Designing a Walkable Suburban Landscape:
New Urbanism and Light Rail as Methodologies

By
Kyle Davidson

Thesis submitted to the faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Master
of
Landscape Architecture

Approved:

Dean Bork, Committee Chair
Benjamin Johnson, Committee Member       Brian Katen, Committee Member

07 April 2006
Blacksburg, Virginia

Keywords:
Suburban Landscape, New Urbanism, TOD, POD, Light Rail, Walkability
Designing a Walkable Suburban Landscape:
New Urbanism and Light Rail as Methodologies

Kyle Davidson

Abstract

The suburban landscape is a landscape of opportunity. Historically, the suburban landscape has been a desirable place for living. Because it demands the use of automobiles, it is also a landscape undesirable for pedestrians. Optimistically, through principles of New Urbanism, walkability, and mass transportation via light rail, there is an opportunity to transform the auto dominated suburban landscape into one that promotes walkability.

Located in the suburbs of Alexandria, Virginia, an atypical intersection is analyzed for its characteristics of walkability. This intersection consists of several major roads converging to create a location overly dominated by busy roads and automobiles. Though there are accommodations that signify this intersection is also a place for pedestrians, a walkability checklist and a walkability study prove otherwise.

The author investigates transforming this otherwise unwalkable landscape into one that promotes walkability by providing a safe, comfortable, and enjoyable experience for suburban pedestrians. Design intentions are focused on preserving much of the existing land use and not re-developing suburbia into a new urban center. Yet, through using new urbanist principles for walkability, there is the opportunity to create a new suburban center.
# Table of Contents

**Title Page**

**Abstract** ii

**Table of Contents** iii

**Dedication** iv

**Chapter 1: The Position** 1

**Chapter 2: Walkability** 2

  2.1 What is a Walkable Community? 
  2.2 New Urbanism 
  2.3 Benefits of a Walkable Community 
    - Lower Transportation Costs 
    - Social Interaction 
    - Environment 
    - Expanded Choices 
  2.4 Characteristics of Walkability

**Chapter 3: Development Patterns** 5

  3.1 Suburban Sprawl 
  3.2 Traditional Neighborhood Development (TND) 
  3.3 Transit Oriented Development (TOD)

**Chapter 4: Light Rail As an Alternative Form of Transportation** 7

  4.1 Defining Rail Systems 
  4.2 Environmental and Economic Benefits 
    - Fossil Fuel Consumption 
    - Rail vs. Bus 
  4.3 Evidence of Light Rail

**Chapter 5: Site Selection** 9

  5.1 Walkability Scenario

**Chapter 6: Designing a Walkable Suburban Landscape** 12

  6.1 Goals, Objectives, and Strategies

**Chapter 7: Reflection** 23

  7.1 Design Alternatives 
  7.2 Application Towards Other Suburban Landscapes

**Appendix** 26

  2.1 Walkability Check List 
  2.2 Principles of New Urbanism 
  3.1 Development Patterns 
  4.2 Case Studies

**Bibliography** 33

**Image Credits** 36

**Résumé** 37
Dedication

To my wife, if it were not for you, there is no telling where I would be today. You made all of this possible and for that I love you more than ever.
THE POSITION

This study investigates enhancing walkability in an extant suburban area to promote safety and convenience for the pedestrian. For decades, the suburban landscape has accommodated the automobile in preference to the pedestrian. One consequence of this choice is increased traffic. Traffic experts observe that increasing the number and supposed convenience of roads actually generates increased automobile travel… “If you build it, they will come (Kay, 15).” This effect is referred to as ‘generated traffic.’ The vicious cycle of building more and better roads to relieve congestion has had unfortunate consequences for pedestrians. Ultimately, in many suburban locations, emphasis on walking is superseded by busy roadways lacking sufficient pedestrian accommodations.

Improving walkability in the suburban landscape can make walking convenient, safe, and pleasant (Online, Pedestrian) during daily activities. Designing a walkable landscape requires analysis at the site, street, and community level to determine “the quality of pedestrian facilities, roadway conditions, land use patterns, community support, security and comfort for walking (Online, Pedestrian)”.

“At a site scale, walkability is affected by the quality of pathways, building accessways and related facilities. At a street or neighborhood level it is affected by the existence of sidewalks and crosswalks, and roadway conditions (road width, traffic volumes and speeds). At the community level it is also affected by land use Accessibility, such as the relative location of common destinations and the quality of connections between them (Online, Pedestrian)”.

One method that could be used to enhance walkability is a light rail system because of its potential to reduce automobile dependency for certain types of travel. Although, many cities use rail systems to relieve traffic congestion and decrease pollution, it also provides an excellent opportunity for a landscape to welcome and encourage pedestrians by reducing automobile dependency. Transportation flow within the landscape might change greatly if pedestrian movement were not dictated by busy roads.

This study will emphasize the methodologies involved in designing a walkable suburban landscape. A discussion of walkability including a definition, a description of benefits, and specific characteristics important to pedestrians is presented. Principles of New Urbanism that apply to designing a walkable landscape will be examined. Development patterns will be discussed with an emphasis on the effects of suburban sprawl. Rail will be explored as an alternative form of transportation and three types of rail systems will be defined with an explanation of environmental and economic benefits. Evidence of light rail will be provided to support light rail as a tool to enhance walkability. Afterwards, the site selected for this thesis, Alexandria, Virginia, will be discussed explaining the reasons why it was chosen. This site selection will be highlighted with a walkability scenario within Alexandria to exemplify the need for a more walkable landscape.

Finally, a design exploration will provide insight into suburban walkability in Alexandria, VA. Goals, objectives, and strategies used to create the design portion of this thesis will be outlined. Specifically, the design will demonstrate walkability in an existing suburban landscape through implementation of pedestrian friendly accommodations. Improved walkability will hopefully encourage people to walk to daily activities that are relatively close to home and use more public transportation, such as light rail, for daily activities further from home.
WALKABILITY

What is a Walkable Community?

A walkable community creates a “desirable place to live, work, learn, worship and play (Principles).” On a day to day basis, residents have access to such commodities and amenities as homes, offices, stores, churches, transportation, schools, and libraries within a walkable proximity to each other. Many people are advocating more walkable communities, and, in fact, the Florida Department of Transportation offers the following Pedestrian Preamble:

“This community, in providing for trip making, grants pedestrian and motorists of all ages and abilities rights, privileges, safety, mobility, and access. To increase walkability, land use should feature clusters of homes, parks, schools, shops, and employment centers within a ½ mile (1k) radius of one another. Intersections should not favor either motorists or pedestrian, but give equal service and support to both. Landscaping, site design and land use patterns should reward those choosing to make a trip by foot, transit, or bike. Public transit, with stops and stations linked with walkways, should be available to complement and extend walking trips (Walkable).”

New Urbanism

A suburban landscape that is designed for the pedestrian rather than the automobile takes into consideration many of the aforementioned qualities. New Urbanism is one philosophy that is often followed in order to create a landscape that accommodates the pedestrian and makes walking more enjoyable because “streets are safe, comfortable, interesting places for people to walk and meet (Congress).”

New Urbanism is a design and development philosophy that gives “physical shape to community (Congress).” New urbanist principles were devised by a Charter between 1993 and 1996 by “architects, planners, interested citizens, scholars, elected officials, and developers (Congress).” The principles of New Urbanism are divided into three categories (Appendix 2.2).

•The Region: Metropolis, City and Town
•The Neighborhood, the District, and the Corridor
•The Block, the Street, and the Building

New Urbanism philosophies are most often implemented for new development (green field) or complete redevelopment of an existing landscape. However, this study focuses on creating walkability within an existing suburban landscape without a complete re-design. By reducing ‘near to home’ automobile use in places that are characterized by conventional suburban development, pedestrians can become more on equal ground with other forms of transportation. “New Urbanist streets can accommodate cars while also providing comfort and convenience for pedestrians, bicycles, and wheelchair use (Congress)” by reducing the interface between pedestrians and automobiles, reducing the number of curb cuts and surface parking, and designing sidewalks and cross-walks to make suburban landscapes more walkable. Some of the principles that promote walkability include:

•most activities or destinations within a 10 min. walk
•pedestrian friendly streets
•buildings are close to streets
•porches, windows, and doors open to sidewalks
•streets are tree lined
•parking is hidden
•narrow streets with slower speeds
•hierarchy of narrow streets, boulevards, and alleys
•quality pedestrian paths and public space to make walking enjoyable (New)

Benefits of a Walkable Community

A walkable community benefits both the individual and community by “lower transportation costs, greater social interaction, improved personal and environmental health, and expanded consumer choice (Principles).”

Lower Transportation Costs

H. William Batt, Ph.D. of Albany, New York explains that higher density walkable landscapes have “all the economies of scale, savings in cost, reduction in externalities, dividends in community and political enhancement, and benefits to urban areas that we all say that we want. The greater the proximity to points of desirable accessibility, the lower are typically the transportation costs (Batt).” A walkable community produces a chain reaction of more intensive land use, higher land value, and a decrease in transportation dependency thereby resulting in overall lower transportation costs. For example, land values are generally higher in areas of transportation corridors (e.g. light rail). Development that occurs in this area is usually of mixed use and highly sought after by residents and businesses because of the proximity to walkable amenities and transportation convenience. Due to the close proximity of daily activities, transportation costs are less as people are more inclined to walk or take advantage of the light rail.

Social Interaction

A walkable landscape will promote social interaction between people who live in the vicinity and towards others passing through. This communal activity is something that can not be promoted from behind the wheel of an automobile. Gil Garcia, AIA and Councilman of Santa Barbra City, believes that developing “good quality design elements of pedestrian infrastructure” exalts and nurtures the human spirit, and protects...
and enhances the neighborhood’s traditional values and quality of life (Garcia).” Walkable neighborhoods embrace “human connectivity and social interaction (Garcia)” by re-introducing inhabitants and visitors to one another and rejuvenating community pride.

**Environment**

A walkable landscape improves noise, dust, air quality, and water quality because of the access to alternative transportation, such as light rail, and the reduction in automobile use. Furthermore, improved environmental qualities directly relates to improvements in personal health because people are apt to drive less resulting in more physical exercise by walking, engaging in daily social interactions, and breathing better quality air (Online, Community).

**Expanded Choices**

A walkable community provides expanded choices and alternatives for the resident and the consumer. “By building places with multiple destinations within close proximity, where the streets and sidewalks balance all forms of transportation, communities have a basic framework for encouraging walkability (Principles).” This framework allows the residents and consumers to be more active in dictating how they choose to interact with their environment whether it be transportation or housing. For example, walking, biking, light rail, etc. are all transportation choices used to travel to the places people desire to live, shop, and recreate. Housing choices include single family detached homes, multi-family dwellings, apartments, town homes, condos, etc. and can be combined with retail and commercial activity.

**Characteristics of Walkability**

Based on a Walkability Checklist (Community), the following qualities are important to pedestrians for better walkability within the landscape: sufficient room to walk, easy to cross streets, courteous driver behaviors, easy to follow safety rules, and a pleasant walk (Appendix 2.1). This simple checklist can be used to complete a quick assessment to determine how pedestrian friendly a community is.

The Florida Department of Transportation did a more in depth investigation to determine walkability and published a guide outlining twelve characteristics to achieve a walkable neighborhood (Walkable). Some of the critical issues to consider are as follows:

1. **Continuously Linked Walkways**
   - sidewalk widths and locations, sidewalks free of obstruction
   - landscape including shade trees, light fixtures, benches, and transit stop shelters
   - having a clear sight line for pedestrians.

2. **Pedestrianized Intersections**
   - street crossings clearly identified and understood by pedestrians
   - roadway designed to reduce or even eliminate left turns for automobiles in areas of high pedestrian frequency

3. **Americans with Disabilities Act (ADA)**
   - provide accessibility for everyone
   - curb ramps at intersections or cross walks
   - accessible crosswalk signal buttons

4. **Signal Placement**
   - proper placement of indicators such as stop lights and crossing signals to enable the pedestrian and auto to clearly see one another

5. **Illumination**
   - proper lighting for pedestrians to easily navigate the landscape as well as be seen by approaching automobiles

6. **Simplify Median Crossings**
   - simplify road crossing so pedestrians can safely and easily traverse the street

7. **Schools**
   - safe ingress and egress for children and others associated with the school
   - crossing and intersections should be clear of streetscapes which could impede sight lines

8. **Eliminate Backing**
   - reduce the interaction of the pedestrian and autos in parking areas

9. **Access Management**
   - safe accessible developments independent of vehicles

10. **Auto Restricted Zones (ARZ’s) and Parking Restricted Zones**
    - autos are able to access these areas during specific time of the day
    - protect pedestrians in busy commercial centers where auto traffic occurs
11. Combine Walking with Transit
   • reasonable walking distances for pedestrians to access amenities or transit stops with stops no more than a ½ mile in radius of a trip's inception

12. Walkable Scale Land Use Planning
   • New and 'in-fill' land use development should favor walking over driving
   • Traditional Neighborhood Design (TND) grid
   • Planned Mixed Use Development (PMUD) roadway systems
   • Transit Oriented Development (TOD) designs
   • Neighborhood schools, pocket parks, and neighborhood stores should predominate
   • Places to sit should be provided on retail blocks and along corridors where people walk through their communities
   • Businesses should front on sidewalks with parking located alongside or behind stores
DEVELOPMENT PATTERNS

Development patterns are the fingerprints of America’s landscape capturing the growth, evolution, and eras of change.

“Cities change through time, especially as technology was introduced... new modes of transportation often serve as the catalyst for major changes in the urban map (Gersmehl).”

Transportation technology has dictated several types of development patterns (Appendix 3.1). For example, the grid iron grid (See Figure 3.1) pattern is typical of most central business districts and is more suited for the pedestrian. The street car grid (See Figure 3.1) was a result of the street car and train which allowed people to move away from central business districts; hence, the beginning stages of suburban sprawl. Suburban sprawl encourages a low-density landscape reliant heavily on the automobile and does not support walkability. However, two types of developments supported by NU that shift away from the conventional suburbs and promote walkability are the traditional neighborhood development and the pedestrian-oriented development (Southworth).

Suburban Sprawl

Since World War II, cities have been spreading outward away from the town’s center or city core. The automobile revolutionized how people travel through the landscape and enabled people to live further from town centers; thus, resulting in what is commonly referred to as sprawl (Gersmehl). This suburban sprawl began to occur after WWII when the typical American family wanted to live the American Dream. This was first observed in Levittown, New York where medium density single family housing occurred away from the urban core. Multi-car families evolved as the head of the household needed a car to travel to town for work and the homemaker needed a car for daily activities. Cul-de-sacs, loop streets, “strip malls, parking lots, highways, and housing tracts (Congress)” took over the landscape (See Figure 3.1).

Vincent Scully, a historian and architectural critic, explains NU as “reshaping the sprawl of automobile suburbia into communities that make sense (Shibley, 1998).” It is an approach that promotes the return of the tight knit community with a decreased dependence on the automobile. In other words, it will bring Maslow’s hierarchy of basic needs within walking range of a community (Katz, 1994).

Traditional Neighborhood Development (TND)

The TND, also known as the neo-traditional development (NTD), replicates the classic small town. They have higher density and mixed use development, provide public transportation, are pedestrian friendly and the community is more connected with more direct route street patterns (Southworth). According to Southworth, a TND is “walkable, has clear civic structure, a mix of uses and housing types, and harmonious design of its buildings and space.” The variety of uses common with TND’s allows “educational facilities, civic buildings, and commercial establishments to be located within walking distance of private homes (Town).” They are supplied with “a network of paths, streets, and lanes suitable for pedestrians as well as vehicles (Town).” TND’s promote options for walking, bike riding, and even driving within the neighborhood. Spaces devoted to both the public and private are of equal significance thus balancing the neighborhood by serving an array of home and business owners. The presence of public open space in the form of plazas, parks and squares “enhances commu-
Transit Oriented Development (TOD)

The TOD, also known as the pedestrian oriented development (POD), is like the neo-traditional development in that it is designed to create convenient walkable communities. However, unlike the TND, this development does not focus as much on dictating architecture in replicating historical styles (Southworth). The designers and developers of these two types of developments claim that they are “less auto dependent and will reduce travel distance and time, expand public transit use, and are more conducive to the formation of community sense than typical late-twentieth century subdivisions” (Southworth p105-106).

Peter Calthorpe, an architect and planner who founded Congress for the New Urbanism, suggests design configurations to reinforce the landscape as a pedestrian-oriented space combined with buildings of mixed uses in anticipation of creating an environment dependent on public transportation such as a light rail system. He recommends there be a transit stop at regular quarter mile intervals thus allowing for walking distances to hubs and commercial districts (Southworth).
LIGHT RAIL AS AN ALTERNATIVE FORM OF TRANSPORTATION

Although pedestrian accommodations within the suburban landscape improves walkability, the pedestrian is still secondary to the automobile. Further modifications are still necessary in the landscape allowing the pedestrian to become more equal within the transportation network. A walkable community can be created by "expanding transportation options, and creating a streetscape, that better serves a range of users – pedestrians, bicyclists, transit riders, and automobiles (Principles)." Light rail is one way to decrease the dependency on the automobile which then allows more pedestrian activity to occur.

Defining Rail Systems

The American Public Transportation Association (APTA) is a primary advocate for advancing public transportation. Its mission is to "ensure that public transportation is available and accessible for all Americans in communities across the country (APTA, Profile)." The APTA defines three categories of rail: commuter, heavy, and light rail (APTA, Profile) Figure 4.2 exemplifies the hierarchy of these rail systems.

Commuter rail "is long-haul rail passenger service operating between metropolitan and suburban areas, whether within or across the geographical boundaries of a state, usually characterized by reduced fares for multiple rides, and commutations tickets for regular, recurring riders. Also known as 'regional rail' or 'suburban rail' (APTA, Commuter)."

Heavy rail "is high-speed, passenger rail cars operating singly (or in short, usually two-car, trains) on fixed rails in right-of-way that is not separated from other traffic for much of the way. Light rail vehicles are typically driven electrically with power being drawn from an overhead electric line via a trolley or a pantograph. Also known as 'streetcar,' 'tramway,' 'trolley car' (APTA, Light)." The APTA also describes sub-categories of light rail as heritage trolleys and vintage trolleys. Although they are considered light rail, these vehicles were either built prior to 1960 or they are replicas of such vehicles (APTA, Light).

Environmental and Economic Benefits

In 1991, the Intermodal Surface Transportation Efficiency Act (ISTEA) declared "it is the policy of the United States to develop a National Intermodal Transportation System that is economically efficient and environmentally sound, provides the foundation for the Nation to compete in the global economy, and will move people and goods in an energy efficient manner (National)." The purpose of this act is to reduce energy consumption, improve air quality, and encourage economic development via several forms of transportation (National). Based upon the definitions provided by the APTA and the ISTEA, light rail will be a good fit in a pedestrian oriented suburban landscape.

Fossil Fuel Consumption

Light rail can move more people more efficiently than many other typical means of daily travel. It has the capacity to move up to 500 passengers resulting in an estimated reduction of 350-400 automobiles from congested streets (Minnesotans). Many larger cities already have light rail systems implemented and within the last 10-20 years, smaller cities are considering it to decrease congestion and pollution from the automobile (National). The average American household consumes more than 1,200 gallons of gasoline per year. This is based on an average of two cars per American household consuming 606 gallons of gasoline per car (Silicone). However, in cities that use rail and buses, the amount of fossil fuel consumed is drastically lessened. For example, the District of Columbia and New York state only consumed 700 gallons of gasoline per household per year (Tennyson, Transit). This fuel reduction is a direct result of less automobiles on the roads and more people taking advantage of a mass transit system for transportation.

Rail vs. Bus

Decreasing the demand for the automobile by combining rails and busses is a step in the right direction for a more walkable community. However, it could be taken a step further by using light rail as the primary means for commuter travel.

People greatly prefer using rail oriented public transportation (Seashore) because of clearly defined routes and stops, safe covered stops, reduced noise and fumes, and roomier vehicles (Tennyson, Transit). Because light rail runs off of electricity there are no fumes and noise is at a minimum when compared to busses.

Another reason rail is a better alternative is because rail systems are more permanent as compared to the short life span of a bus. For example, the trolley with proper maintenance can operate indefinitely whereas as buses typically last no more than 20 years. A good example of longevity with light rail is the New Orleans’ street cars built in the 1920’s which are still in use today (Seashore).

The popularity of rail over busses is evident in
some cities’ where today’s use of the rail actually surpasses its use during the days of gasoline and tire rationing. In some communities exclusively served by busses, there is a marked decline in users. Prior to 1989, bus use declined by 75 percent. On the contrary, Pennsylvania is an example of a state that made improvements in their rail system and showed an increase in use by more than 100 percent (Tennyson).

Furthermore, a rail system provides a sense of permanence and commitment because, in essence, by adopting a rail system for a community the government is ensuring riders that public transportation services will always be available (Seashore).

Evidence of Light Rail

Figure 4.1 provides a reserved yet optimistic list of existing and proposed light rail systems spanning across America’s landscape. This list supports the notion that there is a future in public transportation in the form of a rail system. This transportation transformation provides an opportunity for Landscape Architects to take advantage of the changes and create a walkable suburban landscape.

In addition to the listed cities, Appendix 4.1 provides case studies of several cities and their application of a light rail/trolley system and the success and struggles in promoting development, improving connectivity within a community, and reducing dependence on the automobile.
The design portion of this study is based in Alexandria, Virginia which is located south of the Potomac River across from Washington’s District of Columbia. Alexandria was chosen because of Alexandria’s clear evolution of development patterns and the existence of a regional metro. The ultimate vision is to apply walkability ideas that are not land use dependent to an existing suburban landscape.

Instead of designing from the ground up, this thesis design will be applied into an existing landscape. Like most cities, Alexandria has succumbed to suburban sprawl. Though it may be ideal to eliminate sprawl, a more realistic approach would be to stop further sprawl and implement design to improve the existing suburban landscape. Ultimately, the design will blend light rail into the landscape as a tool to reduce automobile dependency. It will provide connections to and from work, play, and home by minimizing car dominated streets. Most importantly, this design thesis will incorporate principles of walkability to create a more pedestrian friendly suburban landscape.

A Walkability Scenario

Although typical suburban landscapes require the automobile for daily activities, some provide amenities for the pedestrian. However, mere the presence of pedestrian amenities does not equate to a safe, convenient, and enjoyable walk. The comfort and quality of the walk may still be degraded due to the unpleasant streetscapes, dominating road space, and vast parking lots devoted to the automobile (Figures 5.1, 5.2, and 5.3).

The intersection and vicinity of King Street, N. Quaker Lane, and Braddock Road in Alexandria, Virginia is an example of this type of landscape. A walkability study mapping the journey of a pedestrian from a single-family detached home to a local dry cleaner is illustrated in Figure 5.4. By following behind a pedestrian, this study demonstrates her perspective of navigating through the landscape. Despite adequate sidewalks combined with clearly defined cross walks, this seemingly simple walk was inconvenient, unpleasant, and even dangerous for her travel. Using the walkability checklist (Appendix 2.1), this intersection is rated poorly in most categories:

- Sufficient room to walk: No, sidewalks were too narrow (4-5 feet wide)
- Easy to cross streets: No, street crossings often led to an island among automobiles and there were several "no pedestrian" signs in specific locations
- Courteous driver behaviors: No, automobile drivers appeared to have minimal regard for the pedestrian.
- Easy to follow safety rules: Yes, easy to follow rules but not convenient for reaching destinations in an efficient and timely manner for areas within eye's view.
- Pleasant Walk: No, the overall walk had an unpleasant streetscape and the landscape did nothing to enhance the walking experience.

In this study, the pedestrian’s route was dictated by following the rules (e.g. using crosswalks, waiting for crossing signals, etc) and a .23 mile and 5-8 minute walk turned into a .9 mile walk at 35-40 minutes. Direct route is 1252 feet or .23 miles

- Length of walk following the rules is 4669 feet or .9 miles
- Alternative route is 2997 feet or .57 miles a 15-20 min. walk

For the pedestrian, this walk did not ‘feel’ enjoyable or safe. When using the designated crosswalks, she found her self on islands in the middle of busy intersections. Due to the size of the intersection, she usually had to wait more than 3 minutes before crossing to the other side. On several instances, she was required to cross 2 or more crosswalks before getting to the other side of the intersection. Also, there were certain areas where pedestrians were not permitted to cross and she had to walk out of her way several blocks before reaching another crosswalk. This soon became frustrating because the dry cleaner was initially in her sight but she had to walk an additional distance away from the dry cleaner to get to a crosswalk. In fact, she ended up walking nearly 4 times the distance to get to the destination. The extended waiting periods at the crosswalks added to the walking time which created an inconvenient and quite frustrating trip.

Perhaps, if the landscape was aesthetically pleasing, she might not have been so frustrated and may have considered this journey more of a leisurely stroll. However, this was not the case. There was little to no street plantings and the architecture of the surrounding buildings was quite dull. In some areas, the walking surface was far below acceptable. Because of the narrow width, she often had to step off of the sidewalk to provide adequate room for the passer-by. The quality of the sidewalks was often insufficient. Some were cracked, interrupted by obstacles such as a trash can, or simply inoperable. At one point, there was only a small gravel area to stand while waiting at a crosswalk. Another area’s sidewalk was not even walkable be-
cause metal grates running through it were uneven with wide gaps creating a hazard.

Because of the many shopping centers and businesses at this intersection, curb cuts allowing access for automobiles to parking areas quite often interrupted the pedestrian’s walk. Perhaps, if the drivers were more courteous to her she may not have been so discouraged by her walk. However, most drivers did not acknowledge her while she waited to cross curb cuts. At times, she had to wait for several cars to leave or enter parking areas before crossing.

As stated earlier, this walkable journey was rated poor according to the walkability checklist. From a pedestrian’s perspective that has actually walked this specific suburban area, it was also rated poor. She did not enjoy the walk because of the additional time and distance added to her journey, the uninteresting landscape and streetscape, and her feeling of being surrounded by automobiles at any given moment.
DESIGNING A WALKABLE SUBURBAN LANDSCAPE

Examining a regional perspective of Alexandria is important prior to designing the specific site of the intersection of King, N. Quaker, and Braddock Road. A heavy rail system connects Washington D.C., Arlington, and Alexandria. Along the heavy rail system, higher density developments have occurred in the form of TOD’s. For example, Ballston, Clarendon, and Rosslyn have developed along Arlington’s orange line of the Metro. Although these TOD’s are all located in the city of Arlington, development has increased to the point that they have distinct community centers (Figures 6.4 and 6.5). Though these TOD’s are connected by the Metro, there is a larger part of the suburban landscape that is not directly connected without the use of the automobile. The incorporation of light rail will connect the rest of the suburban landscape.

A light rail system in Alexandria may have the potential to transform some landscapes from auto dominated into walkable and pedestrian oriented landscapes while preserving their suburban characteristics. This design does not encourage a significant change in densities along the proposed light rail lines. Although a majority of the land use will remain the same, critical areas such as the Bradlee Shopping Center will be transformed to produce a mixed land use development where housing will be attached to retail and commercial activity.

There are typical obstacles that pedestrians face within suburban landscapes (Figures 6.1, 6.2, 6.3). Examples include narrow, disconnected sidewalks often obstructed with trash cans, power-line poles, automobiles, etc.; difficult and awkward street crossings; inordinate numbers of curb cuts, and, a generally unpleasant landscape for all users (peds, bikes, cars). The design focuses on enhancing walkability by minimizing and/or eliminating some of these typical suburban problems.

In addition to the many of the above characteristics, the suburban intersection of King, N. Quaker, and Braddock Road also has existing characteristics which are desirable when designing a walkable community: schools, churches, recreation, multi-family, and single family homes, offices, and retail all within a walkable proximity. This site was chosen because of its diversity, its overwhelming space devoted to the automobile degrading walkability, and because it was the most challenging location that would provide an opportunity to test ideas under extreme circumstances.

Figure 6.1

Figure 6.2

Figure 6.3
Arlington, Virginia
Transit Oriented Developments
Goals, Objectives, and Strategies

Prior to designing a walkable suburban landscape at this intersection, goals, objectives, and strategies need to be assessed. The following outlines these goals, objectives and strategies:

**GOAL:** To create an enjoyable and walkable suburban landscape that promotes convenience and safety

**Objectives and Strategies:**
Decrease the automobile and the space devoted to the automobile
- Integrate light rail into the landscape
- Incorporate parking garages to reduce surface parking

Decrease the direct interface between the pedestrian and the automobile
- Reduce curb cuts
- Development of a traffic circle limiting automobiles to right hand turns only
- Incorporate pedestrian underpass
- Parking in rear of buildings
- Parking lots become car “parks”

Increase Safety for the Pedestrian within the suburban landscape
- Curb-side accessibility to light rail trains
- Incorporate seating
- Incorporate covered transit stops
- Provide trees for shade
- Provide open space
- Follow ADA guidelines for accessibility
- Incorporate pedestrian underpass
- Incorporate clearly identified crosswalks
- Wider, continuous sidewalks

Incorporate clearly identified crosswalks

Increase Enjoyment for the Pedestrian within the suburban landscape
- Incorporate seating
- Incorporate covered transit stops
- Provide trees for shade
- Provide open space
- Provide places for reflection/relaxation
- Provide visual appeal via architecture, water features, hard-scapes, etc
- Enhance recreational areas

Increase Comfort and Ease for the Pedestrian within the suburban landscape
- Curb-side accessibility to light rail trains
- Incorporate seating
- Incorporate covered transit stops
- Provide trees for shade
- Provide open space
- Follow ADA guidelines for accessibility
- Incorporate pedestrian underpass
- Incorporate clearly identified crosswalks
- Wider, continuous sidewalks
Site Design Location
Preliminary Regional Rail Plan and Strategy

Figure 6.8   Existing primary and secondary roads in Alexandria, Virginia

Critical areas for primary hubs within a .5 mile radius  Figure 6.9

Critical areas for secondary hubs within a .5 mile radius  Figure 6.10
The existing conditions at King St., Quaker Ln., and Braddock Rd. intersection have a good variety of land use, however, it is very one dimensional and is typical of suburban development. Development is heavily devoted to the dependency on the automobile resulting in a lack of walkability despite its mixed land use relative to proximity.

The proposed plan illustrates a traffic circle, parking garage, light rail, and re-development of the Bradlee Shopping Center. There is a decrease in curb cuts, surface parking, improvements with streetscape, and open space. Narrow disconnected sidewalks have been replaced by wider, lighted, and landscaped sidewalks that are continuously connected from location to location. The light rail terminates with a loop that provides cover for transit users. The light rail is also designed for curb-side pickup making entry and exit more convenient for riders.
Existing Conditions

Proposed Conditions
REFLECTION

Design Alternatives

The design portion of this thesis illustrates a single effort attempting to solve a complex problem of creating walkability in an existing suburban landscape. Upon reflection, the specific location of the site design (intersection of King St., Quaker Ln., and Braddock Rd.) proved to be atypical of most suburban intersections. In other words, a normal suburban intersection usually consists of two perpendicular roads crossing one another. The intersection chosen for intervention had five major sections of roads converging onto one location.

The preliminary design focused on reducing curb cuts, surface parking, and awkward intersections for both the automobile and pedestrian in an effort to introduce the principles of walkability to what is otherwise an unwalkable landscape. The design was based on New Urbanist philosophies and the incorporation of a light rail system as an essential tool to reduce the daily use of the automobile.

After experimenting and attempting to incorporate light rail into an already congested intersection, it became clear that the solutions to this intersection are far from being achieved on my first attempt. Upon reflection, I did create a more walkable landscape, however, there were several flaws in the design:

1. The intersection was re-designed with too many New Urbanist principles. This contradicted the original plan to preserve the suburban landscape. For example, the Bradlee Center was removed and completely re-designed into a mixed use development that is very similar to a downtown urban development.

2. The rail system could be an inconvenience to riders and would lessen people’s daily use of light rail and encourage continued daily use of the automobile. The rail design would force riders to transfer trains to continue on their commute. When transferring trains, the riders would have to walk inconvenient distances. Also, the terminus was at an undesirable destination which may require an inconvenient walk to daily activities (schools, shopping, and churches)

3. The pedestrian was still superseded by the automobile. Though there was grade separation, in some locations the pedestrians were moved underground while the automobile remained on the surface.

Despite the above flaws, the design did bring forth questions regarding opportunities for walkability in an extant suburban landscape. Upon further reflection, the two methodologies used in the preliminary design could still apply in a re-design, though they would be implemented much differently. In a re-design, the walkable aspects of new urbanism would be applied in the modification of such developments (rather than extreme land use re-development). Also, the introduction of a light rail system could still be utilized as a tool to reduce the dependency on the automobile. However, its track design would be more efficient and convenient for all travelers.

Figure 7.1 illustrates two alternative design possibilities. The first design shows minimal intervention. It illustrates what the landscape would look like in its present state but only with the implementation of a light rail system. This design does not incorporate any NU principles but could possibly promote walkability just through the introduction of light rail.

In contrast the second design shows an extreme alternative to create walkability. Land use re-distribution would be inevitable and it would be very expensive to implement. In this re-design, the aforementioned flaws could be addressed with the following corrections:

1. Existing buildings could be retro-fitted welcoming all forms of transportation. For example, the Bradlee Center would have a train stop within it, plenty of public open space, as well as parking for automobiles.

2. The train track design would feature a round-about. Riders would not have to change trains. Trains would converge onto one track which would reduce the number of tracks in a pedestrian’s path. Train destinations would include such places as churches, the Bradlee Center, and a high school.

3. The pedestrian is no longer superseded by the automobile. The automobile is underground at the main intersection and the pedestrian is on the surface creating a large Central Park-like environment.

Application Towards Other Suburban Landscapes

There are very few examples of walkability found in the suburbs of Alexandria, as well as suburban landscapes across the United States. Thus, it is safe to say that to date suburbia is not walkable (at least when compared to walkability in urban landscapes). This study, though devoted specifically to an extraordinary intersection, does identify several principles that can be applied to promote walkability in any extant suburban landscape.

Retrofitting, in particular, could be a fairly simple and cost effective intervention. Modifications and renovations of existing development provide an opportunity for a landscape to become more walkable for the pedestrian by providing aesthetically pleasing streetscapes, increasing mixed-use development, and
improving convenience. Retrofitting also has the potential to welcome all forms of transportation (automobiles, light rail, pedestrians, bikers, etc) as exemplified in Figure 7.1.

New urbanist’s walkability principles can also be easily implemented in an extant suburban landscape being careful not to re-design suburbia into an urban center. Basic principles such as pedestrian friendly, tree lined streets, slower street traffic, higher quality pedestrian paths, and public open spaces can make walking more safe and enjoyable.

Periodic grade change between the automobile and pedestrian is another principle than can be implemented into an extant suburban landscape. Grade changes in favor of the pedestrian would essentially bridge pedestrians to desirable destinations without directly encountering the automobile. This, in itself, enhances walkability in suburbia.

Light rail could be a very efficient form of alternative transportation in any extant suburban landscape to reduce the amount of automobiles used for daily activities. Though costly, light rail can be incorporated into existing road infrastructures. As stated earlier, the introduction of light rail alone could support walkability. However, using light rail as a tool in conjunction with NU walkability principles and retrofitting, walkability could be even more enhanced in the suburban landscape. For example, areas of development, as seen in Figure 7.1, could become critical stops for a light rail system.

In conclusion, many of the same principles that were applied to this atypical intersection can be applied to any suburban landscape but with less extreme intervention. The underlying premise is to preserve the suburbs, use alternative forms of transportation to reduce the daily dependence on the automobile, and to design the landscape in such a way that promotes safe, convenient, and comfortable walkability for pedestrians. There is an understanding, that through time, the suburban landscape will slowly evolve into higher density development due to increased development pressures. As a result, the landscape will likely change by being razed then re-built from the ground up, similar to current TODs in the Alexandria/Arlington region (Figure 6.4). However, this thesis addresses what can presently be done in the suburbs to make it more enjoyable for today’s pedestrian.
# APPENDIX 2.1

## Walkability Check List

1. **Did you have room to walk?**
   - Yes
   - Some problems:
     - Sidewalks or paths started and stopped
     - Sidewalks were broken or cracked
     - Sidewalks were blocked with poles, signs, shrubbery, dumpster, etc.
     - No sidewalks, paths, or shoulders
     - Too much traffic
   - Something else: __________________

   **Locations of problems:** __________________

   **Rating:** (circle one) 1 2 3 4 5 6

2. **Was it easy to cross streets?**
   - Yes
   - Some problems:
     - Road was too wide
     - Traffic signs made or wait too long or did not give us enough time to cross
     - Needed striped crosswalks or traffic signals
     - Parked cars blocked our view of traffic
     - Trees or plants blocked our view of traffic
     - Needed curb ramps or ramps needed repair
   - Something else: __________________

   **Locations of problems:** __________________

   **Rating:** (circle one) 1 2 3 4 5 6

3. **Did drivers behave well?**
   - Yes
   - Some problems:
     - Backed out of driveways without looking
     - Did not yield to people crossing the street
     - Turned into people crossing the street
     - Drank too fast
     - Sped up to make it through traffic lights or drove through traffic lights
   - Something else: __________________

   **Locations of problems:** __________________

   **Rating:** (circle one) 1 2 3 4 5 6

4. **Was it easy to follow safety rules?**

   **Could you and your child...**
   - Yes
   - No
   - Cross at crosswalks or where you could see and be seen by drivers?
   - Stop and look left, right and then left again before crossing streets?
   - Walk on sidewalks or shoulders facing traffic where there were no sidewalks?
   - Cross with the light?

   **Locations of problems:** __________________

   **Rating:** (circle one) 1 2 3 4 5 6

5. **Was your walk pleasant?**
   - Yes
   - Some unpleasant things:
     - Needed more grain, flowers, or trees
     - Scary dogs
     - Scary people
     - Not well lighted
     - Dirty lots of litter or trash
     - Dirty air due to automobile exhaust
   - Something else: __________________

   **Locations of problems:** __________________

   **Rating:** (circle one) 1 2 3 4 5 6

---

**How does your neighborhood stack up?**

**Add up your ratings and decide.**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>26-30 Celebrate! You have a great neighborhood for walking.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td>21-25 Celebrate a little. Your neighborhood is pretty good.</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>16-20 Okay, but it needs work. You deserve better than that.</td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td>11-15 It needs lots of work. You deserve better than that.</td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td>5-10 It's a disaster for walking!</td>
</tr>
</tbody>
</table>

**Total** __________________
APPENDIX 2.2

Principles of New Urbanism

The Region

“For new urbanists, the region is the overall context for all planning. That means planning must often cross traditional jurisdictional lines in order to create a healthy region. Towns and cities within a region need a comprehensive metropolitan strategy in order to prosper. Each town should have both homes for people of all incomes-and jobs. That way, residents aren’t forced to travel far to work. Each town also needs a discrete sense of place. New urbanism calls for towns to develop in the appropriate style for their surroundings, while respecting their neighbors. Towns and cities within a region should have clear boundaries, contributing to the sense of place. The land between towns should be preserved as open space wilderness or farm land. These edges are as important to the centers as centers to the success of New Urbanism. Wilderness, farmland, villages, town edges, town centers, city neighborhoods, and city centers each have their own building densities, street sizes, and appropriate mixture of retail, residential, and other functions (Congress).”

The Neighborhood

“Diverse walkable neighborhoods are what distinguish New Urbanism from other modern development styles. “The word Neighborhood” gets tossed around a lot in real estate brochures, so it is important to be clear what it means. Each neighborhood has a center and an edge. The center should be a public space, whether a square, a green, or an important intersection. The optimal size of a neighborhood is a quarter-mile from center to edge. For most people, a quarter-mile is a five-minute walk. For a neighborhood to feel walkable, many daily needs should be supplied within this five-minute walk. That includes not only homes, but stores, work place, schools, house of worship, and recreational activities. People within a quarter-mile radius will walk to a major transit stop. Those who live further from transit nodes are less likely to bother with the train or bus (Congress).”

The Block, Street, and Building

“If there is one thing that reduces livability of most postwar suburbs, it is the fact that streets do not feel like pleasant, shared space. In New Urbanism, streets are safe, comfortable, interesting places for people to walk and meet. Buildings open onto sidewalks, rather than parking lots. Windows and doors facing the sidewalk make streets safer, and more interesting, for everyone. New Urbanist streets use buildings to improve a consistent and understandable edge. This accommodates buildings of all styles and function. Important locations are reserved for grand, attention-getting buildings; other sites require buildings to respect their context. New Urbanist streets can accommodate cars while also providing comfort and convenience for pedestrians, bicycles, and wheelchair use. Since the suburban boom of the 1950’s, urban design has taken a back seat. New urbanists are helping to rediscover this largely lost art. Excellent design can make a dense neighborhood feel livable and open. CNU’s award programs recognize beautiful, livable neighborhoods (Congress).”

Criticisms of New Urbanism

New Urbanism philosophies model the ideas of Sir Ebenezer Howard, an English town planner. Howard outlined a model of a self-sustaining town designed to “create a better city, with trees, ponds, and no pollution (Greenbelt).” Recognition of his “Garden City” finally occurred when his plans were implemented and the cities were actually built just outside of London, England (Greenbelt). Despite the advantages of developing a planned city such as the Garden City, critics of New Urbanism disagree with the attempt to model the Garden City by developing from the ground up, also known as green field development. These critics feel that green field development still contributes to suburban sprawl. The only difference is that they are planned communities designed with NU principles. Several examples of these planned communities developed outside of city centers are Seaside and Celebration, Florida and Mount Laurel, Alabama.
APPENDIX 3.1

Development Patterns

Philip J. Gersmehl, Professor of Geography at the University of Minnesota (Gersmehl, Home Page), classified eleven development patterns evident in the American landscape (Gersmehl, Urban). However, historically there are three major development patterns that indicate eras of change: the standard grid or grid-iron grid, street car grid, and the cul-de-sac subdivision (Gersmehl, Urban).

Standard Grid or Speculative Grid
The standard grid or speculative grid is common in almost every American city and is often the standard beginning point for town development. Due to its ease of surveying and lay out and because some towns were laid out before anyone ever set foot on the actual plot of land, this pattern was commonly used in the formation of a town or city. One of its characteristics is its narrow streets and square blocks making it easy to give value to each plot. In the early stages of development, the grid system was often expected to be used by pedestrians and perhaps horse and buggy. Another pattern, the city beautiful, a very common variation of the standard street grid, is marked most often with a system of diagonal boulevards cutting through the standard grid Washington D.C. is famous for this pattern (Gersmehl, Urban).

Street Car Grid
As transportation technology advanced, the typical grid-iron grid was replaced by the street car grid. The introduction of street cars and trains allowed development to occur further from the town’s center. Railroad suburbs sprang up as people were able to live further and further away. These suburban neighborhoods had larger lots and the occasional curving streets. The increased lot sizes gave people the opportunity to have private yards and gardens which was not typical in the dense urban center (Gersmehl, Urban).

Cul-de-Sac and Loop Streets
Cul-de-sac and loop street development patterns are the most recent standards in development patterns. Cul-de-sac and loop street development patterns are a result of post-WWII automobile oriented suburbs. The automobile revolutionized how people travel through the landscape and, similar to street cars and trains, they enabled people to live, yet, even further from town centers (Gersmehl, Urban).
APPENDIX 4.1

Case Studies

Portland, Oregon

Portland in the 1960’s, like so many other American cities, was faced with a declining downtown city center. “Suburban housing developments, shopping areas, and business parks were draining the vitality from the city center (Portland Streetcar).” Today, on the other hand, due to revitalization, the city is admired for its efforts in maintaining the character of its downtown. Although other factors played a role in its success, transportation played a leading role. For example, TriMet, a public transportation agency, developed a 12-block downtown transit mall. Even though TriMet primarily operated buses, it was a step in the right direction to reduce the dependency on the automobile (Portland Streetcar).

The introduction of a light rail system called MAX is the city’s newest mode of transportation and, thus far, is proving to be the most significant for the town’s revitalization efforts. This system links suburbs over 33 miles apart, as well as linking these suburbs to the area’s larger city centers (Portland Streetcar).

The $214 million MAX lines extend from downtown Portland to Gresham and east towards suburbs beyond the Willamette River. Plans are continually in place to extend these highly successful light rail lines despite the substantial cost. An example of Portlanders appreciation for the MAX was obvious by the proposal of a 21-mile stretch of line designed to connect North and South Portland which brought forth a hefty cost of $475 million. This estimated price was easily approved by the Oregon legislature and accepted with a strong backing from Portland residents. Voters from Metropolitan Portland indicated their approval of the new lines by a deciding 63 percent margin of victory (Portland MAX). These new additions to the MAX are, despite the cost, a result of its initial and continued success, thus proving “success breeds success (Portland MAX).”

Remarkably, several years prior to Portland initiating construction, there were already designs in place for communities based on a regional light rail system. This was due to the efforts of a consortium of governing powers, the Tri-Met, the Metro, the city of Portland, the city of Gresham, and Multnomah County, initiating the planning program. The program, known as the Trans Station Area Planning Program (TSAP), included market studies, detailed station plans, as well as specific design guidelines. Its over arching goal was aimed to gain support for transit oriented development to occur along the proposed rail lines, thus allowing greater opportunities for prospective riders. This project, specifically created to promote transit oriented development along light rail, was a first for the United States (Portland MAX). The Max has played a significant role in shaping development.

The development which has occurred along the rail lines is a response to broader economic trends which is defined as the occurrence of development when the economy is good. Despite Portland’s light rail, broader economic trends are not directly related to a rail system and, in fact, occur whether or not a community has light rail. However, Portland is a good example a city that benefited from broader economic trends by having a light rail system in place. During the 1980’s, before the MAX was introduced, Portland was experiencing a recession. This recession, as in all cities, began to limit and reduce development and growth. The introduction of the MAX did spur some new development along portions of its route but an economic recession occurred again in the 1990’s resulting in reduced development (Portland MAX). This exemplifies that although light rail helps direct growth and development, it does not dictate economic development. However, if a city already has in place a plan for future development designed around a light rail system, then it can further benefit from transit oriented development when the economy is booming.

This point is highlighted by comparing Birmingham, Alabama to Portland, Oregon. Within the last 15 years, major development has occurred at the Lloyd District station located closest to downtown Portland. An economic up-turn resulted in significant new development and the MAX was there to encourage and support the new development. Whether or not development would have occurred in the Lloyd area despite the MAX is unable to be determined (Portland MAX). Nevertheless, by having the MAX, as well as a plan for future development, Portland had a design implemented which not only spurred but it also enhanced development, resulting in a renowned pedestrian friendly city not chained to the automobile. The Lloyd District was able to welcome the new development and the influx of more consumers without the burden of increased traffic and congestion due to the automobile.

Portland’s development has been encouraged by the existence of a light rail system. Since 1998, there have been several expansions on the MAX line light rail system. Yet, one of the most recent rail operated systems introduced was the Portland Streetcar. Since its introduction, improvements in the cities vigor as well as generating and accommodating new residential and business growth have occurred which further solidifies that planning development based around light rail has positive results (Portland Streetcar). Furthermore, prior to the introduction of the MAX, Portland averaged 170 days annually with air quality that violated federal standards. The introduction of the MAX assisted in reduction in the use of the private automobiles, in turn, causing less pollution and congestion on city streets (Minnesotans). Portland is a great example of success.
due to the implementation of the light rail systems.

In contrast, Birmingham’s growth is from reactive development creating identity and transportation issues. The city did not plan for the extent of development that is currently occurring. New development creates more traffic which increases the demand for new roads to relieve congestion. The cycle continues as the newly built roads encourage more development which, in turn, brings more traffic. This cycle creates more suburban sprawl and identity issues because there are little to no specific boundaries between Birmingham and its suburbs. All of the new development is designed exclusively for the automobile so there has been an increase in the amounts of traffic congestion, commuter travel time, and air pollution. Fortunately, Birmingham has recognized its problems and is one of the many cities in the United States that is proposing a light rail system as a solution to reduce automobile congestion, decrease fuel consumption, and increase connectivity within the region (Birmingham).

Baltimore, Maryland

Baltimore’s light rail system, much like Portland’s, is relatively new. A stretch of light rail operated by the Mass Transit Administration of the Maryland Department of Transportation began operation in 1992 (Bell, Baltimore). Unlike the ever expanding highly successful Portland MAX, the Baltimore light rail system seems rather limited. Even though it has expanded from the 22.5 miles from 1992 to today’s total of 30 miles, it has experienced some operational set backs. For example, the lines do not directly connect to the existing subway system consequentially creating awkward transfers for riders needing to access both systems (Bell, Baltimore). However, a 0.34 mile section of track does connect to Peen Station allowing travelers to link to Amtrak as well as Washington D.C.’s MARC commuter service offering direct routes to many east coast cities (Kozel).

Another set back was a result of cost cutting efforts during construction. It was originally built with a single track design. This was intended to reduce construction costs, but after operation began this money saving effort created irregular operation schedules resulting in 17 minute minimum operation frequency which inconvenienced passengers. Another inconvenience occurred when the MTA had to begin construction again to upgrade to a dual track system on all of its lines. By Spring 2005, only half of the lines had been completed (Bell, Baltimore).

To assist Baltimore in their efforts to have a successful rail system, The Federal Transportation Administration (FTA) named the city one of its five cities sponsored in a “Turn Key” Demonstration Program (Kozel). The FTA is “one of eleven administrations within the U.S. Department of transportation headed by an Administrator who is appointed by the President of the United States…which provides financial assistance to develop new transit systems and improve, maintain, and operate existing systems (Federal).” A turn key project is defined by the Transportation Equity Act for the 21st Century (TEA-21), as a “project under which a recipient enters into a contract with a seller, firm, or consortium of firms to design and build a mass transportation system or an operable segment thereof that meets specific performance criteria (Transportation).”

Also, like Portland, planning began in the 1980’s, years prior to construction, with the North Corridor Study (NCS). This endeavor studied three alternative mass transit systems used to connect the downtown northward to Hunt Valley. The first alternative included two lanes of traffic devoted specifically for busses following the I-83 Corridor. The second alternative was commuter rail and the third alternative was light rail. A decision was made to build a northerly route using light rail which has proven to be successful in terms of increasing ridership. In fact, since the systems opening of the original 22.5 mile stretch in the early 90’s, ridership has increased from 20,000 to 36,000 by the year 2002. This is, in large part, due to the 7.5 mile expansions (Kozel).

Boston, Massachusetts

Boston’s light rail system, best known as the Green Line, has a very different history than those from Portland or Baltimore. It is the oldest system in the United States as its first tracks were laid under ground in 1897 connecting Park Street to Boston. Underground rail was a solution to extreme congestion experienced on the streets above. Unfortunately, over the years, many of Boston’s trolley and subway tracks have been removed and public transportation such as light rail has been replaced with bus services. What remains today is a small example of what once was an expansive system of trolleys connecting the Boston area (Boston).

The green line system that is still in operation today has characteristics of a subway and characteristics of a trolley. For example, parts of the Green Line are underground, thus resembling a subway. Yet, the cars are historical trolleys that “still clang their bells, interact with street traffic, passengers signal for stops, and fares are collected in fare boxes outside of the subway (Boston).”

Unlike Baltimore’s system, Boston’s light rail system is conveniently networked to make connections to both heavy rail and commuter rail for movement throughout the region. Boston’s light rail as of 2001 in comparison with the rest of the United States has more riders than any other light rail system despite its remodeling of many of its tracks (Boston).
Minneapolis-St Paul, Minnesota

The Twin Cities are examples of the many cities on the 2003 list proposing light rail for their future transportation needs. As of 2004 the Minneapolis/St Paul Metro area had completed portions of the first of its many proposed lines. The Hiawatha line provides 17 stations, connecting downtown Minneapolis to the Mall of America. According to the Metropolitan Council Directions Newsletter, the new light rail line ridership reached 7.9 million for the year 2005 (Metropolitan). This may be a result of the Twin Cities popular public desire for the application of light rail to their city. According to Brian Lamb, General Manager of Metro Transit, the system’s increasing popularity may be due to “more people are discovering the cost benefits and stress reduction of getting out from behind the wheel of a single-occupancy vehicle (Metropolitan).” Immediate results and success of this newly introduced light rail system is beginning to transform a car dominated community to a community that consumes less fuel resulting in an energy efficient livable community.

Prior to the introduction of the Hiawatha line, residents and Grass Roots Organizations began asking important questions pertaining to the feasibility and likelihood of light rail introduced into their city. The Minnesotans for Light Rail Transit (MLRT) asked the following questions regarding the feasibility and desire to transition their city’s transportation to modern day light rail: why, can it work in Minnesota, and do residents want it? They found an overwhelming positive response.

Why would the Twin Cities want a light rail system? The city looked to Portland Oregon’s success, noticing that prior to the introduction of the MAX, Portland had poorer air quality and increased traffic congestion (Minnesotans). The Twin Cities’ combined population is over 650,000 people (Wikipedia). Obviously, the entire population does not commute, but as of 1999, 97% of those that do commute travel by means of a private automobile. Minnesota statistics predict that in the next 20 years 600,000 more residents will be taking to the Twin Cities’ roads. This steadfast use of the automobile will only compound problems in the future. The present day use of the automobile as well as future trend indicators for continued reliance on the automobile has put light rail on the auction block to be sold as a means of reducing congestion (Olson). A system built in the Twin Cities would ultimately save money, conserve energy, and preserve the environment (Minnesotans).

Can light rail work for The Twin Cities? According to MLRT, cities such as Portland, St Louis, and San Diego which are very comparable to the Twin Cities in categories such as population and density patterns have discovered several advantages as a result of light rail. These advantages are consistently repeated from case study to case study: reduction in air pollution, decrease in daily commute travel times, and a reduction of congested streets and traffic jams from excessive automobile use (Minnesotans).

Do people want it? Minneapolis-St. Paul, like so many other cities, have welcomed the idea with open arms. According to several polls, the residents in the Twin Cities are more than open to the idea of light rail. For example, prior to the construction of the Hiawatha line, a Star Tribune/WCCO-TV Minnesota Poll showed that “81% of residents in the metropolitan area think it is a good idea to have light rail transit (Minnesotans).” According to a news radio forum on Minnesota Public Radio (MPR), hosted on July 2, 1999 by Dan Olson, more than two-thirds of people who responded to a poll commissioned by the Minnesota Public Radio, St. Paul Pioneer Press, and KARE-TV support light rail. His show provided arguments from both sides of the discussion over light rail. Some believe that light rail will not reduce traffic congestion, such as former state senator and current White Bear Lake Attorney Fritz Knaack. He believes that the money invested in light rail would be better spent on increasing roads. Knaack also argued that the success in Portland decreased shortly after “the bills started mounting (Olson).” However, this position does not appear to be a popular position among residents in the Twin Cities because “even as cost estimates for proposed light rail transit systems rise, Minneapolis and St Paul residents continue to show strong support for the idea (Olson).” In fact 83% of the poll participants show support for light rail. Despite whether or not light rail is the answer to the problems of congestion can be argued. On the other hand, fossil fuel is finite and with the future depleted of this resource, alternative transportation must be considered and energies spent towards that understanding. “LRT is not an end tool that can help our region become economically, environmentally and socially sustainable (Minnesotans).”

San Jose, California

Like many cities, San Jose began incorporating light rail into its city’s landscape in the late 1980’s. However, statistically, it has not had an overwhelming amount of success. Despite expansion of the rail system over the past twenty years, ridership has taken a downward spiral. A case study, Vanishing Automobile Update #32, indicated that San Jose’s light rail system almost never has passengers. Popularity and ridership became so reduced that San Jose had to cut services to prevent revenue losses. Statistics suggest that despite the existence of light rail, road congestion has not decreased and has, in fact, increased. The Texas Transportation Institute, tracking congestion since 1982 claims “the amount of time the average San Jose commuter wastes sitting in traffic has more than tripled in the last two decades… congestion cost commuters a billion dollars a year, or more than $1,400 per commuter, and burns up nearly 90 million gallons of fuel per
year (San Jose).” This rise in congestion is attributed to the increased number of miles driven compounded by a small 15% increase in road infrastructure. Despite the less than successful system, the Valley Transportation Authority remains persistent to continue expanding their light rail because their goal is to provide “a viable alternative to the automobile (San Jose).”

San Jose as a viable city to successfully operate light rail has been debated. The case study, Vanishing Automobile Update #32, concluded that “light rail is an obsolete technology that doesn’t really work anywhere. But it is especially unsuitable in post-automobile urban areas such as San Jose (San Jose).” However, Edson L. Tennyson argues that San Jose’s lack luster light rail performance can be attributed to the poor management, the major fault of the system. He states that “there is nothing wrong with VTA’s LRT system that good management could not fix. San Jose’s critical policy issues go all the way back to National City Lines, Inc. – the notorious highway industry outfit which bought up electric streetcar lines in order to convert them to busses (Tennyson, San Jose).” This lack of good management compounded by the recent California budget crisis and sagging Silicon Valley economy causing job loss and travel reduction has had a direct effect on the popularity of public transportation (Tennyson, San Jose). The conglomeration of economic pitfalls will almost always result in negative impacts on urban areas and is especially difficult on public transportation because funding for the system primarily comes from sales tax (San Jose). This is true regardless the type of public transportation. Recently, there have been cutbacks and post-pone-ments on expanding the system (Tennyson, San Jose). On a positive note, the tracks are already in place once the local economy recovers and the future demands an alternative to the automobile. San Jose will be one of the U.S. cities prepared should the transportation paradigm shift towards rail (Tennyson, San Jose).
Bibliography


33


Lewis, R. “The industrial suburb is dead, long live the industrial slum: suburbs and slums in Chicago and Montreal”. Planning Perspectives p. 123-144.


Image Credits

Chapter 3
Figure 3.1 p.5 (Source, Davidson)

Chapter 4
Figure 4.1 p.8 (Source, Davidson)
Figure 4.2 p.8 (Source, Davidson)

Chapter 5
Figure 5.1 p.10 (Source, Davidson)
Figure 5.2 p.10 (Source, Davidson)
Figure 5.3 p.10 (Source, Davidson)
Figure 5.4 p.11 (Source, Davidson)
Aerial Photo from Google Earth
Figure 5.5 p.11 (Source, Davidson)
Figure 5.6 p.11 (Source, Davidson)
Figure 5.7 p.13 (Source, Davidson)

Chapter 6
Figure 6.1 p.12 (Source, Davidson)
Figure 6.2 p.12 (Source, Davidson)
Figure 6.3 p.12 (Source, Davidson)
Figure 6.4 p.13 (Source, Davidson)
Aerial Photo from Google Earth
Figure 6.5 p.14 (Source, Davidson)
Figure 6.6 p.15 (Source, Davidson)
Figure 6.7 p.15 (Source, Davidson)
Figure 6.8 p.17 (Source, Davidson)
Figure 6.9 p.17 (Source, Davidson)
Figure 6.10 p.17 (Source, Davidson)
Figure 6.11 p.18 (Source, Davidson)
Figure 6.12 p.19 (Source, Davidson)
Figure 6.13 p.20 (Source, Davidson)
Figure 6.14 p.21 (Source, Davidson)
Figure 6.15 p.22 (Source, Davidson)
Figure 6.16 p.25 (Source, Davidson)
Figure 6.17 p.25 (Source, Davidson)
Figure 6.18 p.25 (Source, Davidson)
Figure 6.19 p.25 (Source, Davidson)
Figure 6.20 p.25 (Source, Davidson)

Chapter 7
Figure 7.1 p.25 (Source, Davidson)
OBJECTIVE
Landscape Architect for Residential or Urban Design

QUALIFICATIONS
Computer Applications: AutoCAD, Autodesk Land Desktop, Adobe Photoshop, Sketch-Up, Arc GIS, Windows XP, Microsoft PowerPoint, Microsoft Word
Relative Course Work: Construction Documents, Hydrology, Grading, Landscape Design and Planning, Ornamental Horticulture, Mike Lin’s Graphic’s Workshop (2 day course)

WORK EXPERIENCE
May 2002 to May 2003 Knoxville, TN
Michael Versen and Associates, Assistant
☐ Field Surveying, Project Renderings, and General Office Duties

June 2001 to August 2001 Morristown, TN
Oakwood Nursery and Landscaping, Inc, Intern
☐ Installation and Maintenance of Residential and Industrial Landscapes
☐ Installation of Irrigation and Water Features

June 2000 to September 2000 Helena, AL
E & E Property Management, Crew Leader
☐ Installation and Maintenance of Residential and Industrial Landscapes
☐ Installation of Irrigation and Water Features

January 2000 to May 2000 Mobile, AL
Summit Landscape Supply, Nursery Supervisor
☐ Wholesale Distributor to Landscapers and Nurseries
☐ Maintenance of Wholesale Nursery Inventory and General Office Duties

September 1997 to January 2000 Mobile, AL
Morrison’s Nursery and Garden Center, Nursery and Landscape Assistant
☐ Installation and Maintenance of Residential and Industrial Landscapes
☐ Installation of Irrigation, Maintenance of Nursery Inventory, Customer Service

EDUCATION
August 2003 to May 2006 Blacksburg, VA
Virginia Polytechnic Institute and State University
Master of Landscape Architecture GPA 3.65
☐ Sigma Lambda Alpha Honor Society, American Society of Landscape Architects
☐ 1st place Group Competition in Landscape Design for Moseley Architects
☐ 2nd place Individual Competition for Toro Irrigation Design Seminar

August 2001 to May 2003 Knoxville, TN
University of Tennessee
Bachelor of Science, Ornamental Horticulture and Landscape Design GPA 4.0
☐ Pi Alpha Xi Horticulture Honor Society
☐ Phi Sigma Theta National Honor Society
☐ College of Agriculture Science and Natural Resources 2002 and 2003 Senior Scholastic Honors

September 1994 to December 1997 Mobile, AL
University of South Alabama
Bachelor of Arts Psychology, Minor Sociology