COMMUTER RAIL IN DANE COUNTY:
ANALYSIS AND PLANNING FOR TRANSIT ORIENTED DEVELOPMENT

Planning Workshop (URPL 912)
Department of Urban and Regional Planning
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EXECUTIVE SUMMARY

BACKGROUND

The purpose of this study is to explore the development of commuter rail in Dane County. Based on a site-level analysis of four station areas along the proposed commuter rail corridor, opportunities for and challenges to achieving transit-oriented development in various station area prototypes are examined. Confronted with a rapidly growing regional population, Dane County and the City of Madison are currently developing a long-range transportation and land use plan. As part of this planning process, the City and County are studying the feasibility of commuter rail development in the Madison metropolitan region to serve growing regional and local transportation needs.

Graduate students in the Urban and Regional Planning Department (URPL) of the University of Wisconsin-Madison have partnered with the City of Madison and Dane County to provide design guidelines and policy recommendations for four of twenty-five proposed commuter rail stations within the Madison metropolitan region. As the focus of the annual URPL Workshop, students studied the initial commuter rail corridor that runs from the southwest area of the City of Middleton to East Towne Mall in Madison. Assuming sufficient demand, the service will eventually extend to outlying communities, justifying an examination of expansion sites such as the City of Sun Prairie. The areas selected for commuter rail sites are intended to ensure that commuter rail can serve the broadest regional interests, connecting employment centers, high-density residential districts, shopping areas, medical facilities, other popular destinations (e.g., the Capitol, University of Wisconsin, Alliant Energy Center, and Monona Terrace), and outlying areas.

Commuter rail is passenger rail service operating primarily on existing rights-of-way connecting metropolitan and suburban areas. Commuter rail is generally characterized by longer headways (time between station stops) than light rail, and usually operates as the longer haul component of a regional transit system. Equipment type and trip distance will vary based on the technology available and the desired trip market. Commuter rail cars can be diesel powered or can use electric powered rail cars. Trains vary in length from one car to twelve. Some commuter rail uses locomotives for power, others have self-propelled cars. Twenty commuter rail lines are operating in the U.S. and Canada currently, carrying over thirty million passenger-trips each month.

Transit oriented development (TOD) is a concept that encourages pedestrian-oriented development within walking distance of a transit station. TOD generally combines a mix of residential and commercial uses within a small area to reduce automobile dependency and enhance neighborhood livability. The appropriate balance of density, diversity, and design enhances the station area context and commuter rail ridership. Encouraging TOD at commuter rail station sites will help achieve the future multi-modal network envisioned in the Dane County Land Use and Transportation Plan (Vision 2020).
PROJECT PROCESS

Literature Review
Over the last decade, experts have focused more directly on the true efficacies of rail transit, contrasting its ability and inability to solve traffic and land use problems. The first component of the project consists of a comprehensive literature review focusing on transit technologies, design guidelines, and regulatory and incentive-based measures used in other communities to promote TOD and commuter rail. Included are recommendations on applying these strategies to Dane County.

This literature review highlights the most salient findings pertaining to commuter rail operations, their impact on land use, and policies and conditions that help to make intra-regional passenger rail most effective and feasible. Indeed, flexible land use regulation that permits dense, mixed-use development in proximity to stations can help to support rail transit by providing it with a solid ridership base accessible within walking distance. It is also clear that rail stations can guide development and enhance property values. Furthermore, several studies examine the policies and approaches that communities can employ to reap the greatest benefit from rail operations and stations. Modern exclusive-use zoning will typically prevent TOD-type development. Therefore, it is crucial that municipalities rezone those areas surrounding stations, creating tools such as “transit villages” or using transit overlay zones to encourage higher densities, mixed uses, and pedestrian activity. Communities can take advantage of land use and policy tools (e.g., urban growth boundaries, transfer of development rights programs, and density bonuses) to gain amenities such as affordable housing, parks, and enhanced project design.

The review is intended to provide Dane County communities with a reference volume of lessons and policy tools that can be used to support and take advantage of commuter rail, and shape the future character of development to yield more efficient transportation options and better neighborhoods.

Site Inventory and Analysis
In the second component of the project, data was compiled for potential commuter rail station sites at Greenway Center in Middleton, Medical Center near the UW Hospital, Baldwin Street in the East Rail Corridor, and in the City of Sun Prairie. In each case, a study area encompassed by a circular boundary of one-quarter mile radius was analyzed. Considerations included land uses and ownership, transportation circulation, zoning, open space, utilities, and physiography, among others. These data were mapped and analyzed in order to identify opportunities and constraints for TOD in each station area.

Community Goals and Objectives
Area stakeholders including neighborhood associations, residents, City and University planners, developers, alderpersons, and others provided input and contributed their station-specific knowledge to develop a broad set of community goals and objectives for applying TOD to each station area. Existing planning documents were also referenced.
Design and Policy Recommendations

Informed by the station site inventory and community visioning exercises, site-specific recommendations for TOD and commuter rail supportive policy were developed. The principal design elements considered include:

- Transit station design
- Residential development
- Commercial development
- Civic uses
- Vehicle circulation and parking
- Bicycle circulation
- Pedestrian circulation
- Street furniture, signage, and landscaping
- TOD supportive policies

STATION SITES

Greenway Center

Greenway Center, a commuter rail station located in the southwest region of the City of Middleton, would be the western-most station area on the proposed Transport 2020 commuter rail start-up system. A greenfield site, Greenway Center is primarily a greenfield site and was chosen in this proposal as a model for future stations that might be built in other outlying municipalities, contingent upon sufficient demand. Much of the land surrounding the proposed station site is open space and is slated for a few commercial and residential development projects. Careful planning of the site is needed to promote the traditional neighborhood and transit oriented goals of Middleton and to create a thriving area for commercial and neighborhood success.

To the extent possible, development within the Greenway Station study area should be planned and built in a compact, mixed-use, pedestrian-friendly manner that is supportive of commuter rail operations. Building and street designs should enhance the pedestrian environment and establish good vehicular, bicycle and pedestrian access to the station and surrounding activity centers. Residential, retail, and service developments should be designed and built in a manner that economically supports the neighborhood and commuter rail operations, and minimizes the need for automobile trips. In addition, a park-and-ride structure should be built adjacent to the rail station to further support rail operations and accommodate potential rail passengers residing in distant neighborhoods.

Additional housing types should reflect need in the area and include a high number of multi-family units. Mixed-use residential and commercial development is encouraged. Density bonuses, inclusionary zoning, development impact fees, and tax credits can be utilized to promote and fund affordable housing which should be approximately 15 percent of total residential development. Civic uses, including public spaces and open space, are encouraged around the transit station to accommodate the residents and employees of the area. The South Fork of the Pheasant Branch Creek should be protected.
and enhanced to provide public greenspace for residents, visitors, and employees of the area.

University of Wisconsin Medical Center
The proposed Medical Center/West Campus station site is located on the near west side of the City of Madison. The site is situated at the west end of the University of Wisconsin campus at the northwest corner of the intersection of Highland Avenue and Campus Drive. The Med-Center station is one of three rail stops envisioned for the UW campus. This station area is envisioned as a destination station prototype, designed to serve a large population of commuters working in a centralized area. The proposed station site aims to take advantage of commuter rail use as an alternative mode of travel among local employees (projected to be nearly 12,000 within 10 years) and visitors. By reducing the number of vehicle trips to the site area, commuter rail stands to significantly alleviate automobile traffic and parking demand problems. In addition, the University Avenue corridor between Grand Avenue and Walnut Street presents several opportunities for redevelopment consistent with transit-oriented development principles.

The Medical Center station area presents a unique challenge and opportunity for promoting collaboration at the University, Federal, and private land ownership interface within a vibrant neighborhood context. Station area planning needs to balance the diverse and unique characteristics that maintain the University as a premier learning institution, preserve the stable character of the Regent neighborhood, and create a vital mixed-use district at the heart of the area along Old University. Broad community goals include reducing the volume and impacts of automobile traffic through the neighborhood, enhancing bicycle and pedestrian networks, providing mixed-use neighborhood-scale commercial development, and achieving an aesthetically pleasing streetscape design to serve the large employee base, visitors, and residents of the area.

The design guidelines for the Medical Center/West Campus station site reflect the unique dichotomy of existing land ownership (public and private) and land use priorities adjacent to the station. The primary goal of this plan is to redevelop the area immediately surrounding the station site, particularly along University Avenue, into a mixed-use commercial district intended to serve the local workforce, residents, and visitors. To attract these workers as well as visitors and local residents to commuter rail, the station area must provide an accessible, pedestrian friendly environment with a mix of retail and neighborhood-scale service establishments. The four-block segment of University Avenue, between Walnut Street to the east and Farley Street to the west, contains a large number of parcels suitable for such redevelopment. A pedestrian walkway over Campus Drive, west of Highland Avenue, would provide commuters and other campus employees and visitors to the area easy pedestrian access from the station site to the new University Avenue mixed-use commercial district.

The above should be accomplished while protecting and improving the adjacent neighborhood and working in concert with institutional property owners. Therefore, the balance of the study area surrounding the station will remain in its current land use. To the north, the University has a master plan designating the future land use of the entire
west campus area. The one exception is the V.A. Hospital property, which may possibly become available for redevelopment in the future. To the south, the entire Regent Neighborhood should be maintained. The rail station may benefit the neighborhood by decreasing automobile traffic, increasing property values, and creating an attractive retail corridor for the whole neighborhood.

**Baldwin Street**

Madison’s isthmus neighborhood is a compact and highly urbanized district. Baldwin Street, a proposed location for a downtown rail stop, is surrounded by a critical mass of households and may also be home to a new central park in the coming years. The station area has great potential for transit-oriented development (TOD) due to underutilized and vacant lots in close proximity to medium density residential and commercial development. However, as shown by the market analysis and policy recommendations section, the area will need to develop a higher density of residential land uses to support the retail and commercial uses typical of TOD areas.

Many who live near the site today cherish the neighborhood and surrounding area. New development plans will be of high interest to many residents and therefore collaboration needs to be proactive. New development, whether by the public or private sectors, should incorporate the same character into its design as has made the isthmus home to so many vibrant families. Most of the recommendations for new development focus on potential land use changes within the current manufacturing district. The recommendations do not seek to change the density or historical character of the existing residential areas. Within the manufacturing district, increased density and building height, decreased surface parking, and improved pedestrian-friendly design will be crucial to the success of the station. This area can also serve as a unique north-south pedestrian corridor across Madison’s isthmus, provide a gateway to the Williamson Street commercial area, and compliment the proposed Central Park.

**City of Sun Prairie**

The downtown Sun Prairie district is ripe for redevelopment with a large number of its industrial tenants having vacated their parcels in the last few years. Chiquita’s processing plant located adjacent to the rail system is a likely site for future redevelopment as are Royle Publishing, the vacant Wisconsin Porcelain, and those parcels along the rail corridor west of Market on Linnerud Drive. Together, these sites account for over 11 acres of downtown Sun Prairie and are likely to be developed by the private sector as the commuter rail initiative makes progress. As this infill development begins, the City should incorporate the following traditional neighborhood design principles in its creation.

- Mixed-use facilities.
- Increased residential density.
- Accessible, wide, and clearly delineated side/crosswalks.
- Ample lighting and directional signage for wayfinding.
- Public plazas and dedicated urban open space.
- Multi-modal transportation options.
- On-street and structured parking where economical.
• Streetside landscaping and plantings.

In short, the City of Sun Prairie has an opportunity to redesign the visual impression, layout, use, and experience of its downtown into a destination for current and future residents, visitors and workers from throughout the area. The Chiquita processing plant, recently acquired by the City, is an ideal location for a future station. The street corridor, on which the site sits, Market Street, can be shaped into a new mixed-use gateway to Main Street, on which a predominant amount of the existing commercial businesses are currently located. Sun Prairie, while not considered a part of the starter rail system, can begin to competitively position itself to accommodate a future rail depot.
PROJECT ORIGIN AND PURPOSE

PROJECT TOPIC

The purpose of this study is to explore the implementation of commuter rail in Dane County. Based on a site-level analysis of four station areas along the proposed commuter rail corridor, opportunities for and challenges to achieving transit-oriented development in various station area prototypes are examined. Confronted with a rapidly growing regional population, Dane County is currently developing a long-range transportation and land use plan. As part of this planning process, the city and county are studying the feasibility of commuter rail development in the Madison metropolitan region to serve growing regional and local transportation needs. As explained in the Dane County Commuter Rail Feasibility Study:

"Improving public transportation is important because better transit is one of the key strategies that will help improve the region’s quality of life, the overriding objective that emerged from the community’s recent visioning process. The vision statement contained in the Dane County Land Use and Transportation Plan states that:

“In the year 2020, Dane County will continue to offer a quality of life unmatched in the nation. That quality will be enhanced by thoughtfully planned and designed development, an integrated multi-modal transportation network, rigorous business and job growth, and preservation of treasured natural resources” (1-6).

The goal of this analysis is to provide detailed land use and design recommendations for the redevelopment of four proposed rail transit stations within the rail feasibility study region. It begins with an overview of the benefits of rail transportation, commuter rail technologies, the influence of rail on urban form, and development incentives and transit supportive land use regulations. Four station areas are evaluated individually as to their potential for transit-oriented development. Each site was selected for its unique qualities and potential to serve as a design prototype for other transit station areas. Recommendations to achieve transit-oriented development in each station area are based on community goals and objectives, existing conditions, and a detailed analysis of opportunities and constraints. Both public policy and market suitability are considerations for each station area’s redevelopment potential.

DEPARTMENT OF URBAN AND REGIONAL PLANNING WORKSHOP

This study has been conducted by the University of Wisconsin-Madison Department of Urban and Regional Planning annual student workshop. The purpose of the annual student workshop is to provide students with an opportunity to fully engage in an ongoing planning issue within the University’s local and regional community. Through the development of a plan to address an applied community issue, students develop and
sharpen marketable planning skills while assisting a local community group, government agency, or non-governmental organization in advancing an identified planning goal. More than a class project, the product of a workshop has the potential to directly shape public policy and, as such, workshop projects are selected and carried out with both an educational and civic purpose in mind.

Dane County and the City of Madison have commissioned this exploratory study to examine the possibilities for commuter rail development in Dane County. This document is intended to provide stakeholder groups, planning officials, and the general public with a vision of transit-oriented development in a few key locations along the proposed rail corridor. Ideally, the station areas that have been studied and station areas with similar concerns will use these design guidelines and policy recommendations to inform their planning process as commuter rail is implemented. Finally, we hope this document will assist regional planners in conveying the myriad economic, environmental, and social benefits commuter rail would bring to Dane County and its citizens on a regional, community, and neighborhood level.

PROPOSED RAIL CORRIDOR

A commuter rail study completed in 1996 identified the growing need for regional rail services within Dane County. A transit corridor stretching from Middleton to Sun Prairie along Madison’s central isthmus would provide alternative transportation to residents and employees of the area (see Map A). With a potential 100,000 new county residents and 57,000 new jobs by the year 2020, an expanded transit system including commuter rail would alleviate peak period travel congestion in the most populous areas of the County. Unused or lightly used rail lines already exist in the corridor that can serve popular destinations and special events, such as employment centers, high-density residential centers, shopping areas, medical facilities, the Capitol, the University of Wisconsin, Dane County Exposition Center, and the Monona Terrace.

Expanded transit using commuter rail can help to achieve positive impacts on regional goals. These goals include promoting compact urban development and redevelopment, concentrating employment and activity centers along transit corridors, maintaining downtown Madison as the region’s major activity center, and easing future traffic congestion.

SITE SELECTION

The Urban and Regional Planning Workshop chose four potential station locations along the commuter rail corridor to design site-specific transportation oriented development recommendations. The four sites include Greenway Center in the City of Middleton, the Medical Center near the University of Wisconsin Hospital, Baldwin Street in the East Rail Corridor, and Sun Prairie in the City of Sun Prairie. Station sites were selected to capture a diverse set of stakeholder interests along the corridor and to serve as a distinct
model for different development typologies found throughout the study region. Specific station area attributes that informed the selection process are detailed below.

Greenway Center
- Model for future stations located in a greenfield site.
- Western terminus in Phase 1 of Transport 2020 commuter rail design.
- Example of a park and ride site that can accommodate commuters, residents, and employees of the region.
- In accordance with Middleton Master Plan for transit oriented development in the area and potential bus transfer point in the far west.

Map A: Potential Commuter Rail Corridors in Dane County

Source: www.co.dane.wi.us/rail/railmap.htm
Medical Center
- Design of a station site in a high density residential and employment area, serving the University of Wisconsin Medical complex, campus, the Veterans Administration Hospital, Forest Products lab, and the Regent neighborhood
- Model site to accommodate existing or planned large-scale employment centers adjacent to stable, residential neighborhoods.
- Addition of alternative transportation to reduce automobile traffic and parking demand in the region.
- In accordance with University Comprehensive Master Plan.

Baldwin Street
- Model site to serve the greater Isthmus population and control traffic congestion.
- Site is located at a northern rail spur and main rail line that runs to Sun Prairie.
- Site is near residential neighborhoods and retail, and has potential for additions to both.
- In accordance with neighborhood transit plans that call for rail service in the area.

City of Sun Prairie
- Model for future stations located outside the City of Madison to accommodate commuters and reduce automobile trips into the city.
- Site located near retail and residential neighborhoods, and has potential for additions to both.
- Eastern-most rail stop in Phase 2 of Transport 2020 commuter rail design.
- In accordance with Master Plan of the City of Sun Prairie.

BRIEF HISTORY OF RELATED PLANNING EFFORTS

In June of 1997, Dane County’s Vision 2020 Land Use and Transportation Plan recommended that an independent and comprehensive analysis be conducted to assess the potential for various transit modes to serve the growing population of the Madison metropolitan area. This comprehensive effort has been named Transport 2020 and its objective is to evaluate the costs, benefits and impacts of various transportation improvements, including commuter rail, expanded regional bus, and street rail. The City of Madison, County of Dane, and the State of Wisconsin Department of Transportation have retained Parson Brinckerhoff, a private planning firm, to conduct an analysis based upon the following goals:

1. Provide efficient land use and development patterns in Madison and Dane County.
2. Improve mobility for people and goods, and provide and enhance transportation choices.
3. Improve and enhance economic development and employment opportunities, and expand access to jobs.
4. Enhance the natural and social environments.
5. Develop a cost-effective transportation system improvement strategy that maximizes community consensus and institutional support.

Each of the transportation alternatives will be judged on their ability to accomplish these identified objectives. Specifically, Transport 2020 will evaluate the general feasibility of commuter rail service throughout Dane County. In 1998, Parson Brinckerhoff was retained by Dane County, the City of Madison and the Wisconsin Department of Transportation to conduct a commuter rail feasibility study that considered not only issues relating to engineering, but also those that directly affected land use, ridership and future development. According to its executive summary, the purpose of the study was to determine the physical, operational, and financial feasibility of a major capital investment. With this study completed in 1998, Transport 2020 continued evaluating other alternatives and, to date, is continuing its review.

Having garnered considerable public support for commuter rail, or some variation of it, Madison and Dane County have invited the University of Wisconsin-Madison’s Department of Urban and Regional Planning to address specific questions pertaining to transit-oriented development and the implementation of such design at station sites throughout the rail corridor. The analysis and recommendations from this effort greatly extend the scope of the commuter rail feasibility report to include specific neighborhood dynamics, design considerations, redevelopment opportunities, existing conditions, and local goals and objectives. Together, these analyses will provide both a technically broad and neighborhood specific inventory and vision of commuter rail in the greater Madison metropolitan area.
LITERATURE REVIEW: INTRODUCTION

Rail transit has become an increasingly popular transportation mode for many U.S. metropolitan regions suffering from automobile traffic congestion, sprawling development, and inefficient land use. Many observers believe that Dane County is on the verge of experiencing a fate similar to other regions of the United States in which auto-oriented designs and inadequate transportation alternatives lead to dependence on costly automobile use, high air pollution levels, inaccessible neighborhoods, and excessive traffic congestion. Only in the last few decades have experts published studies focusing on the true efficacies of rail transit, highlighting its strengths and limitations in improving traffic and land use problems.

This literature review highlights the most salient findings pertaining to commuter rail operations, their impact on land use, and policies and conditions that help to make intra-regional passenger rail most effective and feasible. Indeed, flexible land use regulation that permits dense, mixed-use development in proximity to stations can help to support rail transit by providing it with a solid ridership base accessible within walking distance. A number of studies have demonstrated that rail stations can guide development and enhance property values. Furthermore, this literature review examines the policies and approaches that communities have employed to reap the greatest benefit from rail operations and stations. Communities can take advantage of land use and policy tools, using them as leverage, to gain amenities such as affordable housing, parks, and enhanced project design.

This literature review is intended to provide Dane County communities with a reference volume of lessons and policy tools that can be used to support and take advantage of commuter rail, and to shape the future character of development to yield more efficient transportation options and better neighborhoods.

EMPIRICAL EVIDENCE LINKING LAND USE AND TRANSIT

It is commonly accepted in the United States that the steady growth in traffic congestion is the result of too few roads and too many people. However, a recent study from the Surface Transportation Policy Project (STPP) has shown that highway networks have expanded more rapidly than population growth. “Only 13% of the growth in driving between 1983 and 1990 is attributed to population growth, while 69% of the growth in driving in this period was due to the increasingly spread out nature of our metro areas” (STPP 1999, 1).

These decentralized, sprawling development patterns are forcing people into their cars. A trip to the corner grocery store, which in traditional neighborhood developments may have been accomplished on foot, now often requires a fifteen-minute drive. Such development creates a cyclical pattern where auto use influences decentralization, and decentralized development makes the car indispensable.
Current transportation networks and their associated land uses are not only geographically isolating and inconvenient, but they are also ultimately untenable. The land use associated with these transportation networks usually involves low density, single use types of urban and commercial development. This development pattern is not sustainable as it requires costly road maintenance; involves long and often congested travel times to work, shopping areas, or home; and results in land uses that rapidly consume open spaces including forests, agricultural lands, and wetlands.

TRANSIT-ORIENTED DEVELOPMENT (TOD)

In the planning community, it is widely understood that extensive low-density development patterns are incompatible with the long-term social and environmental sustainability of metropolitan regions. One method utilized by planners to address this problem is to increase transit use by promoting development that encourages ridership. This method, often referred to as “transit-oriented development” (TOD), aims to reduce traffic congestion by creating compact new developments and directing growth inward through infill development.

The TOD concept often uses existing regional rail systems to define areas of development. The site design aspects of TOD involve relatively high concentrations of new development that attempt to bring activity within walking distance of stations, making transit a viable alternative to driving (Urban Land Institute 1995). TOD is limited in area, contains a mix of uses, and yields communities with population densities that are able to support retail and transit services (Urban Land Institute 1995). The TOD model assumes that future development will be attracted or persuaded to locate in transit-supportive concentrations and that this in turn will boost transit ridership. This development pattern will ultimately result in fewer automobile trips and more livable, pedestrian-friendly residential and workplace environments (Porter 1997).

Not only can TOD positively affect future growth, but it can also offer solutions to the problems of urban blight by helping cities make the most of existing infrastructure. “TOD reactivates underutilized land by rebuilding neighborhoods where infrastructure assets already exist. It brings together both the public and the private to make the most of existing resources” (Urban Land Institute 1995, 8).

EMPIRICAL EVIDENCE

It is difficult to accurately determine the impact that transportation has on land use because the two are mutually dependent through a network of transportation, accessibility, and land use activity patterns. This relationship is further complicated by the long timeframe required to implement major transportation projects, making empirical analysis of the land use and transportation relationships problematic (Hanson 1995).
The basic principle underlying the relationship between land use and transportation is accessibility. Accessibility increases as movement between two places becomes less costly in terms of money or time. A well-designed transit system will usually attract more development to the land surrounding it by providing easy access for riders, who in turn support the land use activities characterized by population and employment (Hanson 1995).

Overall, transportation investments have a significant but difficult-to-predict impact on land use. Planners must be keenly aware of the continuing realities of the development marketplace and the limits of public regulatory intervention in the market (Porter 1997).

Thresholds of Employment and Residential Density Needed to Achieve Minimum Ridership Requirements
To achieve optimum transit ridership, transit must be located in areas where employment and residential densities are sufficient to support its use. Studies from the Institute of Transportation Engineers (ITE) suggest that rapid transit rail is most suitable for serving high-density residential areas that have more than 12 dwelling units per acre (DUA), and areas with high levels of non-residential development, such as employment centers with more than 50 million square feet (ITE 1989).

Other studies have shown that residential densities of at least 7 DUA are considered necessary to economically justify the use of local bus routes operating on 30-minute headways (i.e., the spacing between buses). Once residential densities decrease below 7 DUA, transit use decreases precipitously while automotive travel increases sharply. As residential density rises to 30 DUA, studies have observed a tripling of transit ridership. At 50 DUA transit trips often exceed auto trips. Likewise, transit ridership increases significantly as employment density exceeds approximately 50 employees per acre or in activity centers having more than 10,000 jobs (Meyer et al. 1989).

Research shows a nonlinear relationship between transit mode choice and employment density (Frank & Pivo 1994). The most dramatic evidence shows a decline in single occupant vehicle (SOV) travel at employment densities between 20 and 50 employees per acre. However, the research does not demonstrate an increase in transit use until employee density reaches 75 employees per acre. Carpooling and ridesharing may account for this gap. Once density reaches 75 employees per acre, however, transit ridership becomes a more popular mode of transportation.

Light rail, with its relatively short lines, is most effective in attracting passengers when stations are located in higher-density residential areas close to the central business district (CBD). Commuter rail ridership rises more slowly with residential density than does light rail, because commuter rail is a high-fare mode and its higher-income riders tend to live in more expensive, lower-density communities. Moreover, the higher speeds and longer distances of commuter rail tend to increase ridership to CBDs from places outside cities where residential densities tend to be low (Davis & Seskin 1996).
Aspects of Site Design that are Most Conducive to Transit Ridership

In order to promote transit ridership, it is advisable to follow certain design guidelines that incorporate optimal site design elements including the best building orientation and form and the use of plant materials, public spaces, and signage (Hinshaw 1995).

According to the Urban Land Institute (1995), the exterior of a transit station should reflect a high quality of architectural design and the interior should be a pleasant environment. In addition:

- Stations should impart a strong sense of safety and security. However, they should not look like protected encampments.
- Stations should seem open, outwardly oriented, and part of the fabric of the immediate community.
- Ample open spaces and landscaping should be placed around the stations to avoid feelings of constriction, congestion, lack of visibility or danger.
- Accommodations that encourage transfer from other modes of travel should be provided. These might include bike storage facilities, automobile parking, and bus shelters.
- Station elements should add to and become an important part of the street life of the community. Pedestrian flow into and through stations should be as easy and as direct as possible.
- Station elements should be oriented and located so as to promote, not restrict, the development of adjacent sites.
- Joint development opportunities incorporating activities such as retail, services, daycare, and education centers should be located near the station.

Studies show the impact that certain site design techniques have on ridership. One study conducted by Cambridge Systematics (1994) indicated the following results:

<table>
<thead>
<tr>
<th>Urban design/Land use</th>
<th>Impact on Transit (% increased)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability of Convenience Services</td>
<td>3.7</td>
</tr>
<tr>
<td>Mix of Land Use</td>
<td>3.5</td>
</tr>
<tr>
<td>Accessibility of Services</td>
<td>3.3</td>
</tr>
<tr>
<td>Areas Perceived as Safe</td>
<td>1.8</td>
</tr>
<tr>
<td>Aesthetically Pleasing Environment</td>
<td>4.1</td>
</tr>
</tbody>
</table>

The Metro-Dade Transit Agency in Miami reported a 9.6 percent increase in ridership between 1991-1993. This was attributed to increasing “customer service orientation” (e.g., walkways, shelters, safer pedestrian access, new benches, etc.) and the use of minibuses to provide more “cost effective and comfortable service” between parking areas and transit locations (Porter 1997).

Optimal Headway for Systems in Small to Medium Sized Cities

Headway is defined as the duration of time between two vehicles (trains, buses, autos, etc.) in a traffic stream, measured from the front bumper of the lead vehicle to the front bumper of the following vehicle. Studies have shown that commuter rail services are
most successful where the service is faster than traveling by private automobile in the peak traffic period and where the daily fare is less than the cost of daily parking in the urban center (APTA 2002).

In small to medium sized cities, 15-minute headways during peak periods and 30-minute headways during non-peak periods have been adopted for dense areas. For less dense areas, the thresholds are 30 minutes for peak periods and 60 minutes for off-peak periods. For many routes, demand will dictate frequencies higher (shorter headways) than these minimums (APTA 2002).

Effectiveness of Integrated Land Use and Transit Investments in Reducing Vehicle Travel
According to Cervero (1989), a substantial reduction in midday travel and overall dependence on automobiles could be achieved by integrating a mix of land-uses and office parks. Currently, much of the zoning in urban and suburban areas is based on separation of land uses. By planning mixed-use developments that combine residential and commercial zoning, bicycle and pedestrian travel could replace 18 to 25 percent of suburban vehicle trips (Frank & Pivo 1994).

Studies have also shown that improved land use and transportation planning, which emphasizes non-auto access to a city center, can increase economic productivity. Pedestrian zones, for example, can increase local sales by up to 25 percent or more, and additional space normally used for parking and roads translates into more office space and jobs (Totten 1993).

SUMMARY
Currently transit ridership in Dane County is low. According to the Dane County Commuter Rail Feasibility Study, overall transit ridership in Dane County makes up less than 5 percent of the total weekday daily trips in the county. This is comparable to transit’s 5.3 percent share of trips nationwide (Porter 1997).

One strategy for increasing transit ridership is to expand the availability of transit service between concentrations of development. This would reduce the amount of land needed for new development and the amount of vehicle travel, and ultimately decrease the adverse environmental, economic, and social effects of low-density regional growth patterns (Porter 1997).

In short, a growing number of planners and public policymakers conclude that efficient transportation systems require good land use planning. The transportation needs of citizens will not be met if market forces and government policies continue to foster random and sprawling development patterns. Compact growth, mixed-use development, and proper urban design planning are necessary if transit systems are to succeed. (Totten & Settina 1993).
COMMUTER RAIL TECHNOLOGY

This section describes and summarizes the various commuter rail locomotive and passenger car technologies in use, or currently in development, in the United States, and explains some of their economic and environmental implications. Passenger cars hauled by diesel-electric locomotives (i.e., those propelled by electric motors with electricity generated from onboard diesel engines) currently are the propulsion technology of choice for nearly all commuter rail systems. However, self-propelled cars are economical at low levels of service and could become popular in smaller commuter rail markets.

TYPES OF COMMUTER RAIL TECHNOLOGY

Because of infrastructure startup advantages and worsening automobile congestion, commuter rail has made a comeback in North America since the mid-1960s. Today, rolling stock (locomotives and passenger cars) is designed especially for rapid transit, and many systems use cars with bi-level seats to handle large crowds. Nearly all diesel-powered trains use push-pull operation enabling the train to reverse directions, saving time and labor. Commuter rail technology has been updated by adapting freight locomotives to commuter rail applications, automating ticketing, and refining locomotive and car designs (Zullig & Phraner 2000).

When choosing the best technology for a commuter rail system, a city or region must examine its own particular needs. Each rail project is unique and several factors must be taken into account. Operating standards for commuter rail must consider such economic and technological issues as urban population size and employment, station spacing, central business district circulation, cars per train set, rider capacity per train, overhead, locomotive power supply, exclusivity of track use, average speeds, and maximum hourly passengers that can be moved (Cervero 1998).

Commuter rail vehicle options are not vast, but technology improves continually. These options include locomotive-hauled coaches and self-propelled vehicles known as diesel multiple-units (DMUs), electric multiple-units (EMUs) or hybrids of electric and diesel. Double-deck coaches and cab cars can increase capacity and can be designed to serve low and/or high platforms. The choice between a locomotive and DMU is usually an issue of availability and cost. DMUs are single units that can drive themselves using several small diesel engines with automatic transmissions, often the same ones used in buses or semi-trucks. Driver cabs are located on each end of the vehicle, and the trains can be coupled when higher capacity is needed. DMUs can be more cost effective when trains have four or fewer cars, otherwise locomotives pulling passenger cars are more economical. DMUs also provide faster service with better acceleration and deceleration capabilities, and produce less noise from idling engines. Because existing freight models can be purchased, used, and maintained locally, however, diesel-electric locomotives are much more widely used and available (Parsons Brinckerhoff 1998).
COMMUTER TECHNOLOGIES IN USE

Commuter rail transit in the United States is currently dominated by one technology – the diesel-electric locomotive. Diesel-electric locomotives typically pull up to ten passenger rail cars in a single route-trip, or up to eight double-decked cars. Locomotive-hauled, push-pull trains are by far the dominant commuter rail technology in the United States and Canada. Such systems are used in the metro regions of Chicago, Illinois; New York, New York; Boston, Massachusetts; Miami, Florida; Philadelphia, Pennsylvania; Baltimore, Maryland – Washington D.C.; Los Angeles, California; Seattle, Washington; San Diego, California; San Francisco, California; Montreal, Quebec; Toronto, Ontario; and Vancouver, British Columbia (APTA 2002).

Despite the dominance and low cost of locomotive-hauled systems, there is a great deal of interest in self-propelled DMU technology, which offers a low-cost, flexible option for lower density communities. DMUs offer a technologically different approach from traditional locomotives: they essentially operate as self-propelled passenger vehicles, much like electric light rail vehicles and subway trains. They are typically double-ended and can operate without turnaround loops. DMU sets of up to three or four vehicles are capable of being operated by a single motorman. Currently, eight North American entities operate DMUs, but only five use them in revenue (i.e., regular paid passenger) service. Only three could be considered commuter rail systems: British Columbia Rail, Cape Cod Railway, and Dallas Area Rapid Transit (DART). The remainder of the DMU vehicles are used for rail yard maintenance or limited heritage service (Pier 1996).

Commuter rail system operators consider several criteria when deciding which rail technology to procure. Costs, proven operating success, and Federal Railway Administration (FRA) certification are the most important decision criteria. Power, speed, and compliance with Americans with Disabilities Act (ADA) requirements and recommendations are also important to system operators (Pieri & Nelson 1999; Sarunac 1998).

Capital, operations, and maintenance costs are typically the most important decision criteria for operators. While electrically powered trains are generally less expensive to operate than diesel-powered systems, the massive capital costs associated with power-delivery networks (such as overhead power lines, third-rails, and substations) usually tip the long-run average cost analysis in favor of diesel-electric and diesel powered trains. As for diesel-electric locomotive-hauled trains compared to DMUs, cost-efficiency depends on the number of passengers carried per trip and the corresponding length of the train. Depending on the system manufacturer, the locomotive-hauled train is cost-advantageous when ridership demands are greater than 300-500 passengers per route-trip, or when more than three passenger cars are required. At ridership levels below the 300-500 passenger level, DMUs are typically more cost effective (Sarunac 1998).

The Electro-Motive Division (EMD) of General Motors Corporation builds most of the commuter rail locomotives operated in the United States. General Electric (GE) supplies the remainder. No foreign-built commuter rail locomotives currently operate within the
United States. However, French-designed Alstom locomotives built in New York will enter service in 2004 with New Jersey Transit, which will receive 33 diesel-electric locomotives at a total contract cost of $175.3 million, resulting in a price of $5.3 million per locomotive. This contract includes an unspecified amount of spare parts (Railway Age 2001). Table A displays a comparison of several locomotive models currently on the market.

Passenger cars for locomotive-hauled trains are also a significant capital requirement. While single-deck cars are still common in the United States, especially in the Northeast, double-deck cars comprise most new and replacement purchases because of the lower costs per passenger that result from the greater seating capacity of these cars. Single-deck cars typically carry a maximum of 100 to 115 passengers, depending on configurations that may include cabs, washrooms, and wheelchair accessibility. Meanwhile, double-deck cars can carry a maximum of 120 to 163 passengers (Minnesota DOT 2001). Bombardier produces nearly all of the new double-deck cars sold in the United States, while Kawasaki and Sumitomo also market them. Sumitomo-designed cars assembled in Illinois comprise much of the current Metra (Chicago region) car fleet. For an example of cost, Denmark’s national railway just signed a contract to purchase 25 double-deck cars from Bombardier for a total of $50 million Canadian, or $1.33 million US per car (Bombardier 2002).

### Table A: Diesel-Electric Locomotives Recently Marketed in the United States

<table>
<thead>
<tr>
<th></th>
<th>EMD F59PHI</th>
<th>EMD DE 30AC</th>
<th>GE Genesis</th>
<th>EMD F40PH</th>
<th>Alstom PRIMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power (hp)</td>
<td>3000</td>
<td>3000/4000</td>
<td>4000/4200</td>
<td>2300-3500</td>
<td>4000</td>
</tr>
<tr>
<td>Top speed (mph)</td>
<td>110</td>
<td>100</td>
<td>100</td>
<td>N.A.</td>
<td>N.A.</td>
</tr>
<tr>
<td>Comment</td>
<td>CNG capable</td>
<td>Dual mode capable*</td>
<td>Rebuilt</td>
<td>NI Transit; EMD 710 power plant</td>
<td></td>
</tr>
</tbody>
</table>

* Diesel and diesel-electric

**Sources:** Minnesota Department of Transportation 2001; Railway Age 2001.

The DMU market, while promising due to theoretical cost advantages at lower ridership levels, remains limited and unproven in the United States. At the moment, only DMUs manufactured by the Budd Company in the 1950s and in 1978 are certified by the FRA to operate in the United States. Those models still in operation are now quite old, and have been rebuilt several times. Some European firms produce newer, more technologically advanced and efficient models. However, these manufacturers have only recently begun to market FRA-compatible models.

Meanwhile, Bombardier of Canada and Nippon Sharyo both offer designs that approach FRA standards. FRA regulations for Tier I passenger rail vehicles (operating under 125 miles per hour) that operate on the same tracks as freight must meet strict body strength standards; rail passenger cars must be able to survive crashes with fast moving freight...
cars in the event of just such an accident. In non-technical terms, passenger railcars operating in the United States must be bigger, stronger, safer, and more reliable than those operating in the rest of the world (Sarunac 1998).

While several regional operators are seriously interested in purchasing new European DMUs for commuter service, notably in Pennsylvania, Oregon, and North Carolina, none have yet to operate in revenue service in the United States (Geissenheimer 1997). Suppliers of DMUs, such as Bombardier, Daimler Chrysler Rail Systems, and Siemens have FRA-compliant designs available, but only a few operators are considering these options (Vantuano 1999). Table B highlights some of the specifications of several DMUs recently marketed to commuter rail systems in the United States.

As an example of the cost of new DMUs, the government of Australia recently signed a purchase and 15-year maintenance agreement with Bombardier for 29 two-car DMU operating sets for a total of $339 million Canadian, or $7.8 million US per two-car set (Bombardier 2001).

Table B: Diesel Multiple-Unit (DMU) Rail Cars Currently Marketed in the United States

<table>
<thead>
<tr>
<th>Car Body</th>
<th>530mm</th>
<th>600mm</th>
<th>600mm</th>
<th>550mm</th>
<th>NA</th>
<th>550mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Min. floor height</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Siemens</td>
<td>Aluminum</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>Steel</td>
<td>Composite</td>
</tr>
<tr>
<td>Regio Sprinter VT 4N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adtranz Regio Liner LTM 160</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ABB Region Shuttle RS-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bombardier ALR 92</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sumitomo/ Nippon Sharyo</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DeDietrich Eurorail Bus VT 4-2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Passengers/car</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>174</td>
<td>158</td>
<td>170</td>
<td>184</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Max service speed</td>
<td>100 km/hr</td>
<td>120 km/hr</td>
<td>120 km/hr</td>
<td>120 km/hr</td>
<td>120 km/hr</td>
<td>120 km/hr</td>
</tr>
<tr>
<td>Acceleration</td>
<td>1.1 m/s²</td>
<td>0.75 m/s²</td>
<td>1.28 m/s²</td>
<td>0.75 m/s²</td>
<td>NA</td>
<td>1.5 m/s²</td>
</tr>
</tbody>
</table>

Source: Geissenheimer 1997.

PROPOSED AND PLANNED COMMUTER RAIL SYSTEMS

The Red Rock Corridor Commission (RRCC) recently undertook a technology screening process before choosing commuter rail as the main transit system for the corridor. Serving the metropolitan area of Minneapolis and St. Paul, Minnesota, the RRCC wanted a transit system that would be capable of traveling at least 30 miles per hour and could operate safely in mixed traffic. Furthermore, their chosen technology would consist of a self-contained power supply with diesel or diesel-electric propulsion, and manual control and communication, with a basic system capacity of 7 to 24 vehicles for a circulator service, and 221 or more vehicles for a commuter rail service. The transit technologies that met these criteria were local and express bus, advanced bus, and commuter rail. RRCC’s goals for the technology led them to choose commuter rail and delve further into
a feasibility study. Commuter rail was chosen for its ability to provide reliable, high capacity, fixed guideway service on existing railroad infrastructure. It could be fully integrated with other existing commuter rail systems in the Twin Cities region and complemented with bus transit, light rail, park-and-ride lots, bicyclists, and pedestrians (Parsons 2001).

The RRCC also felt that the commuter rail line would help achieve economic and transit-oriented development objectives in the corridor. A diesel-powered train was chosen for the 30-mile rail line that would propel double-decked passenger cars in push-pull operation. The technology chosen was based on the service concept (weekday peak operation of 10 daily trains running every 30 minutes) and demand forecast (5,900 total riders per weekday in 2020). Total estimated capital cost for the Red Rock Corridor Rail System (including 5 locomotives, 6 bi-level coach cab cars and 12 bi-level coach cars) came to $261.6 million in 2001 dollars, or $421.8 million in 2010 dollars. Operating and maintenance costs would be $7.9 million in 2010 dollars (Parsons 2001).

The Triangle Transit Authority in the Raleigh-Durham, North Carolina, region has decided to construct a two-track commuter rail system using lightweight DMUs along a 35-mile existing right of way (Janssen 2002). The diesel engines used for this line will meet all future emission requirements, operate much more quietly, and consume less fuel than older technologies. This project may be the first to use this type of FRA-compliant DMU.

ENVIRONMENTAL IMPACTS OF RAIL

Environmental impacts must be analyzed when determining the best fitting rail system design and technology. Human and resource impacts can be positive, negative, or neutral. These include: social impacts on jobs, housing, and facilities; noise and vibration causing disturbances near rail tracks and terminals; air and water pollution depending on fuel sources and accident risks; visual obstructions and intrusions; construction disturbance by dust, noise, and traffic; energy use and climatic change depending on fuel sources; equipment manufacturing and disposal; and disturbance of residential, commercial, agricultural, scenic, and natural habitat areas by partition or destruction of the land (Carpenter 1994).

Commuter rail’s potential to reduce overall transportation-related environmental impacts is illustrated by the environmental assessment conducted for the Georgia Rail Passenger Program. Such an assessment is a requirement for all federal New Start programs, and was conducted on the 85-mile Macon to Atlanta Commuter Rail and Express Bus Project. Social, economic, physical, natural, and cultural impacts were evaluated along the corridor and at each station site, layover site, and maintenance facility. The Federal Transit Authority made a finding of no significant impact (FONSI), meaning that an Environmental Impact Statement would not be required.
The Georgia project’s technology will not exceed state and federal air quality standards and will reduce emissions in the non-attainment area around metro Atlanta. Noise levels will not exceed the existing 75-decibel maximum except in areas near grade crossings where the use of warning horns is required. Furthermore, total energy use is expected to fall. The Macon to Atlanta line is projected to reduce total vehicle miles traveled by providing an alternative mode of transportation, concurrently saving auto fuel consumption (Federal Transit Authority 2001).

Mitigation of environmental impacts can be key to a successful commuter rail project. Such efforts minimize political and public resistance to rail operations. For example, the commuter rail authority operating the line connecting Burlington, Vermont, and the suburb of Charlotte has successfully reduced noise pollution by using continuous welded rail to reduce rattling between rail joints as trains pass. The authority also employed a sensor system that monitors cars passing gate crossings, improving the safety of the crossings and making warning whistles unnecessary. Such efforts reduce some negative impacts of rail and can minimize disputes with neighbors, enhancing the likelihood of public approval (Civil Engineering 1998).

SUMMARY

Diesel-electric locomotives are the dominant commuter rail technology operating in the United States largely due to two factors: they offer economical service and are widely available in this country, simplifying many maintenance and reliability issues. DMUs, however, have garnered increasing attention in recent years due to the fact that they promise to be more economical to operate in lower-density regions. Still, most DMU models were designed for the European market and must undergo costly conversions in order to meet stringent FRA strength and safety requirements to be eligible to operate on mixed-use freight tracks in the United States.

From an environmental perspective, commuter rail can have significant noise and physical impacts. However, mitigation is possible and politically beneficial. Furthermore, commuter rail can reduce vehicle-miles traveled, decreasing overall energy consumption.
IMPACT OF RAIL TRANSIT ON RESIDENTIAL AND COMMERCIAL DEVELOPMENT

This section examines TOD as a determinant of urban form. It begins by exploring the causal link between rail transit and residential and commercial property values. In general, transit has been demonstrated to enhance property values, though some stress the prerequisite of a strong regional economy and the presence of several other causal factors. The potential for transit-oriented development to stimulate affordable housing opportunities is also explored. Finally, this section ends with a discussion of other aspects of transit-compatible urban form including optimal type and mix of commercial development, and TOD design considerations.

INFLUENCE OF TRANSIT ON RESIDENTIAL AND COMMERCIAL VALUES

The impact of rail transit on the values of residential and commercial property is of paramount concern in planning for TOD. It is important to understand changes in property value “because they typically occur faster than changes in land use and may thus influence or change urban form” (Benjamin & Sirmans 1996, 2). The literature demonstrates an empirical link between transit and property values, although overall results on the direction and magnitude of the relationship are not consistent.

Several factors may contribute to changing property values. In anticipation of transit investment, values may increase speculatively. Value may be enhanced by greater accessibility and visibility. Based on a study of twelve rail projects across North America, accessibility is considered to have the most significant influence in improving property values (Diaz 1999). Alternatively, noise or environmental pollution, increased congestion, temporary disruption by construction, permanent isolation, or other factors may diminish property value (Rice Center 1987). Alteration of the property use or zoning designation may have either a positive or negative impact on value (Gatzloff & Smith 1993).

In general, transit development has been demonstrated to have a positive effect on commercial and residential values. The magnitude of this effect is determined by access to employment, pedestrian accessibility, market penetration, and development impact (Diaz 1999). In addition, this relationship varies regionally, according to the duration of transit in a locale, the neighborhood context, and other site-specific factors.

Commercial Property Values
The economic benefits of transit service on commercial property value have been documented in locations throughout the United States. The value of office properties in proximity to San Francisco’s Bay Area Rapid Transit District (BART) were shown to be $74 per square foot within one-quarter mile of a station compared to $30 per square foot on average at a distance greater than one-half mile (APTA 2001).
Rent is an important determinant of property valuation; a positive or negative change in rent will affect a property’s value (Benjamin and Sirmans 1996). In Dallas, property adjoining light rail transit stations increased in value 25 percent more than those properties not served by rail transit. Both office buildings and strip retail realized increases in occupancy (8.5 and 49.5 percent increase in a four-year period, respectively) and rent. Office space rent increased from an average of $15.60 to $23 per square foot. Strip retailers showed 64.8 percent improvement in rental rates (Weinstein & Clower 1999).

Similarly, data examined for five station sites in Washington, D.C., and Atlanta, Georgia, provide positive evidence for joint development projects (i.e., public-private sector sharing of costs in recognition of mutual benefits of transit-oriented development) and office market conditions. Average office rents increased with system-wide ridership. Joint development in particular generated an additional three dollars per square foot in office rental rates. In addition, office vacancy rates were lower, building densities higher, and shares of regional growth higher within station areas (Cervero 1994).

**Residential Property Values**

The literature examining the influence of transit on residential property values and apartment rent is extensive. Property values associated with early transit development are well documented. San Francisco’s BART generated a small, but significant increase in residential property values and rent. With each mile of distance from a station, single-family homes decreased in value between $3,200 and $3,700. Apartment rent near BART stations was documented as 15 to 26 percent higher than apartments distant from stations (APTA 2001).

Average housing value in Toronto was found to be $2,237 greater on average near rail lines than elsewhere, an amount capitalized in housing values from commuting cost savings (Bajic 1983). This example may be less transferable to the United States due to the strong development controls in place within Canada that lack U.S. counterparts (Gatzlaff & Smith 1993). In Washington, D.C., Metrorail’s impact on housing value varied between already built up areas and those further from the central business district. Overall, rent per apartment unit decreased 2.5 percent with each one-tenth of a mile increase in distance from a metro station (Benjamin & Sirmans 1996). In a study conducted in 1991, townhouses within 1000 feet of the Pentagon City station sold for $12,300 more than comparable units not near a Metro station (Gatzlaff & Smith 1993). The Philadelphia-New Jersey Lindenwold commuter line generated a 7 percent or $4,500 per house value increase over non-transit residential (Rice Center 1987). A more recent study showed accessibility in several metropolitan areas created an average premium of $5,716 or 6.4 percent (Voith 1991). In the Boston metro region, communities with a commuter rail station have single-family residential property values approximately 6.7 percent higher than those not serviced by commuter rail (Armstrong 1994). An analysis aggregating data from Atlanta, Boston, Chicago, Portland, and Washington D.C. found that moving from within three kilometers to within one kilometer of a transit station increases monthly rent by $19 and housing values by $4,972 (Baum-Snow & Kahn 2000).
In addition to examining transit within established urban cores, it is instructive to examine how housing values are affected in areas with more recently established transit, and in smaller or decentralized metropolitan areas. A study of residential value changes in anticipation of the Miami Metrorail showed weak evidence of increased housing values. Unlike most of the above studies, value was not clearly linked to property distance from stations. Significant variation was noted across neighborhood types; higher price neighborhoods realized a greater increase in housing values than declining neighborhoods (Gatzlaff & Smith 1993). Neighborhood type was not considered to be a significant variant in Chicago, with housing values and rent increasing in both lower and higher income neighborhoods (APTA 2001).

In a critical review of the literature, Ryan (1999) emphasized that a distinction must be made between conclusions regarding property value drawn based on travel distances and those based on travel times. Travel time is generally correlated with property values, such that as travel time decreases property values increase. However, Ryan (1999) suggested that travel distance has a more unpredictable relationship with property values.

Huang (1996) identified several gaps in the literature. He asserted that the independent impact of transit apart from zoning and market conditions has not been adequately measured. Furthermore, it is methodologically challenging to determine with certainty if development is caused by transit, as several studies have claimed (Huang 1996). Transit stations in Cleveland, Ohio, and San Diego, California, illustrate the shortcomings of harnessing transit as a spur for development. In these cities, relatively little development took place around stations that were down-zoned (i.e., zoning classification was changed to permit less intensive development) or industrial (Huang 1996). Caveats are pervasive throughout the literature and are summarized by Cervero:

> Urban rail transit will significantly benefit land use and site rent only if a region’s economy is growing and a number of supportive programs are in place, for example permissive zoning to allow higher densities, and infrastructure such as such as pedestrian plazas and street improvements. Transit guides rather than creates growth, and by itself rarely affects significant land use changes (Cervero 1994, 83).

Nonetheless, the evidence that transit will have a positive impact on property values when coupled with complementary land use planning is compelling.

**TOD AS A STIMULANT FOR AFFORDABLE HOUSING**

Transit’s ability to shape urban form through raising property values is demonstrated above. Cervero (1998) notes that in the absence of zoning restrictions or other extenuating factors, “competition for local advantages will drive up local land values.” This presents an interesting predicament: how to promote affordable housing as a component of TOD while still capitalizing on elevated property values. The salience of this dilemma is exemplified in the literature. The demographics of transit usage illustrate
the need to link transit and affordable housing. College-educated homeowners are the primary group served by transit and transit expansion (Baum-Snow & Kahn 2000). According to Baum-Snow and Kahn’s longitudinal study of five cities served by transit, the poor have reduced their transit usage between 1980 and 1990 and are more prone than other groups to shift to non-transit modes. In contrast, young people and college graduates increased their likelihood of using transit. The same study showed that African-American and young adults were generally the demographic groups not served by transit expansion. A plausible reason for this is that expansion generally occurs in suburban or outer city areas, whereas these lesser-served groups typically do not reside in the suburbs (Baum-Snow & Kahn 2000). Similarly, in San Francisco, residents of transit-based housing tended to be young professionals earning middle-income salaries (Cervero 1996). Thus, the provision of affordable housing in proximity to transit may increase the ridership of demographic groups underrepresented by transit use.

Porter (1998) reports that station area development is generally much more the result of market interest in specific locations than a response to transit availability at the site. Thus, housing development will depend in large part on the market demand for housing. Ultimately, local governments, as “the guardians of land use regulation,” play a fundamental role in stimulating transit-focused development. They can encourage such development through “comprehensive planning policies and zoning provisions that allow, or even provide incentives for, development densities, designs, and a mix of uses supportive for transit service” (Porter 1998, 486). Local governments must be the catalyst for using TOD as a stimulant for affordable housing. Local government controls may inadvertently force out affordable housing, instead of creating it. Critics of Portland’s Light Rail Transit Line maintain that mixed-use, pedestrian friendly environments created by transit, together with the urban growth boundary (UGB), are producing gentrification of the areas within the UGB that are served by transit. This trend threatens the continued affordability of these areas. Anecdotally, this situation has been characterized as such:

Low-income people who own their homes or have the skills to take advantage of jobs being created downtown or along the light-rail lines benefit from revitalization. But others find themselves paying steeper rent, searching for cheaper housing or living on the streets (Walljasper 1997, 14).

Several programs may stimulate affordable housing associated with transit. Cervero (1996) advocates the provision of location-efficient mortgage (LEM) loans for those purchasing homes near rail stops. LEMs are premised on the concept that those households residing near transit are likely to save money by driving less or owning fewer automobiles than the average household. When these savings are considered within the context of income available for housing, higher mortgage loan amounts are possible (Miara 2001; Cervero 1998). Such programs have been pilot-tested in Chicago, San Francisco, and Washington, D.C., under a public–private initiative. Under a similar premise, one development in Bremen, Germany, only accepts residents who renounce car ownership (Cervero 1998).
Local redevelopment authorities may provide financial incentives and land assemblage assistance for multi-family housing at suburban transit stations (Cervero & Landis 1997). In addition, Section 42 of the IRS tax code awards developers tax credits for undertaking a development with a certain amount of affordable housing (WHEDA 2002).

Boarnet and Compin (1999) present an overview of low-income housing development through TOD in San Diego County, specifically two transit-based residential projects: Creekside Villas and Barrio Logan. Creekside Villas is a low income apartment complex with a day care center developed by a private developer on land leased from the Transit Board. The Mercado Apartments in the Barrio Logan neighborhood are sited within one-quarter mile of the transit station. Financing for the project arose from a public-private partnership. The San Diego Redevelopment Agency provided a land write-down (i.e., government-sponsored discount) and subsidies valued at $2 million; federal low-income housing tax credits totaling over $5 million were also used (Boarnet 1999).

In other locations, transit-based affordable housing has been more challenging to implement. A neo-traditional TOD in Chula Vista, near San Diego, provides one such example. Although affordable housing is considered a cornerstone of neo-traditionalism, housing advocates were blocked in their proposal to increase the mere 5 percent affordable requirement to meet the jobs-to-housing balance for this otherwise innovative development (Calavita 1993).

Design is a crucial consideration in affordable housing. In fact, some of the incentive mechanisms mentioned above are predicated on certain design elements. Several of the criteria a developer must meet in order to secure IRS tax credits are design related. These include: encouraging infill development, adequately serving large families, and providing child daycare and access (WHEDA 2002). The U.S. Department of Housing and Urban Development provides a comprehensive list of design considerations for affordable housing (USHUD 2002). In response to the perception that “good design is a frill,” an initiative that solicited “examples of cost-effective, aesthetically pleasing, and energy-efficient, accessible, and housing designed to fit into a neighborhood context; appropriate for different types of households” yielded submissions of innovative projects nationwide (Knack 2001, 8). Novel approaches to developing parking, public open space, private open space, landscaping, building location, shape, appearance and layout, and unit layout are showcased in the web-based “Affordable Housing Design Advisor” (USHUD 2002). This website also features a comprehensive checklist covering each of these points in detail (USHUD 2002). A guiding philosophy for affordable housing is it should “meet the user’s needs, understand and respond to its context, enhance its neighborhood, and be built to last” (USHUD 2002).
DESIGN AND LAND-USE COMPATIBILITY CONSIDERATIONS FOR TOD

Research has defined key design and use considerations for TOD. Effective planning links residential concentrations and employment at a regional scale. At the neighborhood level, transit stations should be sited within walking distance of both residential and employment centers—generally less than one-half mile (Porter 1998). Porter’s study of transit-focused development describes a disparity in development designs adjacent to stations vis-à-vis developments in the wider station area. There is usually attractive and convenient pedestrian access close to the station, but not further out from the core area. According to Porter, “station-area planning should do more to create an attractive pedestrian network throughout the area surrounding the station” (Porter 1998, 486).

Cervero (1998) emphasizes “land-use diversity”—mixing housing, shops, offices and civic places. This allows transit riders to conveniently accomplish activities during the day on foot (Porter 1998; Cervero 1998). The convenience of mixed use catalyzes ridership. Research has shown that a 20 percent increase in floor space devoted to retail or commercial uses increases transit trips by 4.5 percent (Cervero 1998). Locating stores between transit stop and residences also increases the share of work trips via transit (Cervero 1998). High levels of ridership arise from development models where “in the critical half-mile surrounding the station, the blocks are short, development is compact, housing is diverse and oriented to the street, and streets and sidewalks are pedestrian-friendly” (Kreyling 2001, 7). In addition, with projects that are more mixed-use, leases are replaced quickly and at higher rents (Cervero 1994).

Examples of such projects abound. A $100 million mixed-use development was completed in 2001 around a rail station on Northern California’s BART. A pedestrian plaza adjacent to the BART station is flanked by housing, new and renovated retail and office space, and a variety of community facilities, including a new library, day care and senior care facilities, a community center, and a clinic (Kreyling 2001). Atlanta’s Metropolitan Area Rapid Transit Authority (MARTA) plans to develop 51 acres surrounding its Linbergh station. Development will include 2.7 million square feet of office space, 330,000 square feet of retail space, 566 apartments, 388 condominiums, and a 190-room hotel (Kreyling 2001).

At the site level, building design, landscaping, and pedestrian pathways are other important consideration in providing “convenient and attractive access to and from stations” (Porter 1998, 486). Quality design is essential to bolster the public’s support of higher density, transit-oriented development. Carefully designing parking can increase incentive for transit use, enhance site aesthetics through building design and landscaping (Porter 1998), as well as promote efficiency (Cervero 1998). For example, shared parking between daytime employment centers and evening/weekend entertainment and dining venues decreases parking needs and provides a more pedestrian friendly environment (Cervero 1998). A survey of six communities with high transit ridership reinforces the need for pedestrian access:
Eighty percent of those who lived within one-quarter mile of the stations arrived on foot, but foot traffic diminished sharply for commuters who lived more than three-fourths of a mile from the station. A rider’s decision to walk is affected by a ‘pleasant walking atmosphere’ – defined as an interconnected network of streets (with sidewalks) and a continuous architectural fabric, with stores next to the station. The immediate surroundings of the highly used stations do not include huge parking lots or parks, both of which can act as barriers between the station and the surrounding neighborhoods (Kreyling 2001, 7).

SUMMARY

This section has provided empirical evidence of the positive relationship between transit and property values, both residential and commercial. Property situated in close proximity to transit stations has been associated with higher values at the neighborhood and community levels— with causation contingent on a relatively strong regional economy, and appropriate zoning and land use controls.

The reality of market response to transit raises the challenge of providing affordable housing and encouraging use across all demographic groups. There are incentives for providing affordable housing and good examples of how and where it has been implemented.

The discussion of design and development compatibility has emphasized the symbiosis of transit and urban form. Transit shapes urban form and, concurrently, well-planned and designed development stimulates transit use. Thus, design and compatibility are particularly germane to this discussion.

This section brings forth both challenges and opportunities Dane County will face in implementing its commuter rail system while concurrently attempting to capitalize on increased property values, provide affordable housing, and improve regional transportation efficiency. In addition, TOD design and compatibility considerations highlight the exciting opportunities lying ahead as Dane County has a renewed opportunity to further shape urban form.
REGULATORY POLICIES AND FINANCIAL INCENTIVES FOR TRANSIT-ORIENTED DEVELOPMENT

In order for TOD to occur successfully, it is critical for planners and developers to realize that each potential station area will offer different opportunities based on existing land uses, land ownership, prospects for new development, and community attitudes towards TOD. Ideally, a combination of new or adapted regulatory policies and financial incentives for potential developers and residents will encourage high-density, mixed-use, pedestrian-oriented development that maintains a “sense of place” and provides a focal point within each station area community (Jeer 1994; Howland & Dunphy 1996; Salveson 1996). This section seeks to summarize the common obstacles to TOD and provide an overview of policy options and financial incentives that have been adopted across the nation in order to support it.

OBSTACLES TO TOD

Primary obstacles to transit-oriented development are the many existing zoning and design regulations that have been adopted primarily to promote auto-oriented development (PSRC 1998, Porter 1997). Largely accepted as the norm within the development community, these include low-density and single-use suburban zones, minimum parking allotments, and minimum setback requirements (White 1999). The process of changing these zoning ordinances may be complicated, but is often necessary within a one-quarter to one-half mile radius of each transit station.

Community attitudes may also present an obstacle to TOD, especially in suburban areas. Salveson (1996) notes an example of this occurring in Miami, where local residents defeated a proposal to build high-density housing for the elderly near a transit station. Some residents in the suburbs of Philadelphia, Pennsylvania, oppose high-density development on the grounds that it may attract more traffic (Porter 1997). In the Miami, Atlanta, and San Francisco regions, little development has occurred at suburban stations, possibly because local residents and landowners seek to maintain the low-density character of the area (Salveson 1996). This “not-in-my-backyard” mentality needs to be overcome in order for TOD to truly succeed in suburban areas.

In addition to policies supportive of TOD, market factors also play a large role in the success of TOD. There are several market-based obstacles to establishing the commercial elements of TOD. Retail markets are growing larger (Nelson & Niles 1999) and it may be difficult for retailers to compete with some of the conveniences provided by auto-oriented shopping malls and “big box” retailers. Such stores are able to offer large inventories, long hours, and low prices along with ample free parking to allow customers to transport their purchases easily (Nelson & Niles 1999). Financial incentives and public investment must be provided in order to attract appropriate development interests.
Finally, the very nature of developing mixed-use, high-density areas requires the involvement, cooperation, and financial support of multiple dedicated stakeholders: property owners, planners, transit agencies, local, regional, and state governments, citizens, and developers (PSRC 1998; Porter 1997). This need for cooperation among frequently overlapping jurisdictions could be considered an obstacle.

ZONING MODIFICATIONS TO ENCOURAGE TOD

Across the country, many regions and localities have adopted new zoning ordinances or modified existing ones to encourage TOD. Zoning for mixed-use and high-density development is one of the most commonly used tools to support TOD (Smith 1999). Depending on concurrency with a comprehensive plan and state enabling laws, the following options exist for utilizing zoning to encourage TOD. First, an entire new zoning classification can be created surrounding transit station areas. This may be most effective in emerging urban areas (PSRC 1998), and has been used in the San Francisco area, where “transit villages” are encouraged within one-quarter mile of each transit station (Jeer 1994). If only minor changes are necessary, another option is to create “transit overlay zones.” Within these areas, new provisions may be added to existing zoning codes to reduce parking and enhance pedestrian-oriented uses (PSRC 1998). With any zoning changes, it is important to focus on encouraging mixed-use, high-density, pedestrian-oriented development. Following are several specific examples that have been adopted in other regions to further these goals.

Zoning to Encourage Mixed-Use
Three essential characteristics to creating successful mixed-use developments are that uses are compatible, within convenient walking distance of each other, and that there are safe, convenient connections between uses (Morris 1996). There is more than one way to achieve these objectives. Montgomery County, Maryland, retains traditional types of zones, separated by use, but applies them on a smaller scale so that different zones are within walking distance of each other and transit stations (Morris 1996). Similarly, Gresham, Oregon, established four new zones surrounding a light rail station. Each of these small zones encourages minimum amounts of a specific type of development, but the small size and close proximity also allows for mixing. This ensures that, as a whole, the station will be surrounded by at least four types of development (PSRC 1998).

Alternatively, the city of Tacoma, Washington, has entirely replaced existing zoning to create five new “mixed-use center districts,” to encourage a variety of development types in specific centers surrounding rail stations. Landscaping and other buffering has been used in several communities to transition between different uses in a single mixed-use zone (Morris 1996). The use of performance standards, rather than use or structural specifications, is also supportive of mixed-uses (Morris 1996).

Zoning to Encourage High Density
Densities needed to support transit are higher than what is typically found in U.S. cities, yet the majority of new development continues at even lower densities (Morris 1996).
According to Jeer (1994), an increase in allowable residential density should occur within a one-half mile radius of station areas. Although there are many variables to account for around each station area, average densities in areas served by heavy rail systems are at least 12 units per acre (Chicago, Washington D.C., San Francisco, Miami, and Atlanta) (Jeer 1994). On parcels immediately adjacent to transit stations, typical densities increase to 30-40 dwellings per acre (Jeer 1994).

Community opposition, as previously mentioned, may cause difficulty in implementing high-density development. However, increasing density can be achieved in some areas without significantly changing the visual appeal of a neighborhood. Techniques like zero lot line development, which eliminates the standard setback requirements on one side of the lot, and zoning that combines single family residential with duplexes, have been used in Portland, Oregon. Accessory housing (i.e., granny flats), townhouse developments, and cottage housing clustered around common open space have also been used to increase densities while still retaining characteristics compatible with single-family neighborhoods (Morris 1996).

**Provisions to Encourage Pedestrian Activity**

Various communities have used urban design guidelines and zoning codes to encourage pedestrian and bicycle mobility. In Seattle, certain provisions are added to existing zoning ordinances around many station areas. Pedestrian-friendly codes include, but are not limited to, maximum parking standards, maximum setbacks, and landscape and building design codes (PSRC 1998).

Provisions to ensure convenient pathways and direct connections have been used by many communities, along with more specific requirements for pedestrian safety and comfort, including lighting and visibility standards, requirements to separate pedestrians from traffic, and specified sidewalk and bikepath widths. Additionally, common provisions to encourage a more pleasant pedestrian experience include building orientation toward pedestrian paths, minimal setbacks, clustered buildings, and weather-protected building façades and transit stops. Some communities have even taken steps to encourage pedestrian travel by making commercial areas more interesting by avoiding blank façades, and providing landscaping, public plazas, and open spaces (Morris 1996).

**Parking**

Parking regulations can promote TOD both by discouraging auto use, and by enhancing the atmosphere for pedestrians. Guidelines and regulations have been set in several communities to reduce the number of required spaces and visibility of parking lots. King County, Washington, has approved parking reductions of up to fifty percent, and several other communities have allowed reductions in exchange for provision of alternative transportation amenities including transit stops, rideshare programs, covered bicycle parking, public plazas, and other transit-oriented conveniences. Mixed-use development where trips can be combined, or parking can be shared, has also been used to justify reductions in parking. Olympia, Washington, and Sacramento, California, have entirely eliminated minimum parking standards in sections of each city that are well supported by transit. Besides reducing parking, design standards can also encourage development of
parking lots on a smaller, pedestrian scale. Features such as well-defined pedestrian paths through parking lots, adequate lighting, landscaping, and smaller-sized lots have been incorporated into design guidelines in some communities (Morris 1996).

Some studies advocate the elimination of minimum parking requirements altogether. The methodology behind typical municipal minimum parking requirements is problematic and is generally based on inaccurate or plainly false assumptions. Such requirements are based on parking generation rates derived from scant evidence, circular logic, an absence of transportation alternatives such as transit, and the fact that the parking spaces themselves are free for customers. This leads to parking requirements that are unjustifiably high. Instead, Shoup (1999) recommends the elimination of off-street minimum parking requirements and proper pricing of on-street parking; this would allocate parking spaces more efficiently. Furthermore, free parking inflates automobile trip generation rates, increasing traffic generally (Shoup 1999).

Minimum parking requirements also distort the provision of residential and commercial development. One study found that minimum parking requirements depress the price of commercial properties due to profit squeezing (Shoup 1999). As for housing, parking requirements increase the cost of housing by increasing the amount of land and construction required. Developer profits are reduced, deterring development, and housing costs increase. Parking requirements can add 6 to 34 percent to the cost of a housing unit, depending on specific requirements and the cost of land and construction (Litman 1999). Additionally, Litman (1999) finds that the burden of minimum parking requirements falls most heavily on low income households by increasing housing costs. Clearly, parking requirements can have a negative impact on the development climate, reduce housing production, and harm housing affordability.

OTHER REGULATORY POLICIES TO SUPPORT TOD

Urban Growth Boundaries
In order for development to occur in TOD zones, development may need to be channeled from periphery areas through the use of urban growth boundaries, such as those required by Oregon and Washington state laws, or tiered-growth systems like those in San Diego and Minneapolis (White 1999). By limiting the amount of growth allowed in periphery areas, development becomes more concentrated within the boundary, making high-density development more attractive.

Transfer of Development Rights
Transfer of development rights (TDR) programs can support TOD by designating station areas as “receiving” areas. Receiving areas are designated areas that can develop with increased density in exchange for restricted development in other areas. Similar to the effect of an urban growth boundary, TDRs also function to limit development in the periphery. TDR has been used to support TOD by the Tri-County Metropolitan Transportation District (Tri-Met) in Oregon, the Triangle Transit Authority, North Carolina, and King County, Washington (White 1999).
FINANCIAL INCENTIVES TO SUPPORT TOD

It is vital to realize that zoning changes and other regulatory policies alone will not provide adequate support for TOD, but are simply considered to be a primary enabler. Once zoning ordinances have been assessed and amended to allow for TOD, there remains a need to actively attract it with a variety of financial incentives for local governments, developers, and potential residents.

Incentives for Local Government

Transportation Grants -- The San Mateo, California, City and County Association of Government encourages high-density development near transit stations by offering transportation grants to local governments. Cities are awarded $2,000 per bedroom for new housing developments of at least 40 units per acre and within one-third mile of a transit station. The funds, from the State Transportation Improvement Program, can be used for any transportation project within the city (Metropolitan Transit Commission 2000).

Tax Increment Financing -- Essentially, tax increment financing (TIF) provides a mechanism to retain the tax revenues generated from property improvements within a specified area to be utilized for funding public projects within the given area. Relating to TOD, this may offer a means to provide pedestrian-friendly amenities, such as streetlights, sidewalk improvements, and landscaping within station areas. In time, these public improvements would ideally attract more private development (PSRC 2001). Little is known about the success of using TIF for TOD, but when coupled with citizen input and an existing market for redevelopment, the tool has great potential.

Incentives for Residents/Homeowners

Location Efficient Mortgages -- An effective tool to promote middle-income home ownership near transit stations, location efficient mortgages (LEM) allow potential homebuyers to qualify for higher mortgages based on the savings they can accrue by not relying on automobiles. Unlike a traditional mortgage, LEM takes into account the savings accruing to an urban household that relies on public transportation and local services and amenities. This savings can provide thousands of dollars of additional buying power for condominiums, townhouses, or single-family detached houses (Institute for Location Efficiency 2000).

The City of Seattle began utilizing this program in 2000 and, in addition, also offers cost-reduced transit passes to all qualifiers (PSRC 2000). Similar programs currently exist in and around Los Angeles, San Francisco, and Chicago. LEM was made possible by the sponsorship of Fannie Mae, which provided over $100 million dollars over two years for mortgage underwriting. Fannie Mae will be examining these programs in March of 2002, and location efficient mortgage programs may become more widely available across the nation (NRDC 2001).
Incentives for Developers

Density Bonuses -- Density bonuses serve as an incentive to encourage developers to invest in TOD amenities and other assets desired by communities. By meeting conditions specified by the locality, a developer is allowed to complete a project with higher than allowable density. Olympia, Washington, allows for a 20 percent density bonus for zero lot line development, townhouse, and cottage house projects within certain residential zones (Morris 1996). Clark County, Washington, grants density bonuses for developments that include a combination of pedestrian/bicycle connections, bus shelters, designated carpool/vanpool parking spaces, or other transit-related amenities (Morris 1996). California has a Density Bonus Law requiring local governments to allow a 25 percent density bonus for low-income, very low-income, and senior housing. Also, more generally, localities in California are allowed to award 25 percent density bonuses simply for building within one-half mile of transit facilities (PSRC 1998). King County, Washington, Culver City, California, and the Triangle Transit Authority in North Carolina have also used density bonuses to support transit (White 1999).

Tax Abatements for TOD -- Because of state enabling laws, cities in Washington and Oregon are able to offer tax abatements to developers who increase mixed-use or multi-family housing while improving their properties near rail stations (PSRC 1998; Arrington et al. 1999). In Tacoma, Washington, this program began in 1996, and by 1997, 350 additional housing units were created within the city’s 14 mixed-use centers, with an investment of over $17 million. If developers satisfy a list of criteria, the property improvements are tax-exempt for 10 years. Qualifying criteria in Tacoma simultaneously encourages urban renewal and increased residential densities while discouraging gentrification (City of Tacoma 2000). In order to receive the tax abatement, developers must ensure that current tenants are not displaced, existing buildings are not in violation of one or more building codes, and improved or renovated units contain at least four units each.

The Portland, Oregon, TOD tax exemption program functions similarly to Tacoma’s program, but allows more development flexibility. Instead of focusing solely on multi-family housing, tax exemptions are included for property improvements to create childcare facilities, housing for special needs populations, housing with ground floor commercial space, recreational facilities, or other public benefits. TODs were included in the Core Area Tax Exemption Program in 1995 by the State Legislature, and by 1999, six projects containing 755 rental units had been approved in Portland (Arrington et al. 1999).

Permit Review Streamlining -- For many developers, a swift permit review process may be enough of an incentive to invest in TOD rather than conventional suburban development. Once zoning and design regulations are adopted for transit station areas, they should be well organized and easily accessible to developers. If possible, steps within the review process should be consolidated, and applicants should have the flexibility to choose a fast application review period (when all standards are met) or a flexible, interactive process that allows for creative, less traditional proposals (PSRC 1998).
SUMMARY

This section has summarized some of the common obstacles to TOD, including regulatory, community, and market obstacles. Zoning ordinances in several communities that encourage mixed-use, high-density, and pedestrian-oriented development have been important tools for supporting transit. Additionally, tools such as Urban Growth Boundaries and Transfer of Development Rights have also been beneficial. These regulatory policies alone, however, may not be sufficient to encourage TOD. Localities must also consider the ability to capitalize on financial incentives that will help make TOD marketable.

CONCLUSION

It is clear from the literature that land use and transportation influence each other, and that compact, mixed-use development is critical to the success of rail transit. Therefore, neighborhoods should be designed with transit in mind in order to make transit operations economically feasible. TOD can help communities maximize transit use and minimize traffic congestion through design, density, and mixed-use considerations. For instance, it is generally recognized that rail transit is most feasible for neighborhoods having at least 12 dwellings units per acre. Furthermore, making activities such as employment and retail accessible to station areas and residences while minimizing available parking will support transit use.

The selection of a rail technology is an important economic and operational issue that Dane County planners will have to deliberate. Commuter rail systems in the United States are currently dominated by diesel-electric locomotives that haul traditional passenger rail cars. However, self-propelled diesel multiple-unit (DMU) vehicles are widely used in Europe and hold great promise for use in some U.S. markets. Diesel-electrics are very economical for large, densely-populated regions, while DMUs appear to be more economical for smaller regions that would offer lower route-trip ridership levels. DMU technology and safety designs continue to improve, and it is likely DMUs will become a prominent rail transit option in the coming years. Considering Dane County’s relatively moderate population size and lower density, DMU technology might be a good fit here. Nevertheless, much analysis and investigation should be conducted on projected resources, ridership, and long-term objectives to determine an appropriate technology choice.

Considering that rail transit stations represent a considerable capital investment designed to improve accessibility and attract pedestrian traffic, it should be no surprise that such stations increase the value of property within their vicinity. Studies show that stations do indeed enhance commercial and residential property values when regions are growing and land uses and other policies are supportive of growth around stations. In light of this relationship, transit can help communities achieve other goals, such as the creation of affordable housing, if local regulations and proper incentives and protections are in place prior to rail startup.
Regardless of transit’s ability to influence property values, supportive policies are still needed to adequately spur transit-oriented development. Modern exclusive-use zoning will typically prevent TOD-type development. Therefore, it is crucial that municipalities rezone those areas surrounding stations, creating tools such as “transit villages” or using transit overlay zones to encourage higher densities, mixed uses, and pedestrian activity. Discouraging parking or eliminating minimum parking requirements can also be important. Other helpful policies include growth boundaries, transfer of development rights programs, and density bonuses. In any case, local land use regulations must be permissive and flexible enough to allow intensities and mixes of uses that will both support and take advantage of rail transit if it is to succeed financially and minimize automobile use.

Rail transit offers Dane County an excellent opportunity to improve its transportation and land use efficiency while at the same time reduce automobile traffic and highway costs. Due to the fact that rail transit operations carry significant capital expenses, however, it would behoove Dane County governments to undertake advance planning in order to obtain the most benefit from rail transit. Land use regulation and associated policies can help or harm rail operations, and should be tailored with care in order to achieve community and system-wide objectives. Communities should certainly look upon rail transit as a catalyst and opportunity for enhancement. However, the introduction of rail must be accompanied by the right supportive policies in order to achieve economically feasible rail operations, maximum community benefit, and other region-wide transportation goals.
GREENWAY CENTER STATION

A proposed commuter rail station would be located in the southwest area of the City of Middleton, Wisconsin. This area is bounded by U. S. Highway (USH) 14 on the north, USH 12 and 14 on the east, the City of Madison on the south and the Town of Middleton on the west.

This station site would be the western-most stop on a commuter rail start-up system in accordance with Transport 2020. Greenway Center, a greenfield site, was chosen in this proposal as a model for future stations that might be built in other outlying municipalities, contingent upon sufficient demand. The quarter-mile site area that is part of southwest Middleton was also chosen to enhance public support for a commuter rail line across the entire proposed rail corridor.

COMMUNITY GOALS AND OBJECTIVES

The City of Middleton 2000 Master Plan includes general recommendations for the southwest area of the City, including Greenway Center. These recommendations include:

- The area should promote development that would better accommodate transit service
- The City should consider working with Madison Metro to plan for the establishment of a far west transfer point in this area
- The area should adopt ordinances for Traditional Neighborhood Development and Conservation Subdivisions by January 1, 2002
- The area should promote Transit Oriented Design for new neighborhoods

The following goals are a synthesis of recommendations from Assistant City Planner Mark Opitz, Carol Biendseil of Western Center Properties -- the dominant landowner in southwest Middleton, District 1 Alderperson Steve Olson, District 5 Alderperson Howard Teal, and the City of Middleton 2000 Master Plan. Many common objectives were shared among the sources and will be used to help shape the station design guidelines.

HOUSING

Although housing is not a current priority for the area’s predominant landowner, Western Center Properties, city officials would like the Greenway Center area to provide high-density, multifamily, affordable housing in a traditional neighborhood design. Minimum densities were not specified, but to most effectively serve rail transit at Greenway Center, as the Master Plan suggests, the quarter-mile radius around the commuter rail station should feature at least 12 housing units per gross acre.
RETAIL AND COMMERCIAL DEVELOPMENT

The City of Middleton, Western Center Properties, and RED Development Company of Scottsdale, Arizona, have already discussed and planned the construction of an upscale commercial retail and service development at Greenway Center. The rail station is planned as part of the development, using tax increment financing (TIF) to build a rail spur off the existing rail line. The City and developers would like to see incorporation of a large grocery store and possibly movie theaters within the project area. A major focus for southwest Middleton is to include retail that is complementary to, rather than in conflict with, downtown Middleton. Commercial development catering to commuters and residents in the nearby area may include coffee shops, convenience stores, drug stores, banks, and restaurants.

PARKS AND OPEN SPACE

Traditional neighborhood development and conservation subdivisions include land area set aside for parks and/or recreation. Preserved lands, including Esser Pond and the South Fork of Pheasant Branch Creek corridor, are located in southwest Middleton. No specific goals were mentioned for future park or conservation land.

TRANSPORTATION AND PARKING

A major focus for Greenway Center is to create a walkable, pedestrian friendly area. Both developers and City officials want the retail, residential and transit-ways easily accessible by bicycle, bus, foot, and car. Middleton officials also see this area as a park and ride site for the station, located at the end of the commuter rail line. In general, pedestrian friendly environments incorporate wide sidewalks, well-lit areas and walkways, connections for through areas where roads do not exist, slow speed limits, and roads with a maximum of only one or two lanes.

ENVIRONMENTAL AND VISUAL QUALITY

The development planned for the area will be distinguished by a “historic train station” motif, drawing inspiration from the commuter rail station. There are no historic landmarks in the Greenway Center area of Middleton, nor are there currently any unique building styles. The site is largely characterized by open grassland parcels where development is expected to occur. Neither city officials nor developers made any mention of land preservation or protection as a goal.
INVENTORY OF EXISTING CONDITIONS

LAND USE AND REGULATION

Ownership
A great majority of the undeveloped land in the southwest area of Middleton is owned by Western Center Properties. Privately owned parcels within and intersecting the study area consist of 190 acres (96 percent), while the City of Middleton owns approximately 7 acres (4 percent) (see Map 1.1).

Map 1.1: Parcel Ownership

Land Use Controls
Within the study area, 136.75 acres (94 percent of the area) are zoned as Planned Development (PDD). A small 8.84 acre area (6 percent) in the northwest corner is zoned as Highway Business (B3) (see Map 1.2). The City of Middleton Zoning Ordinances for these areas are as follows:

PDD: The Planned Development District provides the regulatory framework to encourage improved environmental design by allowing flexibility in the development of
land while ensuring compliance with the basic intent of the Zoning Ordinance and with the City Master Plan. PDD has no “set” standards and specifications. Developers can propose uses or combinations of uses and various configurations of intensity and density of development. Through a process of Plan Commission review, public hearing and Common Council review and approval, accompanied by discussions with developers and, as appropriate, with other interested parties, an agreement is reached between the property owner and the City of Middleton. The details of this agreement constitute the zoning controls of the property. These controls have the same legal force and effect as to standard zoning requirements. To achieve the community benefits of PDD zoning, it is generally true that the project size should be large enough to allow clustering and to establish a coherence of design. Parcels less than 100,000 square feet are presumptively too small to be approved, but small projects may still be submitted and considered.

B3: Lands placed within Highway Business Districts take the form of clustered or strip commercial areas, land intensive development patterns of retail, service, warehouse, or light industrial uses, most of which are highway-oriented. While serving these functional purposes, these areas also serve as gateways to the Middleton community. Design review will seek to create as much attractiveness as is economically feasible and consistent with the functioning of the businesses. Minimum lot area is 7200 square feet.

Map 1.2: Zoning
Existing Uses
Inventoried from site visits and year 2000 orthographic aerial photographs, the current land use areas within our circle consist of the following (see Figure 1.1 and Map 1.3):

- 98.08 acres within the study area are open space, which is either grassland or wooded. Some grassy areas were observed being used as dog runs on more than one occasion.
- Large office buildings (including the Wisconsin Trade Center), a farm co-op, a child daycare center, and part of a lumberyard cover 45.93 commercial acres.
- Rights-of-way cover 35.95 acres and form an irregular grid system. All roads are two or four lane in the study area. Widths of main roadways in the study area are 40 feet (Market Street), 50 feet (Deming Way and Aspen Commons Road), and 80 feet (Greenway Boulevard). No on-street parking is allowed on Greenway Boulevard.
- Seven multifamily residential buildings cover 13.43 acres. These are part of a 582-unit apartment building project that extends south of the study area.

Outside the study area, but within the southwest area of the City, are the following uses: Restaurants (McDonald’s, Denny’s), two hotels, a gravel quarry, a 310-acre golf course, and Middleton Industrial Park. The City of Madison is just to the south and a designated 100-year floodplain area is north of the site.

Figure 1.1: Land Use by Area
TRANSPORTATION

Vehicle Circulation
Madison Metro Bus Routes 61 and 62 access the study area along parts of Deming Way and Greenway Boulevard. The area can also be reached by automobile using USH 14 to Pleasant View Drive, using USH 12/14 to the Greenway Boulevard exit, or from the south on Deming Way, Greenway Boulevard or Pleasant View Drive (see Map 1.4).

Bicycle Circulation
Bicycle access to the study area is available via an existing pathway that connects to the downtown area of Middleton extending under USH 12. The path traverses the entire study area.

Pedestrian Circulation
Pedestrians can access the study area using the bike path and sidewalks. Sidewalks run from the residential housing area and along Greenway Boulevard as well as along Market Street, but have not been built along Deming Way or Aspen Commons. Sidewalks will need to be built to facilitate pedestrian access a new station site.
Rail
Railroad tracks run east-west along USH 14, north of the study area. These tracks lie more than one-quarter mile from the station study area. The City of Middleton currently leases a train for travel to and from University of Wisconsin sporting events and for leisure tours.

Map 1.4: Circulation

UTILITIES

Electric, Natural Gas, Sewer, and Water
Sewer and water lines from the City of Middleton are already in place within the study area. Gas and electric lines are connected as well. If future hookups are needed, it will be a developer’s responsibility to assess and acquire the necessary services.

City municipal well 6 is located just to the west of the proposed station site. A major high-pressure water district had to be established to serve the southwest area, because the
City’s existing water system can only provide service to an elevation of 980 feet. Elevations above this require either boosters or a high-pressure district area.

BUILDINGS

Footprints
The Greenway Center study site is largely undeveloped and existing structures cover only a small part of the southwest area of Middleton. About 20 structures exist around the potential commuter rail site, with seven residential and 13 commercial buildings. Developers plan to add several commercial/retail buildings to the study area and these will be discussed later in this report. A diagram of the building footprints is below (see Map 1.5). Black areas on the map represent existing structures that are expected to remain or grow larger to accommodate future employment and needs of the area.

Map 1.5: Building Footprints
Building Heights
Building heights at Greenway Center range from one to ten stories. All residential structures, located in the southwest area of the site, are three-story multifamily buildings. Commercial structures range in height from flat-roofed, one-story buildings, to ten-story angular buildings. When demand exists, an additional five stories will be added to Greenway Station, an office building that currently rises to five stories. A three-dimensional simulation of building locations and height is below (see Map 1.6).

Map 1.6: Rendering of Existing Buildings and Proposed Rail Station Site

Significant Structures and Attributes
Commercial -- The commercial buildings at Greenway Center are a mixture of size and styles. In general, glass and windows are frequently incorporated into designs, with mostly brown, green, gray, and white colored building material. Minimal landscaping surrounds the buildings and is made up of young trees and bushes.

The Wisconsin Trade Center is an impressive office building with 10 stories of reflective glass and an atrium to welcome visitors (see Figure 1.2). Connected to the Trade Center by an enclosed pedestrian bridge is Greenway Station. Just north of the Trade Center and across Greenway Boulevard, the five-story office building is square-shaped with brown brick and green windows (see Figure 1.3).
To the west of Greenway Station, across Pheasant Branch Creek and along Market Street, lies a section of office buildings that include mixed office types and the United States Geological Service (USGS) center. The USGS is a tan and maroon building (see Figure 1.4) situated next to a larger, U-shaped building. This one story, white and black, flat-front structure contains offices for several businesses (see Figure 1.5).
Residential -- South and slightly west of the Wisconsin Trade Center, multifamily residential buildings line both sides of Greenway Boulevard. These three story buildings have similar signage, but buildings on the west side of Greenway Boulevard are styled differently from those on the east side.

To the east of Greenway Boulevard, the apartments have dark gray roofs, gray brick for walls and clear windows with dark green shutters (see Figure 1.6). Each of the three stories has wooden porches, and sidewalks lead to shared front doors.
To the west of Greenway Boulevard, the apartments are also three stories, but have light gray roofs, tan, white, and red brick sidings and clear windows (see Figure 1.7). The shape of the buildings also differs from those on the east side of the street. Third floor porches jut out from the buildings above enclosed bay windows on the first and second floors.

Figure 1.7: Residential Units West of Greenway Boulevard
PHYSIOGRAPHY

Soil Suitability for Development
Within the study area, the slope and soil constraints on building commercial development (i.e., slight, moderate, and severe) were analyzed. The area in each class occupies the following site proportions (see Map 1.7):

- Slight (11%) Relatively flat ground, consisting of Troxel soil
- Moderate (47%) Consists of Batava, Kegonsa and St. Charles soils
- Severe (34%) Relatively steep sloped ground, consisting of Dodge, Dresden, McHenry and St. Charles soils
- Other (8%) Consists of man-altered soils, such as cut and fill land or quarry

Map 1.7: Soil Suitability

Land Cover
Wetlands -- The southwest area of Middleton is part of the Pheasant Branch Creek Watershed, a drainage area to Lake Mendota. The South Fork of the Pheasant Branch Creek has been rechanneled through the southwest area, and runs north-south across the
entire study area. As part of the channel project, a 5-acre detention pond was created just south of USH 14. Esser Pond, classified as permanent open space, is also included in the southwest area, but lies outside our study circle.

Woodlands -- The Study area contains approximately 13.75 acres of wooded land, most of which is located near the multifamily residences in the southwest quarter of the study area.
ANALYSIS OF OPPORTUNITIES AND CONSTRAINTS

OPPORTUNITIES

Parcels with Potential for Adaptive Re-use
As noted in the Soils section above, much of the land within the Greenway Center study area is suitable for development. The existing vacant lots and surface parking lots are prime opportunities for the residential and commercial development necessary to support transit-oriented development (see Map 1.8). There are already plans to develop several parcels for commercial use.

Map 1.8: Development Opportunities

Potential Location of the Transit Station
The transit station at Greenway Center should be located between the South Fork of Pheasant Branch Creek and the existing Greenway Center building (see Map 1.8). Because of its proximity to housing and accessibility for pedestrians, bicycles, buses, and automobiles, this location is the most suitable for the station site.
The existing multifamily residential units on the southern edge of the area have wide sidewalks and bike paths to allow for pedestrian circulation throughout most of the study area (see Map 1.8). Madison Metro bus routes 61 and 62 run through part of the site as well, and would provide bus connectivity for rail commuters. The streets in the area are new, wide, and in sufficient condition to handle high volumes of traffic if Greenway Center is used as a park-and-ride stop or for retail shopping.

Natural Amenities
The South Fork of Pheasant Branch Creek in the southwest area of Middleton could attract new residential and commercial development. Though the creek itself could be seen as a constraint to development, the corridor provides an open space area for exercise, enjoyment, and bicycle connectivity to the rail station.

Gateways to the Community
The site has easy access from all directions. Greenway Boulevard connects the study site to USH 12/14 on the eastern side and to the existing multi-family housing units to the southwest. There is a neighborhood on the far side of the apartments, which are also connected by Greenway Boulevard. These communities have the potential to attract investment into the development area. The access from the north is on USH 14 to Deming Way or Quarry Rd. Anyone traveling to Middleton or Madison from Black Earth, Sauk City, or beyond will have an easy place to stop and shop on the edge of the city.

CONSTRAINTS

Rail Line
The vacant lots and parking lots in Map 1.8 signify areas that have building potential, but none are located next to the existing rail line. The City of Middleton plans to construct a rail spur turning south into the Greenway Center site, crossing Market Street to provide a linkage to the depot site. This limits the placement of a station based on the placement of the rail spur, but since funding for the project is already available, time should not be a constraint. The future intersection of Market Street and the rail line could cause traffic flow problems if the volume of cars in the area increases.

Physiography
Several parcels within the study area should remain as open space due to their natural amenities and high costs necessary to prepare the land for development. These include, the corridor of the South Fork of Pheasant Branch Creek and steeply sloped ground (see Map 1.9).
Incompatible Buildings
In the northwest corner of the study area, a cluster of buildings including a lumberyard and a farm co-op may be a constraint for future development. The buildings are old, and their current use and design do not support TOD.

Pedestrian Barriers
Due to the low traffic volume in the area there are currently no pedestrian barriers. However, there are intersections that could potentially create constraints within a transit-oriented neighborhood, as pedestrian crosswalks are unmarked. Currently, all intersections have only stop signs to slow traffic.

Deming Way and Aspen Commons, two roads that will likely see an increase in vehicular flow and pedestrian traffic, do not have sidewalks on either side of the street. For improved access to the rail station, sidewalks and associated lighting will need to be installed.
MARKET SUITABILITY ANALYSIS

The late James A. Graaskamp of the University of Wisconsin-Madison created a financial analysis tool that is relevant and easy to use for both the planning community and the development sector. His “front-door” analysis is a straightforward instrument that enables planners and developers to ascertain the rough financial feasibility of an income-producing redevelopment idea. By inputting a few parameters that account for both debt and equity financing sources, a required rent per unit is calculated that yields a solvent project. This back-of-the-envelope calculation is a systematic and supportable method by which planners and developers alike can gauge the reality of their land use ideas.

Essentially, a project’s cost parameters are partitioned into debt and equity obligations. Based on the required annual equity return and the terms of the debt financing, a required income level is determined that the project must generate each year to cover these obligations. Working backwards, the model concludes with how much rent is required per unit to achieve these performance standards. The model’s user then must determine whether the required rent is typical of the market in which it must operate. In short, the model assesses feasibility of a redevelopment projected based upon its projected income-producing potential.

The result allows the model’s user to test the effect of various changes in the input parameters to see how the financial feasibility of the project shifts and what changes will be required to ensure its actual development by the private sector.

GREENWAY CENTER ANALYSIS

In order for the Greenway Center station area to approach the recommended minimum 12 units per acre, approximately 1,200 new dwelling units will have to be constructed in the coming years. Because most land in the station area has already been dedicated to commercial uses, it is recommended that the City of Middleton require residential development on available empty parcels and within proposed retail developments.

This market analysis will concentrate on the feasibility of building a 500-unit residential complex on a vacant 10-acre parcel in the station study area just south of US-14 and west of Deming Way. We believe that this site could support this type of development considering: 1) the intensity of development that is planned nearby, particularly retail and office; 2) proximity to two highways, US-14 and US-12; and 3) the planned construction of a commuter rail station at Greenway Center.

Using front-door analysis, it is estimated that rents would have to average at least $872 per unit per month (based on average apartment size of 1050 square feet). This analysis rests on the following assumptions:

- One-bedroom units are 800 square feet
- Two-bedroom units are 1000 square feet
• Three-bedroom units are 1300 square feet
• Site acquisition costs are $1,350,360 based on $3.10 per square foot, 435,600 square feet (10 acres, 43,560 square feet per acre)
• Construction costs are $46.62 per square foot for three-story buildings
• Required return on equity is 15%
• Loan rate is 7.5% on a 30-year mortgage

Currently, one-bedroom apartments in newly-constructed buildings located within the station study area rent for about $900 per month; two-bedroom units rent for about $1,100 per month. Based on these rents and a monthly break-even threshold of $872 per month, market rents from the smallest apartments meet the feasibility criteria for the average unit. Therefore, a 500-unit three-story apartment complex could be feasibly developed and operated on the subject site.
RECOMMENDED DESIGN GUIDELINES

LAND USE CONCEPT

Design
To the greatest extent possible, development within the ¼-mile Greenway Station study area should be planned and built in a compact, mixed-use, pedestrian-friendly manner that is supportive of commuter rail operations. Building and street designs should enhance the pedestrian environment and establish good vehicular and pedestrian access to the station and surrounding activity centers. Residential, retail, and service developments should be designed and built in a manner that economically supports the neighborhood and commuter rail operations, and minimizes the need for automobile trips. In addition, a park-and-ride structure should be built adjacent to the rail station to further support rail operations and accommodate potential rail passengers residing in distant neighborhoods.

Development and Land Use
The ¼-mile radius station study area and areas immediately adjacent offer excellent opportunities for residential, retail, and other commercial developments that could create a neighborhood that is cohesive, vital, and feasibly supports commuter rail operations. As noted earlier in this report, a minimum residential density of 12 units per gross acre is necessary to support rail operations. To facilitate achieving this density, and add commercial development to support residents and commuters, opportunity areas have been delineated into sectors; general development and land use recommendations for each of these sectors follow (see Map 1.10 and Map 1.11).

Sector A
Description: Trapezoid-shaped parcel north of Market Street, east of the South Fork of Pheasant Branch Creek, and west of Deming Way.

High-density, mid-rise (6-10 story) residential development is recommended for this sector. A small park, possibly with recreation and/or playground facilities, would improve the livability and attractiveness of this sector.

Sector B
Description: Area bounded by Market Street to the north and east, Greenway Boulevard to the south, and the Pheasant Branch Creek buffer to the west.

There is one commercial building located in the southwest corner of this sector, while retail and a hotel is currently planned for the remainder. In order to create a pedestrian-friendly environment, it is recommended that structures be situated immediately adjacent to Market Street, Deming Way, Greenway Boulevard, and Aspen Commons. Automobile parking should be screened from the street by placing it behind businesses. Furthermore, surface area dedicated to parking should be minimized. Residential units should be incorporated within this area through upper story additions to some of the retail buildings. Adding a residential component will enhance the vitality of the district and strengthen its long-term viability. Additional walkways and/or narrow roads should be
laid out in grid-like fashion within these superblocks to increase accessibility for pedestrians. It is also recommended that a grocery or supermarket be developed in this sector in order to serve the present and future inhabitants of the station study area, furthering objectives supportive of transit use and pedestrian orientation.

Map 1.10: Land Use Concept

Sector C
Description: Area bounded by Greenway Boulevard to the north, the Wisconsin Trade Center to the west, and the hotel to the east.

Low-profile (one story, matching facade) commercial development is recommended for this sector.

Sector D
Description: Parking lot located to the west and south of the Wisconsin Trade Center.

It is recommended that the expansive surface parking lot behind the Wisconsin Trade Center be subdivided for further development. This site would be appropriate for mid-rise
residential development due to excellent accessibility, provided by Greenway Boulevard and the proposed rail station, and similar adjacent uses. In addition, the adjacent creek and wooded buffer provide a considerable natural amenity.

Map 1.11: Rendering of Existing and Proposed Buildings

Note: Existing buildings are depicted in yellow; proposed buildings are depicted in blue; and the rail station is depicted in red.

Sector E
Description: Pheasant Branch Creek and adjacent wooded buffer areas.

A conservation area is recommended to provide a scenic natural amenity, buffering between commercial buildings to the north and residential buildings to the south, and an aesthetically-pleasing environment for bike path users.

Sector F
Description: Gravel quarry located west of Pleasant View Road and south of USH 14.
Although Sector F is located just beyond ¼-mile from the proposed station site in the Town of Middleton, it offers an excellent opportunity for the development of a transit-supportive and pedestrian-oriented neighborhood. Currently, a gravel quarry occupies the entirety of Sector F. Being located within a zone ¼-mile to ½-mile distant from the proposed station site, a medium-density traditional neighborhood development averaging seven dwelling units per acre is recommended for this sector. Building at this minimum density will encourage transit use and enhance the long-term viability of nearby retail development.

Sector G
Description: A lumberyard and farm co-op comprise Sector G, located south of USH 14, east of Pleasant View Road, and north of Quarry Road.

For the long-term, as the Greenway Station area evolves, the City of Middleton should encourage medium or high-density commercial and/or residential development on this site, depending on market demand.
TRANSIT STATION

The transit station should provide convenient and safe access to nearby commercial, retail, and residential establishments.

Location
The station will be located to the west of Aspen Commons and north of Greenway Boulevard (southwest corner of Sector B).

Station Design
- Station should be located in an area easily accessible by pedestrians with sidewalks and bridges.
- Building should reflect the character of the development by using the same materials and architectural character but establish its own identity.

Integration with Bus Transit
- Site should consist of convenient and safe connections with the feeder bus routes, roads, and the pedestrian/bicycle network.
- Bus stops and shelters, and a possible Metro bus transfer station, should be included in the station design.

HOUSING

A variety of residential housing types should be incorporated into the area, including multifamily affordable housing.

Recommended Densities
- In order to economically support the rail operation a minimum standard of 12 housing units per acre, about 1,500 units within a quarter-mile radius is recommended.

Source: http://www.users.techline.com/mccleary

Examples of existing transit stations.
Source: http://www.railroadpix.com

Source: http://www.atlcondo.com
Affordable Housing
- Affordable housing should account for 15 percent of housing in the area.

Suitable Parcels
- Residential development is recommended in Sectors A, B, D, F, and G (see Map 1.10).

Lot and Building Design Standards
- Building scale and materials should be varied, incorporate architectural styles, building materials, and color used in surrounding buildings (ex. red brick, green glass, neutral colors).
- Buildings and new development should be designed and sited to preserve the South Fork of the Pheasant Branch Creek viewshed.
- Buildings on redeveloped sites should strengthen sense of enclosure at the streetscape level.
- Primary residential entrances should be oriented to and be visible from the street.
- Buildings greater than one story should clearly delineate the boundary between each floor of the structure through architectural detailing.

COMMERCIAL

Recommended development
A variety of commercial uses including office space, retail, and entertainment, should be provided.

Integration with Multi-Family Housing
- Commercial spaces should be integrated with multi-family housing.

Suitable Parcels
- Commercial development is recommended in sectors B, C, and G (see Map 1.10)
- Residential units should be located above commercial space where applicable.

Lot and Building Design Standards
- Buildings should be built up to the edge of the sidewalk in a consistent plane with other buildings on that street.
- Building scale and materials should be varied, incorporate architectural styles, building materials, and colors used in surrounding buildings.
- Decorative and functional elements such as signage, awnings, and ornamentation should be used to create human scale elements on the facades. A building greater than one story should clearly delineate the boundary between each floor of the structure through architectural detailing.
- Retail activities should be located on the ground floor of buildings, be oriented towards the street, and provide direct access from sidewalks.
- Loading docks should not be located on the major pedestrian street side of buildings.

CIVIC USES

Civic uses, including public spaces and open space, are encouraged around the transit station to accommodate the residents and employees of the area.

- A library and post office, for example, are encouraged near the transit station. These structures should be designed following the office/retail guidelines detailed above.
- These buildings should be centrally located and places in areas where private redevelopment opportunities are high.
• The South Fork of the Pheasant Branch Creek should be enhanced and provide public greenspace for residents, employees, and visitors to the area (see Map 1.10, Sector E).

VEHICLE CIRCULATION & PARKING

Traffic circulation should be efficient and safe for motorists as well as pedestrians.

Traffic Calming
• As development occurs the addition of stoplights or additional stop signs may be necessary.
• A traditional grid-based system, with alleys at the mid-block, should be considered.
• Blocks should be no more than 300 feet per side.

Parking
• Surface area parking should be kept to a minimum and located behind buildings.
• Where surface parking lots meet the sidewalk area, trees and shrubs should be used to create a barrier between cars and pedestrians.
• Mixed-use parking lots (ground-level retail and elevated parking) should be considered whenever possible and take into consideration the preservation of the character of the site and the surrounding community.
• Parking facilities should connect directly to pedestrian walkways that are safe and clearly identified.

Bus Linkages
• Development of bus stops and shelters, and a Metro bus transfer station, should be included in the station area design.
• A clear and direct route should be established for feeder bus routes.
BICYCLE CIRCULATION

It is important to provide convenient and safe access by bicycle to the transit station.

On-street Lanes
- Dedicated bicycle lanes should provide direct access to the transit station.
- Dedicated bicycle lanes should be provided on collector streets.
- Dedicated bike lanes should be 4 to 6 feet wide.
- The existing bicycle path should provide direct access to the station from surrounding residential areas, this may mean expanding or rerouting the current path.

Parking
- Bicycle racks should be provided at the station, in civic, multi-family residential, and commercial areas, and adjacent to bus transfer points.

PEDESTRIAN CIRCULATION

Pedestrian movement and activities should be the top priority in assessing transportation and street improvements. A pedestrian should be able to access any part of their community safely and efficiently by walking.

- Crosswalks should be incorporated into all street intersections and should be well marked.
- Sidewalks should range from 6 to 12 feet depending on expected capacity.
- Vehicular lane expansion should be de-emphasized in favor of widening pedestrian sidewalks where possible.
- “Bump-outs” at intersections are encouraged for shorter pedestrian crosswalks and smaller vehicle lanes.
**Accessibility for Disabled**

- Adequate access for the disabled to the transit station should be provided.
- Disabled persons should not have to cross behind any motor vehicles to access a walkway.
- Ramps should have maximum 8 percent slope and be no longer than 30 feet.

**SIGNAGE**

Signs should be informative and directional in character.

- Streetscape designs should include a system of pedestrian wayfinding signs.
- Scale, color, and design should blend in with the architectural style of the area.
- Signage should be provided with a pedestrian scale and design.
- The size, materials, and maintenance of new signage should be regulated. Excessively large and freestanding signage should be avoided, to reduce visual clutter.
- Most of a storefront should be used for window displays.

**STREET FURNITURE**

Street furniture should be provided for the convenience of the residents/visitors of the area. Lighting should be provided to give pedestrians a sense of security.

- Lighting around vehicle and pedestrian areas should be emphasized.
- Lighting levels should be uniform to avoid very contrasting areas, and make objects appear as close to a natural color as possible.
- Style and height of lighting should be consistent with surroundings.
• Lighting should be directed downward and at the lowest acceptable level to preserve the night sky. This can be done through the use of cutbox fixtures.
• Retail stores should have after hours lighting for signage and displays.
• Bike racks should be provided on sidewalks.
• Garbage receptacles, newspaper racks, and seating, should be provided on sidewalks.
• Street furniture should not clutter the street or obstruct the pedestrian in any way.

LANDSCAPING

Landscaping should be incorporated into all elements of development around the transit station including commercial, residential, and civic spaces.

• The corridor along the South Fork of the Pheasant Creek should be preserved and enhanced to promote public enjoyment.
• Landscaping should consist of native species adapted to the area.
• Planters and flowerpots should be hung from street lamps in the mixed-use station area. Seasonal displays are encouraged in public open spaces.
POLICY RECOMMENDATIONS

The City of Middleton should consider implementing a set of policies and incentives that support rail transit operations and create a sustainable and attractive mixed-use neighborhood surrounding the proposed rail station. This section details suggestions for an affordable housing policy, a mixed-use overlay zone, a minimum residential density objective, and parking guidelines. The City should also explore incentives that further these policies, such as tax increment financing, Community Development Block Grants, density bonuses in exchange for the provision of affordable and senior housing and mixed uses, incorporation of environmentally-conscious design, and public amenities such as plazas and parks. Middleton should also investigate the potential benefits of streamlining the permit review process for those proposed developments that help the city meet its policy objectives.

AFFORDABLE HOUSING

Affordable housing should be planned for the vicinity around the Greenway Center station site consistent with the goals of the City of Middleton, Dane County, and the State of Wisconsin. Objective 5 of Middleton’s Master Plan states that the city should “Support efforts to provide housing for low to moderate-income persons and to locate this housing in proximity to areas that offer access to transit alternatives, shopping, recreation and employment centers.” Encouraging the construction of affordable housing within the Greenway Center area would be highly consistent with this objective. Dane County’s Land Use and Transportation Plan also makes reference to providing housing opportunities to low-income households. Unfortunately, neither plan spells out specific affordable housing goals for new developments. Nevertheless, it would not be unreasonable to expect that a new development be required to reserve a minimum of 15 percent of its units for long-term or permanent affordability. This standard is consistent with affordable housing plans in the City of Madison and other U.S. cities. Different levels of affordability could be included within this requirement. For instance, 10 percent could be reserved for households earning up to 80 percent of the Area Median Income (AMI), with the remaining 5 percent reserved for households earning up to 50 percent of the AMI.

Currently, the City of Middleton has no statutory or regulatory policies in place to encourage or require the construction of affordable housing within new developments. Policies that the City could enact include: density bonuses for the inclusion of affordable housing in new developments; inclusionary zoning that requires a minimum percentage of affordable units when developments exceed a certain number of units; and development impact fees on commercial development that can be used to subsidize affordable housing construction. The city could also take advantage of federal funds, such as Community Development Block Grants (CDBG) now available through Dane County, to subsidize construction within new developments. Considering that there is a great deal of undeveloped land within both half and quarter-mile radii of the proposed
station site, opportunities exist for economies of scale in development to subsidize the construction of affordable units within new developments.

Because the majority of land within a quarter-mile radius of the station site is planned for commercial development, all new residential construction within this radius should be medium to high-density, multi-family buildings incorporating a significant share of affordable units. Such construction will not only enhance the feasibility of rail operations, but it will also keep the per-unit cost of residential development lower. To further enhance affordability, the City should consider lowering or eliminating minimum parking requirements for all new residential construction. This will both reduce development costs and encourage transit use. Finally, all affordable housing units should be integrated with market units, with similar architectural features. Mixed-income development will not only minimize the stigma of affordable housing, but it will result in positive social outcomes for all residents.

REGULATORY POLICIES

Zoning
The station study area is currently zoned Planned Development District (PDD) and Highway Business. Ostensibly, PDD zones can already include a mixture of uses and varying degrees of development intensity. Nevertheless, placing a mixed-use overlay zone over the station area could alert potential developers that an intense mixture of retail, residential, and office uses are indeed encouraged.

Density Recommendations
Given the character and location of the site, it is difficult to determine with certainty what minimum or maximum levels of density are optimal for the Greenway Center station study area. At the very least, however, activity and density levels that support the feasible economic operations of a commuter rail system should be encouraged. Long-term feasibility of the rail system will ultimately hinge on ridership. As indicated in the literature review, ridership flowing through a commuter rail station at Greenway Center will be a function of the following factors: 1) a sufficient number of dwelling units located within a short walk of the station; 2) the number of jobs located near other stations on the commuter rail network (e.g., at the Medical Center, downtown, etc.); 3) the number of jobs located within a short walk of the Greenway Center station; 4) the amount of commercial space located near all system stations; 5) the level of service provided by the rail system; and 6) the amount and cost of parking located near system stations. The City of Middleton will only be able to control those factors located within its jurisdiction, such as the number and density of dwelling units, the amount of commercial space, and the amount and cost of parking, whether in park-and-ride structures or associated with residential and commercial development.

If maximizing ridership through Greenway Station is the primary objective, the City of Middleton should encourage the location of a maximum number of dwelling units and jobs in the vicinity of the station while at the same time accommodating a maximum of
park-and-ride spaces for rail riders who would drive to the station from their homes. Depending on system headways, and the number of riders induced from park-and-ride spaces and arriving from other station areas, research recommends that station areas have a minimum average of 12 units per gross acre in order to support rail operations. The ¼-mile radius station area comprises a total of 125.66 acres; therefore, the area would ideally have a minimum of approximately 1500 housing units.

Notwithstanding these general guidelines, Middleton will have to set policies for the station area that meet its own objectives in concert with the feasibility requirements of the rail system and the conditions of residential and commercial real estate markets. If near-term projections show that ridership from park-and-ride riders and those incoming for jobs at the Greenway Center area would be low, then a minimum of 12 dwelling units per acre should be followed. If near-term projections for those riders are higher, then the minimum density of dwelling units could be adjusted downward accordingly.

There are currently 300 dwelling units in the station area. Under the 12 dwelling units per acre guideline, the City of Middleton would have to encourage the development of 1200 additional dwelling units within the station area in order to support rail operations. To reach this total, it is recommended that dwelling units be developed at a moderate-to-high density in some exclusively residential zones, while others should be vertically mixed into retail developments proposed for the area. Building to this density would entail higher construction costs than regional averages. However, local rents already exceed regional averages, while future development in the station area will only enhance the amenities and desirability of the area, thus boosting potential rents. Considering current development conditions and the absence of a rail system, development should be phased in concert with the absorptive capacity of the market so that maximum feasible density will be achieved.

Parking
Minimum parking requirements should be reduced or waived entirely in order to encourage transit use, reduce construction costs, and minimize stormwater runoff. Instead of imposing or encouraging minimum parking, the city could let developers determine their own parking requirements. This would enable a reduction of costs that will improve housing affordability and encourage a greater intensity of development. Reducing parking requirements could also provide more room for open space and/or more development and assessable property. Middleton could also enact maximum parking thresholds for certain land uses, if it desires. A few American cities, including Portland, Oregon, have enacted parking maximums in certain areas where transit use is highly encouraged. Furthermore, the City of Middleton should work closely with the commuter rail operator to optimally price parking in city-owned parking structures.
INCENTIVES FOR DEVELOPMENT

Tax Increment Financing
Most of the station area is already included in a tax increment financing (TIF) district. In fact, construction of much of the infrastructure in the proposed station area was financed with TIF. However, the seven-year allowable expenditure period of this TIF district is scheduled to end in October 2003. This fact should be kept in mind if Middleton officials believe that it would be appropriate to use TIF funds to finance developments that further support commuter rail operations. Proposed projects include, but are not limited to:

- Park-and-ride parking structures for transit riders
- The rail spur and station
- Affordable housing units
- Pedestrian and bicycle facilities

Density Bonuses
Density bonuses could be awarded to developers who meet specific criteria that promote certain land uses, assets, and design features within the station area. These could include affordable housing, mixed uses, and environmentally-conscious design. Developers that agree to set aside a minimum of 15 percent of the dwelling units that they construct as affordable should be permitted to increase the intensity of their residential projects beyond limits permitted by current zoning. In theory, density bonuses enhance the profitability of projects, depending on local market conditions, and improve the long-term feasibility of transit operations.

Listed recommendations in the City of Middleton Master Plan include conservation subdivision development in the southwest area. This includes improving environmental quality of the area and providing recreational amenities. Density bonuses could be granted to developers who agree to follow design standards in accordance with conservation subdivision definitions from the Wisconsin “Smart Growth” law. Under those standards, buildings are clustered on the most suitable portion of a parcel, while at the same time preserving natural drainage systems, open space, and environmentally sensitive areas. Specific density requirements are not set in the current PDD zone at Greenway Center, but all Middleton parkways, greenways, and environmental corridors cannot be less than 100 feet in width, and should be 200 feet wide within a proposed plat. Density bonuses may work well at Greenway Center given the availability of large open space parcels and the location next to the Pheasant Branch Creek corridor.

Provision for public amenities in development plans, such as parks, plazas, and other gathering areas, may also allow granting of density bonuses. Similar to recommendations mentioned above, higher density units could be permitted if a nearby portion of the site is reserved for public use and recreation.
Tax Credits
The city should encourage the use of federal low-income housing tax credits to provide affordable dwelling units and increase the density of the station area.

Permit-Review Streamlining
To the extent that it is possible, developments proposed for the study area that are consistent with transit-oriented design principles should be given priority review status within the framework of the Middleton’s development review process.

Community Development Block Grants
As mentioned in the section on affordable housing policy, Middleton should consider using Community Development Block Grants available through Dane County in order to subsidize the inclusion of affordable housing units within new residential and mixed-use developments in the station area.

SUMMARY
The Greenway Center study area stands as a good example of a potential station site in a developing area of Dane County. Future greenfield station sites could certainly be modeled on Greenway Center, provided that future development occurs with an eye to supporting transit. While not a pure greenfield site, due to the presence of some existing office and apartment buildings and extensive infrastructure, the area is by no means built out. There is ample space for new development. Therefore, there is great potential that new residential, retail, and office development could be built based on transit-oriented principles, in a compact, pedestrian-friendly manner, and supportive of regional commuter rail operations. Indeed, more than 50 percent of the land in the ¼-mile area surrounding the proposed station site is vacant, and most of this is suitable for development. Furthermore, other parcels within and adjacent to the study area offer excellent redevelopment opportunities.

In order to best support future commuter rail operations in Dane County, land in the study area should be developed according to transit oriented design principles, as described in other parts of this report. In brief, development should be compact, mixed-use, and amenable to pedestrians. Residential development should be given a high priority, in order to enhance transit ridership, the area’s vitality, and the long-term viability of area retail. Recommendations for the seven sectors outlined in the Land Use Concept are intended to address these objectives.
MEDICAL CENTER STATION

The proposed Medical Center/West Campus station site is located on the near west side of the City of Madison. Specifically, the site is situated at the west end of the University of Wisconsin campus at the northwest corner of the intersection of Highland Avenue and Campus Drive. The station is envisioned immediately north of the existing railroad tracks either abutting or upon the present Veterans Administration (V.A.) Hospital property. The Med-Center station is one of three rail stops envisioned for the UW campus. The other two stations are planned in the vicinity of the Union South/Engineering campus and the Kohl Center.

Several factors contributed to the selection of this particular station site. In order to maximize commuter rail system ridership, it is imperative to serve large employment centers. The Med-Center site sits within one-quarter mile of over 7,500 employees of UW-Madison, the V.A. Hospital, and the U.S. Forest Products lab. That number is projected to rise to 12,000.

Currently, the Med-Center area suffers from excessive automobile traffic congestion and overflow parking demand. The proposed station site aims to take advantage of commuter rail use as an alternative mode of travel among local employees and visitors. By reducing the number of vehicle trips to the site area, commuter rail stands to significantly alleviate automobile traffic and parking demand problems.

The University Avenue corridor between Grand Avenue and Walnut Street presents several opportunities for redevelopment consistent with transit-oriented development principles. The existing mix of housing, retail, and office uses is of a density and character insufficient to support and enhance commuter rail and the growing area workforce. However, the area holds strong potential for supporting transit and transit-oriented development given appropriate redevelopment opportunities, land use, and design guidelines.

This station area is envisioned as a model for other commuter rail stations sited adjacent to existing or planned large-scale employment centers. The Med-Center station is a destination site, designed to serve a large population of commuters working in a centralized area. The design guidelines produced for this site may therefore transfer to similar sites, providing a useful prototype for future transit-oriented development.

This site is also recognized in the University of Wisconsin’s Comprehensive Master Plan (December 1996) as the Med-Center station site. The location west of Highland Avenue allows direct pedestrian access to the U.W. Hospital and Clinics and the V.A. Hospital without crossing Highland Avenue.
COMMUNITY GOALS AND OBJECTIVES

The following set of community goals and objectives is a synthesis of ideas elicited from existing plans and informal public input regarding transit-oriented development at the Medical Center Site. The University Comprehensive Master Plan, adopted in December 1996, was the source of the majority of the University-based goals and objectives. In addition, feedback specific to commuter rail was sought by University staff, including: Lori Kay, Transport 2020 member, and Gary Brown, Senior Landscape Architect with the University Facilities Planning and Management Division. To develop goals and objectives for transit-oriented development outside the University, comments were incorporated from informal meetings with residents of the Regent Neighborhood. Cumulatively, these sources have provided a framework from which to develop station area goals and objectives that will, in turn, inform and shape station area design guidelines specific to the needs of the community the project is intended to serve.

Special consideration should be made in planning for the interface between the University, Federal institutional property, and the Regent Neighborhood, balancing the needs of both public and private interests and recognizing the complex institutional relationships in this station area. A unique challenge and opportunity exists to encourage collaboration between the City of Madison, Regent Neighborhood Association, the University, and the Federal government in promoting transit oriented development while balancing the needs of a major land grant university with those of an established residential and commercial district.

HOUSING

A balance of residential dwelling types should continue to be provided in the station area, including single and multi-family opportunities. Housing should continue to serve a diverse population, including students and families, and provide adequate opportunity for a wide range of incomes. The stable and desirable supply of housing south of University Avenue within the Regent Neighborhood should be preserved. As the site area is currently saturated with housing, the plan should encourage redevelopment of older multi-family residential into new, mixed-use spaces along University Avenue as needed to enhance land use efficiency and promote sound urban design.

COMMERCIAL

Commercial development potential in the station area exists predominantly along the University Avenue corridor, south of Campus Drive at selected nodes from Farley Avenue to Walnut Street. Some of the existing commercial facilities along University Avenue are in disrepair or are of poor visual quality. Commercial development north of Campus Drive among University and Federal facilities is unfeasible. However, these facilities provide a significant population of employees demanding commercial services. To better serve the employee base, area visitors, and area residents the plan should
encourage increased retail and commercial opportunities. Along University Avenue, neighborhood scale development including small service-oriented businesses (e.g., coffee shop, daycare, bank, dry-cleaner, automobile service, small scale grocery, etc.), restaurants, and retail will continue serve the needs of west campus and Regent Neighborhood area well. The plan should encourage redevelopment of commercial spaces along University Avenue as needed to enhance land use efficiency and promote sound urban design.

PARKS AND OPEN SPACE

In the interest of stimulating social interaction, planned open space should be integrated into the station area. The plan should encourage connections to nearby recreation and open space facilities. Because of the built-up nature of the station area, the small pockets of open spaces that currently exist on-campus should be maintained, or replaced with well-planned public open spaces providing adequate space for seating, interaction, and exercise convenient to residents, employees, and visitors to the area.

TRANSPORTATION

In general, the plan should aim to enhance multi-modal access to the station area. This goal is implicit in providing commuter rail access to the area. One area of concern is enhancing employee access to the site and, where possible, minimizing existing traffic volume on local streets particularly within the Regent neighborhood. Continuing and expanding existing mitigation measures (such as traffic calming) that ensure safety of other transportation modes (particularly bicycles and pedestrians) is desirable. Sidewalk access and connection to bus or shuttle routes should be used jointly to provide access from the transit station to the hospital area and the Regent neighborhood.

Pedestrian Circulation

The plan should incorporate measures that enhance pedestrian safety and movement directly to the transit station as well as throughout the surrounding area. These measures should include, but are not limited to, creating pedestrian surface and walkway corridors that link and provide adequate pedestrian access to major facilities in the area. In addition, existing pedestrian thoroughfares and sidewalks should be improved and better connected. Where pedestrian access is inadequate or incomplete, new sidewalks or paths should be added. Attention should be given to connecting the Regent Neighborhood with the campus, and developing more safe and efficient means of crossing University Avenue and Campus Drive, which pose formidable barriers to pedestrians.

Vehicle Circulation

Overall, the plan should aim to achieve an easily understood road system, while actively discouraging private automobile use for both access to the station area and circulation within the neighborhood. This includes providing an effective interface with the local municipal bus system and exploring opportunities for a shuttle service to connect with the
transit station in order to move employees and visitors around the Medical Center area. Measures should be taken to minimize vehicular traffic and congestion along University Avenue. The neighborhood, city, and University should work together to implement measures to reduce traffic speed and volume and prompt safer driving behavior.

As parking space is limited both on campus and in the neighborhood, above ground ramps (on-campus) or below ground parking (serving multi-family or commercial complexes) should be used wherever feasible to maximize parking efficiency. UW Transportation Services should intensify their effort to implement policies that would minimize automobile use on campus and spillover traffic into adjacent local streets.

Bicycle Circulation

The plan should seek to encourage bicycling as a viable mode of transportation by creating major bicycle routes and increased storage opportunities and amenities for bicycle commuters. Creating separate bicycle and automobile routes including in-street lanes and off-street paths would enhance bicyclist safety. Where possible, campus and regional bicycle routes should be connected. Direct links from the transit station to bicycle paths, avoiding interaction with automobile traffic, would encourage multi-modal travel.

ENVIRONMENTAL AND VISUAL QUALITY

Planning efforts should seek to protect existing natural, historical, and visual features in the station area. Landscaping should be encouraged to preserve and maintain the natural features of the neighborhood and campus area. Landscaping should be utilized to buffer incompatible uses from each other, mitigating noise and negative visual effects of certain areas. Screening the elevated portion of Campus Drive, parts of the Forest Products Lab, and the proposed Madison Gas & Electric power plant from adjacent uses would help achieve this objective.

Efforts to enhance visual quality should include coordinating architectural styles and design of commercial and residential development along University Avenue. Visual quality should also be a key consideration in new campus development. A well-designed transit station could provide a refreshing architectural contribution to this area. Attention to natural and architectural features should be reflected in all institutional, residential, and commercial development; transportation routes including walkways, roads, and bikeways; and parks and open space to promote the highest attainable environmental and visual quality for the station area.
INVENTORY OF EXISTING CONDITIONS

LAND USE & REGULATION

Ownership
The Medical Center/West Campus study area encompasses all land within a one-quarter mile radius of the proposed station site. Land ownership is almost evenly distributed between public and private owners, with Campus Drive serving as the dividing line. The area north of Campus Drive is exclusively under public ownership. The primary landowners are the University of Wisconsin Hospital and Clinics, the Veterans Administration (V.A.) Hospital, and the U.S. Forest Products Lab. Conversely, private landowners hold all parcels south of Campus Drive. Overall, private property owners hold 98 percent of the parcels within the study area, but less than 50 percent of the land area (see Map 2.1).

Map 2.1: Parcel Ownership
Land Use Controls
The only current land use regulation in the study area is zoning (see Map 2.2). Of the 353 total parcels within the study area, the City of Madison has zoned 44 parcels commercial and 309 parcels residential (see Figure 2.1). Commercial zoning appears in the northern half and along University Avenue. Residential zoning occurs primarily in the southern half of the study area.

Map 2.2: Zoning
Existing Uses
There are eleven land use categories represented within the Medical Center study area (see Map 2.3).

- The largest land use, covering 37 acres (20.6% of total area) is street right of way.
- The second largest land use is single family residential, covering 33 acres (18.2% of total area).
- 27 acres (15% of total area) are institutional.
- 26 acres (14.5% of total area) are park and open space
- 20 acres (10.9% of total area) are office.
- 17 acres (9.6% of total area) are retail.
- 7 acres (4.1% of total area) are 3+ family residential.
- 5 acres (2.9% of total area) are rail right of way.
- 3 acres (1.7% of total area) are two-family residential.
- 3 acres (1.7% of total area) are other residential.
- 1 acre (0.8% of total area) is food service. (see Figure 2.2)
TRANSPORTATION

Vehicle Circulation
Traffic volume is high at the intersection of Highland Avenue and University Avenue. University Avenue has a total daily volume of 95,000. Highland Avenue has a daily traffic volume of 20,500 on the south side of University Avenue and 4,600 on the North side of University Avenue.

Madison Metro Bus service presently serves the area with several routes and bus stops. Major routes run along University Avenue and Highland Avenue (see Map 2.4).

Bicycle Circulation
Bike routes are located along Kendall Street and Highland Avenue. The University has plans to construct a bicycle path along the rail corridor immediately north of the railroad tracks linking Highland Avenue with the Engineering campus and other City bicycle paths (see Map 2.4).
Pedestrian Circulation
The north side of Campus Drive between University Bay Drive and Highland Avenue has no sidewalk. The east and west sides of Highland Avenue also have no sidewalks. The crossing point at the Highland-University intersection is currently unsafe for extensive pedestrian use. The sidewalk is narrow and in need of repair. This creates a significant barrier between the employment center north of the intersection and the retail and commercial businesses along University Avenue.

South of University Avenue, in the residential area, sidewalks are abundant and accessible from several points.

Rail Circulation
The rail line runs parallel along the north side of Campus Drive / University Avenue. The general orientation is east west with a secondary spur splitting off of the primary spur on the east side of Highland Avenue (see Map 2.4).

UTILITIES

Electric and Natural Gas
Sufficient utility service is provided to the study area. Located at the proposed station site is a utility box that controls services to the surrounding area. Running parallel to
University Avenue are high voltage lines, telephone lines, natural gas lines, and fiber-optic wires. Above ground lines may be an obstacle for future rail transit development.

Map 2.4: Circulation

A new Madison Gas & Electric power plant will be constructed two blocks east of the proposed station site.

Sewer and Water
Sewer, sanitary water, and stormwater services are provided throughout the study area by the City of Madison.

BUILDINGS
The architectural and historic character of the Medical Center site is very diverse. The area contains a variety of uses including commercial, institutional, industrial, multi-family, and single-family residential. The architecture within the area reflects this variety.
Footprints
The Medical Center site is densely developed (see Map 2.5). The southern portion of the transit area contains small single-family residential homes. Located along University Avenue are a number of multi-family units and commercial buildings. The northern portion of the transit area contains large institutional buildings.

Map 2.5: Building Footprints

Building Heights
The building heights at the Medical Center site vary from one-story commercial and residential buildings to nine-story hospital and industrial buildings. The southern most portion of the transit area is comprised of one and two story homes. Along University Avenue, there are one and two-story commercial buildings, as well as four and five story multi-family residential units. The northern portion of the transit station area is the location of the eight and nine story buildings; making up the Veteran’s Hospital, UW Hospital, and the USDA Forest Products Lab. A three-dimensional rendering of the location and height of buildings in the area is below (see Map 2.6).
Significant Structures and Attributes
*University Hospital and Veterans Hospital* – Much of the station site is comprised of the University Hospital and clinics, the Forestry Products Lab buildings, and the Veterans Administration Hospital. Both the University Hospital and the Veterans Hospital are very institutional in appearance. They are mostly composed of brick with long strips of windows that run horizontal through the building. Flat roofs also characterize the buildings. The buildings are neutral in color, ranging from a tan for the Veterans Hospital to a dark brown for the University Hospital.
USDA Forest Products Lab -- The USDA Forest Products Lab is also industrial in appearance. The architectural style is characterized as modern. The buildings upon this parcel of land vary. There are one-story warehouses on the south end of the property. A high-rise industrial center with smokestacks is located in the middle of the property. Office buildings cover the remainder of the property. These office buildings are three-stories with windows that run the length of the buildings. The materials used on the site primarily include brick, cement, and aluminum. Again, the buildings are a neutral, tan color.

Commercial Buildings -- South of the proposed station site, on Old University Avenue, there are many different architectural styles. Many of the storefronts that line the streets are the traditional commercial storefront buildings that date from the late 19th to early 20th century. These buildings are both one and two-stories and are characterized by flat roofs. The materials used are brick, stucco, and face tile. There is very little ornamentation and design visible from the street level. Many of these buildings are in a state of disrepair.

The colors are uniform throughout the area, usually in whites, browns, tans, or grays. Along University Avenue, there are two homes that have been converted into businesses.
These homes are of a Colonial style, but have concrete block additions added on to the front of the building. The concrete block additions face the streetscape. While the homes have gabled roofs, the additions have flat roofs. Each addition has one large picture window that looks out onto the street. The additions bring the building right to the sidewalk. While passersby are able to see what is going on inside, these buildings do not connect well with the surrounding area.

Figure 2.7: House with Commercial Storefront

University Avenue also contains a modern one-story grocery/liquor store. This building sits further back on the property with a parking lot located in the front of the store abutting the sidewalk. The windows line the front of the store, so passersby can look inside. However, these windows are cluttered with neon signs advertising the different types of beer that can be purchased at the store. The store has a flat roof, with little outside ornamentation. There is a small sign placed near the street to advertise the store’s location.

The corner of University Avenue and Highland Avenue is the location of the Best Western Inntowner Hotel. This building faces Highland Avenue and has a large parking area in the front. The hotel is four-stories, with a slightly pitched roof. The materials are aluminum siding and brick and both are grayish in color. The entrance to the building consists of a drive-through carport with canopy. The windows are slightly rectangular and align with the floor beneath and above. The side of the hotel that faces University Avenue is a solid brick wall. The building on this side of the street meets the sidewalk.
Multi-family housing -- The larger multi-family units vary in age as well as architectural style. Many of the larger multi-family dwellings are located along University Avenue. Architectural styles are generally modern, with most buildings constructed in the late 1970s to early 1980s. These buildings are three stories in height with small windows.

There are new apartment buildings located along this corridor as well. They are similar to the apartment buildings that are being developed around the Madison area today and have large, square windows trimmed in a white plexi-glass material. Many of the units have private porches and balconies. There is underground parking available for these particular units and the building is five stories in height. The building is made of brick and aluminum siding both in a grayish-blue color.
There are also a number of “brownstone” apartments along University Avenue. These buildings have a decorated main entrance into the building, usually trimmed in white. The windows are perfectly square, aligning one above the other. These buildings range from two to three-stories, with flat roofs. While the actual width of the building is small, the length of the building extends the whole length of the property. A few of these buildings have shutters for each window. At a glance, these buildings have been renovated and are well cared for by the property owner.

**Figure 2.10: Apartment Buildings**

*Single-family residential* -- The entire southern half of the study area consists of residential homes that fall within the quarter-mile radius from the Medical Center Site. These homes vary in style and design. There are a large number of Georgian style homes. Windows are balanced on both sides and are aligned with the floor beneath. A higher pitched roof is also a defining characteristic.

The area also has many smaller residences that are Cape Cod Colonial style. They are one story to one and a half stories with a high-pitched, gable roof. The eaves hang near the window line. Most homes of this style have shutters on all of the windows. There are other versions of this colonial style home located throughout the area. Many of these homes are quite large with wrap around porches or smaller porches that protrude from the house toward the street.

In summary, the materials, as well as, the building styles within this particular transit area vary greatly. Even though some of the buildings within the transit area are older, no part of the Regent Neighborhood falling within the study area is under Historical District Protection. These are all things that need to be taken into consideration when creating the design guidelines for this transit station area.

**OPEN SPACE**

Four parcels are classified by the City of Madison as open space. However, only one of these has an open space use. The remaining three contain structures and minimal open space. There are no parks or vacant parcels within the study area.
ANALYSIS OF OPPORTUNITIES AND CONSTRAINTS

Overall, the study area surrounding the Med Center station presents a great opportunity to build transit ridership and spur transit-oriented development. The large workforce within the institutional complex north of Campus Drive should generate significant commuter rail ridership. Moreover, that employee base, combined with visitors and local residents, will demand additional retail, food service, office, and housing uses in the area.

This section will first identify and analyze the opportunities envisioned within the site area. Particular attention is paid to: (1) specific parcels or blocks suitable for redevelopment in accordance with TOD principles; and (2) potential station locations which can maximize transit use and redevelopment. Subsequently, this section will offer an analysis of the existing constraints to development.

OPPORTUNITIES

Parcels with Potential for Adaptive Re-use
The most important and viable area for redevelopment is the two-block section of Old University Avenue bisected by Highland Avenue (see Map 2.7). The block west of Highland contains a series of isolated small buildings, generally of poor quality and design, on small parcels, separated by private parking areas and non-landscaped grounds. These buildings house a mix of private retail, office, and food service establishments. This entire block could be redeveloped into a compact series of two or three story buildings, offering first floor, pedestrian-oriented retail and food service, in combination with office or apartment space on upper floors.

The block of University Avenue east of Highland currently contains several major land uses. On the north side, the 170-unit Casa Blanca apartment complex is inconsistent with the area’s predominant architectural styles and appears to be approaching the end of its anticipated use period. This large parcel is ripe for future redevelopment as multi-family, predominantly student housing in combination with first floor retail and food service businesses. A market analysis of the Casa Blanca parcel’s redevelopment potential is provided below.

The Ivy Inn property across University to the south provides a model for future redevelopment throughout the area. The current property owner intends to replace the existing three-story hotel, dating to 1957, with a five-story structure. The first floor would have 5,250 square feet of retail space, and the upper four floors would contain 117 apartments. The proposed project also includes 151 underground parking spaces.

Finally, the Veterans Hospital property may offer an excellent opportunity for redevelopment in the future. The federal government has gradually reduced the number of these facilities nationwide as the veteran population decreases. It is conceivable that the Madison V.A. Hospital will eventually fall victim to such downsizing. If so, this crucial property fronting on the rail station could provide room for UW Hospital
expansion, additional parking facilities, and even public/private partnership developments of commercial enterprises tailored to serving the needs of daily rail commuters.

Map 2.7: Development Opportunities

Potential Locations of the Transit Station

Three potential station sites were considered in the vicinity of the west campus/medical center complex. The first, at the northeast corner of Highland Avenue – Campus Drive intersection, was constrained by (1) Forest Product Lab buildings fronting the existing railroad tracks; and (2) the Highland Avenue barrier to access the UW Hospital complex. This option was not seriously considered.

The second option was at the intersection of University Bay Drive and University Avenue, roughly one-quarter mile west of the selected site. This site offers good pedestrian access to UW Hospital. If the Veterans Hospital is ultimately closed and removed, the redevelopment opportunities on that parcel could justify a station at this site.

However, the western-most site was rejected because it is too distant from the Old University Avenue corridor, an area deemed ripe for transit-oriented redevelopment. The
preferred site, immediately west of Highland Avenue, offers adequate access to the medical center complex and to the Old University Avenue corridor, an ideal combination.

CONSTRAINTS

Pedestrian Barriers and Conflicts
Two sections of roadway present significant constraints to a successful redevelopment of the Old University Avenue corridor. First, the four-lane, elevated section of Campus Drive is a barrier between the rail station and the thousands of employees north of Campus Drive and Old University Avenue. The exclusive means of access from north to south is via Highland Avenue (see Map 2.8).

Map 2.8: Development Constraints

Unfortunately, Highland Avenue between Old University and the railroad tracks is the other major constraint. Pedestrian traffic must navigate around (1) through-traffic on Highland; (2) traffic turning on the access ramp to Campus Drive; (3) traffic exiting off Campus Drive; and (4) the cramped underpass below Campus Drive. Highland Avenue is a major entry point to the medical center and west campus area, and receives a high
traffic volume. Pedestrians and bicyclists will be reluctant or unable to reach Old University Avenue unless an alternative access route is installed.

Lack of Spatial Enclosure
In the above-described two-block section of Old University Avenue, the majority of structures could be readily redeveloped given proper market forces and government policies. However, the Best Western Inntowner hotel at the northeast corner of Highland Avenue and Old University Avenue is a relatively recently constructed and well-established structure. It is a use appropriate for the area and not likely to change.

Unfortunately, the property devotes a large amount of space to surface parking for hotel guests. Such empty space, especially so close to the rail station, is contrary to TOD design principles. A large hotel complex surrounded by a broad parking lot fails to set the tone as a gateway to the envisioned redevelopment of mixed-use retail, food service, and housing along Old University Avenue.

MARKET SUITABILITY ANALYSIS

PURPOSE

The purpose of this section is to illustrate the feasibility of redevelopment of property in the Medical Center station area based on a front-door financial development model (for a full explanation of the front-door model, please see page 58). This model allows assessment of redevelopment potential by comparing required periodic revenues with current market conditions in the station area. The Casa Blanca, a multi-family residential complex located at 2302 University Avenue, was selected for this market suitability analysis. The selection of this parcel was based on the estimated age and deteriorating condition of the structure. These factors, together with this parcel’s potential to continue to provide dense multi-family housing, make this parcel ripe for redevelopment.

ASSUMPTIONS

The utility of the results of the front-door financial development model is based on several assumptions. Assumptions stated in the model for each development were: percent common area, building cost (per square foot), equity return, loan to cost ratio, vacancy loss (per square foot), operation expense, real estate tax rate, and annualized mortgage constant.

FINDINGS

Based on the assumptions stated above, the financial feasibility of redevelopment of the Casa Blanca as a multi-family structure containing 170 units, averaging 1050 square feet of living space, and on land costing $5,500,000.00 would require periodic revenue to
remain above a $1,153.37 threshold per unit. This significantly exceeds the average rent of $681 (2000) in the City of Madison. However, this rent amount is not in excess of that characteristic of new, upscale developments of comparable size around the campus and downtown area.

Other factors should be considered in evaluating this scenario. One important point is that by retaining underground parking currently existing on-site, it is possible to reduce need for surface parking and increase the overall footprint of the building on the parcel. Thus, decreasing the marginal required periodic revenue per unit by adding more total units. A second objective should be to incorporate a mixture of uses into this parcel redevelopment, designating the street level of the parcel as commercial use. Commercial rent on the first floor may serve to offset required residential revenue.

However, this redevelopment scenario must be approached with certain caveats. First, the fact that multi-family development on this street represents an important source of student housing must be considered. The periodic revenues required for this development scenario may be cost-prohibitive for students. Second, with the impending redevelopment of the Ivy Inn into upscale housing, the market for more upscale housing as necessitated by this model’s results may be saturated. A more detailed economic model might consider the effects of these two developments cumulatively on both the relatively low cost student and more upscale housing market to determine what type of residential development is in the greatest demand in the station area currently and into the future.
RECOMMENDED DESIGN GUIDELINES

LAND USE CONCEPT

The design guidelines for the Medical Center/West Campus station site reflect the unique dichotomy of existing land ownership (public and private) and land use priorities adjacent to the station. The land north of the proposed station site is heavily developed, supporting a densely populated workforce. The southern half of the site area consists of a desirable, well-established single-family residential neighborhood. The primary goal of this plan is to redevelop the area immediately surrounding the station site, particularly along University Avenue, into a mixed-use commercial district intended to serve the local workforce, residents, and visitors, while boosting rail ridership. This can and should be accomplished while concurrently protecting and improving the adjacent neighborhood.

The station will primarily serve the projected west campus population of 11,740, all working north of Campus Drive. To attract these workers as well as visitors and local residents to commuter rail, the station area must provide an accessible, pedestrian-friendly environment with a mix of retail and neighborhood-scale service establishments. The four-block segment of University Avenue, between Walnut Street to the east and Farley Street to the west, contains a large number of parcels suitable for such redevelopment. A pedestrian walkway over Campus Drive, west of Highland Avenue, will allow commuters and other campus employees and visitors to the area easy pedestrian access from the station site to the new University Avenue mixed-use commercial district. Moreover, a shuttle service will regularly operate in a loop, serving the west campus employment centers, the rail station, and the University Avenue district.

The balance of the ¼ mile radius area surrounding the station will remain in its current land use. To the north, the University has a master plan designating the future land use of the entire west campus area. The one exception is the V.A. Hospital property, which may become available for redevelopment in the future. To the south, the entire Regent Neighborhood should be maintained without significant modification. The rail station may benefit the neighborhood by decreasing automobile traffic, increasing property values, and creating an attractive retail corridor for the whole neighborhood.

The following three-dimensional digital map displays this vision (see Map 2.9). The blue structures represent parcels targeted for potential redevelopment; the yellow structures remain unchanged; and the red building is the proposed rail station. The numbers in Map 2.9 correspond to Table 2.1. This vision, if implemented, offers great potential to support the commuter rail system, the west campus area, and local residents.
Table 2.1: Proposed Site Improvements

<table>
<thead>
<tr>
<th></th>
<th>Proposed Site Improvements</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed UW Hospital Parking Facility</td>
</tr>
<tr>
<td></td>
<td>This planned parking garage exemplifies development inconsistent with transit-oriented development, and should be reconsidered.</td>
</tr>
<tr>
<td>2</td>
<td>Proposed MG&amp;E Facility</td>
</tr>
<tr>
<td></td>
<td>This proposed electricity generating facility represents a public-private development on University property.</td>
</tr>
<tr>
<td>3</td>
<td>2302 University Avenue</td>
</tr>
<tr>
<td></td>
<td>This existing multi-family complex could be redeveloped as first-floor retail and 3-4 floors of apartments with underground parking.</td>
</tr>
<tr>
<td>4</td>
<td>2400 block of University Ave.</td>
</tr>
<tr>
<td></td>
<td>Various parcels on the south side of University may be targeted for mixed-use redevelopment.</td>
</tr>
<tr>
<td>5</td>
<td>2500 block of University Ave.</td>
</tr>
<tr>
<td></td>
<td>Various parcels on both sides of University are ripe for mixed-use redevelopment – in particular the north side, where a single owner holds a group of adjoining parcels.</td>
</tr>
<tr>
<td>6</td>
<td>Proposed Ivy Inn mixed-use Redevelopment</td>
</tr>
<tr>
<td></td>
<td>The landowner plans to construct a mixed-use structure (1st floor retail, 3 floors apartments) with underground parking.</td>
</tr>
<tr>
<td>7</td>
<td>2600 block of University Ave.</td>
</tr>
<tr>
<td></td>
<td>Various parcels on the south side of University may be targeted for mixed-use redevelopment.</td>
</tr>
<tr>
<td>8</td>
<td>Transit Station site</td>
</tr>
<tr>
<td></td>
<td>The station site, served by bus/shuttle and pedestrian overpass, provides easy access to the Medical Center and University Avenue.</td>
</tr>
<tr>
<td>9</td>
<td>Pedestrian overpass</td>
</tr>
<tr>
<td></td>
<td>An overpass would facilitate safe pedestrian access between the station site and the redeveloped University Avenue corridor.</td>
</tr>
</tbody>
</table>
TRANSIT STATION

The transit station should provide reliable and efficient transportation for employees, visitors, and residents of the West Campus area and Regent Neighborhood, as well as adjacent neighborhoods.

Location
The station should:
- Be equally accessible to pedestrians from the West Campus area and Regent Neighborhood, as well as bicyclists.
- Serve the mix of land uses located near the site, including residential, office, retail, and institutional.

Station Design and Amenities
The station should be designed to:
- Recognize the limited space available.
- Reflect the character of the community through the use of local materials and appropriate station architectural design.
- Provide riders protection from inclement weather conditions, such as an awning or shelters.
- Provide additional amenities to transit riders, including ticket purchasing facilities, transit information, seating, phones, restrooms, newsstand, coffee kiosk, lockers, and bicycle parking.

Integration with other Transportation Modes
The station should provide:
- Connections to feeder bus routes, pedestrian and bicycle networks, and a shuttle service that circulates throughout the Medical Center Complex.
- Secure, covered storage options for bicycles within 50 to 60 feet of the station area.
- Safe passage over Campus Drive via a pedestrian overpass from the station to University Avenue.
HOUSING

The transit station area should maintain the stable character of the existing Regent Neighborhood while accommodating multi-family housing development and redevelopment along University Avenue. Emphasis should be placed on accommodating a wide range of income levels.

Recommended Housing Densities
Housing density standards should not be set for the entire station area, given the established density of the Regent Neighborhood and lack of housing opportunity in the northern section of the planning area. Consideration of density should:

- Encourage stability of current housing density in the predominately single-family residential area south of University Avenue, while increasing housing density along University Avenue.
- A minimum density of 10 to 12 units per acre is encouraged for new multi-family development.

Affordable Housing Targets
- Station area housing market and available land limitations impede ability to supply affordable housing. However, multi-family residential property owners should be encouraged to explore options to provide housing for a broader range of income levels.
Parcels Suitable for Residential Development

The following parcels in the station area have been identified as most appropriate, or are already planned, for residential redevelopment:

- A four story mixed-use (1st floor retail, upper-level apartments, underground parking) development is planned for the Ivy Inn property located at 2355 University Avenue.
- The Casa Blanca apartment complex at 2302 University Avenue is recommended for redevelopment, featuring first floor commercial space and 3 to 5 stories of apartment units.
- Along the 2400 to 2600 blocks of University Avenue, individual parcels should be considered for mixed-use redevelopment.

Lot and building Design Standards

- Residential buildings on redeveloped sites should match setback width from the curb to adjacent buildings.
- Materials and colors should coordinate with those used in similar, good quality buildings in the surrounding neighborhood. When possible, use materials with high levels of recycled content.
- Neighborhood context should influence building appearance and articulation such that visual complexity, facade, roof shape, size and rhythm of openings, trim and details reflect the neighborhood image, yet portray a unique individual identity for the building.
- The prevalent scale, height, and massing of existing residential structures should be considered and provide guidance for new residential development.
- New residential development should incorporate on-site storm water management measures such as porous surfaces, bioretention areas, raingardens, buffer strips, and grass swales.

Source: www.cnu.org
COMMERCIAL

Transit station area planning should promote the maintenance and appropriate redevelopment of existing office and retail units, and encourage infill within empty or under-utilized parcels with commercial uses that will cater to the needs of the Medical Complex employees, visitors, and residents of the Regent Neighborhood area.

**Recommended Uses and Standards**

- Commercial uses that provide neighborhood-scale services (such as daycare, dry cleaners, small grocery, restaurants, coffee shops, etc.) should be encouraged.
- A floor-to-area ratio (FAR) between 1.0 and 2.0 for new commercial development would minimize space available for surface parking.

**Integration with Multi-Family Development**

- Commercial uses are recommended for the street level to add a mixed-use dimension to existing and new multi-family residential development.

**Suitable Parcels**

The following parcels in the station area have been identified as most appropriate, or are already planned, for commercial redevelopment (see Map 2.9).

- Many of the parcels in the 2500 block of University Avenue.
- The parcels on the south side of the 2300 block of University Avenue.
- The 2600 block of University Avenue, on the south side between Farley Avenue and Highland Avenue.
- On the present site of the Ivy Inn, 2355 University Avenue, a mixed-use development will be built by a local developer.
- The Casa Blanca apartment complex at 2302 University Avenue is recommended for mixed-use redevelopment.
Lot and Building Design Standards

- Commercial buildings on redeveloped sites should limit setback from curb to adjacent buildings. Setbacks should incorporate sufficient area for sidewalk and landscaping.
- Materials and colors (foundation, walls, roofing) should coordinate with those used in similar aesthetically pleasing buildings in the surrounding neighborhood. Brick facades and awnings have worked well in the area. Where possible, use materials with high levels of recycled content.
- The prevalent scale and massing of existing residential structures should be considered in designing new commercial development. The massive scale of the Best Western Inntowner Hotel, while setting a “tone” for the area, should not be duplicated.
- Ground floors should contain public or semi-public uses and should allow for direct entry from the street.
- Entrances should be easily accessible and oriented toward the street to allow for direct pedestrian access from the sidewalk.
- New commercial development should address stormwater management by incorporating porous surfaces into parcel design such as bioretention areas, rain gardens, buffer strips, and grass swales.
VEHICLE CIRCULATION

The transit station area should provide simple and direct road systems with consideration for decreasing traffic congestion, increasing multi-modal transportation safety, and discouraging automobile use.

Traffic Calming
Madison has appropriated funds for traffic calming measures on Highland Avenue. However, the high volume of traffic and speed of vehicles through the area necessitate additional calming efforts.

- Traffic calming devices (such as islands, chokers, and speed-bumps) should be installed, especially within the Regent Neighborhood.
- Additional traffic slowing enforcement methods such as “speeders hotline” and “speed board” are encouraged.
- Expand on-street parking along both sides of the 2300 to 2500 blocks of University Avenue to serve the dual purpose of traffic-calming and accommodating commercial parking.

Raised surface traffic islands effectively slowing traffic in residential neighborhoods.
Source: www.ci.orlando.fl.us

Traffic circles and chokers are other engineering solutions to reducing traffic speeds.
Source: www.apbp.org
Parking
Parking should be accessible, yet out of view from the street. By diminishing the visibility of parking, pedestrians, landscaping, and attractive buildings become the central focus of the area.

- Parking should be designed and located away from bicycle and pedestrian routes where possible to minimize interaction between vehicles, pedestrians, and bicyclists.
- Expand on-street parking along the 2300 to 2500 blocks of Old University Avenue to calm traffic and accommodate commercial parking. Meters would ensure that on-street parking serves commercial, rather than residential users. On-street parking should be limited during peak periods.
- Where new multi-use development occurs, parking should be screened from the street and adjacent residential property, located either underground or behind buildings.
- New multi-use development of significant size should be required to provide underground parking.
- When parking ramps are used in the West campus area, they should be located away from the primary boundary streets to allow traffic generated by the University to disperse before reaching neighborhood streets. Such ramps should not have large blank walls facing the street.
Bus Linkages
Effective linkages with other forms of public transportation would increase the efficiency and convenience of commuter rail.

- Bus stops and shelters should be included in station area design.
- A clear and direct interface should be established for feeder bus routes. The location and design of this interface should take into account the local road network and traffic patterns.
- Provide a dedicated shuttle route at peak travel times to provide connections between the transit station and major West campus employment buildings. The route could run from the station along the southern portion of the V.A. property parallel to the rail right-of-way then clockwise around the Medical Center Complex.
- In addition, shuttle service circulating from West campus to other UW medical clinics including University Station, University Avenue (Middleton) Clinics, Junction Road, and the West transfer point could be considered to better accommodate Medical Center employees and visitors.

Source: www.apbp.org
BICYCLE CIRCULATION

Bicycling should be promoted as a viable and safe mode of transportation to and from the transit site, as well as around the West campus area. Emphasis should be placed on providing adequate bicycle connectivity and parking at the station site and throughout the entire station area.

On-street Lanes
- Potential for additional dedicated bicycle lanes in the transit station area should be explored.
- Improve continuity, signage, and other safety measures of on-street bicycle lane between Kendall and Walnut Streets and along Walnut to the Lakeshore Path.

Off-street Paths
- A multi-use bicycle-pedestrian path should be established parallel to the rail right-of-way between Highland and University Bay Drive. Path will run from Highland along rail corridor on planned University path connecting to Engineering Campus.
- Off-street paths should be approximately 10 to 14 feet wide to accommodate heavy bicycle and pedestrian traffic.
- Bicycle traffic should be separated from automobile parking facilities and routes.

Bicycle Parking
- Bicycle parking should be visible, accessible, easy to use, convenient, and plentiful (www.ci.burlington.vt).
- Station area should incorporate bicycle and personal storage lockers for commuters within 50 to 60 feet of station platform, as well as standard bicycle racks.
- Provide adequate bicycle parking on every block of University Avenue and at all West Campus buildings.
- Consider creative bicycle storage designs to add character to the streetscape.
PEDESTRIAN CIRCULATION

Pedestrian accessibility, convenience, and safety should be a high priority for the transit station area design. University Avenue/Campus Drive is a major barrier between residential areas and campus. Station area design should:

- Construct a pedestrian overpass from station area to University Avenue to facilitate safe passage over Campus Drive. Overpass should be sited between the station and University Bay Drive and linked by sidewalk to the station.
- Establish a multi-use bicycle-pedestrian path parallel to the rail right-of-way between Highland and University Bay Drive. Path will run from Highland along rail corridor on planned University path connecting to Engineering Campus.
- Improve pedestrian crossings in the University Avenue corridor, in particular at Highland Avenue and University Bay Drive, through adding signals, marked crossings or additional signage.
- Improve pedestrian pathways and crossings throughout West campus area by adding signals, marked crossings or additional signage.
- Widen sidewalks on University Avenue where possible to foster pedestrian use and interaction.

Accessibility for the Disabled

- Adequate access for the disabled to the transit station should be provided.
- Parking spaces in the area should be at least 9 feet wide with an additional 5 feet of walkway adjacent to the lane for easy access onto sidewalks.
- Disabled persons should not have to cross behind any motor vehicles to access a walkway.
STREET FURNITURE

The transit station area should utilize street furniture and lighting to provide a comfortable, safe, and aesthetically pleasing streetscape environment.

- Seating opportunities should be provided on each block along University Avenue and dispersed throughout the West campus area. Seating should be between 12 and 30 inches in height and approximately 16 inches in depth.
- Outdoor seating should be thoughtfully designed and strategically located, keeping in mind seating appearance and orientation in relation to view and environmental factors (sun, shade, etc.).
- Ledges, stairs, public art, etc., should also be incorporated into streetscape design to function as seating and for aesthetic purposes.

Lighting
- Style and height of lighting should be consistent with surroundings.
- Provide adequate lighting to promote a sense of security during evening hours in all vehicle and pedestrian areas.
- Lighting should be used to illuminate entryways, signage, and areas of unique architectural design.
- Lighting intensity should be matched to its purpose; for instance, the intensity of lighting required for a pedestrian path is substantially less than that required to light a parking garage.
- Consider energy efficient lighting where possible.
- Avoid lighting that shines directly into dwelling units.
- Downcast or shielded lighting should be encouraged to contribute to the preservation of dark night skies.

Seating should be strategically placed in relation to view. Here, those seated can relax and watch the passersby.
Source: www.apbp.org

The combination of amenities including benches, planters, and trees along the sidewalk add to an ideal venue for social interaction.
Source: www.apbp.org

Appropriate lighting can add new life to an urban environment at night.
Source: www.apbp.org
LANDSCAPING

Effective landscaping brings environmental benefits, improves property value, and can function as a windbreak, shade, or screening, to enclose or define outdoor space.

- Building should be enhanced with landscaping that emphasizes entryways, softens blank walls, increases privacy and security, and brings identity to the building.
- Existing trees and landscaping should be preserved.
- Trees, shrubs, and groundcover should be hardy, and native species should be used when possible.

SIGNAGE

Signs convey the identity, image, style, quality, and service of a business or area and can enhance the sense of character and visual interest of the area, as well as provide residents and visitors with directional and business information.

- Scale, color, and design of signage must be consistent with the architectural context of the area.
- Advertising signs should add diversity to the streetscape by reflecting the individuality of each commercial business.
- Size, height, and quality of signs should be oriented to the pedestrian, rather than to the automobile.
- Excessively large and freestanding signage contributing to visual clutter should be avoided.
- Awnings should be encouraged to function as signs, conveying a message while adding a decorative element.
POLICY RECOMMENDATIONS

To further the recommendations within the Design Guidelines, the following regulatory policies and incentives for development should be considered. Such policies and incentives, employed in various combinations, can potentially impact the specific housing, retail and commercial, and automobile parking goals discussed above.

REGULATORY POLICIES

Zoning
First, the City of Madison should consider amendments to the zoning regulations employed in the University Avenue corridor between Walnut Street and Farley Street. This 4 block corridor contains 10 parcels currently zoned Residential (R1, R2, R3, or R5). The remaining parcels are zoned C2 commercial or PUD (planned unit development). All 10 parcels are targeted for redevelopment as commercial uses (retail, service, food service), with some upper-floor residential use. To make this transition, the City should make several zoning changes.

At a minimum, the ten residential properties should be rezoned either commercial or PCD (planned community development district). Alternatively, the City should consider creating a new “mixed-use / transit development zone” in the 4 block corridor. This zone can be tailored to allow a mixing of residential and retail/service businesses. The zone can also prohibit incompatible uses. This zone should additionally incorporate transit-oriented development design guidelines controlling building design, pedestrian-orientation, building scale, vehicle access and parking, landscaping, and other site design issues. These design guidelines state direct objectives, but offer a variety of ways to achieve those objectives.

These changes should occur in conjunction with the final approval of the commuter rail proposal and the Medical Center station site. The zoning change will signal to property owners and potential investors/developers that the sites are ripe for investment and future development.

Density Recommendations
Along the University Avenue corridor, the City should consider imposing mandatory minimum floor-to-area ratios (FARs). This is the ratio of the total floor area to the size of the lot (square feet) used to regulate building size. The recommended FAR for the corridor is between 1.0 and 2.0. This standard will prevent underutilization of parcels.

The City should also examine the general guidelines for housing density to support transit-oriented development. The standard recommendation is to achieve a housing density of 12 units per acre in the quarter mile station area. This translates into approximately 1500 units for the entire area. However, over 50 percent of this station area is in public ownership or devoted to commercial use. If one applies this recommended housing density level to the remaining residential area, at less than 50
percent of total station area, then approximately 700 housing units would meet the
density guideline. The multi-family housing units on Old University (Ivy Inn,
approximately 110 units; Casa Blanca, 170 units), combined with a dense, traditional
single-family neighborhood, result in a current measure exceeding 500 units. Thus,
housing density is already quite reasonable.

Moreover, it must be remembered that this station site is intended primarily to serve a
major employment node. It is not intended to spur a dramatic housing increase. The
Regent Neighborhood generally opposes projects designed to increase housing density
due to concerns over intensifying traffic congestion. Therefore, the only density
recommendation is to require new multi-family housing structures in the University
Avenue corridor at a minimum density of 12 units per acre.

Similarly, for the same reasons, a true “affordable housing plan” is not appropriate at this
site. Nevertheless, some of the student-housing apartments on University Avenue may
qualify as affordable housing. Beyond that type of housing, some of the new mixed-use
construction incorporating multi-family apartment units could be encouraged to qualify
as affordable housing.

Parking
Finally, the City should address parking regulations related to land development. Where
possible, the City should require underground parking. Moreover, “maximum parking
limits” should be imposed to limit excessive surface parking lots. The goal should be to
courage residents and patrons along University Avenue to use rail, bicycle, and
pedestrian travel, as opposed to the automobile, when entering the district. Parking
maximums of 1 stall per residential unit and 1-2 stalls per 1000 square feet office/retail
should be considered. All parking approvals must consider site-specific factors.

The University should also evaluate its West campus parking policies. The existing
traffic management plan should consider further parking fee increases in campus lots,
subsidized transit passes for employees, and the potential elimination of employee
parking spaces. These measures can increase transit ridership, diminish traffic
congestion, and preserve valuable land for development and open space. The
overarching principle is that plentiful, low-cost parking creates a compelling incentive to
choose one’s automobile over commuter rail and other alternatives. Policies to
courage rail use will decrease the high costs of constructing and providing parking.

INCENTIVES

Two important factors support a position that no comprehensive incentive program is
necessary for this site. First, the proposed redevelopment is limited in scope. Second,
and related, this limited number of parcels will be quite attractive to developers once the
rail plan is approved and appropriate zoning is in place. Market forces will drive the
anticipated redevelopment, in conjunction with careful City planning oversight.
Nevertheless, the City should consider a promotional campaign to highlight the impact of commuter rail, the vision for the University Avenue corridor, and the market potential for commercial development. Specific efforts to attract specific transit-oriented businesses also may be practicable.

However, one unique opportunity may arise in the future. The V.A. Hospital parcel, immediately adjacent to the proposed station, could potentially discontinue its operations. The federal government would then be interested in transferring ownership, perhaps to the University. While expansion of UW Hospital facilities is a natural option, the southern portion of the V.A. parcel could be developed through public-private partnerships or through private investment. The current UW – MG&E project is an example of such development.

SUMMARY

The Medical Center Station redevelopment plan will be a useful prototype for other “destination” station areas situated in proximity to large employment centers. As would be expected at other large employment centers, this station area will likely draw a significant ridership base from the University Medical Complex, V.A. Hospital, and Forest Products Lab. However, the unique circumstances of this site must be considered in using this station area as a model for future transit-oriented development. Primarily, the site consists of University, other public facilities, and a residential land uses. The land ownership in the planning area is nearly evenly distributed between public (state and federal) and private. For these reasons, the recommendations in this plan should be transferred to other areas with an understanding of the specific context in which these guidelines were developed.

While the likely benefits of commuter rail are demonstrated, some questions pertaining to the forces that may shape redevelopment in the area remain unanswered. Of paramount concern for planning are the complex institutional relationships among the powerful stakeholders within the site area. The University, Veterans Administration (hospital), U.S. Department of Agriculture (Forest Products Lab), and the City of Madison must work cooperatively to make a transit station, and transit-oriented development, a successful reality at this site. The key to achieving this degree of collaboration amongst the institutional players is unclear. A second question that must be further explored is the market effects of station area redevelopment. Concern exists that with redevelopment and increasing property values tied to transit, the market will be unsuitable for small, neighborhood scale businesses to compete with larger national chains. A detailed market analysis would help achieve an understanding of the ensuing market dynamics with an aim toward encouraging small-scale commercial development as is called for in the plan.

The Med-Center Station area stands to benefit significantly from a commuter rail station as proposed in this document. The improved access to employment, likely reduction of automobile traffic, and increased redevelopment potential on University Avenue in particular will provide social, economic, and environmental benefits to both the Regent
Neighborhood area and the University community. However, it should be noted that the above discussion of station area redevelopment and design is a set of recommendations. This is not the final plan for the West Campus area or Regent Neighborhood. Rather, these guidelines are designed to work in concert with other plans for these areas. Both the station area and commuter rail ridership will be enhanced by the appropriate balance of density, diversity, and design as recommended in these redevelopment recommendations.
BALDWIN STREET STATION

The station area is located in proximity to the intersection of South Baldwin Street and Wilson Street, northeast of downtown Madison. The transit station site is located on a publicly owned parcel currently used as a parking lot where the Central Pacific rail line crosses Baldwin Street (see Map 3.1). The station site is located in an area referred to as the East Rail Corridor and is the subject of several past and current planning efforts.

The Baldwin station site was selected to serve the greater Isthmus population as traffic congestion and travel demand increase in the future. This specific location takes advantage of the intersection between a northern rail spur and the main rail line heading to the City of Sun Prairie. This northern spur is a potential additional line that may be phased into operation after the main rail line is completed. The proximity to the residential development in the Marquette and Atwood Neighborhoods as well as Williamson Street retail areas were other principal considerations in selection of this site.

Locating the station at Baldwin Street also acknowledges several ongoing planning efforts that have identified the site as an appropriate location for a transit station. The East Rail Corridor is currently the focus of a planning effort within the City of Madison Department of Planning and Development. This study and several others (including, but not limited to, the Marquette Neighborhood Plan and Williamson Street BUILD Plan) recognize the potential for redevelopment in this underutilized area. These studies emphasize that a rail station will be pivotal in promoting high-density employment and residential growth in the future.

COMMUNITY GOALS AND OBJECTIVES

The following goals are a synthesis of recommendations from the following plans:

- Marquette Neighborhood Plan
- East Rail Corridor Plan Advisory Committee Phase 1 & 2 Recommendations
- Urban Open Space Foundation’s Central Park Visioning Sessions
- East Washington Avenue Corridor Study
- City of Madison Bike Plan
- Yahara River Parkway Plan
- Williamson Street BUILD Plan.

Each of these plans addresses specific needs in areas within and surrounding the East Rail Corridor. However, they share many resolutions that will be used to help shape the station design guidelines and policy recommendations for the study area.

HOUSING

Develop a high density of housing (mixed with commercial uses) in underutilized areas. Specific areas of interest in the community plans include: exploring tax increment
financing programs for funding support, maintaining a target of 15-25 percent affordable housing, and developing spaces where residents can live and work.

COMMERCIAL USES

Retain and, in some cases, develop high-density commercial uses and employment in the area. Some of the suggested methods to achieve this goal include developing greater use of business incubators (such as the Madison Enterprise Center) and expansion of the diversity of business types in the area. However, the community also desires to control this growth in a high-density fashion and maintain existing core retail areas that market to the neighborhood consumer.

PARKS AND OPEN SPACE

Address 30 to 40 acre open space/park deficiency in the area. To achieve this goal, the community plans recommend redevelopment of private and public spaces to emphasize contiguous open space (Marquette Neighborhood Plan, Urban Open Space Foundation's Central Park Visioning Sessions, Yahara River Parkway Plan). A strategy to achieve this recommendation is to use private easements to develop bicycle/pedestrian paths that link open spaces.

TRANSPORTATION AND PARKING

Enhance the safety and efficiency of automobile, pedestrian, and bicycle facilities. There is currently a study underway to improve the capacity and safety of East Washington Avenue without widening. As the area continues to grow, Williamson Street and East Main Street will require similar attention. In addition, community plans recommend bike and pedestrian improvements along the Yahara River and throughout the Isthmus to strengthen the existing networks.

ENVIRONMENTAL AND VISUAL QUALITY

Enhance Baldwin Street to serve as a "gateway" to the Williamson Street corridor and a bridge from East Washington Avenue. To achieve this goal, aesthetic improvements are required along Baldwin Street as well as at the intersections of East Washington Avenue and Williamson Street. Possible improvements include public art projects, community gardens, and enhanced pedestrian and bicycle facilities. In addition, contaminated soil and brownfield sites as well as air quality concerns along this corridor should be addressed.

Concerning visual quality, several of the plans also acknowledged a desire to preserve historic areas, especially those identified by the East Rail Corridor Plan Advisory Committee in the Williamson Street area. As redevelopment occurs around the station site, it should be sensitive to the historic and cultural character of the area.
INVENTORY OF EXISTING CONDITIONS

LAND USE AND REGULATION

Ownership
Within the study area, there are a total of 436 parcels, 418 of which are privately owned (see Map 3.1). Private ownership ranges from single residential lots to large industrial and commercial parcels.

The 18 publicly owned parcels cover 23 percent of the total land area. Large publicly owned and developed parcels within the study area include those occupied by the Madison Metro Bus Garage, the City of Madison Real Estate Department, the State of Wisconsin Department of Administration, Marquette School, and the City of Madison Fire Station #3. In addition, there are 13 small, publicly owned, undeveloped parcels within the study area, which lie adjacent to the Yahara River or existing rail lines. One such parcel is the proposed station site, which is currently a surface parking lot owned by the City of Madison.

Map 3.1: Parcel Ownership
Land Use Controls
The Baldwin Street study area contains a mix of commercial, residential, and industrial zoning (see Map 3.2 and Figures 3.1 and 3.2). Directly surrounding the proposed station site is a Manufacturing District, which currently allows office use as a conditional use. However, within this district, residential and retail uses are not permitted. Commercial districts lie along East Washington Avenue (zoned as C3 General Commercial District) and Williamson Street (zoned as C2 General Commercial District). The residential parcels within the study area are generally zoned R4 General Residential, with a few small areas of R5 General Residential. Both of these zoning designations are established to maintain a medium level of density.

Within and directly outside the study area are three historic districts that should be preserved as new development increases (see Map 3.2). These include the locally and nationally recognized Marquette Bungalows Historic District, the nationally recognized Orton Park Historic District, and the locally recognized Third Lake Historic District. An Urban Conservation District encompasses much of the Manufacturing and Commercial districts along Washington Avenue, and will impact the scale and density of new development along the East Washington Avenue Corridor.

Map 3.2: Zoning
Figure 3.1: Distribution of Zoning

Figure 3.2: Number of Parcels by Zoning Class
Existing Uses
This study area is diverse in its mix of current land uses (see Map 3.3 and Figures 3.3 and 3.4).

- The largest land-use, which consumes almost 47 acres (29 percent of the total area), is road and rail right-of-way.
- Commercial land uses, excluding industrial, occur on a significant portion of the study area (23 percent of the total land area), including several large office parcels (see Map 3.6).
- Residential uses account for 32 acres (20 percent of the total area), over half of which is multi-family housing.
- Industrial uses are visually prominent in this area and occupy almost 16 acres (10 percent of the total area).
- Finally, the Madison Metro Bus Garage covers 10.2 acres (7 percent of the total area).

Map 3.3: Land Use
TRANSPORTATION

Vehicle Circulation
The study area is easily accessible by vehicle from East Washington Avenue and Williamson Street (see Map 3.4). According to the Marquette Neighborhood Plan (1993) streets within the study area are classified from heavy to light traffic flow as follows: East Washington Avenue is a primary arterial, Williamson Street is a standard arterial, Baldwin Street and Ingersoll Street are collector streets, and all others within the study area are local. Access to surface parking is abundant within the area, which contains 38 surface parking lots covering approximately 21 acres.

Multiple bus routes traverse the study area, traveling east and west along Washington Avenue and Jennifer Street. In addition, one bus route currently runs north and south on Baldwin Street.
Bicycle Circulation
The Isthmus Bike Path runs parallel to the rail line along Wilson Street, and will ensure bicycle connectivity to the rail for residents and employees south of East Washington Avenue. Also, the segments of Baldwin Street and East Mifflin Street within the study area are identified as bike routes within the City of Madison’s Bike Plan.

Pedestrian Circulation
Sidewalks currently lie along nearly all streets within the study area. Stoplights with pedestrian crossings exist on both East Washington Avenue and Williamson Street where they intersect with Baldwin Street and Ingersoll Street. However, there are no pedestrian crossings where East Washington and Williamson Street intersect with Few Street or Dickinson Street. Because of the retail and food services, the section of Williamson Street within the study area is a high pedestrian traffic area, in contrast to the rest of the study area.

Rail
The proposed station site lies between two existing rail lines; one heading East to Sun Prairie, and one heading North. This location could eventually serve as a transfer point between East-West and North-South rail lines. It is important to mention the East Rail Corridor Planning Advisory Committee’s recommendations to reroute rail traffic from the currently used rail line adjacent to Wilson Street to the un-used rail line directly north of the Madison Central Park property. This change will affect approximately four city blocks of rail line.
Map 3.4: Circulation

Baldwin Street
Circulation

Station
1/4 Mile Radius
Railroad
Bus Route
Bike Route
Streets
Parking Lots
Yahara River

0.2 0.2 0.4
Miles

N
BUILDINGS

Footprints
Map 3.5 displays the area occupied by buildings in the study area. As the map details, buildings have very different layouts depending on their use. Generally, the rail right-of-way bisects the study area accompanied with large, one-to-two story commercial and industrial buildings. On either side of this manufacturing zone, the building footprints are noticeably smaller and denser, and consist of mostly residential and retail uses.

Map 3.5: Building Footprints
Building Heights
Map 3.6 is a three-dimensional depiction of the current building heights in the study area. The large commercial and industrial building layouts are generally one or two stories. The smaller residential and retail buildings are typically multi-story with front and back yards.

Map 3.6: Rendering of Existing Buildings

**Significant Structures and Attributes**

**Housing** -- Most houses in the study area are detached single-family homes located in the Tenney/Lapham and Marquette Neighborhoods (see Figure 3.3). Most of the homes are two-story, have small driveways, porches, and front and back yards. Some homes also have detached rear garages for one or more automobiles.

The architectural styles vary but generally are of the Modern aesthetic and setbacks from the street range from 15 to 25 feet. While the setback distance varies throughout the study area, in general the distance is constant along particular blocks or sections of a neighborhood. Construction materials typically include wood framing and siding, asphalt roofing, and concrete foundations.
Another housing type includes multi-story homes. These homes and their site layout are very similar in style and design to the single-family homes. They are often apartments and condominiums with small yards and rear garages (see Figure 3.4).

Retail -- Local shops, restaurants, and other retail uses are located along several streets in the study area. The highest concentrations of retail lie along East Washington Street and
Williamson Street. Smaller streets such as East Wilson Street and Dickenson Street also contain a significant amount of retail space mixed with residential and commercial land uses. These structures are typically mixed-use, built to the street, and two-stories or more. They provide some on-street parking and minimal off-street parking. Most buildings are brick and in the Neoclassical or Modern style (see Figure 3.5). The corner of Williamson Street and Baldwin Street also contains several Chicago Commercial styles of architecture (see Figure 3.6). However, areas like East Washington Street contain some contrasting Modern architecture in comparison to the Chicago Commercial style (see Figure 3.7).

Figure 3.7: Neoclassical Architectural Style in Mixed Use District along Williamson Street

Figure 3.8: Chicago Commercial Architectural Style along Williamson Street
Figure 3.9: Retail Space long East Washington Street in the Modern Style (Note the difference in style compared to Figure 3.6)

*Industrial* - Several buildings along East Washington and surroundings are light industrial and retail businesses. These structures typically cover a large surface area and are one-story in height. Most of the buildings are in a Commercial Modern architectural style (see Figure 3.8).

Figure 3.10: Light Industrial Space in the Modern Style along Dickenson Street
Office/Convertible Space - The study area also contains several multi-level office buildings. These include the site of the old Marquip Company and the Madison Enterprise Center that are both located along Baldwin Street. The architectural styling of these buildings is representative of Neoclassical Design or Victorian Gothic (see Figures 3.9 and 3.10).

Figure 3.11: The Madison Enterprise Center.

Figure 3.12: Large Office/Convertible Space at the Intersection of Baldwin Street and East Washington Street (representative of Victorian Gothic styling)
OPEN SPACE

Parks and playgrounds
There are limited open space parcels within the study area (see Map 3.5). The three acre parcel to the west of the proposed station site is an important feature within the Baldwin Street study area. Owned by the Urban Open Space Foundation, this parcel is slated to become part of Madison’s Central Park and will address documented park deficiencies within the East Side Rail Corridor (Widstrand, 2001). This is intended to be a significant public open space and will serve to promote pedestrian activity. Also, it will compliment the higher density, mixed-use development necessary to support the rail station.

Additional open space includes the public green space along the Yahara River waterfront and the narrow strip of bike path right-of-way that extends from Wilson Street to the Yahara River. Lastly, within the study area lies the green space and playground adjacent to the Marquette School.
ANALYSIS OF OPPORTUNITIES AND CONSTRAINTS

OPPORTUNITIES

Parcels with Potential for Adaptive Re-use
Six developed parcels within the study area have been identified as having high potential for redevelopment or adaptive re-use because they are currently underutilized and are close to the station site (see Map 3.7). One such parcel, slated for the placement of the transit station, is currently a parking lot owned by the City of Madison. A limited number of small parcels are currently vacant, and also present opportunities for development. In addition, several large surface parking lots within the study area may provide opportunities for development of a more intensive land use.

Natural Amenities
A limited number of park and open space parcels are included within the study area. These include the small open area along the Yahara River, the Isthmus Bike Path right-of-way, and a three acre parcel owned by the Urban Open Space Foundation.

Map 3.7: Development Opportunities
Landmarks and Other Historic Structures
The southeastern portion of the study area is a historic district with mainly commercial and residential land uses. The moderate density and historic character of this area are important to preserve, and will fit in well with TOD, as long as new development within the study area can occur at a higher density.

CONSTRAINTS

Brownfields
Since the core of the study area has a history of industrial land use, there is potential for brownfield contamination. Environmental assessments and necessary remediation will be important to complete prior to further development.

Incompatible Uses
The parcels occupied by the Metro Bus Garage and Madison Gas and Electric are currently incompatible with TOD, as they are large, low-density buildings with surface parking (see Map 3.8).

Map 3.8: Development Constraints
Pedestrian Barriers/Conflicts
Primary pedestrian conflicts within the study area have been identified at the following intersections (clockwise, from top): Dickinson Street and East Washington Avenue, Dickinson Street and Williamson Street, Few Street and Williamson Street, and Few Street and East Washington Avenue. These intersections will likely require pedestrian crosswalks in the future.

MARKET SUITABILITY ANALYSIS
Our recommendations include the redevelopment of three parcels on the northwest corner of Baldwin Street and Wilson Street. These parcels are directly across the street from the proposed station site, and their current low-density industrial use is not conducive to the overall concept of TOD. Solely for the purpose of a market analysis, the 0.9-acre parcel now occupied by the Isthmus Storage buildings has been chosen for a multi-family, mixed-income residential development containing 40 units with an average floor plan of 1000 square feet. Ideally, this will allow for a mix of one-bedroom, two-bedroom, and three-bedroom units, at least 20% of which will be affordable housing. Residents living in such a development would have ample access to the transit station, Madison’s Central Park, and the retail and food service on nearby Williamson Street.

PURPOSE
With this analysis, an average monthly rent necessary to support the developer’s overall costs can be derived for new residential units. Once this value is established, the need for public investment to assist developers in providing sufficient affordable housing can be estimated. For a full description of the analytical model used for this analysis, please see page 58.

MODEL ASSUMPTIONS
The current appraised value of this parcel is $300,000. In addition, it is highly possible that environmental remediation would be necessary on this site, which is included in the $500,000 indirect costs.

As stated in the recommended design guidelines, new residential and commercial developments should be built with brick or brick facades facing the street. An estimate of $60 per square foot has been used to illustrate the cost for a new building with a brick facade.

Finally, to remain consistent with our recommendations for a minimum residential density of 30 units per acre, the model development surpasses that minimum with 40 residential units (44 units per acre), which have an average floor plan of 1000 square feet.
FINDINGS

When taking into account the building and operating costs shown in the model, the monthly rent levels required would be $1,100.61 per unit (approximately $1.10 per square foot). Currently, this cost is representative of area rent levels, but would ideally be lowered to accommodate desired affordable housing units. The City of Madison could apply as a TIF district, utilizing funds for site acquisition, environmental remediation, or building costs in order to decrease this figure and help to meet the 20 percent target for affordable housing.
RECOMMENDED DESIGN GUIDELINES

LAND USE CONCEPT

The Baldwin Street study area currently consists of a diverse mix of uses. The residential districts within the north and south portions of the area already contain a relatively high density, and the Williamson Street corridor is a vibrant pedestrian corridor served by several retail and food service establishments. These land use mixes are supportive of TOD, and are characteristics of the study area that should be preserved.

The proposed transit station site lies within a manufacturing district, which contains several large parcels with office, warehouse, and light industrial uses. The land intensive nature of these parcels and the lack of pedestrian amenities in the manufacturing district are not consistent with TOD, and limit the ability of this area to provide sufficient ridership for a viable station.

Despite this, the manufacturing district provides an employment base that is critical to maintain. The intent of these recommendations is to balance the need for high-density residential and pedestrian-oriented uses with the need to maintain and increase the employment base. Most of the recommendations for new development focus on potential land use changes within the current manufacturing district. They do not seek to change the density or historical character of the existing residential areas.

Map 3.9: Rendering of Existing and Proposed Buildings

Note: Building numbers are referenced within the following guidelines.
Within the manufacturing district, increased density and building height, decreased surface parking, and improved pedestrian friendly design will be crucial to the success of the station. This area can also serve as a unique north-south pedestrian corridor across Madison’s isthmus, provide a gateway to the Williamson Street commercial area, and complement the proposed Central Park. Several parcels, highlighted in blue, have been identified as opportunities to enhance TOD (see Map 3.9). Specific parcel recommendations are included in the design guidelines text.
TRANSIT STATION

The design of the transit station should utilize building styles and materials that complement those used in the area. The shelter should be located in an area accessible to pedestrians. In addition, a convenient and safe connection with bus transit is recommended.

Location

- East of Baldwin Street, situated between existing rail lines. This site could serve as a transfer point between two lines in the future.

Station Design

- A simple shelter long enough to accommodate the length of the train, with adequate protection from poor weather conditions. Construction materials should complement the architectural character of the surrounding neighborhood.
- A small public square northeast of the shelter, with space for vendors (news stands, coffee, etc.), public art, trees, benches, and landscaping.
- Ensure adequate access for disabled individuals.

Integration with Bus Transit

- In order to provide direct bus connectivity to the station, buses currently routed along East Washington Avenue could be re-routed to enter the station area via Baldwin Street and exit via Dickinson Street.
TOD recommendations for this area strive to balance the need for both residential and employment opportunities. Therefore, new residential development should be high-density, mixed-use, and provide opportunities for a variety of income levels.

**Recommended Densities**
- New single-use residential development should have a minimum density of 20 to 30 units per acre. It should be concentrated within the current manufacturing area near the station rather than impacting outlying areas.
- Mixed-use buildings that incorporate residential and other uses (retail, office, etc.) should have a minimum floor-area ratio (FAR) of 1.5 to 2.0 and a minimum density of 20 to 30 residential units per acre.

**Affordable Housing Targets**
- New residential development should meet an affordable housing target of 20 to 25 percent, as consistent with community goals.

**Suitable Parcels (see Map 3.9)**
- Consolidate three parcels at the corner of Baldwin Street and Wilson Street for a new four-story residential building with first floor office or retail uses (parcel 1).
- Several small to medium sized multi-family residential buildings as infill development within the existing residential areas (parcels 5,6,7,8).
- Some upper level residential may occupy the street facing sides of multi-level parking structures with first floor retail (parcels 2,4).
Lot and Building Design Standards

- New housing should match setbacks of existing neighborhood buildings.
- To blend with the existing character of the manufacturing and commercial districts, the facades of new residential buildings within these districts should compliment the Neoclassical architecture in the area.
- To reduce the impact of height, all 3 to 4 story buildings should either have upper stories set back from those below, or have pitched roofs.
- To reduce impact of large building mass, building facades should be articulated separately.
- Balconies and roof gardens are encouraged to meet open space needs.

COMMERCIAL

Mixed-use development is encouraged to simultaneously increase the number of residents and employees that will utilize the commuter rail. New commercial establishments should incorporate a combination of uses such as residential, office, retail, and restaurants.

Recommended Densities

- Mixed-use commercial buildings should have a minimum FAR of 1.5 to 2.0.

Integration with Multi-Family Housing

- Within the mixed-use framework, most retail and/or food service should be on the first floor, with office and/or multifamily residential space on upper levels.
Suitable Parcels (see Map 3.9)

- A new three-story building, or adaptive re-use of existing structure for commercial development. Retail is encouraged where the building faces Baldwin Street (parcel 3).
- Multi-level parking structures should accommodate first floor retail uses (parcels 2, 4).
- Consolidate three parcels at the corner of Baldwin Street and Wilson Street for a new four-story residential building with first floor office or retail uses (parcel 1).

Lot and Building Design Standards

- New and redeveloped buildings should incorporate pedestrian scale retail while maintaining the historic character, architectural style, and building materials of the area.
- Mixed-use or commercial development should have similar setbacks to neighboring structures. In addition, efforts should be made to compliment adjacent building facades and materials.

CIVIC USES

Public open spaces enhance the pedestrian atmosphere, and are particularly important to serve the increased density of TOD.

- Designated public open spaces include parcels identified near the proposed Central Park and along the Yahara River.
- The public square adjacent to station will serve as an additional civic use.
VEHICLE CIRCULATION & PARKING

To accommodate the needs for pedestrian safety and minimize surface parking, on-street parking and multi-level parking structures are encouraged. In addition, on-street parking will serve to moderate vehicle speeds.

Traffic Calming
- Increased on-street parking along Baldwin Street and Wilson Street would provide additional parking for area retail uses, offer a safety buffer for pedestrians, and help calm traffic.

Parking
- Reduce the surface parking and replace it with multi-level public parking structures, or accommodate parking within office and residential buildings.
- New surface lots should be located behind buildings.
- Remaining surface parking should be buffered from the sidewalk with trees, shrubs, or decorative fencing.
- Parking structures should incorporate first floor retail and possibly upper level residential units along street facing sides.

Bus Linkages
- Several bus routes currently travel east-west along Washington Avenue. Some of these routes could be diverted to pass through the station area.
BICYCLE CIRCULATION

On-street Lanes
- New dedicated bicycle lanes along East Washington Avenue and Baldwin Street would increase bicycle linkage to the station.

Parking
- Bike racks and lockers should be provided at the station site, as well as within the proposed public parking structure.
- Commercial establishments should provide bicycle parking within 50 feet of the entrance.

PEDESTRIAN CIRCULATION

- Adequate access for the disabled should be provided within the entire study area.
- Within mixed-use areas, sidewalks should be 10 to 12 feet wide and include landscaping and street furniture.
- Along any given segment of sidewalk in the mixed-use area, ensure an unobstructed zone of 8 feet for pedestrian traffic.
- Marked pedestrian crossings should be added on Baldwin Street and Dickinson Street. In addition, traffic signals and crosswalks are needed along East Washington Avenue at Few and Dickinson Streets.
- 8 to 12 foot tall lamp posts with shielded lights directed towards the ground should be provided to protect the night sky and upper-level residential units.
STREET FURNITURE

Street furniture should be provided to accommodate pedestrian needs without creating obstacles to travel.

- Bicycle racks/lockers should be provided at commercial buildings and civic uses.
- Benches should be provided, particularly near public open spaces and retail or food service establishments.
- Garbage and recycling containers should be visible and accessible.
- Telephones
- Drinking Fountains
- Planters

SIGNAGE

Signs are important for orienting the pedestrian and conveying information. They should stand out, but not be visually obtrusive.

- All public and commercial signage should be provided on a scale appropriate for pedestrians rather than automobiles.
- Signs are also necessary to alert drivers of bicycle and pedestrian traffic in the area, especially along East Washington Avenue.
- Signs should clearly delineate their messages with more pictures than text.
LANDSCAPING

For aesthetic and ecological reasons, landscaping benefits TOD. Effective landscape design will consider the local climate, seek to reduce storm water run-off, and shade buildings to reduce energy consumption for cooling.

- Landscaping (trees, shrubs, vines, and groundcover) is encouraged to give a sense of enclosure along the street and sidewalk.

Landscaping on State Street in Madison provides a natural buffer between the sidewalk and vehicle right-of-way.
POLICY RECOMMENDATIONS

In order to permit and encourage aspects of TOD, a combination of new regulatory policies and financial incentives can be applied to portions of the study area. The following are suggestions for amendments to zoning, densities, and parking requirements, as well as potential incentives to encourage desired private development.

REGULATORY POLICIES

Zoning
The most comprehensive way to encourage greater mixed-use development in the study area is to create a mixed-use overlay zone within the study area’s manufacturing district and the East Washington Avenue commercial district. This will add new permitted and conditional uses, and ultimately allow for increased integration of the office, retail, and residential development necessary to support the transit station without changing the character of the current residential areas.

Within the manufacturing district and the East Washington Avenue commercial district, the following should be added as permitted uses:

- Three story mixed-use buildings with a combination of office, retail, food service, and residential uses.
- Three story multi-family residential buildings.

In addition, and in accord with criteria for density bonuses below, the following conditional use should be applied:

- Four story mixed-use buildings with first floor retail or food service, and upper level office and residential uses.

Lastly, the following should be listed as non-permitted uses within the defined study area:

- Commercial establishments with the primary purpose of servicing automobiles (gas stations, auto-service centers, etc.).
- Drive-through businesses such as banks and food service establishments.

In order to preserve historic character and affordability, no new permitted uses should be added to the existing residential districts or to the Williamson Street commercial district at this time.

Density Recommendations
Residential -- In order to determine the residential density needed to support the transit station, many variables must be taken into account. For instance, what is the level of employment in the area? Will ridership be supported by a park and ride facility? What level of density is most consistent with community goals for the area?
This particular area is not a major employment center at this time, and will not serve as a park and ride facility. Community goals seek to maintain the current density within existing residential areas and allow for continued commercial and light industrial uses within the manufacturing district. Therefore, ridership will be most responsive to increased residential density in limited portions of the station area. Based on a need for an average of 12 housing units per gross acre to support a transit station, the density of new residential development within the study area should be greater than the existing housing density in the area.

Currently, there are approximately 515 housing units covering 32 acres within the 125-acre study area. Within the current residential area, units are at an average density of 16 units per acre. However, this translates as a density of only 4.1 units per gross acre for the entire study area. To reach 12 units per gross acre, new development within the area must add 985 units (see equation below).

\[
\begin{align*}
12 \text{ units per gross acre:} \\
515 \text{ existing units}/31.8 \text{ residential acres} & = 16 \text{ units per acre within residential area} \\
515 \text{ existing units}/125 \text{ total acres} & = 4.1 \text{ units per acre within entire study area} \\
125 \text{ total acres} \times 12 \text{ units/acre needed} & = 1500 \text{ total units are needed} \\
1500 \text{ units needed} - 515 \text{ existing units} & = 985 \text{ unit deficit}
\end{align*}
\]

A significant need for residential development within the study area exists. However, for the following reasons, it may not be imperative to meet the deficit expressed above. The transit station will very likely draw riders from residential areas directly north and south of the defined study area. Additionally, some land must be reserved for non-residential use because there is a need to enhance the area as an employment center with office, retail, and light industrial uses.

Given these variables, it is recommended that the current manufacturing district and East Washington Avenue commercial district include a limited number of higher-density multi-family residential and mixed-use developments. This will preserve the character of existing residential areas, allow adequate space for commercial and continued light industrial use, and approach necessary residential densities. New residential development should occur at a minimum density of 20-30 units per acre.

**Commercial** -- Commercial development within the study area must currently be designed with a maximum floor-area ratio (FAR) of 3.0 (FAR expresses the relationship between the amount of useable floor area permitted in a building or buildings and the total area of the lot.

In order to encourage higher density development, the maximum FAR for new commercial and mixed-use development should be flexible to accommodate density bonuses within the study area. In addition, setting a minimum FAR of 1.5-2.0 would ensure that new commercial developments are developed at a greater density than many of the current single-story buildings within the study area.
Parking
In general, off-street surface parking within the study area should be reduced in order to allow for higher density development, and also to offset the cost that developers incur in order to provide parking. Ideally, proximity to a transit station will attract more residents who do not own vehicles. Parking can be reduced in many different ways.

In Portland, Oregon, maximum parking standards have been set to encourage TOD (TCRP 1999; Community Building Sourcebook 1999; Millard-Ball 2002). In Eugene, Oregon, minimum and maximum off-street parking standards have been set, in order to reduce overall surface parking but simultaneously calm neighborhood concern about potential overflow parking in nearby residential areas (Millard-Ball 2002).

Residential -- For new residential developments in the study area, it may be most effective to relax minimum parking standards and possibly set maximum parking standards based on more extensive traffic studies. Since the provision of parking spaces increases the cost of development, residential, and mixed-use developments that include affordable housing could have even lower minimum parking requirements. The current residential parking standards for high-density R6 districts may serve as a guideline for setting these specific numbers in the future. Please see table below for suggestions.

Table 3.1: Recommended Parking Standards for Residential Development

<table>
<thead>
<tr>
<th>Possible maximum parking for new residential development</th>
<th>Efficiency</th>
<th>1 BR</th>
<th>2 BR</th>
<th>3 BR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current for the City of Madison’s R6 Districts</td>
<td>0.5</td>
<td>1.25</td>
<td>1.5</td>
<td>1.75</td>
</tr>
<tr>
<td>Possible relaxed minimum parking for new residential development</td>
<td>0.5</td>
<td>1</td>
<td>1.25</td>
<td>1.5</td>
</tr>
<tr>
<td>Possible relaxed minimum parking for new affordable housing units</td>
<td>0.5</td>
<td>1</td>
<td>1</td>
<td>1.25</td>
</tr>
</tbody>
</table>

Source: Adapted from www.nonprofithousing.org

In addition, the provision of underground parking will be strongly encouraged by awarding density bonuses to developments that incorporate it.

Commercial -- In order to reduce traffic and the impacts of impervious surfaces within the study area, minimum on-site parking standards should be waived for new retail, food service, and office development. New commercial development should primarily serve the needs of area residents and those who use transit. Current and future employers adjacent to or across the street from the proposed parking structure should have prioritized access to the lower floors, and metered public parking should be accommodated on upper levels and along Baldwin Street and East Wilson Street.
INCENTIVES FOR DEVELOPMENT

Tax Increment Financing

Tax Increment District -- In order to encourage economic development in proximity to the transit station, the City of Madison should seek to create a general TIF district plan for the entire study area. Within a TIF district, public funds spent on a variety of projects can be recovered through the increased taxes generated by new private investment in the area. Funds can be used for a wide variety of projects to spur private investment. Specific project ideas for this area include, but are not limited to:

- Conversion of surface lots to public parking structures
- Pedestrian improvements, such as lighting and landscaping along Baldwin Street and Wilson Street
- Financing rail station construction
- Environmental remediation of vacant and underdeveloped parcels
- Publicly funded site acquisition to encourage private investment towards desired development

Environmental Remediation TIF (ER-TIF) -- In order to encourage private investment within the area currently zoned as a Manufacturing District, the City of Madison may seek to apply specifically for ER-TIF financing for this area. Ideally, this would ease the process for developers, who otherwise might fear high environmental remediation costs and choose to develop elsewhere. Eligible expenditures within an ER-TIF district that may apply to this specific site include environmental investigation, remediation, removal of underground storage tanks, and demolition (DNR 2002).

Density Bonuses

As a tool to promote certain uses within the study area, density bonuses can be given to developers who meet specific criteria for affordable housing, mixed-use, or environmentally-conscious design. If adopted, developers would be allowed to increase the density of their project beyond what is otherwise allowed in the zoning district. Further citizen involvement would be necessary to set both a flexible maximum density that could be surpassed by proposed developments meeting specific criteria and an absolute maximum density for the study area.

Affordable Housing -- In order to increase the availability of affordable housing, developers that commit to greater than 20 percent affordable housing units could receive density bonuses. In theory, this would offset any profit-loss to the developer due to the decreased revenues associated with affordable housing, and simultaneously meet the goals of transit-oriented development.

Mixed-Use -- For any development plan that includes both residential and commercial uses, such as ground floor retail or office space under residential units, developers will be awarded density bonuses.
Environmentally Conscious Design -- A proposed development that meets criteria for environmentally conscious design may be awarded density bonuses. Further citizen involvement will be necessary to fully develop a list of criteria for climate-sensitive design, but possibilities include:

- Provision of underground parking to reduce impervious surfaces on the site
- Inclusion of roof-top gardens
- On-site “raingarden” for on-site storm water management
- Commitment to renewable energy sources
- Landscaping with native plants

Tax Credits
Similar to density bonuses, tax credits can be used as an incentive to promote desired uses within the study area. For instance, credits could be offered to developers who surpass the 20 percent affordable housing goal for the area. For each affordable housing unit above 20 percent of the entire development, a specified percentage of property tax credits could be awarded.

Permit Review Streamlining
To the extent that it is possible, all proposed developments within the study area should be prioritized for review by the City of Madison Planning Commission.

SUMMARY

Several factors make the Baldwin Street site a valuable model for other sites along the corridor. Foremost, the station area has potential for transit-oriented development due to a number of underutilized and vacant lots in close proximity to existing medium density residential and commercial development. However, as shown by the market analysis and policy recommendations section, the area will need to develop a higher density of residential land uses to support the addition of rail transit. Most areas along the rail corridor will encounter this challenge, so design and policy guidelines for the Baldwin Street site can serve as a prototype.

Moreover, this station area can serve as an example of how TOD addresses community concerns and generates net benefits for all parties. Many who live near the site today cherish the neighborhood and surrounding area. New development plans will be of great interest to many residents and therefore collaboration needs to be proactive. This study area has many active community groups and several of these groups were consulted during development of this project’s station siting and guidelines. Other station locations should follow this method of decision-making informed by the community and their goals.

Through the course of this project, several questions arose that will need clarification in the future. A primary need is to further delineate the boundary and use of the Central Park concept (a “seam” of parkland that will run from Livingston Street to Baldwin Street...
in the current rail right-of-way north of East Wilson Street). How can this park be used to increase density of residential and commercial uses surrounding it while maintaining the integrity of the current architecture and economic demographic of the neighborhood? In addition, the City and local neighborhood groups will need to continue to support housing that is affordable to low and moderate income groups in this central city area, as land prices are likely to increase with TOD. Lastly, as TOD increases the number of residents living in the study area, regulating parking will be an important consideration.
CITY OF SUN PRAIRIE STATION

This proposed station is located in downtown Sun Prairie, in the southeast portion of the city. The Sun Prairie transit study area is roughly bordered by Main Street on the north, Angell Park on the south, Dewey Street on the east, and South Bristol Street on the west. The precise station location that was identified for this proposal is on a city-owned parcel that was recently purchased from Chiquita Canning Company.

This site is envisioned as the easternmost station in the regional commuter rail system, and was chosen for several reasons. First, the 2000 Sun Prairie Master Plan called for a transit station in downtown Sun Prairie as part of the city's downtown rehabilitation plan. Also, in the Dane County Regional Commuter Rail Feasibility Study, Sun Prairie was chosen to serve as the east terminal of the regional commuter rail system. Second, part of the purpose of this workshop is to increase public support for transit usage and to promote community linkages across the entire rail corridor. Sun Prairie is the second largest city in Dane County and therefore serves this purpose well. Third, many people in Sun Prairie commute to Madison for work so this makes the potential demand for rail service there particularly strong.

Another reason for siting a transit station in Sun Prairie is its potential for redevelopment. Two industrial facilities are closing their operations near the proposed station area downtown, thus opening up many parcels for redevelopment. This provides an excellent opportunity for both TOD and affordable housing development in this area with a land acquisition price below typical market rates.

Although there are many infrastructure improvements that need to be made, such as pedestrian access, bike paths, parking, and increased open space, Sun Prairie offers a unique design opportunity for combining downtown revitalization with both affordable housing and transit-oriented development near the station area.

Our study aims to design an attractive station that implements transit-orient development concepts including improved accessibility, compact land use patterns, walkable environments, and reduced auto use.

COMMUNITY GOALS AND OBJECTIVES

In the summer of 2000 the city of Sun Prairie commissioned Vandewalle & Associates to develop a comprehensive revitalization strategy for the downtown. A key determinate in forming this vision of a revitalized downtown was citizen input gathered at community forums. In order to best represent the Sun Prairie community, Vandewalle held three separate forums, each one targeting a specific group of stakeholders. These three groups of stakeholders, seniors, residents, and businesses owners, each represent a unique and vested interest in the downtown. In the revitalization plan, Vandewalle lists the key issues that were raised by the participants when addressing what was needed in the downtown and how these needs should be prioritized. While redevelopment priorities
differed slightly within different groups, the key issues to be addressed were largely consistent from group to group.

HOUSING

In the area of housing all groups felt increased residential development in the downtown area was an important aspect of downtown revitalization. It was also stressed that this housing be affordable.

COMMERCIAL USES

In terms of retail and commercial employment, participants felt that industrial uses should be moved outside of the Downtown Business District. These uses currently create noise, pollution, and an increase of mosquitoes during the summer months. Participants would rather see an increase of retail diversity downtown, as well as more space to accommodate growing businesses. People also articulated that inconsistent retail businesses hours and high turnover rates were a problem for the vitality of downtown. Many advocated for a strong marketing strategy as a part of the solution.

PARKS AND OPEN SPACE

A major issue for all groups was scarcity of public and open space in the downtown area. Many groups recommended that community square should be created as the focal point of downtown. An expansion of the existing farmer’s market was also recommended.

TRANSPORTATION AND PARKING

All participants expressed the need for changes in terms of the current parking and transportation situation. All participants expressed the need for more accessible parking and clear signage. Many also felt that the current traffic flow along Main Street was poor. Truck traffic in particular was said to cause problems both in terms of pollution, noise, and safety. Business owners went further to say that the Main Street and Bristol Street intersections in particular do not accommodate pedestrian movement and safety. People also expressed the need for a bike path.

Participants also advocated for a commuter rail station in the downtown area. Many feel that a station will not only link Sun Prairie to Madison, but will also work to promote revitalization in the downtown. It is interesting to note that all groups expressed the desire for a commuter rail station and stressed the “urgency” of working with the County and the State to ensure that rail service benefits the City and Downtown revitalization.
ENVIRONMENTAL AND VISUAL QUALITY

The historic character of Downtown Sun Prairie is an obvious source of pride among residents and all groups articulated the desire to capitalize on this feature. In order to do this, however, many felt that improvements must be made to the existing facades of the businesses along Main Street. Current businesses owners are either not willing or able to improve facades, however, and participants felt incentives are necessary. The block across from City Hall, which currently contains several single-family units in poor visual condition, was singled out as the block that most needs to be revitalized.
INVENTORY OF EXISTING CONDITIONS

LAND USE AND REGULATION

Ownership
The land surrounding the proposed Sun Prairie station site consists of both publicly and privately owned parcels. The City of Sun Prairie owns several of the public parcels and currently uses them for the municipal building and to store city maintenance vehicles. Dane County also owns several parcels on the northeast side of Main Street and uses them for vehicle storage. Other parcels in the area are privately owned and are used for residential, commercial, and industrial purposes (see Map 4.1).

Map 4.1: Parcel Ownership
Land Use Controls
The land uses in the study area are zoned as 82 acres of industrial, 14 acres of commercial, and 34 acres of residential (see Map 4.2). A tax increment finance district (TIF) and a business improvement district (BID) encompass most of the study area. The land directly surrounding the proposed transit site is zoned industrial, but the City of Sun Prairie has purchased many of these parcels and plans to redevelop them for residential and commercial uses. This could help make transit oriented development feasible for this area.

Existing Uses
The station area consists of a variety of land uses (see Map 4.3 and Figures 4.1 and 4.2).

- Residential currently covers approximately 40 acres within the study area, and more than half of these acres are for single-family homes.
- The next largest land use, accounting for 38 acres, is for parks and open spaces. The majority of this open space is Angell Park, which is an infrequently used volunteer fireman’s park open to the public.
- Road rights-of-way cover approximately 35 acres.
- Industrial uses make up another large portion of land use in the study area with approximately 27 acres. However, as these parcels are sold to the City and private owners, much of this land use is projected to change to residential and commercial.
- Commercial uses currently account for only 10 acres within the study site, and are divided between office, retail, and foodservice.

Map 4.3: Land Use
Figure 4.1: Number of Parcels by Use

![Bar graph showing the number of parcels by use in Sun Prairie Land Use.](image)

- **Retail**: 4.88 acres
- **Office**: 1.89 acres
- **Mixed Use-Business & Residential**: 1.61 acres
- **Food Services**: 1.70 acres
- **Vacant**: 3.19 acres
- **Parks & Open Spaces**: 38.15 acres
- **Cemetery**: 4.23 acres
- **Industrial**: 23.55 acres
- **Institutional**: 15.35 acres
- **1 Family**: 8.55 acres
- **3+ Family**: 34.93 acres
- **Railroad Right-of-way**: 10.59 acres
- **Road Right-of-way**: 26.97 acres

Figure 4.2: Distribution of Land Use

![Pie chart showing the distribution of land use in Sun Prairie Land Use.](image)

- **Retail**: 4.88 acres
- **Office**: 1.89 acres
- **Mixed Use-Business & Residential**: 1.61 acres
- **Food Services**: 1.70 acres
- **Vacant**: 3.19 acres
- **Parks & Open Spaces**: 38.15 acres
- **Cemetery**: 4.23 acres
- **Industrial**: 23.55 acres
- **Institutional**: 15.35 acres
- **1 Family**: 8.55 acres
- **3+ Family**: 34.93 acres
- **Railroad Right-of-way**: 10.59 acres
- **Road Right-of-way**: 26.97 acres
TRANSPORTATION

Vehicle Circulation
Downtown Sun Prairie can be accessed from four directions (see Map 4.4). It can be reached from the east or west by State Highway 19 and from the north or south by County Trunk Highway N. The downtown area is located approximately two miles from Highway 151, and Interstate 90/94 runs along the southwestern edge of the City (Vandewalle 2001).

Bicycle Circulation
There is currently no designated bike path located within the study area. However, a bike path proposed by the City of Sun Prairie would enter the City from the east along State Highway 19, veer south on County Trunk Highway N, turn east again through Angell Park, and finally connect to Linnerud Drive near Marshview Drive.

Pedestrian Circulation
All of the streets within the downtown business district have sidewalks to accommodate pedestrians, and there are also wide sidewalks along Linnerud Drive. The absence of sidewalks along Park Street could cause pedestrian safety and circulation problems.
Rail
The proposed Sun Prairie commuter rail station is located along the Canadian Pacific Rail Line in downtown Sun Prairie. Currently, the rail line only serves freight rail transport. The Wisconsin Department of Transportation is developing a State Rail Plan and is considering regional high-speed rail that would eventually connect Chicago to Minneapolis. The City of Sun Prairie would be along this rail route, although the high-speed trains would not stop there.

BUILDINGS

Footprints
Map 4.5 depicts the building footprints of all buildings located within the ¼ mile study area. The larger buildings in the center of the map are generally used for industrial or light industrial purposes. The smaller buildings on the west and north portions of the map are predominantly single family homes. Multi-use historical buildings can be seen along Main Street between South Bristol and Lincoln Streets. Angell Park covers most of the area in the southern portion of the map, thus the lack of buildings in that section.

Map 4.5: Building Footprints
Building Heights
The buildings in the study site are generally between one and three stories in height (see Map 4.6). There is one four story building on the east side of the study area that is multi-family residential. In general, the industrial area near the rail line consists of buildings and warehouses that are one to two stories in height. The buildings along Main Street vary from two to three stories, and the residential neighborhoods north of Main Street and west of South Bristol Street generally consist of two to three story homes with one story garages.

Map 4.6: Rendering of Existing Buildings

Note: Proposed rail station is depicted in red.

Significant Structures and Attributes
Downtown Sun Prairie can be divided into four main architectural sections, each consisting of different building types dating from various periods. These four sections are Historic Main Street, the area south of Main Street and east of market Street, the area south of Main Street and west of Market Street, and the residential area north of Main Street and west of South Bristol Street.

Historic Main Street -- Comprising the heart of downtown, historic Main Street is perhaps the most prominent architectural area and undoubtedly the most charming. Many of the buildings along the street date back to the early 1900s and their overall designs are indicative of that time period. These building facades all exhibit a similar
pattern and rhythm that, while not uniform, are still consistent. Facade ornamentations work nicely to unite building patterns. As in many older developments, the buildings are mixed use with first floor business use and second floor residential. The storefront windows and dense clustering of retail space make this a very pedestrian friendly environment. In addition to the historical structures described above there is a clustering of single family residential homes that does not conform well to the overall architectural theme of Main Street. These units date from the 1960s and are currently in poor condition (see Figure 4.3).

Figure 4.3: Downtown Stores

Other significant architectural features of Main Street include the Old City Hall (see Figure 4.4), and the newly built bank and municipal building (see Figure 4.5). The bank and the municipal building are unique to Main Street in that they are newer buildings and therefore display a more modern style. The structure and style of the two new buildings fit nicely with the overall architectural style of Main Street. Old City Hall, on the other hand, is dates back to the early 1900s. Its ornate facade and intricate ornamentation make it a focal point of downtown.
South of Main Street and East of Market Street -- Much of the area south of Main Street consists of heavy industrial uses. In terms of architecture this area can be further divided into two separate periods. The area to the east of Market Street consists of pre-WWII industrial buildings. The majority of these buildings are red brick warehouse style typical
of the period. While many of these buildings are in disrepair, their structures remain sound and architecturally appealing (see Figures 4.6 and 4.7).

Figure 4.6: Pre-WWII Industrial Use

Figure 4.7: Pre-WWII Industrial Use
South of Main Street and West of Market Street -- On the west side of Market Street there are Post-WWII heavy industrial buildings. Many of these buildings date from the 1960s and some as recently as within the past five years. These buildings are mainly functional in style, consisting of few windows and loading docks facing the street. As industrial warehouses their most notable feature is their large size (see Figures 4.8 and 4.9).

Figure 4.8: Post WWII Industrial Use

Figure 4.9: Post-WWII Industrial Use
Residential Neighborhood -- The neighborhood north of Main Street and west of South Bristol Street consists largely of single-family homes. Many of these homes were built before 1950 and thus give the neighborhood historical character typical of many traditional neighborhood developments. Homes in the area are generally two to three stories in height, with large setbacks, and wide sidewalks.

Figure 4.10: Residential Home North of Main Street

OPEN SPACE

Parks and Playgrounds
Although parks and open spaces appear to be a very significant land use in the study area, this is misleading (see Map 4.7). Angell Park is a large tract of land that accounts for most of these acres, but the park is owned by the Volunteer Fire Department and is not managed by the City of Sun Prairie Parks Department. The park is open to the public, but many of the public facilities that used to be located in the park have been removed to accommodate midget car racing on summer weekends (Master Plan, 2000). In addition to Angell Park, one rectangular parcel located in the far northeast portion of the study area is near a retirement home and has playground equipment.
PHYSIOGRAPHY

Topography
The elevation in the Sun Prairie Station Area is approximately 900 feet above sea level, and the study area is relatively flat with a few gentle slopes. The area along Koshkonong Creek and the Canadian Pacific Railroad has lower elevations than the rest of Sun Prairie (Master Plan 2000).

Map 4.7: Parkland and Vacant Parcels

Drainage
Sun Prairie and its surrounding area is drained by the Yahara River Basin and the Koshkonong Creek-Maunesha River Basin, which are characterized by drumlin and marsh physiography, low baseflow, and warm water temperatures (Master Plan 2000). Many of the small streams in the Koshkonong Creek drainage system have been ditched and straightened to provide more efficient drainage. This is troublesome as it can negatively impact water quality and stormwater management (Master Plan 2000).

Soils and Subsurface Conditions
The soils in the study area include the Dodge-St. Charles-McHenry, Plano-Ringwood-Griswold, and Batavia-Houghton-Dresden Associations (Master Plan 2000). The Sable
soils in the Dodge-St. Charles-McHenry association are level, poorly drained, have moderate permeability, and high water capacity. This is a common soil formation in the study area and it has slight to moderate limitations for urban uses. The Batavia and Dresden soils are also commonly found in the study area and are nearly level to sloping and well drained. These soils also have slight to moderate limitations for most urban uses (Master Plan 2000).

Land Cover
Koshkonong Creek -- This creek flows through the study area and is an important natural resource in Sun Prairie. The creek is approximately 32 miles long and flows through the southern portion of the City before emptying into Lake Koshkonong in southeastern Dane County. The Upper Koshkonong Creek watershed drains 103 square miles of land surrounding the City of Sun Prairie (Master Plan 2000).

Wetlands -- According to the Wisconsin Wetland Inventory, wetlands in the City of Sun Prairie are commonly found along Koshkonong Creek. There are several other isolated wetland pockets in the City of Sun Prairie, none of which fall within the study area.

Woodlands -- There are no large woodlands located within the study area. However, there are several mature hardwoods along the banks of Koshkonong Creek and in the northern portion of Angell Park. There are also mature hardwoods lining many of the residential streets within the study area.

ANALYSIS OF OPPORTUNITIES AND CONSTRAINTS

OPPORTUNITIES

Parcels with Potential for Adaptive Re-use
There are many parcels in the vicinity of the proposed transit station that are suitable for adaptive re-use (see Map 4.8). Of particular interest is the old Wisconsin Porcelain facility that is located on Lincoln Street. The facility has been vacant for several years and is now for sale. Because of the parcel’s close proximity to parks and downtown shopping and services, there is great potential for adaptive re-use on this site.

Potential Location of the Transit Station
The City of Sun Prairie recently purchased the old Chiquita Banana facility that is located along the railroad tracks and Market Street. Because of the existing historic structure on this site, and because of its proximity to the railroad tracks and downtown, it is identified as a potential transit station location.
Landmarks and Other Historic Structures
The Main Street area of Sun Prairie between South Bristol and Market Streets boasts many older buildings that should be preserved since they exemplify the qualities of traditional neighborhood design. This type of design fits well with the principles of TOD, which is desired for the study area.

Natural Amenities
Despite its semi-urban setting, the study area contains several high quality natural amenities. Koshkonong Creek runs directly through the proposed transit station area and could provide an excellent opportunity for a bicycle/pedestrian trail that connects residential neighborhoods with downtown, parks, and the transit station.

Angell Park is also partially located within the study area, and while the park has less of a natural focus than a high-impact recreational focus, it has the potential to become an important resource to the Sun Prairie community.

Tax Increment Finance District
The majority of the study area, excluding Angell Park, is located within a tax increment finance district (TIF). This designation has been in place for several years and could help
promote TOD and other infill development in the downtown area. Please see the appendix for a description of TIF.

CONSTRAINTS

Brownfields
Most of the land surrounding the proposed transit station has a history of moderate to heavy industrial uses. Therefore, there is a strong possibility the area could have brownfield contamination problems. The City of Sun Prairie recently hired consultants to conduct an environmental assessment of the area to determine whether there are contamination problems, and if so, where they are located. It will be necessary to consider the findings of this study when planning new development for this area.

Incompatible Uses
There are notable uses within the study area that are incompatible with TOD. Most obvious is the disparity between the different uses at Angell Park. Many people visit the park on summer weekends to attend Midget Car racing at the racetrack. Others visit the park to enjoy the open space or have a quiet picnic (see Map 4.9).

The other incompatible use within the study area involves the new industrial buildings located at the corner of Linnerud Drive and Market Street. The City of Sun Prairie owns several of these buildings, and Wisconsin Porcelain owns the others. These facilities do not fit in with the proposed TOD for the area, but since they are new and in good condition, they are not likely to be relocated or removed.

Pedestrian Barriers/Conflicts
All of the major intersections along Main Street in the downtown area should be considered as pedestrian conflicts. However, the City of Sun Prairie is currently undergoing a downtown revitalization project that includes widening the sidewalks and providing better pedestrian crossings. It is likely that this will alleviate the pedestrian-vehicle conflict.

In addition, there is a potential pedestrian conflict occurring where the rail line crosses Market Street. Although this is not currently a pressing issue, improvements will be necessary to ensure pedestrian safety if the transit station is located in this area.
Map 4.9: Development Constraints
MARKET SUITABILITY ANALYSIS

The downtown Sun Prairie district is ripe for redevelopment with a large number of its industrial tenants having vacated their parcels in the last few years. Chiquita’s processing plant, located adjacent to the rail system, is a highly probable site for future redevelopment as are Royle Publishing, the vacant Wisconsin Porcelain, and those parcels along the rail corridor west of Market on Linnerud Drive. Together, these sites account for over 11 acres of downtown Sun Prairie and are likely to be developed by the private sector as the commuter rail initiative makes progress.

The City of Sun Prairie acquired the Chiquita site in 2001 for approximately $1.7 million and is currently in the process of soliciting requests for proposals from the development community. With this site under redevelopment by the City, the vacant Wisconsin Porcelain property is poised for immediate consideration and redevelopment. Its location positions the site as a critical connection between Main Street to the north and the rail line and future station to the south.

Connecting the area’s demographics and market dynamics with the City’s desire to introduce additional housing opportunities to the downtown area, it is feasible to consider redeveloping the southern half of the Wisconsin Porcelain site as an active-adult or senior housing community. This analysis models approximately 100 units (1,250 square feet) that could be placed on the vacant Wisconsin Porcelain site and determines the likely financial outcomes of such a project.

PURPOSE

The purpose of conducting a front-door suitability analysis is to ascertain whether the ideas expressed throughout the TOD visioning process possess a certain degree of market feasibility – mainly whether or not the required rent to achieve solvency is above or below what the market is currently paying (for a full description of the front-door model, please see page 58). The results are intended to assist planners in identifying which cost variables will most dramatically influence the overall development budget and help guide policy recommendations to ensure the project vision becomes a reality.

MODEL ASSUMPTIONS

- Parcel Sale Price: $500,000
- Building Cost / Square Foot: $50
- Indirect Costs: $500,000
- Dwelling Units: 100
- Average DU Size: 1200 s.f.
- Equity Return: 15%
- Loan to Cost Ratio: 73%
- Debt Interest Rate: 7.5% (30 Year)
- Vacancy Loss: $.61 / s.f.
- Operating Expense: $2 / s.f.
- Real Estate Taxes: $1 / s.f.

FINDINGS

These assumptions, while sensitive to time, individual investor, and location, are an average measure of typical inputs found in the market today and are meant merely as an approximation. Nonetheless, they do provide an insightful tool to assist the planning process in successfully mixing market dynamics with creative visioning.

The listed inputs yield a required monthly rent of roughly $1,100 per unit. This amount is commensurate with other new developments with similar sized units in the Madison metropolitan area. However, changes in construction cost per square foot are the fastest way to effect affordability and should therefore be carefully reviewed in the future. To help create additional affordability, the next most significant change would be a write-down on the sale price of the land by implementing tax incremental financing. Either way, public subsidization of some form may be required to bring rent levels below $1,100 per month. With or without this assistance, however, the rates required for project solvency are in line with other projects throughout the Madison area given the stated inputs.
RECOMMENDED DESIGN GUIDELINES

LANDUSE CONCEPT

The City of Sun Prairie has a unique advantage when considering design guidelines for new development. Proximity to both the urban fabric of the City of Madison and rural Wisconsin allows Sun Prairie to draw its own design influences from both. This is reflected in the small city feeling of its Main Street, and should continue to guide the design of new development. To capture the full potential of Sun Prairie, a set of general design guidelines should be established to help inform citizens, guide developers, and support the municipality in reshaping the downtown area.

The presence of the railroad has had a dramatic influence on the physical design of downtown Sun Prairie. Historically, medium-sized industries located along the track corridor to take advantage of its connectivity. In the last several years, however, Sun Prairie’s downtown industrial base has decreased, and longtime tenants of the area have either been closed or relocated. Left behind are large abandoned industrial sites with little economic activity, few residential housing options, and very little pedestrian connectivity.

While a future rail station in the City will likely be oriented as a park-and-ride, significant strides can be taken to ensure that the city core does not become a large surface parking lot supporting rail commuters. Over time, a significant increase in the number and density of residential housing options should be pursued. Bringing people to the downtown area will spur demand for office space and retail activities to support the increased population. When feasible, new developments should seek to incorporate a mix of residential and commercial uses in an attempt to limit the frequency and distance of required travel.

An important opportunity remains for this growing community to reclaim its downtown center and transform it into a mixed-use medium-density neighborhood, integrating shopping, housing, open space and office activities for a diverse population. Accessibility to Madison, which will be further enhanced by the introduction of commuter rail, invites a wide range of individuals and families who seek the advantages of the urban core combined with the pleasantness of small town America. To compete with the introduction of several “new town” developments in the surrounding suburbs, Sun Prairie should look no further than the potential of its own downtown and create a place to come to, not simply drive through.

REDEVELOPMENT SCENARIO

Several downtown parcels have been identified as important potential redevelopment projects to spur the area’s revitalization (see Map 4.10). Existing structures have been colored yellow, while envisioned projects have been identified as blue. The following additions to the Sun Prairie TOD area are recommended:
1. Office space  
2. Structured parking  
3. Public open space  
4. Active adult apartments or condominiums  
5. Mixed-use (retail)  
6. Mixed-use (retail)  
7. Mixed-use (retail)  
8. Mixed-use (retail)  
9. Mixed-use (retail)

The building footprints illustrated in the diagram are intended to illustrate sites where redevelopment may assist the neighborhood in creating a new identity. The sites and structures were chosen based on their location along the Market Street corridor, which can serve as an important connector between the proposed station site (highlighted in red) and downtown’s Main Street.

Map 4.10: Rendering of Existing and Proposed Buildings
TRANSIT STATION

Provide a uniquely designed and easily accessible rail station for patrons arriving in multiple modes of transportation.

Location
- Locate in an area easily accessible to pedestrians.
- Locate in an established or planned mixed-use neighborhood.

Station Design
- Reflect the character of the community through sensitive use of local materials and surrounding architectural character.
- Reflect a common community identity or history.

Other
- Establish a network of safe and convenient transportation networks feeding the station, such as arterial road networks and pathways for pedestrians and bicyclists.
- Create public open spaces or plazas around the station site.
- Encourage the incorporation of a mix of uses into the station such as child-care facilities, personal care services, or retail.

Sun Prairie’s existing Chiquita processing plant proposed for rail station redevelopment.

An example of a multi-modal rail station.
Source: Calthorpe Associates

An example of a station design that blends with the context of the surrounding building stock.
Source: Calthorpe Associates
HOUSING

Provide welcoming, cost-effective, and safe housing environments in which residents of all backgrounds and types are welcome.

Density
- Current study area has residential density of approximately 1 to 2 units per gross acre.
- Housing density should average approximately 8 to 10 units per gross acre to promote downtown living as well as increase rail ridership potential.

Suitable Parcels
- Redevelopment site #4. (see Map 4.10).

Lot and Building Design Standards
- Unique and diverse number of housing options, in terms of design, pricing, amenities, and size.
- Residential buildings on redeveloped sites should relate to adjacent property setback distances to create a visual urban corridor.
- Building scale, materials, color and architectural style should be varied but relate to neighborhood patterns.
- Redeveloped sites and newly developing parcels should be designed and sited so as to preserve key viewsheds and visual gateways.
- Primary residential entrances should be oriented towards and visible from the street.
COMMERCIAL

Provide an economically sustainable commercial structure in downtown Sun Prairie that is both inviting and productive for residents and visitors.

Development Mix
- When possible, commercial space should be integrated with multi-family housing.
- Office and retail uses should be mixed within the same buildings, when feasible.

Suitable Parcels
- Redevelopment sites #1, #5, #6, #7, #8, and #9 (see Map 4.10).

Lot and Building Design Standards
- Buildings should generally be built up to the edge of the sidewalk in a consistent plane with other buildings on the street.
- Building scale, materials, color and architectural style should be varied, but carry a consistent theme with other structures in the immediate area.
- Decorative and functional elements such as signage, awnings, and ornamentation should be used to create human scale elements on the building facades.
- Retail activities within buildings should be encouraged to be oriented towards the street and have direct access from sidewalks though storefront entries.
- Loading docks should not be located on the major pedestrian street side of new buildings.
- Outside seating should be incorporated into a development’s design when ample space is available on sidewalks.
CIVIC USES
Create a community-wide identity with new civic structures and public open spaces.

- A public library and post office utilizing commercial design guidelines above are encouraged near the transit station.
- A public green space should be designed for passive and unstructured active recreation. Improvements to the green may consist of paths, benches, and landscaping.

LIGHT INDUSTRIAL
Provide limited but economically sustainable industry to the downtown economic base while preserving the visual quality and character of residential and commercial land uses.

- Industrial properties should be designed and constructed using building materials and colors found in existing downtown buildings.
- Sites should be shaded and covered with a high density and frequency of landscaping, utilizing native trees, shrubs, and groundcover.
- Should be well lit for pedestrian safety and visibility.
- Loading dock entrances should be clearly delineated and located away from pedestrian routes when possible.
VEHICLE CIRCULATION & PARKING

Provide efficient and safe vehicle circulation routes that encourage multi-modal transit and balance the needs of drivers, pedestrians, and bicyclists.

Traffic Calming

- Encourage more narrow streets to slow traffic, reduce streetscape scale and create a more intimate urban environment.
- “Bump-outs” are encouraged for shorter pedestrian crosswalks and smaller vehicle lanes.

Parking

- Mixed-use parking lots (ground-level retail and elevated parking) should be considered when economically feasible.
- On-street metered parking should be encouraged for area retail services.
- On-site parking should be visually unobtrusive and preserve the character defining features of the site and the surrounding community.

BICYCLE CIRCULATION

- Bicycle lanes, where appropriate, should be encouraged, clearly delineated, and connected to other bicycle systems for extended travel.
- Bicycle racks should be provided at the station, in urban square and parks, and adjacent to bus transfer points.
- Bicycle racks should be provided at intermittent locations throughout the downtown area for a specified amount of retail space, to be agreed upon by the City.

Crosswalk “bump outs” calm traffic and shorten the distance pedestrians must travel from one side of the road to another.
Source: www.pedbikeimages.com

On street parking is critical for commercial enterprise success as well as traffic calming and the minimization of impervious surface.
Source: www.cnu.org
PEDESTRIAN CIRCULATION

Pedestrian movement and activities should be the top priority in assessing transportation and street improvements. A pedestrian should be able to access any part of their community safely and efficiently by walking.

- Crosswalks should be incorporated into streets and at all intersections.
- Sidewalks on neighborhood retail streets should be approximately 12 feet wide from curb to adjacent building.
- Desired width of sidewalks along residential streets is 5 to 6 feet.
- Adequate access and space for the disabled should be provided.

SIGNAGE

Streetscape designs should include a system of pedestrian wayfinding signs, kiosks, and other graphics to supply directions and information for pedestrians.

Clearly delineated sidewalks improve the safety of pedestrians while landscaping provides visual relief from the concrete environment.
Source: www.pedbikeimages.com

Clearly delineated sidewalks improve the safety of pedestrians while landscaping provides visual relief from the concrete environment.
Source: www.pedbikeimages.com

Independent pedestrian routes are often a source of added efficiency, connectivity, and recreation.
Source: www.cnu.org
STREET FURNITURE

Provide helpful, attractive, and convenient amenities to create a welcoming atmosphere for area residents, customers, and visitors.

- A minimum of 25 linear feet of seating for every 1,000 square feet of required open space.
- One garbage can should be provided for every 5,000 square feet of physically separated open space.
- Directional lighting should be utilized in place of “globe” luminaries.
- When affordable, brick, patterned concrete, cobblestone or other similar materials should be utilized in place of concrete for sidewalks.

Sheltered transit benches and amenities are important elements in the streetscape environment.
Source: www.sitespecifier.com

Directional lighting reduces light pollution, increases efficiency, and decreases cost over globe lighting.
Source: www.sitespecifier.com

An example of a pedestrian friendly streetscape environment with seating, landscaping, attractive paving material and bicycle racks.
Source: City of Madison
LANDSCAPING

Provide an environmentally appealing and efficient urban landscape throughout downtown Sun Prairie.

- A minimum of 30 square feet of landscaping should be provided for each parking space.
- At least ¼ of the required open space should be either provided as water or landscaped with groundcover, shrubs, or flowers.
- Slopes should be preserved to the extent possible as the green backdrop to the urban development of the city.
- One tree should be planted for every 1,000 square feet of required open space.
- Walls, fences, and dense plantings that visually seclude the interior space from the sidewalk should generally be avoided.

The use of landscaping and plantings help to create the separation of unique environments creating smaller spaces within the whole community.
Source: www.cnu.org
POLICY RECOMMENDATIONS

The City of Sun Prairie should consider a set of regulatory policies and development incentives that will contribute to station area development in accordance with the recommended design guidelines. This section offers a list of recommendations that may further affordable housing, regulatory policies, and development incentives in the station area.

AFFORDABLE HOUSING

Households with incomes below 80 percent of the area median income are considered to be low-income consumers. In 1998, such households were comprised of individuals earning less than $31,000 per year or families of four earning less than $45,000 per year. The City of Sun Prairie should consider the following policy recommendations when addressing how affordable housing in the station area could serve such households.

- Multi-family, medium- or high-density (townhouses, cluster units, condominiums, garden apartments) development covering the study area is recommended. Housing development should be mixed by type, price, as well as use.
- Those units designed for affordable multi-family housing should be designed with a similar appearance to the area’s market rate housing developments.
- Tax abatements should be considered for improvements that meet requirements for low-income, affordable housing linking directly to transit, childcare facilities or other public benefits.
- Affordable housing federal tax credits could be employed to encourage the creation of affordable rental housing.
- The City may offer developers a density bonus for provision of a certain number or percentage of affordable housing units. A 25 percent density bonus should be awarded to housing developments that reserve 20 percent of new units for lower income households.
- The elimination or graduation of development fees for affordable housing developments should be explored.
- A Community Development Block Grant program (CDBG) was awarded to the city of Sun Prairie in year 2000. This program could support the City’s affordable housing efforts.
- The City could also create a Housing Trust Fund, through various public and private sector mechanisms, dedicated to creating affordable housing.

REGULATORY POLICIES

Zoning

A portion of the station area was formerly occupied by several heavy industrial uses. That area should be rezoned to allow medium-density residential and commercial mixed uses. The City should specifically designate one or more “mixed-use center districts”
within a 1/4-mile radius of station. For example, the area east of Market Street, between Main Street and the rail line, could be designated as multi-family housing with supporting retail and commercial businesses integrated into the area. Likewise, the land west of Market Street, between Main Street and the rail line, could be zoned for a commercial and office center. Similar zoning of the land south of the rail line could allow development of an office and recreational park. Overall, the basic idea is to encourage a variety of development types in specific centers surrounding the rail station.

An alternative to rezoning would be the creation of a Planned Unit Development (PUD) zoning district. A PUD promotes flexibility of design, enhanced diversification, and the integration of uses and structures. Developments within a PUD should emphasize mixed land use, pedestrian friendly design, and the protection of local character.

Density Recommendations
Current land uses around the study area are mostly industrial and open space with residential density of less than one unit per acre (approximately 100 units in the 121 acres of the study area). Based on the current development patterns in the City and the fact that Sun Prairie will serve as a park-and-ride station site, an average residential density of 8 to 10 units per acre is a reasonable figure to be recommended.

In addition, the City should consider allowing zero lot line development, eliminating the standard setback requirements on one side of the lot, to increase density.

Parking
The City of Sun Prairie should consider both reductions in parking requirements (up to 50 percent) and shared parking among different buildings and facilities to take advantage of different peak periods. For example, an office complex may efficiently share parking facilities with restaurants or theaters.

Other potential measures include eliminating minimum-parking standards for affordable housing, balancing the parking needs of new development by reviewing them on a project-by-project basis, and encouraging transit systems to play an active role in transit-oriented joint-development projects such as structured parking.

INCENTIVES FOR DEVELOPMENT

Tax Increment Financing
A Tax Incremental District (TID) was recently formed to encourage the revitalization of downtown -- an area within the quarter-mile radius of the station area. The proposed public improvements include added streetscape/pedestrian enhancements, new signage, parking structures, and landscape enhancements. Further, the possibility of using tax increment financing to fund rail-related improvements such as public plazas and a rail station may be used to encourage the private sector to incorporate traditional neighborhood design into their projects at significantly lower costs.
Density Bonuses
To support a transit station, 8 to 10 housing units per acre are recommended for downtown Sun Prairie. While higher densities are typically needed in more urban districts, the Sun Prairie station will represent the terminal station for the commuter line and will therefore serve as a park and ride facility as well. Currently, residential density with a quarter mile radius of the station site is below one unit per acre. A 25 percent density bonus for new residential development is recommended to encourage denser infill.

Government Grants
State and federal brownfield grant programs are another source of revenue for local municipalities. For example, the Brownfield Site Assessment Grant (SAG) program from the Wisconsin Department of Natural Resources may fund the investigation and subsequent cleanup of industrial lands once occupied by Wisconsin Porcelain and Chiquita Canning. Environmental Remediation Tax Increment Financing could also be used as a tool for environmental investigation and remediation costs.

SUMMARY
The City of Sun Prairie will play a pivotal role in the future development of commuter rail in Dane County. There are numerous factors that distinguish Sun Prairie as unique within the overall region and it was because of these features that it was selected for in-depth study and analysis. Below is a brief outline of some of these factors.

Sun Prairie’s location on the far east end of the railway corridor along the existing rail line links it to Madison and therefore makes it a vital terminal station. Together, Sun Prairie and Madison comprise the two largest population concentrations in Dane County and are expected to receive a significant proportion of the area’s future growth. The Highway 151 corridor that connects these two cities has rapidly filled in over the last decade and will continue to do so in the coming years. The addition of new households to the area opens a significant opportunity for downtown Sun Prairie to leverage itself as a residential and retail center.

Historically, development precedent in the City of Sun Prairie has focused mainly on auto-oriented design principles in which industrial, commercial, and residential land uses have been separated. Coupled with the downtown’s recent loss of large, low-density industrial facilities, transit oriented development will add a critical benefit to enhancing the district’s image, business sustainability, and residential character. Medium density development, in which supportive commercial enterprises and employment centers are within walking distance of new residential housing, will add value to the City’s economic potential by making it more attractive to current and future residents.

Recent Community Development Block Grant (CDBG) funds have been awarded to Sun Prairie to support the Central Business District Revitalization Plan. A mutually beneficial relationship between the public and private sectors will enable future public
improvements and private redevelopment efforts to support a healthy offering of community events, recreation, retail and service amenities -- all of which are currently lacking in this area.

Ultimately, the downtown district can be transformed into a destination for visitors, shoppers, and residents throughout Dane County. The moderate phase-out of industrial land uses from the downtown area will make room for both the public and private sectors to create a new image built on the City’s long-standing civic pride and history.
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REFERENCES


Parsons Brinckerhoff. 1998. *Dane County Commuter Rail Feasibility Study Phase 1 Report*. Submitted to Wisconsin Department of Transportation, County of Dane and City of Madison, WI.


