Bus Routes	9 Routes	8 Routes	7 Routes
Other Bus Routes	4 Routes	1 Route	13 Routes
Off-Street Bus Bays	7	13	15

Existing and future access needs of the three sample stations are discussed below.

GLENMONT

Glenmont is a terminal station on the Red Line, which opened in 1998, and was the last station to be built in Montgomery County. The station and rail line are located underground below Georgia Avenue. The average daily boardings at Glenmont in 2005, as well as the projections of future daily boardings in 2025 are listed in Table E-2 by mode of access.

Total daily boardings are expected to more than double by 2025 with the largest total increase in mode share coming from drop-offs. The number of boardings from bus transfers will also increase substantially, by 98%. Daily rail boardings have increased 23% in the last 5 years.

The Glenmont station has entrances and Kiss & Ride facilities on both sides of Georgia Avenue. The north Kiss & Ride lot has more spaces and includes a taxi stand, which is partially separated from other Kiss & Ride traffic. During a weekday site visit, the number of accessible parking spaces provided in both Kiss & Ride lots was below the demand at the site.

Table E-2: Average Daily Boardings at Glenmont by Mode, 2005 and 2025

Mode of Access	2005	2025	Percent Change
Walk	550	1,150	109%
Bus	870	1,725	98%
Drop and Parked	3,560	7,130	100%
Drop-Offs	720	1,495	108%
Total	5,700	11,500	102%

Source: WMATA

Several vehicles with handicapped stickers were parked in expired metered parking spaces adjacent to the accessible spaces. The motorcycle parking located in the north Kiss & Ride lot was mostly empty, with the exception of one motorcycle.

The bus facility is located near the entrance on the east side of Georgia Avenue and has a loop design that provides good circulation and layover space. A continuous canopy along the bus platform provides weather protection for transit customers. Both escalator entrances also have canopies. The central landscaped island created by the bus loop could be better utilized as a "Rain Garden" for storm water management.

Long-term parking is constrained on the station site with the Park & Ride structure's 1,780 spaces typically filled by 7:30 AM, indicating unmet demand for parking.

Pedestrian access to the west station entrance is very good. The street network located southwest of Georgia Avenue consists primarily of neighborhood streets with sidewalks that connect to the station entrance. A multi-use path along Georgia Avenue provides excellent bicycle access to the station entrance and to the bicycle lockers. The station has excellent bicycle storage facilities with 48 lockers and 36 racks. However, only 20 lockers were rented at the time of this study.

Pedestrian access to the east station entrance is not as good. The width of Glenallan Avenue and Layhill Road, as well as the lack of traffic signals or marked crosswalks, impedes access from adjacent neighborhoods. Glenallan Avenue is a five-lane roadway with no median or marked pedestrian paths directly connected to the station except at the intersections with Georgia Avenue and Layhill Road. Sidewalks along Glenallan Avenue are located on the edge of the roadway with no buffer, which puts pedestrians next to vehicle traffic. Layhill Road is a six-lane roadway, also with no direct or marked pedestrian crossings except at the intersections with Georgia Avenue and Glenallan Avenue.

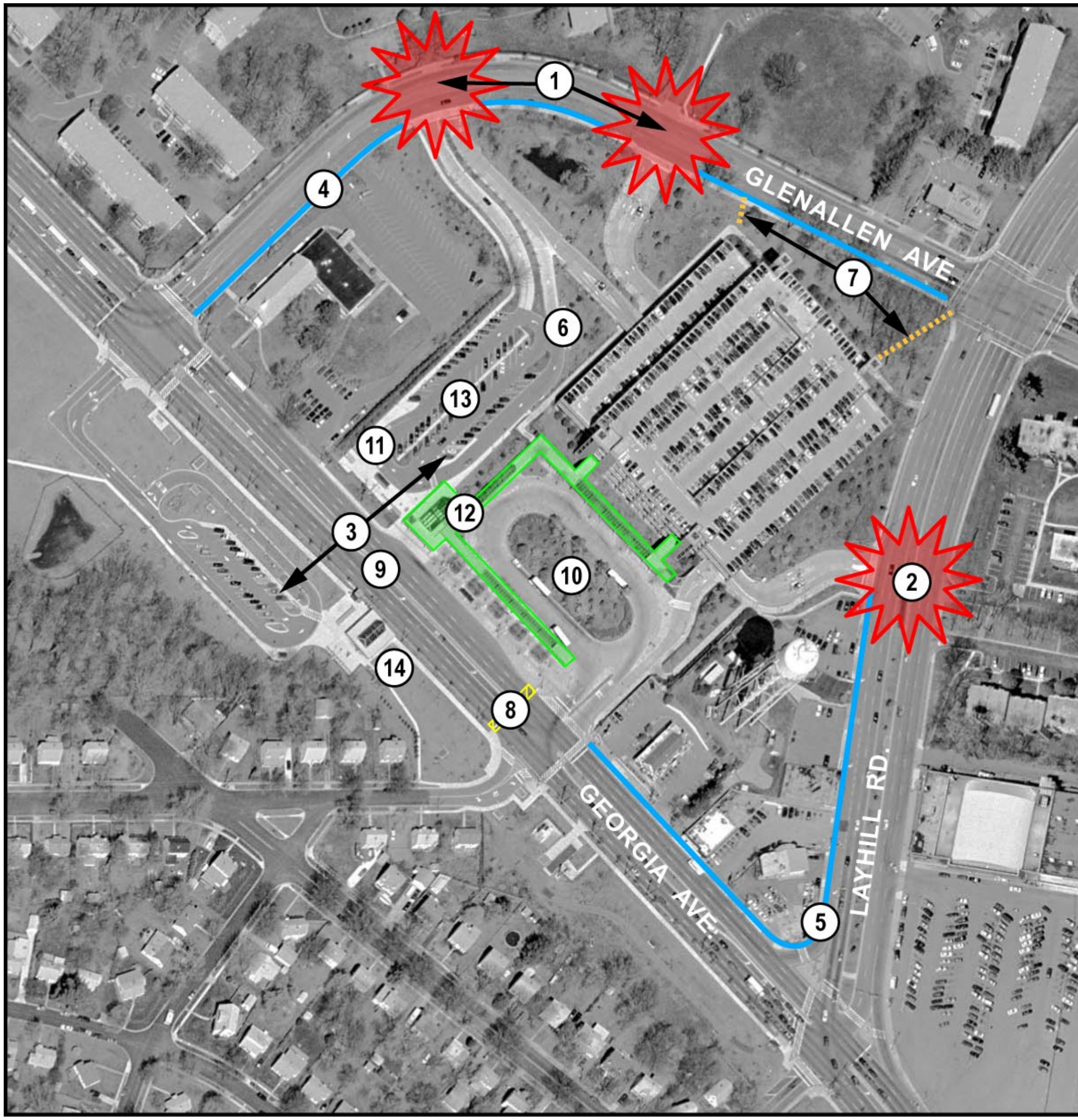
The existing levels of service (LOS) along Glenallan Avenue may justify a "road diet" or reduction in capacity in this area, which could allow for improvements to the pedestrian environment (e.g.; on-street parking, medians, or widened sidewalks). The intersection of Glenallan Avenue with Layhill Road was listed as operating at LOS A during both the AM and PM peak hours. The intersection of Glenallan Avenue with Georgia Avenue was listed as operating at LOS A during the AM and LOS B during the PM. The intersection of Layhill Road with Georgia Avenue was listed as operating at LOS B during both the AM and PM peak hours. [1]

Montgomery County prepared a sector plan for the Glenmont station area that proposes several changes to the current land use and street network. Proposed changes to land use include replacement of aging developments with new transit-oriented developments at increased densities, as well as design improvements to the pedestrian environment. Proposed changes to the street network include connecting Flack Street through property currently owned by WMATA, which would also connect to an extension of Glenallan Avenue. The plan also proposes bifurcation of Layhill Road. The southbound lanes of Layhill Road would be realigned beginning at a point just south of the Glenallan Avenue intersection. The realigned southbound lanes would run

[1] *Sector Plan for the Glenmont Transit Impact Area and Vicinity*, 1997

Figure E-1: Glenmont Station - Bus and Pedestrian Flows

Figure E-2: Glenmont Station – Existing Conditions Assessment



1	• No signal or marked pedestrian crossings of Glenallen Ave. • Existing 5-lane roadway cross-section with no median creates barrier to pedestrian access from adjacent neighborhoods.
2	• No signal or marked pedestrian crossings of Layhill Road. • Existing 5-lane roadway cross-section creates barrier to pedestrian access from adjacent neighborhoods.
3	• Not enough accessible parking spaces to accommodate demand. • Overflow of accessible vehicles are parked in metered spots. • Good sight lines from short-term parking spaces in the Kiss & Ride area to the station entrance.
4	• Sidewalk is located at the street edge with no barrier between pedestrians and travel lanes.
5	• Numerous access points along Layhill Road and Georgia Avenue interrupt sidewalks. Lack of buffer between sidewalks and roads.
6	• Motorcycle parking is underutilized. • No sidewalks or connections from motorcycle area to station.
7	• Dirt paths used by pedestrians for more direct route to station entrance.
8	• No marked crosswalk on northwest side of Georgia Avenue Intersection.
9	• Jaywalking across Georgia Avenue observed at this location, despite fences.
10	• Existing bus bay layout provides good bus circulation, but has a large footprint with unutilized space close to the station.
11	• Taxi-stand area is clearly marked and separated from other Kiss & Ride vehicles.
12	• Continious canopy provides good weather protection for Kiss & Ride and bus waiting areas.
13	• Alignment of Kiss & Ride provides good site lines from vehicle area to covered waiting area near station entrance.
14	• Bicycle lockers are in a good location near the station entrance with direct access from a multi-use trail and outside of the main pedestrian flows.

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Figure E-3: Glenmont Station – Access Improvements

parallel to the newly constructed Glenmont parking garage and connect to Georgia Avenue near the existing bus entrance to the station. The right-of-way for each leg of the bifurcated Layhill road would include three travel lanes, as well as pedestrian and bicycle paths.

A new two-lane Busway is proposed to operate in the median of Georgia Avenue, beginning at the Glenmont station and extending to Olney.[2] The busway would increase the need for improved bus access and storage to the site.

SUITLAND

The Suitland station is the 2nd to last station on the Green Line in Prince George's County—the Branch Avenue Station is the terminal station. The station and rail line are located above ground at this location.

The average daily boardings at Suitland in 2005, as well as the projections of future boardings in 2025 are listed in Table E-3 by mode of access. The number of rail boardings has increased by 20% since the station opened in January 2001.

Existing conditions and access conflicts at the Suitland station are illustrated in Figure E-2. Access from the west to the station entrance on the east side is limited to the Spring Hill Road bridge that crosses the Suitland Parkway.

Of the three sample stations, Suitland provides the best application for priority access for pedestrians on the station site. Buses are located closest to the station, followed by the Kiss & Ride area, and the Park & Ride area. However, the HOV parking area, which is designed for commuter and tour bus parking, appears to be underutilized.

Table E-3: Average Daily Boardings at Suitland by Mode, 2005 and 2025

Mode of Access	2005	2025	Percent Change
Walk	1,010	1,450	44%
Bus	1,210	1,780	47%
Park	3,470	5,040	45%
Drop-Off	510	730	43%
Total	6,210	9,000	45%

Source: WMATA

The design of the bus facility at Suitland uses a contra-flow, bus loop layout, which provides a central bus platform that is connected directly to the station entrance via vertical circulation systems and a pedestrian bridge above the bus lanes. The design eliminates pedestrian conflicts with buses and places all bus bays near the station entrance. The Kiss & Ride lot is located adjacent to the bus bays and is oriented perpendicular to the station entrance. The orientation of the Kiss & Ride site provides drivers a clear view of passengers exiting the station. The continuous canopy from the Park & Ride structure to the station entrance provides weather protection to almost all transit customers.

Parking aisles in the parking areas are oriented towards the station entrance and provide a direct path to the station

[2] *Sector Plan for the Glenmont Transit Impact Area and Vicinity*, 1997

Figure E-4: Suitland Station - Bus and Pedestrian Flows

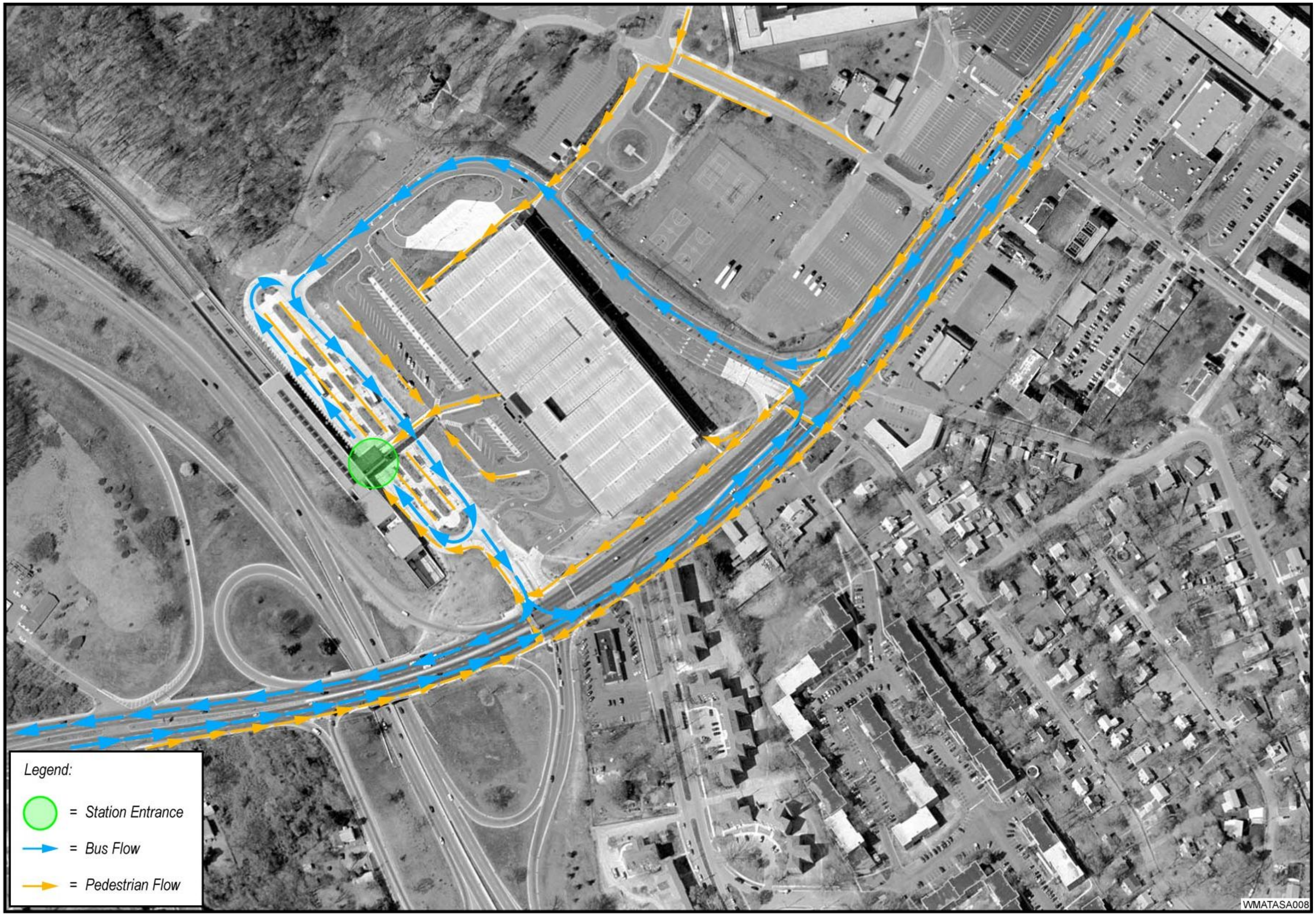


Figure E-5: Suitland Station - Existing Conditions Assessment

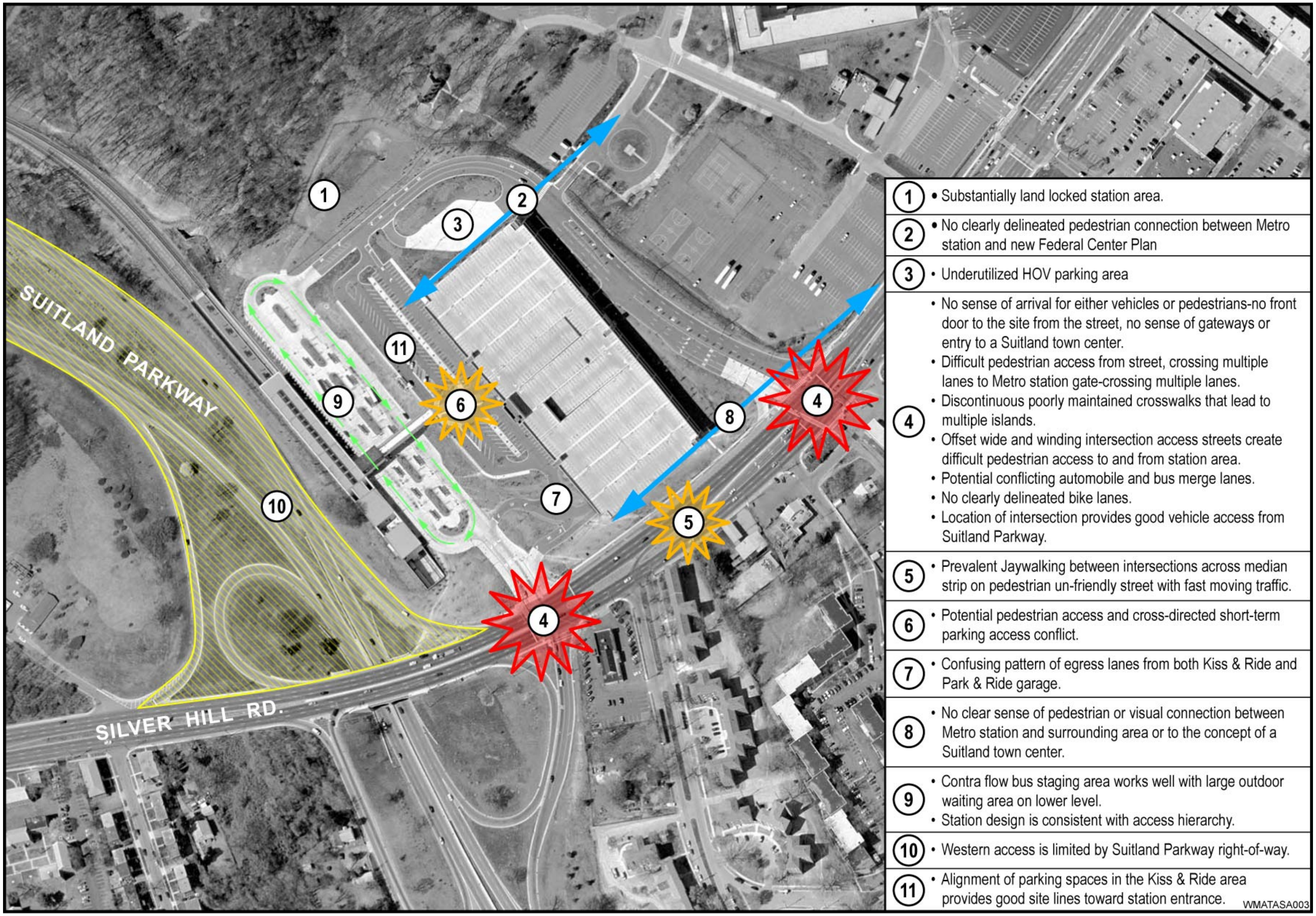


Figure E-6: Suitland Station - Sample Joint Development

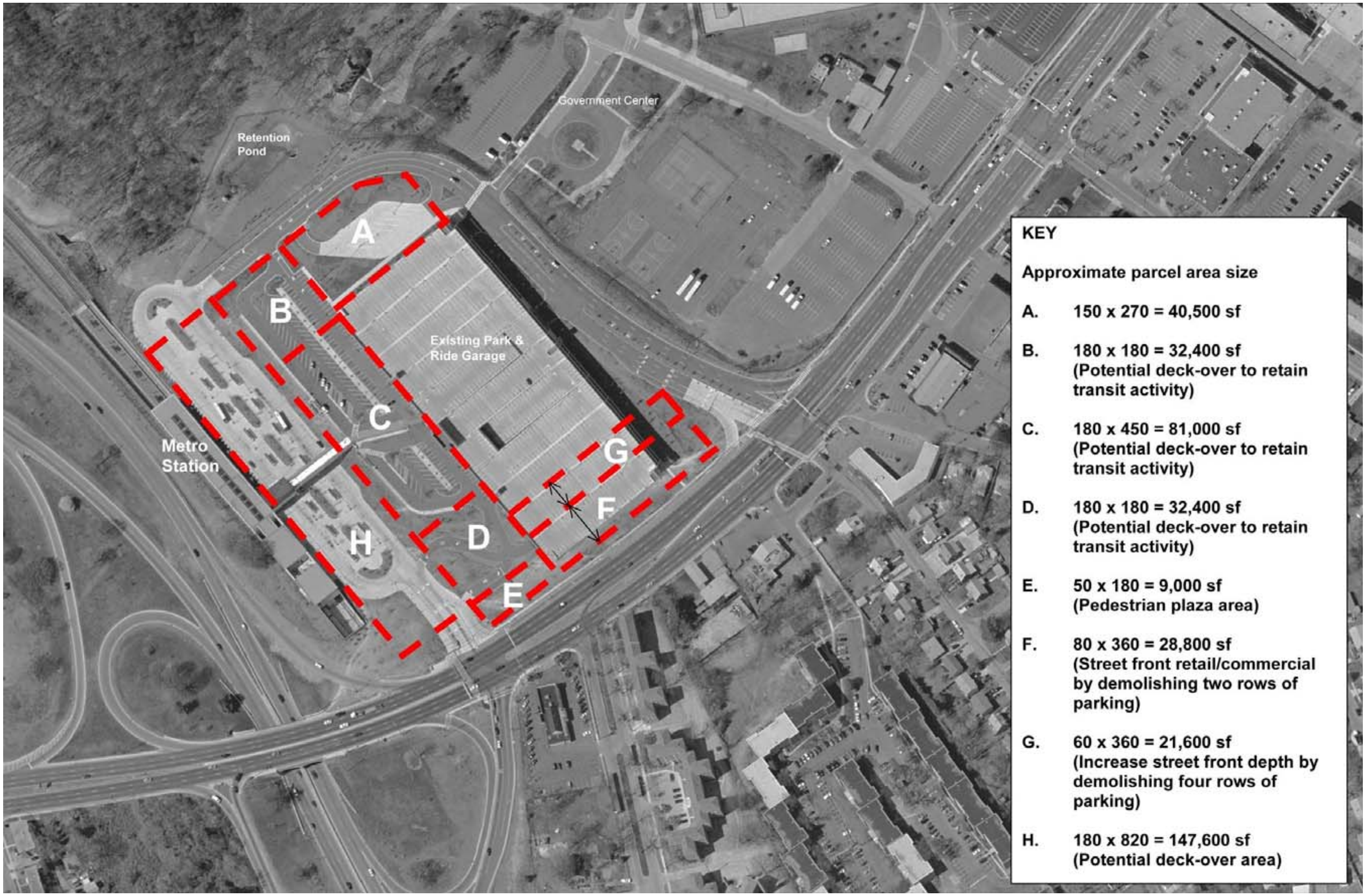


Figure E-7: Suitland Station – Sample Four Story Plan for Joint Development

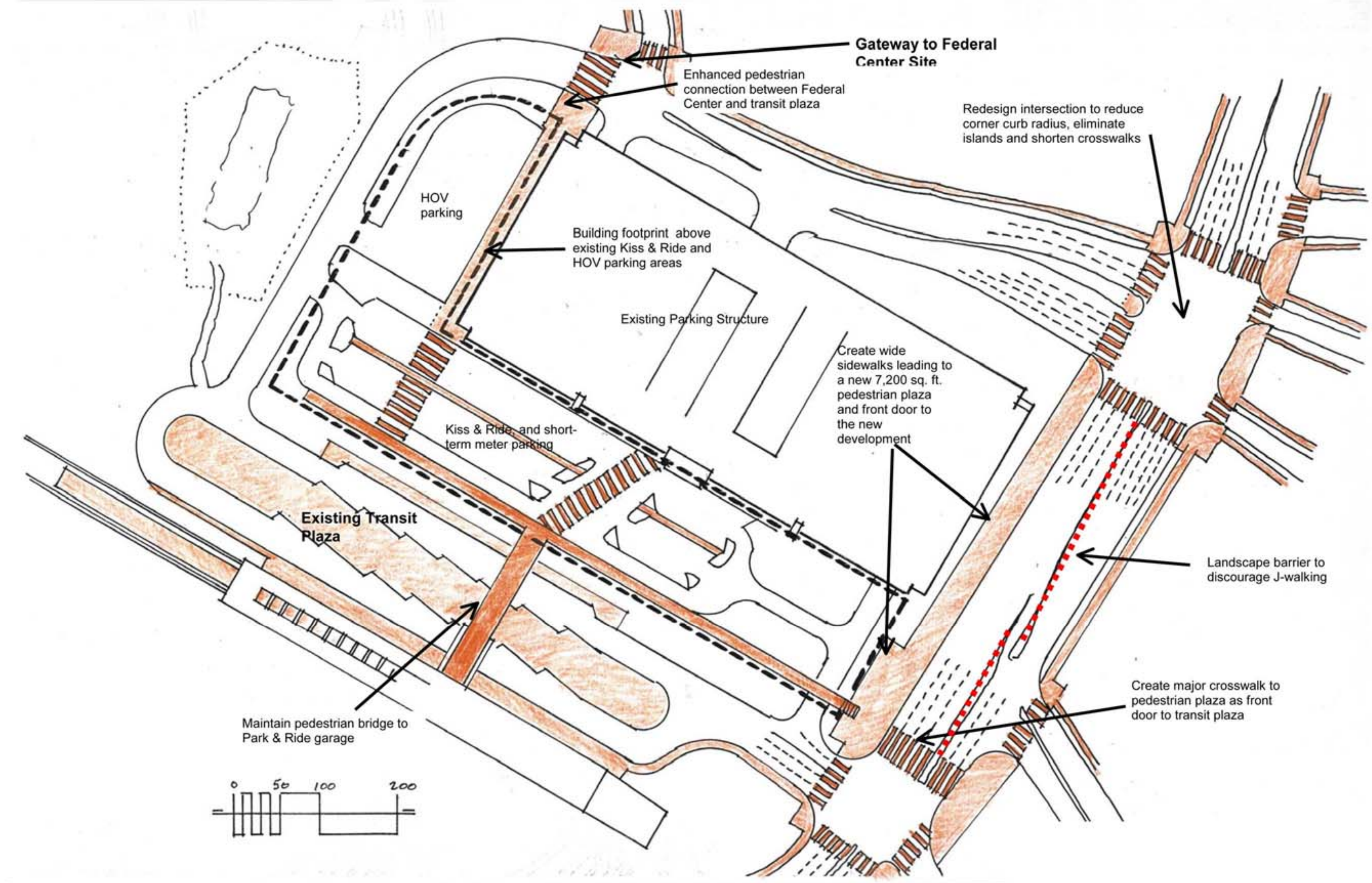
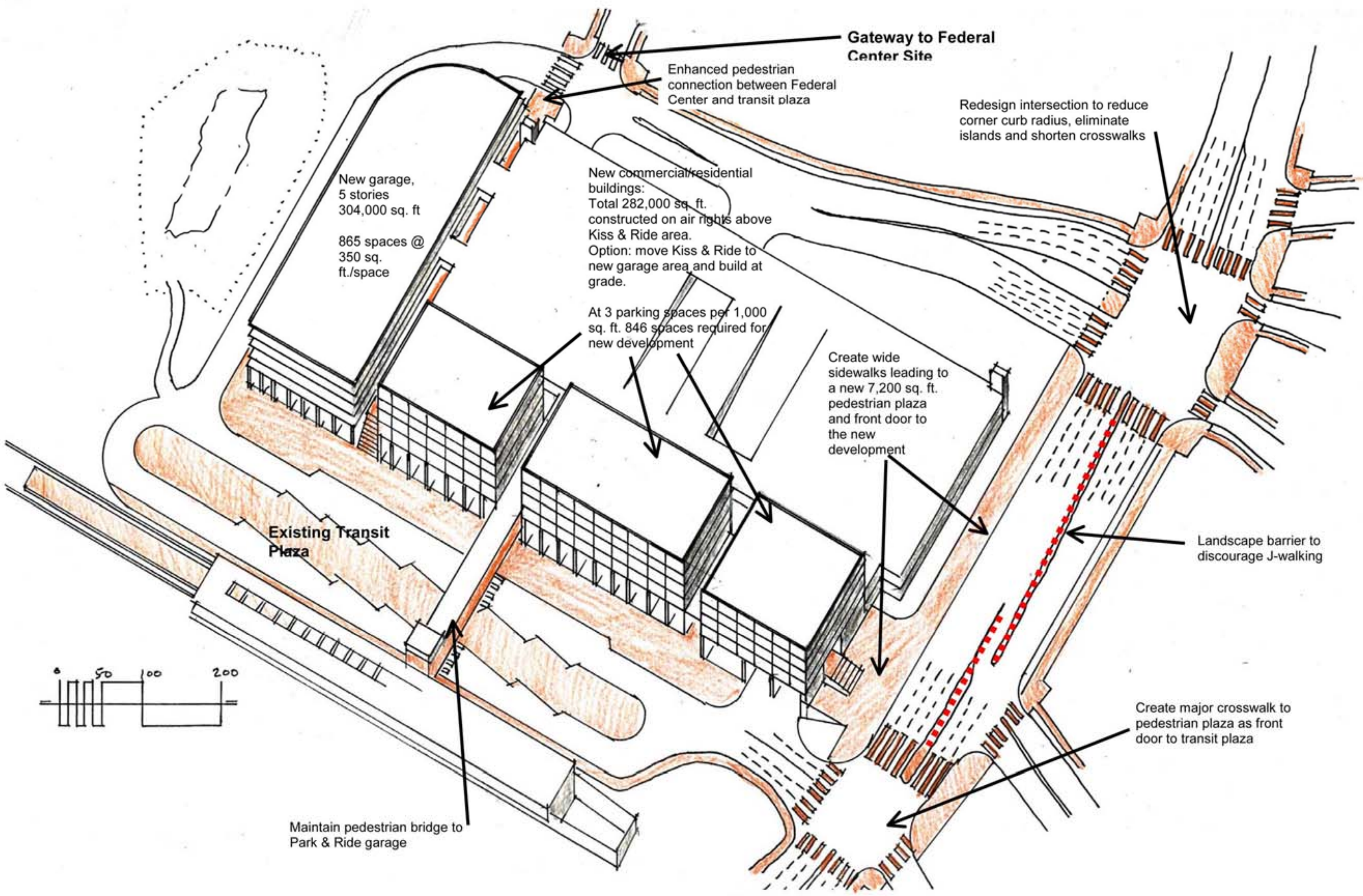


Figure E-8: Suitland Station: Sample Axonometric View of Joint Development



entrance. However, long-term parking is constrained on the station site with the Park & Ride structure's 1,890 spaces typically filled by 8:00 AM.

The station also has good vehicle access from Suitland Parkway and Silver Hill Road. However, pedestrian access to the site from Silver Hill Road often requires crossing multiple lanes that lead to multiple islands. Pedestrians frequently cross Silver Hill Road at unmarked intersections.

Bicycle storage facilities at the station are good with 20 bike lockers and 20 racks. However, only 3 lockers were rented at the time of this study.

Plans for development surrounding the Suitland Metro station include a Suitland Town Center, which would be located northeast of the Metro station and expansion of the existing Federal Center, which is located between the Metro station and the planned Suitland Town Center. Connections between the Metro station and the northeast areas should be improved in conjunction with these other developments in order to accommodate all modes of access.

WEST FALLS CHURCH-VT/UVA

The West Falls Church-VT/UVA (WFC) station is a mid-line station on the Orange Line located in Fairfax County. The station and rail line are located above ground in the median of the I-66 corridor, just west of the interchange with the Dulles Airport Access Road (DAAR).

The WFC station, which opened in June 1986, has experienced an 85% increase in rail boardings over the last ten years. The total daily boardings at WFC in 2005, as well as the projections of future boardings in 2025 are listed in Table E-4 by mode of access.

Table E-4: Average Daily Boardings at West Falls Church-VT/UVA by Mode of Access, 2005 and 2025

Mode of Access	2005	2025	Percent Change
Walk	880	1,310	23%
Bus	5,100	940	--542%
Park	2,750	2,250	-22%
Drop-Off	1,080	560	-92%
Total	9,810	5,060	-93%

Source: WMATA

Bus access is the largest mode share at WFC station. However, when the first phase of the Dulles Corridor Metrorail Project is built and if all Fairfax Connector, Washington Flyer, and commuter bus services currently using the WFC north bus facility are instead terminated at the future Wiehle Metrorail station as planned, then future daily boardings from bus access would greatly diminish since the largest share of bus transfers is from the north side of the station.

Existing conditions and access conflicts at the WFC station are illustrated in Figure E-3.

The WFC station is located in the median of I-66 with restricted bus only access from the DAAR and entrances for all modes on the south side of the I-66 corridor. The intersection of I-66 with the DAAR and the existing rail yard limits access to the north side entrance. The location of the West Falls Church station is typical of many sub-urban, mid-line stations where the Metrorail alignment follows an existing interstate highway or a railway corridor, creating a natural barrier that impedes pedestrian access. The north bus facility is a loop design with a narrow platforms and sidewalks along both sides. Some problems observed in this area include pedestrians crossing bus lanes to reach the correct bus and lack of shelter for passengers standing in long queue lines. A continuous canopy and better signage would improve the function of this facility.

Most patrons access the station from the south entrance where the south bus facility, Kiss & Ride, and Park & Ride facilities are located. The Park & Ride facility with 2010 spaces does not fill up at the time of this report. The bicycle storage facilities are inadequate with all 22 lockers rented and a waiting list of 18. Some of the bicycle racks should be provided shelter for weather protection. The layout of facilities on the south side does not conform to the current access hierarchy. The new parking structure is located closer to the station entrance and closer than some of the bus bays and Kiss & Ride spaces. The layout of the elongated U-shaped bus and Kiss & Ride facility does not provide a good view of the station entrance and requires pedestrians to cross the bus lane to access the Kiss & Ride area.

Within the Kiss & Ride facility, the taxi-stand is located closest to the station entrance, but not clearly separate from other Kiss & Ride traffic. The motorcycle parking is underutilized. Automobiles parked in the spaces furthest from the station entrance do not have a good view of passengers exiting the station, which may be the cause of frequent illegal maneuvering, such as double parking that impedes traffic flow within the Kiss & Ride facility.

Several additional metered parking spaces are also provided along the access road on the south side of the station. Many of the metered spaces are located in an area with no sidewalks or crosswalks to the station entrance.

If all service to the north bus facility is diverted to the Wiehle station as planned when the Dulles Corridor Metrorail Project is complete, then this area of the station may become open to re-use such as an additional Kiss & Ride or Park & Ride facility. However, the only means of access to the north side is through the Dulles Connector Road, which is restricted to eastbound HOV use in the morning rush hour. The adjacent rail yard and existing neighborhoods limit other possibilities for access to the site.

Figure E-9: West Falls Church Station – Bus and Pedestrian Flows

Figure E-10: West Falls Church Station – Existing Conditions Assessment

(1)	• Existing rail yard bars direct access to the north side of station for pedestrians and bicycles. Only buses can access the station from this side. • Limited single occupancy vehicle access from Dulles corridor and areas north.
(2)	• Turning radii for buses is tight in this location.
(3)	• Bus signage and wayfinding is not adequate. Patrons often cross bus lanes. • Small canopies do not provide adequate cover for most queues. • Limited capacity in this area for potential parking areas.
(4)	• Minor queues form on inbound left turn into parking lot from I-67 during morning peak. • Vehicles do not yield to pedestrians in crosswalk.
(5)	• No sidewalks along roads.
(6)	• Pedestrians have to cross bus and single occupancy vehicle lanes to get to the Kiss & Ride area.
(7)	• Kiss & Ride area does not match access hierarchy. Taxi's and some vehicle parking areas are located near to the station than buses or Kiss & Ride vehicles. • Site lines from Kiss & Ride vehicle area to waiting areas is not direct, resulting in illegal maneuvering and parking conflicts. • Taxi stand is not very well separated from other vehicle circulation resulting in conflicts with Kiss & Ride operations. • Motorcycle parking is underutilized.
(8)	• Bicycle parking is well located and close to the station, while out of the way of most pedestrian flows.
(9)	• Accessible parking in this location is far removed from the station entrance requiring movement through and across vehicle lanes.
(10)	• Sidewalk is narrow with a small buffer between adjacent vehicle lanes. • The northeast end of the sidewalk does not have a painted crosswalk across vehicle lanes.
(11)	• Bus turn lane and painted median extends width of pedestrian road crossing at this location. • Bicycle access from east is not marked.
(12)	• Vehicles do not yield to pedestrians in crosswalks. There are no crosswalks from metered parking areas on the south side of the access road to the station entrance.
(13)	• No sidewalks from metered on-street parking areas along access roads.
(14)	• Direct pedestrian access from neighborhoods northwest of the station is unavailable because of the I-66/Dulles Airport Access Road (DAAR) interchange.

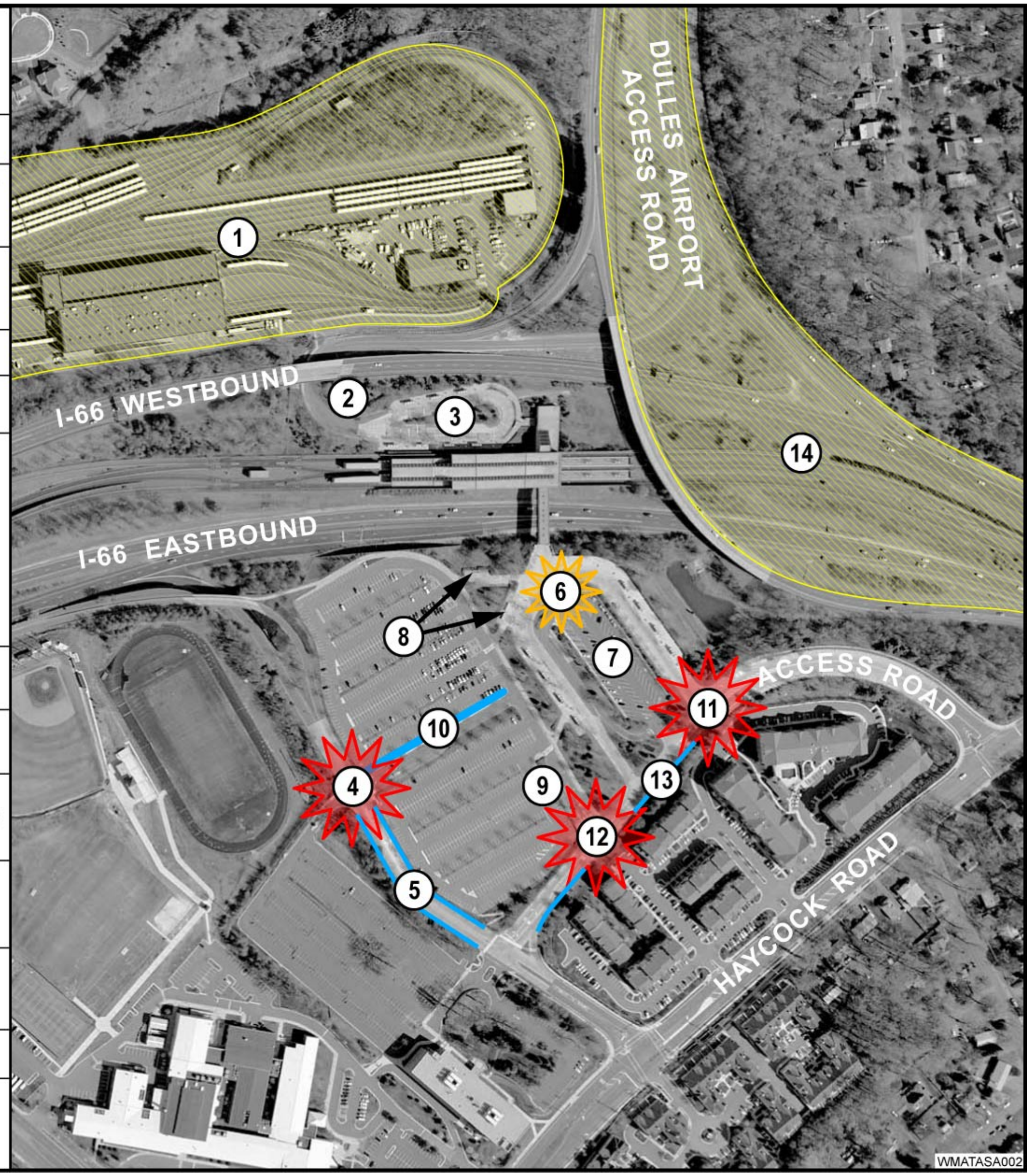
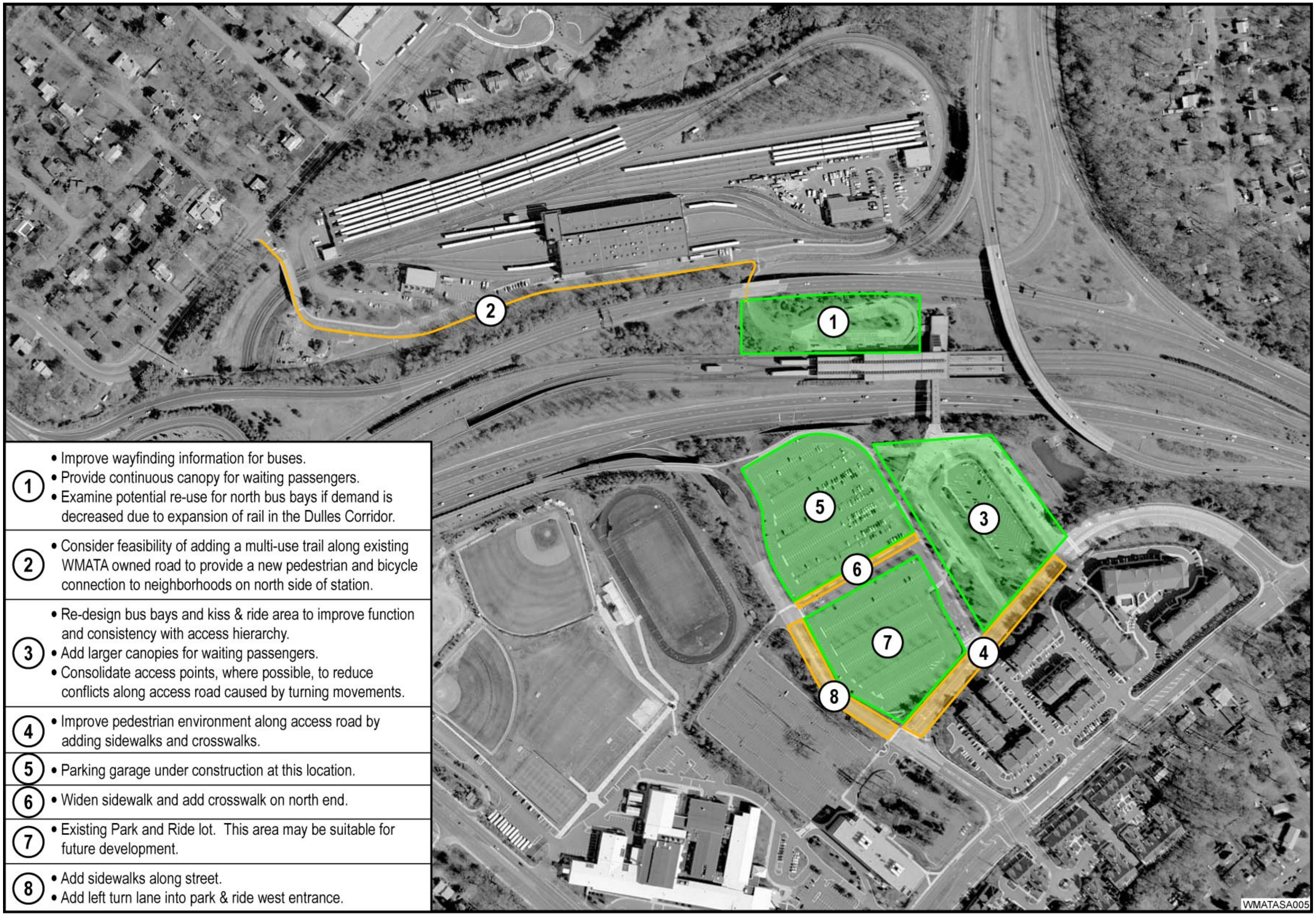


Figure E-11: West Falls Church Station – Access Improvements



Fairfax County plans for any future development in the West Falls Church station area are directed towards the south side of the station.[3] The existing WMATA Park & Ride lot could be developed as 30 residential dwelling units per acre. The plan recognizes that improvements in the pedestrian circulation system are needed throughout the station area. Specifically, the plan recommends adding pedestrian walkways along the existing Metro access roads and proving a direct “major pedestrian axis” from the Virginia Tech/UVA Center to the station entrance.

RECOMMENDATIONS FOR ACCESS IMPROVEMENTS

Maintaining or improving pedestrian access at all Metrorail stations should be a high priority. Walking is the most common means of access to metro stations. The increase in station boardings from buses represents the largest percentage increase by mode of access (74%). Improving bus access at Metro stations should also be a high priority. The percentage of drop-off access will rise significantly by 30%, but accounts for a relatively small percentage of total system boardings (4%). Park & Ride access to Metrorail stations will increase by the smallest percentage (8%).

Recommendations for improvement at the three sample stations were developed to improve multi-modal access to rail stations and to resolve existing conflicts between different modes while maintaining consistency, whenever possible with WMATA’s established access hierarchy.

These recommendations are summarized below (Table E-5) and include minor improvements, such as improving signage in some areas or increasing the number of accessible spaces, as well as some long-term improvements that reflect changes proposed in station areas by local jurisdictions. Of the sample stations considered, Suitland has the best existing access with the least conflicts.

[3] Fairfax County Comprehensive Plan, 2003 Edition, McLean Planning District, Amended through 4-26-2004, West Falls Church Transit Station Area.

Table E-5: Recommendations for Sample Stations

Station	Recommendations
Glenmont	▪ Increase the amount of ADA-accessible spaces to meet demand at station. ▪ Pave dirt path beginning at the intersection of Glenallan Avenue and Layhill Road to provide more direct pedestrian path to station entrance. ▪ Improve pedestrian connections to adjacent neighborhoods by adding mid-block crosswalks along Glenallan Avenue and Layhill Road. ▪ Consider possibilities for converting underutilized capacity on Glenallan Avenue for pedestrian improvements, such as medians or on-street parking. ▪ Relocate bus bays to south side of Georgia Avenue to allow for potential future expansion of bus bay capacity and allow for redevelopment on north side.
Suitland	▪ Improve pedestrian environment along Silver Hill Road by adding wide sidewalks, crosswalks, and pedestrian countdown signals. ▪ Consider other uses for underutilized HOV parking area. ▪ Improve connections with new and proposed developments in surrounding areas (Federal Center and Suitland town center).
West Falls Church-VT/UVA	▪ Improve signage in bus bay area on north side of station. ▪ Provide expanded canopies in bus bay and Park & Ride waiting areas. ▪ Add sidewalks along access roads. Sidewalks are most need from the areas with metered on-street parking. Upon completion of parking garage, some on-street parking may be less needed and could be converted for use as a sidewalk. ▪ Add crosswalk from sidewalk connection within the Park & Ride lot. ▪ Reconfigure bus bays and Park & Ride areas on south side consistent with access hierarchy. Consolidate access points to avoid conflicting turning movements into facility. ▪ Explore possibilities for re-use of north bus bays when Metrorail is extended to the Dulles Corridor.