Station Area Access within Transit-Oriented Development:

A Typological Analysis

by

Matthew Francis Hennigan, B.A.

Report

Presented to the Faculty of the Graduate School

of The University of Texas at Austin

in Partial Fulfillment

of the Requirements

for the Degree of

Master of Science in Community and Regional Planning

The University of Texas at Austin

May 2006

Station Area Access within Transit-Oriented Development:

A Typological Analysis

APPROVED BY

SUPERVISING COMMITTEE:

_____

_____

To my wife, Wendy.

Station Area Access within Transit-Oriented Development:

A Typological Analysis

by

Matthew Francis Hennigan, M.S.C.R.P.

The University of Texas at Austin, 2006

SUPERVISORS: Ming Zhang and Tracy McMillan

Transit joint development (TJD) is a specific component of transit-oriented development (TOD) characterized most commonly by a collaborative development relationship between transit agencies and private developers. A spatial evaluation of public and private properties within TOD station areas offers a valuable and unique point of view to examine the association between transit agencies, local government and private developers. The link between transit space including entrances, exits, lobbies, direct connections, multi-modal integration and immediately adjacent private property is essential to the success of TOD. This report offers insight and analysis concerning the spatial interface and access between public and private properties within the station area from a multimodal standpoint in an effort to evaluate the conditions that promote optimal pedestrian connectivity in harmony with the presence of the automobile and other motorized forms of transportation.

Within this report a station area spatial interface - access typology is introduced, which captures the various interfaces between public and private properties at transit station areas from a multimodal perspective. The Dallas Area Rapid Transit (DART) rail system was the model for this typology To better understand the spatial relationship between these principal TOD players, an evaluation of the factors that affect the physical composition of TOD - TJD station areas is also conducted. These factors include site limitations and opportunities, financial arrangements, and land use regulatory policy.

Table of Contents

Chapter 1 Introduction

1.1 Station Area Spatial Interface - Access Typology

The interface between the transit agency, local government, and the private development community engaged in transit-oriented development is complex. A spatial evaluation of public and private properties within transit-oriented development (TOD) station areas offers a valuable and unique perspective to examine the association between transit agencies and private developers. The link between transit space including entrances, exits, lobbies, direct connections, multi-modal integration and immediately adjacent private property is essential to the success of TOD. Within this report a station area spatial interface - access typology is introduced, which captures the various interfaces between public and private properties at transit station areas from a multimodal perspective.

The degree of collaboration between these public and private partners has a significant impact on the level of connectivity within a TOD station area and success of TOD. According to the California Department of Transportation, "transit-oriented development is moderate to higher-density development, located within an easy walk (about one-half mile) of a major transit stop, generally with a mix of residential, employment, and shopping opportunities designed for pedestrians without excluding the auto. TOD can be new development or reconstruction of one or more buildings whose design and orientation facilitates transit use" (BART TOD, 2003, p. 9). The

station area spatial interface - access typology takes into consideration the necessity for the coexistence of pedestrian/bicycle, bus/taxi, and the private automobile as modes of transportation within the station area.

Transit joint development (TJD) is a specific component of TOD characterized most commonly by a development relationship between transit agencies and private developers. It is important to note that TJD does not exist within all TOD projects. Cervero (2002) defines transit joint development as "any formal agreement or arrangement between a public transit agency and a private individual of organization that involves either private-sector payments to the public entity or private-sector sharing of capital costs in mutual recognition of the enhanced real estate development potential or market potential created by the siting of a public transit facility" (p. 7).

Most TJD takes place by means of cost-sharing agreements or revenue-sharing agreements, according Cervero (1992). Costing-sharing agreements include "sharing construction expenses, incentive-based programs that provide benefits (e.g. density bonuses) in return for off-loading construction costs, and joint use of equipment like air-conditioning systems" (Cervero, 2002, p. 8). Revenue-sharing agreements include "air-rights and property leasing, connection fees (for physically linking a retail store to a station), and benefit assessment financing" (Cervero, 1992, p. 2).

1.2 Station Area Spatial Orientation Factors

From a design standpoint, TJD creates superior connectivity within the station area. TJD brings the public and private sectors together so that the planning and development within the station area can be a collaborative process. This enhanced accessibility translates into a more pedestrian-friendly built environment as well as increased commercial rents and lower vacancy rates. Rents and occupancy levels can be financial indicators that may be used to evaluate pedestrian accessibility. While private developers are more likely able to identify the impact of TJD in terms of increased profits, the benefits of TJD for transit agencies include the opportunity for value capture, new sources of operating revenue, and quality of life enhancements that are often difficult to measure in terms of dollars. Each of these benefits can be attributed in some form to the higher level of accessibility produced by TJD.

To better understand the spatial relationship between these principal TOD players, an analysis of the factors that affect the physical composition of TOD - TJD station areas is necessary. These factors include site limitations and opportunities, financial arrangements, and land use regulatory policy. An analysis of the financial motives of transit agencies and private developers engaging in TJD lends support for why the public and private sectors should collaborate on more TJD projects. An evaluation of the joint development programs of transit agencies that have taken an aggressive approach to TJD assist to better understanding the legal and regulatory issues involved with this form of development. An examination of TOD design

standards is beneficial to defining to what extent that these tools can promote accessibility within transit station areas. This report also assess TOD - TJD station areas based on the spatial interface between transit agencies and private developers from a site selection, financial, and regulatory viewpoint.

The studies that have been conducted to measure the financial benefits for transit agencies who participate in TOD - TJD projects reveal various levels of financial gain. Overall, the research examined for this report has found that joint development had a positive influence on office rents and vacancy rates. This report presents examples of TOD - TJD in the Dallas and the Washington D.C. metropolitan areas and evaluates their financial impacts on accessibility and spatial composition of these station areas.

1.3 Case Studies: DART & WMATA Rail Systems

The Dallas Area Rapid Transit DART rail system is 45 miles in length, including a total of thirty six stations set in the cities of Dallas, Garland, Plano, and Richardson. In 2004, the ridership for the DART rail system was 16.5 million passenger trips. Since its inception in 1996, DART Rail has played a major role in stimulating economic growth along its service corridors. DART officials are actively working with member cities and developers to promote, facilitate, and accommodate TOD.

Washington Metropolitan Area Transit Authority's (WMATA) is known as a national leader in the area of TJD. WMATA's Metrorail is highly regarded by the

transportation planning community as one of the model transit agencies in the United States in terms of maximizing the benefits of TJD. The Metrorail system serviced a ridership of 190 million in 2004 throughout its eighty six rail stations located throughout suburban Maryland, Northern Virginia, and the District of Columbia.

DART's Downtown Plano and Mockingbird Stations and WMATA's Rosslyn-Ballston corridor stations represent the specific station area case studies that are examined in this report.

1.4 This Report

The primary function of the report is to develop a typology that delineates the interface between public and private properties within transit station areas in terms of accessibility. The purpose of the typology is to establish a frame of reference to allow for more comprehensive comparisons concerning connectivity between rail stations and contiguous sites. Chapter 2 introduces the station area spatial interface – access typology methodology that has been developed based on a thorough on-site evaluation of the Dallas Area Rapid Transit (DART) rail system. Chapter 3 provides an application of the station area spatial interface – access typology through an analysis of DART transit station areas.

The station area interface typology created from the DART system is utilized in Chapter 4 to evaluate the factors that impact the spatial orientation of TOD station area case studies in Dallas and Washington D.C. metropolitan areas. These factors include site opportunities and constraints, TOD financing agreements, and land use

regulatory policy. The case studies concentrate on DART's Downtown Plano and Mockingbird Stations as well as the stations that comprise WMATA's Rosslyn-Ballston corridor to determine what role each factor played in the spatial composition of each station area. Chapter 4 also includes a brief examination of the financial impact of enhanced accessibility within TOD - TJD station areas in the Dallas and Washington D.C. metropolitan areas. This report concludes with Chapter 5, which features a summary of the most significant findings from the formulation of the station area spatial interface – access typology.

Chapter 2 Station Area Interface – Access Typology Methodology

2.1 Introduction

The station area spatial interface – access typology presented in this chapter was created to develop a tool that can be utilized to define and/or differentiate station areas in terms of accessibility from a multimodal perspective. The DART rail system was the model for this typology. The typology consists of three different spatial interface station area classifications: Surface Level Stations, Elevated Stations, and Subway – Below Grade Stations. Figure 2.1 illustrates the station area spatial interface – access typology and outlines the framework of analysis for this chapter.

Figure 2.1: Station Area Spatial Interface – Access Typology

<table>
<tr><td colspan="2" rowspan="2"></td><td colspan="3">Mode</td></tr>
<tr><td>Pedestrian/ Bicycle</td><td>Bus/Taxi</td><td>Automobile</td></tr>
<tr><td rowspan="3">Station Area Type</td><td>Surface Level
• Destination
• Park & Ride</td><td colspan="3" rowspan="3">An evaluation of each station area type from a multimodal perspective based on safety and convenience factors and considerations.</td></tr>
<tr><td>Elevated
• Destination
• Park & Ride</td></tr>
<tr><td>Subway – Below Grade
• Destination
• Park & Ride</td></tr>
</table>

Each station type is evaluated, where applicable, based on an interpretation of WMATA's (2005) Access Hierarchy (see Figure 2.2), which "shows the mode of access with the highest priority at the top and the lowest priority at the bottom" (p. 1-4). Specifically, station access by pedestrian/bicycle, bus/taxi, and private automobile for each station area type is examined in this chapter based on safety and convenience factors and considerations. These factors and considerations can be related to security, distance, and comfort. The classifications included in this typology are intended to be expansive and appropriate for application to station areas both domestic and abroad. The station area spatial interface – access typology is applied to the DART rail system in Chapter 3.

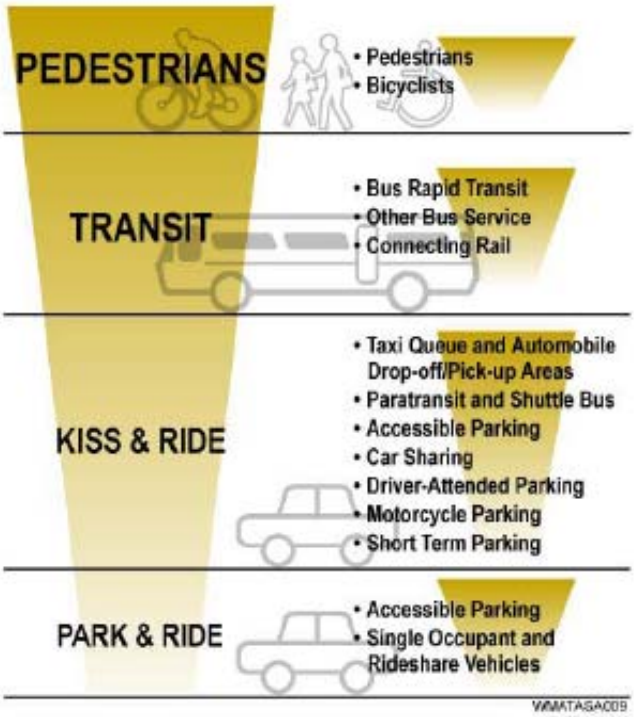

Figure 2.2: Access Hierarchy - Source: WMATA

A comprehensive on-site evaluation of the connectivity within DART rail station areas was conducted based on criteria developed from BART Station Access Guidelines, the North Central Texas Council of Governments (NCTCOG) Transportation Department Rail Station Access: Bicycle and Pedestrian Needs Assessment, and the WMATA Guidelines for Station Site and Access Planning to formulate this typology. The following station area accessibility factors and enhancements (see Figure 2.3) have been compiled from a combination of the literature cited above and observations derived from the DART rail system.

Figure 2.3: Station Area Accessibility Factors & Enhancements
• Platform type - split v middle • Multi-direction station access (multiple access points) v. single direction access (single access point) • Traffic barriers, including parallel adjacent bus bays • Park & Ride lot buffers • Direct connections and skywalks • Signalized/raised crosswalks & medians • Bike parking & bike lanes • Wayfaring signage

Each station area type can be further subdivided into two classifications: Destination stations and Park & Ride stations. Destination Stations as defined by DART are as those stations that do not offer parking facilities for the transit user. Park & Ride stations are designed to promote the use of public transit to those commuters who drive their personal vehicle to the station and can be identified by their large parking lots and garages.

2.2 Surface Level Stations

Highway corridors and existing rail lines are common alignments in developed areas to position rail systems and Surface Level Stations (Park, n.d.). These areas are selected in an effort to minimize some of the high cost of establishing or expanding rail service within a community. While rail lines parallel to major arterials may be attractive from a budgeting perspective; station area accessibility is often negatively affected by this choice of setting. Surface Level Stations situated adjacent to highways essentially eliminate half of its connectivity opportunities (See Figure 2.4). Those stations that can only be accessed from one direction provide greater connectivity when the station layout includes direct access and/or direct connections between the transit station and the adjoining private properties. Site limitations created by the alignment of the rail line such as single-direction accessible stations can have a direct impact on the connectivity between Surface Level Stations and its adjoining private parcels.

Pedestrian/Bicycle Access

Safety:

Rail transit stations vary in their level of accessibility based on the type of platform, center or split, which is included in the layout of the station. From a connectivity standpoint, split platforms are ideal. Split platforms prevent the actual rail from becoming a safety obstacle between the transit station and the adjacent

private properties. While split platforms are preferred, cost and site constraints often favor the inclusion of center platforms into station design. Center platforms are a

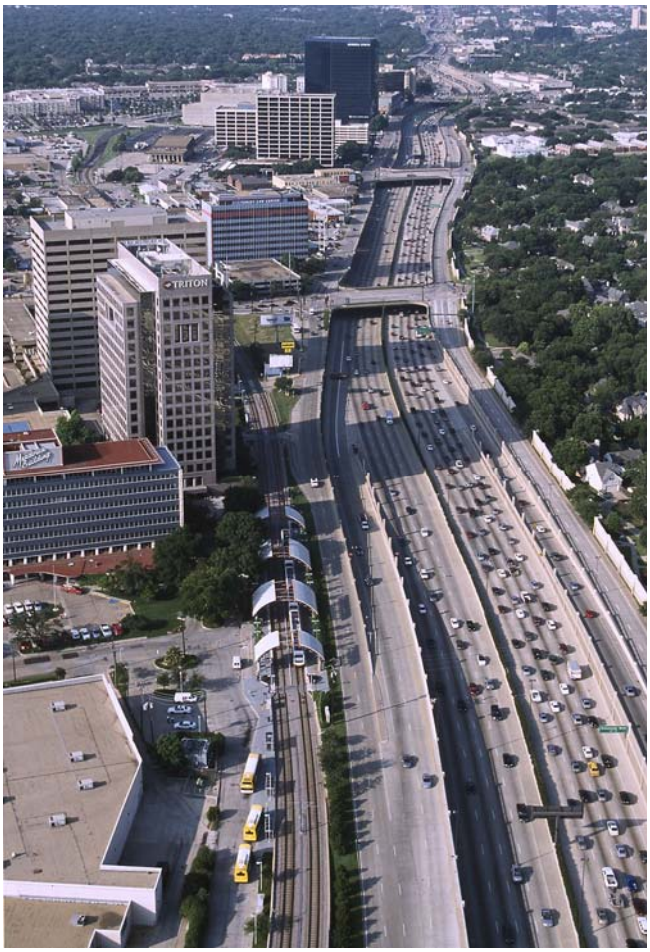

Figure 2.4: Surface Level Destination Station, Lovers Lane Station, Dallas, TX - Source: DART

less significant obstacle for light rail transit users to overcome because the trains run at-grade and pedestrians can safely walk across the tracks at designated crossing locations as shown in Figure 2.5. Heavy rail, on the other hand, requires total grade separation due to the fact that its energy source is provided from the third rail or guideway. Pedestrian bridges or tunnels must be designed above or beneath the

railway in order to prevent transit users from endangering themselves as well as to facilitate the flow of pedestrian traffic.

Figure 2.5: Light rail pedestrian-friendly split platform crossing, Surface Level Park & Ride Station, White Rock Station, Dallas, Texas – Source: Hennigan

Pedestrian bridges and tunnels are potential remedies to the barriers created by adjacent automobile traffic most often implemented at Elevated or Subway Stations that also can be integrated into the design of Surface Level Stations. Pedestrian bridges and tunnels "reach out" into the station area and shorten the distance to the transit platform (Park, n.d., p. 5) (See Figure 2.6). Extending the transit station provides greater connectivity within the station area and can contribute to increased ridership. While the integration of the transit station into its surrounding area is enhanced by pedestrian bridges and tunnels, these amenities are not always the

Figure 2.6: Pedestrian tunnel under adjacent roadway at Surface Level Park & Ride Station, Arapaho Station, Richardson, TX – Source: DART

preferred alternative for security reasons, in addition to the obstacle they create for the elderly and disabled riders.

The location of bus right-of-ways and pick-up/drop-off areas can have a major impact on the level of station area accessibility for pedestrians and bicyclists at Surface Level Destination Stations. Station area pedestrian accessibility is challenged even greater when non-station related traffic is permitted to travel the roadways that separate Surface Level Destination Station public transit space from private parcels.

Surface Level Park & Ride Stations are automobile-oriented and generally consist of numerous barriers which require pedestrians to use caution to overcome before they can even venture into the adjoining private properties that surround the

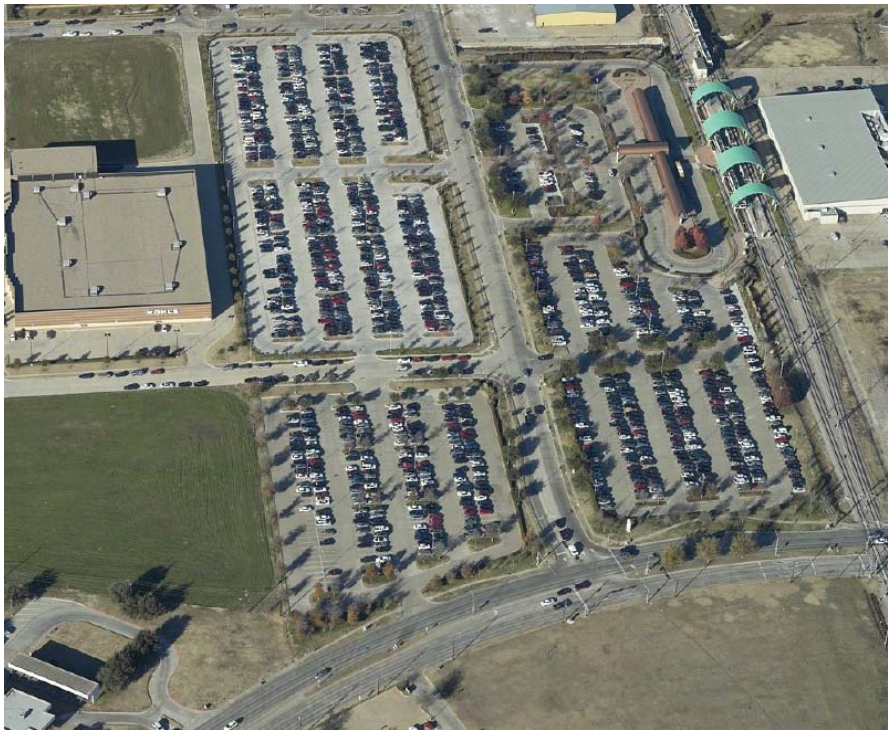

Figure 2.7: Surface Level Park & Ride Station, Parker Road Station - Source: Microsoft

station area (See Figure 2.7). Surface Level Park & Ride Station bus bays also have the potential to be sizable dangerous obstacles for pedestrians to contend with when navigating in, out, or within the station area. Bus transfer areas are regularly designed immediately outside of rail station entrances and exits points. Pedestrians within Park & Ride Station areas are also forced to be aware of a significant increase in overall automobile traffic generated by higher volumes of single occupant vehicles coming and going from Park & Ride Stations. Figure 2.8 illustrates the NCTCOG Transportation Department Rail Station Access: Bicycle and Pedestrian Needs Assessment (2003) recommendation for the provision of "separated sidewalks and walkways to route pedestrians through station parking" (p. 12). Calthorpe (1993)

suggests that “undesirable facilities like [park & ride lots and bus bays] be placed on one side of the station [whenever possible], leaving the other for pedestrian-oriented environments to develop” (p. 106).

Figure 2.8: Separated pedestrian walkway at Surface Level Park & Ride Station, LBJ/Skillman Station, Dallas, TX – Source: Hennigan

Safety and security concerns also exist for bicyclists who use their bike as their primary mode of transportation in and out of the Surface Level Station areas. BART Station Access Guidelines (2003) recommend that “routes to and from BART station have bicycle lanes, if possible, or wide curb lanes at a minimum” (p. 3-10). The positioning and quantity of the bicycle parking area within the station area also requires important consideration for security reasons. WMATA Guidelines for

Station Site and Access Planning (2005) address these security concerns by suggesting that "bicycle lockers should not be placed below structures, such as bridges or buildings" (p. 2-9).

Convenience:

Surface Level Destination Stations often offer direct access between the transit station and the adjacent privately owned parcels (See Figure 2.9). Connectivity is strongest when pedestrians can walk between public and private properties within the station area unobstructed by automobile traffic. Direct connections between neighboring buildings and transit stations offer a high level of accessibility for transit users. Direct connection fees are value capture opportunities

Figure 2.9: Direct connection between rail platform and adjacent office complex, Surface Level Destination Station, Lovers Lane Station, Dallas, TX – Source: Hennigan

for transit agencies who seek to obtain a return on their substantial investment to provide public transportation service. Direct connections are tangible examples of how a joint development revenue stream can improve pedestrian accessibility within a station area.

Surface Level Park & Ride Stations can be significantly large in size due to the inclusion of surface lots, parking structures, or a combination of both. Stations located at the end of rail lines, sometimes referred to as terminus stations, usually contain more considerable amounts of parking. Terminus stations tend to be far more automobile oriented than most Park & Ride Stations due mainly to the fact that the majority of its users travel by car to utilize the services of these stations. Overall, the layout of Park & Ride Stations presents pedestrians and bicyclists with overcoming often significant distances between the station platform and the adjoining private parcels.

Pedestrian friendly Park & Ride Stations are those that are laid out in such a way that the sidewalks, paths, and/or trails that run along and through adjoining private properties continue inside the public space of the transit station. The BART Station Access Guidelines (2003) recommend that "BART should not interrupt pedestrian routes and where there are routes on either side, they should continue through the BART property; allowing non-riders to take the most direct route, even if it runs through the station" (p. 3-5). The continuity of these pedestrian paths is most effective when they provide the safest, unobstructed, and most direct route to the rail platform. From a comfort standpoint, NCTCOG Transportation Department Rail

Station Access: Bicycle and Pedestrian Needs Assessment (2003) suggests that shelter should be supplied for pedestrians as they move through the station area to the platform. Unfortunately, more often than not the needs of the pedestrian are neglected at Park-and-Stations leaving the transit user to negotiate their way through the Park-Ride lot into another parking lot before they reach their desired destination.

Finally, from the bicyclist perspective the primary convenience consideration relates to the location of the bicycle parking area. WMATA Station Site and Access Planning Guidelines (2005) state that "bicycle parking areas should be designed so that bicyclists can ride all the way to the area of bicycle parking before dismounting whenever possible" (p. 2-9). Bicycle parking is usually located as close to the station entrance as possible in high pedestrian areas, but not in such a way that the "racks or

Figure 2.10: Bicycle parking area at main entrance of Surface Level Park & Ride Station, Vienna – Fairfax Station, Fairfax, VA – Source: Hennigan

lockers should impede pedestrian flows" (BART, 2003, p. 3-11) (See Figure 2.10). Overall, Elevated and Subway/Below-Grade Stations share many of the same safety and convenience factors and considerations as Surface Level Stations.

Bus/Taxi Access

Safety:

Bus access is second to pedestrians/bicyclist on the WMATA's Access Hierarchy. As a result, on-street as well as off-street bus bays enjoy as much immediate access as possible to the rail platform area at both Destination and Park & Ride Stations. Therefore, the safety concerns relevant to bus/taxi access for Destination and Park & Ride Stations are reasonably similar to each other. The BART Station Access Guidelines (2003) recommend "locating bus stops to minimize the walking distance to fare gates and avoid the need to cross roadways, particularly busy arterials" (p. 3-6). Bus bays are most often situated immediately adjacent to the rail station platform area, requiring transit users to travel a short distance while transferring modes (See Figure 2.11). However, it is not unusual for transit stations that serve as bus hubs to include free standing bus depots independent of rail platforms within the confines of the station area. In cases such as that stated above, dedicated pedestrian pathways preferably separated from vehicular and bus traffic by landscaping can be designed to enhance the level of safety of transit users who must travel on foot to and from the bus depot and the rail platform.

Figure 2.11: Bus bay – station platform spatial relationship, Surface Level Park & Ride Station, White Rock Station, Dallas, TX – Source: Hennigan

Convenience:

The high priority given to bus access allows transit users to make fast and direct transfers between the bus bay and the rail platform. Transit users who utilize Destination Stations often are nearly equidistant for the adjoining private land uses as they are from the rail platform when they arrive at bus pick-up/drop-off area. While Park & Ride Station are in many instances so expansive that pedestrians wishing to access neighboring private properties may even be better served by riding a bus to their destination than by exiting the station area on foot. In terms of weather protection, the WMATA Guidelines for Station Site and Access Planning (2005)

includes a condition that is intended to provide bus customers with equal facilities to Metrorail customers that calls for "bus platforms to be covered with a continuous canopy that extends to the station entrance via the pedestrian pathway whenever possible" (p. 2-10).

Automobile Access

Safety:

Park & Ride Stations are planned with the best interests of the commuter who chooses to drive his/her car to the rail station in mind. Technically, the park & ride transit users face many of the same accessibility challenges as pedestrian/bicycle transit users as soon as they park their vehicles. While the park & ride transit users usually travel a shorter distances to the rail platform than pedestrian/bicycle transit users, they encounter identical safety concerns generated by the high volume of vehicles entering and exiting the station area.

Kiss & Ride access is generally designed to be located as close to the station entrance as possible, limiting the safety concerns that this type of transit user must face as they walk directly between pick-up/drop-off area and the station platform. Figure 2.12 illustrates WMATA's criteria for the maximum allowable distance between the Kiss & Ride pick-up/drop-off area and the station entrance as well as the guidelines for other modes examined in this chapter. The BART Station Access Guidelines (2003) recommend that "drop-offs and pick-ups should be located so they do not conflict with bus traffic and other traffic and pedestrian movement in the station area" (p. 3-12). While Kiss & Ride access is critical component of Surface

Level Destination Stations, Surface Level Park & Ride Stations also feature Kiss & Ride connectivity.

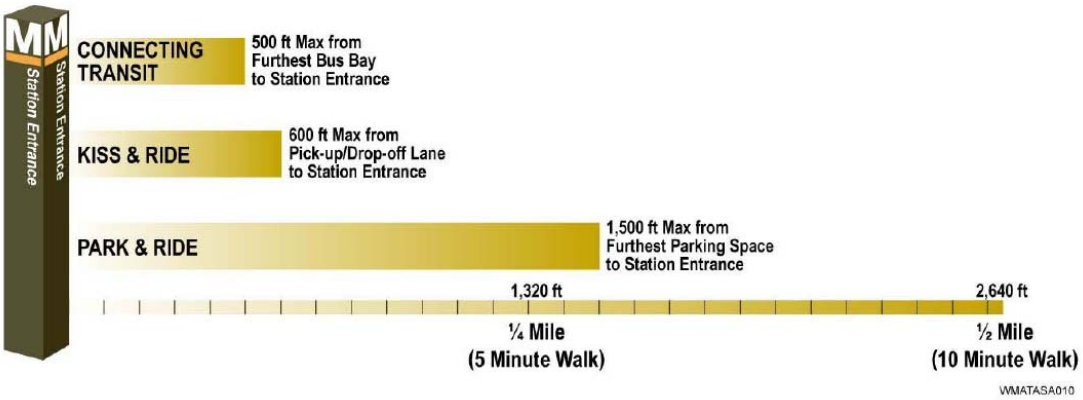

Figure 2.12: Allowable walking distances of station facilities to station entrance - Source: WMATA

Convenience:

According to the WMATA Guidelines for Station Site and Access Planning, "Park & Ride facilities should be located within easy walking distance of the station entrance, which is typically less than 1000 feet with the generally accepted walking distance from the station entrance to the farthest parking spot in the Park & Ride facility to be 1500 feet" (p. 2-19). The BART Transit-Oriented Development Guidelines (2003) point out that "parking facilities should be sited so that automobile traffic does not impair pedestrian circulation between the station and the surrounding community" (p. 33). Although Park & Ride Stations rarely offer direct access to its adjoining private parcels, the BART Station Access Guidelines (2003) suggest that "parking does not need to be provided directly adjacent to the station" (p. 3-14).

Furthermore, the BART Transit-Oriented Development Guidelines (2003) advocate that the "foot traffic along the pedestrian link between the [parking facility] and the station should be used to stimulate economic activity in the TOD" (p. 33).

2.3 Elevated Stations

Elevated Stations are commonly situated along major arterials where the automobile is the primary mode of transportation. Right-of-way conflicts with rail alignment tend to be the basis for the design of Elevated Stations. Elevated Stations are frequently located in commercial/business centers or corridors. The built environment in these areas can vary from dense urban areas to less thickly settled large lots consisting of "big box" retail and office parks. While the station platform is elevated, the actual public transit station property on the ground can differ in size based on the site and ridership.

Pedestrian/Bicycle Access

Safety:

Park & Ride facilities are frequently included within public domain of Elevated Stations. In many instances, the transit station parking lot is located adjacent to the parking lot for neighboring private parcel. Differentiation between transit station Park & Ride lots and the "big box" retail store or office building parking next door can be difficult. In addition, Park & Ride lots for Elevated Stations also tend to be designed parallel to high-speed roadways. These automobile dominated environments pose significant challenges to pedestrians who wish to

access adjacent private properties on either side of the arterial over which the elevated rail line is constructed.

Convenience:

Elevated Destination Stations and Elevated Park & Ride Stations have the potential to provide pedestrians with multiple access points to transit stations, enhancing overall connectivity within the station area. Elevated Stations can offer various points of access which are invaluable for transit users who are faced with navigating station areas that are subject to high levels of automobile traffic. Elevated Destination Stations located in dense built environments can also offer enhanced connectivity via direct connections between the rail station and adjacent private parcels in the form of skywalks and pedestrian bridges. Elevated Stations have the capability to be multi-functional and serve as a pedestrian bridge for those transit users that require access to nearby private parcels throughout the station area (See Figure 2.13). While Elevated Stations can be solutions to rail alignment conflicts, this type of station is not always friendly to all transit users such as the elderly, the disabled, and families with small children who may be required to walk significant distances and maneuver stairs, elevators, and/or escalators before they even enter or exit the transit station. From the bicyclist perspective, WMATA Guidelines for Station Site and Access Planning (2005) suggest "avoiding the design of bicycle routes that require traversing stairs or escalators" (p. 2-8).

Figure 2.13: Elevated Stations can offer multiple access points, Elevated Destination Station, Walnut Hill Station, Dallas, TX – Source: DART

Bus/Taxi Access

Safety:

The layout of both Elevated Destination Stations and Elevated Park & Ride Stations put forward similar accessibility challenges from a bus/taxi access perspective that transit users must overcome at Surface Level Stations. Like Surface Level Stations, bus bays and taxi pick-up/drop-off areas at Elevated Stations are also positioned in such a way to keep the distance that the transit users must travel to and from the rail platform to a minimum (See Figure 2.14). While the priority placement of bus/taxi access points decreases the safety risks that transit users face concerning

Figure 2.14: Elevated Park & Ride Station bus bay – rail platform spatial relationship – Forest Lane Station, Dallas, Texas – Source: DART

contending with vehicular traffic, Elevated Stations do present security issues that transit agencies must take into account. The elevated rail guideway overhang can create dark spaces that are not always clearly visible from all directions that require extra lighting and/or surveillance. Elevated Park & Ride Stations may call for extra security measures to be taken as the lack consistent station activity and "eyes on the street" can enhance the potential danger created by this rail alignment and station configuration.

Convenience:

Transit users who access Elevated Destination Stations and Elevated Park & Ride Stations by way of bus or taxi are presented with many of the same barriers confronted by pedestrians in terms of reaching the raised platform from ground level. Specifically, the grade separation between the bus bays, taxi pick-up/drop-off areas

and the rail platform in many cases force transit users to expend extra time and energy walking stairs, riding escalators, or waiting for elevators.

Automobile Access

Safety:

Vehicular traffic remains the primary safety concern for those transit users who utilize Elevated Park & Ride Stations. Similar to Surface Level Stations, Elevated Park & Rides Stations require dedicated pedestrian pathways to minimize the potential conflicts between vehicular and pedestrian traffic. The BART Station Access Guidelines (2003) suggest that "pedestrian pathways through parking lots should be indicated with sidewalks, trees, and/or surface markings" (p. 3-15).

Convenience:

Direct connections between Elevated Park & Stations and parking structures offer enhanced level of accessibility to those transit users who choose to drive to the station area. Skywalks and/or pedestrian bridges can provide transit users with a shorter as well as sheltered walk between the parking garage and the rail station platform that may not require a change of grade. According to the BART Station Access Guidelines (2003), direct pedestrian bridges are an unnecessary luxury that can be substituted to by "safe, well marked surface-level routes" (p. 3-15).

The proximity of the Kiss & Ride pick-up/drop-off area in relation to elevator services to the station platform is particularly critical for disabled transit users at Elevated Destination Stations as well as Elevated Park & Ride Stations. WMATA

Guidelines for Station Site and Access Planning (2005) require “continuous depressed curb along the sidewalks adjacent to the Kiss & Rid pick-up/drop-off area” (p. 2-16).

2.4 Subway/Below-Grade Stations

Subway Stations like Elevated Stations have the potential to provide pedestrians with multiple access points to transit stations, enhancing overall connectivity within areas of already dense development. Subway Stations are located underground often because the existing built environment prevents the desired surface rail alignment. Downtown districts are usually where Subway Stations are most common. While Subway Stations are typically complicated to design and expensive to construct, the accessibility that this type of station offers pedestrians is in most cases exceptional.

Below-Grade Stations are less common than Subway Stations; featuring open-air platforms sunk several stories below ground level as illustrated in Figure 2.15. Below-Grade Stations are usually located on the periphery of urban area where undeveloped land is not yet at a premium. Generally, Below-Grade Stations present transit users with similar accessibility concerns as Subways Stations in terms of moving to and from the rail platform and the adjacent private parcels.

Pedestrian/Bicycle Access

Safety:

Subway Stations are typically categorized as Destination Stations, while Below-Grade Stations are more likely to include Park & Ride facilities. The safety

Figure 2.15: Below-Grade Park & Ride Station, Mockingbird Station, Dallas, TX - Source: DART

concerns correlated with Subway Destination Stations are predominately focused on protecting pedestrians from the dangers linked to vehicular traffic. BART Station Access Guidelines (2003) recommend that the installation of signalized crosswalks on major streets that include countdown-style indicators and audible signals. According to the WMATA Guidelines for Station Site and Access Planning (2005), "medians should be used to provide a refuge island for pedestrians for any street wider than four lanes" (p. 2-7). Finally, transit users who utilize Below-Grade Park & Ride Stations should expect to confront safety-related issues similar to those associated with Surface Level Park & Ride Stations.

Convenience:

Because the Subway Station platforms are below grade, the relationship between transit station and its adjoining private properties frequently involves direct connections. Surface access to Subway Stations can range from free-standing structures to egresses built into existing buildings. Subway Stations can require an extensive network of underground tunnels that channel transit users to their desired destination. Multi-modal transfers necessitate precise design that minimizes the distance that must be traveled by transit users. Similar to Elevated Stations, Subways Stations can be difficult for some types of transit users to navigate such as elderly, the

Figure 2.16: Underground direct connection between Subway station and office tower, Subway/Below Grade Destination Station, Cityplace Station, Dallas, TX – Source: www.subways.net

disabled, and families with small children. Direct connections between Subway Stations and structures above like offices as depicted in Figure 2.16, shopping

centers, and entertainment venues not only promote enhanced pedestrian connectivity within the station area, but produce additional revenue streams for the transit agency.

Bus/Taxi Access

Safety:

Security concerns exist for all transit users of Subway Stations due to the personal safety issues associated with pedestrian tunnels. WMATA Guidelines for Station Site and Access Planning (2005) suggest that for security reasons "tunnels should generally be avoided, but if necessary should be well lit with generous cross sections for visibility and user comforts" (p. 2-8). BART Station Access Guidelines also support the use of "lighting and security cameras where no indirect or natural surveillance is provided" (p. 3-4). Below-Grade Stations are more likely to include open-air pedestrian linkages between the rail platform, bus transfer areas, and adjacent private parcels.

Convenience:

Subway Station surface access points can be numerous. Subway Stations situated at the intersection of major downtown thoroughfares commonly offer access to the Subway station from each side of the arterials (See Figure 2.17 & 2.18). BART Station Access Guidelines (2003) specify the "use of dual-side street entrances/portals in downtown areas where feasible to shorten the actual and perceived walking distance to the station" (p. 3-4). Subway Station portals are usually positioned within or immediately adjacent to wide downtown sidewalks "on the same side of the street as popular destinations, and as close as possible to them" (BART, 2003, p. 3-4). This

Figure 2.17 & Figure 2.18: Subway station portal, Subway/Below-Grade Destination Station, Cityplace Station, Dallas, TX – Source: Hennigan

choice of location allows pedestrians to enter and exit the transit station with ease, while accommodating efficient multimodal transfers. Although some Subway Stations are designed to include below grade bus transfers as depicted in Figure 2.19 & 2.20, on-street bus stops are more prevalent in downtown districts.

Automobile Access

Safety:

Park & Ride facilities are infrequently incorporated into the design of Subway Stations. Stations of this nature are located in areas where foot traffic is high and the need for automobile parking by transit users is minimal. However, on-street parking is extremely common in central business districts. The presence of on-street parking is significant to pedestrian circulation and more importantly serves to buffer pedestrians from automobile traffic (BART, 2003). Also, depending upon the station

Figure 2.19 & 2.20: Subway station underground bus depot, Subway/Below-Grade Destination Station, Harvard Station, Cambridge, MA – Source: Simon P. Smiler & Tonyang

location, it is not uncommon for Kiss & Ride pick-up/drop-off area to be absent from the station design of downtown Subway Destination Stations.

Convenience:

Under certain circumstances the density of land uses surrounding Below-Grade Stations can allow for Park & Ride facilities to be incorporated in the station layout. While Below-Grade Park & Ride Stations offer transit users who rely on driving their private vehicle to the station the opportunity to take advantage of public transit, overall pedestrian connectivity within the station are is usually sacrificed. The NCTCOG Transportation Department Rail Station Access: Bicycle and Pedestrian Needs Assessment (2003) points out that "constructing a parking lot to serve the rail station secures the land immediately around the station until the market is right for development" (p. 9). In the meantime, parking structures constructed at rail stations as shown in Figure 2.21 are encouraged to be designed to offer first floor retail to

meet the services needs of transit users as well as to create more active uses that enhance the level of security within the station area (BART, 2003).

Figure 2.21: Commuter rail station parking structure featuring first floor retail, Auburn Station, Auburn, Washington/Sound Transit – Source: Integrus Architecture

2.5 Conclusion

The station area spatial interface – access typology is designed to examine the relationship between public and private space starting immediately from where the transit user steps off the train: the rail platform. While TOD emphasizes a pedestrian-oriented built environment, this typology has utilized a multimodal approach to evaluate access within the station area. This typology acknowledges the private automobile among the modes of transportation that must operate throughout the station area in concert with pedestrians/bicyclists and buses/taxis. Although each mode offers its own unique connectivity challenges, inevitably transit users who

access the station area via bus/taxi or automobile enter and exit the rail platform as pedestrians. As a result, the station area spatial interface – access typology pays close attention to accessibility obstacles and opportunities from a pedestrian perspective.

Finally, it is important to reiterate that this typology was formulated based on DART; a relatively new light rail system that is located in a part of the country where public transit has yet to be fully embraced. Because the DART rail alignment is predominately at grade, the Surface Level Station area type detailed in this chapter particularly benefited from the abundance of on-site evaluation opportunities. Similarly, the high quantity of Park & Ride facilities presently located at DART stations allows this report to include a detailed analysis of accessibility and the interface between public and private properties from the point of view of the transit user who drives to the station area. The key findings from the formulation of the station area spatial interface – access typology are presented in Chapter 5.

Chapter 3 DART LRT System: Station Area Spatial Interface – Access Typology Application

3.1 Introduction

An application of the station area spatial interface – access typology is able to enhance the spatial analysis of the relationship between public and private space within any given station area. This chapter relates the station area spatial interface – access typology to the DART rail system in an effort to provide specific examples of the classifications offered within the typology (See Figure 3.1). Because the connectivity within each station area is incredibly site specific, the DART rail stations associated with each typology classification are further differentiated based on their built environment and the function of the station.

This second-tier of site specific designations are based on the ForwardDallas! vision illustration building blocks. The ForwardDallas! vision incorporates the voice of the citizens of Dallas and is a product of many public meetings and community visioning workshops. The vision illustration "will be used by the City of Dallas staff as a guide for developing projects for the implementation plan and as a starting point for detailed small area plans (p. 21)". The building blocks are separated into two main categories for the ForwardDallas! visioning exercise: special mixed-use building blocks and conventional separate use building blocks. Many of the types of building blocks within each of the categories are utilized in this report. In some

Figure 3.1: DART Station Area Spatial Interface –Access (Red & Blue Lines Only)

	Pedestrian/Bicycle	Bus/Taxi	Automobile Kiss & Ride	 Park & Ride
Surface Level	**Lovers Lane** **Galatyn Park** **Cedars** **LBJ/Skillman** **St Paul** **Plano** Parker Road Bush Turnpike Arapaho LBJ/Central *Pearl* *Akard* ***St. Paul*** *West End* Union Station Convention Ctr. Cedars 8th & Corinth Dallas Zoo Tyler Vernon Hampton Westmoreland Garland Forest/Jupiter White Rock Illinois Morrell Kiest VA Medical Center Ledbetter	**Lovers Lane** **Galatyn Park** **Cedars** **LBJ/Skillman** **Plano** Parker Road Bush Turnpike Arapaho LBJ/Central Union Station Convention Ctr. Cedars 8th & Corinth Dallas Zoo Tyler/Vernon Hampton Westmoreland Garland Forest/Jupiter White Rock Illinois Kiest VA Medical Center Ledbetter	**Lovers Lane** **Galatyn Park** **Cedars** **LBJ/Skillman** **Plano** Parker Road Bush Turnpike Arapaho LBJ/Central Union Station Convention Ctr. Cedars 8th & Corinth Dallas Zoo Tyler/Vernon Hampton Westmoreland Garland Forest/Jupiter White Rock Illinois Kiest VA Medical Center Ledbetter	**LBJ/Skillman** Parker Road Bush Turnpike Arapaho LBJ/Central 8th & Corinth Hampton Westmoreland Garland Forest/Jupiter White Rock Illinois Kiest Ledbetter
Elevated	**Spring Valley** Park Lane Forest Lane Walnut Hill	**Spring Valley** Park Lane Forest Lane Walnut Hill		**Spring Valley** Park Lane Forest Lane
Subway – Below Grade	**Cityplace** **Mockingbird**	**Cityplace** **Mockingbird**		**Mockingbird**

Note : No bicycle parking facilities provided at downtown stations listed in *italics*. Stations listed in **bold** are highlighted in Chapters 3 & 4. See following page for DART Rail System Map.

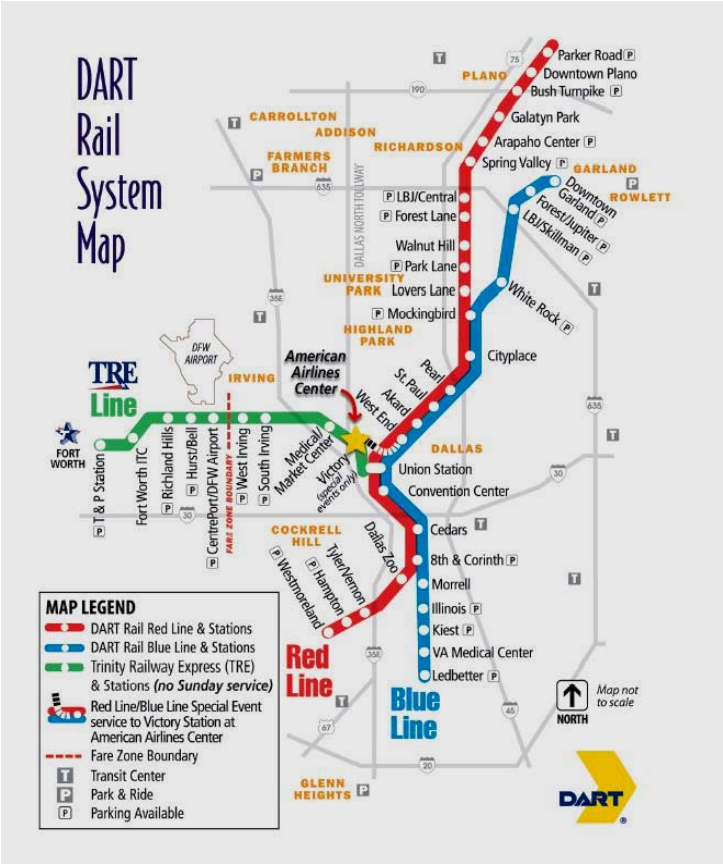

Figure 3.2: DART Rail System Map – Source: DART

cases, new building blocks have been created, while in other instances they have been modified when necessary. Further classification through the use of these building blocks allows for the pedestrian accessibility within each station area to be evaluated in greater detail.

An example of each primary station area spatial typology classification that is identified within the DART rail system is presented in depth inside this chapter. Table 3.1 provides a summary of the second-tier site specific designations adopted from the ForwardDallas! vision illustration. Each second-tier designation will be

detailed only in conjunction with the analysis provided for each station area spatial interface typology classification. Multiple examples of Destination Stations are featured in this chapter in order to better demonstrate how enhanced accessibility can be attained within a variety of TOD projects that were constructed in different types of built environments throughout the city.

Table 3.1 ForwardDallas! Vision Typologies

Special Mixed-Use	Conventional Separate Use
Downtown	Business Center/Corridor
Campus	Industrial
Urban Core Mixed-Use	Commercial Center/Corridor
Transit Station/Corridor	Residential Neighborhood
Main Street	
Urban Neighborhood	

Source: ForwardDallas!, 2006

3.2 Lovers Lane Station: Surface Level Destination Station

Lovers Lane Station is situated north of downtown Dallas and is the first stop on the DART's Red Line after it splits from the Blue Line in the direction of Plano. Lovers Lane is typical of several of the northern Red Line stations. Due to its location along side the North Central Expressway, Lovers Lane qualifies as a single-direction accessible station. On its eastern side, the Lovers Lane Station platform offers direct access to a courtyard that is shared by four high rise office buildings. The eastern faces of these office structures are set immediately on the sidewalk of Greenville Avenue. Although the DART rail alignment prevents access to Lovers Lane station from the west, Lovers Lane is an excellent example of a Surface Level Destination Station.

Direct pedestrian access offered to the adjoining private office properties and the absence of a Park & Ride facility on site are important characteristics of a Surface Level Destination Station. The second-tier building block designation associated with Lovers Lane Station is a combination of the ForwardDallas! Business Center/Corridor and Commercial Center/Corridor districts. While the station area directly surrounding the transit platform is conducive to pedestrian activity, Greenville Avenue is often congested with automobile traffic. Greenville Avenue is a six lane road that is dense with commercial development, including CVS and OfficeMax. Residents living in single-family homes west of the North Central Expressway and multi-family units east of Greenville Avenue within a half mile radius of the station platform face significant obstacles should they wish to access the Lovers Lane Station on foot.

A short set of stairs that are unprotected and exposed to the natural elements extends between the office parcels and the transit station. While stairs can represent a barrier for some transit users such as the elderly and the disabled, this access point signifies an exceptionally high level of connectivity between private and public properties. Ground-level access to the rail platform is offered at the main station entrance, north of the stairway. In addition, a paved pedestrian path located directly adjacent to the rail lane provides enhanced connectivity between the transit station and the office complex. Although this walkway is somewhat narrow, this pedestrian path is well-lit, landscaped, and quite functional.

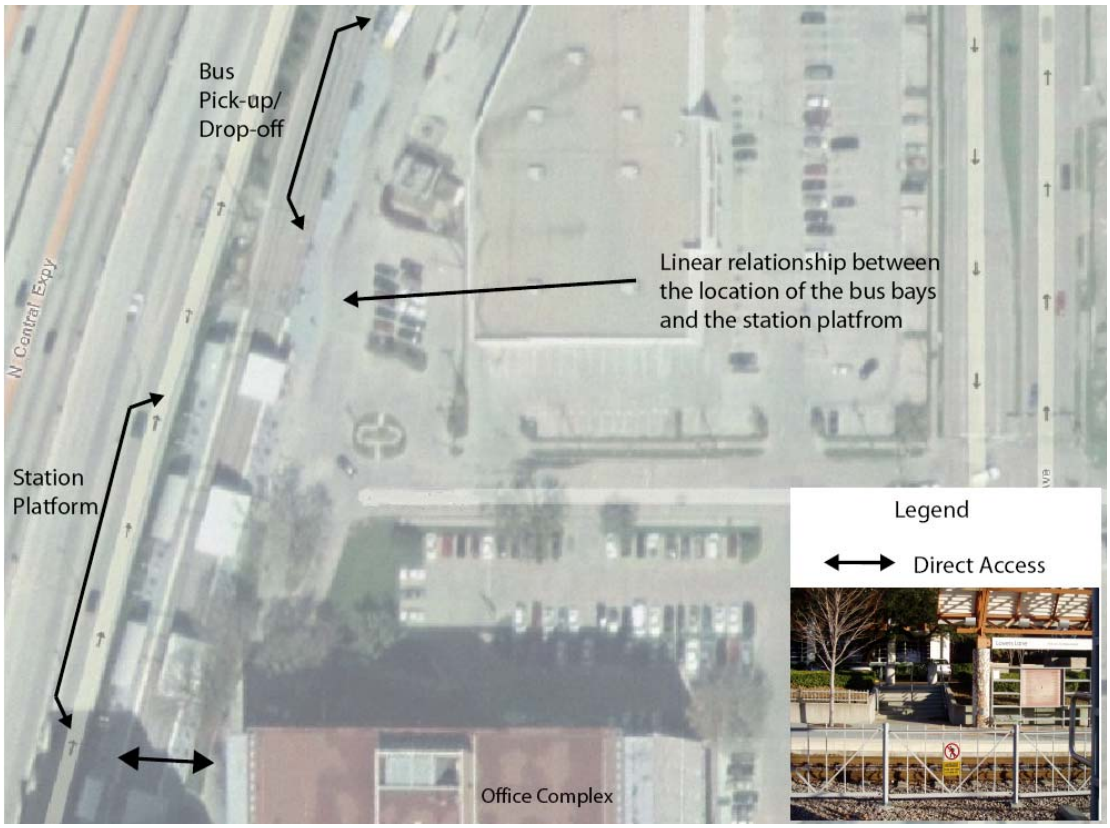

Figure 3.3: Example of direct access between Lovers Lane Station and adjacent office complex – Source: Microsoft

The layout of the Lovers Lane rail platform and its bus bays allow for the direct access between the transit station and the adjoining private office properties to be possible (See Figure 3.3). The linear design of the transit station is responsible for the superior levels of connectivity that pedestrians enjoy within the immediate station area. While the existing built environment as well as the size and shape of station parcel were in all likelihood the major driving forces behind Lovers Lane Station's linear layout, the vertical alignment of rail platform and bus bays is an important element of pedestrian-friendly transit station design.

3.3 Galatyn Park Station: Surface Level Destination Station

Galatyn Park Station is representative of the City of Richardson's dedication to transit-oriented development. Richardson public officials view DART rail as an opportunity to transform the areas surrounding each of the cities' four stations to a more pedestrian friendly built environment. By conducting market studies and instituting land use regulations, Richardson has taken a proactive approach to development around its rail stations. Galatyn Park was originally proposed to be a new city center as several municipally owned parcels and hike-and-bike trails are located within the station area.

Galatyn Park is Richardson's first TOD. Galatyn Park Station is a Surface Level Destination Station that is best characterized by the DallasForward! Transit Station Center building block designation. Located adjacent to the eastern side of the North Central Expressway, Galatyn Park is situated on DART's Red Line between Arapaho and Bush Turnpike Stations. Galatyn Park is a split platform station that opens immediately onto The Plaza at Galatyn Park on its eastern side (See Figure 3.4). The direct access between the station platform and The Plaza offers pedestrians an unobstructed route to the Renaissance Hotel and the Eisemann Center for the Performing Arts. The station area is also equipped with wide sidewalks that were designed to handle the high volume of pedestrian traffic generated by the Nortel and Countywide campuses. Figure 3.5 illustrates the path leading from the station

platform to these employment centers is well distinguished by an artistically designed brick walkway that runs past a modern water sculpture.

Figure 3.4: Galatyn Park Surface Level Destination Station aerial, Renaissance Hotel in foreground, Nortel and Countywide campuses in background - Source: DART

Galatyn Park Station is not positioned within the service routes of any DART bus lines. Instead, a shuttle system provides transit users with access to the large quantity of office complexes that have been constructed within the station area. The shuttle bus bay area is sited on the North Central Expressway access road and is adjoined to station's western platform. No parking of any form is available at Galatyn Park Station. Overall, Galatyn Park's should be recognized for its exceptional pedestrian-friendly design. The layout of Galatyn Park does not require

Figure 3.5: Galatyn Park Station Plaza - Source: Hennigan

transit users to cross bus or automobile traffic to reach their intended destination from the east side of the station. Currently, the Galatyn Park station area can still be described as a work in progress. Unfortunately, the events of 9-11 derailed Richardson's plans to develop Galatyn Park into a 24-hour city center. Several Galatyn Park mixed-use projects were cancelled due to the post – 9/11 economic slowdown. As a result, several large graded empty parcels still exist within the station area, the most significant of which is located immediately adjacent to the rail station and The Plaza at Galatyn Park. The paths laid out north to south within The Plaza dead end directly into this expansive vacant lot, one of the station area's most valuable and prominent pieces of real estate.

3.4 Cedars Station: Surface Level Destination Station

Cedars Station is a Surface Level Destination Station, situated on Dallas' south side within the city's rail yard and warehouse district. ForwardDallas! uses its Urban Core Mixed-Use building block to describe the land use within this section of the city. The built environment within much of the Cedars Station area can be classified of transit-oriented redevelopment. Cedar's primary TOD project consists of the Southside on Lamar, the redevelopment of a former Sears' distribution center into combination of artist lofts and retail.

Cedars Station is identified by DART and Cervero as one of Dallas' five TOD transit stations. While the current development surrounding Cedars meets TOD qualifications, the station area is still early in its transition from an industrial center to a pedestrian oriented built environment. In addition to the Southside on Lamar project, an IBM office complex, a bank-training facility, and a new police station comprise the major land uses within the immediate station area. As a result, it would be stretch to categorize the Cedars station area as a vibrant 24-hour urban neighborhood as foot traffic is still rather insignificant.

Cedars is a split platform station that offers bus service and limited parking. The western platform was constructed immediately adjacent to the IBM complex. However, there is no direct access between the platform and the neighboring IBM building. Transit users who are traveling to or from IBM, the police station, or

Southside on Lamar must walk to northern end of the platform and proceed left along Belleview Street.

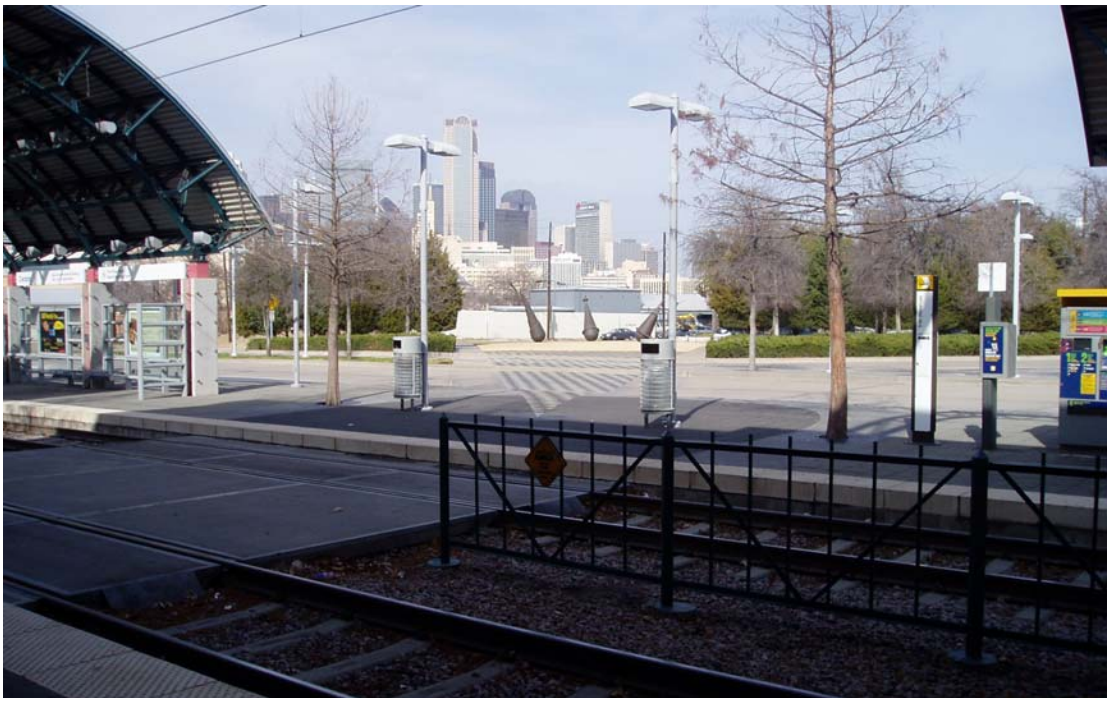

Figure 3.6: Cedars Station - Source: Hennigan

The eastern platform adjoins the bus bay area and Cedars small short-term parking lot. The eastern side of the station property features a grove of cedar trees, a spectacular view of the Dallas skyline, and creatively designed walkway that was laid out around an abstract example of station art (See Figure 3.6). Unfortunately, with the exception of several older trees in front of the IBM building, the streetscapes along the private parcels adjacent to Cedars do little to promote a pedestrian-friendly environment. This lack of attention to the needs of the pedestrian can be somewhat attributed to the fact that the station area is still in its early stages of transformation.

As vacant parcels are developed and existing land uses are redeveloped, the city will need to continue to improve the access to Cedars in the form of additional pedestrian amenities and enhancements.

3.5 St. Paul Station: Surface Level Destination Station

St. Paul Station is a Surface Level Destination Station located within Dallas's downtown district and is serviced by DART's Red and Blue Lines. St Paul Station is one of four stations that comprise DART's transitway mall. Other stations include Pearl, Akard, and West End. Transitway mall stations are predominantly located in downtown areas and are created by acquiring the right-of-ways of existing streets within central business districts; essentially replacing the automobile traffic on a specific network of streets with a railway. With the implementation of light rail systems within existing downtown areas, transitway mall stations have become more common. Stations of this nature are a cost-effective alternative to constructing Subway Stations underground. Houston is an example of another city in Texas that offers this type of downtown light rail service. Transitway mall stations are more conducive to light rail systems than heavy rail due to the cost and engineering issues that would need to be addressed to isolate rail guideways from pedestrian traffic.

Structures along transitway malls and particularly at transitway mall stations where transit users often congregate provide direct access to pedestrians. Buildings set immediately along transitway malls commonly offer a range of first floor retail and services options as well as eating and drinking establishments. Overall, transit

Figure 3.7: St Paul Station situated along downtown Dallas' transitway mall- Source: DART

agencies that embrace rail alignments that include transitway mall in favor of underground alignments are effectively creating more pedestrian accessibility within downtown districts while saving valuable construction funds.

St. Paul Station is positioned on a section of Bryan Street between St. Paul and Harwood Streets that formerly accommodated automobile traffic prior to DART. This transitway mall is in the heart of downtown, surrounded by high-rise office towers. The second tier blocking block designation associated with St. Paul Station is the downtown/central business district. This classification is not among the building blocks developed for the vision exercise and was created for this report.

Office towers set along the St. Paul transitway mall Station include One Dallas Centre, the Harford Building, and Harwood Center (the former Olympia and

York Tower). Each of these structures offers direct access between their ground floors and the St. Paul station area. Sandwich shops and other eating and drinking establishments are common ground floor tenants within the St. Paul station area that benefit from the enhanced accessibility associated with transitway malls. St. Paul Station is lined with amenities such as benches and public art (See Figure 3.7). These station-related features serve to promote a more pedestrian-friendly environment and a higher level of connectivity within these particular sections of the downtown district.

3.6 LBJ/Skillman Station: Surface Level Park & Ride Station

LBJ/Skillman Station, shown in Figure 3.8, is located on DART's Blue Line adjacent to the LBJ Expressway (I-635). LBJ/Skillman Station is among fourteen Park & Ride Stations currently operating within the DART Rail system. Adjoining private properties to the transit station include industrial use to the east and a large townhouse apartment complex to the north. The ForwardDallas! building block that best represents the area surrounding LBJ/Skillman Station is a hybrid between its Commercial – Office – Industrial classifications. For the purpose of this report, these building blocks were consolidated into one based on their similarities concerning automobile-oriented streetscapes and a lack of regard for pedestrians.

Due to its proximity to a major arterial like the LBJ Expressway, LBJ/Skillman Station is an ideal site for a Park & Ride rail transit facility. LBJ/Skillman Station is comprised of two Park & Ride lots and a total of 646 parking

spaces. Two vacant parcels owned by DART that buffer the station area and an apartment complex from the LBJ Expressway also are included within the station area.

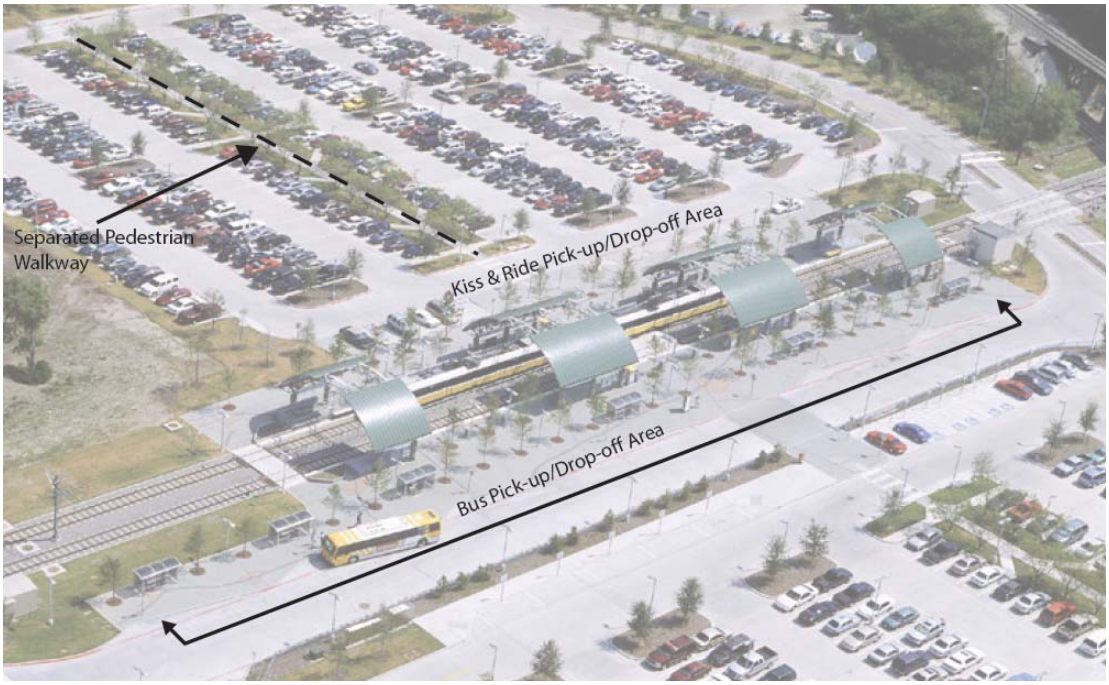

Figure 3.8: LBJ/Skillman Surface Level Park & Ride Station aerial – DART

Park & Ride lots surround the rail platform to both the north and south. LBJ/Skillman Station was designed as a split platform station, offering transit users immediate access to the bus bays (south) and Kiss & Ride areas (north) that adjoin the rail platform. Landscaped walkways originate from the rail platform and guide pedestrians to their vehicles within the respective Park & Ride lots. While these walkways provide transit users with a safe and direct route to the rail station, these pedestrian paths dead-end and do not extend outside the public space of the transit

station. It is interesting to note that a trace (dirt path) has been formed from the regular foot traffic between the apartment complex and where the walkways to the transit station terminate (See Figure 3.9).

Figure 3.9: Foot path connecting residential units to LBJ/Skillman station area - Source: Hennigan

In May 2005, DART accepted proposals from developers for the lease or sale of the 22 acres of vacant land located along the LBJ Expressway. The Request for Proposals specifies that the proposed development project must "adhere to the philosophy of transit-oriented development, maximize pedestrian access, and promote and enhance the use of public transportation" (DART, 2005, p. 3). Efforts such as this one to transform a Surface Level Park & Ride Station into a pedestrian-friendly built environment demonstrate that DART officials are actively promoting TOD

opportunities. The recognition of potential joint development projects at rail transit stations like LBJ/Skillman indicates that DART officials understand that many Park & Ride facilities can be put to a higher and better use and that enhanced station area pedestrian accessibility should be soon to follow.

3.7 Spring Valley Station: Elevated Park & Ride Station

Spring Valley Station is the first of four stations from south to north located within the City of Richardson on DART's Red Line. Spring Valley Station is sited on Spring Valley Road, approximately one half mile east of the North Central Expressway. Spring Valley Station is one of three Elevated Park & Ride Stations within the entire DART Rail network. An aerial track configuration is necessary for the rail alignment in this instance as east and west Spring Valley Road automobile traffic travels beneath the overpass constructed perpendicular to the roadway for use by DART's Red Line trains.

The commercial/office/industrial building block is a modification of the ForwardDallas! typology that best suits the development within the station area. Spring Valley Road is a busy thoroughfare lined with a combination of office and retail structures that is not conducive to pedestrian traffic. The Park & Ride facility is positioned west of the station platform and north of Spring Valley Road. The eastern edge of the Spring Valley Station property is marked by the rail tracks and station platform. The Green Valley apartment complex is situated immediately east of the station.

Figure 3.10: Spring Valley Surface Level Park & Ride aerial – Microsoft

While Park & Ride lots may be a common component within the layout of a rail transit station, these facilities are a secondary barrier that the pedestrian must confront after he/she disembarks from the train onto the platform. The common frame of reference for each station area analyzed within this reports begins from the same place in each case, the station platform. The first obstacle faced by all pedestrians who attempt to access adjacent properties within Elevated Station areas is the vertical distance between the station platform and ground level.

The Spring Valley Station rail platform can be accessed either by a stairway or by elevator. Immediately adjacent to the station entrance to the west is a strip of

bus bays that must be crossed by pedestrians wishing to enter the Park & Ride lots. The Park & Ride facility is divided into three sections, two of which are separated by the Spring Valley Station access road. Designated walkways lead pedestrians across the access road into the larger western-most Park & Ride lot. North of the bus bays is Spring Valley Station's third Park & Ride lot. Transit users who park in this lot can follow the walkway that extends from the bus bay area to walk to their vehicle. None of the predominately industrial properties that adjoin the station's Park & Ride facilities offer any access to enhance the connectivity within the station area.

The best example of superior accessibility between public and private space within the station area is the paved path that runs between the Green Valley Apartment complex and Spring Valley Station. This path travels beneath the elevated rail line and connects the northern end of the station with the parking area of the apartment complex (See Figure 3.10). This amenity is especially attractive for those residents of Green Valley Apartments who are transit users that seek the most direct route to the station platform.

Although the rail alignment is elevated over Spring Valley Road, the station platform can only be accessed from the northern side of Spring Valley Road. This rail station was not designed as a pedestrian overpass to facilitate foot traffic along Spring Valley Road. In its current state, Spring Valley Road is not pedestrian-friendly and streetscape improvements would directly increase the level of connectivity within the station area.

3.8 Cityplace Station: Subway/Below-Grade Destination Station

Cityplace Station is DART's only true Subway Destination Station, located ten stories beneath the North Central Expressway along a 3.25 mile tunnel that links Pearl Station with Mockingbird Station. Cityplace Station, the first station north of the downtown district, is serviced by both Red and Blue Line trains. Above ground, Cityplace Station is situated between Haskell and Lemmon Streets. Station access points are positioned on the frontage roads on either side of the North Central Expressway. Transit users enter and exit Cityplace Station from the west through a free-standing station portal (See Figure 3.11). Access to Cityplace Station from the east is made possible through two doorways that are built into Cityplace Center East.

Cityplace Center, depicted in the background of Figure 3.12, is a 42-story office high rise that was completed in 1988. Originally known as Cityplace Center East, this structure was intended to be the first of twin office towers constructed by the Southland Corporation on either side of the North Central Expressway. The Cityplace Center towers were to be the focal point of a master plan that included a dynamic mix of apartments, condominiums, retail, hotels, and office structures over a twenty year time period on a 160 acre uptown location. According to LaGesse (1990), Southland secretly assembled the parcels for the Cityplace complex in the early 1980s and proceeded to clear old neighborhoods in preparation for construction. A combination of a depressed Dallas real estate market and financial difficulties led to the sale of undeveloped portion of the Cityplace property in early 1990s. With the

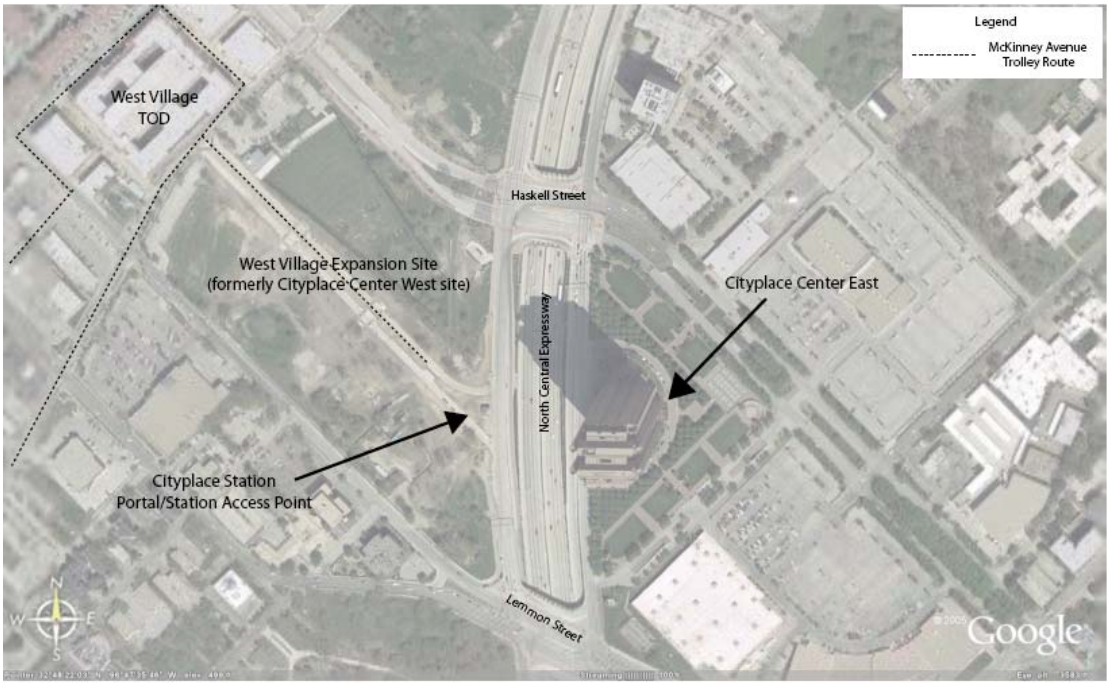

Figure 3.11: Cityplace Subway/Below-Grade Destination Station aerial – Source: Google

exception of the West Village mixed-use project, a large segment of the former Southland Corporation site remains vacant.

The DallasForward! transit station center and urban core mixed-use district building blocks best captures the built environment surrounding the Cityplace Station. The transit station center designation is predominately composed of a dense mix of retail and residential units ranging from low high-rise condominiums to townhouses. The West Village mixed-use development project and the current master plan for its expansion within the vacant parcels previously earmarked for the Cityplace Center West office tower are a model example of the transit station center building block. The urban core mixed-use classification is best suited for the development on the

Figure 3.12: View of mixed-use featured at West Village TOD with Cityplace Center in the background- Source: Hennigan

eastern side of the North Central Expressway. This designation is used as description for mixed-use districts that include high-rise commercial towers, like Cityplace Center.

The connectivity within the eastern side of the Cityplace station area is enhanced by the direct connection underground between the Subway Station and the Cityplace Center office tower. The lower level of the office tower is linked to Cityplace Station and can only be accessed by employees who work within Cityplace Center who possess key cards. These key cards are required in order for employees to enter the office tower from the Subway Station as well as for employees to exit the office tower and enter the Subway Station. According a member of the Cityplace Center security team, direct access between the office tower and the Subway Station

is no longer permitted for all transit users due to the safety concerns pertaining to loitering within the building's lobby, thus limiting this access point to Cityplace Center employees only.

Figure 3.13: McKinney Trolley provides access to West Village from Cityplace Station- Source: Hennigan

A multi-modal transportation network is available to pedestrians directly outside of both Subway Station access points. DART bus service is offered on the east and west frontage roads of the North Central Expressway with bus stops positioned immediately along the street. In addition, a McKinney Avenue streetcar stop is within a short walk from the Cityplace Subway Station portal on the western side of the North Central Expressway. The McKinney Avenue streetcar system was extended to the Cityplace Subway Station in order to enhance the level of connectivity for pedestrians and transit users within the Uptown area, including West

Village. Specifically, the numerous West Village shops, restaurants, and residences located on the periphery of the Cityplace station area are made significantly more accessible due to the service provided by the McKinney streetcars shown in Figure 3.13.

3.9 Conclusion

The DART station areas highlighted in this chapter portray a metropolitan area that is progressing in terms of increasing its quality of station area accessibility. Thus far, developers who have constructed TOD projects in Dallas have found collaboration with the public sector to be extremely limited in comparison to neighboring cities like Richardson and Plano. The adoption of the ForwardDallas! comprehensive plan should mark a new development era for Dallas that will likely benefit TOD, creating a more pedestrian-friendly built environment throughout the city.

DART is also taking a more active role in promoting TOD based on its efforts to explore the conversion of some its Park & Ride facilities, such as at LBJ/Skillman Station, to higher density uses that support increased ridership. The ability for DART officials to be able to recognize Park & Ride facilities as an underutilization of valuable land is refreshing as most TOD – TJD entails redevelopment, like the projects at Cedars and Cityplace Stations, due to the lack of vacant land available in most station areas. These steps taken by the DART will enhance the likelihood for

new TOD-related public/private partnerships in the future with greater involvement from local government.

In order for joint development to be successful from a connectivity standpoint, site selection including land assemblage, financial arrangements, and land use regulatory policy usually are important factors that influence the planning and development within the station area. The following chapter examines three case studies that demonstrate the impact that these factors can have on accessibility and the spatial interface between public and private space within transit station areas.

Chapter 4 Station Area Spatial Orientation Factor Case Studies: DART & WMATA Rail Systems

4.1 Introduction

The case studies presented in this chapter examine the impact that site selection, TOD financing, and land use regulatory policy can have on the level of connectivity within a TOD station area. Specifically, the spatial orientation of DART's Downtown Plano and Mockingbird Stations as well as WMATA's Rosslyn-Ballston corridor stations are evaluated in this chapter based on the factors listed above. Each factor is analyzed individually and is supported by detailed examples from the DART and WMATA case studies. Prior to the evaluation of each spatial orientation factor, each case study is briefly introduced and identified according to the station area interface typology. This chapter concludes with a brief examination of the financial impact of enhanced accessibility within TOD - TJD station areas in the Dallas and Washington D.C. metropolitan areas.

4.1.1 Downtown Plano Station

DART's Downtown Plano Station is one of two stations situated in the City of Plano on DART's Red Line (See Figure 4.1). Opened in 2002, Downtown Plano Station is located one stop south of the Red Line's terminus, Parker Road Station. Plano, like Richardson, has taken an aggressive approach to TOD, using DART as a catalyst for the redevelopment of its downtown. The collaboration of Plano city

officials and Dallas developer, Robert Shaw, is chiefly responsible for the revitalization of Plano's central business district, which was spurred by the construction of Shaw's mixed use-residential projects, Eastside I & II. Downtown Plano is a Surface Level Destination Station that can be characterized by the ForwardDallas! Main Street building block classification. Park & Ride facilities are not available at the Downtown Plano Station. Transit users access the station area through a variety of modes; including bus, bicycle, automobile (Kiss & Ride), and on foot.

Figure 4.1: Downtown Plano Station – Surface Level Destination Station - Source: DART

4.1.2 Mockingbird Station

DART's Mockingbird Station as shown in Figure 4.2 is located north of downtown Dallas where DART's Red and Blue Lines split. In the late 1990s Developer Ken Hughes assembled ten acres of under-utilized land between the North Central Expressway and DART's Mockingbird Station with the intention of constructing Dallas' first urban transit village. The Mockingbird Station TOD was

Figure 4.2: Mockingbird Station – Subway/Below-grade Destination Station - Source: DART

completed in 2001; four years after DART first started offering light rail service to the area. The Mockingbird Station project consists of a high-end mix of retail, office, restaurants, residential units, and a movie theater. Mockingbird Station can be categorized as a Subway/Below-Grade Park & Ride Station. Prior to Hughes' mixed-

use development project, Mockingbird Station, the initial terminus of DART's pilot system, was designed to include a Park & Ride facility. While Mockingbird's rail platform is not positioned underground like Cityplace Station, it is situated 40 foot below grade in an open-air channel. According to the ForwardDallas! vision typology, Mockingbird Station fulfills the Transit Station Center building block criteria.

4.1.3 Rosslyn – Ballston Corridor Stations

The Rosslyn – Ballston corridor is a segment of WMATA's Orange Line that provides service to Arlington County, Virginia (See Figure 4.3). The Rosslyn – Ballston corridor is comprised of Rosslyn, Court House, Clarendon, Virginia Square, and Ballston Metro Stations. Each rail station along the corridor is best identified by the Subway/Below-Grade Destination Station area interface typology classification. Rosslyn Metro Station, the first station in Virginia west of the Potomac River, offers access to WMATA's Orange and Blues Lines. In 1977 WMATA opened Rosslyn Metro Station to Blue Line passengers and later extended the Orange Line to Ballston Metro Station in 1979. Rosslyn and Ballston Metro Stations are both major bus transfer hubs on the corridor. According to sector plans conducted by the Arlington County Planning Division each station area along the corridor was designated to perform a different purpose: "Rosslyn as a major business center, Court House as the local government center, Clarendon as an urban village, Virginia Square as a cultural and education center, and Ballston as Arlington's new downtown" (ULI, 2004, p.77).

Figure 4.3: Rosslyn - Ballston Corridor - Source: Dunphy/ULI

4.2 The Site Factor

Transit station site selection can present numerous opportunities and/or constraints for the enhancement of pedestrian accessibility within a station area. Financial considerations generally dictate the site selection process. Site selection can also be influenced by factors ranging from rail alignment, land availability, and redevelopment – economic development objectives. Open lines of communication between transit agencies, municipalities, and the local development community are necessary when finalizing station sites in order to maximize pedestrian connectivity. This section of the report offers background concerning the site selection process for

DART's Downtown Plano and Mockingbird Stations and WMATA's Rosslyn Ballston Corridor Stations and analysis regarding how each station site has impacted pedestrian accessibility within its station area.

4.2.1 Downtown Plano Station

Downtown Plano Station is an at-grade split platform station, located adjacent to Haggard Park and Eastside Village I between E 15th Street and E 16th Street. The bus transfer area is positioned immediately north of the station's eastern platform. Because Downtown Plano is a Destination Station, all parking in the central business district is restricted to 4 hours, including the Haggard Park lot that borders the station's western platform.

The station site was first proposed in 1991 based on the recommendation from the City of Plano's 1991 Downtown Development Plan. According to DART's projected implementation schedule at that time, rail service was not anticipated for downtown Plano until after 2010. Porter (2002) explains that "DART's initial service plan for the Red Line northern extension showed light-rail service extending along the Houston and Texas Central Railroad corridor, parallel to U.S. 75, through downtown Plano with stops north and south of downtown, but not in the downtown area" (p. 92). The success of DART's pilot program in 1996 expedited the target start for downtown Plano service to 2002.

DART and city officials worked together quickly to approve the proposed station location. From an economic development perspective, the station site was integral to Plano's downtown revitalization efforts. The approved station location

required Plano to assemble the site through the closure of a section of Avenue J and acquisition of the adjoining blighted commercial properties. Turner (2003) suggests that "closing Avenue J between 15th Place and 16th Street would provide sufficient land for the platform and eliminate any need to encroach into Haggard Park" (p. 7). Ultimately, this station location allowed the city to amass a 3.6 acre parcel to serve as a catalyst to drive the redevelopment of its downtown, while at the same time satisfying DART's site engineering standards.

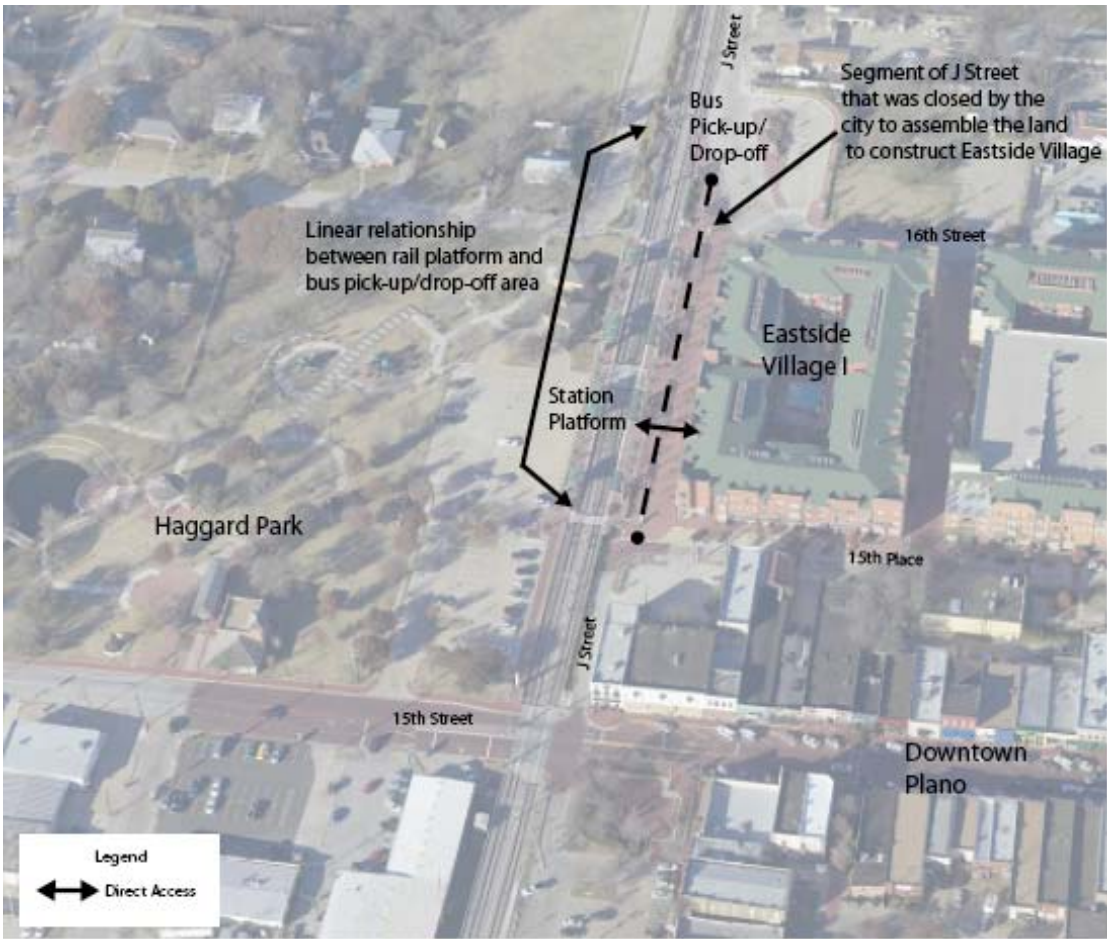

Figure 4.4: Aerial View of the Direct Connection between Downtown Plano Station and Eastside Village I - Source: Microsoft

The pedestrian accessibility within the station area was dramatically enhanced by the selection of the originally proposed station site. The closure of Avenue J illustrated in Figure 4.4 eliminated a significant connectivity obstacle and offered transit users direct access to the adjacent land uses from both the eastern and western platforms. The spatial relationship between the rail platform, the bus transfer area, and the rail line was also prompted by the annexation of a segment of Avenue J. Finally, streetscape improvements including brick sidewalks and ornamental lighting assisted to integrate the rail station within the downtown district. The high level of pedestrian connectivity that has been created within the station area can be largely attributed to the vision of the city offered by Plano's 1991 Downtown Development Plan and the strong commitment by public officials to the promotion of transit-oriented development.

4.2.2 Mockingbird Station

Because Mockingbird Station originally served as DART's northern terminus, its station location was primarily based upon its proximity to major thoroughfares and the availability of adjoining land to construct its Park & Ride facility. The alignment of the rail line was designed to take advantage of abandoned or under-utilized rail corridors for cost saving purposes. However, Mockingbird Station's open air, below grade platform was not planned in anticipation of Ken Hughes' mixed-use development project that shares the same name. Hughes' TOD project was built on an irregular shaped 10 acre site defined by the rail corridor and the North Central Expressway (See Figure 4.5). Dittmar (2004) points out that "transit agencies need to

site stations carefully if they want to encourage TOD, noting that [according to Hughes] if the station at Mockingbird had been built even 50 feet closer to the North Central Expressway, there would not have been enough site to build on" (p. 172). While Hughes's TOD exhibits a high caliber of pedestrian connectivity, overall pedestrian accessibility within the station area is limited by the barriers created by Mockingbird Lane and the North Central Expressway.

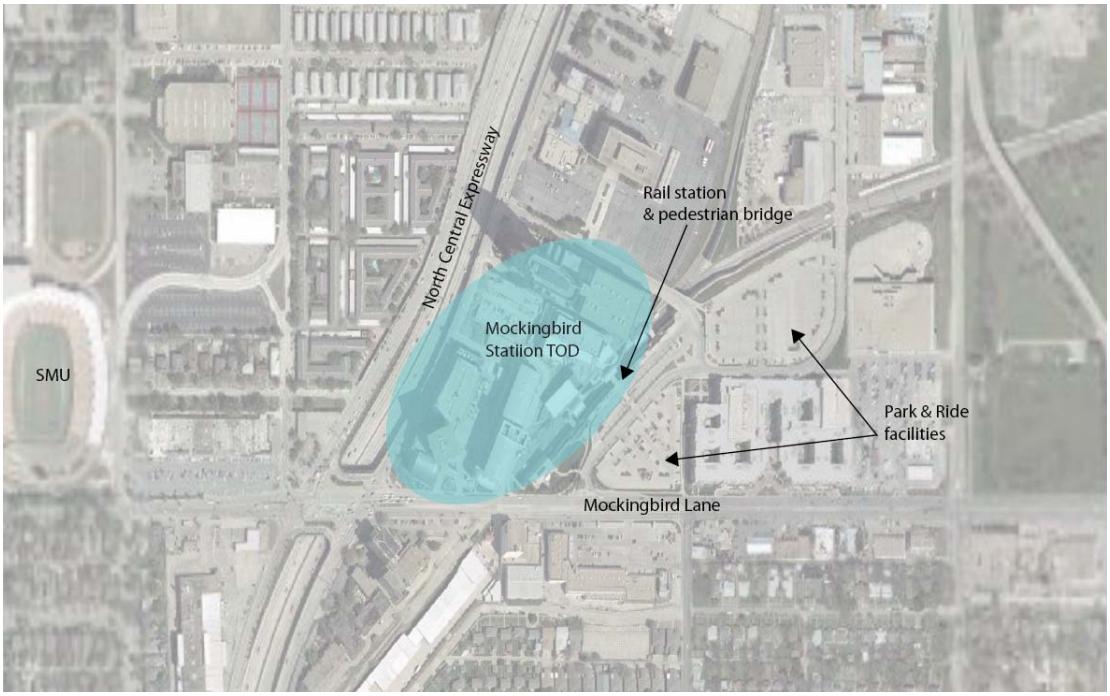

Figure 4.5: Mockingbird Station aerial - Source: Google

The pedestrian bridge shown in Figure 4.6 provides transit users direct access west to Hughes' Mockingbird Station project from the DART station. Pedestrians can choose from a system of elevators, escalators, or stairs to ascend the forty feet from the boarding platform to the pedestrian bridge. Mockingbird Station's

Figure 4.6: Mockingbird Station Pedestrian Bridge - Source: Hennigan

expansive Park & Ride facility is located on the opposite end of the pedestrian bridge, east of the rail station. The vast size of the parking facility creates another obstacle that pedestrians must navigate before they can access adjoining parcels. Although the original function of the Mockingbird Station was to operate as a terminus, the lack of collaboration between the public and private sectors in terms of redevelopment within the station area is clearly evident based on the lack of connectivity that continues to exist between land uses.

4.2.3 Rosslyn – Ballston Corridor Stations

The alignment of WMATA's Orange Line was the determining factor regarding the level of pedestrian connectivity that each station area along the corridor

would be able to offer transit users. During the late 1960s, Arlington County and the regional transit agency, then known as the National Capital Transit Agency (NCTA) were engaged in negotiations regarding whether the Orange Line should be routed below grade following the Wilson Boulevard corridor or above ground along the existing public right-of-way of Interstate 66. NCTA preferred the Interstate 66 option based on financial considerations even though this alignment would pass "through low density residential neighborhoods that did not offer the same redevelopment potential as the Wilson Boulevard alignment" (Dittmar, 2004, p. 144). In the end, the Wilson Boulevard alignment prevailed and Arlington County planning officials were presented with the opportunity to utilize Metrorail to promote its revitalization efforts along the corridor.

All five of the Orange Line rail stops along the Rosslyn – Ballston corridor can be classified as Subway Destination Stations. Subway Stations offer more creative opportunities for pedestrian connectivity via TJD revenue sharing agreements such as the leasing of air-rights and direct connection fees. In terms of air-rights leasing, both Rosslyn Metro Center and Ballston Metro Center are examples of two mixed-use development projects constructed above Metro stations along the corridor. Rosslyn Metro Center also includes a direct connection from its lobby to the transit station. Multiple street-level access portals provide enhanced accessibility for transit users particularly at stations like Ballston and Court House that are located on major arterials. Skywalks are another design element that increases pedestrian accessibility. Congested downtown commercial districts comprised of mid to high-

rise buildings are the optimal built environment for skywalks to be implemented. The Rosslyn and Ballston Metro Station areas are two illustrations along the corridor where skywalks play an essential role in facilitating pedestrian connectivity (See Figure 4.7). Both station areas feature a system of skywalks that link city blocks together, offering pedestrians a safer and more direct route to destinations like office towers, high density residential structures, and retail centers like Ballston Commons.

Figure 4.7: Pedestrian connectivity is enhanced within the Rosslyn Metro Station area by a series of skywalks- Source: Hennigan

WMATA's Rosslyn – Ballston corridor is an excellent model of the incredible impact that major initial transportation planning decisions like rail alignment can have on the level of pedestrian connectivity within a station area.

4.3 The Financing Factor

True transit-oriented development (TOD) is a function of a cooperative effort between the private sector, the public sector, and the transit agency. The planning, financing, and construction of transit infrastructure, which is the origin and focal point of TOD, are the responsibility of the transit agency. Presently, the economics of assembling or extending rail service in the United States is a very expensive endeavor. The unreliability of state and federal subsidies for transit has pressed transit agencies across the country to seek creative forms of funding. TOD developers have also become forced to overcome significant obstacles from the lending community in order to ensure their projects will come to fruition.

The financing issues associated with TOD have not gone unnoticed by the public sector. TOD is a form of development that can create a pedestrian friendly and mixed-use built environment that alleviates many of the negative side effects of sprawl. Proponents of TOD have long applauded the impact that it can have on "mitigating a host of social ills, such as automobile dependence, travel congestion, air pollution, and physical health" (Dumbaugh, 2004, p. 44). Local, state, and federal government have taken strides to facilitate TOD through a variety of mechanisms. These means range from instituting various policies and incentives to contributing land and/or funding. Transit joint development (TJD) or public-private partnerships have become a popular component within TODs throughout the United States.

TOD is still considered a rather unproven commodity to lenders because of what is thought to be a significant risk that developers must absorb in terms of the mixed-use factor of these projects. Transit agencies are attractive partners to developers, allowing for distribution of risk. In addition to the financial benefits offered by the collaboration between the public and private sectors, the design and circulation of TJD are generally superior. Access between the transit station and surrounding commercial and residential area within TJD is augmented by the opportunity for the developer and the transit agency to join forces during the planning process.

Financing strategies for TOD can vary based on the local market and the level of support from the public sector. The perception of TOD can also fluctuate throughout different regions of the country, which contributes to the apprehension experienced by lenders concerning this form of development. The DART and WMATA case studies offer contrasting views and techniques toward the financing of TODs in the Dallas Metroplex and the Washington D.C. metropolitan area. This section attempts to draw connections between the financing of TODs and the level of connectivity created within a station area.

4.3.1 Downtown Plano Station

The redevelopment surrounding the Downtown Plano Station is indicative of the type of financial cooperation between private developers and local municipalities that is often necessary for TOD to be successful in areas where public transit is still building its ridership, like North Texas. Ten years prior to the arrival of DART's rail

service in Plano, local city officials made a commitment to revitalizing its downtown in the form of its 1991 Downtown Development Plan. Besides The Downtown Development Plan, Plano public leaders recognized that the new policy changes called for in the plan needed to be complemented by public sector financing mechanisms. In order to achieve Plano's downtown objectives, the development climate in North Texas for transit-oriented redevelopment related projects required additional financial incentives such as tax increment finance district to boost Plano's TJD efforts.

Tax increment financing (TIF) is a popular method of funding infrastructure improvements for TOD projects. Local governments establish specific TIF districts around transit station areas to provide a stimulus for private investment. Sullivan, Johnson, and Soden (2002) explain TIF as the process of a city government [designating] a specific parcel of land as a TIF district and [pledging] all increases in real estate tax revenue owing to increased property assessed value to a TIF district account for a pre-determined number of years" (p. 3). The revenue generated by increased property tax revenue within TIF districts are diverted from the municipalities' general fund to repay bonds floated to fund infrastructure improvements.

Because TIF is currently a high profile form of financing, much attention has been paid to the criteria used for the determination of TIF districts. Cervero (2002) points out that "since revenue intake relies on an increase in property values, [TIF] districts should only be considered in areas where there is a reasonable expectation

that new development will occur" (p. 52). Sullivan, Johnson, and Soden (2002) add that TIF districts should not include land that is already appreciating in assessed value. Texas is among a group of states that calls for a finding of blight as a prerequisite for establishment of a TIF zone (Sullivan, Johnson, and Soden, 2002).

Figure 4.8: Downtown Plano Station & Eastside Village I - Source: Amicus Partners

The City of Plano along with PISD, Collin County and Collin County Community College established a TIF district in 1999 to "encourage economic reinvestment along the DART LRT corridor" (Turner, 2003, p. 14). Plano's TIF district encompasses all of the city's rail stations with the Downtown Plano station area receiving first priority for use of TIF funds (Porter, 2002). According to Frank

Turner, the executive director of the Development Business Center for the City of Plano (2003), the anticipated revenue from Plano's TIF district when it expires in 2014 is over $15 million. The City of Plano has utilized $4.6 million TIF funds to construct local amenities like the Courtyard Theater in an effort to entice for residential and commercial development to downtown (Porter, 2002).

Thus far, the most significant product of redevelopment of downtown Plano has been developer Robert Shaw's (Amicus Partners) residential mixed-use projects, Eastside Village I & II. Constructed in 2001, Eastside Village I (234 units) is situated directly adjacent to the Downtown Plano Station's eastern platform (See Figures 4.8 & 4.9). Located at the northeast corner of Avenue K and 14th Street, Eastside Village II (229 units) was completed in late 2002. Eastside Village I & II are a direct result of the public and private sectors working together and represent excellent examples of the concept of TJD.

Even prior to The Downtown Development Plan, the City of Plano had been active in acquiring blighted property in its central business district. Preparation for the arrival of DART LRT increased the City of Plano's efforts to purchase and/or condemn blighted parcels along rail line and Avenue J between 15th Place and 16th Street for the construction of the station platform. Upon the selection of the platform location, DART purchased the designated land for the station from the City of Plano; leaving Plano with a 3.6 acre redevelopment opportunity. Amicus Partners was chosen by the City of Plano as the developer for the land adjoining the station by way

Figure 4.9: Pedestrian walkway to western platform at Downtown Plano Station, Eastside Village I in back ground - Source: DART

of a request for proposals process in 1999. It is important to note that this instance is a variation of Cervero's definition of TJD in which case the municipality fulfilled the role of the transit agency as DART transferred the ownership of all land not required for the construction of the transit station back to the City of Plano.

The Eastside Village I & II would not have been logistically or financially feasible projects for Amicus Partners alone. The role played by the City of Plano was critical to the success of these TJD projects. The City of Plano facilitated the redevelopment of its downtown by assembling the land for the Amicus projects. In addition, the city agreed to pay for $2 million in off-site public infrastructure and streetscape improvements that were required for the project. In order to maintain better control of the long-term future of development the city opted to lease rather

than sell the site to Amicus. According to Turner (2003), the city granted a "start-up incentive to the developer by discounting the ground lease to 25% of the base rent during the first year and 50% of the base rent during the second year" (p. 9). These terms assisted Amicus in their efforts to secure financing for the project from lending community. Amicus also benefited from Plano's commitment to expedite its development review and permitting process by avoiding costly delays over the course of the project.

Overall, the accessibility within the Downtown Plano station area has been clearly enhanced by the Eastside Village I & II TJD projects. The redevelopment site assembled by the City of Plano allowed Amicus to design and construct a mixed-use residential project that was would take advantage of its direct access to the rail platform. Finally, the 70-year lease agreement with three 10-year options that the City of Plano negotiated with Amicus keeps the city more involved in the future of site, allowing for the potential for more public/private collaboration in the years ahead.

4.3.2 Mockingbird Station

The Mockingbird Station TOD is a redevelopment project that was the product of the vision of its developer Ken Hughes, president of UC Urban. Hughes sought to create a built environment that captured the vibrancy generated by the activity that surrounds transit stations (Cervero et al., 2004). Mockingbird Station was inspired by Hughes' appreciation of the impact that mass transit has had in the shaping of some of the world's great cities like London and New York (Cervero et

al., 2004). Hughes identified the former Western Electric assembly plant and its site adjacent to the DART station, shown in Figure 4.10, as an ideal location to attain his development objectives.

Figure 4.10: The Lofts at Mockingbird Station, former Western Electric assembly plant Source: Allresco

Traditionally, the Dallas public officials have relied upon market forces rather than public subsidies to stimulate development throughout the city. The Mockingbird Station project was entirely privately financed with the exception of some federal transportation funding that was spent toward local infrastructure improvements. Ultimately, Mockingbird Station was constructed without any financial assistance from the City of Dallas. Hughes was required to "foot the bill for pedestrian

amenities and transit linkages, [not including the federal contributions cited above]; for construction links to the Katy hiking and biking trail; for public sidewalks and landscaping, and even for upgrade improvements to the DART station" (ULI, 2004, p. 106).

Fearful that reaching out to local government to engage in a potential public/private partnership could result in costly delays in the construction schedule for Mockingbird Station, Hughes opted not to seek any public financial support. According to Dittmar (2004), Hughes "raised the bar for other Dallas developers because he not did ask for any public assistance, …but it is unlikely that Hughes would make that choice again, given the amount of public subsidy provided for transportation improvements at other TOD projects around Dallas and elsewhere in the country" (p. 163-164). For Hughes, the cost of time from a financing standpoint outweighed the possibility that he would be able to obtain enough public subsidies from the city to make a possible public/private partnership worthwhile.

From the lenders perspective, the Mockingbird Station project was attractive because of its proximity to the North Central Expressway and Mockingbird Lane. Hughes understood that the transit-oriented aspect of the Mockingbird Station project was more of an afterthought than a selling point to the lending community. Hughes would also find that local planning officials would share the lending community's lack of appreciation of Mockingbird Station's superior accessibility to the DART LRT system when the parking capacity of the development was determined. The abundance of parking that was required by city officials would have a direct impact

on the success of the Mockingbird Station project and its connectivity with the surrounding station area. A more detailed discussion of the specific parking requirements mandated by the city is included in the following section (The Regulatory Factor).

In terms of TJD, DART seems to have recognized that Mockingbird Station's expansive 708 space, approximately ten acre Park & Ride facility is an under-utilization of valuable land. Last March 2005, DART released a Request for Proposals (RFP) for the lease of the parking lots at Mockingbird Station. DART's position on the role of TJD is as follows:

> As with other transit agencies, DART is custodian of large-scale public investment that includes real property assets. In many cases, the properties can sustain additional profitable uses supportive of DART's main transit function. By encouraging high quality and more intensive development around and on these properties, DART can promote and enhance public transit, generate new revenues and improve its transit operations while creating attractive investment opportunities for the private sector and facilitating local economic development goals (DART, 2005, p. 3).

Included among DART's objectives for the lease of the property is the "development of a financially viable project, the adherence to the philosophy of transit oriented development, consistency with regional and local policies and plans,

and maximized pedestrian access" (DART, 2005, p. 3). Transit joint development can offer the opportunity to DART to recapture a portion of the sizable financial investment spent to provide transit service to the Dallas Metroplex. The future TOD that will be constructed on the site of the Mockingbird Station parking lots will be representative of Cervero's definition of TJD as development will be directly orchestrated between DART and the developer.

Figure 4.11 & 4.12: Mockingbird Station Park & Ride Entrances - Source: Hennigan

Figures 4.11 and 4.12 assist to illustrate the largest criticism of Hughes' Mockingbird Station TOD: its lack of connectivity with its surrounding built environment. According to Cervero et al. (2004), "the project's only shortcoming is poor pedestrian connections across adjacent streets and highways [where the] sidewalks surrounding the project are undersized, discontinuous, and flank fast moving-traffic" (p. 304). It can be suggested that some of Mockingbird Station's accessibility limitations may not have been as significant had the City of Dallas taken some financial stake in the project. The lack of public financial involvement from the

City of Dallas in the form of any TJD cost-sharing or revenue-sharing agreements reduced the opportunity for collaboration on accessibility enhancements within the station area.

4.3.3 Rosslyn – Ballston Corridor Stations

Over nearly the past 30 years, much of the redevelopment that has taken place surrounding the station areas along the Rosslyn – Ballston Corridor can be attributed to WMATA's aggressive joint development program. WMATA is widely regarded as one of the most entrepreneurial transit agencies in the United States based on the success it has experienced in the area of TJD. WMATA "is the national leader in striking revenue-sharing deals" ranging from station leases to station connection agreements (Cervero, 1992, p. 2). Accessibility opportunities can be a direct benefit of TJD. WMATA has experienced great financial success by negotiating station connections fees with developers of adjacent properties. Station connection agreements are one of several WMATA development programs [that are] attracting new riders to the transit system, rejuvenating and creating neighborhoods, and augmenting federal, state, and local revenues" (McNeal and Doggett, 1999, p. 78).

According to WMATA's (2005) Joint Development Policies and Guidelines, the goals of WMATA's joint development program include (p. 3):

- Promote transit oriented development;

- 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 expeditiously negotiating joint development agreements between WMATA and public or private development entities;
- Assist the 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.

During the early1960s, Rosslyn was cluttered with a mix of pawnshops, warehouses, and service yards. An amendment of Arlington County's General Land Use Plan in 1962 spurred the redevelopment of Rosslyn faster than other areas along the future rail corridor such as Ballston. Even prior to the arrival of the Metrorail, Rosslyn experienced a development boom that transformed it into an automobile-oriented commercial area dominated by high rise office towers. According to Bernick and Cervero (1997), "by the 1970s [Ballston] had become an aging district surrounded by surface parking lots, auto repair shops, fast food outlets, older homes, and a handful of garden apartments" (p. 217).

Rosslyn was already considerably more built-out compared to the other station areas along the rail corridor when WMATA started offering Orange Line service

between Rosslyn and Ballston. As a result, WMATA's joint development program has had a far greater impact on the Ballston Metro Station area built environment than the Rosslyn Metro Station area built environment. Consequently, the level of connectivity within the Ballston Metro Station area has been appreciably enhanced due in large part to the success of WMATA's joint development program.

Figure 4.13 - Ballston Metro Subway Destination Station - Source: Hennigan

Ballston Metro Center is a 26 story structure that was constructed on a 2.7 acre site directly above the Ballston Metro station (See Figure 4.13). Completed in 1990, Ballston Metro Center includes a hotel, retail, office, and residential condominiums. International Development Incorporated (IDI) was contracted as the

developer for the Ballston Metro Center. From a TJD perspective, WMATA initially facilitated the development of the Ballston Metro Center by assembling the land necessary for a financially viable project. WMATA negotiated an agreement with the adjacent property owner to its 87,118 square feet Ballston Metro Center site, a former bus staging area, to put together a larger parcel which would be viewed as more attractive by the developer community. While this sort of arrangement was a deviation from WMATA's joint development guidelines, creativity was required because the original request for proposals for developers for the transit agency's 87,118 square foot lot received no proposals.

The financial agreement between WMATA and the Ballston Metro Center's ownership group, Ballston Center Associates Limited Partnership (BCA) also reflected an understanding by the transit agency of the obstacles that developers must overcome to make a project successful. WMATA provided some flexibility in its deal so as to appease BCA's lenders. First, because the project involved the construction of condominiums, WMATA was required to diverge again from its standard practices and sell a portion of the site to BCA rather than lease the entire parcel. According to Lefaver (1997), in order to help reduce the risks of the development team "further and in recognition of the large amount of cash necessary to get the construction loan to close, WMATA agreed to minimal, up-front lease and land purchase payments until project completion" (p. 147). Also, WMATA approved the request by BCA's lenders to increase the first term of the 99 year lease from 50 to 60 years.

Figure 4.14: Spatial relationship between Ballston Metro Station main access point and Ballston Metro Center - Source: Hennigan

In addition to the strong impact that WMATA's joint development program has had in the development of the Ballston Metro Station area, Arlington County's role in the construction of a 3,200-car garage located three blocks from the Metro station also had a significant affect on its built environment. In 1982, the county issued bonds to fund a parking garage/Park & Ride facility that was to be built in anticipation of the construction of the Ballston Commons shopping mall as well as for use by Metro commuters. Bernick and Cervero (1997) indicate that the county's involvement in the parking garage project was also one of the major economic development turning points that jump started the tremendous growth within the Ballston Metro Station area during the 1980s.

Figure 4.15: View of the Ballston Metro Station entrance from inside Ballston Metro Center - Source: Ming Zhang

Pedestrian accessibility within the station area has benefited from TJD and public subsidy in the form of an extensive system of skywalks between the Ballston Metro Center and Ballston Commons. While Ballston Metro Station was not designed to include a direct connection between itself and the Ballston Metro Center, Ballston Metro Station's main entrance/exit portal is located at virtually the front doorstep of Ballston Metro Center, as shown in Figures 4.14 and 4.15. A station portal with elevator access is situated on the south side of Fairfax Drive. An additional station portal with elevator access on the north side of Fairfax Drive is a Ballston Metrorail access improvement project that is currently under construction and scheduled to open this summer. Collaboration between WMATA and BCA

produced a seven bus bay transfer area along Stuart Street "only a few yards from the entrance to the Metrorail Station" (Lefaver, 1997, p. 144).

Bernick and Cervero (1997) suggest that the building massing and high-rise structures in the Ballston Metro Station area has created a built environment that could be more pedestrian-friendly. County zoning regulations and design guidelines have been used to complement public subsidy and WMATA's joint development program to enhance the accessibility within the station area in an effort to establish a mix of land uses to promote 24-hour street activity.

4.4 The Regulatory Factor

Land use regulatory policy such as zoning controls/incentives, design guidelines, and form-based code are also tools that can be used to improve pedestrian accessibility within station areas. Plano, Dallas, and Arlington County have each taken their own approach concerning the role that land use regulatory policy has played in shaping the built environment within their transit station areas. This section of the report examines to what extent the pedestrian connectivity within DART's Downtown Plano and Mockingbird Stations and WMATA's Rosslyn – Ballston Corridor Stations has been augmented by each municipality's utilization of their land use regulatory policy toolbox.

4.4.1 Downtown Plano Station

The City of Plano's 1991 Downtown Development Plan was the stimulus for multiple land use regulatory policy mechanisms that assisted in the redevelopment of

its central business district. According to Porter (2002), "the plan recommended preservation of the modest scale and historic character of downtown and expansion in adjacent areas through infill development and redevelopment" (p. 92). Specifically, the Downtown Development Plan was the driving force behind "a new Business/Government (BG) zoning district [that] was formed in 1993, which allowed mixed use development in the entire (80-acre) downtown core" (Cervero et al., 2004, p. 307). The approval of the Business/Government zoning district was pivotal in the transformation of Plano's downtown in preparation for the arrival of DART LRT. The B/G zoning district included density limits, design standards, and parking requirements that would have a significant impact on the built environment and pedestrian accessibility within the Downtown Plano station area.

Under the original terms of the B/G zoning district, the permitted density was 40 units per acre. In the case of the Robert Shaw's Eastside Village I & II TOD projects, the maximum density within the B/G zoning district needed to be reassessed. Turner (2003) suggests that "the residential density necessary for viable urban housing was underestimated" by Plano public officials (p. 9). Shaw engaged the community in the design process of the Eastside Village in an effort to gain support for a higher maximum density within the B/G zoning district. In order for the project to attain its objectives as a financially viable transit village, Shaw understood that a higher maximum density would be necessary. After several months of public participation, Plano City Council amended the B/G zoning district to increase the maximum density to 100 units per acre. Cervero et al. (2004) explains that "the

community was willing to accept high density in exchange for the prospect of re-energizing and upgrading downtown Plano" (p. 308).

Figure 4.16: Downtown Plano streetscape, 15th Street - Source: Hennigan

The B/G zoning district also required that new downtown development comply with a set of design standards that was assembled to promote pedestrian accessibility and the restoration of the historic character of the central business district. The 1991 Downtown Development Plan served as the basis for the new zoning district's design standards. Heavy commercial uses were prohibited under the B/G zoning district design standards. Other requirements included minimizing building setbacks and capping building heights at four stories. Streetscape

improvements featuring brick sidewalks and ornamental lighting were recommended by the 1991 Downtown Development Plan (See Figure 4.16).

The parking requirements instituted by the City of Plano have enhanced the level of connectivity within the Downtown Plano station area. Surface parking is specifically limited within the B/G zoning district as shown in Figure 4.17. Landscaping for parking areas is included among the conditions of the downtown zoning district. In addition to the parking requirements dictated by the B/G zoning district, the policy decision to restrict commuter parking within the station area has had positive ramifications on pedestrian accessibility. The connectivity within the station area automatically was increased by the absence of any form of Park & Ride facility.

The design of the Eastside Village parking structures also took into consideration the need for high pedestrian accessibility. According to Turner (2003), "parking requirements for new development downtown were discounted 75% of the standard requirements, presuming mixed-use development and transit use will reduce demand" (p. 18). Each parking garage is positioned off the street within the interior of each development. The City of Plano is allotted over 100 spaces for public use for up to a maximum of four hours. This shared parking arrangement was negotiated by the City of Plano in return for an adjacent parcel of city property. By taking more parked cars of the street, Plano city officials exhibited the ability to put together

Figure 4.17: Example of parking restrictions within Downtown Plano Station area – Source: Hennigan

creative solutions for the benefit of improving pedestrian accessibility within the station area.

The discussion in this section of the report shows the intertwined relationship between the financial and regulatory factors. For example, a TJD tool like parcel assembly can facilitate parking regulatory policy as demonstrated above. It is also interesting to note that "to help leverage the Eastside Village projects, [Plano] paid for new local streets, constructed brick sidewalks, and provided street furniture and ornamental lights" (Cervero et al., 2004, p. 309).

4.4.2 Mockingbird Station

The City of Dallas has augmented its market-driven financial approach to TOD with an equally hands-off line of attack from the land use regulatory policy perspective. The issue of parking is a particular area where city planning officials have had the opportunity to make more allowances for TOD. Mockingbird Station is an instance where the City of Dallas opted against significantly altering its parking regulatory policy to benefit TOD.

Although the City of Dallas did reduce the parking requirement for the Mockingbird Station TOD from 2,200 spaces to 1,600 spaces, Mockingbird Station has been criticized by some for its over abundance of parking. Between Hughes' TOD project and DART's park-and-facility, the total parking capacity for the Mockingbird station area is over 2,900 spaces. However, Hughes approximates that only 1,300 spaces are necessary for Mockingbird Station to function properly. Hughes has estimated that he has had to construct $6 million worth of excess structured parking for his project (Cervero et al., 2004). While the City of Dallas has been slow to implement more progressive parking regulatory policy, DART has recognized that its vast arsenal of parking facilities in some cases may have a higher use. Ridlington and Heavner (2005) explain that "DART does not require developers to replace all displaced surface parking because some parking lots under consideration [for development] have excess capacity and parking demand will be reduced by allowing shared parking between retail, residential, and transit users" (p. 18).

Figure 4.18: View from Mockingbird Station Park & Ride area - Source: Hennigan

Conveniently, the Mockingbird Station site was already zoned for mixed-use. Figures 4.19 & 4.20 assist to illustrate the integration between land uses immediately adjacent to the rail station. According to Cervero et al. (2004), "the City of Dallas of has [historically] made no changes to its plans or zoning codes to promote or allow TOD" (p. 304). Although zoning was not an obstacle for the Mockingbird Station TOD, more active participation from the public sector from a planning perspective may have better facilitated the integration of the project within the station area. Because the city did not produce a station area plan for the Mockingbird DART

Figures 4.19 & 4.20: Steps connecting rail station and movie theater with lofts and retail (elevator service also offered) – Source: Selzer Associates

station, Hughes was forced to rely more on the master plan that he contracted RTKL to produce. Hughes believed that a station area plan initiated by the City of Dallas "would have served to put all city departments on notice about the city's goals for the site, it would have helped coordinate their disparate objectives, it would have helped ensure political support, and it would have made clear the necessity of transportation improvements, some of which were paid for by Hughes" (Dittmar, 2004, p. 171). Dittmar (2004) suggests that "visioning and master-planning exercises, development of special codes and design guidelines, help to create certainty for both public and private partners" (p. 170).

The prospect for more collaboration between the private and public sectors in the area of TOD in Dallas has become brighter upon the February 2006 release of Dallas' first city-wide comprehensive plan, ForwardDallas. Included among ForwardDallas!' implementation goals are the development of a "new 'form based' mixed use zoning code that is predictable and objective" and the formation of Transit Station and Transit Corridor Districts as part of this mixed use zoning code" (City of Dallas, 2006, p. 10-6). Looking ahead, ForwardDallas should send a positive message to developer and lending communities concerning TOD. ForwardDallas! demonstrates recognition by city officials of the benefits and importance of TOD and pedestrian accessibility.

4.4.3 Rosslyn – Ballston Corridor Stations

Arlington County has been successful in shaping the development within the station areas along WMATA's Rosslyn – Ballston corridor through primarily the use of incentive zoning and density bonuses. An extensive planning process consisting of a multi-level hierarchy of plans has also played a significant role in the creation of a pedestrian-friendly mix of land uses within each station area. These regulatory policy tools have been utilized in effort to transform each station areas along the corridor into a transit village. Rosslyn and Ballston represent two stations area where Arlington County's regulatory approach has achieved varying levels of success.

Incentive zoning has allowed Arlington County to satisfy many of its station area objectives. Arlington County has used incentive zoning to provide public infrastructure and streetscape improvements along the rail corridor. Arlington

County's General Land Use Plan presents developers with the opportunity during the site review and approval process to negotiate with "county board and staff, citizen commissions, and the community over their project's design and community benefits" (Dittmar, 2004, p. 134). In return for density bonuses, developers have been required to supply a range of public infrastructure-related improvements including "undergrounding utilities, redesign and signalization of intersections, and provision of sidewalks, crosswalks, street trees, street lighting, and other amenities" (Dittmar, 2004, p.134). These improvements are designed to enhance the level of pedestrian connectivity throughout the county. According to Dittmar (2004), "developers have expressed some concern about the growing list of amenities they are required to pay for as a condition for site plan approval and that erodes the profitability of projects" (p. 146). Because Arlington County has made such a strong commitment to funding public transit, it often times relies on the private developers for the provision of public infrastructure and streetscape improvements. The outcome of this approach has resulted in an uneven balance of public infrastructure and streetscape upgrades in areas only where re/development is planned.

Density bonuses have also been employed to increase the level of residential units within the station areas along the Rosslyn – Ballston corridor. Arlington County planning officials understand that the right mix of office, retail, and residential is necessary in order for each station area to truly function as a transit village. The redevelopment in the vicinity of Ballston Metro Station is a particularly strong

example of how density bonuses can have a real impact on the built environment and the character of street activity within the station area.

Arlington County's in-depth planning process is largely responsible for establishing the appropriate framework to attain its TOD goals. Starting with its General Land Use Plan, Arlington County's four-tiered planning process is designed to promote TOD and pedestrian accessibility within each station area. In addition, the Arlington County's planning process strives to create an attractive real estate climate that is appealing to the development community. Next, Arlington County has taken a "bull's-eye" approach to station area planning, designing Sector Plan around each Metrorail stop along the corridor (Dunphy et al., 2004, p.76). These Sector Plans provide a comprehensive vision of how the mix of land uses within the station area will be arranged to fulfill the function designated for each district. Dittmar (2004) explains that the "third level of planning has been focused on specific functional aspects of the corridor such as affordable housing, retail development, parking policy, pedestrian and bicycle access, and safety" (p. 146). This level of planning is more in depth and often produces design standards. Finally, the site review and approval process, referenced above, is the most detailed and site-specific level of the planning process.

4.4.3.1 Rosslyn Metro Station

The lackluster outcome of the original redevelopment efforts involving the Rosslyn Metro Station area was more indicative of the fact that it was first district planned along the corridor than a demonstration of the capabilities and vision of

Arlington County public officials. Arlington County planners have spent over thirty years trying to instill the qualities of a transit village into its first major business center. The transformation of the Rosslyn Metro Station area and its new physical form that evolved during the 1960s was a reflection "of the state of planning practice at the time: widely spaced, rectangularly shaped buildings situated off of plazas; a skywalk system to connect buildings and main the street level for automobiles (See Figure 4.21); broad avenues, 70 to 80 feet wide, with narrow sometimes discontinuous sidewalks" (Bernick and Cervero, 1997, p. 226).

Arlington County has utilized regulatory policy tools such as density bonuses and the creation of the Rosslyn Coordinated Redevelopment District to attempt to reshape the Rosslyn Metro Station area into a more pedestrian-friendly environment. Additional density and height is permitted within Rosslyn Coordinated Redevelopment District upon approval from the County Board, through the site plan approval process, in exchange for the provision of important community benefits. Included among these community benefits are "the development of a mixed-use project with a significant residential component; the provision or enhancement of retail, restaurant and entertainment facilities in the center of Rosslyn; the provision or enhancement of the pedestrian, vehicular and mass transit circulation system, the creation of a "Central Place" and the "Esplanade" as envisioned in the Rosslyn Metro Station Area Sector Plan Addendum" (Arlington County DCPHD, n.d.). The "Central Place" is a proposed mixed-use redevelopment project within the two block area surrounding the Rosslyn Metro Station.

Figure 4.21: Rosslyn Metro Station rear entrance features a skywalk designed to separate transit users from automobile traffic below - Source: Hennigan

The Rosslyn Metro Station area has also been a frequent target of Arlington County's extensive planning process. Since the opening of WMATA's Rosslyn Metro Station, two sector plans have been developed for the station area: Rosslyn Transit Station Area Study (1977) and Rosslyn Metro Station Area Plan Addendum (1992). More specific functional reports such as the Central Rosslyn Curb-Side Management Study (2005) and Rosslyn Metrorail Station Access Study (2002) have also been commissioned in an effort to provide a framework to improve pedestrian accessibility within the station area. These reports are intended to complement the corridor-wide policy documents like Streetscape Standards for the Rosslyn – Ballston

Figure 4.22: Rosslyn Metro Station front entrance and streetscape - Source: Hennigan

Metro Corridor (2003). Figure 4.22 shows the present state of the streetscape outside the main entrance of the Rosslyn Metro Station.

The latest Rosslyn Metro Station area make-over has been a gradual process. While first floor retail, bike lanes, and new open space are apparent improvements, the lack of integration between office and residential land uses must be addressed further. Arlington County planners continue to strive to instill the Rosslyn Metro Station area with a sense of vibrancy synonymous with a 24-hour urban area. This greater goal may not be achieved until major redevelopment projects like “Central

Place" are implemented and start to reconfigure the land uses within the Rosslyn Metro Station area.

4.4.3.2 Ballston Metro Station

Like Rosslyn, Ballston was also intended to serve as a major business center. According to the Ballston Sector Plan (1980), the district surrounding the Ballston Metro Station was planned to become Arlington's new downtown. Having learned from the Rosslyn experience, Arlington County public officials aggressively utilized incentive zoning and density bonuses to "mix its commercial development with an equal amount of housing within a quarter-mile sphere" of Ballston Metro Station (Bernick and Cervero, 1997, p. 220). The adoption of the Ballston Sector Plan called for the rezoning of the seven block area surrounding the Ballston Metro Station to form a "Coordinated Mixed Use (C-O-A) Development District". According to the Arlington County Department of Community Planning Housing and Development, "the goal of the C-O-A district is to create a balance between new residential development and employment opportunities" (Arlington County DCPHD, n.d.).

Bernick and Cervero (1997) explain that Arlington County "used density incentives to achieve a desired built form" that included first floor retail, open space, and an intermingling between commercial and residential land uses (p. 220). The C-O-A district is an example of one of the special zoning districts that Arlington County approved in the 1980s when development was skewed toward office "that required developers to build residential space first before they could get the maximum allowable office density" (Dittmar, 2004, p. 135). The density incentives offered by

the county authorized the standard FAR of 3.5 to be increased to 6, meaning that "250,000 square feet of additional commercial would be permitted for each 100,000 square feet of site square footage for residential/commercial projects, up to the 6 FAR ceiling" (Lefaver, 1997, p.140). The Ballston Metro Center is one of many development projects within the station area that is the product of Arlington County's decision to exercise this regulatory policy tool.

Figure 4.23: Wayfaring signage positioned immediately in front of Ballston Metro Station - Source: Hennigan

The strong level of pedestrian and bicycle access within the Ballston Metro Station is the outcome of Arlington County's methodical planning process. Corridor visioning exercises such as The Rosslyn-Ballston Corridor: Early Visions (1989) and The Rosslyn-Ballston Corridor: Mid-Course Review (1989) has served to reinforce

Figure 4.24: Ballston Bus Transfer Area featuring pedestrian-friendly wide sidewalks and street trees - Source: Hennigan

the framework that was established in the Ballston Sector Plan (1980). Function specific studies like the Rosslyn – Ballston Corridor Retail Action Plan (2001) provide urban design guidelines that can be incorporated into a policy documents like Streetscape Standards for the Rosslyn – Ballston Metro Corridor (2003). Overall, Arlington County's systematic planning approach is responsible for Ballston Metro Station area pedestrian and bicycle access amenities like medians, wide sidewalks, wayfaring signage, bike lanes, car-sharing, and signalized crosswalks with countdown indicators (See Figures 4.23 and 4.24). While many of these same accessibility

amenities can also be found in the Rosslyn Metro Station area, the redevelopment of the Ballston Metro Station area benefited tremendously from WMATA's "decision to extend the Orange Line from its terminus at Ballston Metro Station to Vienna/Fairfax Station" (Cervero et al., 2004, p. 248). This shift permitted large parcels of land formerly utilized as parking and bus staging zones to be redeveloped in accordance with the guidelines outlined in the Ballston Sector Plan.

4.5 Conclusion – The Economic Impact

A quantative analysis of the enhanced pedestrian accessibility associated with TJD – TOD station areas by this report is necessary to understand the financial impact of this product of joint development. The studies that have been conducted to measure the economic value of TJD projects have revealed a range of financial gains. The outcome of these studies allow for empirical observations to be made regarding the economic advantages linked to the increased level of connectivity generated by TJD. This section draws from a group of economic impact studies to highlight the financial benefit of TJD located within the DART and WMATA rail systems.

DART

Weinstein and Clower of University of North Texas have completed three financial-related studies since 1999 that assist to demonstrate the economic benefit of the increased station area connectivity linked to TJD. According to Weinstein and Clower (1999), between 1994 and 1998 property valuations around DART stations system-wide rose about 25 percent greater than in control neighborhoods. The

Cityplace-Mockingbird-Lovers Lane corridor experienced the sharpest increase in property valuation during the same time period. While Hughes's Mockingbird Station was not yet completed during this timeframe, Cityplace and Lovers Lane are among best examples of Surface Level and Subway/Below-Grade Destination Stations that offer direct access between the transit station and adjacent private property. The percent change in total property value (1994-1998) for Cityplace and Lovers Lane station areas was 59% and 66%, compared to the 16% average increase for the 15 existing station areas and a 13% average increase for comparable areas (Weinstein and Clower, 1999).

The estimated value of new investment completed, underway, or planned adjacent to DART stations since 1999 is more than $3.3 billion, according to Weinstein and Clower (2005). The Mockingbird ($270 million) and Downtown Plano ($260 million) station areas are ranked third and fourth within the DART system in terms of largest estimated new investment/reinvestment per station. Weinstein and Clower (2005) suggest that "access to DART service [has been] instrumental in driving many real estate leasing and purchasing decisions" (p. 2). Hughes explains that rents at Mockingbird Station "are some 35% above comparables, which is attributed in good part to transit's presence (Cervero et al, 2004, p. 304). In terms of occupancy, Eastside Village I is at 98%. Shaw approximates that "25% to 50% of new leases are now DART-driven" (Cervero et al, 2004, p. 309).

WMATA

According to Cervero (1992), "Washington's WMATA received over $20 million in joint development revenues [between 1979-1989], though these payments have never amounted to more than 0.7% of annual income for any one year" (p. 3). Possible rationalizations for the less impressive levels of revenue associated with TJD include restrictions concerning land assembly and/or utilization of federal property (Cervero, 1992, p. 3). It is important to keep in mind that the statistics compiled by Cervero for Washington D.C. reflect the condition of the TJD market prior to the institution of the *New Joint Development Policy* in 1997 by the federal government.

This new policy allows transit agencies to "sell land holdings financed by federal grants without having to return the proceeds as long as the grantee retains control over TJD projects and funds are used to 'help shape the community that is being served by the transit system'" (Cervero, 2002, p. 30). The contingency to the FTA joint development policy prevents transit agencies from selling to developers who can ensure the highest level of profit. Instead, transit agencies must select development proposals based on how each "will develop the site in its 'highest and best transit use'" (Cervero, 2002, p.30). According to Federal Register (1997), highest and best transit use is "that combination of residential, retail, commercial, and parking space that results in the highest level of transit support from a combination of project revenues and increased ridership" (p. 12266).

At Ballston Metro Station, "WMATA receives approximately $200,000 in annual revenues in the form of base rent plus a percentage of rent for a portion of

WMATA-owned land leased to the developer" (Cervero, 1992, p. 3) Office rent per square foot increased by approximately $15 in the Ballston Metro Station area between the opening of the station in 1979 and the completion on the Ballston Metro Center in 1989 (Cervero, 1992). The value of increased accessibility to rail within the station area is also demonstrated by a matched-pair test performed by Cervero, comparing Ballston to Tysons Corner, a local auto-oriented suburban office market. "Ballston averaged an annual office rent premium of over $3 per square foot (in nominal terms) over Tysons Corner" between 1978 and 1989 (Cervero, 1992, p. 7).

In conclusion, a quantative economic evaluation of the accessibility associated with TJD – TOD station areas reveals examples of financial benefits in the form of increased commercial rents and higher occupancy rates. Also, the case studies included earlier in this chapter assist to demonstrate how site selection, financial agreements, and land use regulatory policy can impact pedestrian connectivity within TOD station areas. The redevelopment surrounding Ballston and Downtown Plano Stations are excellent illustrations of the collaboration between the public and private sectors. The built environment within each station area is a product of a detailed vision (Ballston Sector Plan and Plano Downtown Development Plan) that has provided a basis for municipalities and developers to work together. Incentive zoning, density bonuses, and infrastructure cost-sharing are all tools that can be utilized to promote TOD and pedestrian accessibility within transit station areas.

Chapter 5: Conclusion

5.1 Favorable Conditions for Successful TOD

Today, TOD is still an emerging and progressive form of development in many sections of the United States. While empirical financial data when available allows TOD – TJD station areas to be compared to each other from monetary perspective, certain key social and economic conditions are suggested to be in place prior to even considering the fiscal feasibility of a specific TOD project. First, a growing economy is necessary for TOD to become a reality. The last five years have been difficult times for TOD to gain momentum. Specifically, the events surrounding 9-11 have served to indefinitely postpone many TOD projects across the United States, such as the City of Richardson's plans to transform the DART's Galatyn Park station area into a new city center. Secondly, because TOD is still relatively unproven form of development, financing of TOD is largely dependent on the presence of local comparables to appease the lending community. Finally, public support for mass transit in the form of existing ridership is critical for the success of TOD within a particular market. It is far more difficult to sell TOD in a region where the benefits of mass transit are not already clearly recognized.

Connectivity is essential to the success of TOD. TJD offers more direct lines of communication between the public and private sectors so that these projects might be planned with the best interest of the pedestrian in mind. Without top notch connectivity, TOD will continue to experience marginal financial triumphs, resulting

in few success stories. Private developers and local governments need to understand the importance of collaborating with one another to design TODs to be as accessible as possible.

5.2 Station Area Spatial Interface – Access Typology Findings

The station area spatial interface – access typology presented in this report is designed to offer a framework that allows for the examination of the relationship between public and private space within station areas from a multimodal perspective. This typology is the foundation for the analysis of the contributing factors highlighted in Chapter 4 that can affect the physical composition of TOD – TJD station areas. Figure 5.1 summarizes of the most significant findings from the on-site evaluation of the DART rail system and the formulation of the station area spatial interface – access typology.

Rail alignment and platform type are fundamental decisions made by transit agencies that can have a major influence on the quality of accessibility within a station area. Platform type, center versus split, can be an immediate obstacle that transit users must negotiate before they even exit the rail station. While rail alignment in many instances is the predominant factor that can dictate the level of accessibility that is offered within a station area. The station area type (Surface Level, Elevated, and Subway/Below-Grade) is largely determined by the alignment of the rail line. The high costs of associated with financing the assemblage of land and the construction of the rail lines and stations often push transit agencies to select

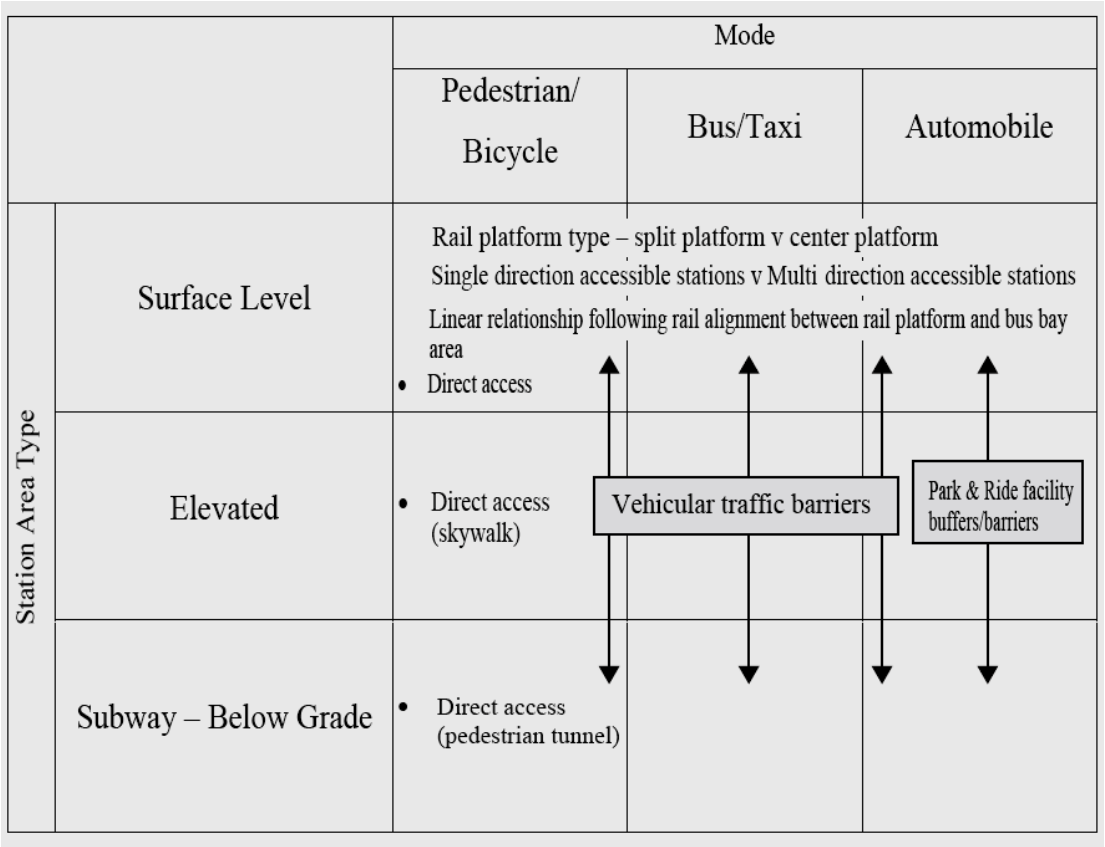

Figure 5.1: Key Station Area Spatial Interface – Access Typology findings – Source: Hennigan

highway and existing rail corridors as the alignment for new light/commuter rail service. Rail stations situated adjacent to expressways in most cases limit all access to one side of the station, creating single direction accessible station situation. Single direction accessible Surface Level Stations can create major design challenges which often compromise the level of station area accessibility that is offered as all modes are forced to enter and exit the station from one direction.

In general, the vehicular traffic created by buses, taxis, and private automobiles coming and going in and out of all types of station areas serve as a significant barrier for transit users to overcome as they move back and forth between

the rail station and the adjacent private parcels. Park & Ride facilities also serve as obstacles or large buffers that obstruct pedestrian connectivity. The station area spatial interface – access typology points out that vehicular traffic barriers and Park & Ride buffers must be addressed thoughtfully in order to create direct access between the rail station and adjacent private parcels whenever possible. One pedestrian-friendly solution to the obstacles put forward above that is highlighted in this report suggest a linear configuration of the rail platform and the bus bay pick-up/drop-off area along the rail corridor. This optimal Surface Level Station layout facilitates direct connections between the rail station and the adjacent properties as demonstrated by the Downtown Plano and Lovers Lane DART station areas.

Direct connection access is ultimately the preferred relationship between rail stations and their adjoining land uses for all station area types. Direction connections can also take the form of skywalks and pedestrian tunnels as illustrated earlier in this report by DART's Cityplace and Mockingbird Stations. Chapter 4 documents some the functions and tools that transit agencies and municipalities can utilize to maximize station area connectivity. The magnitude of the action that city and transit agency officials take in terms of land assemblage, financial assistance, and regulatory policy represent in large part the dedication of the public sector to TJD.

TJD is a collaborative effort that is dependent on the strength of public/private partnerships. While maximizing station area pedestrian access is among the main objectives of successful TOD, bus/taxi as well as automobile connectivity is also a basic component of overall station area accessibility that must not be ignored. This

report offers insight and analysis concerning the spatial interface and access between public and private properties within the station area from a multimodal perspective in an effort to evaluate the conditions that promote optimal pedestrian connectivity in harmony with the presence of the automobile and other motorized forms of transportation.

References

Arlington County Department of Community Planning, Housing & Development. (1980). *Ballston sector plan.* Arlington County, Virginia: Author

Arlington County Department of Community Planning, Housing & Development. (1989). *The rosslyn-ballston corridor early visions.* Arlington County, Virginia: Author

Arlington County Department of Community Planning, Housing & Development. (1989). *The rosslyn-ballston corridor mid-course review.* Arlington County, Virginia: Author

Arlington County Department of Community Planning, Housing & Development. (1992). *Rosslyn station area plan addendum*. Retrieved March 9, 2006 from http://www.rossren.com/rosslyn/content/files/RosslynSectorPlan.pdf

Arlington County Department of Community Planning, Housing & Development. (2003). *Streetscape standards for rosslyn-ballston metro corridor*. Retrieved December 15, 2005 from http://www.arlingtonva.us/departments/CPHD/ planning/docs/pdf/rbstreetfinal_051303.pdf

Arlington County Department of Community Planning, Housing & Development. (n.d.). *Special planning areas: metro corridors.* Retrieved March 2, 2006 from http://www.arlingtonva.us/departments/CPHD/planning/docs/ CPHDPlanningDocsGLUP_metrocorridors.aspx

Arlington Economic Development. (2001). *Rosslyn-ballston corridor retail action plan*. Retrieved December 15, 2006 from http://www.arlingtonvirginiausa. com/docs/retail_action_plan.pdf

Bay Area Rapid Transit. (2003) *Station access guidelines.* Retrieved January 3, 2006 from http://www.bart.gov/docs/planning/access_guidelines.pdf

Bay Area Rapid Transit. (2003). *BART transit-oriented development guidelines.* Retrieved December 19, 2005 from http://www.bart.gov/docs/ planning/ TOD_Guidlines.pdf

Bernick, M. & Cervero, R. (1997). Transit villages in the 21st century. New York: McGraw-Hill

Calthorpe, P. (1993). The next american metropolis. New York: Princeton Architectural Press.

Cervero, R. (1992). Land market impacts of urban rail transit and joint development: an empirical study of rail transit in washington d.c. and atlanta. *The University of California Transportation Center, 135,* 1-12

Cervero, R., Ferrell, C., & Murphy, S. (2002). Transit-oriented development and joint development in the united states: a literature review. *The Institute of Urban and Regional Development, University of California, Berkeley, 52*, 1-144

Cervero, R, Murphy, S., Ferrell, C., Goguts, N., Tsai, Y., Arrington, G.B., et al. (2004). Transit-oriented development in the united states: experiences, challenges, and prospects. *Transportation Research Board*, TCHRP Report 102.

City of Dallas. (2006). *ForwardDallas! draft comprehensive plan.* Retrieved on January 9, 2006 from http://www.forwarddallas.org/news/item.php?id=67

Dallas Area Rapid Transit. (2005). *Request for proposal for lease or sale of property at lbj/skillman station.* Retrieved January 11, 2006 from http://www.dart.org /tod/RFPLBJSkillman.pdf

Dallas Area Rapid Transit. (2005). *Request for proposal for lease of parking lots at mockingbird station.* Retrieved January 11, 2006 from http://www.dart.org/ tod/rfpmockingbird.pdf

Dittmar, H. & Ohland, G. (2004). *The new transit town: best practices in transit-oriented development*. Washington D.C.: Island Press

Dumbaugh, E. (2004). Overcoming financial and institutional barriers to TOD: lindbergh station case study. *Journal of Public Transportation, 7*(3), 43-68.

Dunphy, R. T., Cervero, R., Dock, F.C., McAvey, M, Porter, D. R., Swenson, C. J. (2004). *Developing around transit.* Washington D.C.: ULI.

Federal Register. (1997). Federal transit administration policy on transit joint development. Retrieved October 20, 2005 from http://frwebgate.access. gpo.gov/cgi-bin/getpage.cgi

HOK Planning Group, Parsons Brinkerhoff, Earth Tech. (2005). *Central rosslyn curb-side management study*. Retrieved December 15, 2005 from http://www.co.arlington.va.us/Departments/CPHD/forums/rosslyn/120905RSLNFinalRpt.pdf

LaGesse, D. (1990, September 28). Southland will offer cityplace for sale. *The Dallas Morning News*. p. 1A, 8A.

Lefaver, S. (1997). *Public land with private partnerships for transit based development.* Retrieved November 3, 2005 from http://transweb.sjsu.edu/publications/97-1.pdf

McNeal, A., & Doggett, R. (1999, September). Metro makes it mark. *Urban Land*, 78-81

Miller, R. (1993, June). Joint development at ballston metro center. *Urban Land*, 22-24

North Texas Council of Governments Transportation Department. (2003). *Rail station access: bicycle and pedestrian needs assessment.* Retrieved on January 3, 2006 from http://www.nctcog.org/trans/sustdev/bikeped/access_to_rail/index.html

North Texas Council of Governments Transportation Department. (2003). Rail access. *Regional mobility initiatives.* 7(1). 1-15. Retrieved on January 3, 2006 from http://www.nctcog.org/trans/sustdev/bikeped/access_to_rail/Access_to_Rail_RMI.pdf#page=12&zoom=100

Park, R. S. (n.d.). *Improving pedestrian access to transit stations in less walkable environments.* Retrieved on January 17, 2006 from http://www.americawalks.org/PDF_PAPE/Park.pdf

Porter, D. R. (20002, October). Transit village rebirth. *Urban Land*, 91-95.

Ridlington, E. & Heavner, B. (2005). *Transit-oriented development: strategies to promote vibrant communities.* Retrieved December 18, 2005 from http://marypirg.org/reports/TODreport.pdf

Sullivan, G. L., Johnson, S.A., & Soden, D. L. (2002). *Tax increment financing best practices study*. Retrieved October 12, 2005 from http://iped.utep.edu/IPED%20Reports/tr2002-10/tr2002-10.pdf

Turner, F. F. (2003). *Downtown plano: creating a transit village*. Retrieved November 1, 2005 from http://www.planoplanning.org/News/Amicus/Downtow_%20Plano_History.pdf

Walsh, M. D. & Terpak, N. E. (1998, March 13). Rosslyn adding amenities by easing rules on zoning. *Washington Business Journal*. Retrieved March 9, 2006 from http://www.bizjournals.com/washington/stories/1998/03/16/focus12.html

Washington Metro Area Transit Authority. (2002). *Rosslyn metrorail station access study*. Retrieved March 1, 2006 from http://www.commuterpage.com/pdfdocs/accessrosslyn.PDF

Washington Metro Area Transit Authority. (2005). *Guidelines for station site and access planning.* Retrieved January 10, 2006 from http://www.mwcog.org/uploads/committee-documents/pFpeWl820060109165740.pdf

Washington Metro Area Transit Authority. (2005). *WMATA joint development policies and guidelines.* Retrieved November 3, 2005 from *http://www.wmata.com/bus2bus/jd/revised_policies/RevisedGuidelines.pdf*

Weinstein, B. L. & Clower, T. L. (1999). *The initial economic impacts of the dart lrt system.* Retrieved hardcopy in person from DART on June 27, 2005.

Weinstein, B. L. & Clower, T. L. (2002). *An assessment of the dart lrt on taxable property valuations and transit oriented development.* Retrieved June 28, 2005 from http://www.unt.edu/cedr/dart2002.pdf

Weinstein, B. L. & Clower, T. L. (2005). *The estimated value of new investment adjacent to dart lrt stations: 1999-2005.* Retrieved March 1, 2006 from http://www.dart.org/WeinsteinDARTDevelopment2005.pdf

Vita

Matthew Francis Hennigan was born in Columbus, Ohio on March 6, 1973, the son of Marylyn Ann Hennigan and Thomas Robert Hennigan. After completing his work at Milton Academy in Milton, Massachusetts in 1991, he entered Emory University in Atlanta, Georgia. He received the degree of Bachelor of Arts with a major in Economics from Emory University in May, 1995. During the following years Matthew fulfilled a variety of roles in the financial services and publishing industries. In August, 2004, he entered the School of Architecture at The University of Texas at Austin to pursue a graduate degree in Community and Regional Planning. He is married to Wendy Louise Hennigan.

Permanent Address: 1210 Windsor Road Apt. 212
Austin, TX 78703

This report was typed by the author.