ABSTRACT

Title of Document: URBANIZING THE SUBURBS: A TRANSIT-ORIENTED DEVELOPMENT FOR RESTON, VIRGINIA

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American urban development during the late 19th and early 20th century allowed for vibrant and successful city centers, while also decentralizing living options to transit-serviced suburbs. After WWII, freeway-based suburban sprawl and urban decay replaced this healthy form of development. Significant urban revitalization during the past two decades has largely failed to address the continuing economic, social and environmental concerns raised by the sprawl-based development outside our cities.

Addressing the need for greater regional planning, Transit-Oriented Development ("TOD") offers a framework for capitalizing on existing infrastructure by augmenting underutilized neighborhoods with regional transit access, spurring urban/suburban renewal, and creating walkable, mixed-use communities. This thesis will: 1) identify TOD best practices; 2) apply these best practices to a TOD proposal for a proposed Metrorail stop in the Reston, Virginia, area; and 3) explore the influence a mixed-use transit station can have as part of a TOD of the chosen site.

URBANIZING THE SUBURBS: A TRANSIT-ORIENTED DEVELOPMENT FOR RESTON, VIRGINIA

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By

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Thesis submitted to the Faculty of the Graduate School of the
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Advisory Committee:
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Dedication

To creating spaces worthy of becoming places.

To Puck.

Acknowledgements

I would like to thank my family and friends for their loving support of this recovering lawyer, I would not be completing this program without them. I would also like to thank the numerous students, friends and family members that helped in my final push to complete my presentation. Special thanks to Hyo Jung Kim, Sarah Beth Goncarovs, Erin Carlisle, my father Robert Garland, Brian Carroll, my sister-in-law Glenda Garland, Mike Fisher, Nick Mansperger, Mark McKevitz, Anat Lang, Nari Stephens, Mike Binder, and Justin Kerns for their help with my model and drawings. Thanks to my mom, Barbara Garland, for delicious cookies that kept our blood sugar up. Thanks to the group of students who helped me pin-up and anyone else who I have overlooked mentioning by name. I would, finally, like to thank my classmates, professors, and the other students who have assisted me through this experience and helped me to realize my goal of becoming an architect.

Table of Contents

List of Figures

Chapter 1: Introduction

> "We are a culture of production and consumption. We produce and consume so much because we borrow so much. We borrow from the past when we burn fossil fuels and clear cut ancient forests. We borrow from the present when we overfertilize the land and overfish the oceans. And we borrow from the future when we bequeath government deficits and chemical toxins to our children. Put less gently, we are robbers: by plundering the planet's savings account and squandering its income, we rob future generations of a good and decent life and maybe life itself." [Kelbaugh, p.25]

The History of the Modern Planned Community

Ebenezer Howard and the Garden City Movement

As a response to the unmanageable densities, inhospitable and unhygienic living conditions, foul working conditions, and high costs of living found in London during the peak of the Industrial Revolution, Ebenezer Howard developed the initial concept of the garden city. Howard's book of 1898, *To-morrow: A Peaceful Path to Real Reform*, offered a utopian response to this situation, envisioning a general movement away from the centralized and overpopulated metropolis and into a series of interrelated garden cities placed in the surrounding countryside, known together as the social city. Howard offered a "third way" between city and country living, positing the magnet of the "town-country" which comprised all the healthful and inexpensive aspects of living in the country with the economic and social benefits of living in town. Howard's ideal manifestation of the garden city diagrams a utopian ideal circle of clearly zoned uses.

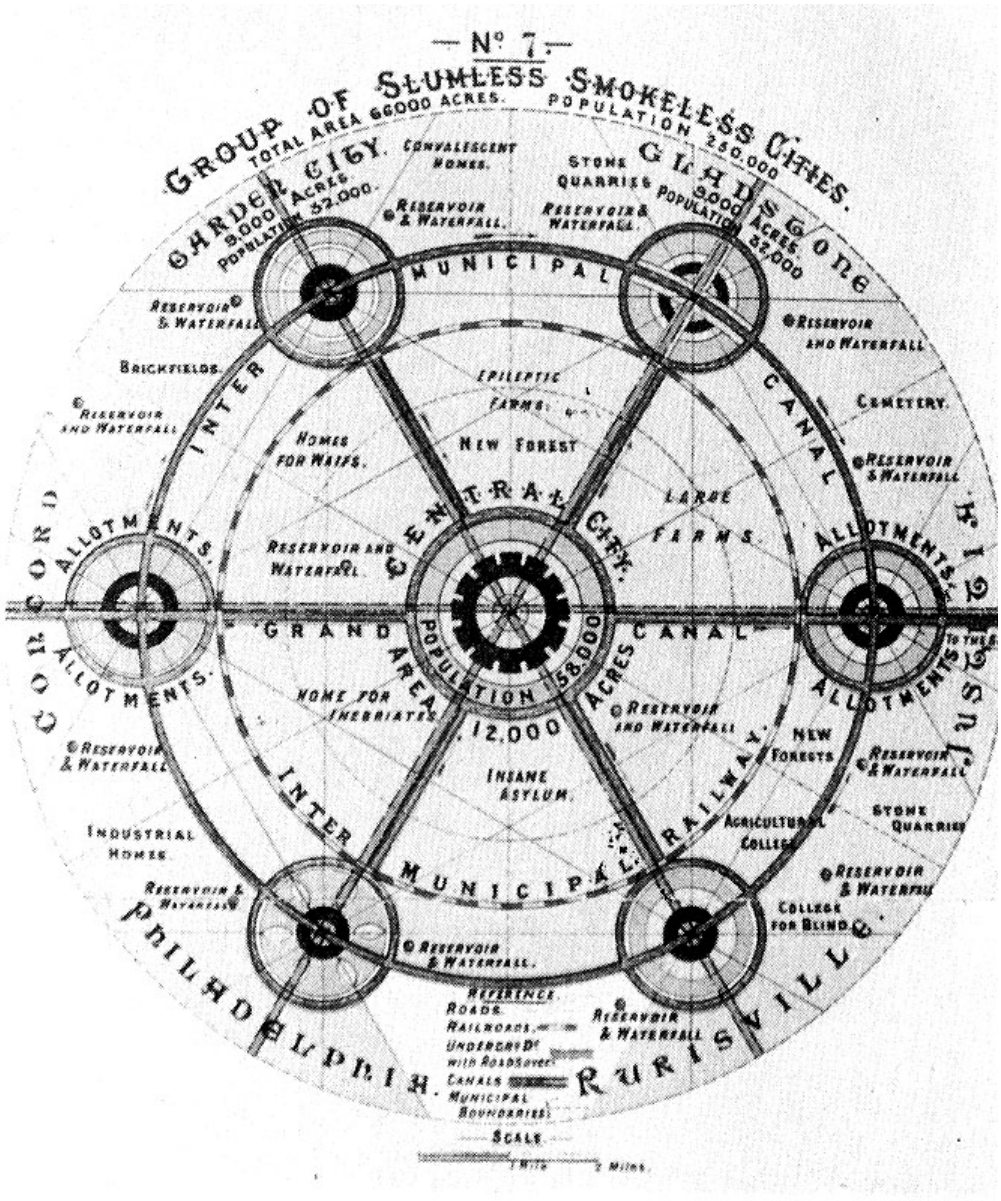


Figure 1 - The Social City
Postulating a series of small garden cities of approximately 30,000 residents on 5000 acres surrounding and connected by a variety of means to each other and to a larger central city. Howard's response provides for a relatively low density, one reason that it was not a very successful model from a public transportation standpoint.
(Source: Parsons & Schuyler, p.22)

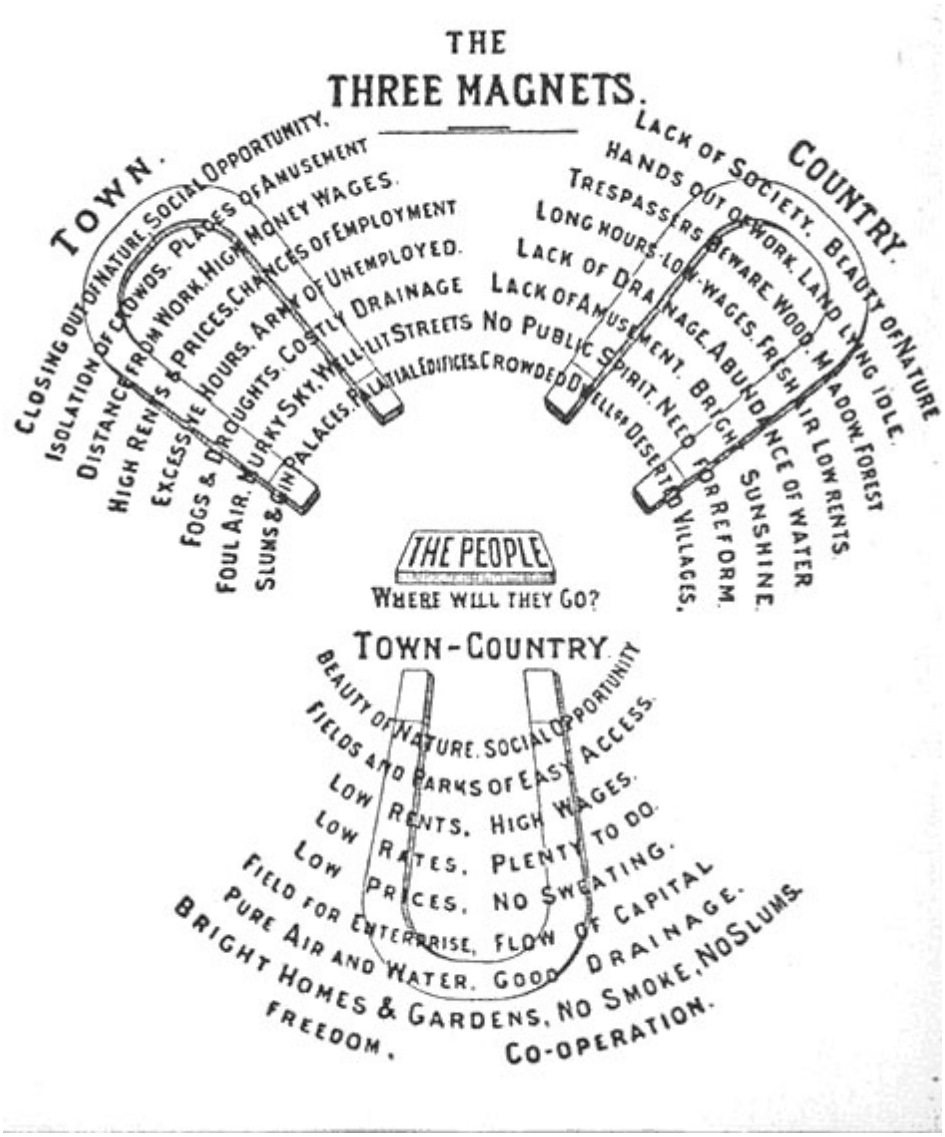


Figure 2 - The Three Magnets
The Three Magnets argue for the creation of the garden city. The "Town-Country" concept optimistically manifests only the positive aspects of the supposed dichotomies.
(Source: Ward, p.29)

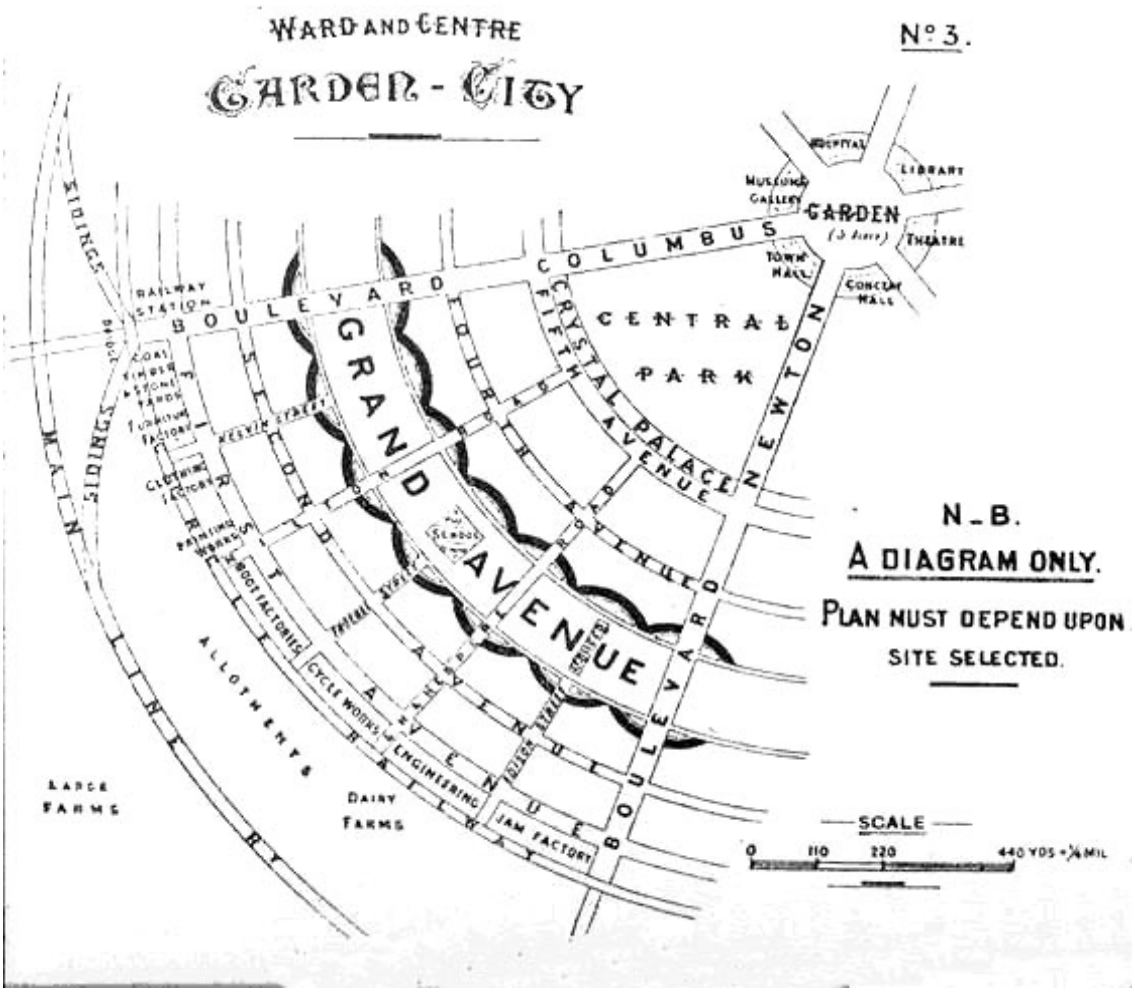


Figure 3 - Garden City Wedge
Concentric zones of civic/service buildings, parkland, commercial/shopping arcades, residential, and industrial/rail corridor radiate out from a central public garden, with all zones connected by boulevards radiating from the center. Rural/agricultural/institutional uses for the benefit of the garden city would surround the developed city, providing for a self-sufficient and self-governed entity. .
(Source: Ward, p.46)

Howard's ideas resulted in several attempts at physical realization in England, most notably under the architects and site planners Raymond Unwin and Barry Parker. The communities of Welwyn and Letchworth achieved qualified success, but developed at a much slower pace than expected by their investors. Similarly, in the car dominated culture of the United States, with its dearth of public transit options, the American experience of the garden city has been little more than a typical suburb dressed in nicer, and perhaps better fitting, clothes.

The Garden City in the United States: Radburn, New Jersey and the Greenbelt Towns

Despite limited application during the first decades of the 20th century in the United States, the garden city principles continued to influence planners in the United States. In 1923, Lewis Mumford, Clarence Stein, Henry Wright, Benton Mackaye, Clarence Perry, among others, formed the Regional Planning Association of America ("RPAA") to discuss and promote garden city principles. Stein and Wright were commissioned in 1928 to design a new garden city on two square miles of land purchased in the Fairlawn area of New Jersey, approximately 14 miles outside of New York City. The primacy of the automobile and the inherent conflict between the pedestrian and the automobile served as important factor in the determination of the design of Radburn, which adopted Perry's neighborhood approach in which a "superblock" containing a series of cul-de-sac housing surrounded an inner park accessible by footpaths from all units. With four suberblocks comprising one neighborhood, the interior parks served as a separate pedestrian movement system. The plans called for a hierarchy of roads from service lanes accessing individual units, up through the collector roads around the superblocks, larger boulevards connecting the neighborhood sections, and finally highways to connect to outside communities. [Lee and Ahn].

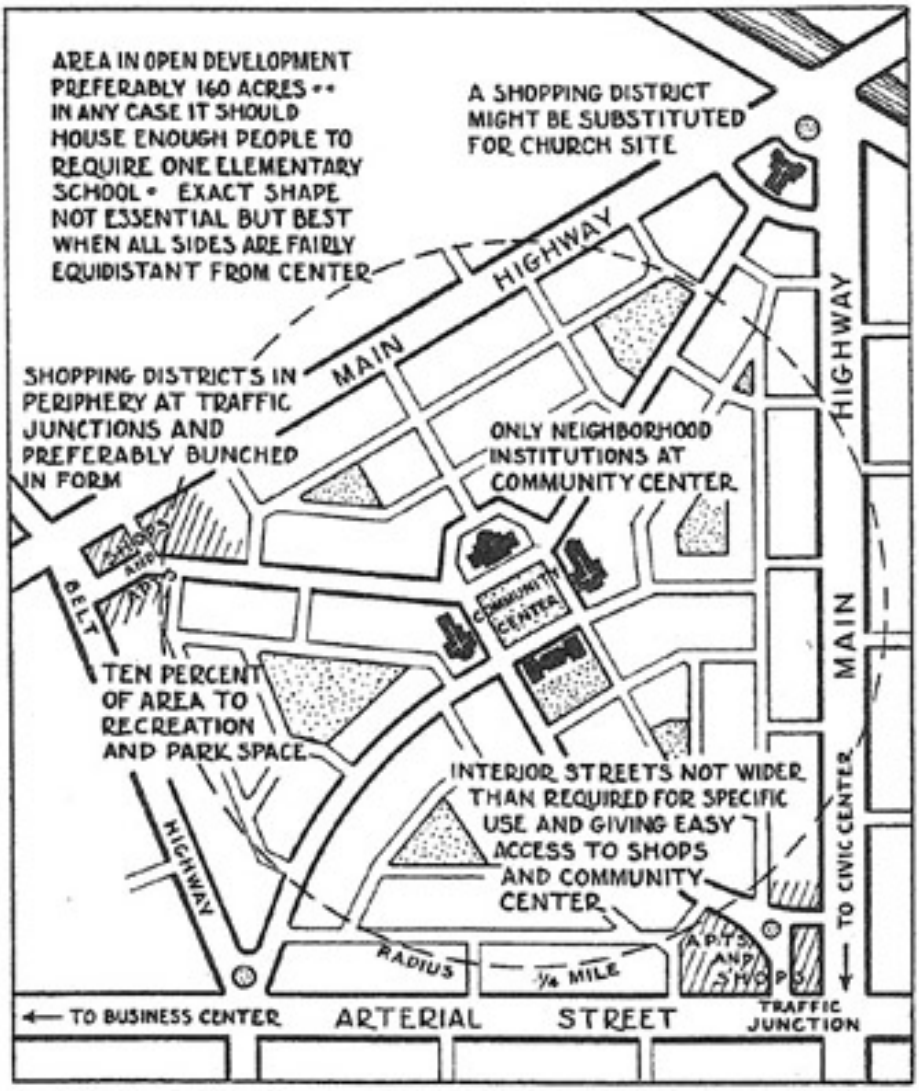


Figure 4 - Clarence Perry's Neighborhood Diagram
Proposing a ¼ mile diameter development encompassing all the elements of a successful neighborhood. Groups of neighborhoods should be joined to support an active business center and full school system. (Source: http:// www.cnu.org)

The Depression and WW II put a halt to most major new town development in the United States. However, three "greenbelt towns" commissioned by the United States government during the Depression Era continued the garden city movement in the United States. These towns (Greenbelt, MD; Greenhills, OH; and Greendale, WS) envisaged an alternative for displaced workers who had lost their jobs in the traditional industrial centers. Although described as "rural-industrial communities,"

the three built communities did not include any industrial development and thus failed again to meet the self-sufficiency of Howard's ideal. [Scott, p. 339] Similar to Howard's conception, the towns did surround themselves with zones of land to protect from future development encroachment and to provide for natural amenities and farmland. Greenbelt exhibits the U.S. tendency to partition the auto from the pedestrian with a superblock structure containing a separate pedestrian way in the parks at the center or the superblocks.

The limited exploration of the garden city between the World Wars further diluted Howard's conception of an independent and self-sufficient community, resulting instead in garden suburbs still nearly wholly dependent on the nearby metropolises for jobs. To be sure, these communities exhibited superior planning when compared to the average suburb, and provided for a more pedestrian-friendly environment, but they did serve as the catalyst for social reform that Howard envisioned.

Satellite Cities of the 1960's-1970's: Reston, Virginia and Columbia, Maryland

The post-WW II period witnessed an unbridled and unsurpassed period of decentralization of Americans from their cities. The federal government subsidized this dispersal through the insuring of home mortgages, tax breaks on mortgage interest, and highway building programs. [Ward, p. 151] This dispersal was coupled with an almost complete lack of planning controls. [Id.] In a further blow to the cities, industry and then shopping and entertainment followed suit and abandoned the cities. Eventually, in the 1970's and 1980's non-industrial businesses also heeded the

call and moved to the suburbs, sprawling linearly along growth corridors adjacent to the miles of new highways subsidized by the federal government. Without the growth limitations and control envisioned under the greenbelt concept, the major metropolitan regions became an undifferentiated mass of housing and shopping that made reliance on the car a given.

As early as the 1960's, a small number of private developers decided to investigate the idea of creating self-sufficient new towns outside the then-developed periphery of major metropolitan regions. Despite their reliance of some of the garden city concepts, as filtered through the Radburn and greenbelt experience, these communities vary greatly from garden city ideals. The deviations from Howard's garden city plan in such communities as Reston, Virginia and Columbia, Maryland reflect the complete transformation of the garden city in the United States into the garden suburb.

Developer Robert E. Simon's original plans for Reston made a limited nod to the teachings of Radburn. While the plans incorporated a general superblock structure with linear green spaces, cul-de-sacs, and pedestrian paths, the design did not have the comprehensive focus on the pedestrian that is a hallmark of prior garden city developments. Indeed, in the automobile-pedestrian conflict, the automobile appears as the clear winner in Reston. The pedestrian paths appear as an afterthought with frequent grade level crossings at collector streets and few direct connections between residential areas and civic/commercial zones. [Parsons & Schuyler, p. 152] The Columbia development, a product of developer James W. Rouse starting in 1967,

suffers from similar pedestrian path problems. [Id., p. 156]. Additionally, the important Howard goals of job self-sufficiency and affordable housing played a small part in Reston and Columbia's development. While some affordable housing was developed as part of Reston, the profit goal of Simon prohibited much such development. Further, a significant job base has only appeared in Reston recently as the area has become a center for the high tech industry.

Contemporary Formalization of Garden City Ideals: New Urbanism

The failure in planning controls in the post-WWII era, with its resultant loss in city population, increase in traffic, suburban sprawl, and environmental damage has led to a renewed interest in the concepts of urbanism and the ideas of Ebenezer Howard. Some of the most vocal proponents of ideals that are connected to the garden city movement are the New Urbanists, led by the work of architects Andres Duany, Elizabeth Plater-Zyberk and Peter Calthorpe. This growing group has organized themselves through the Congress for New Urbanism ("CNU"), founded in 1990, which sponsors conferences, a newsletter, and various other entities to promote its vision for solutions to the questions of sprawl. In 1996, the CNU ratified the "Charter for New Urbanism," which codified the movement's major beliefs, many of which bear a clear relationship to the ideas set out by Howard almost 100 years before. Three major components of the Charter that mirror garden city ideals are as follows: 1) developments should form compact, walkable neighborhoods (approximately ¼ mile in diameter); 2) a diverse mix of uses (civic, residential, commercial, recreational) should exist within close proximity, as well as a diversity of housing types; and, 3) open spaces, including parks and greenbelts, should exist within

neighborhoods and civic buildings should be sited in prominent locations. [Parsons & Schuyler, p. 185-186]. Indeed, the New Urbanist concept of the "neighborhood" clearly owes its origins to Clarence Perry. One major difference between the New Urbanist tenets and those espoused by the garden city movement is the way that the two movements address the pedestrian/automobile relationship. While both movements encourage pedestrian activity, the New Urbanists forgo the garden city device of complete separation of automobile and pedestrian and also encourage the use of a more urban street grid system in which "coherent" blocks are created by an interconnected network of streets. It is this formalization of geometries in plan that most clearly distinguishes the New Urbanist approach from that of the original garden city movement. A number of New Urbanist communities have been built, most notably: Seaside, Florida (1981); Celebration, Florida (1987); and Kentlands, Maryland (1988). Similar to the other American incarnations of garden city principles, the New Urbanist developments have abandoned Howard's social concept of collectively owned lands and agricultural/economic self-sufficiency.

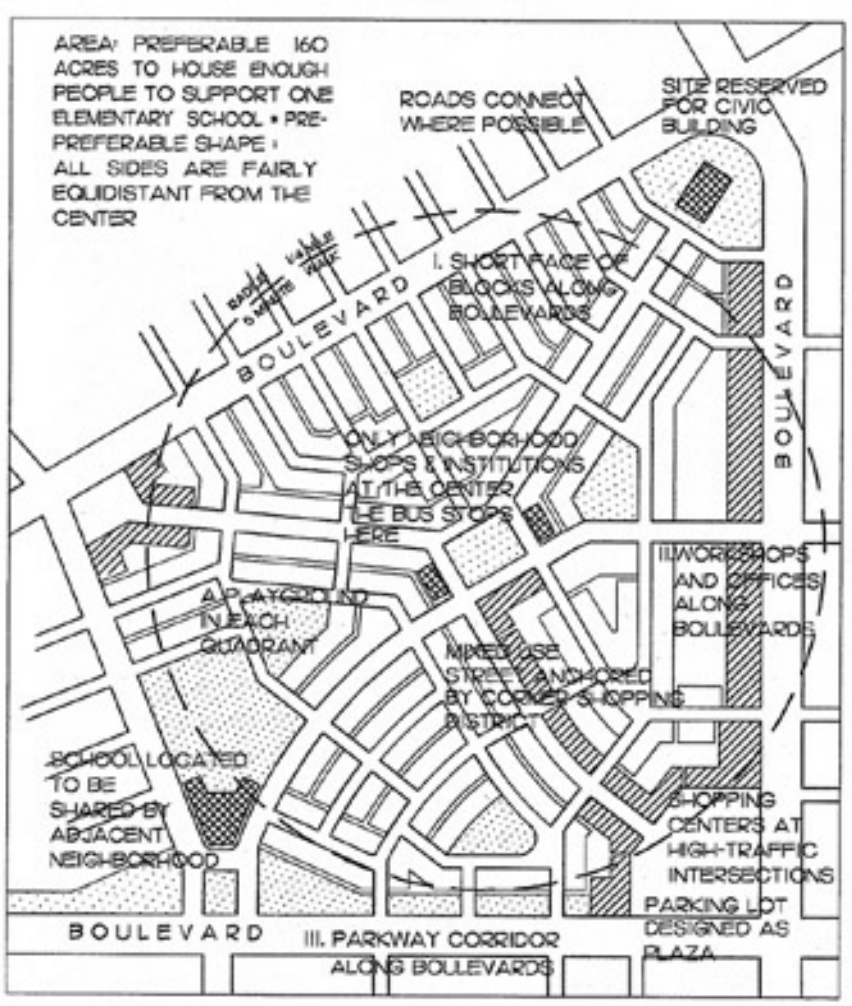


Figure 5 - Duany & Plater-Zyberk's adaptation of Perry Neighborhood Diagram
Provides a slightly finer grain, focus across main bordering streets and a more human scale to the streets surrounding the neighborhood.
(Source: http://www.dpz.com)

Transit-Oriented Design ("TOD") represents one facet of the New Urbanist approach. Developed primarily by Peter Calthorpe on the west coast of the United States during the 1980's, TOD stresses the development of small, walkable communities, of somewhat higher density than traditionally found in typical suburban community, that provide a variety of housing types, with commercial, civic and business centers located within ¼ to ½ mile of a central transit stop. [Kelbaugh, pp. 128-131]. This tight zone of development, usually between 30 and 150 acres, should contain an

interconnected network of streets and provide for a variety of transportation means and paths (pedestrian, bicycle, automobile, and mass transit) both within the development and to surrounding areas. While TOD grew out of the energy and environmental concerns of the 1970's, the similar design parti brought its practitioners in contact with proponents of Traditional Neighborhood Design and led to the formation of the CNU in the 1990's.

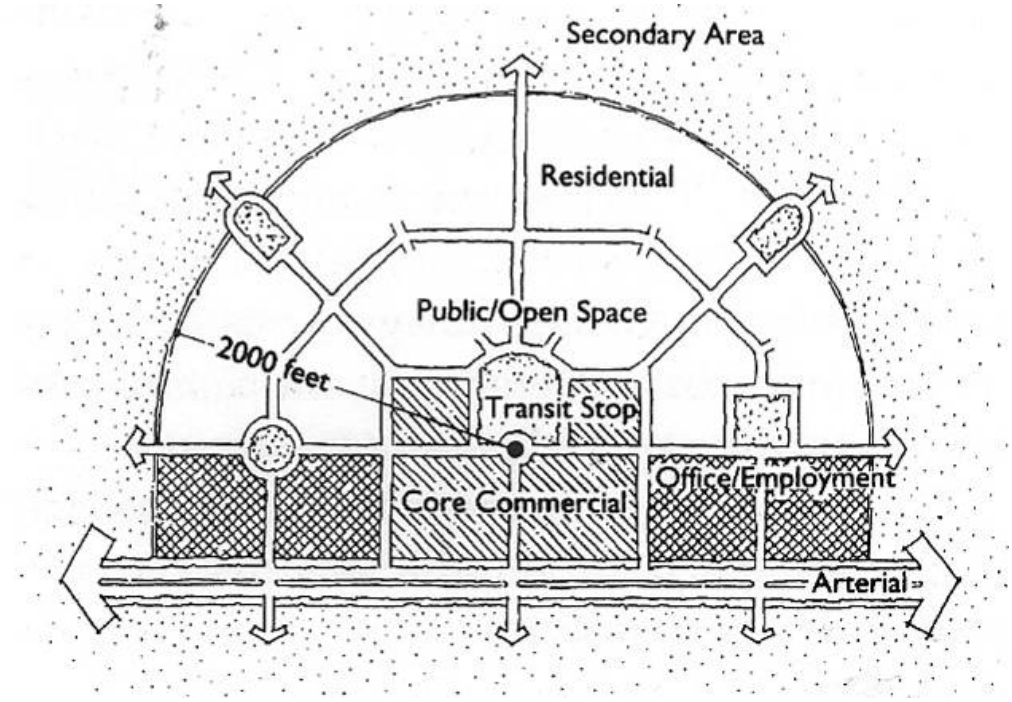


Figure 6 - Calthorpe Associates Diagram for a TOD
This idealized diagram extends the core development to 2000 feet (.38 miles) from the transit stop and provides for a series of civic open spaces as well as a modified grid of hierarchical streets.
(Source: Calthorpe and Associates, found in Kelbaugh, p. 128)

In a critique of New Urbanism, planner Alex Krieger notes that while the New Urbanist goals are laudable, the greenfield New Urbanist developments (such as Kentlands) have done little to meet their goal of containing sprawl and creating diverse neighborhoods. [Krieger]. Krieger instead argues that such developments

have continued to perpetuate and validate low-density ex-urban residential developments at the expense of existing urban centers by creating unconnected and expensive neighborhoods that come with the gloss of "urbanism." [Id.] His main critiques center on the lack of density, failure to create meaningful public transportation connections, and relative expense of real estate costs in the developments.

These arguments point to important challenges for the successful integration of garden city ideals within the United States. Faced with a low emphasis and investment in public transit, a transitory job market, and a market preference for the "American Dream" of a single-family home with a big yard, it is a challenge to make garden city ideals a constructive and prevalent force in shaping our urban environments. However, despite their selective interpretation, these ideals have consistently resonated with American planners and architects and are likely, in one form or another, to continue to guide new development within the United States. Indeed, in recent years proponents of TOD have moved beyond the early low-medium density conception of the TOD diagram and produced developments with densities on par with those of major cities. Looking at the results of successful transit systems such as those found around Copenhagen, Denmark and Stockholm, Sweden, as well as limitations found in early TOD attempts in the U.S., a greater focus has been placed on identifying proper densities and a proper mix of uses to adequately support transit ridership. TOD has moved beyond greenfield development and more frequently sees application as an infill approach both in urban and more suburban contexts.

Why TOD?

> "[A] compact, mixed-use community, centered around the transit station that, by design, invites residents, workers, and shoppers to drive their cars less and ride mass transit more. The transit village extends roughly a quarter mile from a transit station, a distance that can be covered in about 5 min by foot. The centerpiece of the transit village is the station itself and the civic and public spaces that surround it. The transit station is what connects village residents and workers to the rest of the region, providing convenient and ready access to downtown, major activity centers like a sports stadium, and other popular destinations. The surrounding public spaces or open grounds serve the important function of being a community gathering spot, a site for special events, and a place for celebrations --- a modern-day version of the Greek agora."
>
> (Bernick & Cervero, p.5)

Proper evaluation of the benefits, and thus the value, of creating TOD requires recognizing a differentiation between the concepts of mere adjacency to transit and transit "orientation." Based out of environmental and energy concerns, TOD seeks to maximize the utility in creating mass transit systems. Mass transit requires a large public investment, but one that balances against other, often unrecognized, economic, social and environmental costs associated with the current state of suburban sprawl that permeates our culture. Thus, current TOD research and practice focuses on providing a mix of densities, uses, and users that will maximize the return on investment by increasing land value, transit rider-ship, and quality of life issues. In order to understand these considerations, a true look at all costs of sprawl is essential. Distinguishing between the *cost* and *price* of how we create our built environment informs the choices we make. While the *price* of commuting by car might be limited to the dollars allotted for gas, insurance, maintenance and financing the purchase of

the car, the *cost* would include public taxes and subsidies for building and maintaining roads, supporting the auto and energy industries, costs for environmental degradation caused by burning fossil fuels, loss of time from family, and mental and physical stress caused by frustrations of commuting on congested roads.

Economic Factors

Government subsidies have played a large role in encouraging the development of suburban sprawl. As much as 40% of the costs of building and maintaining roads comes from taxation sources outside of taxes and fees generated from the actual vehicle use (i.e., gas taxes, registration fees, etc.). [Kelbaugh, p.31]. Thus, the larger society bears the costs associated with individual driving decisions. Individual transportation decisions thus rightfully become a public issue and allocation of tax dollars between transportation systems a public decision. Automobile travel (generally recognized as one of the least safe methods of travel) results in deaths and injuries that add another unseen cost to our decision of how to travel. Finally, typical suburban development results in unneeded duplication of infrastructure and services.

Social Factors

Perhaps the most "soft" of costs, determining the negative effects on our society from suburban sprawl often eludes easy quantification. Our suburbs, besides resulting is a segregation of uses, has also commonly resulted in a segregation of races and socio-economic classes. Moreover, the typical suburban community biases development towards single-family, multi-bedroom homes, a misallocation of building in a society that includes an ever decreasing (and far from majority) representation of families with children. Segregation of families thus results, because these communities

provide opportunities for multiple generations of families to find appropriate housing choices within the same community. Finally, the congestion of roads and increase of time spent in the car (whether commuting or running simple errands) decreases the time available for spending with our families and for interacting with our community.

Environmental Factors

Walking, bicycling, and mass transit alternatives comprise well under 10% of average national choice for how to travel. These decisions have been dictated by our allocation of transportation resources and how to develop land. Americans utilize resources at a rate of four times our representation in the global community, degrading our air and water and an unprecedented rate. While a current movement towards building efficiency seeks to lighten this impact, energy utilization for transportation makes up three times the energy utilized in buildings in the typical suburb. [See, Figure 8]. Increases in number of vehicles and number of miles traveled has far outstripped the increase in automobile fuel efficiency, suggesting that a reorientation towards more fuel efficient mass transit options could greatly effect energy usage. Again, environmental cleanup and the negative health effects from our polluted environment comprise costs that rarely appear in the price of our development decisions.

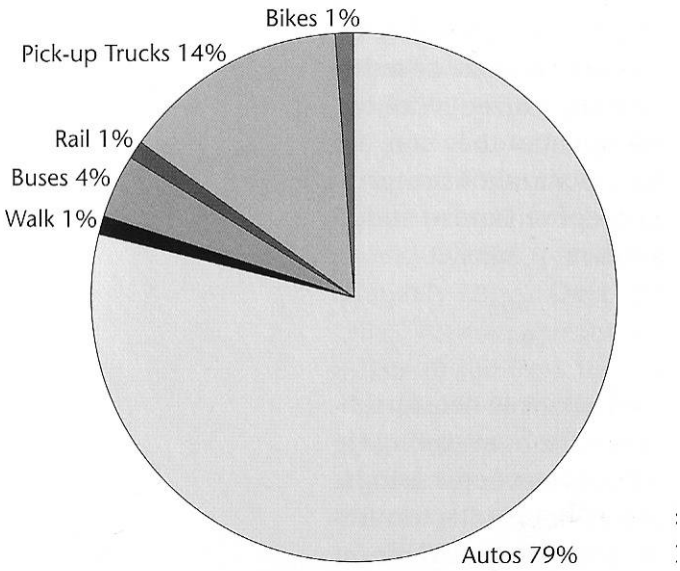


Figure 7 - Modal splits in the Average American Subdivision
(Source: Kelbaugh, p.29)

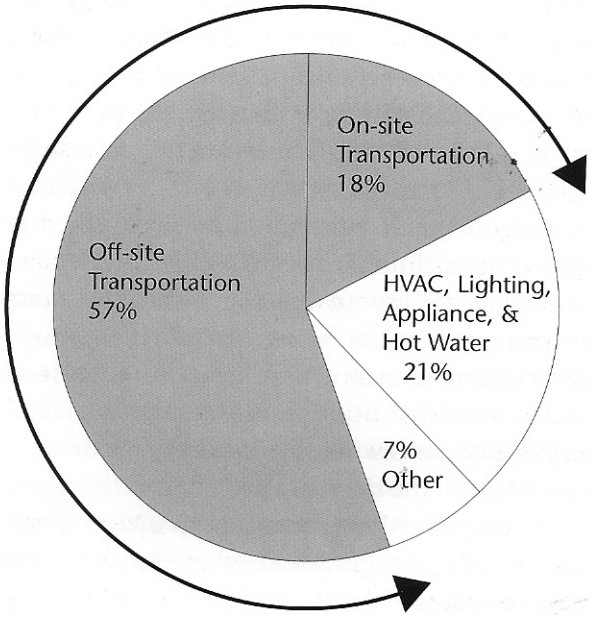


Figure 8 - Energy Allocation in a Suburban Community
(Source: Kelbaugh, p.34)

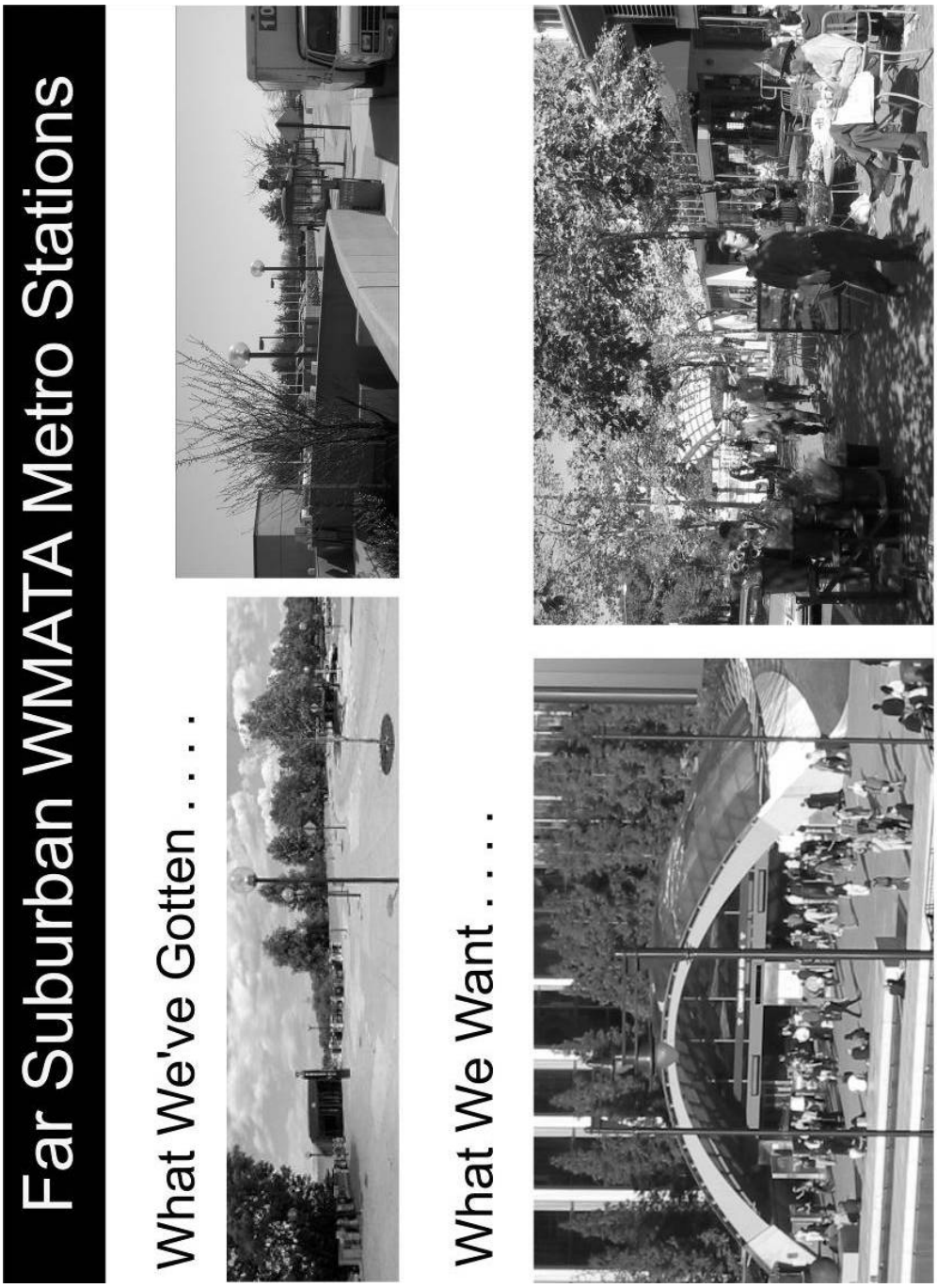


Figure 9 – Metro Station Comparison
Typical Washington, D.C. metro area far suburban WMATA stations appear as concrete bunkers swimming in a sea of parking and concrete "plazas" devoid of scale or life. Contrasting stations on London's Jubilee line and WMATA's own stations in Bethesda display a human scale and an active urban context surrounding the station. These stations provide, either quietly or more overtly, a civic presence that adds to this sense of life and place.
(Source: Author, www.wmata.com, Edwards)

GRADIENT OF LAND USE INTENSITY

	Relative Level of Development Intensity
¼ mile radius	Higher density, mixed land use including office, retail, and service businesses, residential, and compatible community facilities
¼–½ mile radius	Medium density, mixed land use including office, retail, and service businesses, residential, and compatible community facilities
½–1½ mile radius	Development intensity is likely to vary, relative to the development that surrounds the overall station area. Mixed, medium-density land use may continue in support of the neighborhood/ring area, and lower-density development, including retail and service businesses serving larger markets, may occur.

INTENSITY OF LAND USE AND TRANSPORTATION RELATIONSHIP

Residential Use	Commercial Use	Transportation Compatibility
15+ units/acre	50+ employees/acre	Supports rail or other high-capacity service
7–14 units/acre	40+ employees/acre	Supports local bus service
1–6 units/acre	2+ employees/acre	Supports cars, carpools, and vanpools

Adapted with permission from New Jersey Transit.

MINIMUM HOUSING DENSITY AND FLOOR AREA RATIO BY STATION ACTIVITY LEVEL

ACTIVITY LEVEL	RESIDENTIAL GROSS DENSITY (units per acre)			NONRESIDENTIAL GROSS DENSITY (floor area ratio)		
	Core	Neighborhood	Range (0–½ mile)	Core	Neighborhood	Range (0–½ mile) (avg. empl/acre)
1*	10	4	10–4 (7)	0.3	0.15	.30–.15 (24)
2	15	7	15–7 (11)	0.5	0.20	.50–.20 (35)
3	22	10	22–10 (16)	0.7	0.25	.70–.25 (52)
4	45	15	45–15	1.0	0.30	1.0–.30 (113)

**Activity Level 1 in the Triangle Fixed Guideway Study (TFGS) included residential and nonresidential densities too low for regional transit system station areas.*

Source: *Triangle Transit Authority,* Triangle Fixed Guideway Study *(TFGS), Phase III Report. 1995.*

Figure 10 – Transit Densities

The above tables outline the types and densities of development that will best support public transit use. It is clear that higher levels of densities support greater investment in high capacity rail transit. Design precedents with density in the higher range will be preferred. The current housing density of Reston is approximately 3 dwelling units per acre based on the following calculation: The Reston Association advertises approximately 58,000 residents on 11.5 square miles (See, http://www.reston.org/Home/h_history.html). This results in a calculation of a little over 5000 people per square mile or 7.88 residents per acre. The U.S. census bureau offers an average figure of 2.56 people per household for Virginia (http://factfinder.census.gov), thus the 7.88 residents/acre divided by the 2.56 residents/household results in approximately 3 households/acre. The Reston Chamber of Commerce states that there are approximately 60,000 jobs in Reston (http://www.restonchamber.org/pdfs/Demog.pdf), resulting in an average of only 8 jobs per acre. While this number is somewhat unhelpful because a good number of the jobs in Reston are concentrated in the office developments that flank the Dulles Toll Road, thus suggesting a density level that might support some form of public transportation, it should also be noted that there is no housing within a quarter-mile of the site of the proposed transit station.
(Source: Griffin, p. 57)

Land Use

The mix of retail, office, residential and civic uses provides opportunities for efficiency and promotion of alternative modes of travel other than the automobile. For example, parking utilized by office workers during the day can be used to support restaurant and theater uses at night. Putting homes and stores and work next to each other increase opportunities for residents to walk to these uses, decreasing use of the automobile altogether. Additionally, a healthy mix of uses can create a "24/7" environment which, because of the continual presence of a variety of users can increase safety and the feeling of security.

Site Design

The design of TOD seeks to create a compact and diverse environment that promote walking and use of transit. Factors that increase this type of usage include:

- continuous pedestrian and vehicular routes between activity centers
- minimized distances and maximized routes to the transit station
- attractive streetscapes and building treatment that enliven the walking experience
- a major commercial center located at the transit facility
- gridded streets without cul-de-sacs
- minimized surface parking and no front of building parking
- clearly placed transit stops and route information
- public plazas and open spaces near transit

Factors of TOD Success

Measures of success for TOD are often elusive. Many benefits, the ability to walk to a shop or restaurant, social interaction with neighbors, a lively and vibrant community, can not necessarily be quantified in dollar terms. Other factors, however, can be reduced to hard numbers. Increases in land value and transit ridership are the two most common quantifiable factors reviewed for TOD success.

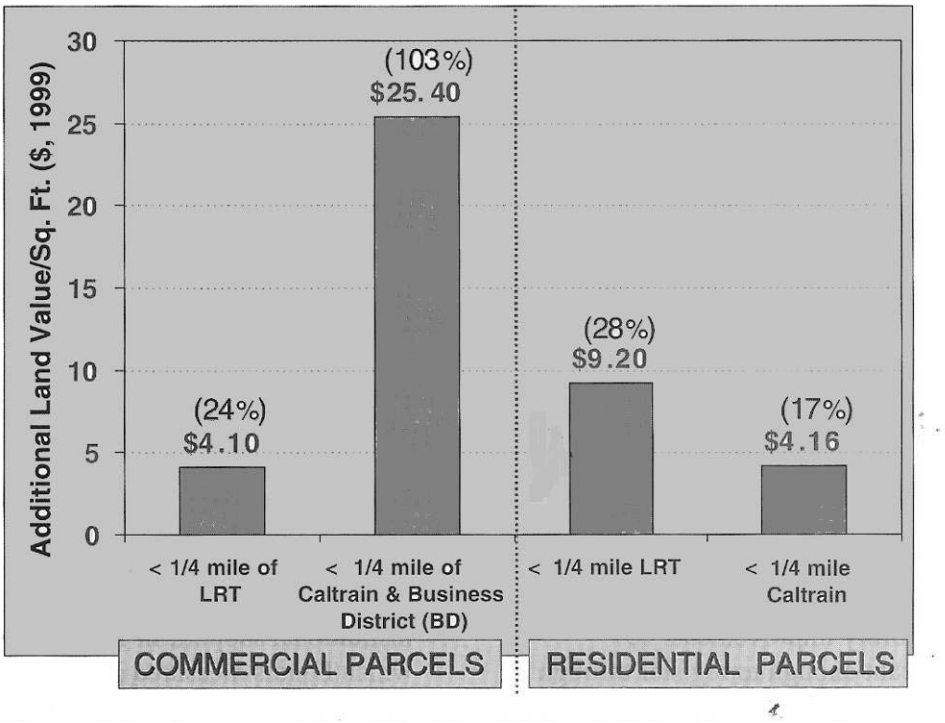


Figure 11 - Increased Land Values around Transit Stations
Showing commercial and residential land value premiums in Santa Clara County, California during 1999 around light rail transit and the heavy rail Caltrain system.
(Source: Chisholm, p. 167)

Modal Splits for Residential Developments Near Metrorail Stations, Washington, DC, Area, 1987

Metrorail Station	Project	Distance to Station	% Rail	% Auto	% Other[1]
Rosslyn	River Place North	1000 ft	45.3	41.5	13.3
	River Place South	1500 ft	40.0	60.0	0.0
	Prospect House	2200 ft	18.2	81.9	0.0
Crystal City	Crystal Square Apts.	500 ft	36.3	48.8	14.9
	Crystal Plaza Apts.	1000 ft	44.0	45.0	11.0
Van Ness-UDC	The Consulate	300 ft	63.0	32.6	4.4
	Connecticut Heights	3800 ft	24.0	56.0	20.0
Silver Spring	Twin Towers	900 ft	36.4	52.3	11.4
	Georgian Towers	1400 ft	34.7	43.1	0.8

[1]Other consists of such forms of access as riding the bus, walking, and bicycling.

Figure 12 – Modal Splits for Residential Developments near WMATA Metrorail
Modal Splits at WMATA transit stations. Rail usage for developments near transit stops far outstrips general trends for the U.S., and shows a clear inverse relationship with distance from station. (Source: Bernick & Cervero, p.125)

Chapter 2: The Dulles Corridor Rapid Transit Project as a Generator of Transit-Oriented Development in Reston, Virginia

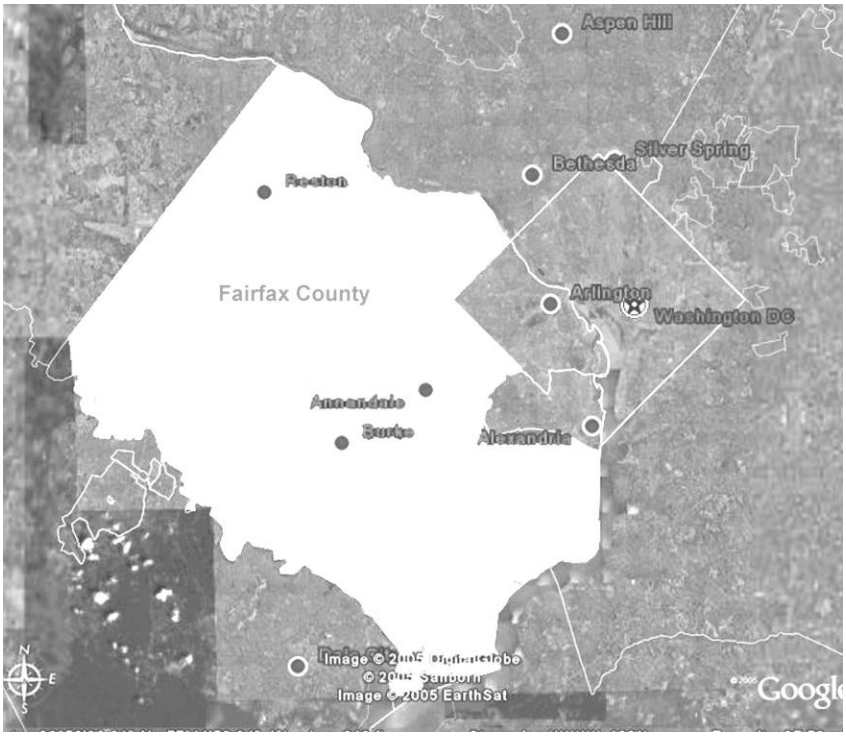


Figure 13 – Fairfax County, Virginia
Reston, Virginia comprises an unincorporated portion of Fairfax County. Fairfax County is located immediately west of Arlington County and Alexandria, Virginia, adjacent to Washington, D.C. Fairfax County is one of the wealthiest counties in the country and, while traditionally a large source of workers commuting to Washington, D.C., for jobs, has become an important regional jobs center focusing on defense and the high-tech industry.
(Source: Author and http://www.earth.google.com)

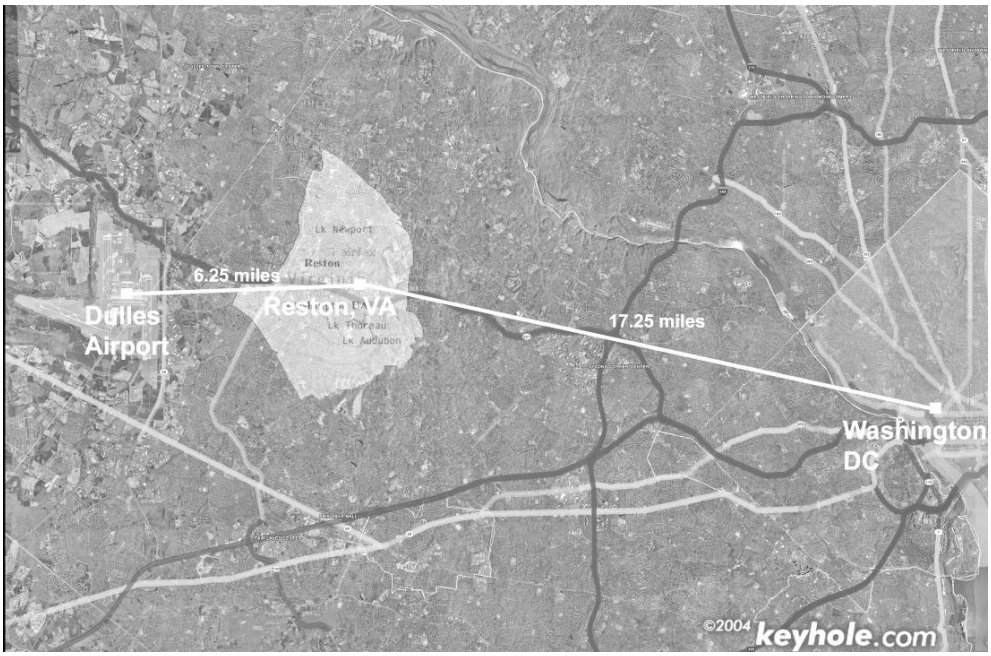


Figure 14 – Reston Location
Reston, Virginia location between Washington, D.C. and Dulles Airport. The Dulles Access Road ends either at the I-495 Washington Beltway or at I-66, the main freeway entering into Washington, D.C. Thus, other freeways or local roads must be accessed to commute to Washington, D.C.
(Source: Author and http://www.keyhole.com)

Figure 15 – Reston Detail
Detail of Reston, Virginia overlaid on aerial photo. Present day Reston is almost entirely developed to the extents of the master plan. Most of the development is single family homes, townhouse communities, and some low density apartments. Of the seven proposed commercial centers, only Lake Anne and Reston Town Center have been developed, with Lake Anne remaining more as a remnant piece from the initial master plan. The zones abutting the Dulles Access Road have been developed as office, rather than industrial zones.
(Source: Author, http://reston.org/maps/m_index.html, and http://www.keyhole.com)

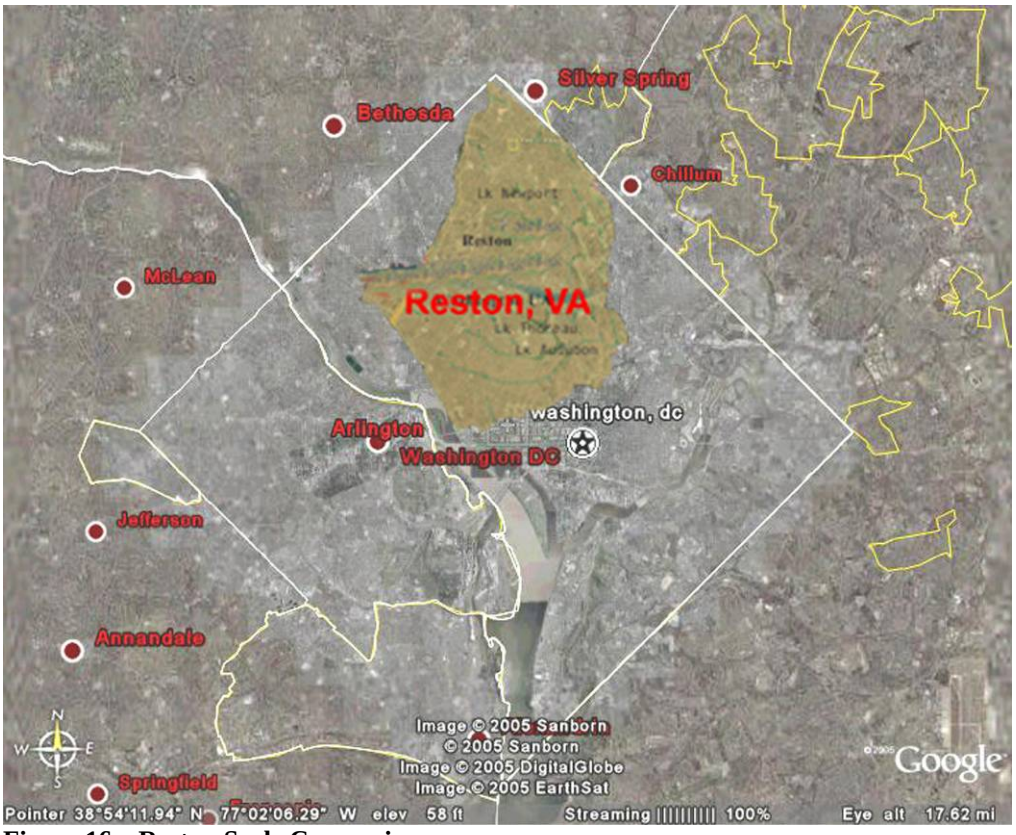


Figure 16 – Reston Scale Comparison
Reston overlaid on Washington, D.C. as a scale comparison. Reston comprises approximately 11.5 square miles while the District is between 68 and 69 square miles. The 2000 Census population for Washington, D.C., was approximately 572,000 residents while Reston advertises approximately 58,000 residents. Density levels in the District are thus approximately 1.64 times that found in Reston. (Source: Author and http://www.earth.google.com)

The History of Reston as a Planned Community

Reston, named after its developer, Robert E. Simon, comprises an 11.5 square mile unincorporated planned community of over 58,000 residents within Fairfax County, Virginia (part of suburban Washington, D.C.) in 1962. Originally part of a 17th century land grant from King Charles II of England, the land passed through several hands before being acquired by Dr. Carl Adolph Max Wiehle in the late 19th century. Wiehle attempted to establish a new community on the land, but died before his plans came to fruition.

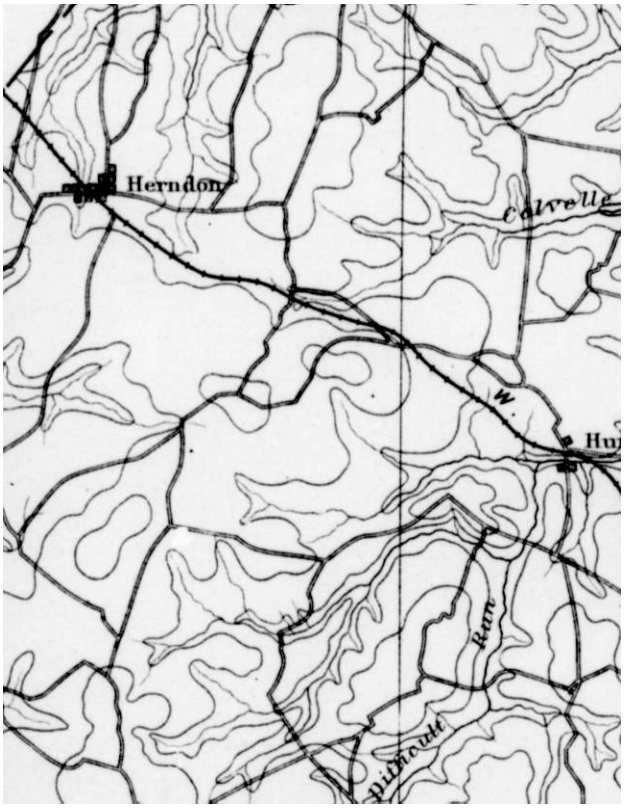


Figure 17 - Reston Area c. 1890
Almost no development in area comprising modern day Reston. Only nearby Herndon appears as a significant feature. Washington and Old Dominion rail line can be seen connecting Herndon east. (Source: http://www.restonpaths.com/OldMaps/Images/RestonArea1890 .jpg)

The land was farmed until 1956. Anticipating the plans to build the Capital Beltway and Dulles Airport, the creation of a new community of 30,000 residents was proposed for the site. This plan failed due to environmental concerns, zoning problems and constraints caused by the Federal Government's decision to run the Dulles Airport access road through the middle of the property.

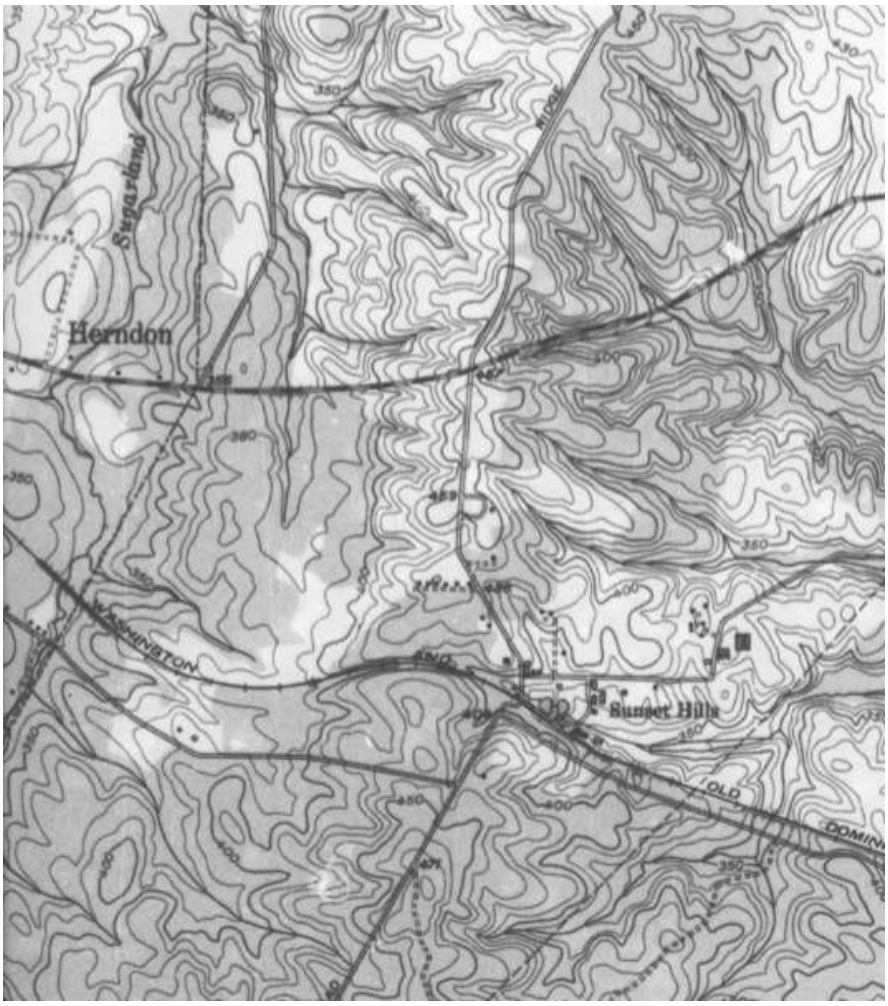


Figure 18 - Reston Area c.1954
Sporadic development, mostly adjacent to the Washington and Old Dominion rail line. Sunset Hills Road, Ridge Road (later Reston Parkway) and a small portion of Wiehle Road are mapped. Dulles toll road not yet in existence.
(Source: http://www.restonpaths.com/OldMaps/Images/NorthReston1954.jpg)

In 1961, Robert Simon purchased the property and succeeded in rezoning the property to accommodate his plans for a new town. Despite Simon's loss of control of Reston in 1967, his vision of a new town that encompassed the positive amenities of city living with the open space and greenery of the suburbs has been realized in large part and continues to evolve. Most significantly, Reston has become a major high-tech business center with over 1400 companies located within its borders. The

Reston Town Center, the commercial heart of the project, was dedicated in 1990 and serves as a local and regional mixed-use destination for the area.

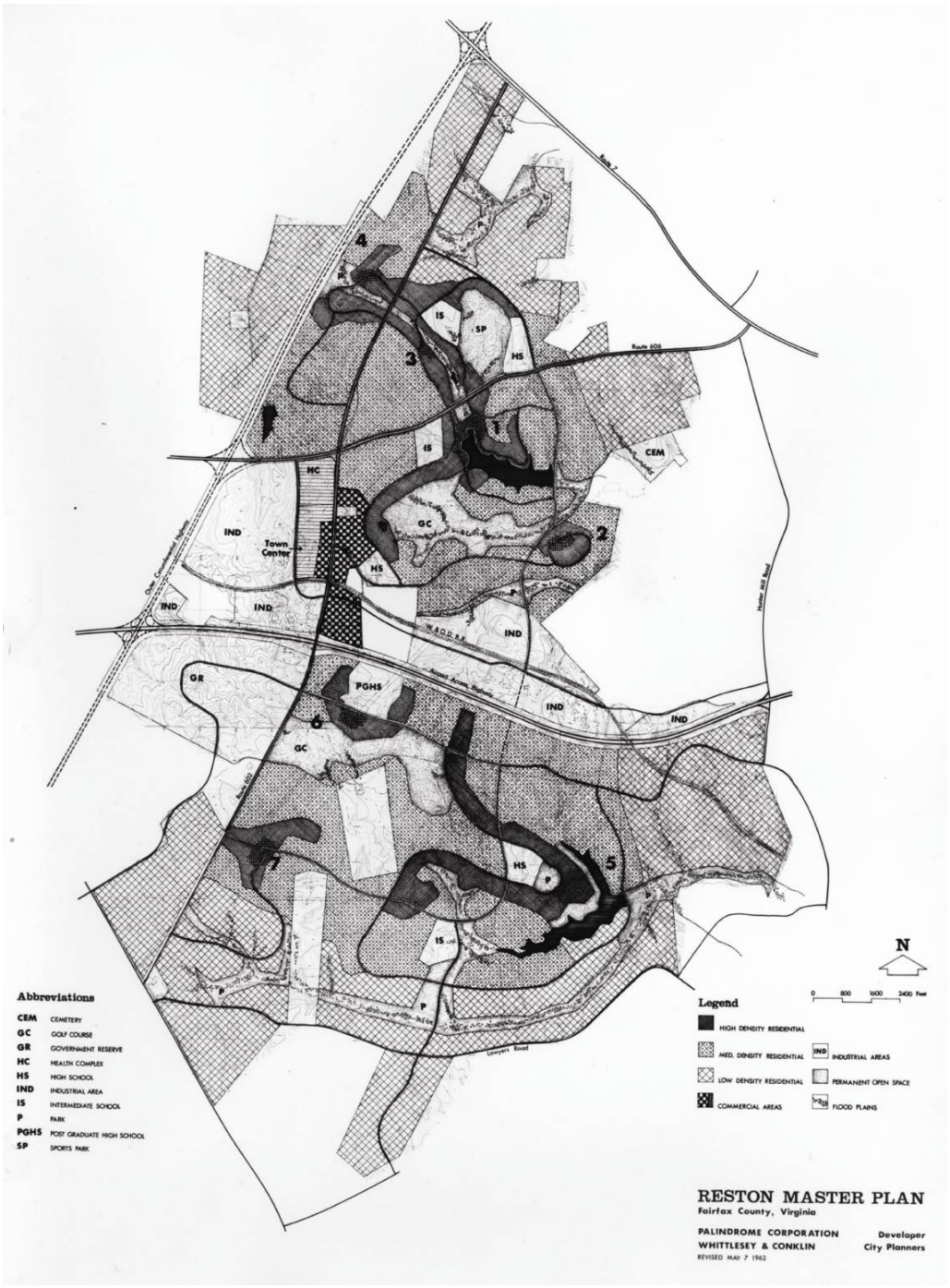


Figure 19 - Reston Master Plan
Darker hatching represents higher density housing, with density decreasing with intensity of hatching. Plan also identifies areas for schools, parks, health and government centers, industrial areas and commercial areas. Area around proposed site originally proposed for industrial uses.
(Source: Reston Master Plan-http://www.restonmuseum.org/images/masterplan/restonbooklet.pdf)

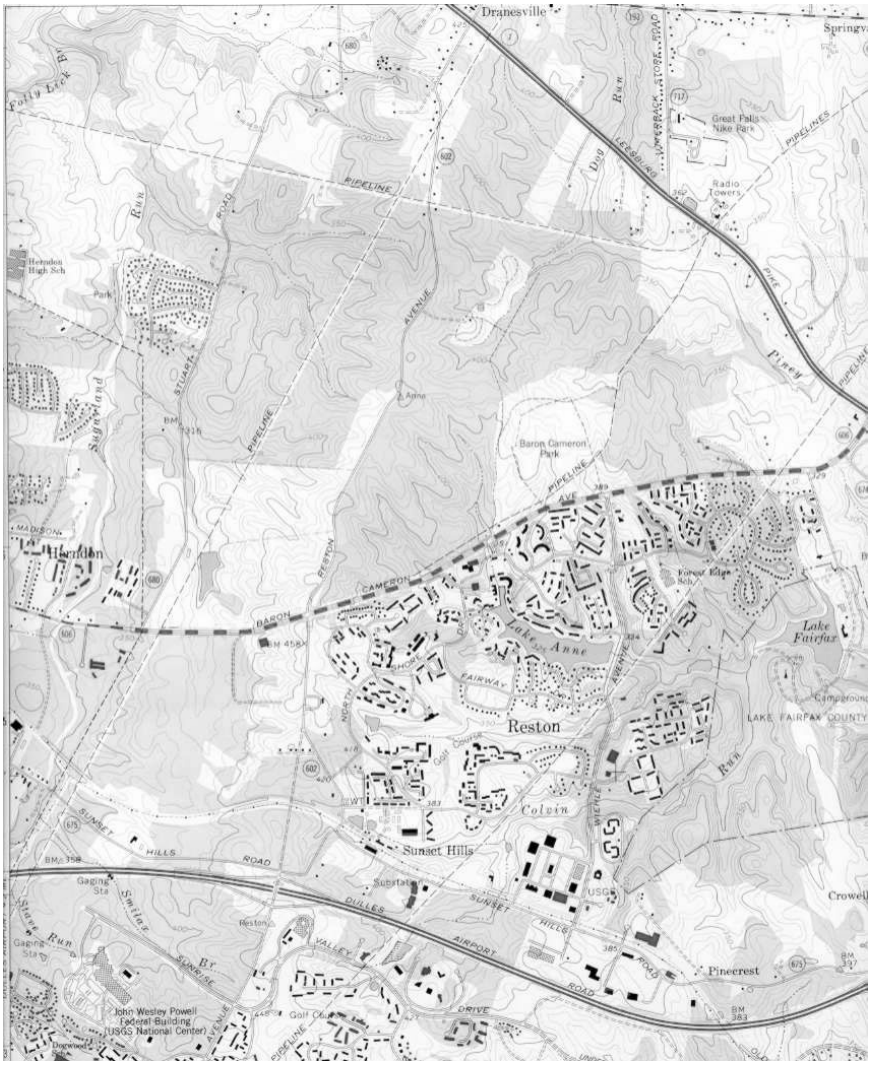


Figure 20 - Reston Area c. 1980
Main area of development of northern Reston limited to between Reston Parkway and Wiehle Avenue, with additional development adjacent to the east of Wiehle Avenue. Note no significant development north of Baron Cameron Avenue.
(Source: http://www.restonpaths.com/OldMaps/Images/NorthReston1980.jpg)

Site Description: The Site as Tabula Rasa

The core portion of the site is comprised of a nine-acre, L-shaped parcel owned by Fairfax County and located immediately adjacent to the proposed Wiehle Avenue Metrorail Station. The Site was identified in the "Wiehle Village Center and Metrorail Station Joint Development Solicitation" Request for Proposals issued by Fairfax County on March 1, 2005 (the "RFP"). This RFP offered the opportunity for

a public-private partnership to create a transit-oriented development at the Metro site, and identifies an additional 8 acres of land immediately adjacent to the county-owned land and the proposed station, which has been zoned for higher-density development once metrorail has been approved. [See, Figure 22, below]. These two areas are located in Land Unit G-4 as identified in the Fairfax County Comprehensive Plan, 2003 Edition, Upper Potomac Planning District. The site is bounded on the south by the Dulles Airport Access and Toll Road ("DAAR"), on the east by Wiehle Avenue, on the north by Sunset Hills Road, and on the west by a privately owned office complex. The site is mainly paved and presently serves as a park-and-ride lot for commuter bus transit. Consistent with its present use, the site does not have any significant topographic features. The site and its surrounding context are typified by gently rolling topography and are wooded where not developed. The areas immediately surrounding the site have generally been developed as low-rise one to four-story office structures serviced by surface parking. Several larger-scale office developments exist to the west of the site and to the south across the Dulles Access right-of-way. These developments are in the 12+ story range and are also served by surface parking. The Dulles Access right-of-way creates a significant barrier to the south of the site. Besides the topographical barrier created by the berm that separates the traffic from the site, the right-of-way is over 300 feet wide, consisting of three lanes of traffic in each direction on the toll portion and two lanes in each direction on the airport access portion. The toll lanes, which sit on the outside edges of the right-of-way, are separated from the access lanes in each direction by a grass divide, as are the two directions of access lanes. The center divide between the airport access lanes

will be the right-of-way for the extended Metro line and measures slightly over 60 feet wide.

For this thesis, the remainder of the land in Land Unit G-4 and approximately 40-45 acres of land found in Land Unit G-1 have been identified as potentially developable for an expanded TOD. Land Unit G-1 lies immediately north of the RFP site and is bounded by Sunset Hills Road to the south, Wiehle Avenue to the east, and Hidden Creek Country Club Golf Course to the north and west. The area for development in Land Unit G-1 is known as Isaac Newton Square and contains several one story and two four story office structures surrounded by a large field of surface parking. A portion of the Washington and Old Dominion Trail just north of Sunset Hills Road also crosses this land. The RFP site and the additionally identified lands equal approximately 76 acres for development.

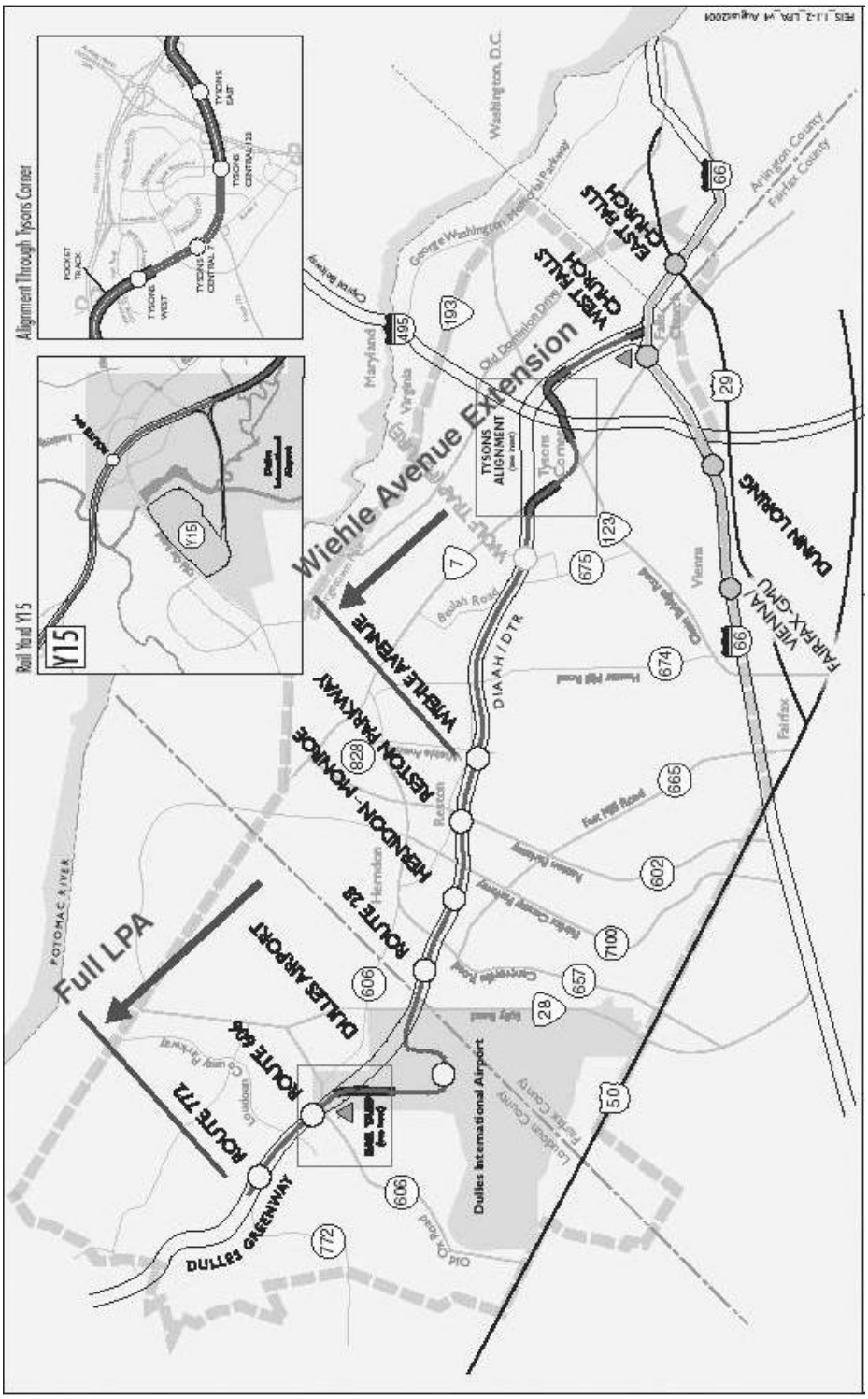


Figure 21 - Map of planned extensions from Metrorail Orange Line to Dulles Airport
Proposal shows 12 stations. The line generally follows a right-of-way down the center of the Dulles International Airport Access Highway/Dulles Toll Road. The line does deviate from this right-of-way in two areas; the first is in Tyson's Corner, where four stations are located on their own path, the second is at Dulles Airport where the lines deviates to meet the airport complex.
(Source: http://www.dullesmetro.com/pdfs/Dulles_Metrorail_map.pdf)

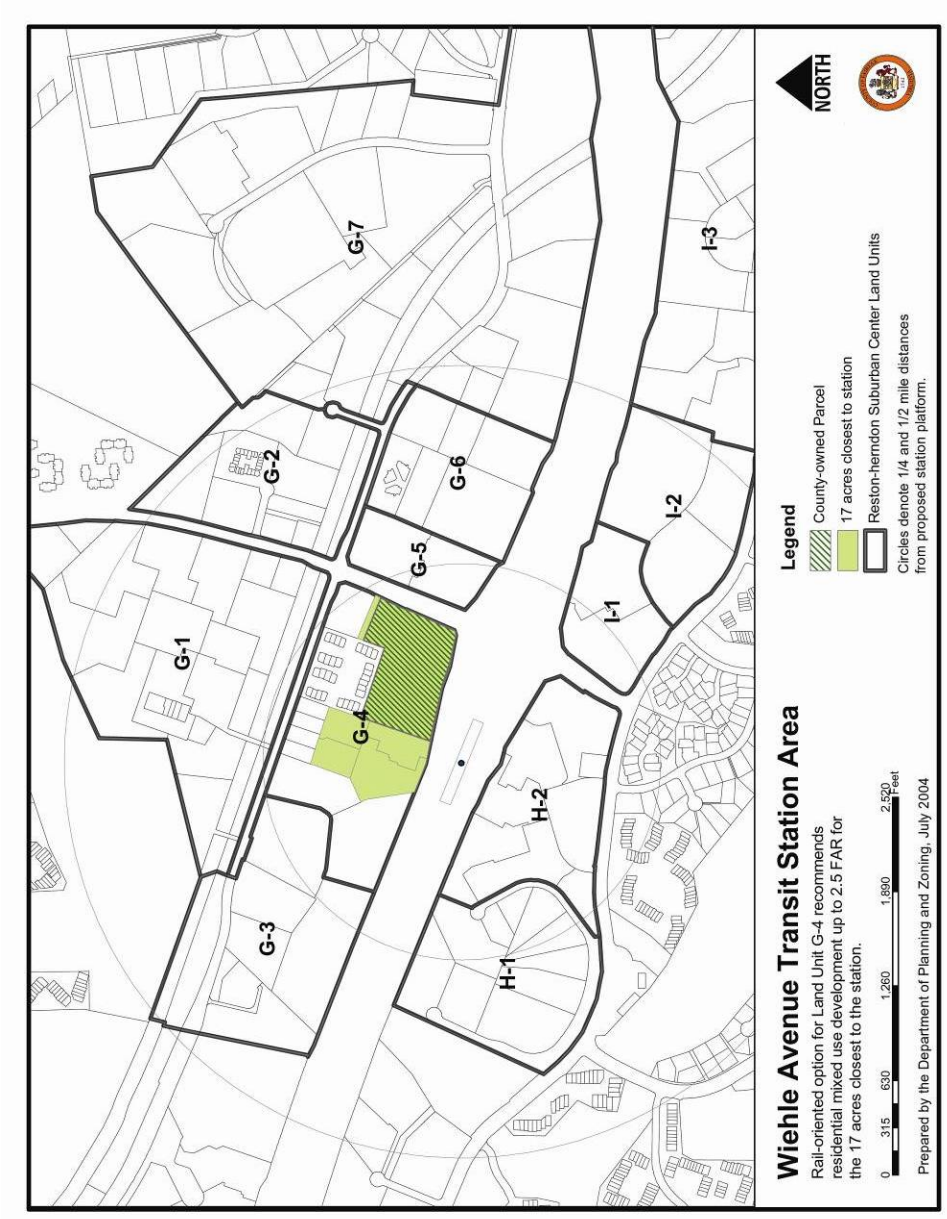


Figure 22 – RFP Site
Fairfax County RFP site with zoning designations from Fairfax County Comprehensive Plan, 2003 Edition (as amended through 7-11-2005). The map identifies both the 9-acre county-owned land in dark green and another 8 acres of privately-owned land contiguous to the site and available for development under a higher than normal density, in lighter green. The Comprehensive Plan designates these areas as the Wiehle Avenue Transit Station Area and provides options under the zoning under scenarios without transit-oriented development, with bus transit-oriented development and rail transit-oriented development. For example, the G-4 designated zone (where the core portion of the site is located) allows up to .50 FAR office or 30 du/acre residential without an agreement related to transit development; .70 FAR mixed-use non-residential development or 1.5 FAR mixed-use residential development with a funding agreement with Bus Rapid Transit; and, 2.5 FAR mixed-use residential development with a funding agreement with a funding agreement for rail development.
(Source: Fairfax County Department of Planning and Zoning-from Fairfax County Wiehle Village Center and Metrorail Station Joint Development Solicitation)

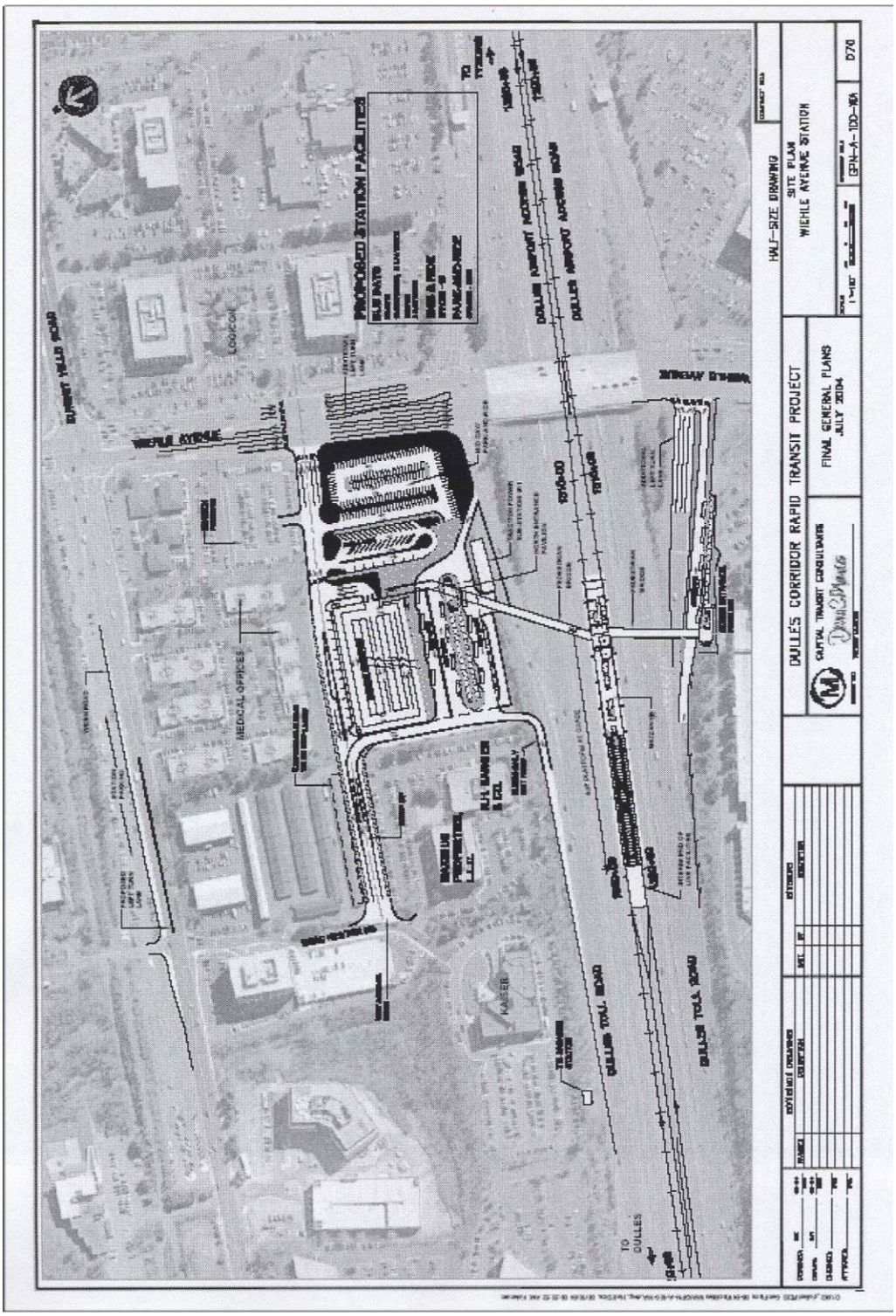


Figure 23 - Proposed Wiehle Avenue Metrorail Station Plan
Plan shows structured parking and surface park-and-ride lot, bus bays on north and south sides of Dulles Access Road, and station mezzanine centered over right-of-way.
(Source: Fairfax County Department of Planning and Zoning-from Fairfax County Wiehle Village Center and Metrorail Station Joint Development Solicitation)

Figure 24 – Aerial Photo of Reston Metro Sites
Wiehle Avenue site and Metrorail location (at right of side of image) with respect to Reston Town Center and Reston Avenue Metrorail location on left edge of image.
(Source: Author and http://www.earth.google.com)

Figure 25 – Aerial Photo of RFP Site
Wiehle Avenue RFP Site and planned right-of-way site for Metrorail station. The site currently serves as a Park-and-Ride lot for bus transportation. Development around the site is low and mainly comprised of commercial office space.
(Source: Author and http://www.earth.google.com)

Figure 26 - Panoramic of Existing Site, Park-and-Ride Lot
The site lacks any significant context. North of the site contains, on the right, several single story office structures of little value.
(Source: Author)

Figure 27 - Panoramic of Mid-Block Entry Road to Park-and-Ride Lot
Existing streets might be incorporated into staged development
(Source: Author)

Figure 28 - Panoramic of South Side of Site, Including Entry Ramp to Dulles Toll Road
Orientation only occurs through signs and Wiehle Ave. expands into a six-plus lane barrier.
(Source: Author)

Figure 29 - Panoramic North of RFP Site at Corner of Wiehle Avenue and Sunset Hills Road
What few buildings that exist at intersection are so far set back from corners that they give no sense of enclosure to street.
(Source: Author)

Figure 30 - Panoramic of Wiehle Avenue in Front of Mid-Block Entry to Park-and-Ride Lot
Wiehle Avenue serves as a major barrier because of width and lack of scale.
(Source: Author)

Figure 31 - Panoramic of Isaac Newton Square, a Potential Site for Further TOD
Site is a large surface parking lot surrounded by single story office-type structures of low quality.
(Source: Author)

Figure 32 - View West from Existing Bus Park-and-Ride Lot on Site
Larger scale office buildings lining Dulles Toll Road are visible in the distance. While site offers some visual connections to surrounding development, it also shows that there is little to no apparent order to those developments.
(Source: Author)

Figure 33 -View west from surface lots lining north side of Sunset Hills Road leading towards Reston Town Center area.
Lack of sense of place evident. The dispersed nature and setbacks of development on the south side of the road detract from any sense of coherent street edge. Similarly the surface lots on the north side leave this side of the road completely edge-less. The most prominent (and unfortunate) image one is left with is the towering power lines. The W&OD Trail runs behind the trees on the right side of the photo.
(Source: Author)

Figure 34 -W&OD Trail in Area North and West of Site
A mostly untapped resource that is marred by co-utilization as an electric line right-of-way.
(Source: Author)

Site Analysis: The Site as Generator of Value

The higher densities and mix of uses allowed in TOD, resulting in increased land value, inure to the benefit of the community and the transit system. The WMATA metro system has already capitalized on these land values in a series of TOD in Arlington County. WMATA has entered into a variety of joint development agreements that allow private development of air rights and WMATA owned land adjacent to stations, with a portion of revenues from this development going back to WMATA. Similarly, increased ridership brings added revenue to the transit system, allowing for increases in service and a variety of transit options. Thus, it is not any particular element of the location that intrinsically adds value, but rather the transit adjacency and the proper treatment of development of the site.

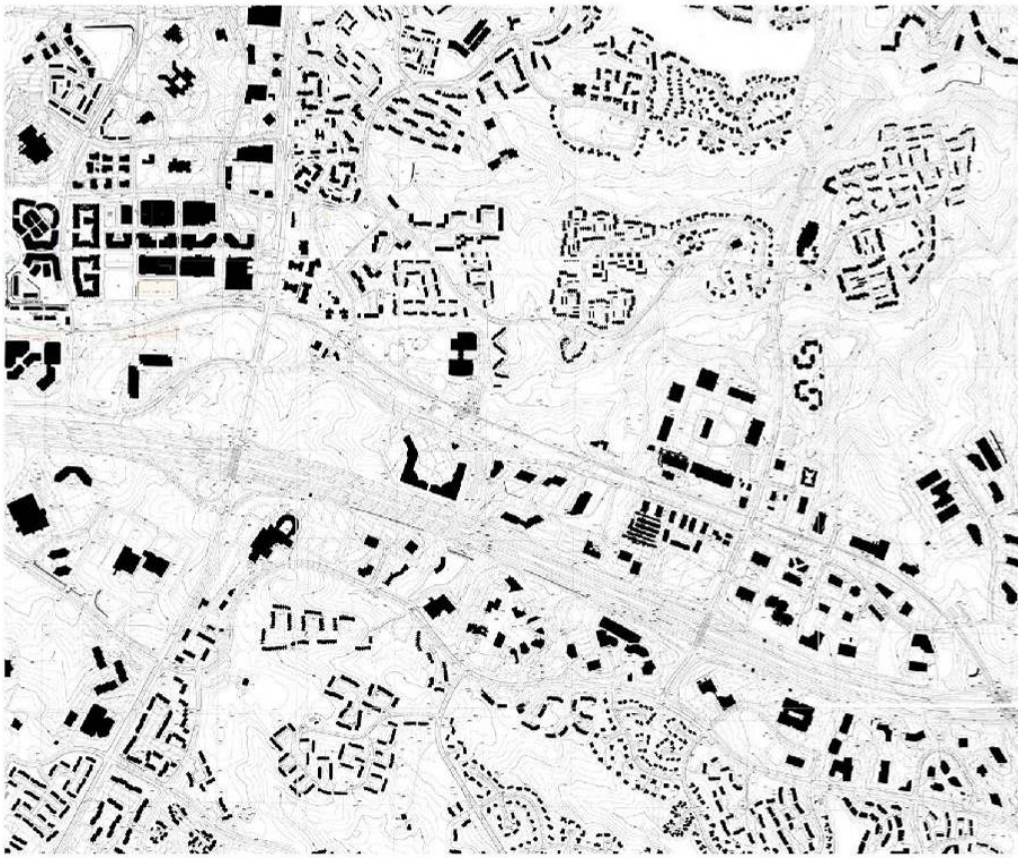


Figure 35 - Figure Ground Diagram of Reston Area
Shows Reston area adjacent to the Dulles Toll Road from Reston Parkway on the right to Wiehle Avenue on the left. The diagram reveals a mostly incoherent road network without a fine gradation of road hierarchies; a preponderance of cul-de-sac developments; and, sporadic densities and relationship between developments.
(Source: Author and Fairfax County Department of Planning and Zoning)

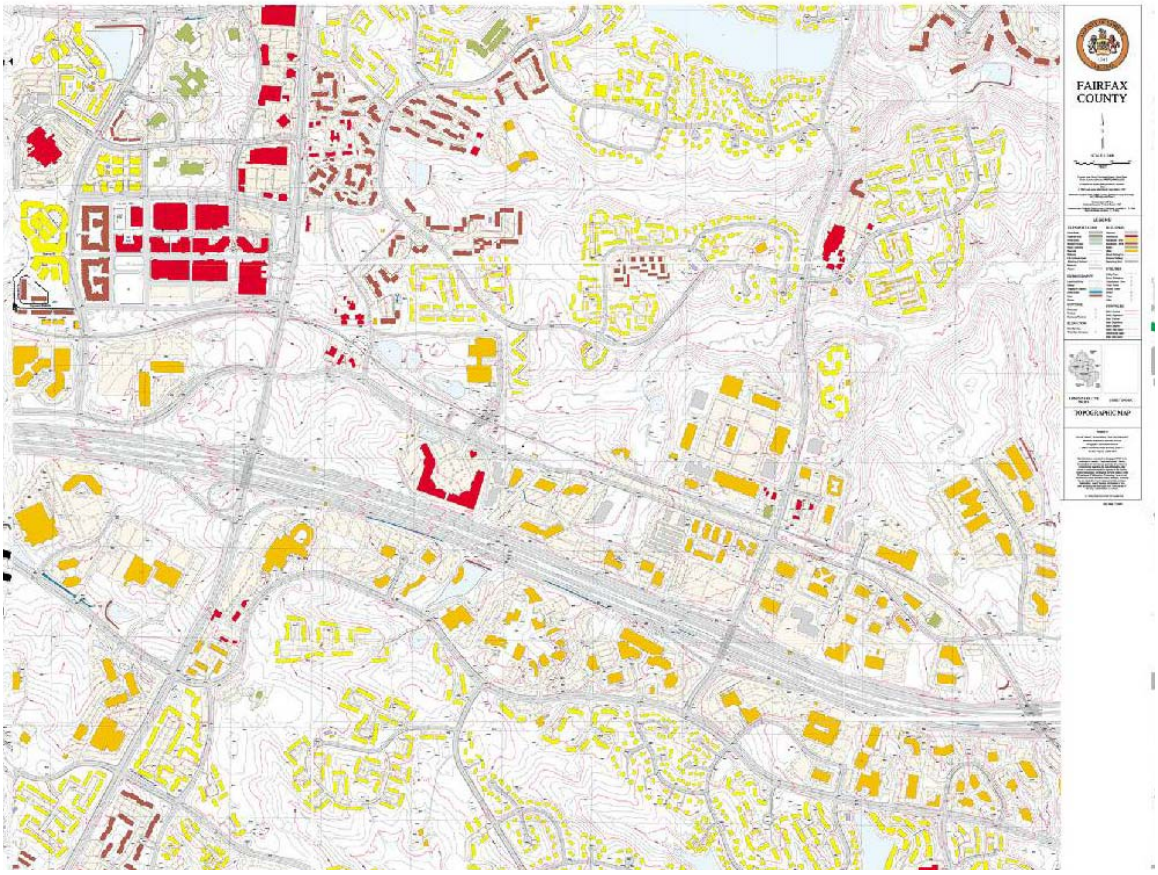


Figure 36 - Land Use Diagram
Designations as follows: red-brown for multi-family housing, yellow for single family housing, red for mixed-use/commercial, and yellow-orange for commercial office. Plan shows a general separation of uses with a lack of housing near the proposed metro stations.
(Source: Fairfax County Department of Planning and Zoning)

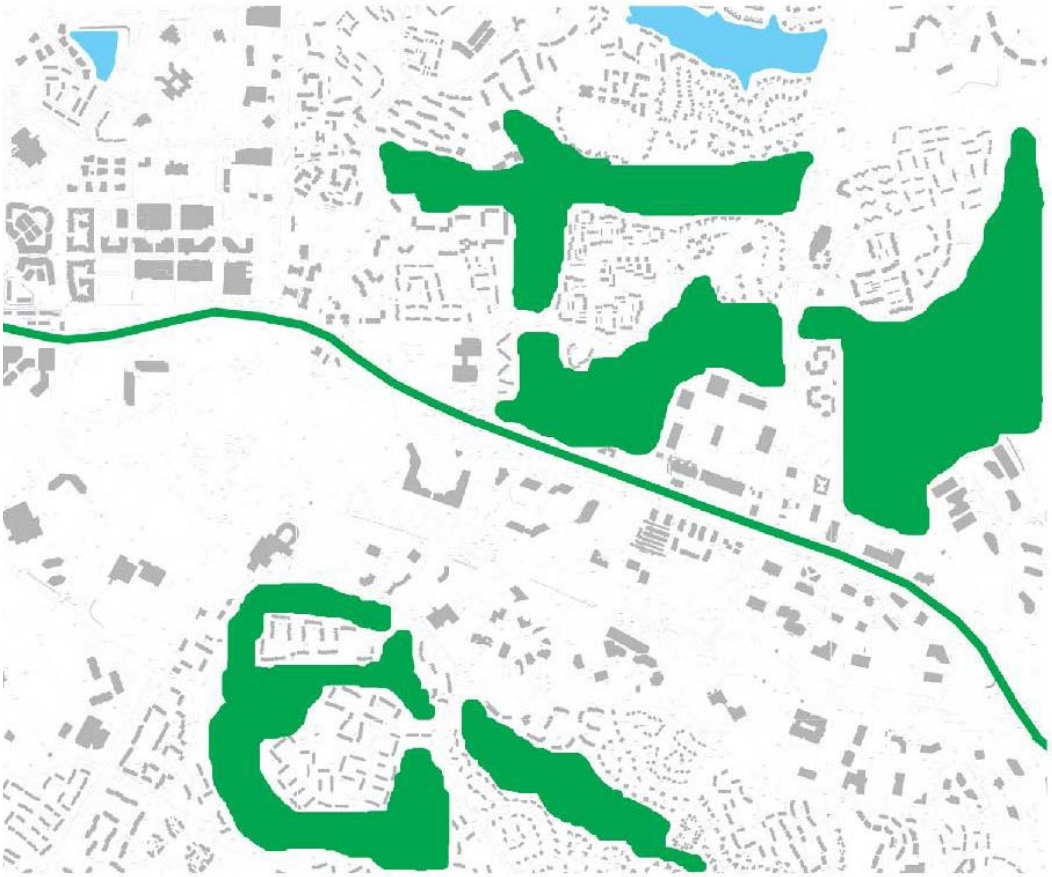


Figure 37 - Park Land
While a significant amount of green space surrounds the proposed TOD site, this is mainly golf course that is essentially inaccessible to the general public. The large green zone at the east side of the plan is Lake Fairfax Park, a public recreational park, and the line crossing from west to east represents the W&OD rails to trails path. None of these green spaces comprises a civic green space, but instead typify the type of disjointed recreational green spaces usually developed in the suburban environment. (Source: Author and Fairfax County Department of Planning and Zoning)

Figure 38 - Quarter Mile Radius from RFP Site

TOD generally calls for the highest density of development within ¼ mile of a transit station to maximize the value and transit use sponsored by the adjacency to the station. Assuming the primary station access occurs on the southern edge of the site, as proposed, the main portion of this ¼ mile zone remains within the border of Sunset Hills Road to the north, Wiehle Avenue to the east and the Dulles Toll Road to the south. There is some spillage over these boundaries.
(Source: Author and http://www.earth.google.com)

Figure 39 - Quarter Mile Radius Diagram with Realignment of Tracks
Assumes alignment off of Dulles Toll Road right-of-way and proposes station at corner of Wiehle Avenue and Sunset Hills Road. In this instance the heaviest density starts to encompass potentially developable areas north of Sunset Hills Road, but also makes connection across the Dulles Toll Road less likely.
(Source: Author and http://www.earth.google.com)

Figure 40 - Half Mile Radius Diagram from RFP Site

TOD guidelines suggest that significant development of a slightly lower density is appropriate between ¼ mile and ½ mile from the transit station, and will still support transit use. The half mile radius from the RFP site starts to encompass potentially developable land north of Sunset Hills Road and also starts to interact with some of the existing higher density office development between Sunset Hills Road and the Dulles Toll Road on both sides of Wiehle Avenue. The ½ mile radius also interacts with existing development on the south side of the Toll Road and suggests that there might be overlap with development around the proposed Reston Parkway transit station.
(Source: Author and http://www.earth.google.com)

Chapter 3: Designing a Transit Oriented Development

Design Goals: Creating a Mixed-Use, Mixed Income Transit-Oriented Development

- Integrate Transit Stop to Create A Walkable Zone
  - Turn Area Surrounding Station into a "Center of Gravity"
  - Link Both Vehicles and Pedestrians to Station through an Interconnected Street Network
  - Accommodate Multiple Modes of Travel/Transit: Rail, Bus, Bicycling, Walking
  - Limit Parking
  - Reduce Incoming Automobile Trips

- Design a Framework for a Public Realm
  - Provide Walkable Streets
  - Supply Public Greens
  - Plan Civic Plazas
  - Include a Transit Pavilion
  - Propose "Gateway" Building/Spaces
  - Define Public Space and Build to a Human Scale
  - Mandate Urban Design Coding/Form Based Codes
  - Steward Environmental Sensitivity

- Overlay a Grid of Streets and Integrate Under-Used Lands
  - Create Pedestrian-friendly Streetscapes and Block Sizes
  - Connect Both Vehicles and Pedestrians to Surroundings by Mapping an Interconnected Street Network
  - Capture "Buffer" Spaces and Consolidate Parking into Structures
  - Distribute Traffic More Evenly/Avoid Traffic Bottleneck
  - Increase Access to Public/Open Lands

- Increase Density, Especially Residential Within ¼- ½ Mile from Station
  - Provide an Appropriate Transition to Neighboring Single Family Residential Development
  - Plan for High to Mid-Rise Mixed-Use Residential Near Station
  - Create a "24/7" Zone
  - Mandate a Significant Affordable Housing Component
  - Design a Broad Array of Housing Options
  - Propose Mixed-Use, Mixed-Income, Mixed-Age
  - Capitalize on Increased Land Value to Fund Transit Improvements

Special Design Issues: Creating a Sense of Place

The site currently serves as a park and ride lot on a commuter bus line and is located in an area of mainly low density commercial office development. The bulk of Reston, including this area, has been developed only over the previous 45 years. Currently, the most immediate buildings adjacent to the site are 1-4 story office buildings, although several lots to the west and south of the site have larger scale office building in the 8-12 story range. Regardless of the density of the development, the area is typified by a large percentage of asphalt, with most buildings served by surface parking. Additionally, the site is bordered to the south by a major arterial toll-way. In short, the area is almost completely devoid of any identifying character. There is no prevalent style of architecture nor important site lines or view corridors. This leads to one of the key questions of this thesis: How do you take an area that is essentially placeless and give it a "Sense of Place." This thesis will first look at how form-based codes might be applied in a manner that starts to shape an identity for a new development. The thesis will also consider how a transit center might start to take a place in the civic realm and act as both a part of a whole system of similar stations while at the same time retaining a sense of individuality and identification unique to its site and community.

Figure 41 - Existing Road Network
Reston displays a lack of a coherent road network. The network consists mainly of primary roads with few to no secondary connectors. Most tertiary roads are cul-de-sacs or entries to parking lots. The Dulles Toll Road/Airport Access Road acts as a major barrier between northern and southern Reston. (Source: Author and Fairfax County Department of Planning and Zoning)

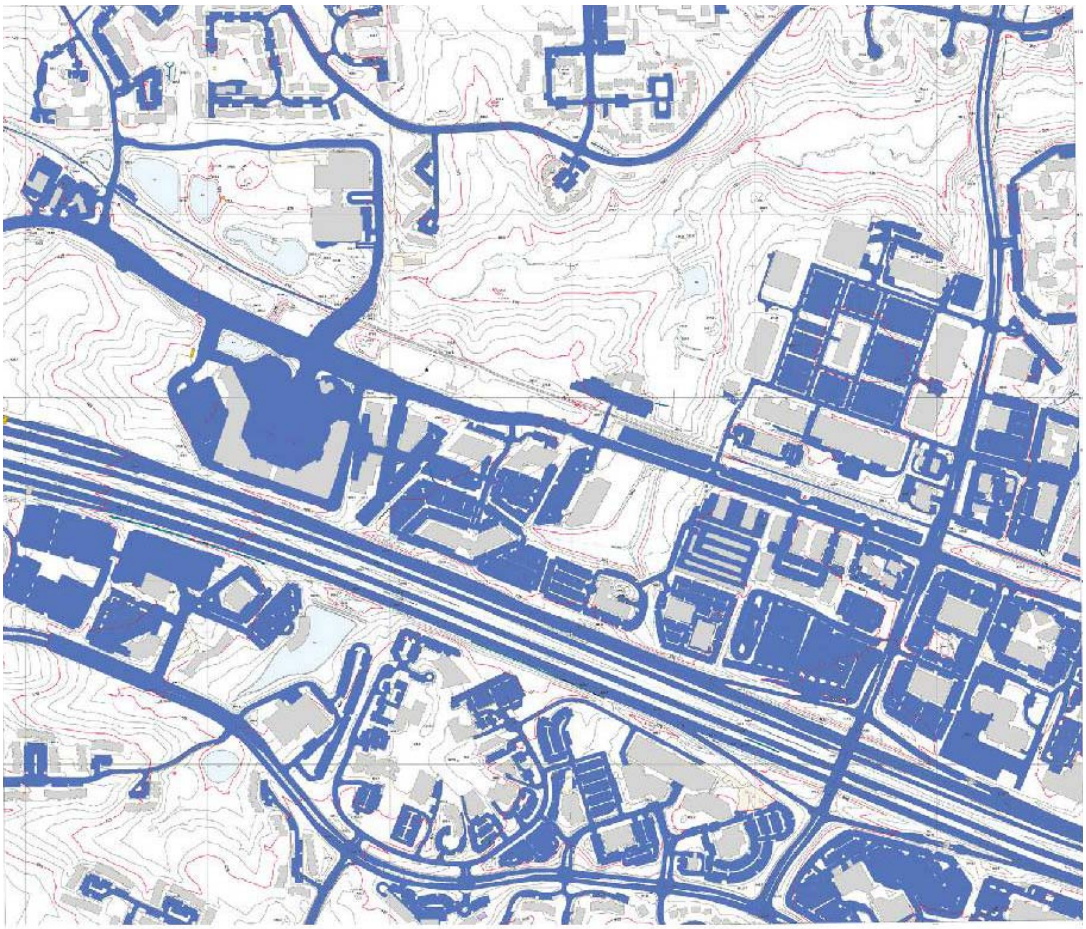


Figure 42 -The Asphalt Suburb
The area comprising and surrounding the proposed sites contains most of its paving not in streets, but in parking lots (paving indicated in blue). While some of the newer and higher density office developments are serviced by structured parking, most developments are surface parked. This leaves a lot of land in the station vicinity that could be reconfigured for more productive use.
(Source: Author and Fairfax County Department of Planning and Zoning)

Figure 43 - Road Network Rethought
Diagrammatically, the road network can be reconceived to provide greater connections between existing parcels and across the Dulles Toll Road/Airport Access Road, without taking down existing buildings. By replacing parking lots with streets and structuring parking, a density and pattern similar to that being achieved at the Reston Town Center could filter into the entire corridor between the Reston Parkway and Wiehle Avenue.
(Source: Author and Fairfax County Department of Planning and Zoning)

Chapter 4: Precedents for a Transit Oriented Development in Reston, Virginia

Urban Design Precedents: Establishing Connections in the Suburbs

Addison Circle - Addison, Texas

Key Components:

Location:	Northern Dallas
Designer:	RTKL
Typology:	Mixed-use infill project adjoining bus transfer station
Site:	80 acre suburban tract
Uses:	4,000 housing units; 115,000 sq.ft. retail; 342,000 sq.ft. office; 30 % parks and public space
Density:	37.5 units/acre
Coverage:	1.86 FAR commercial
Height:	5 stories residential; 10 stories office
Parking:	1/bedroom; 3.2/ 1000 sq.ft. office; 3.7/100 sq.ft. retail
Transit:	Bus transfer center; adjacent to proposed light rail line

Figure 44 - Aerial Perspective Drawing of Addison Circle
Showing major public square. The creation of compelling public/civic spaces enhances the sense of place in a new development.
(Source: http://www.rtkl.com/portfolio)

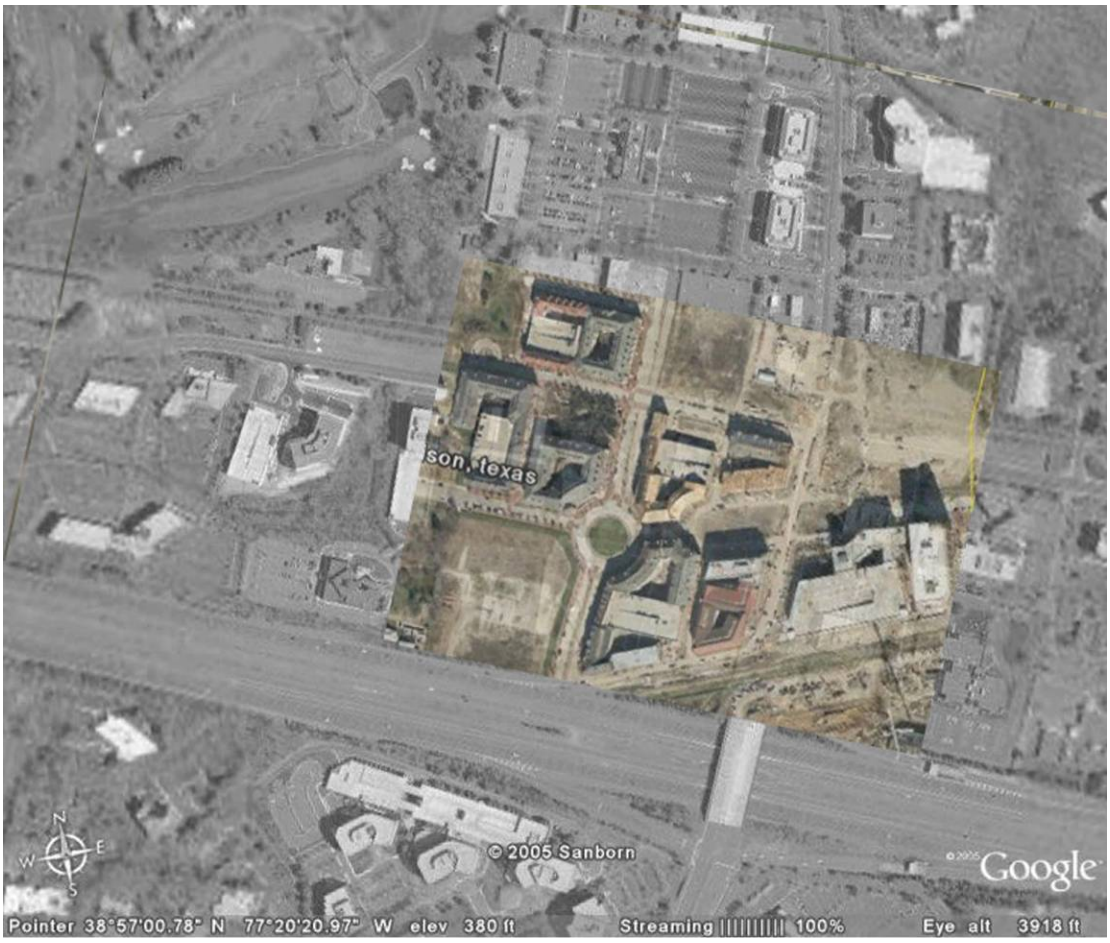


Figure 45 - Addison Circle Scale Comparison
Built portion of Addison Circle overlaid on Wiehle Avenue site for scale comparison. This portion is only a small part of the entire 80 acre site to be built.
(Source: Author and http://www.earth.google.com)

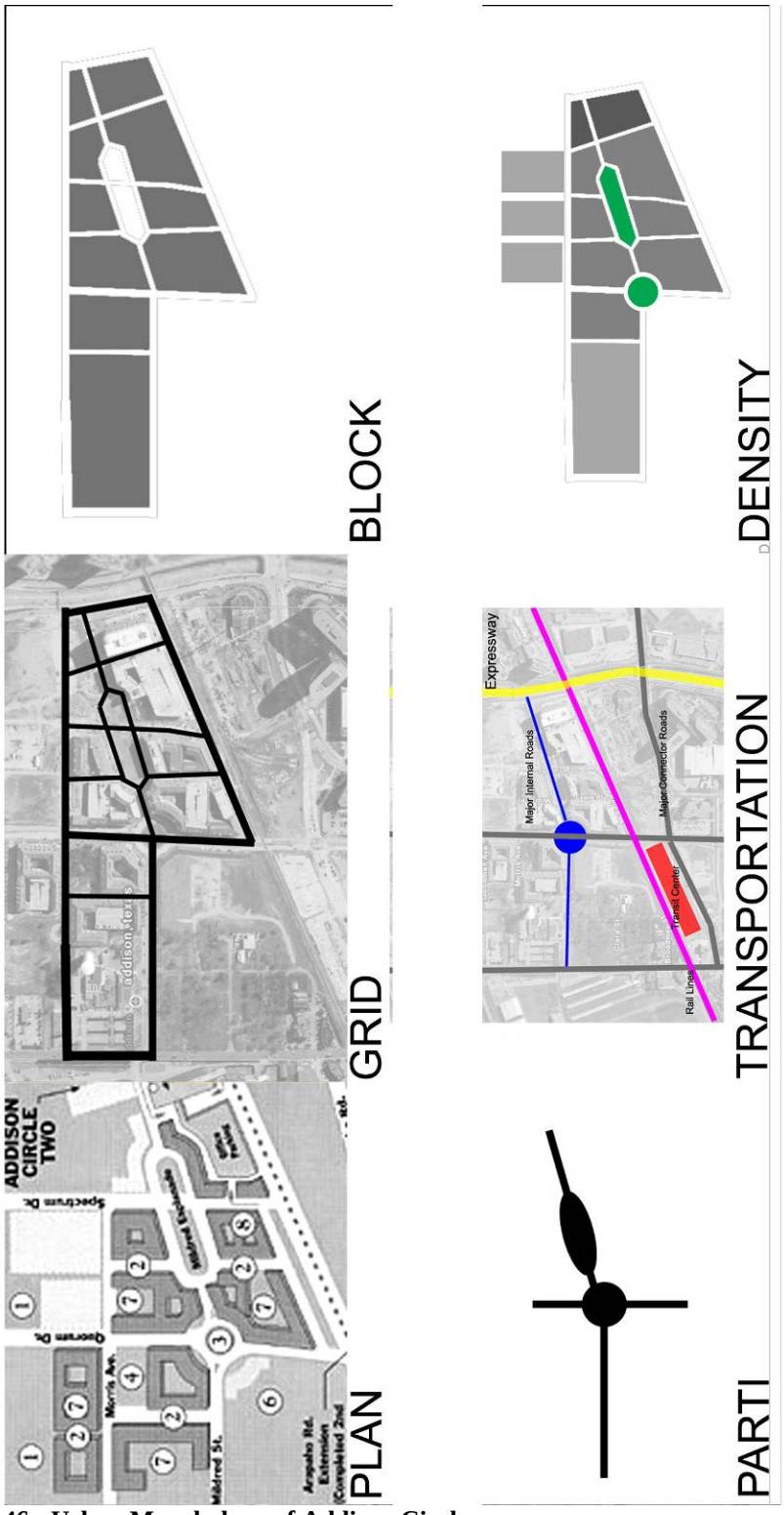


Figure 46 - Urban Morphology of Addison Circle
The design focuses on creating a coherent grid centered on public green spaces. The transit station (marked in red in the transportation diagram) lies at the edge of the development. The Density reflects the gradation from highest (dark gray) and medium (medium gray) around the civic green spaces, down to lower densities (light gray) outside of the core area.
(Author and http:// www.rtkl.com)

The Crossings – Mountain View, California

Key Components:

Location: San Francisco Bay Area
Designer: Peter Calthorpe
Typology: Mixed-use, mixed-income residential development on former shopping center site
Site: 18 acre suburban greyfield
Uses: 630 housing units; 5,000 sq.ft. retail; 7.5 acres parks and public space
Density: 30 units/acre
Height: 2 stories
Parking: 36 surface park and ride spaces
Transit: Commuter rail stop

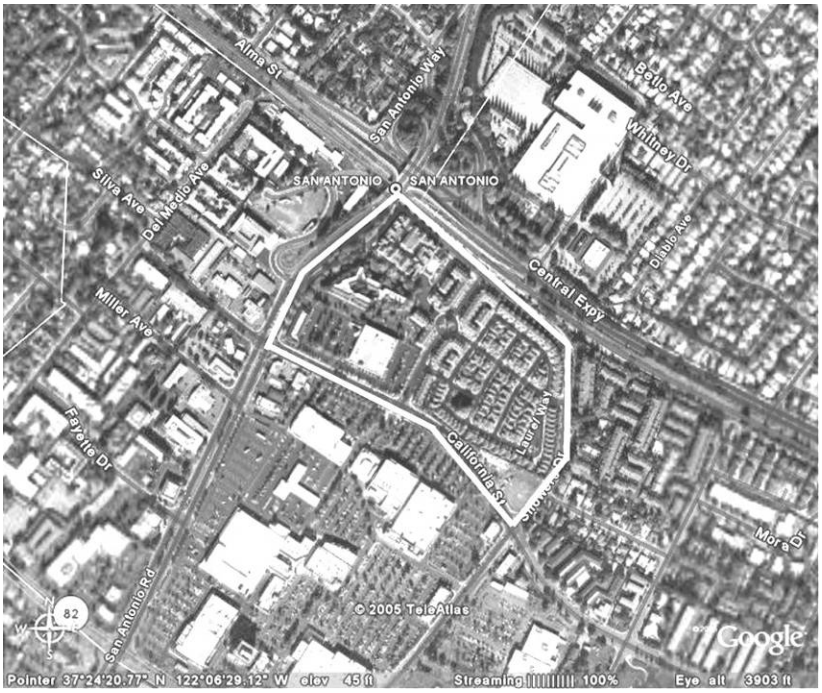


Figure 47 – Aerial Photo of The Crossings
Aerial Photo showing the extents of The Crossings infilled into existing dense fabric.
(Source: Author and http://earth.google.com)

Figure 48 – The Crossings Scale Comparison
The Crossings overlaid on Wiehle Avenue Site for a scale comparison.
(Source: Author and http://earth.google.com)

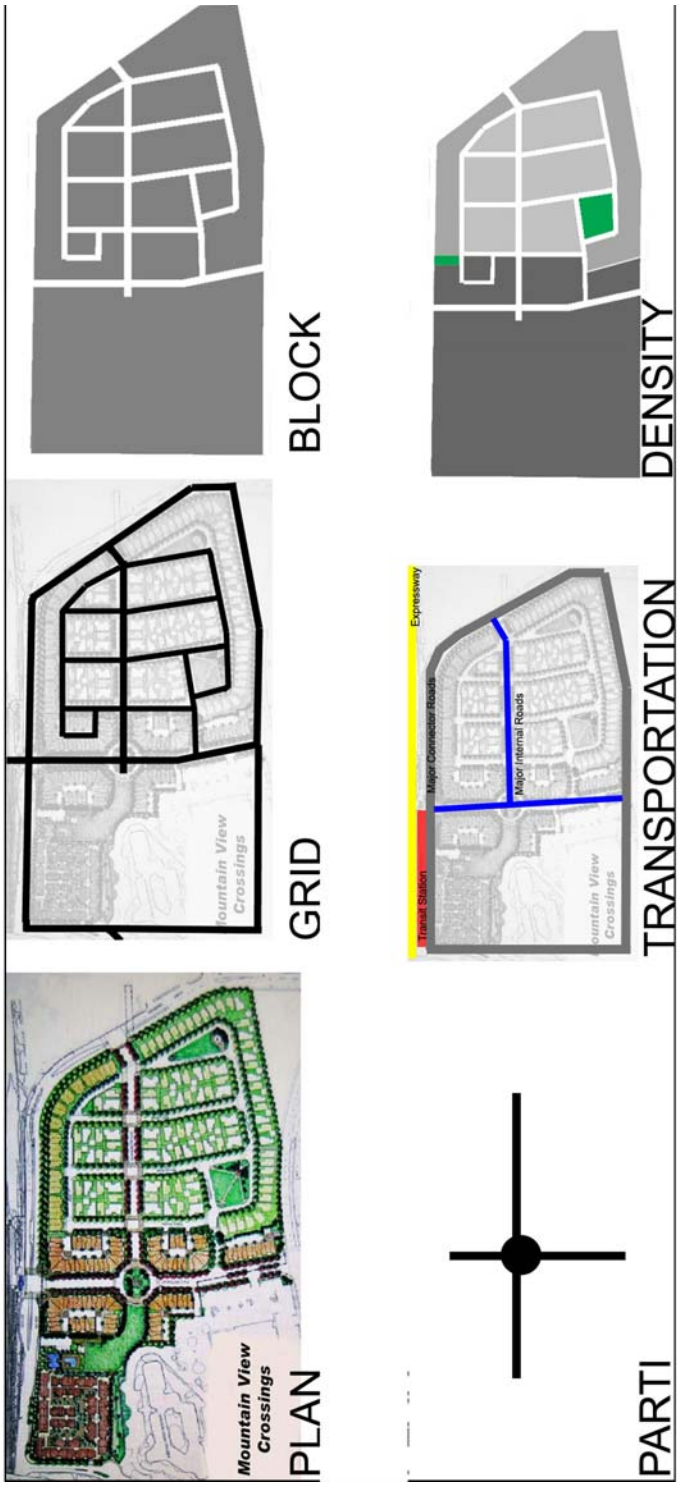


Figure 49 – Urban Morphology of The Crossings
While creating a coherent grid, this plan does not focus on maximizing the porosity of the streets. The grid is internalized with limited connections to the surrounding arterial road. The metro station is located at the northern edge of the site, and the highest density development (dark gray) is located immediately adjacent. Low density housing is contained within the internalized grid and is surrounded by a ring of multifamily houses.
(Source: Author and http://www.calthorpe.com)

Twinbrook Commons – Rockville, Maryland

Mixed-Use Development Program
-Total Site: 26 Acres
-Civic Uses: Transit Station
-Parks: System of Pocket Parks and Urban Greens
-Residential Units: 1261 Units
-Retail: 203,500 sq.ft.
-Commercial Office: 615,300 sq. ft.
-1150 WMATA Structured Parking
-Structured Parking at Transit Development Ratios

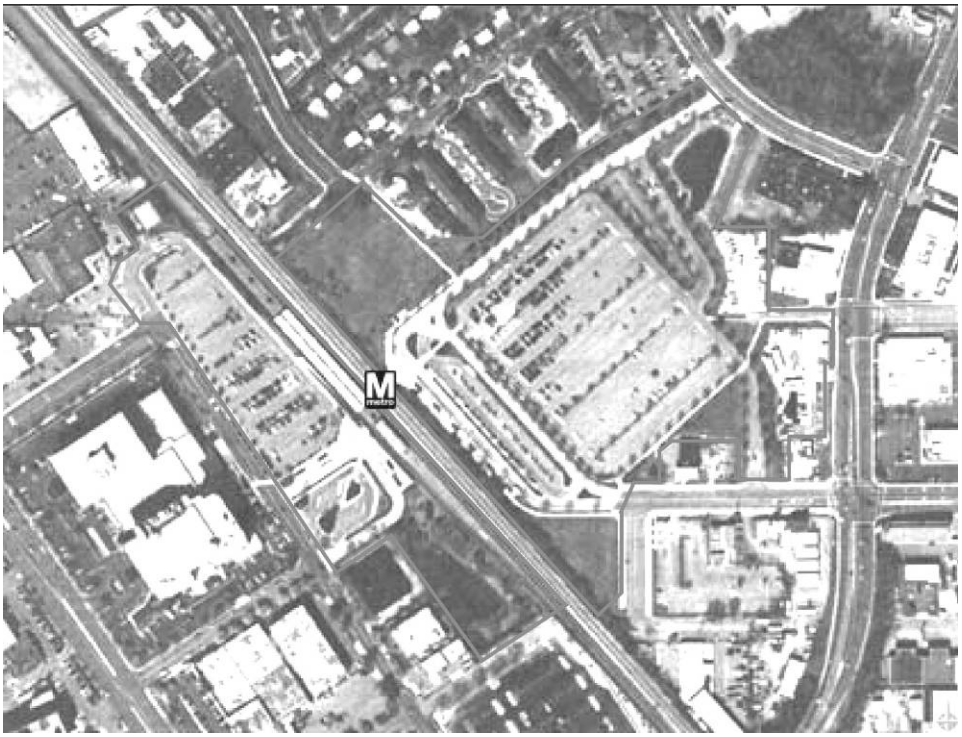


Figure 50 – Twinbrook Commons Existing Conditions
Pre-existing condition, park-and-ride lot to be converted into transit-oriented development. (Source: Torti Gallas and Partners)

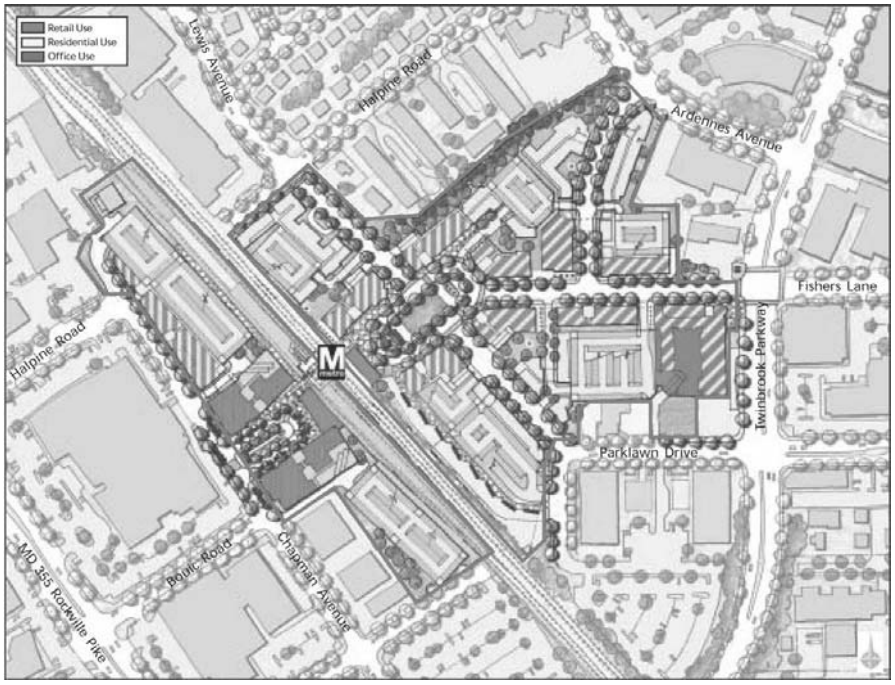


Figure 51 – Twinbrook Commons Proposed Land Use
Proposed land use and design for transit-oriented development at Twinbrook Metro Station. Twinbrook conscientiously strives for a mixed use development to foster a 24/7 environment. (Source: Torti Gallas and Partners)

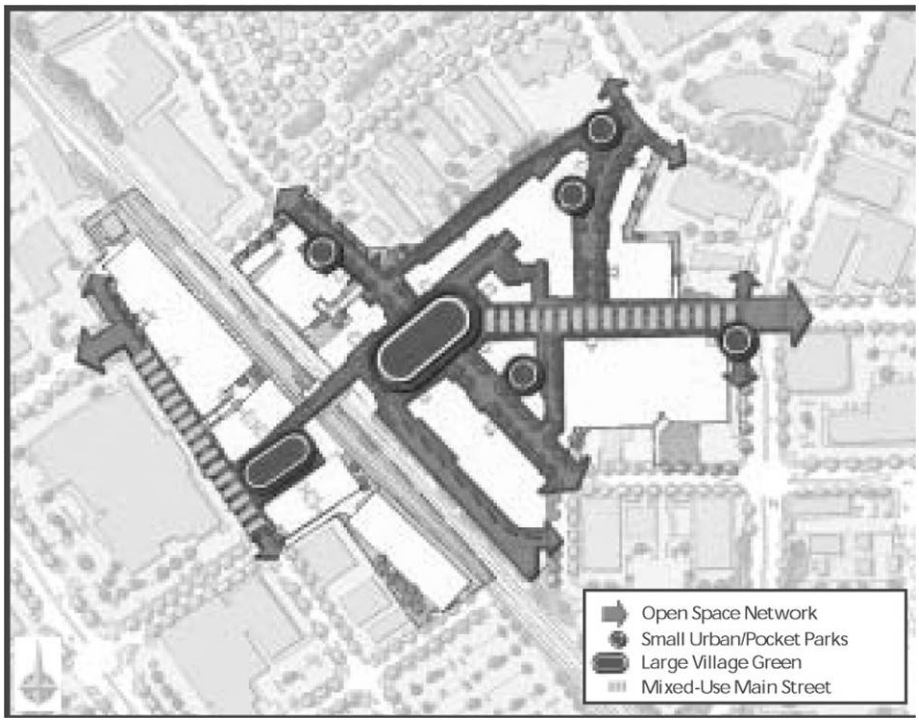


Figure 52 - Green/Open Spaces Connections at Twinbrook Commons
A series of smaller parks surround the main civic space and serve as green nodes within the development. The network of roads seeks to create multiple access points that work with the existing road network adjacent to the constrained site.
(Source: Torti Gallas and Partners)

Station Architecture Precedents: Individualism as Part of a System

Rotterdam Blaak – Rotterdam, The Netherlands

Key Components:

Location: Rotterdam, The Netherlands
Designer: Harry Reijnders
Typology: Interchange station between metro and rail lines; two levels below ground
Site: 1.7 acre urban square
Use: 2 metro rail lines located one level below ground; 4 rail lines perpendicular to metro located below
Special Features: Extensive daylighting; special noise reduction measures; wind speed/pressure mitigation

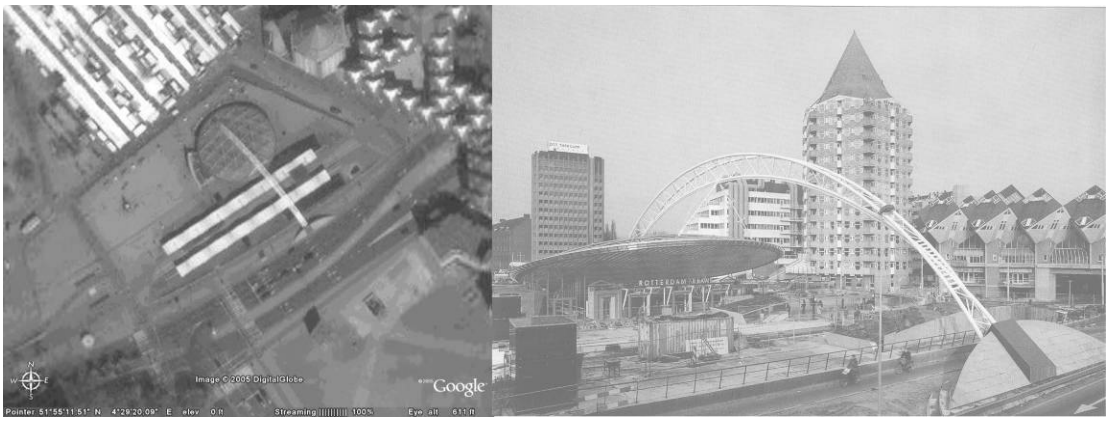


Figure 53 - The Station as an Urban Object in a Transit Square
This small scale metro rail station sits in an urban plaza, surrounded by dense development. The futuristic design and dramatic structure define a sense of movement often associated with transit stations.
(Source: Edwards)

Figure 54 – Blaak Station Scale Comparison
Blaak Station overlaid on corner of Sunset Hills Road and Wiehle Avenue, adjacent to RFP site.
(Source: Author and http://www.earth.google.com)

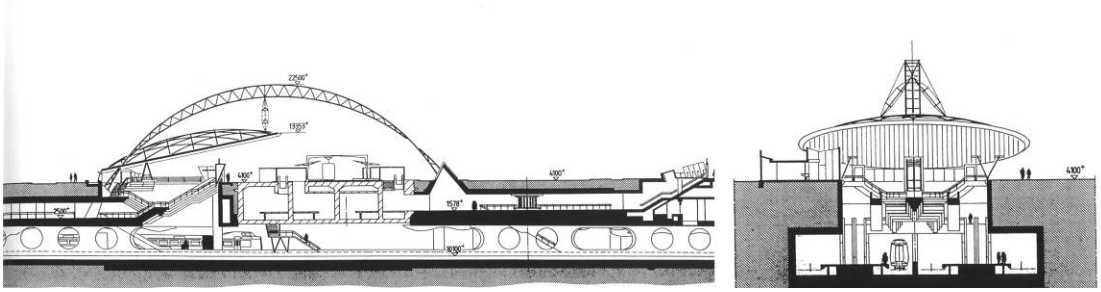


Figure 55 – Blaak Station Sections
Blaak Station sections showing layering of tracks below plaza. Blaak is an underground station servicing two train lines. One set of tracks resides on an upper level with side platforms, while the two sets of tracks, each with a central platform, servicing the other line on a lower level.
(Source: Edwards)

Twinbrook Commons – Rockville, Maryland

Mixed-Use Metro Station Development

Site: 1.35 Acres
Civic Uses: Transit Station
Parks: Transit Plaza
Retail: 39,400 sq.ft.
Commercial Office: 300,000 sq.ft.
Residential Units: 400 Units
WMATA Structured Parking
Residential/Office/Retail Structured Parking
Station Elements:

- -Park and Ride Spaces
- -Kiss and Ride Spaces
- -Bicycle/Motorcycle Parking Area
- -12 Bus Spaces
- -4 Taxi Spaces
- -Bus Staging Area
- -2 Station Entrances

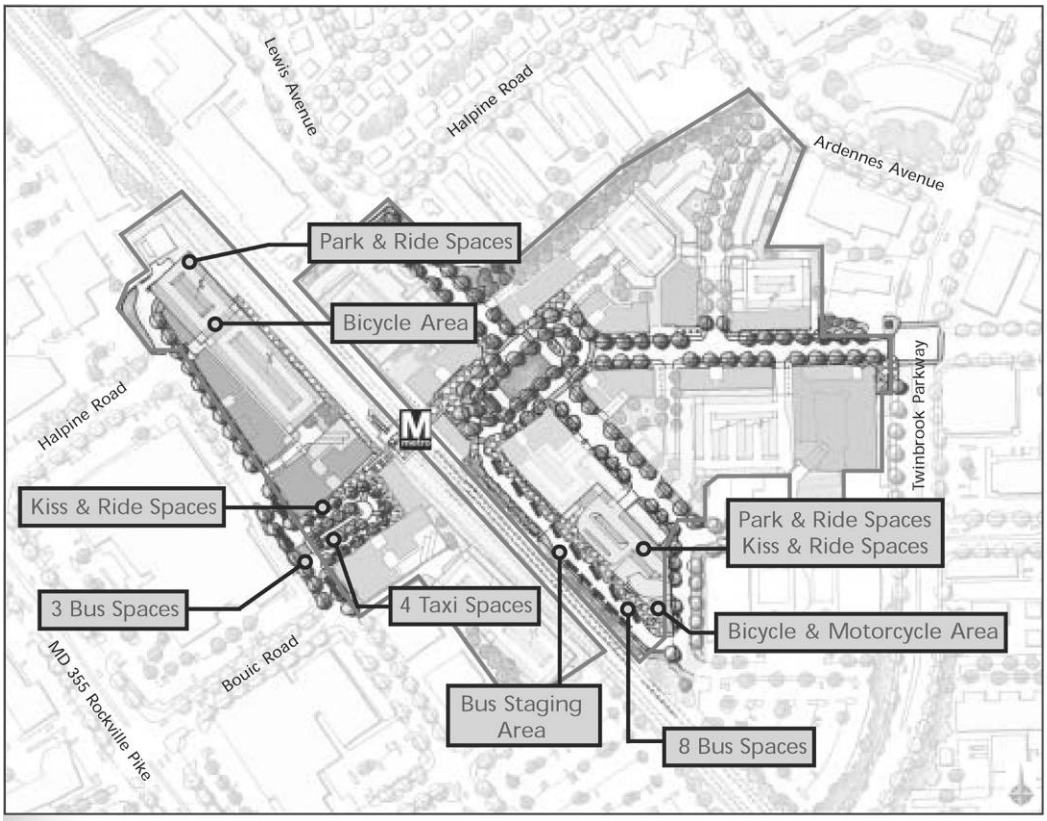


Figure 56 – Twinbrook Metro Transit Elements
Elements of Twinbrook Metro station, located on both sides of tracks. The station plan encourages multi-modal travel by providing access by car, bus, walking and bicycling.
(Source: Torti Gallas and Partners)

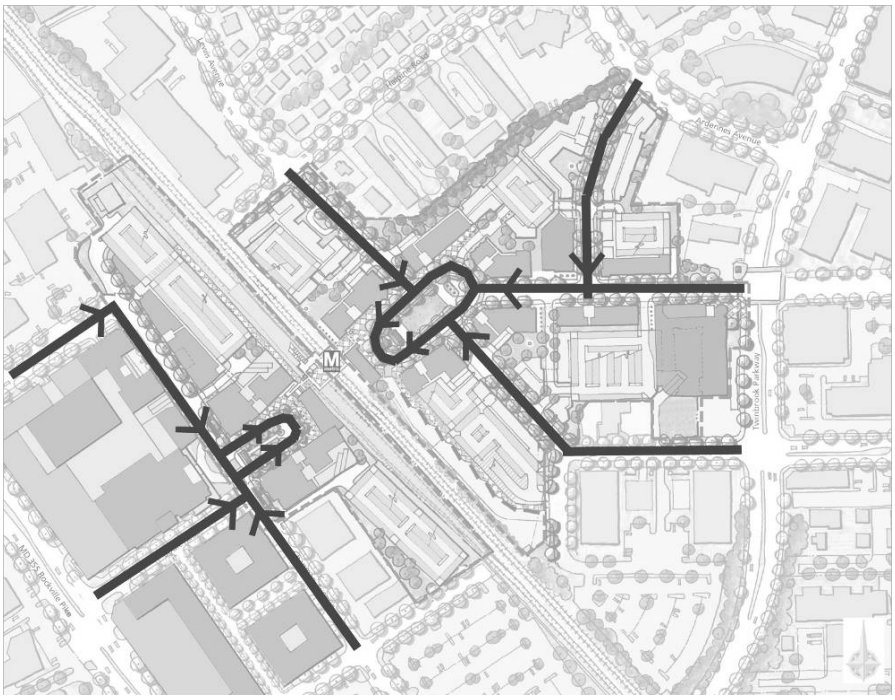


Figure 57 – Twinbrook Vehicular Access
Vehicular access routes through Twinbrook Commons to Metro station. The network of streets encourages arrival from several directions, hopefully lessening traffic issues.
(Source: Author and Torti Gallas and Partners)

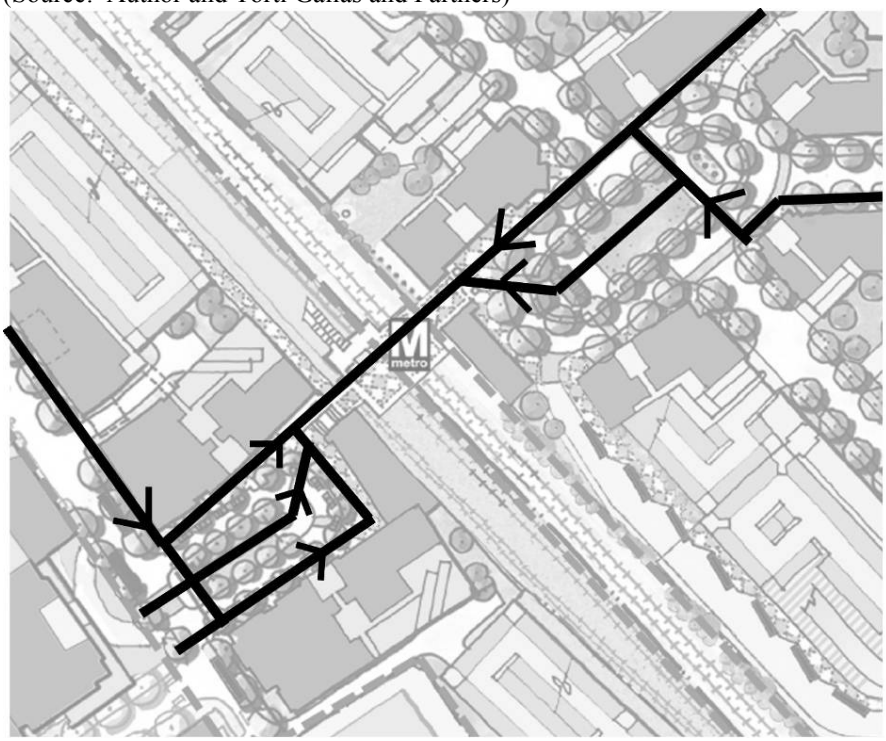


Figure 58 – Twinbrook Pedestrian Access
Pedestrian access routes to and through transit squares to Metro station. The inclusion of public greens of a modest scale in front of the station entrances encourages pedestrian approach without marginalizing the station.
(Source: Author and Torti Gallas and Partners)

Figure 59 – Twinbrook First Floor
First floor retail level of mixed-use building housing Metro entrance on southern side of tracks. Includes retail, cinema entrance, and parking. Mix of uses provides reasons for using metro other than just as a commuting source and increases liveliness of station area, making the station environment more friendly and safe.
(Source: Torti Gallas and Partners)

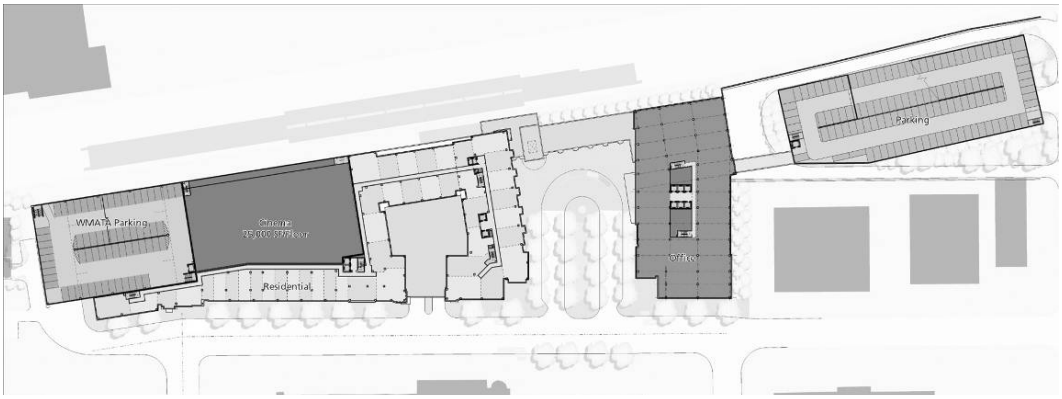


Figure 60 – Twinbrook Second Floor
Second level of mixed-use building housing Metro entrance on southern side of tracks. Includes cinema, offices, residential and parking. Mix of office and residential builds in potential captive audience for increasing metro rider-ship. This mix also suggests that different uses (residential, office) might increase the "split" of users, i.e. users both embarking and disembarking station at same time.
(Source: Torti Gallas and Partners)

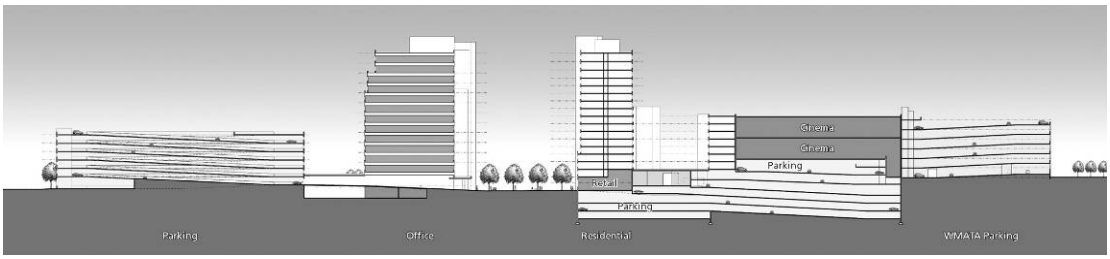


Figure 61 – Twinbrook Section
Section of mixed-use building housing Metro entrance on southern side of tracks, showing layered relationship of residential, office, retail and parking. This project provides a large amount of parking. Some TOD advocates suggest limiting parking immediately adjacent to stations to encourage multi-modal travel and transit use.
(Source: Torti Gallas and Partners)

Kowloon Station – Kowloon Hong Kong

Key Components:

Location: Adjacent to Chek Lap Kok Airport
Designer: Terry Farrell
Typology: Rail station connecting three train lines to airport terminal, coach, bus and road transport; master plan for site includes over 11 million sq. ft. of mixed-use residential, hotel, office and retail development
Site: 43 acres of reclaimed land
Building Size: 1,735,000 sq. ft.
Construction: reinforced concrete with structural steel roof; metal and glass cladding, with standing-seam steel roof

Figure 62 - Kowloon Station Entrance Level
The station design dramatizes the role of transit through dramatic architecture.
(Source: Edwards)

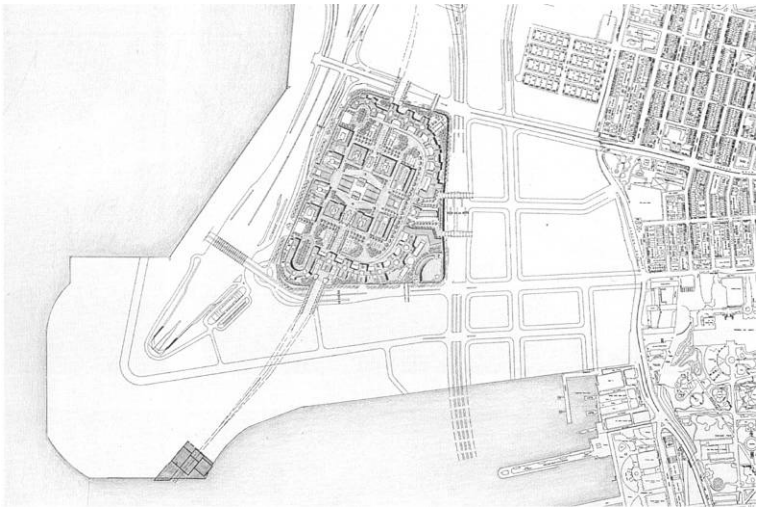


Figure 63 – Kowloon Site Plan
Urban plan of Kowloon Station development showing location on reclaimed peninsula. While the development itself appears very self-contained and set apart from the urban fabric, the plan reveals a framework of roads that can be developed back towards the urban grid.
(Source: Edwards)

Figure 64 – Kowloon Scale Comparison
Aerial photo of Kowloon Station development overlaid on Wiehle Avenue site for scale comparison.
(Source: Author and http://www.earth.google.com)

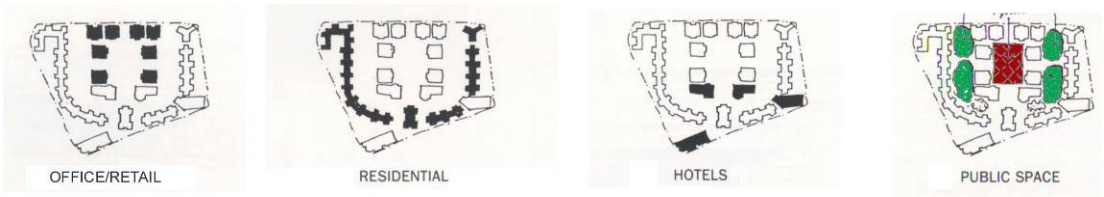


Figure 65 - Land Uses in Kowloon Station Development
While the plan separates uses, it does so in a fairly tight zone, making the site, if not the buildings themselves, mixed-use. The station element sits in the center of the development.
(Source: Author and Edwards)

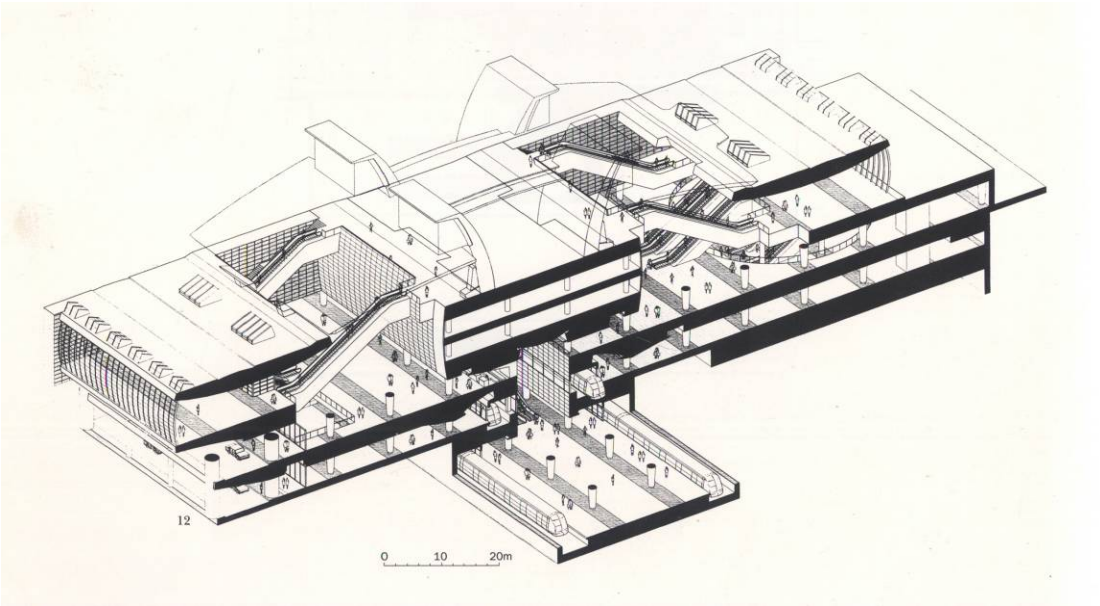


Figure 66 – Kowloon Sectional Axonometric
Sectional axonometric of station showing layering of transportation elements. The station provides a complex program that includes a rail and bus link to the Kowloon airport as well as an airport check-in area.
(Source: Edwards)

Chapter 5: Proposing a Transit Oriented Development of the Area Surrounding the Proposed Wiehle Avenue Metrorail Station

The Station as a Civic Presence

Metrorail Station Program

The following program assumes an underground station, which requires significant area for ventilation.

FUNCTIONAL PROGRAM ANALYSIS

Platform Tunnel	length	width	sq. ft.	total
Single Platform	600	30	18000	18000
2 Train Lines	600	15	9000	18000
Total Sq.Ft.				36000
Mezzanine Circulation				
Peak 15 Minute Passengers				816
Square Feet Per Passenger				10
Total Sq.Ft.				8160
Ancillary Space Program		sq. ft.	rooms	total
Station Electrical Services				
Electrical Distribution		900	2	1800
Collector Bus Room		420	2	840
UPS/Battery Room		260	2	520
Tunnel Lighting		80	2	160
Total Sq. Ft. SES				3320
Traction Power				
Control Room		200		200
Power Room 1		2000		2000
Power Room 2		2600		2600
Power Room 3		4000		4000
Total Sq. Ft. TP				8800
Signals				
Signal Room 1		1200		1200
Signal Room 2		320		320
Total Sq. Ft. Signal				1520
Station Operations				
Station CTA		100		100
Station Dry Storage		100		100
Station Chemical Storage		100		100
Refuse Storage		100		100

Scrubber	100	2	200
Total Sq. Ft. Station Ops			600
Station Exhaust			
Exhaust Room	1200	2	2400
Total Sq. Ft. Station Exhaust			2400
Station Ventilation			
Chiller Rooms	2600	2	5200
Total Sq. Ft. Station Ventilation			5200
Tunnel Ventilation			
Ventilation Room	4900	2	9800
Vent Blast Shaft	2000	2	9800
Total Sq. Ft. Tunnel Ventilation			19600
Plumbing and Fire Protection			
Ejector Rooms	300	2	600
Pump Room	240		240
Sprinkler Valve	120		120
Toilet Unisex	40	2	80
Toilet Public	90	2	80
Total Sq. Ft. Plumbing & Fire			1120
Maintenance			
Ladder/Lift Storage	200		200
Lamps & Ballast	200		200
Supplies & Equipment	100		100
Total Sq. Ft. Maintenance			500
Communications			
Communication Room	800		800
Public Telephone Equip.	100		100
Comm. Wireless Telephone	100		100
Total Sq. Ft. Communications			1000
Security and Control			
Station Service Centers	120	2	240
Emergency Management	100		100
Total Sq. Ft. Security & Control			340
Total Ancillary Space Program			**44400**

FUNCTIONAL PROGRAM TOTAL **88560**

Additional RFP Elements

2300 Park & Ride and 46 Kiss & Ride Spaces
17 Revenue Buss Bays and 3 Layover Bus Bays
16 Covered Bicycle Racks & 16 Bicycle Lockers

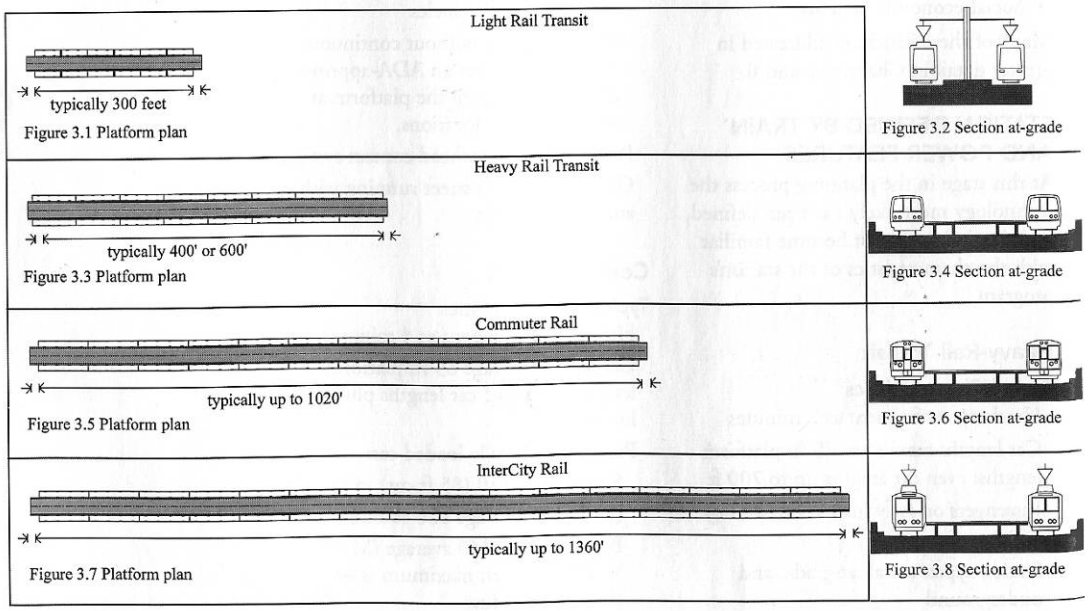


Figure 67 -Typical Platform Lengths for Various Transit Types
WMATA metrorail stations have a 600 foot platform to accommodate 8 car trains. A central platform for those tracks is generally 30 feet wide.
(Source: Griffin, p. 64)

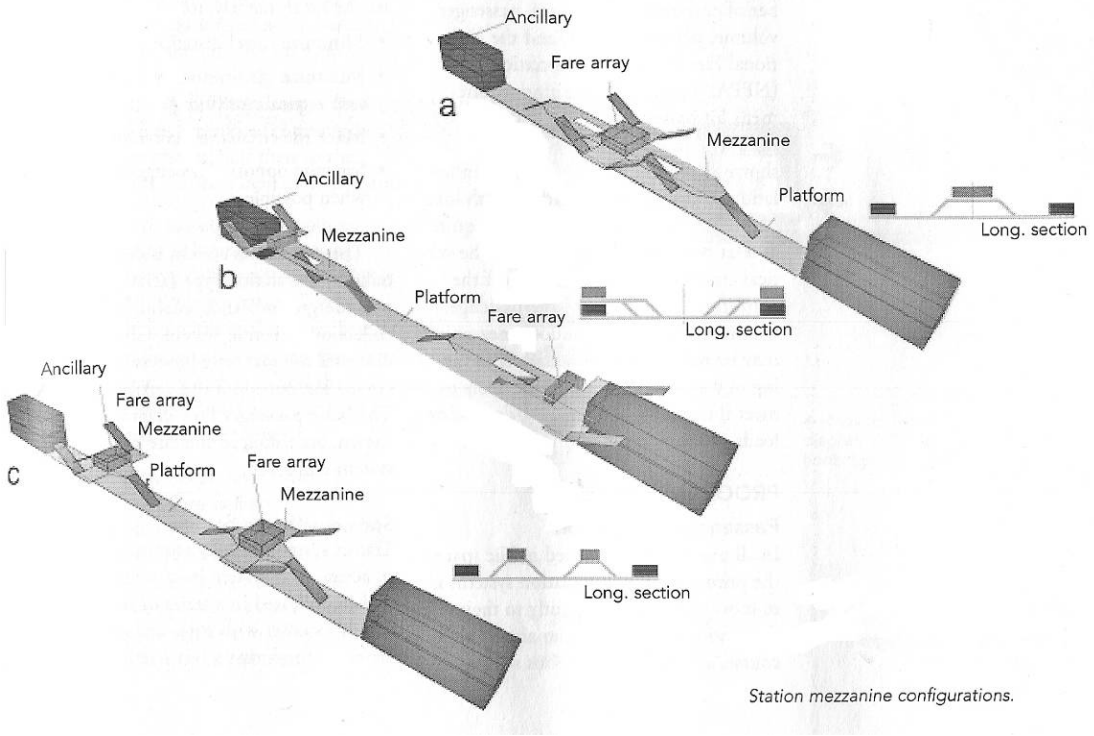


Figure 68 - Major Program Zones Diagram
Assumes either an underground or at grade station with entry mezzanines above the platform. Vertical circulation between the entry mezzanine and tracks is usually very simple. Central platforms are usually service by two or more sets of stairs flanked by escalators. Some side platform stations only have escalators. In addition, stations must also have at least one elevator for handicap access. This elevator must go up to outside ground level for access to underground stations.
(Source: Griffin, p. 75)

Transit Station Typologies

Three general typologies of transit stations exist: At-Grade, Raised, and Underground. These typologies refer to the physical location of the tracks. Each type can be configured in several variations and with differing means of accessing the tracks. Additionally, a single station, if servicing multiple lines, might include more than one typology of track configuration.

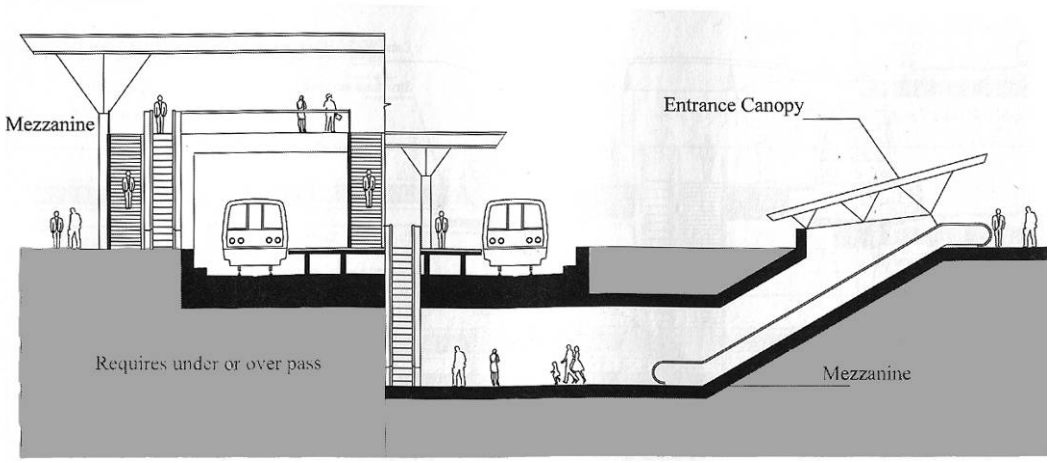


Figure 69 - At-Grade Tracks with Overpass and Underpass Entries
A central platform requires that the tracks be accessed from below or above regardless from which side a passenger approaches. Side platforms can also be utilized and may be accessed directly if approached from the correct side, an overpass or underpass must still be utilized to access the opposite side of the tracks. Side platforms require more space than a single central platform because the minimum width of a single platform is more that half of the width of a single platform.
(Source: Griffin, p. 66)

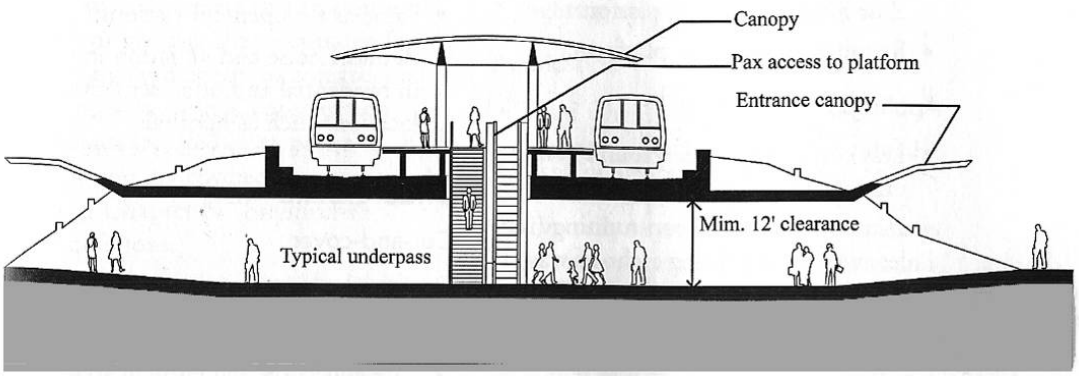


Figure 70 - At-Grade Tracks Built on Fill with Double-Underpass Access
This configuration can also be used with side platforms.
(Source: Griffin, p. 67)

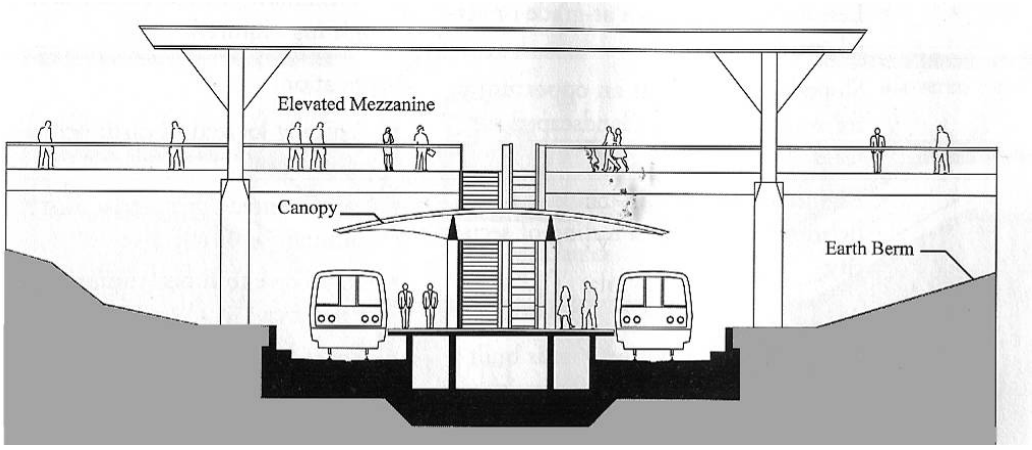


Figure 71 - At-Grade Tracks Built with Bridge Overpass Access
This configuration can also be used with side platforms and is the most likely configuration given the present right-of-way for the metro extension. The current schematic plan for the Wiehle Avenue transit station (See Figure 23) shows a main entry on the north side of the Dulles Toll Road/Airport Access Road and a secondary entrance on the south side. A bridge element spans from both sides (which have a spot elevation approximately 20 feet higher that the road bed) to a central platform and tracks running between the two halves of the Access Road.
(Source: Griffin, p. 67)

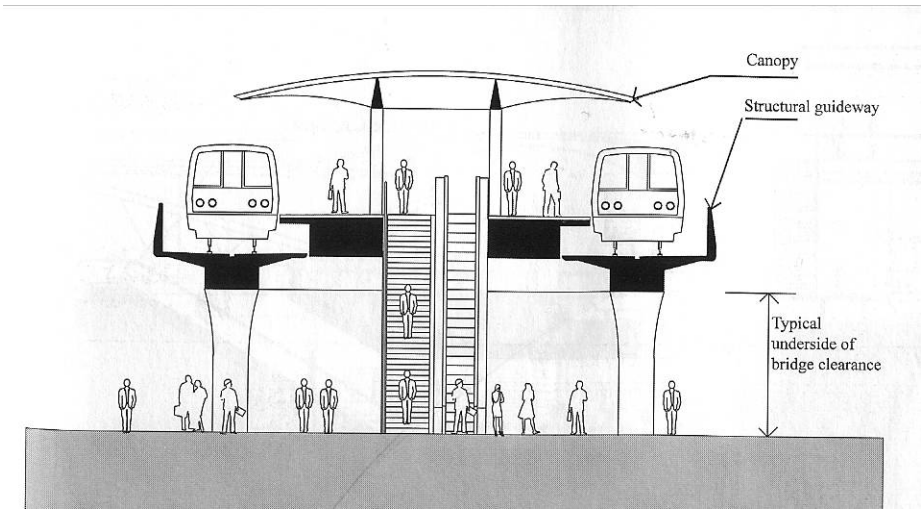
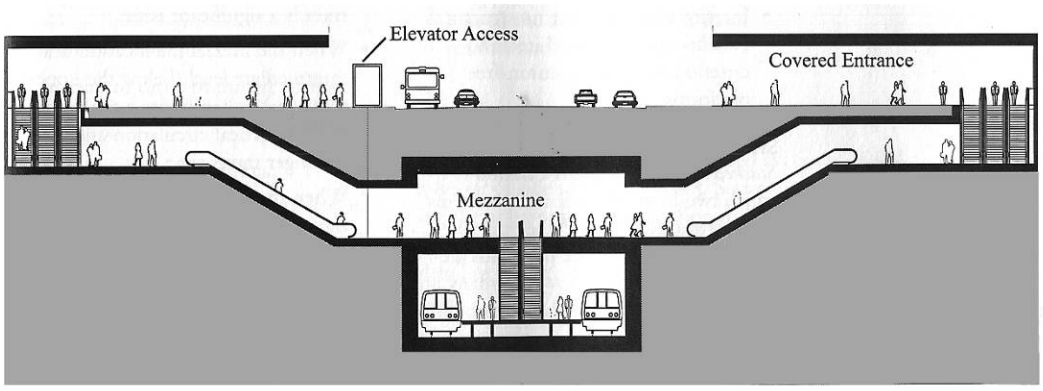
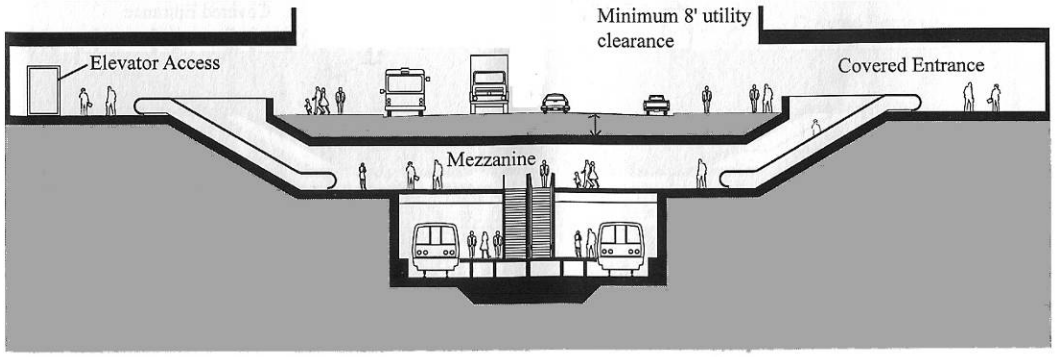


Figure 72 - Raised Platform Tracks

This type of configuration, which can also be used with side platforms, might be utilized in order to bring the transit line to the same level as the land on either side of the Toll Road/Access Road. Difficulties would be encountered in getting passengers under the tracks and back up to the platform in the narrow area available in the right-of-way.
(Source: Griffin, p. 65)





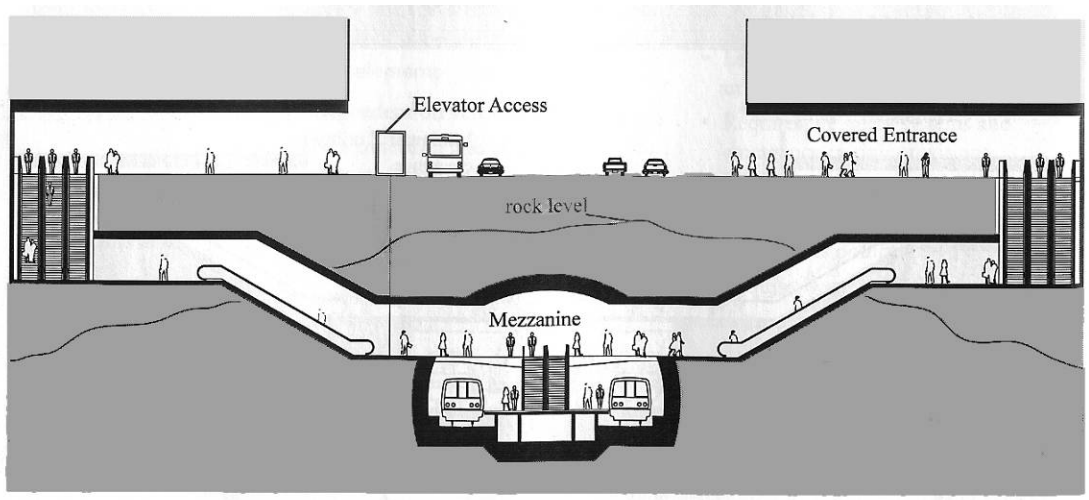


Figure 73 - Various Configurations for Underground Track Stations
While an underground station would not be utilized if the existing right-of-way alignment is used, such a station might be considered as a method for re-aligning the stations to capture more developable land for the TOD (See, Figure 39, Chapter 2, above).
(Source: Griffin, pp. 69-71)

Urban Design Interventions: Creating a Center of Gravity

The urban strategies pre-suppose acquirement of significant additional lands to support the TOD. The areas addressed include approximately 76 acres, around 4.5 times the initial 17 acres proposed for use in the RFP. This is achieved by assuming that the low quality single story developments immediately surrounding the site and to the north on Isaac Newton Square, can be acquired over time. The general proposal would include a mixed use development with higher density residential, office and commercial to the south of Sunset Hills Road and more medium density residential and neighborhood retail to the north.

Standard Alignment Strategies

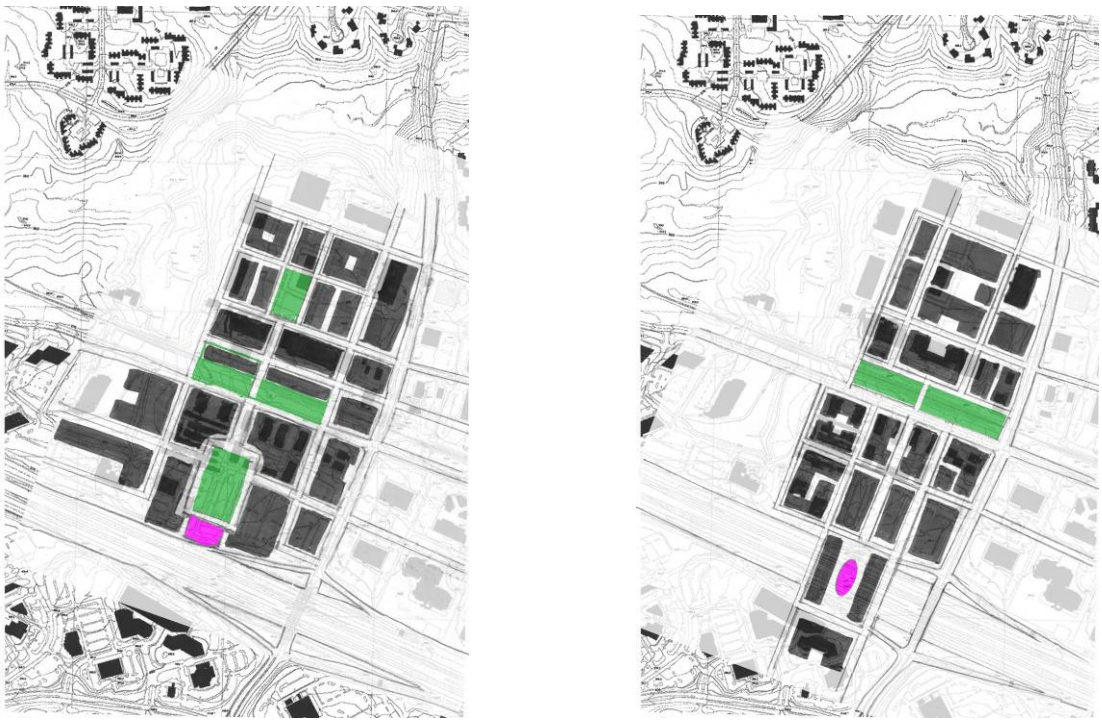


Figure 74 – Standard Alignment Urban Design Strategies
Urban Design Strategies with station utilizing existing right-of-way alignment down center of Dulles Access Road. The first strategy places a station at the end of a civic green and immediately adjacent to the Dulles Toll Road/Airport Access Road. The station could be a stand-alone building or part of a larger building. The station square is connected visually and physically by an avenue running perpendicular to the face of the station and to a residential square A bridge would take riders to a mezzanine over a central track platform running at-grade down the right-of way. The tracks could also be raised to the level of the station, which is approximately 20 feet above the road bed, but this would require side platforms and some form of underpass to get to the far side of the tracks. The second strategy proposes creating a plaza with buildings spanning across the Dulles Toll Road/Airport Access Road and placing the metro station at the center of this plaza. This plaza would provide a literal and figurative bridge between the northern and southern halves of Reston and connect the developments on the south side of the Toll Road to the TOD.
(Source: Author, map courtesy of Fairfax County)

Realignment Strategies

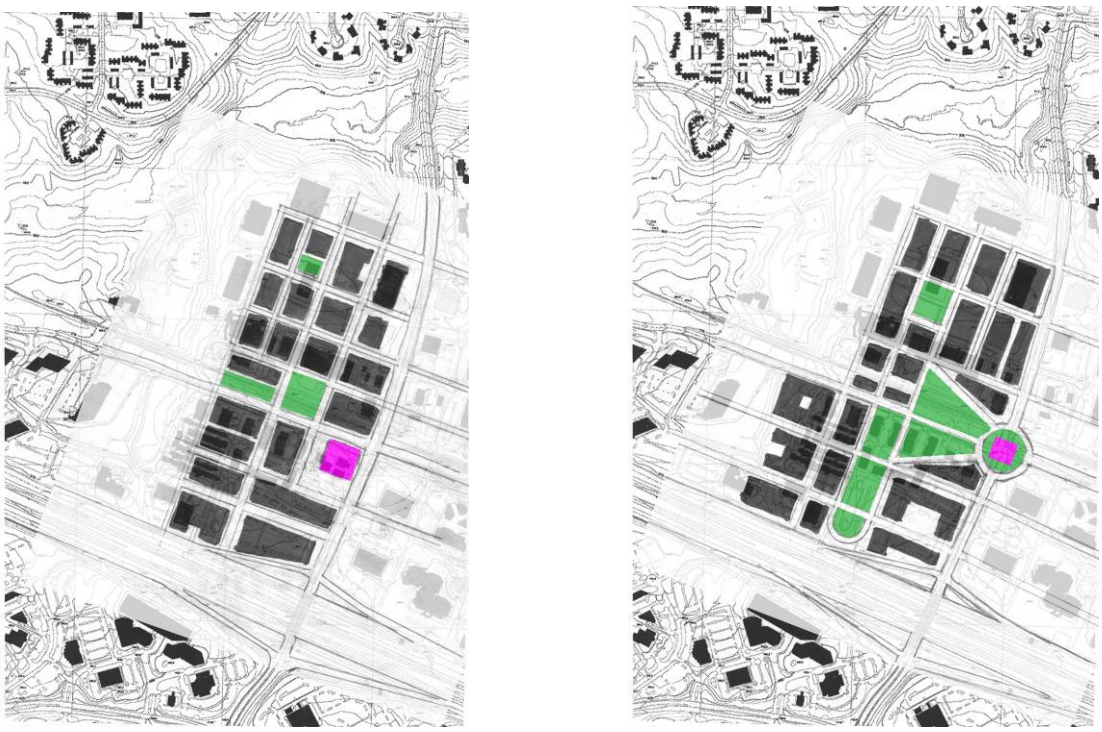


Figure 75 – Realignment Urban Design Strategies
Urban design strategies proposing a realignment of the tracks to run underneath Sunset Hills Road. The first strategy places the station entrance at the corner of Sunset Hills Road and Wiehle Avenue. The station could either a separate building, or more likely part of a larger complex. Additionally, the station could be merely an entrance with the mezzanine located below grade and entrances could happen at all 4 points of the intersection. The second strategy looks at the station as more of an object building that would sit in a plaza that would interrupt Wiehle Avenue. This begins to address the idea of modifying Wiehle Avenue to tame traffic and make it into a boulevard, as opposed to an arterial street. This strategy also looks at connecting the station to the surrounding development through a series of figural green spaces.
(Source: Author, map courtesy of Fairfax County)

Conceptual Design Studies

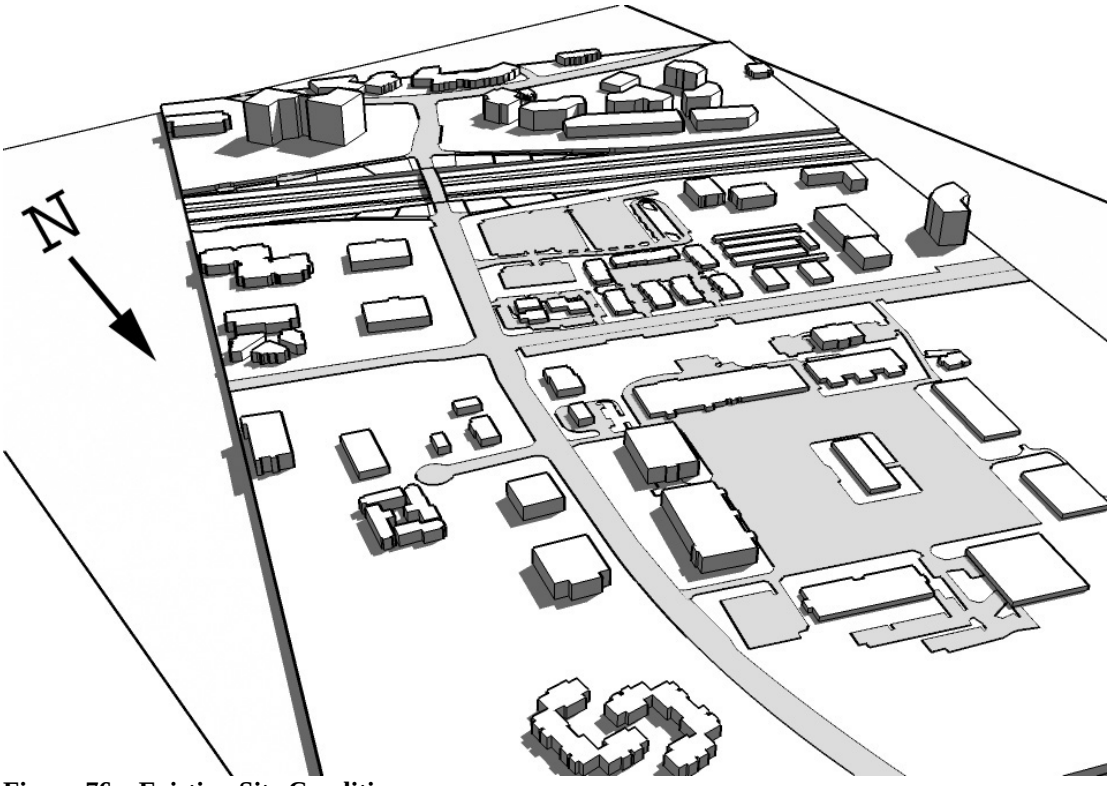


Figure 76 – Existing Site Conditions
This aerial perspective highlights the low scale and low density development that currently exists at the site and the surrounding area.
(Source: Author)

The Station as an Urban Object

Treating the station as an object building serves to highlight the importance of transit and give the station a civic presence that it presently lacks in its usual suburban manifestation. In the sense used here, the "object" building does not define itself as being inconsiderate of context, but rather one that acts as a stand-alone structure. The building might still have a mixture of uses, but should be of a scale that highlights its main use as a transit center.

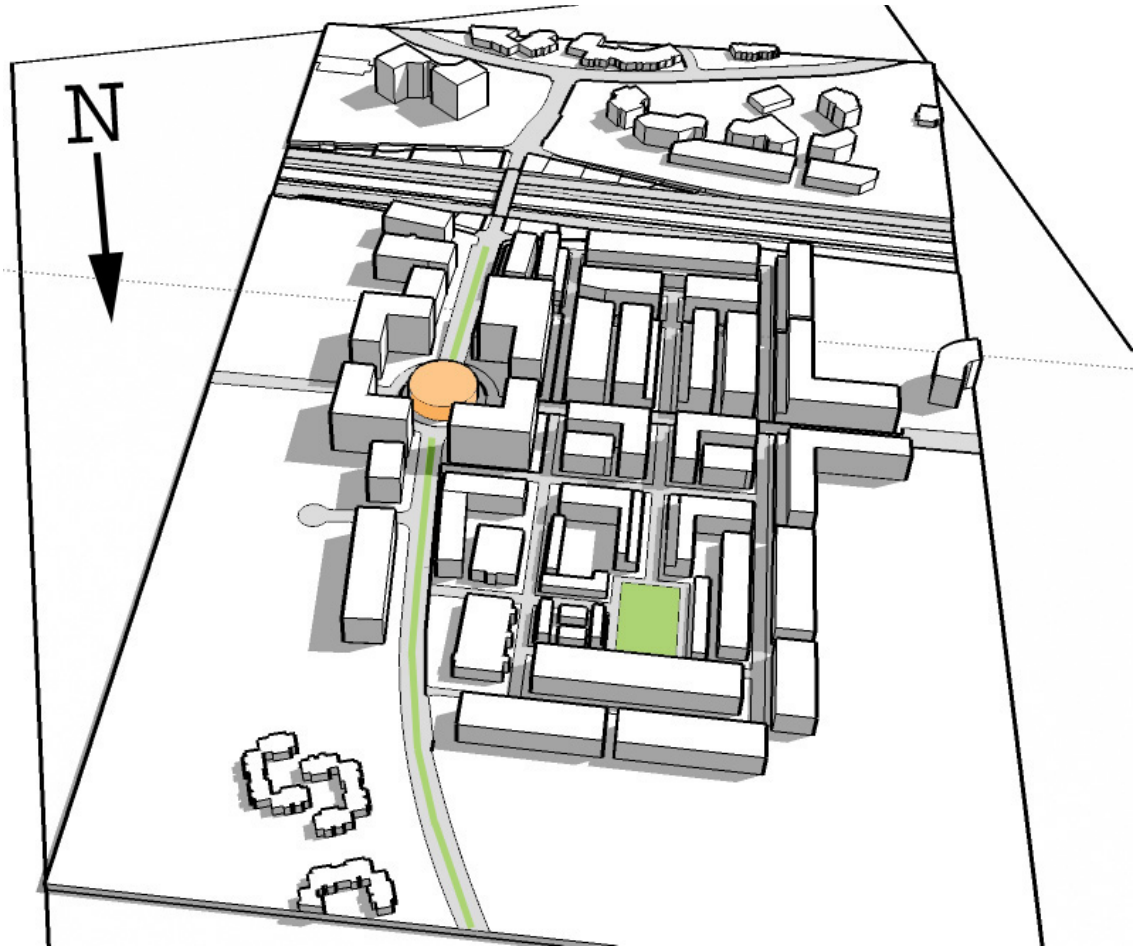


Figure 77 - The Urban Object
This aerial perspective shows the station conceived as an object building in a round plaza at the conjunction of Wiehle Avenue and Sunset Hills Road. This scheme requires a realignment of the metrorail tracks and the creation of an underground route for the tracks. By placing the station at the confluence of these two streets and reconceiving Wiehle Avenue as an urban boulevard, the scheme creates a "100% corner" to serve as a center of gravity for extending private TOD outside of the two areas identified for development in this thesis. The station also acts as a visual marker of this center for motorists on either Wiehle Ave. or Sunset Hills Road. The two areas identified for development as part of this thesis, the zones south and north of Sunset Hills Road on the west side of Wiehle Avenue, provide mixed-use commercial, office and residential buildings at a density significantly higher that typically found in the suburbs. The area south of Sunset Hills Road receives 6-10 story buildings with a heavier weight towards office development. The area to the north functions as a slightly less dense and mainly residential zone with buildings of 4-6 stories and a residential square. The entire area is serviced by structured parking.
(Source: Author)

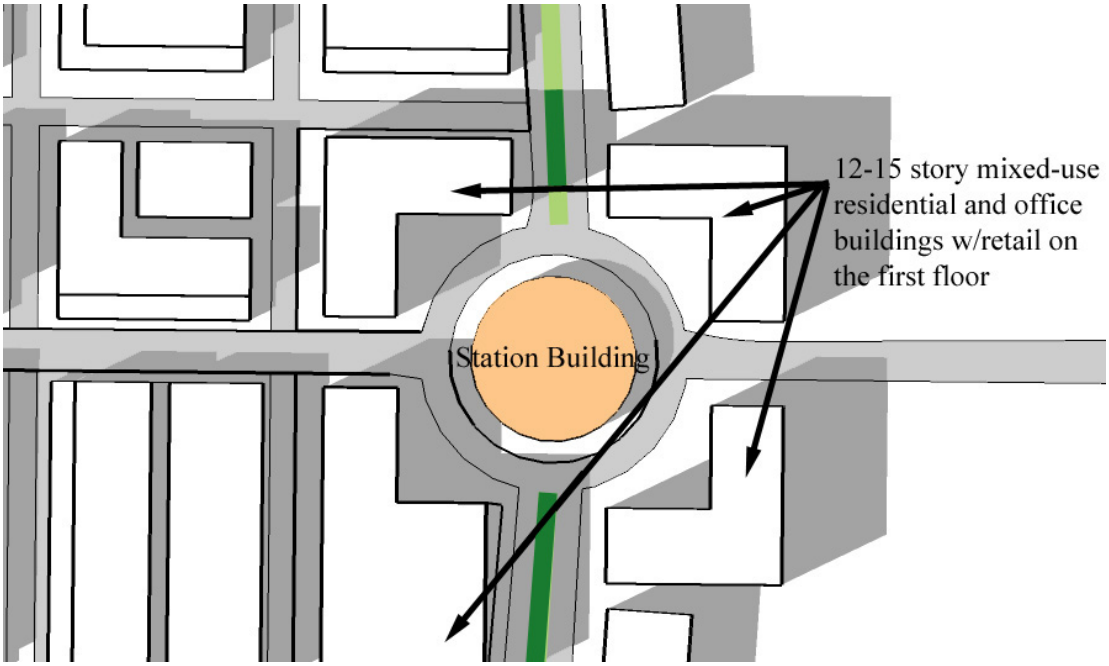


Figure 78 – Urban Object Schematic Plan
The station stands as an object surrounded by four buildings of a higher height than the surrounding neighborhood. The higher density in the surrounding buildings provides a larger pool for transit use immediately adjacent to the station and to highlight this intersection as a center for the area. This scheme could also be developed, in a manner similar to Dupont Circle in Washington, D.C., with a plaza in the center and station entrances at the buildings surrounding the circle.
(Source: Author)

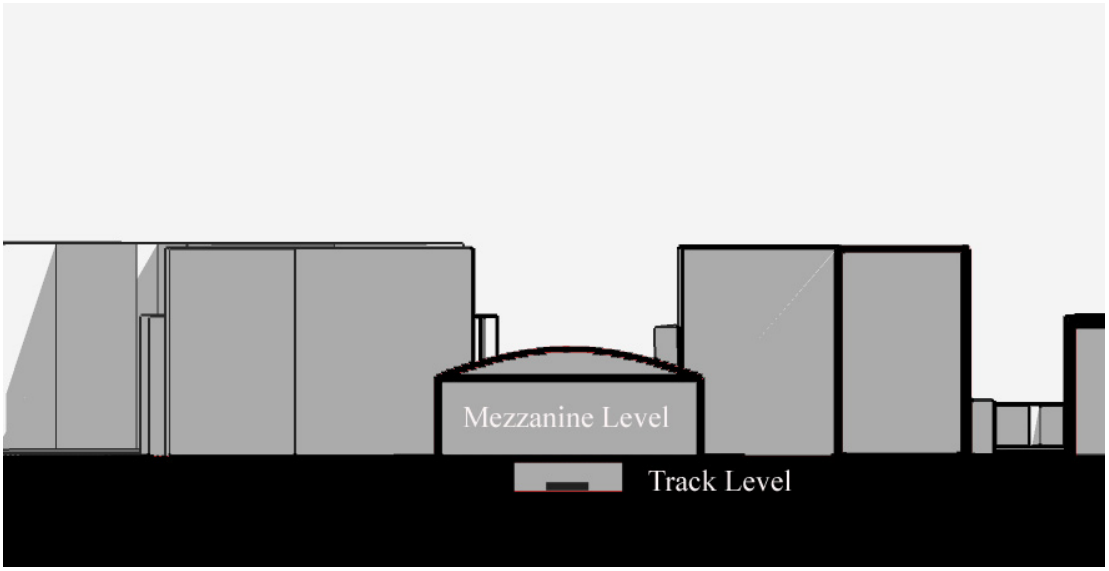


Figure 79 – Urban Object Section through Station
At its most basic, the station provides a mezzanine level with fare arrays, and information booth and ancillary spaces. The track level contains the tracks, the platform, and ancillary spaces.
(Source: Author)

The Station as a Mixed-Use Project

Treating the station as a subsidiary part of a larger mixed-use project creates a role for the station as part of the urban fabric and adds to the transit orientation, as opposed to just transit adjacency. The station can still be imbued with civic presence by placing it in a mixed-use building at a slightly larger scale and presence in the TOD project. Thus, the entire building, rather than just the station can act as a focal point for the entire development. The retail at this building would want to be of a particular draw to the community and might include restaurants, a large bookstore, or a movie theater. Further, creating a figural element within the building design that gives hierarchy to the transit entrance can also emphasize the civic nature of the station.

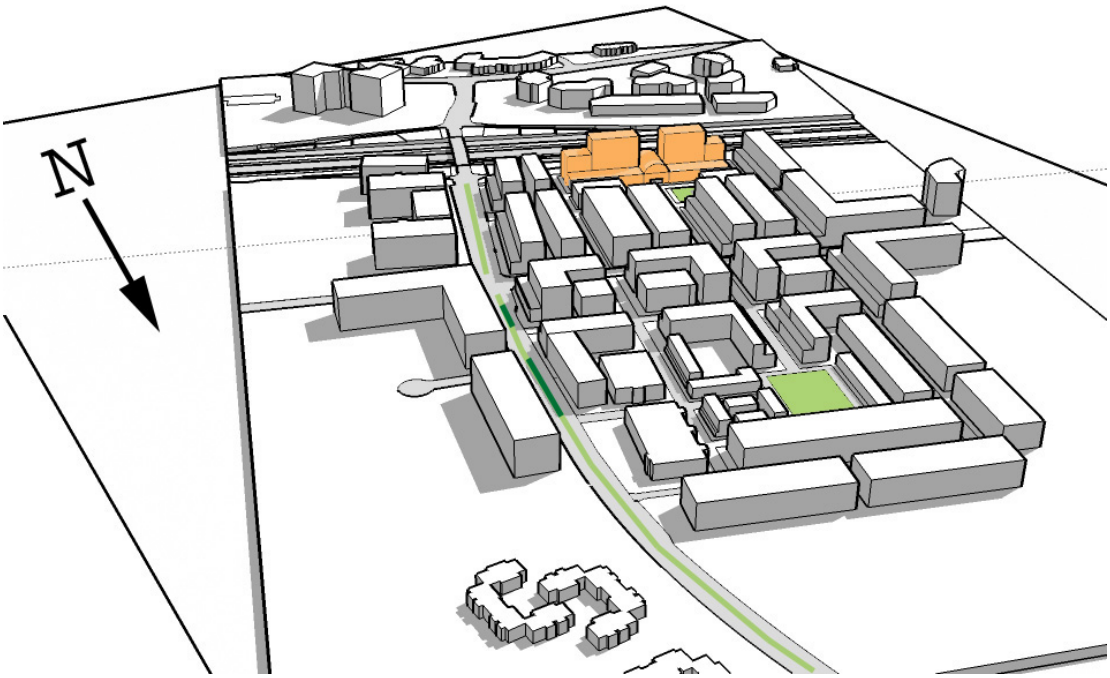


Figure 80 - The Mixed-Use Project
This aerial perspective shows the station conceived as part of a large 12-17 story mixed-use project. The project would contain retail on the ground floor as well as the transit station mezzanine level. The two towers would contain both office and residential uses, either stacked vertically in each tower or separated between the two towers. The project would set at the end of a new boulevard running the length and down the center of the TOD project. An urban square surrounded by buildings with first

floor retail/restaurant uses would front the transit project building and a residential square would terminate the opposite end of the new neighborhood boulevard. As in the previous scheme, areas to the north of Sunset Hills would be predominantly residential while areas to the south would be a mix of office and residential. Both areas would be serviced by structured parking. This scheme does not require any realignment of the track right-of-way and a bridge would lead from the rear of the mixed use building to access the platform and tracks running down the center of the Dulles Toll Road/Airport Access Road.
(Source: Author)

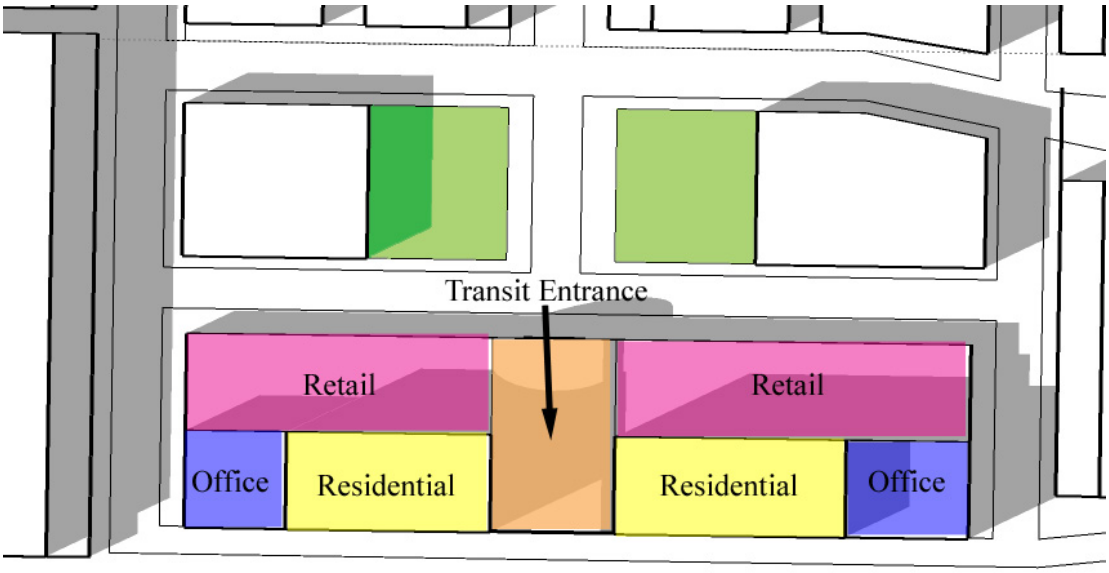


Figure 81 – Mixed Use Schematic Plan
Representing location of uses.
(Source: Author)

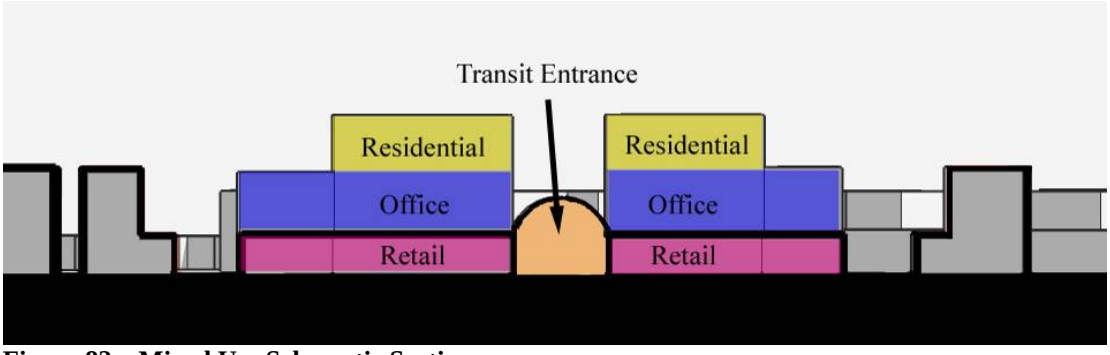


Figure 82 – Mixed Use Schematic Section
Showing vertical mixing of uses.
(Source: Author)

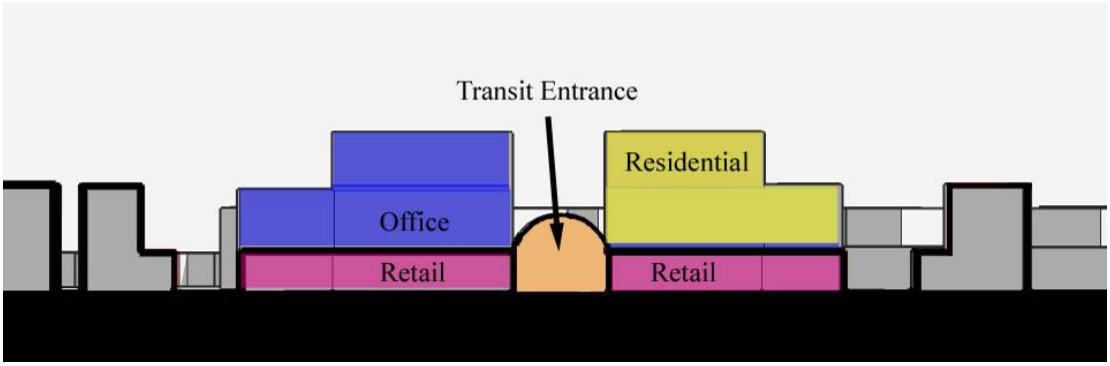


Figure 83 – Mixed Use Schematic Section
Showing horizontal mixing of uses.
(Source: Author)

The Station as Bridge

Treating the station as a bridge seeks to literally bridge the void created between northern and southern Reston by the Dulles Toll Road/Airport Access Road. The success of the bridging is predicated on including a mix of uses, not just a station element, on this bridge. This mix of uses encourages use of the bridge as a civic space and a transfer of people between the two sides. Creating this crossing effectively captures additional "land" and TOD is encouraged on the southern side of the thruway.

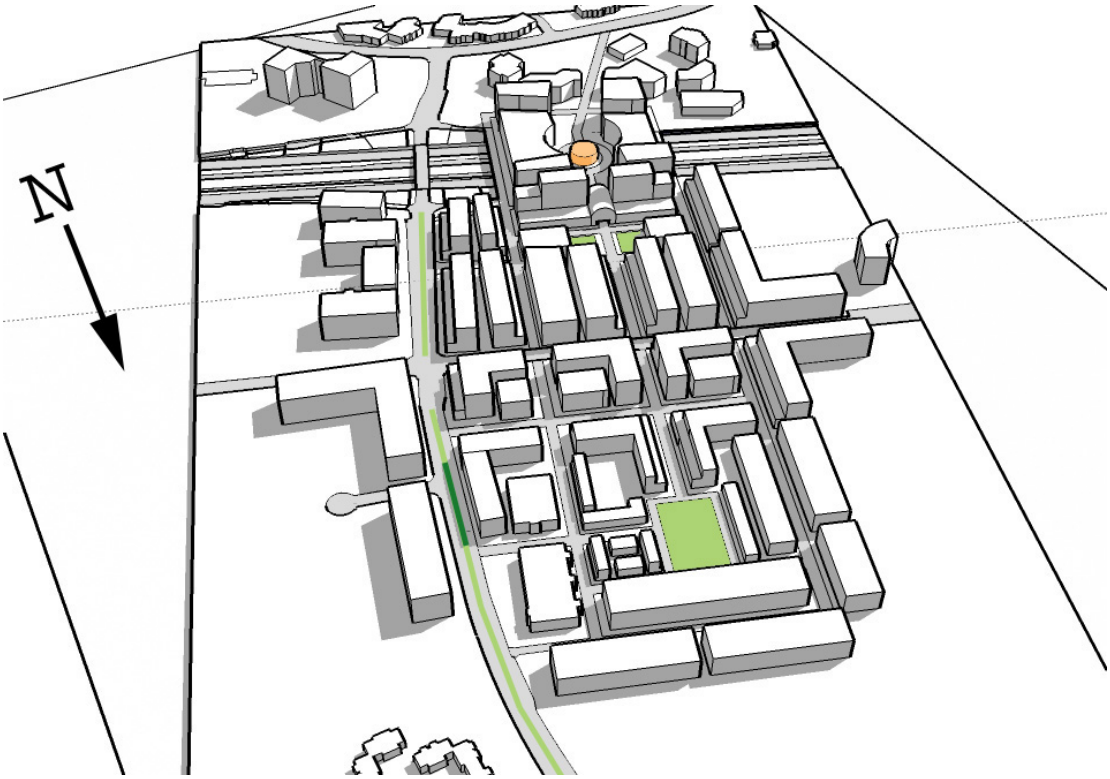


Figure 84 - The Urban Bridge
The TOD follows a similar development strategy to the last project, with an internal boulevard connecting the northern residential-oriented zone with the southern commercial/office/residential zone. A large mixed-use project still terminates the southern end of the boulevard, although the plan could also be developed without the central piece. The bridge element is conceived as mainly a pedestrian plaza flanked by buildings and centered by a transit station, but vehicular routes would also be included to increase the points for crossing over the Toll Road.
(Source: Author)

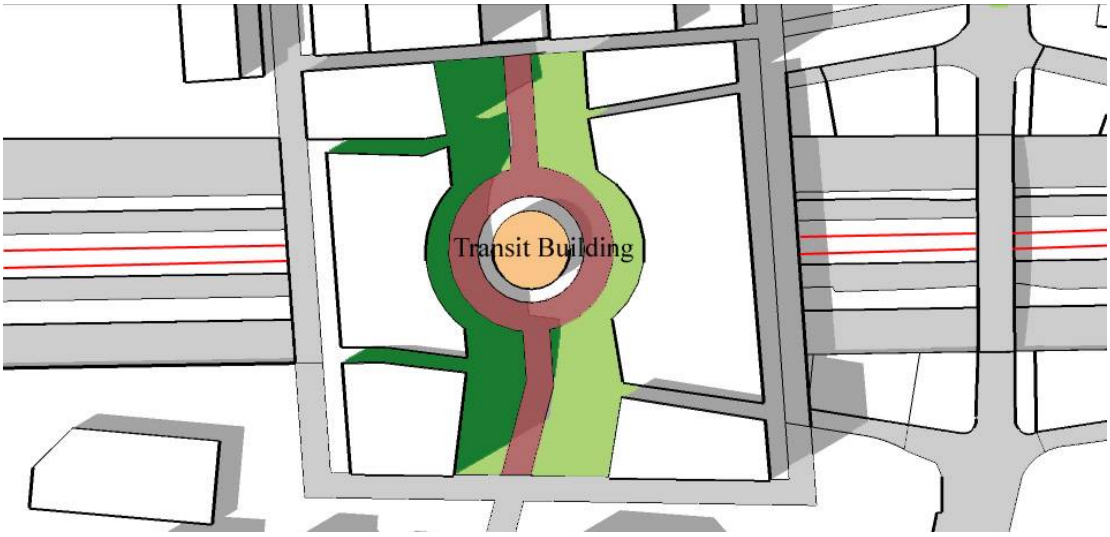


Figure 85 - Urban Bridge Plan
The station would be surrounded by mixed use buildings but, given the location above the Toll Road, the uses would more likely be office, entertainment and retail.
(Source: Author)

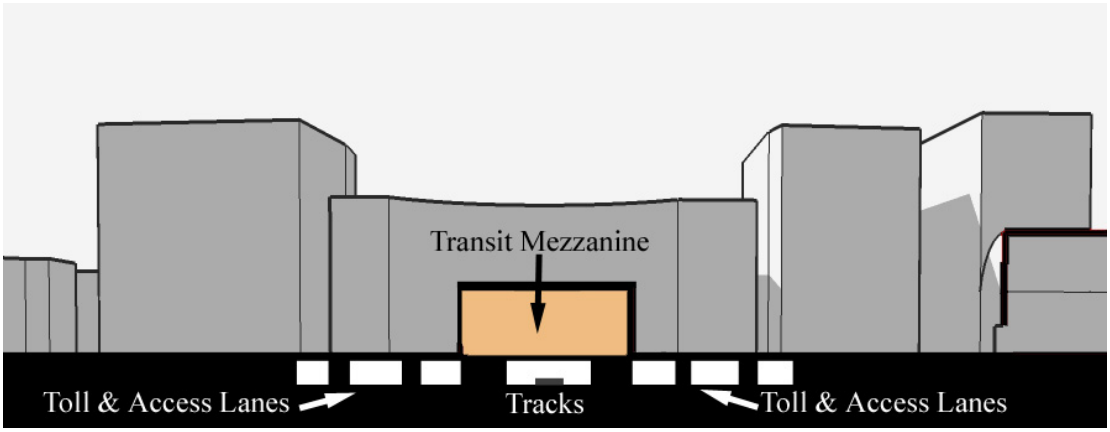


Figure 86 - Urban Bridge Section
This north-south section shows the bridge spanning over the roadway and tracks.
(Source: Author)

Chapter 6: Final Design – Creating Value through Siting and Design

Final Design Drawings

Regional Intervention

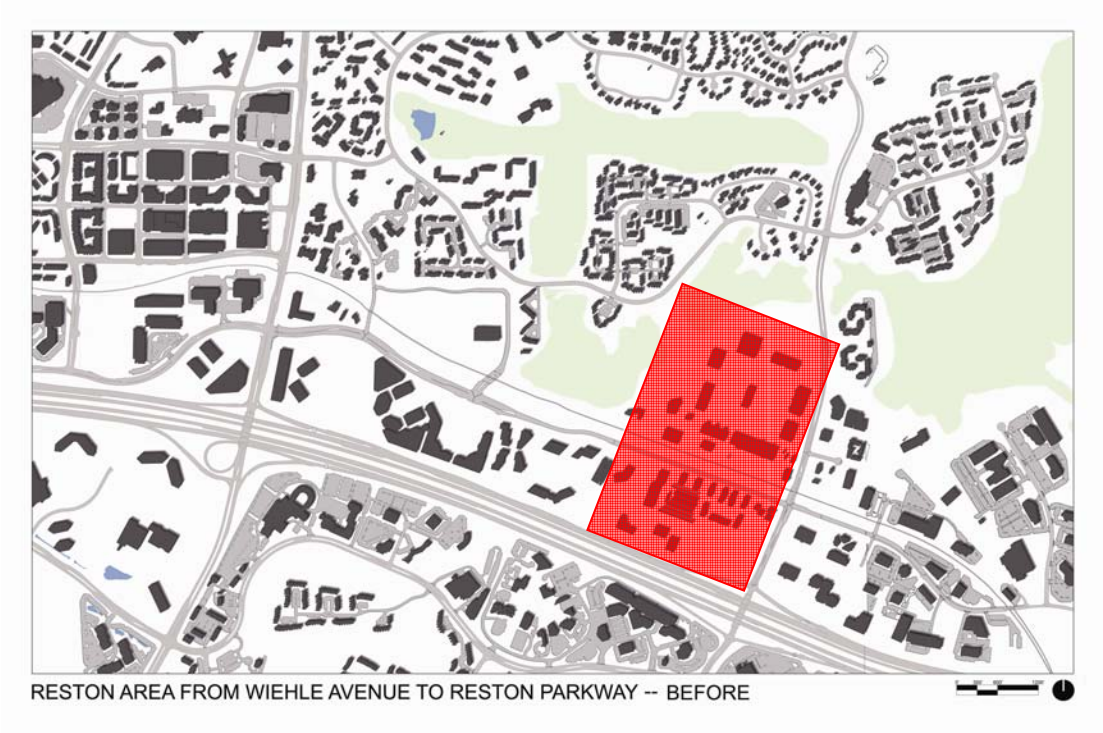


Figure 87 - Figure Ground Diagram of Existing Conditions in Reston Area
During the course of the design development exploration, the area of intervention expanded to include approximately 132 acres circumscribed within the red box in the diagram above.
(Source: Author and Fairfax County Department of Planning and Zoning)

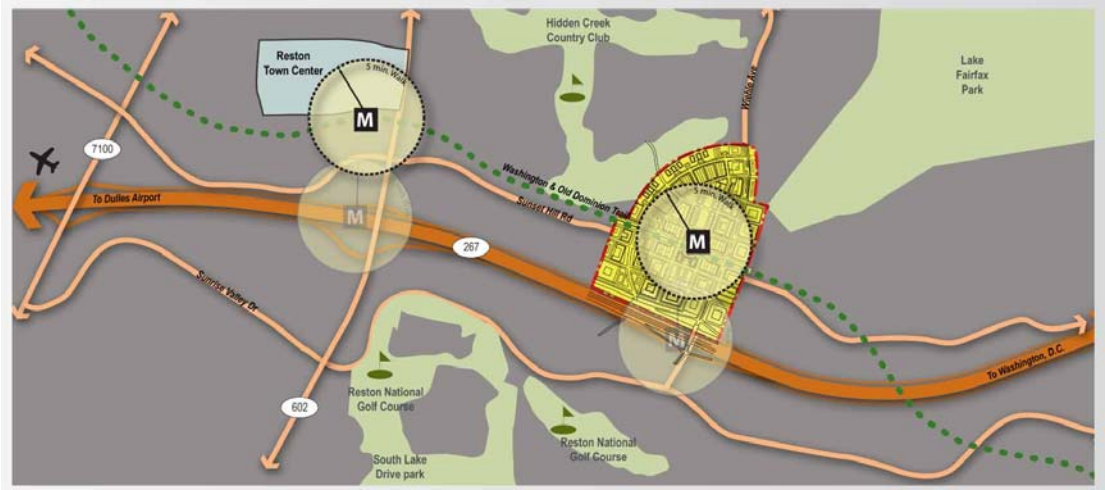


Figure 88 - Diagram of Connections between Reston Town Center and Wiehle Avenue with 5 Minute Walking Radius Based on Existing and Thesis Proposal Metro Station Sites

The exploration of the idea of a realignment of the metrorail line off of the DAAR became a central focus of design development. Further investigation of the topography of the area revealed that the "urban bridge" scheme discussed above was not a viable strategy to capture any significant amount of "new" developable land. Thus, providing for realignment north of the DAAR offered the most significant opportunity for significant development within ¼ - 1/2 mile of the proposed stations. The right-of-way associated with the W&OD offered a unique strategy for realignment that greatly served the goals of TOD. The W&OD Trail crosses over the DAAR approximately ½ mile east of the proposed Wiehle Avenue station and provides an undeveloped corridor of approximately 90 feet (minimum) from the DAAR, through the intervention site, and all the way past the Reston Town Center. Utilization of this right-of-way offered many advantages. First the right-of-way allows the metrorail to be run as a cut-and-cover tunnel system through the area, a less costly alternative to tunneling under existing development. Second, the realignment along the trail corridor allows for full development of the land in the effective zone surrounding the station. Finally, the realignment allows placement of a station immediately adjacent to Reston Town Center, instead of the ½ mile separation that would occur with the present DAAR alignment, thus capitalizing on the existing Reston Town Center development for transit ridership.
(Source: Author)

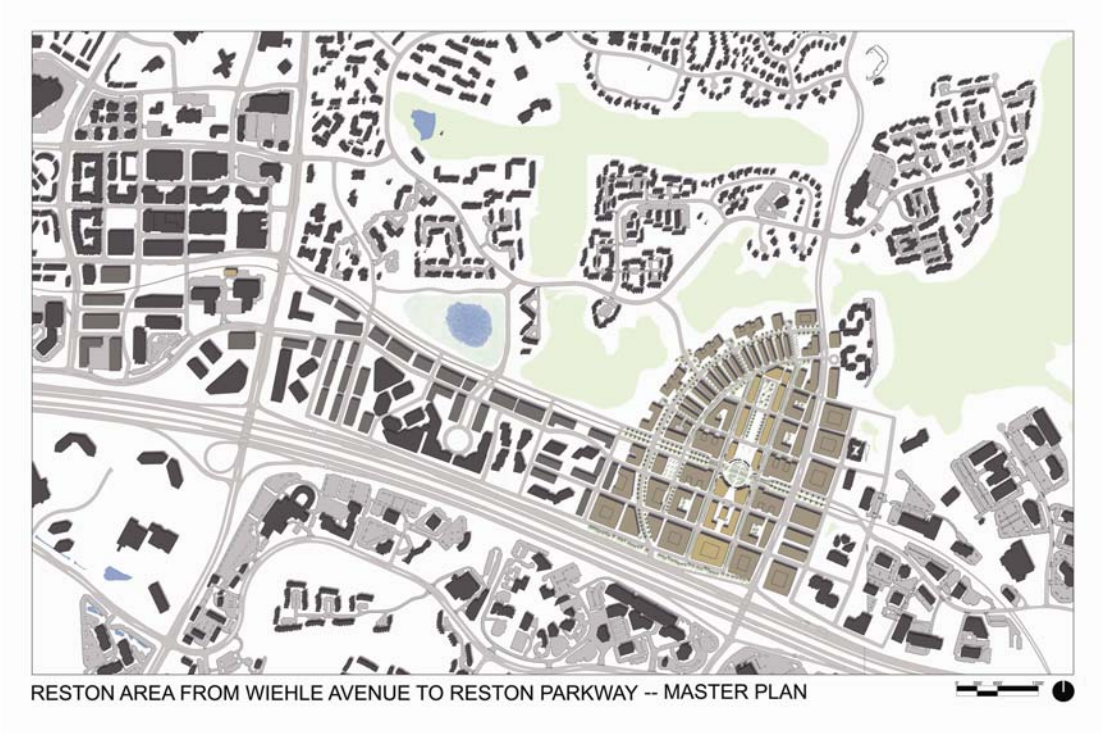


Figure 89 - Figure Ground Regional Master Plan
The thesis proposal looks not only at the development of a compact, dense, and mixed-use community surrounding a transit plaza located off of Wiehle Avenue, but also master plans further development of the linear strip of land abutting the DAAR between Reston Town Center and Wiehle Avenue. A new boulevard that parallels and brackets the W&OD trail replaces Sunset Hills Road as the main connecting street between Reston Parkway and Wiehle Avenue. This boulevard arrives at the main development of Reston Town Center, as opposed to the far southern arrival point of Sunset Hills Road. The master plan calls for a series of liner buildings to edge the southern side of the new boulevard, creating a continuous street-face between the two development centers. A reduced-in-size Sunset Hills Road acts as a secondary connection between these two centers and sponsors a number of new blocks that place the existing and new developments in a porous and inter-connected grid. The area to the south of Reston Town Center is also given a grid that breaks down the scale of the development in this zone.
(Source: Author and Fairfax County Department of Planning and Zoning)

Site Design

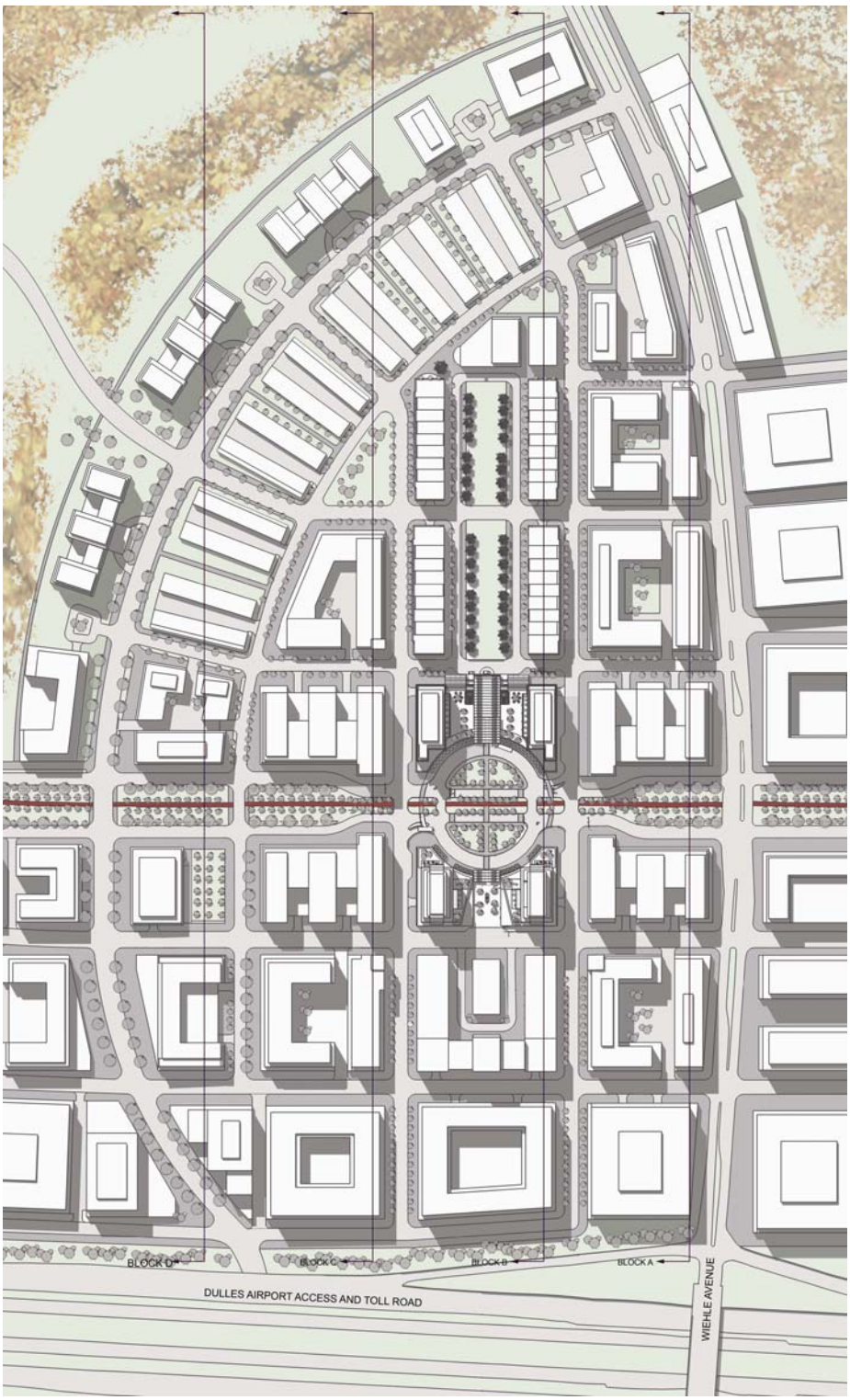


Figure 90 – Site Plan

The proposed TOD centers on a circular transit plaza and underground metro station. The above-ground traffic circle acts as a bus station and is limited to bus traffic. Automobile traffic is limited to passing through the circle on the bisecting boulevard. The W&OD continues as an urban trail through

the linear "Commonwealth Avenue" park down the center of the boulevard, providing pedestrian and bicycle circulation through the development. Pedestrian-scaled plazas to the north and south bracket the circular bus plaza, with the north plaza containing a steel and glass pavilion entry to the underground metro system. The north and south plaza areas each contain two tall, vertically mixed-use building developments with complementary retail uses at the plaza level. While the entire development is conceived as mixed-use, the area to the north of the boulevard serves as more heavily weighted towards a "residential" zone, and is defined by the two block residential square. The area to the south bears a heavier weighting towards office and entertainment uses, with a Faneuil Hall-like shopping block immediately to the south of the transit plaza.
(Source: Author)

Figure 91 – Site Diagrams
The development seeks to provide a coherent, legible scheme that would be understandable both to the resident and visitor. A modified grid of pedestrian-scaled block defines a coherent street grid throughout the neighborhood. The new boulevard serves as the main east-west connection across the development, while Wiehle Avenue to the east and a new curved, tree-lined avenue creates a border to the development to the west. While the entire development is mixed-use, a greater concentration of residential units exists in the northern areas of the plan. As conceived, the development provides over 18 million square feet of building on 132 gross and 76 net acres, resulting in a net FAR of approximately 5.8. 10% of the development would be allocated to retail/entertainment uses, with the remaining 90% of the development split 60/40 between residential and commercial uses. This split results in approximately 7000-8000 new housing units (over 50 dwelling units per gross acre) and over 10,000 new jobs (over 75 jobs per gross acre). A series of open spaces provide a network of green throughout the dense development, softening the impact of development on the site. Finally, mandated underground and structured parking guarantees a sufficient level of density to promote transit use and provide options to driving the car.
(Source: Author)

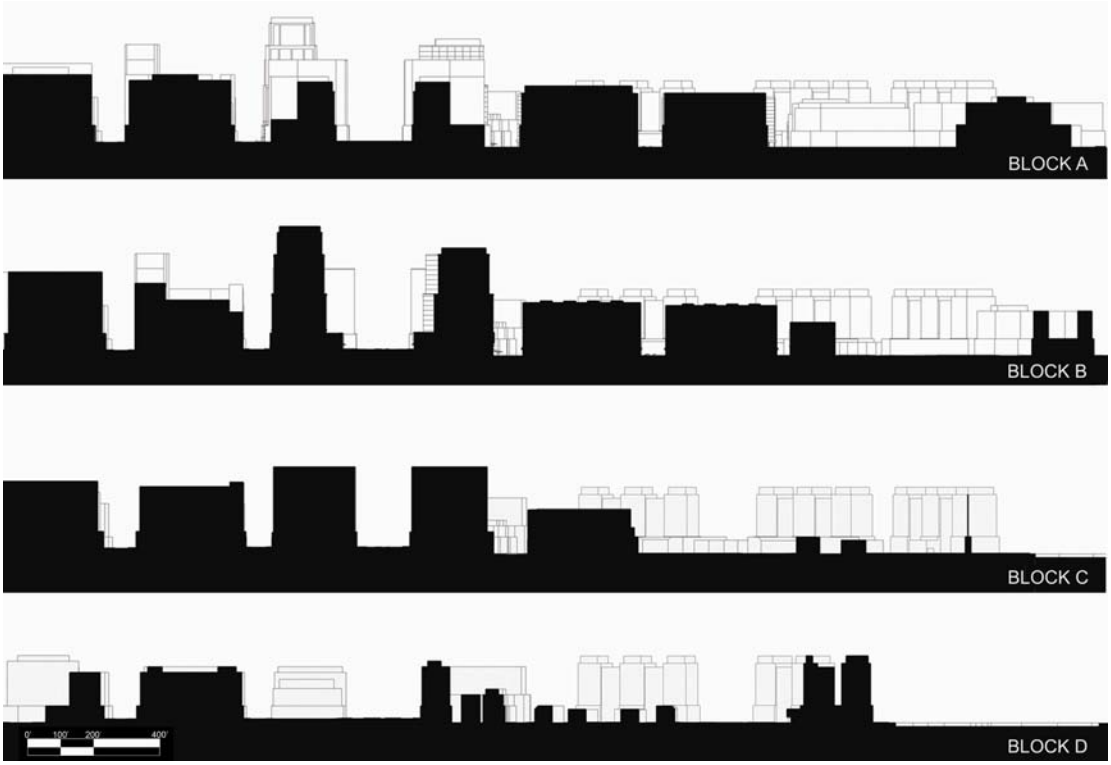


Figure 92 – Street Sections
A variety of building types and heights provides diversity and choice within a flexible block structure.
(Source: Author)

Figure 93 – Site Aerial Perspective
The added height for the four buildings sitting on the transit plaza punctuate the plaza's location and act as markers from throughout the development.
(Source: Author)

Figure 94 – Longitudinal Site Section
The transit plaza acts as a mediator between the lower zone to the north and higher average elevations to the south, allowing a resident arriving from the north to enter the entry pavilion one level lower than the bus plaza level. Underground structured parking surrounding the plaza allows access for auto commuters without impinging on the pedestrian experience.
(Source: Author)

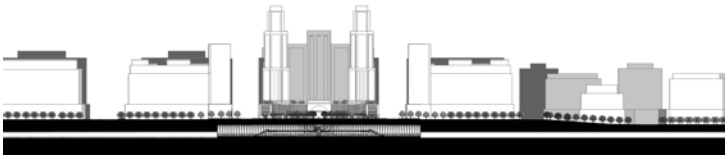


Figure 95 – Transverse Site Section
A duel track system allows for providing an express train option to Dulles Airport.
(Source: Author)

Transit Plaza and Station

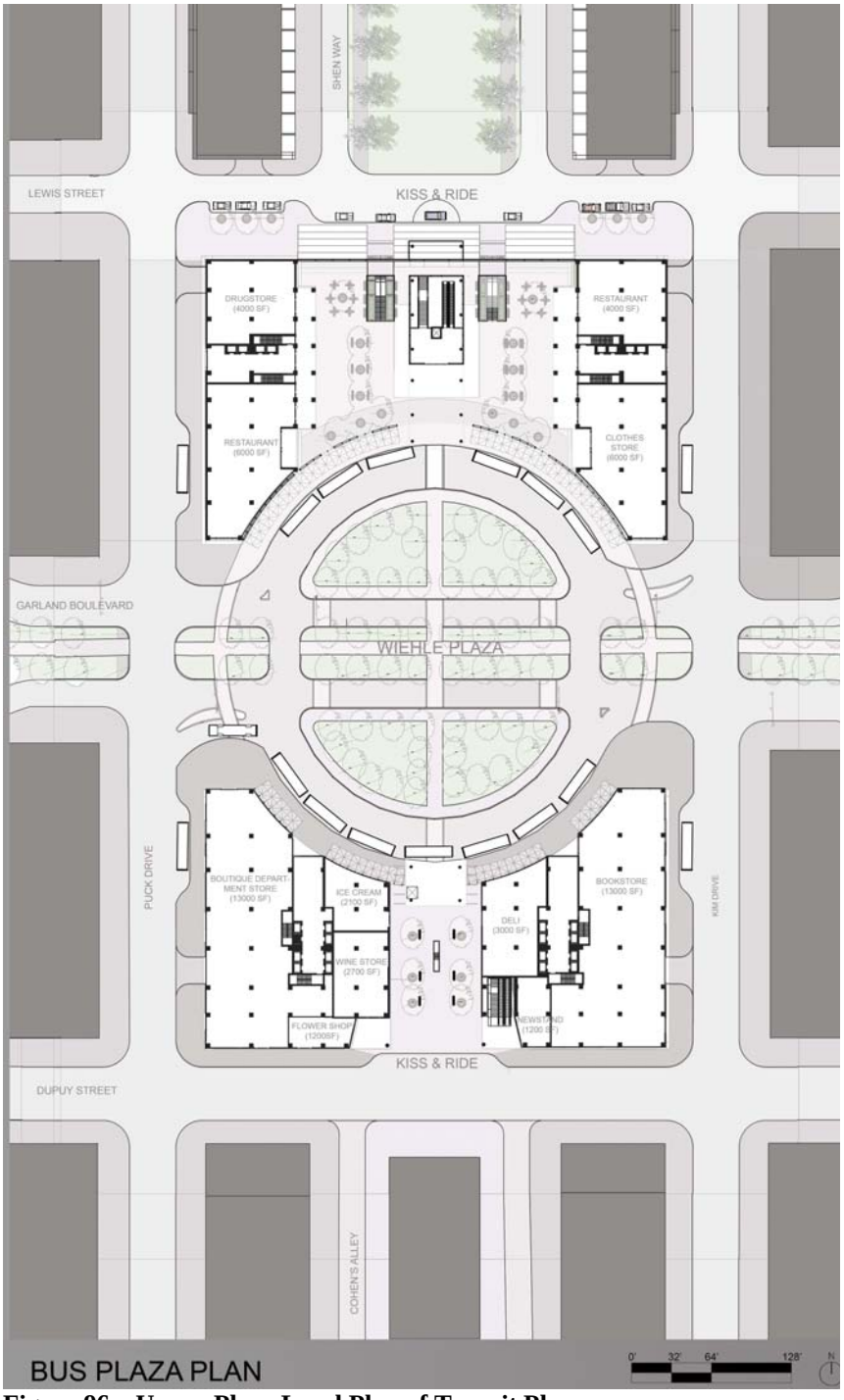


Figure 96 – Upper Plaza Level Plan of Transit Plaza

The uses surrounding the transit plaza are imperative to attracting multiple types of users. The plaza is meant as a draw not only for those utilizing the transit facilities, but also for the resident and office-worker. Only through attracting these multiple types of users can the plaza truly act as a "24/7" place. (Source: Author)

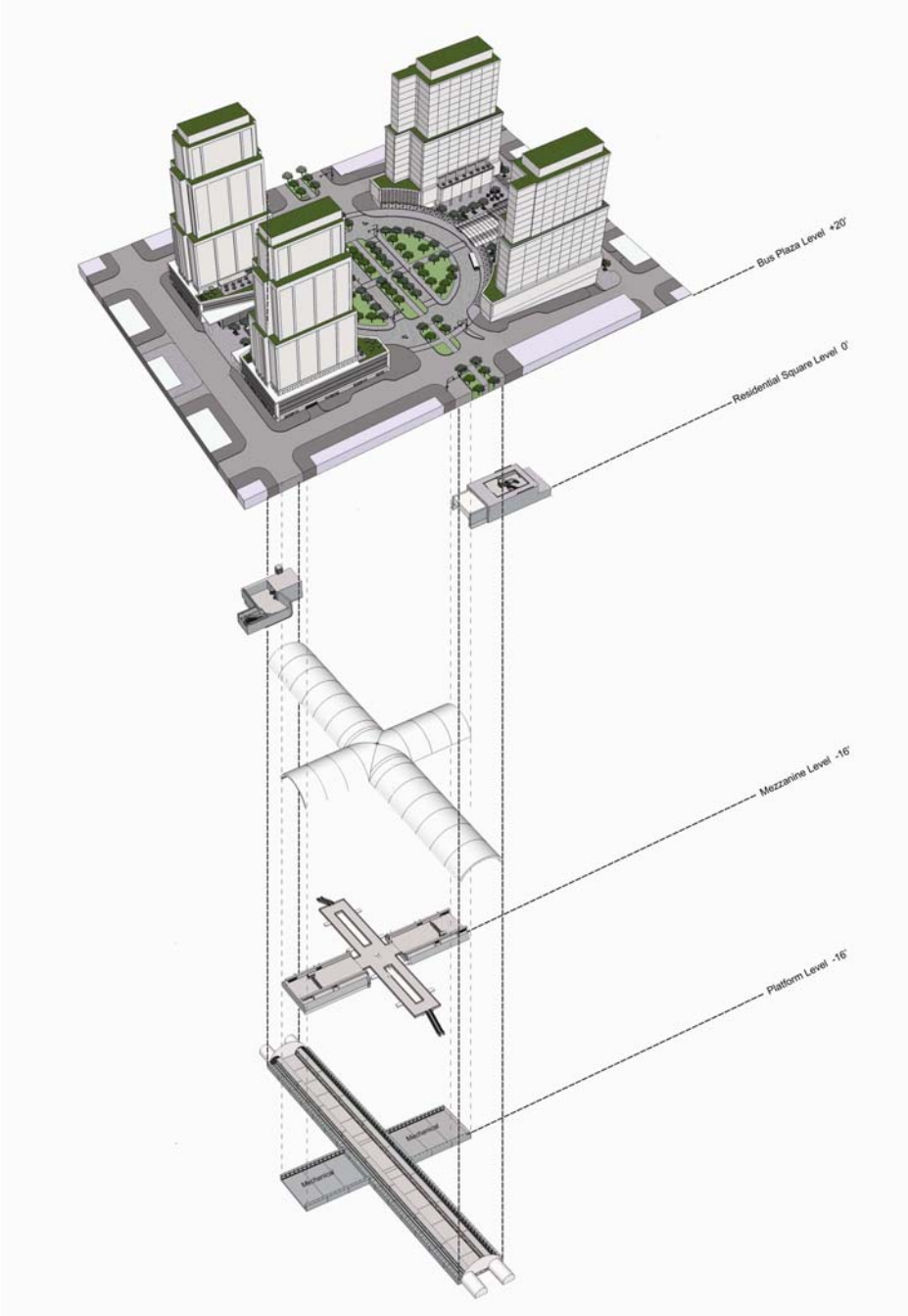


Figure 97 – Exploded Axon of Station Tunnel System
The bus transit plaza sits over the underground metro tunnel station. A WMATA standard 600 foot platform allows for the flexibility of full eight-car trains, while a duel track system allows for trains to bypass through the station. The mezzanine level above provides stair and escalator points at either end, requiring that no passenger need walk more than 150 feet after disembarking. While the system maintains the Harry Weese language of barrel vault and coffer, the materials are updated by paneling the coffers with white painted steel, lightening the color palette of the concrete to a smooth cool gray, and updating the floor tile to light gray subway tiles.
(Source: Author)

Figure 98 – Section Perspective of Transit Plaza
The transit plaza sits as a node in the regional transit system development and as a true "place" meant to unite the entire development. By encouraging a variety of users from day to night, transit becomes a daily part of the residents' lives, rather than a special "other" that is meant for infrequent trips to the city. The direct integration of the transit into the urbanized fabric is meant not only to increase ridership, but (by being treated as essential visual and spatial experience) also adds to the overall legibility of the community and enhances the daily experience of those in the community,
(Source: Author)

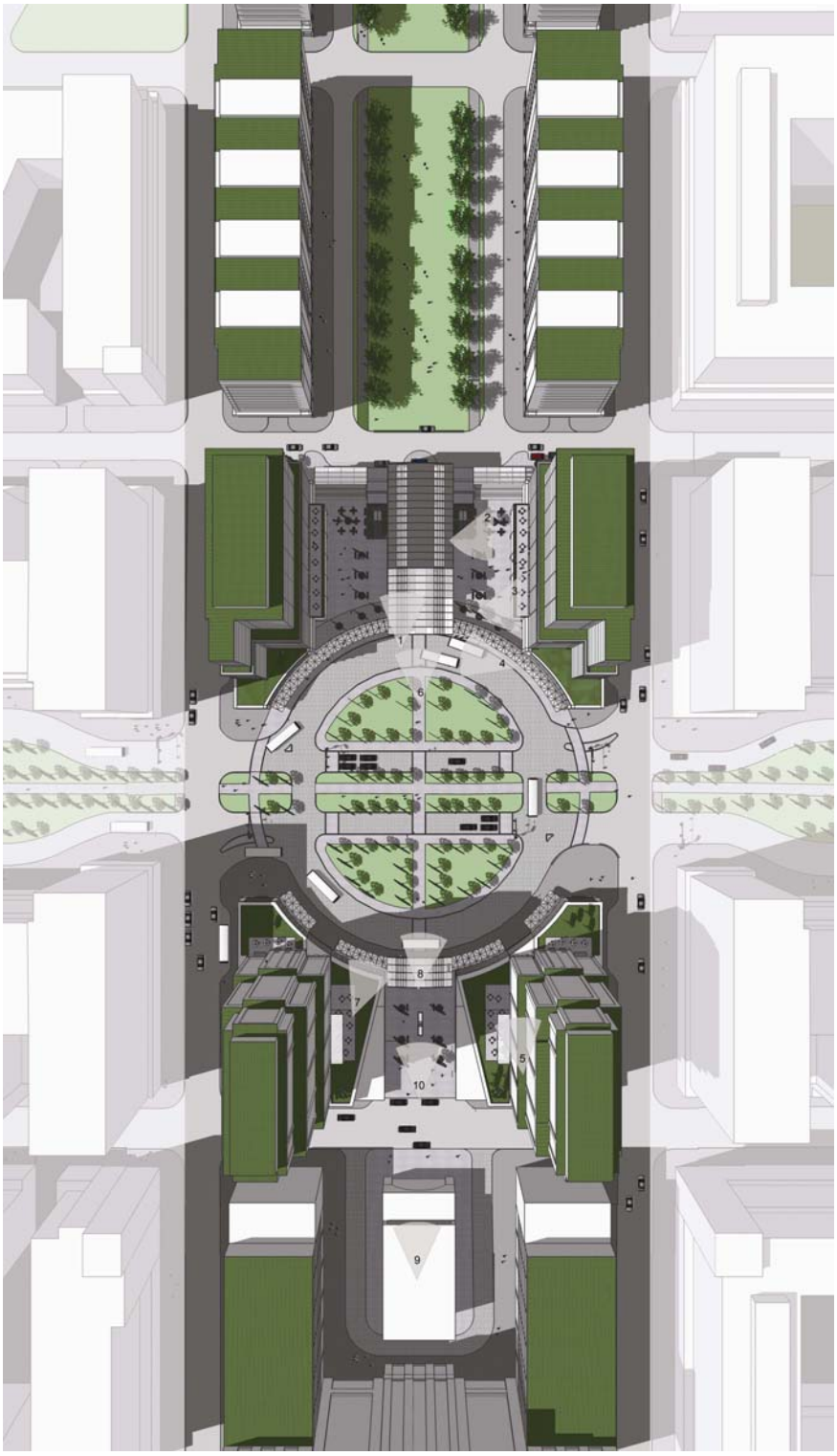


Figure 99 – Perspective Plan of Transit Plaza and Adjoining Public Spaces
The series of scaled public spaces comprising and surrounding the transit plaza create an experiential effect that is both spatial and visual.
(Source: Author)

Figure 100 – Perspective of Transit Plaza from South
The design of the spaces provides porosity from the transit plaza to the residential square to the north. Surrounding buildings help to shape the space in all three dimensions and act as liners to the space. Terraces, plazas, and signage all add to the lively atmosphere of the plaza.
(Source: Author)

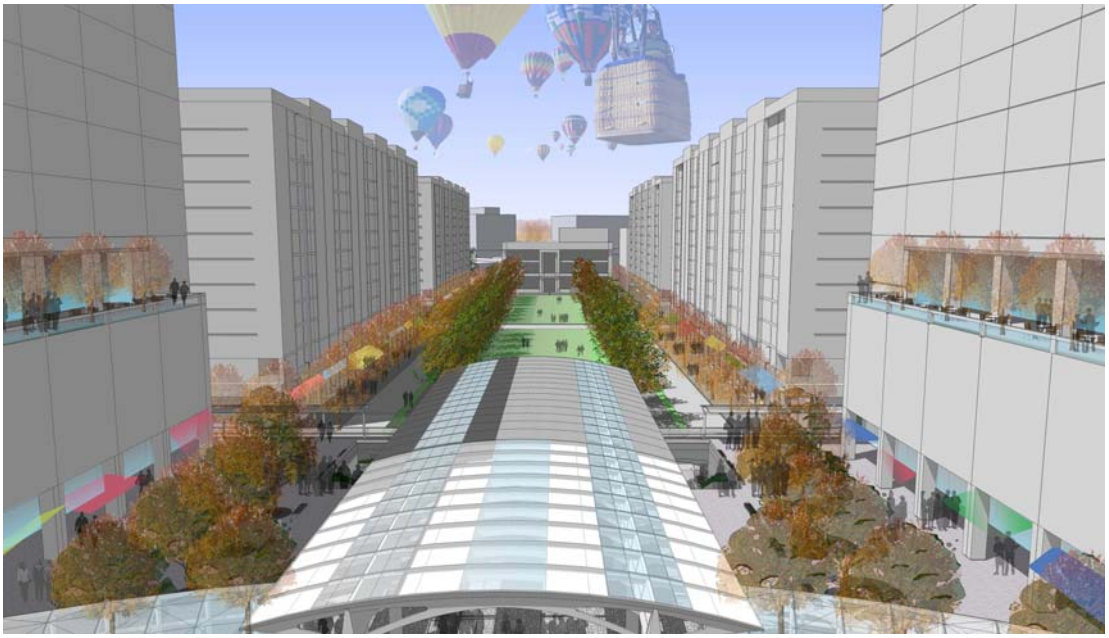


Figure 101 – Perspective of Residential Square from Transit Plaza
The variety of spaces serves the functional task of transit and as a backdrop for daily community activities and special community events.
(Source: Author)

Figure 102 – Perspective of South Public Plaza
Activation of the plazas through retail uses adds to the community vitality.
(Source: Author)

Figure 103 – Perspective of Station Entrance and Canopy from South
The glass and steel entry pavilion and canopy on the north side of the plaza provide a memorable procession to the transit station while also serving double duty to provide human scale to the pedestrian plaza.
(Source: Author)

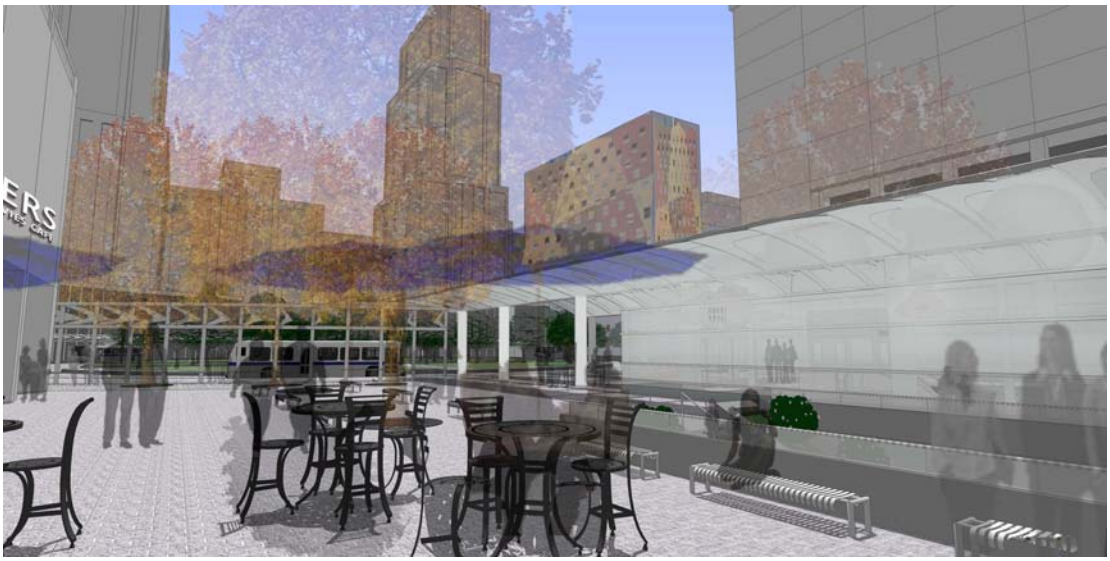


Figure 104 – Perspective of North Public Plaza
The shaping of the pedestrian plaza and the streetscape and uses present on the plazas encourage commuters to linger and treat the community as more than just a node of passage.
(Source: Author)

Figure 105 – North Station Pavilion Elevation
Arrival to the station from the north residential square presents a more formal façade than when entering into the pavilion from the plaza above. This façade acts as a cap to the residential façade while also providing porous access to the transit system and the plaza above. A bike station sits to the right of the transit entrance, while a café brackets to the left.
(Source: Author)

Figure 106 – Section Through North Elevation of Station Pavilion
A vertical section through the station shows the stair and escalator access up to the upper level as well as how elevator access is provided to all three levels. A canopy/trellis on the upper plaza level helps to tie the plaza into the station pavilion. Bridges cross over the grand stairs to either side of the station pavilion, allowing for continuous circulation on the plaza.
(Source: Author)

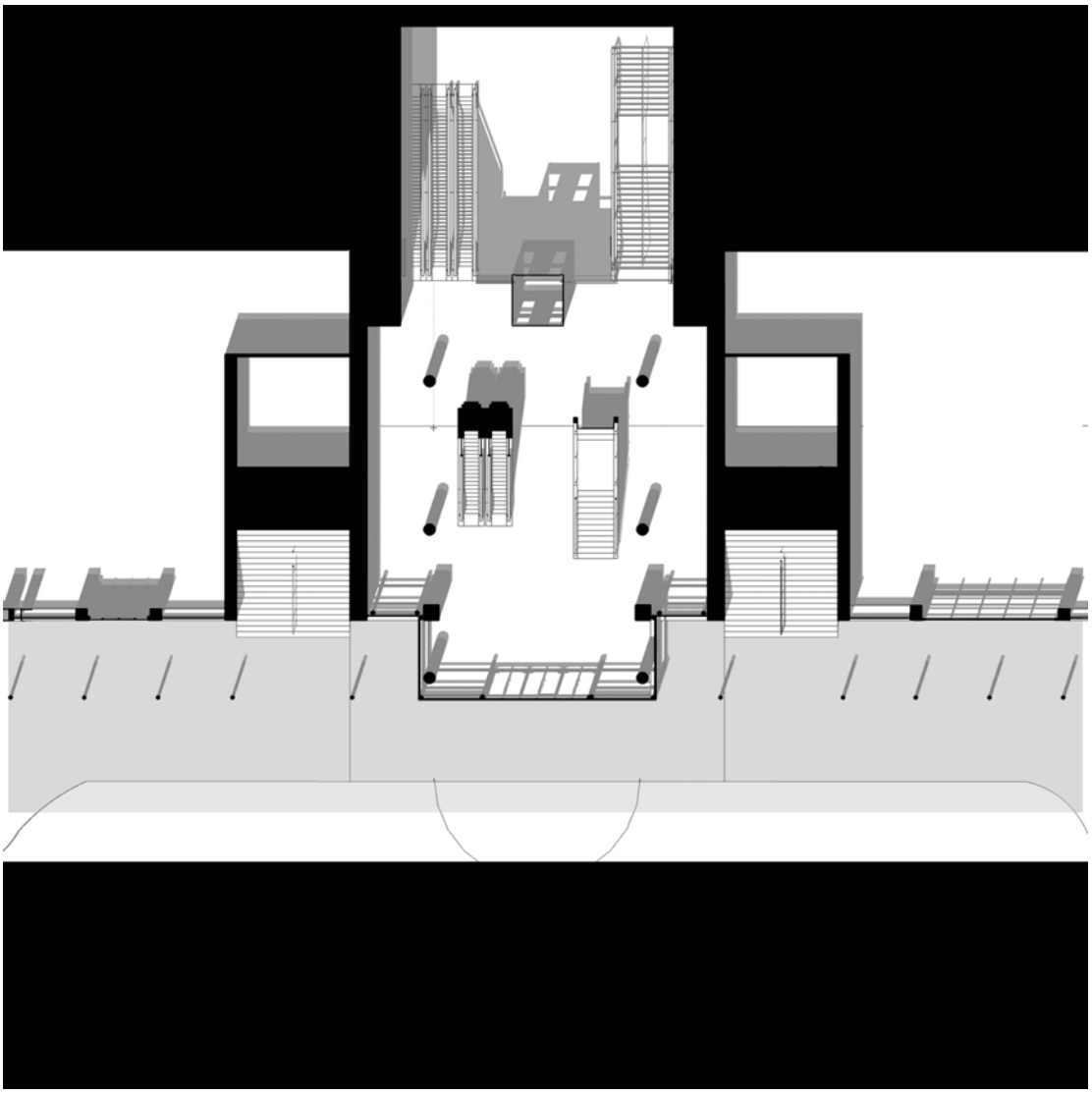


Figure 107 – Section Through Station Pavilion from Above
A horizontal section taken at the lower, residential square level shows both the vertical circulation up to the upper bus plaza, and down to the station mezzanine.
(Source: Author)

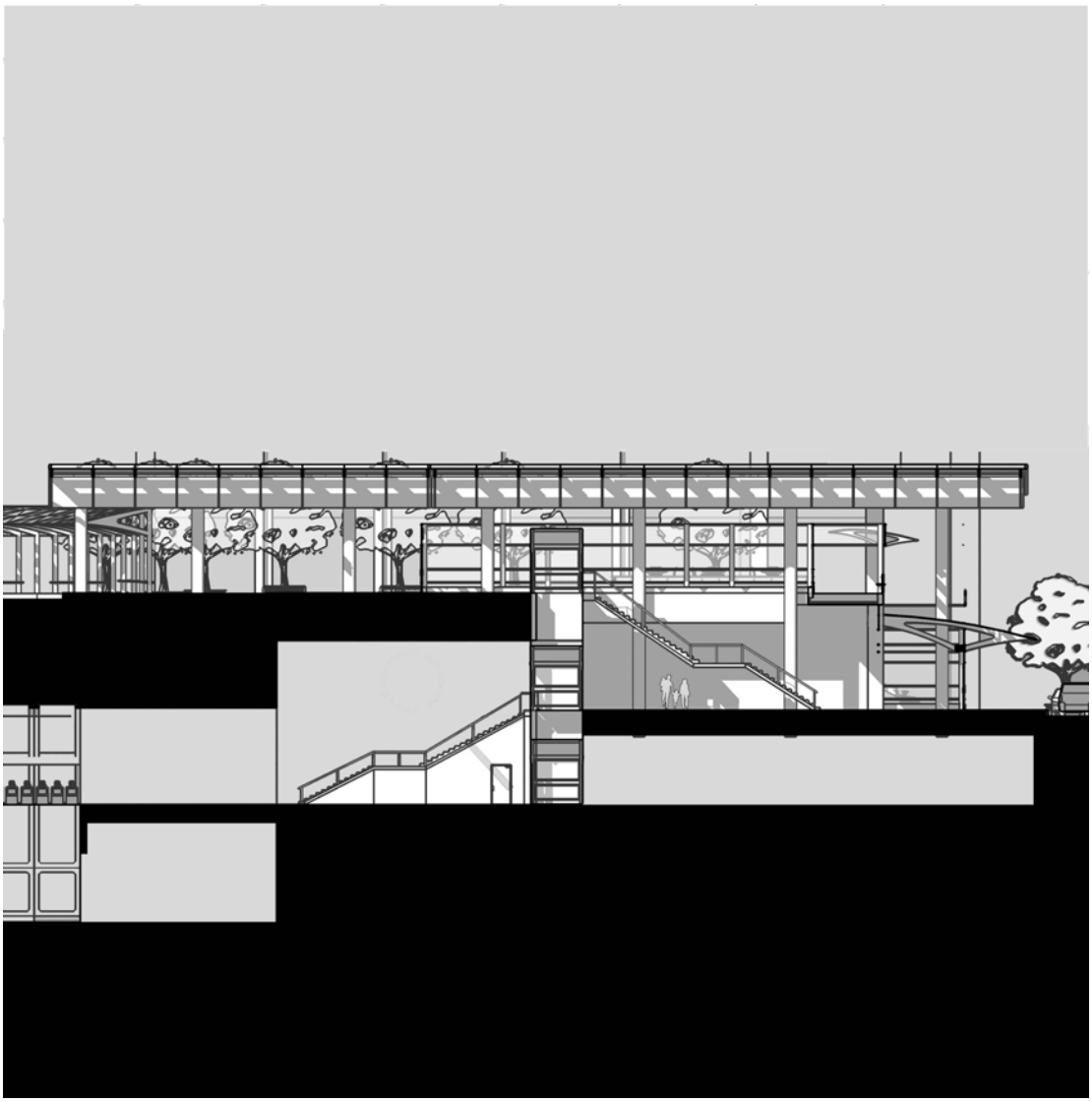


Figure 108 – Section Through Station Pavilion from East
A north–south cut through the station pavilion expresses the sectional nature of the development of the station. The station acts as a mediator between the topographical levels in addition to its functional role.
(Source: Author)

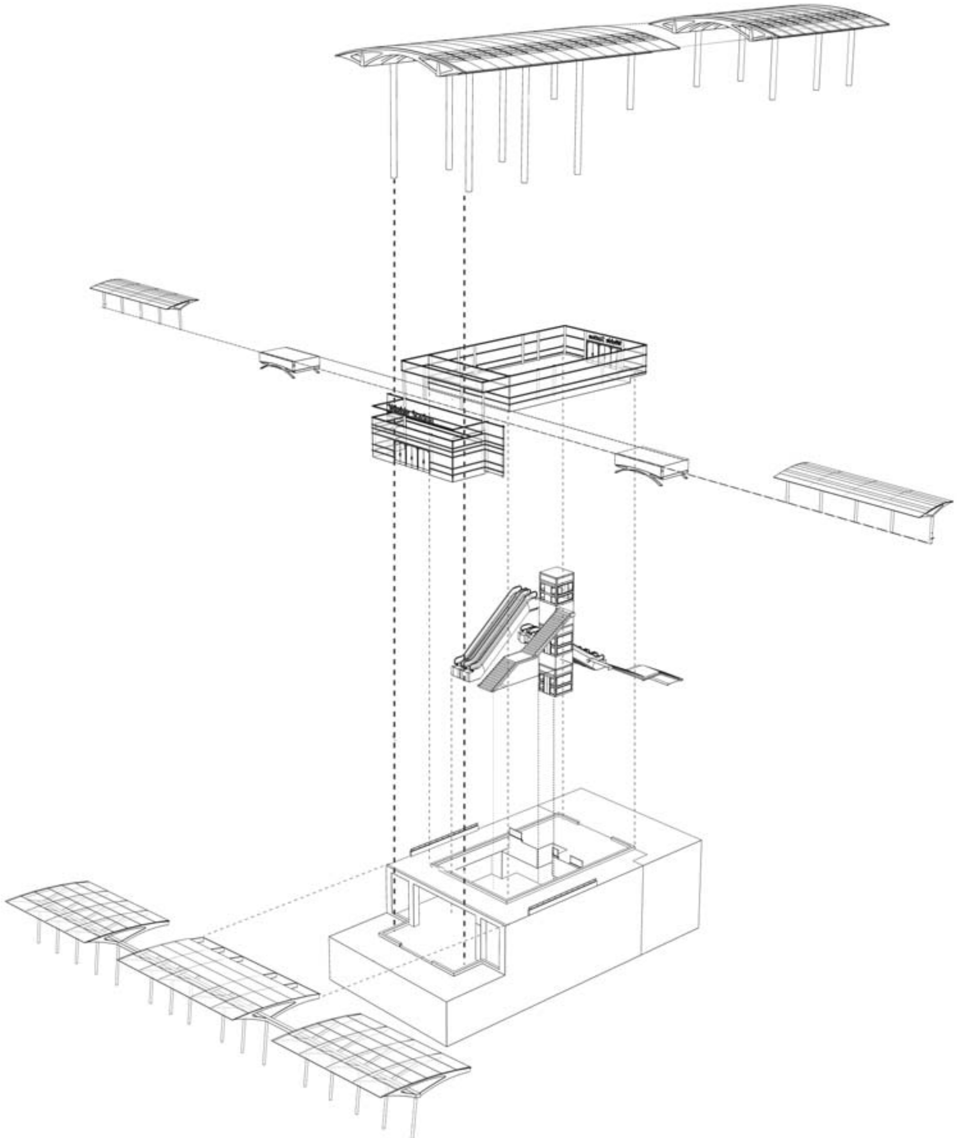


Figure 109 – Deconstruction of Station Pavilion and Utilization of a Kit of Parts
The design of the station pavilion and a variety of built elements on the transit plaza derive from a "kit of parts" gleaned from recent WMATA stations. Station pavilions and canopies at New York Avenue on the Red Line and Largo Town Center on the Blue line exhibit an updated palette of white painted steel, lighter concrete, stainless steel, and glass, especially in . This varies from the heavy concrete structural system and brown-painted metal found in the older stations. This system, and especially the unique canopy truss found at these stations act as the building blocks for this station. The truss itself, while used in whole for the entry canopy, is also repeated in its component parts to act as structure for [illegible] [illegible] [illegible] [illegible]er plaza. The modification and use of these parts provides a rhythm and relationship between the component parts of the system that add to a greater whole.

(Source: Author)

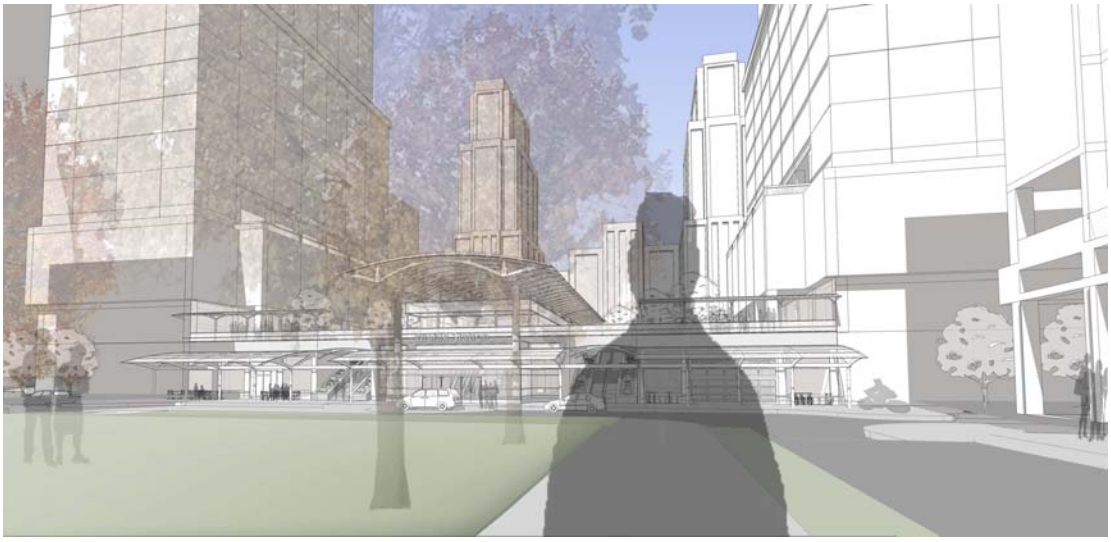


Figure 110 – Perspective of Approach to Station from Residential Square
The ultimate success of the formal urban design gestures resides in the daily, ground-level experience of those living and working in the community. These people never see the community in plan, but instead experience the design in elevation, perspective and section. The formal design moves, thus, are meant to accentuate this ground level experience and enhance the clarity and quality of this experience. Axial relationships, porous views, and street level activation through use all add to a greater experience of place.
(Source: Author)

Figure 111 – Perspective of Streetscape Approaching Station
The final goal is "community," a place of which one feels a part. Where one might meet a neighbor and have a cup of coffee on the way to work; where one is encouraged to relax and experience, instead of as a place to merely pass through.
(Source: Author)

Figure 112 – Perspective of Station Front Including Bike Station
TOD, at its best, provides choice. A choice in type of housing, in type of transportation, and in type of lifestyle. An opportunity to live with just one, or perhaps no car. A compact community where walking to work, to school, or to the store is a meaningful alternative. A community that by its very design adds to sustainability.
(Source: Author)

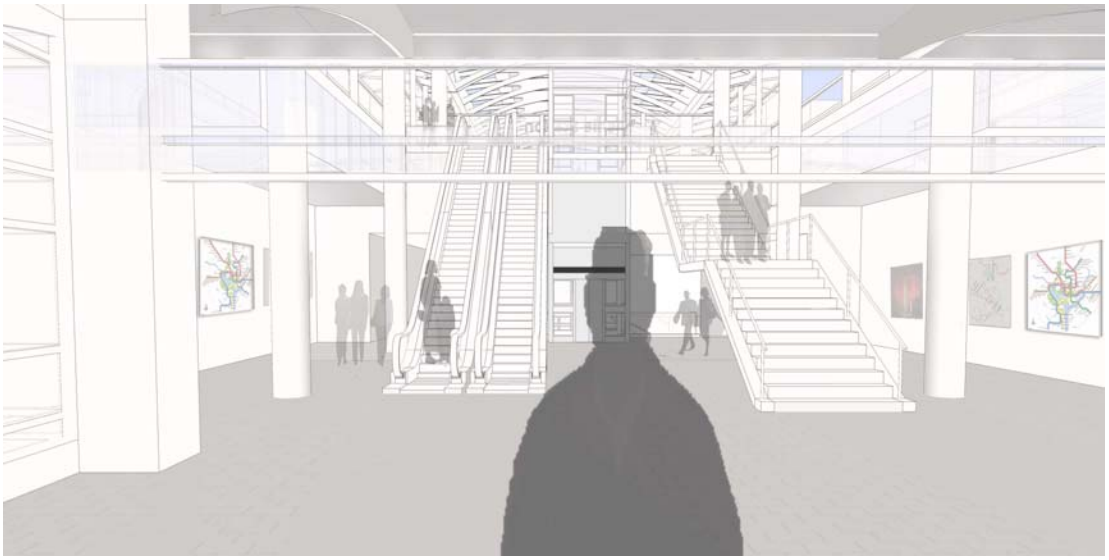


Figure 113 – Perspective of Interior of Station Pavilion
Mere adjacency of transit does not guarantee success. A real exploration of appropriate densities, and uses, and design are imperative if there is a serious goal to decrease dependence on the automobile. An attractive and inventive system must be provided to encourage use and acceptance of public transit as a viable daily option.
(Source: Author)

Figure 114 – Perspective of Station Mezzanine Level
The current plans to run the metro extension system down the center of the DAAR do not serve the purpose of integrating public transit as a daily transportation alternative. Besides ceding the most valuable developable ground immediately adjacent to the transit to asphalt, it continues the unfortunate tradition of metro development in the suburbs as treating the metro system as an "other," a minimally convenient option that exists at the edge of development, that must be driven to, and that one must traverse through a sea of driving to arrive at.
(Source: Author)

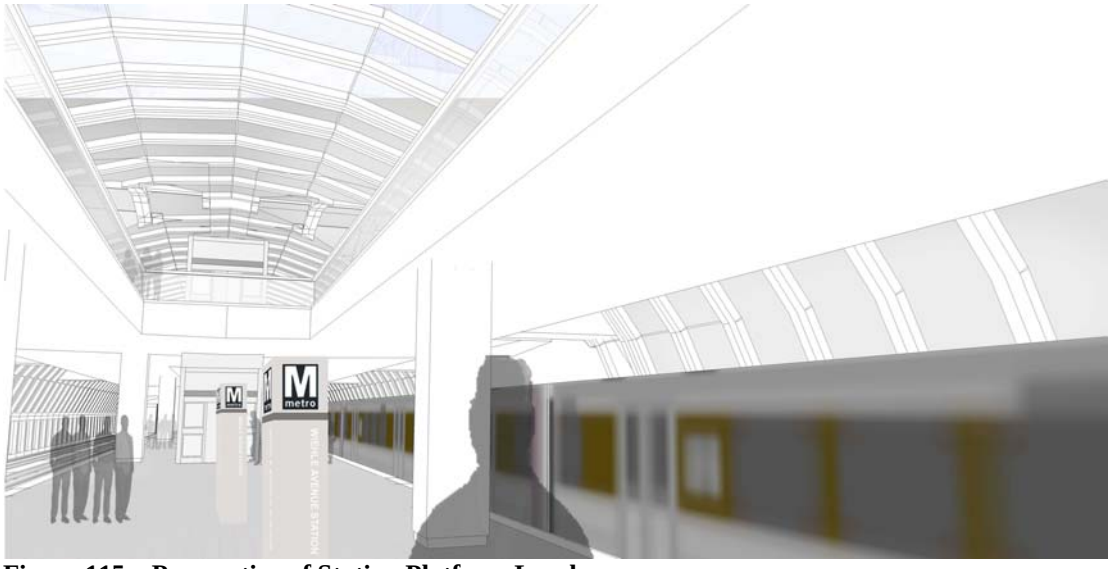


Figure 115 – Perspective of Station Platform Level
While "urbanizing" the suburbs might be a controversial concept, an untapped market of those who must live in the suburbs for their jobs, but desire a more sustainable way of life and community, exists to be served by this type of development. With rising gas prices and ever longer gas commuting times, a true discussion over density and development must occur.
(Source: Author)

Conclusion

Ultimately, one of the decisions that most freed the design to achieve a rational and successful level of development also proved to be the most controversial. Discovering the right-of-way associated with the W&OD trail offered a unique opportunity to create an underground metro system at a reasonable cost and in an alignment that maximized the opportunity and effectiveness of development around the proposed metro stations at Wiehle Avenue and Reston Town Center. The placement of the W&OD trail in a linear park running down a new urban boulevard, however, raised significant issues regarding the interaction between the pedestrian, the bicycle, automobiles, and the bus and train metro system. Regardless of the final determination of the workability of the proposed system, the important discussion regarding the ways in which we view density and development that occurred during the final review reflect the real success of the project. While the project does reflect an actual response to a particluar site and situation, it more importantly serves as a model for how this type of development might occur to raise the level of sustainability to our suburbs. The associations of density and development inherent in the concept of "urbanization" of the suburbs might be anathema to some of its residents, but also represents a necessary reality in order to counteract the negative effect that sixty years of sprawl have had on our country. This thesis pre-supposes that there is an untapped market of people of all ages, incomes, and family-type who would prefer to live close to work, in a compact, dense and walkable community,

with easy access to transit and a real alternative to owning a car, and yet still have to live outside of a major urban center. These are the type of people who will flock to this type of development, and provide the final essential element to its success.

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