Dane County Market Demand Study

Bus Rapid Transit & Other Local Investments in Walkable Transit-Supportive Communities

Capital Region Sustainable Communities

CAPITAL AREA REGIONAL PLANNING COMMISSION

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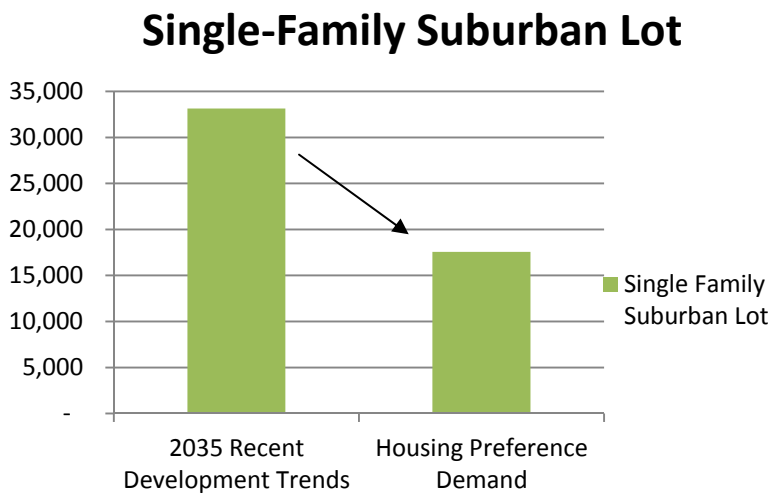
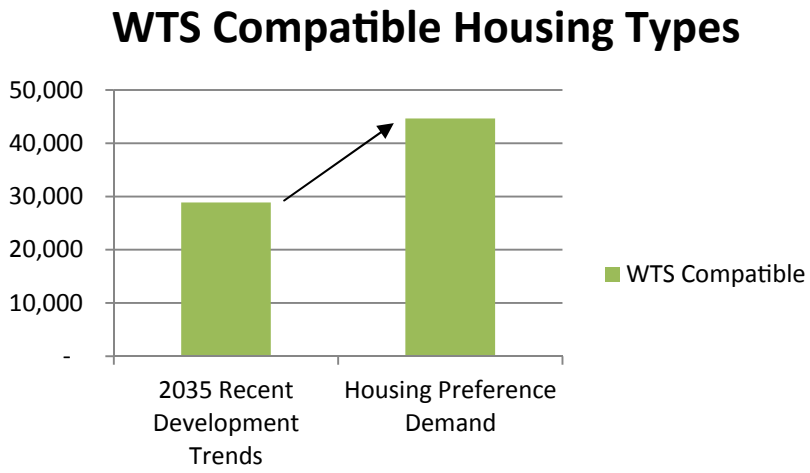
Executive Summary

Dane County is growing. Madison and outlying communities are steadily attracting new residents, with most expansion occurring outside the city in places like Cottage Grove, Sun Prairie, Verona, and Waunakee, to name a few. Middle- and higher-income families are being lured to surrounding towns by perception of better school districts, jobs, and newer housing.

But the region isn't just growing; **it's also changing**. Dane County, like many counties nationwide, is expected to experience a significant demographic swing, with a greater percentage of the population falling into the over 65 and 25-44 age ranges. These cohorts increasingly favor multi-family units, townhomes, and single-family houses in compact, walkable neighborhoods instead of the expansive suburban lots that have dominated real estate preferences for decades.

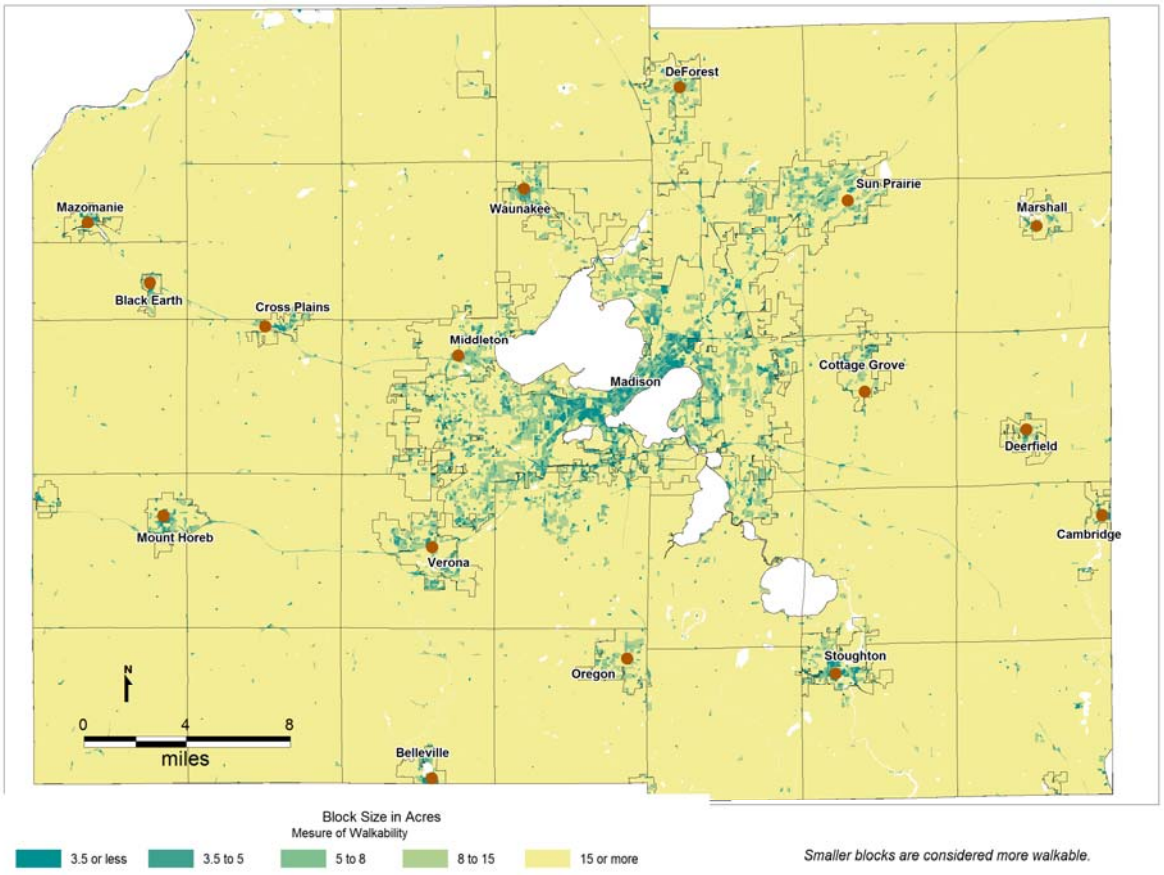




If development trends of the past are allowed to guide Dane County's growth planning, this demand for smaller housing types will be missed. The opportunity for developing compact, mixed-use, and pedestrian-oriented neighborhoods—referred to as Walkable Transit-Supportive (WTS)—will be lost. The housing preference survey in this report estimates that if planners continue making decisions based on outdated preferences, single-family suburban homes will be overbuilt by over 15,000 housing units, as more households will demand multi-family units, townhomes, and smaller single-family homes.

Meeting this growing demand for walkable, mixed-use places will be both an opportunity and a challenge. The biggest hurdle will be shifting development trends to deliver increased walkability. Between 2000 and 2010, 85% of new housing was built in areas with blocks larger than 3.5 acres, which makes it difficult to efficiently walk to local amenities.

The darker green areas on the map below show areas with blocks of 3.5 acres or less. As the map shows, most of the walkable blocks are concentrated on the Isthmus and near the University of Wisconsin campus, with relatively few walkable blocks located in the outlying areas where the most growth is expected to occur.



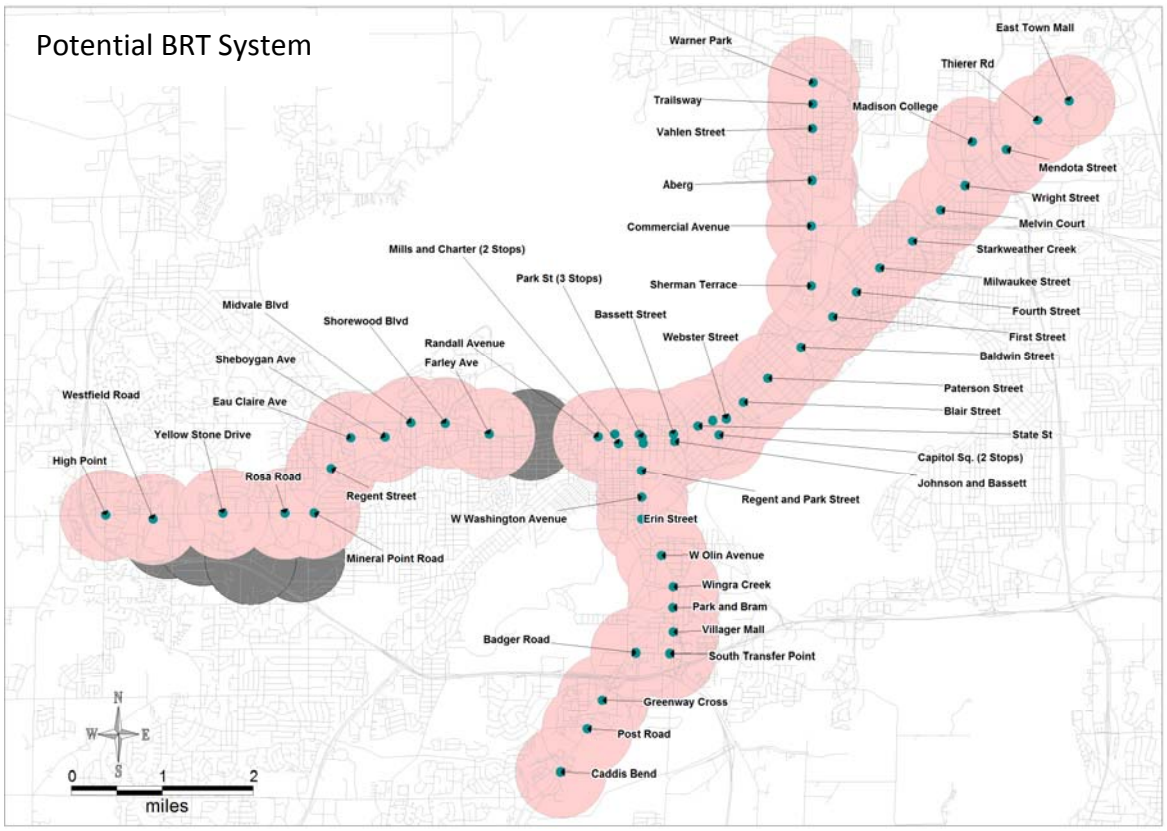
The Potential of Bus Rapid Transit (BRT) in Dane County

This market study examines the potential for transit-supportive development to help meet this growing demand for WTS along the proposed Bus Rapid Transit (BRT) system.

BRT is popular with planners and policymakers for many reasons:

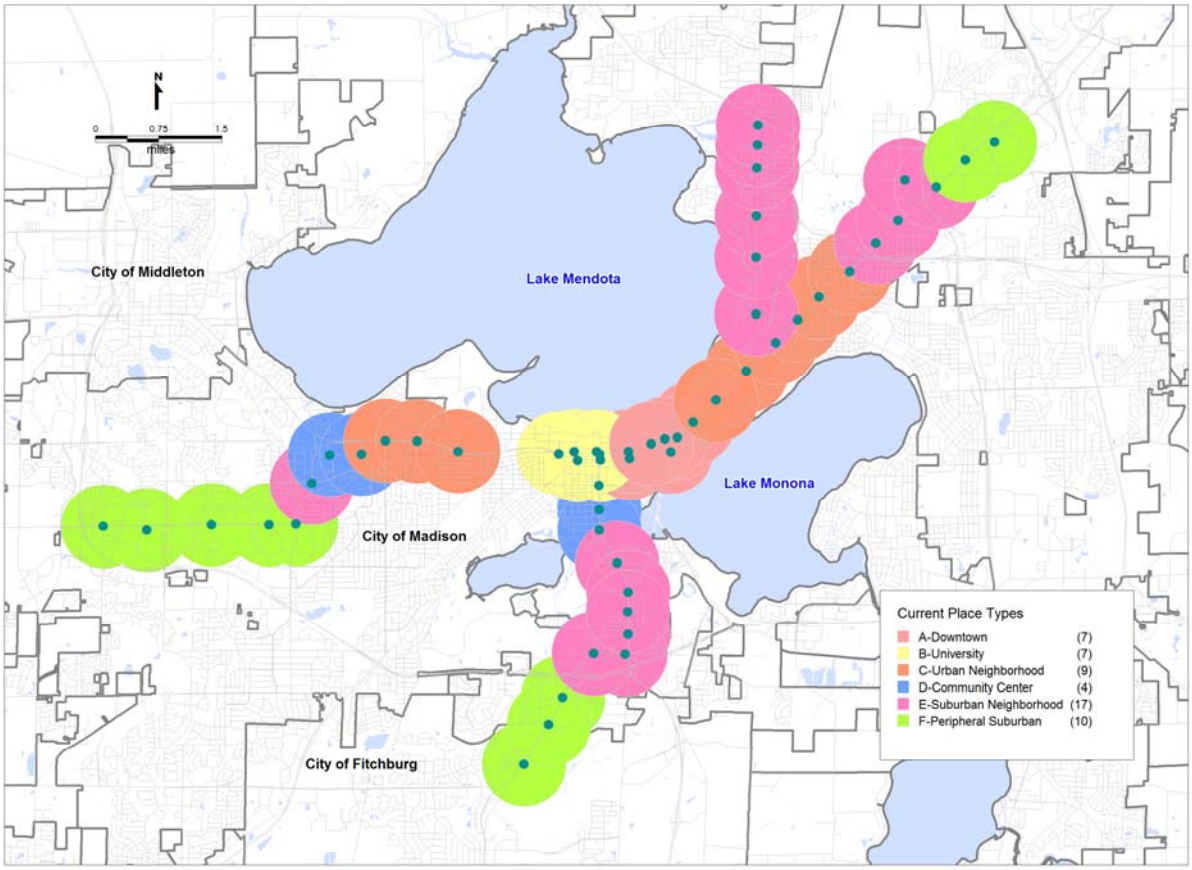
- It can be more cost-effective to implement than other forms of fixed-guideway transit
- It has the potential to attract development at levels comparable to rail service
- It has evolved in design and function to become attractive to consumers
- It is viewed as a viable transit option in traditional urban centers and in mid-sized and suburban communities

To maximize the potential of a BRT system and distribute the benefits equitably throughout the community, the network must balance congestion relief, a traditional focus of transportation planning, with value capture and equity to underserved populations. The Madison Area Transportation Planning Board (MPO) recently completed a BRT study investigating its potential along four major corridors in Madison and Fitchburg, with long-term extensions to Sun Prairie and Middleton. The study found that a BRT system would serve 15,000–20,000 riders a day over the coming decades, while reducing travel times 19% to 42%.



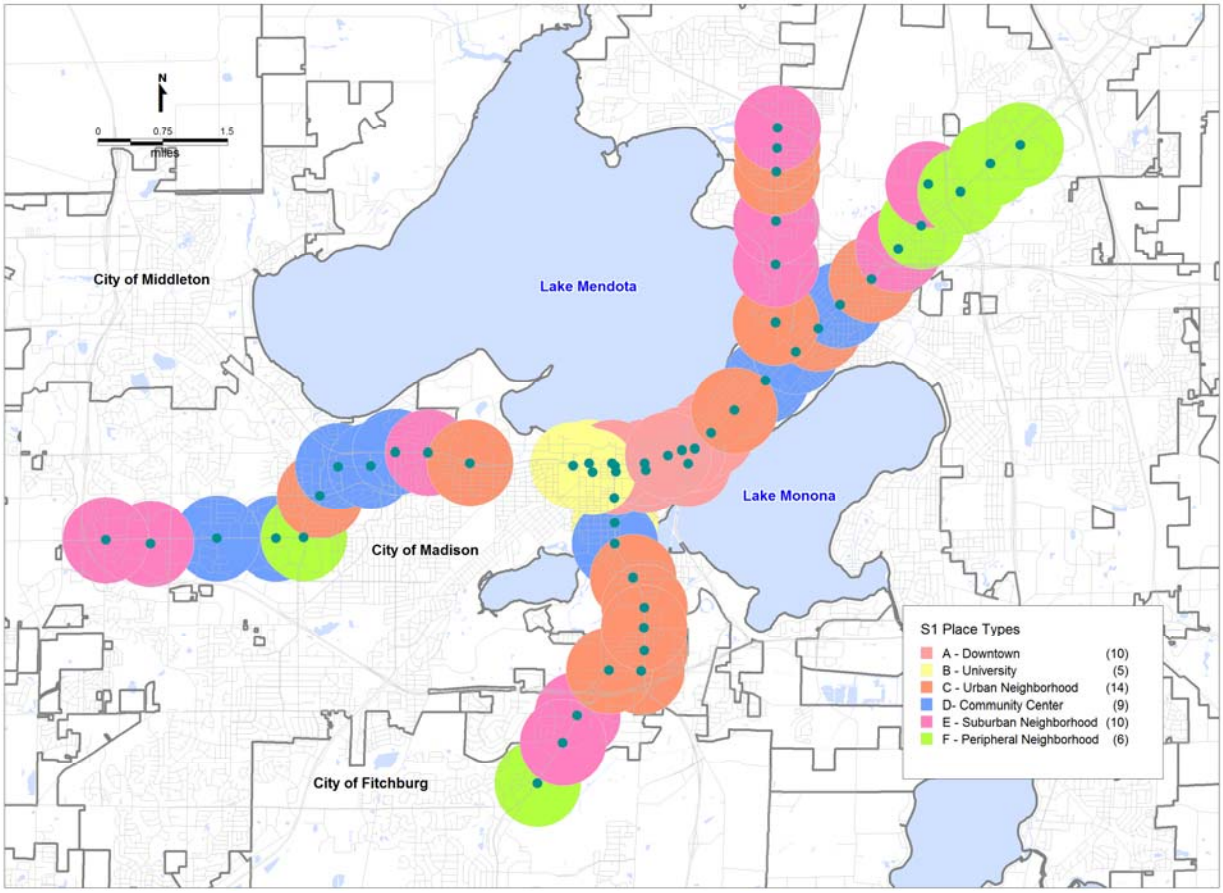
This market study first looked at the development potential along BRT stops for three different development scenarios. The following maps show how transit-supportive development could, over time, shift the character of areas around transit stations. Half-mile circles around stations show different "place types," including Downtown (salmon), University (yellow), Urban Neighborhood (orange), Community Centers with commercial concentrations (blue), Suburban Neighborhood (pink), and Peripheral Suburban (green).

The first map shows the current place types along the proposed BRT route. Much of the WTS development shown on the map above is concentrated Downtown, near the University, and in Urban Neighborhoods around the Capitol. Much of the area outside of the central core is designated as Suburban and Peripheral Suburban.

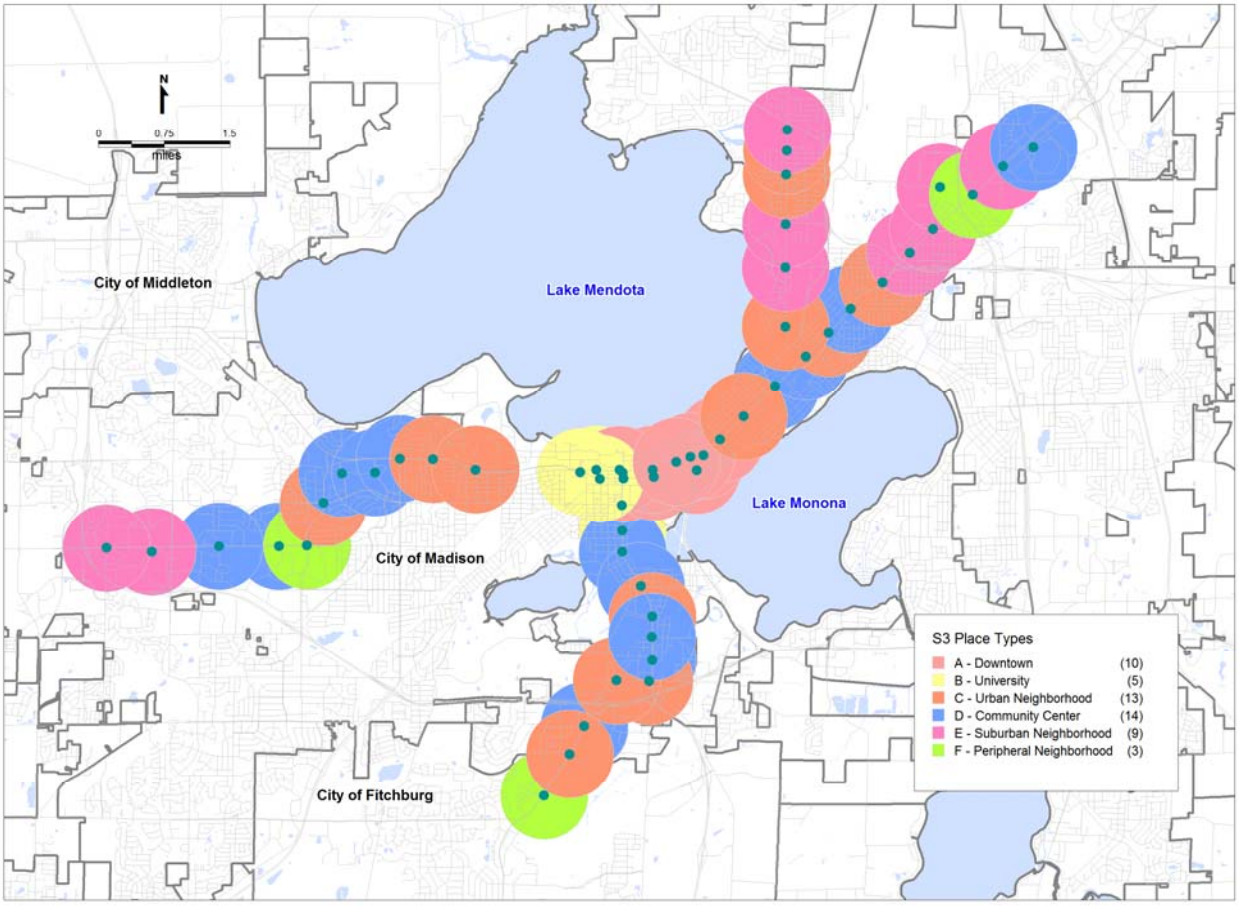


The next map shows how the station areas could change by 2035 if a BRT system was not constructed, but small increases in transit service were implemented and consumer preferences for WTS communities grew. This closely resembles the business-as-usual scenario if development continues to be based on past trends. The map shows that the Park Street

corridor to the south shifts from Suburban Neighborhood to Urban Neighborhood, and the east and west routes show some areas transitioning to Community Centers.



The following map shows how the BRT station areas could transform if the BRT was implemented and policies were in place to encourage higher household and job density within a mixed-use, pedestrian-oriented environment (the BRT “plus” scenario). Under this scenario, Park Street shows more Community Center areas and further extension of Urban Neighborhoods. The East Towne mall also becomes a Community Center as it transforms into a pedestrian-oriented community.



Realizing the Benefits of WTS

The direct benefits from implementing the Bus Rapid Transit system were measured based on the BRT "plus" scenario.

On the low end, if the 2035 BRT "plus" development scenario was realized, Dane County would save:

- $22.2 million in annual household transportation expenditures
  - County Savings = 1%
  - Household Savings = 22%
- 6,152 metric tons in greenhouse gas (GHG) emissions
  - County Savings = .34%
  - Household Savings = 9.5%
- 14.3 million vehicle miles traveled (VMT) per year
  - County Savings - .34%
  - Household Savings = 9.5%

The BRT "plus" scenario does not meet all of the demand for WTS communities. Even if the development under BRT "plus" were fully realized, the new development would still leave an estimated 22,000 Dane County households without access to the WTS communities they desire. In order to meet this demand, it is important to look beyond the proposed BRT system to other areas in Dane County that could benefit from WTS.

Options for meeting this additional WTS demand include:

- Enhancing other Urban Neighborhoods, such as the Monroe Street and Atwood districts in Madison
- Enhancing existing Town Centers in suburban communities like Sun Prairie, Stoughton, and Middleton
- Extending BRT further to serve more communities in Dane County over time, prioritizing places like Sun Prairie and Middleton
- Redeveloping some suburban commercial centers, such as American Center and Greenway Station, to contain a walkable mix of housing, retail and civic developments

If this additional WTS demand is met, the benefit would include a county-wide savings of:

- $63.2 million in household transportation expenditures
    - County Savings = 2%
    - Household Savings = 22%
- 17,534 metric tons of GHG emissions
    - County Savings = 1%
    - Household Savings = 9.5%
- 40.6 million VMT per year
    - County Savings = 1%
    - Household Savings = 9.5%

II. Study Background and Overview

The purpose of this study is to estimate the demand for housing and commercial uses in areas designed to be compact, walkable, mixed-use, and transit-supportive, with the intent to inform local and regional land use and transportation plans, implementation plans, and public and private investments. Many regional plans and local comprehensive plans include goals and objectives aimed at promoting such areas. This analysis helps identify where these areas are or could be located, the potential for projected regional growth to catalyze their further development in the form of compact, walkable, mixed-use, and transit-supportive (or transit-oriented) nodes, and how these areas may evolve over a 25-year time horizon from present conditions both with and without BRT.

The study employs the term "transit-supportive" to indicate areas that have the basic building blocks of land uses, compact form, and pedestrian design to eventually support or expand transit service. This development form is abbreviated in the study as "WTS," or walkable transit-supportive. Areas that have robust transit service and a mutually reinforcing development pattern are "transit-oriented developments", or TODs. Therefore, TODs may be viewed as a subset of WTS areas.

Support for this project comes from a Sustainable Communities Regional Planning Grant from the U.S. Department of Housing and Urban Development (HUD) received by a consortium of Dane County organizations called the Capital Region Sustainable Communities (CRSC) Consortium. The consortium—comprised of government, businesses, and nonprofits—is led by the Capital Area Regional Planning Commission (CARPC). A major goal of the three-year grant project is to create a broad partnership to advance regional sustainable development and promote shared goals and performance targets in local and regional plans.

Among the activities of the Sustainable Communities projects are to: prepare plans for enhanced transit and transit-oriented development along regional corridors that increase connections between residents and destinations while promoting redevelopment and revitalization; and to prepare Future Urban Development Area plans for sustainable urban growth (see www.capitalregionscrpg.org for more information). These activities include market studies in the scope of work. A parallel and concurrent BRT feasibility study, conducted by a different project team for the Metropolitan Area Transportation Planning Board, provided all BRT routes and station locations used in this project (see www.madisonareampo.org/brt.cfm for more information).

To guide this analysis, CRSC formed an Oversight Committee drawn from a broad range of Dane County stakeholders representing commerce, community and economic development, local governments, transportation planning, and real estate. The project team met with the Committee four times (beginning in the summer of 2012 and concluding in the spring of 2013) to present interim work products, receive input and feedback, and answer questions. Several Committee members also attended the design workshop held in April 2013. A list of the Committee's membership is provided in Appendix 1.

This project has five major components:

1. A market analysis to project the magnitude of demand in Dane County for real estate products compatible with walkable transit-supportive development patterns (WTS)
2. A framework of development types used to assess the region's potential to absorb that demand
3. Modeling of alternative scenarios that show where projected WTS-compatible demand might be accommodated, both with and without the introduction of BRT
4. Estimated impacts of the scenarios along the BRT System and in Dane County
5. Conceptual designs for a compact, walkable, mixed-use, transit-oriented neighborhood around three selected stops along the proposed BRT routes.

III. Estimate of Existing and New WTS Demand: Major Factors That Influence Demand for Walkable Transit-Supportive Development

The Madison region's implementation of BRT is taking place within growing interest nationally and internationally in this form of transit. A combination of factors contribute to making compact, mixed-use, pedestrian-friendly neighborhoods an attractive development pattern for consumers, private sector interests, and public sector decision makers. Key among these factors are the convenient, amenity-rich lifestyle that appeals to growing segments of the consumer market; the financial benefits of reduced automobile dependence in an age of ever-rising energy and infrastructure costs; and the potential of more efficient land use to deliver higher returns on public and private investments.

A. Demographic shifts

One of the most significant demographic trends over the century that will impact demand for WTS is a shift in age distribution. Nationally, this shift was attributed to smaller family sizes and increased lifespans, simultaneously shrinking population in lower age groups expands the proportion in higher age groups. **This shift is expected to impact preferences in the residential real estate market towards multi-family units, townhomes, and single-family homes in compact neighborhoods.**

Arthur Nelson, a highly regarded demographer and professor at the University of Utah, has conducted a number of studies to measure how demographic changes and preferences for housing in the U.S. impact the built environment throughout the country. In findings presented to the American Planning Association (APA) in 2010, Dr. Nelson compared his 2006 projections with national real estate consultants Robert Charles Lesser & Company (RCLCO) 2008 projections. These projections were also compared with the existing U.S. housing supply measured by the U.S. Census during the American Housing Survey (AHS) in 2009. The comparative findings show mismatches in the current supply and projected demand for several different residential products (Figure 1):

Figure 1: Demographic and Housing Preference

House Type	Nelson 2006 Demand	RCLCO 2008 Demand	Average	Census - AHS 2009 Supply
Attached/Other	23%	27%	25%	23%
Townhome	15%	11%	13%	5%
Small Lot	37%	37%	37%	10%
Large Lot	25%	25%	25%	61%

Sources: Arthur Nelson, Robert Charles Lesser & Company (RCLCO), and U.S. Census American Housing Survey

Dr. Nelson estimated that the demand for large lot suburban homes will decline by 35 million between 2010 and 2030, while the demand for smaller lot single-family homes will increase by 39 million nationally. The driving forces behind this shift in demand include changing demographics, changing perceptions of home ownership, increased renter tenure, and the increased desire for living in convenient proximity to employment, shopping, entertainment, and transit options.

An annual report by the Urban Land Institute (ULI) and Price Waterhouse Coopers (PWC), *Emerging Trends in Real Estate*, also illuminates housing preferences of the age groups comprising the consumer base residential products in the coming decades. ULI and PWC project the dominance of childless homes over the period 2005-2030 (88% of household growth), and show that one of the most significant cohorts, "echo boomers"—or those born between 1982-1999—express preferences for compact, mixed-used communities that are walkable and/or served by public transit.[1]

According to research by AARP and RCLCO, many baby boomers and most "echo boomers" (those born between 1982-1999) express a preference for living near transit and in mixed-use communities, in the urban core of their region, and near amenities

Members of the echo boomer generation are of particular interest because of their mobility. This cohort is currently delaying home ownership and family formation due to income constraints, and even as those constraints are relieved over time, the overwhelming majority (77%) express a preference for living in the urban core of their region.[2] **Access to amenities is very important to this population, with one-third willing to pay more for housing where they can walk to shops, work, and entertainment, and 50% willing to trade lot size for proximity to work and shopping.**[3]

[1] Urban Land Institute and Price Waterhouse Coopers, *Emerging Trends in Real Estate 2012*, 2011.
[2] Robert Charles Lesser & Co., Survey of Housing Preferences, 2009.
[3] ULI and PWC 2011.

Other sources provide insights into baby boomer preferences. **71% of respondents to an American Association of Retired Persons (AARP) survey expressed an interest in living near transit, while 75% of retiring boomers surveyed by Robert Charles Lesser & Company (RCLCO) expressed an interest in living in mixed-use communities**. On top of a generally higher incidence of childless and smaller-size households that is increasing demand for rental housing and smaller units, the residential product these preferences describe is, essentially, urban or suburban forms of transit-oriented development. The Center for Neighborhood Technology's own research on this issue concludes that, nationally, 25% of new households by 2030 will demand homes close to transit.[4]

These demographic changes can be observed in population data and projections for both the State of Wisconsin and Dane County. For the 2010 to 2035 forecast period of this market study, projections recently released by the Wisconsin Department of Administration (DOA) show that the largest population growth in the state will occur within the subpopulation aged 65 and over, followed by those aged 25-44. The following table shows the population growth for primary age groups in the state (Figure 2).

Figure 2: Demographic Changes in WI

Age Group	Population		Total Change	% of Change
	2010	2035		
Under 17	1,339,492	1,376,240	36,748	4.6%
18 to 24	549,256	559,850	10,594	1.3%
25 to 44	1,447,360	1,533,540	86,180	10.9%
45 to 64	1,573,564	1,497,390	-76,174	-9.6%
65 & over	777,314	1,511,330	734,016	92.8%

Source: Wisconsin DOA 2012 State Projections

The 92.8% growth in the population aged 65 and over demonstrates the large impact the baby boomer generation will have on state population growth. The growth of this older generation will dwarf the next largest group aged 25-44, projected to grow by 10.9% from 2010 to 2035. While the 65 and over population will have a large impact on the demand for multi-family ownership units, the 25-44 age group is a prime age group impacting both the rental market and the market for multi-family and single-family ownership housing.

Dane County will also experience the largest population growth of people aged 65 and over. Data released by the DOA in 2008 for Dane County show that 44.5% of all population growth from 2010 to 2035 is expected to be attributed to that age group. The next two largest

[4] Center for Transit-Oriented Development, *Hidden in Plain Sight: Capturing the Demand for Housing Near Transit*, September 2004.

population increases are with those aged 15 and under (21.2%) and 15 to 34 (19.3%). The increase in the age group 15 and under suggests the continuing growth of families with children, which supports continued demand for single-family housing, while most of the 15 to 34 age cohort support both rental and for-sale multi-family and single-family housing.

The Dane County population projections also show a reduction in families with children as a percentage of total population compared to historical trends, and a continuing decline in average household sizes. The latter is an effect of the increase in older households. As household size declines, the number of housing units needed increases relative to population growth. **The larger increase in homes needed for smaller households will have important implications for the future of housing in Dane County and most specifically for housing within walkable transit-supportive communities.**

Seemingly small percentage-point differences in the share of various household types as a proportion of total households can make a significant difference in a local housing market. For example, the share of households without children in 2009 was 70%, but is expected to creep upward to 72% by 2025.5 For a county of approximately 250,000 households, this means some 5,000 housing decisions will be driven by a potentially very different set of needs and preferences compared to those that involve children.

Figure 3: Dane County Household and Income Change as a Percent of the Regional Median Income 2010 to 2035

% of Median Income	Total Households 2035		2010 to 2035	
	2010	2035	Total Change	% of Total
30% or less	28,665	36,925	8,259	13%
31-50%	24,122	31,072	6,950	11%
51-80%	38,804	49,985	11,181	18%
80-100%	26,808	34,532	7,724	12%
100-120%	21,794	28,074	6,280	10%
120%+	75,829	97,678	21,849	35%
Totals	216,022	278,265	62,243	100%

Source: CHAS data for Dane County provided by HUD, based on ACS 2005-2009.
Peloton Research Partners 2013.

Affordability was also considered in this study. For the purposes of this research, the percentages were taken from ACS distributions in 2009 and carried forward to 2035. If current conditions continue, Dane County is likely to experience a growth of over 26,000 households

[5] Capital Area Regional Planning Commission, "Households and Housing Trends: Implications for Future Urban Development in Dane County, Wisconsin," unpublished white paper, 2011.

earning 80% or less of the regional median income. The moderate income households will likely grow proportionate to their existing concentrations, adding just over 14,000 new households earning between 80% and 120% of the regional median income (Figure 3).

B. Shifts in Household and Public Sector Economics

According to the U.S. Treasury Department, the average American family spends more than $7,600 a year on transportation, more than they spend on either food or out-of-pocket health costs, which is largely attributable to automobile dependence.

Along with the shifts in demographics and generational differences in preferences, consumers are increasingly aware of the cost savings associated with having multiple means of transportation at their disposal and a development pattern that supports walking, biking, and public transit to meet everyday needs. A March 2012 study by the U.S. Treasury Department reports that the "average American family spends more than $7,600 a year on transportation," equating to one out of every seven dollars of income for most households. According to the authors, this is "more than they spend on food and more than twice what they spend on out-of-pocket health care costs" and is attributable in large part to the lack of available alternatives to automobile travel.[6]

Between slow wage growth and higher housing and transportation costs between 1999-2009, CNT estimates that the typical Madison area household had only $124 per month to cover all over increases in the cost of living.

CNT's own work has estimated that Americans living in "location-efficient" neighborhoods (i.e. those where the development pattern enables lower dependence on automobiles for daily needs) were able to save $200 per month in transportation costs over the past decade. **The more a community's development pattern supports growing demand for alternatives to driving, the more likely it is that a household can reduce both the miles it drives and the number of vehicles required to support its needs.** This kind of flexibility can insulate households from economic fluctuations such as the recent sustained increases in gasoline prices that took place during a period of slow wage growth.

For example, median household income in the Madison metropolitan area (Dane, Columbia, and Iowa counties) increased by $685 per month from 1999 to 2009 (U.S. Census 2010). During the same period, however, Census data shows that housing costs increased by $362 per month

[6] U.S. Department of Treasury and the Council of Economic Advisors, "A New Economic Analysis of Infrastructure Investment, March 2012.

and CNT estimates that transportation costs increased by $199 per month due to higher gasoline prices. In other words, after housing and transportation cost inflation, the median-income household had only $124 left to cover all other increases in the cost of living. Of course, as energy prices rise, households with higher incomes have the flexibility to switch to vehicles with improved fuel economy. For many households, however, the growing trend toward compact mix development will provide more housing choices in WTS areas, which could help cut the costs associated with automobile dependence. Cities and regions have an opportunity to meet this demand by establishing a framework for transit-supportive and transit-oriented development.

More efficient use of land combined with improved transit infrastructure also creates the potential to deliver higher returns on private investment and increased stability for public sector finances through various value capture mechanisms. These include property and sales taxes, real estate lease and sales revenues, fare box revenues, parking revenues, joint development, tax increment financing (TIF), and special assessment districts. As noted in the U.S. Department of Treasury report, land value increases in areas within close proximity to transit. While this research focuses primarily on light rail and commuter rail systems, we can expect the recent surge of interest in BRT to result in this research being extended to BRT systems.

The essential concept behind value capture is that private and public sector actors can share in the increased land values that result from joint investment in transit-oriented development, i.e. in the public infrastructure and privately financed residential and commercial developments that comprise TOD. As shown in Figure 4, subsequent investments in the transit network, including linkages to other modes of transportation, add value to each station and hence to each station area.

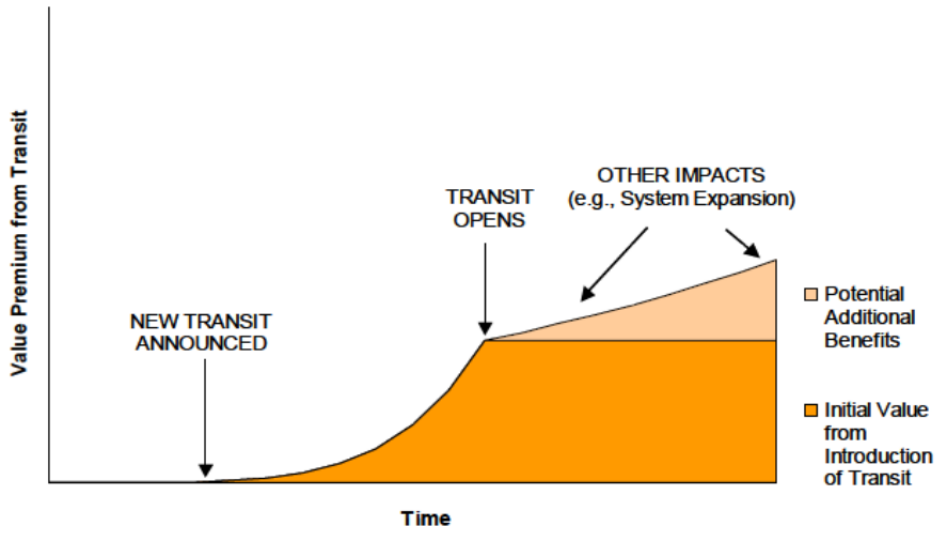
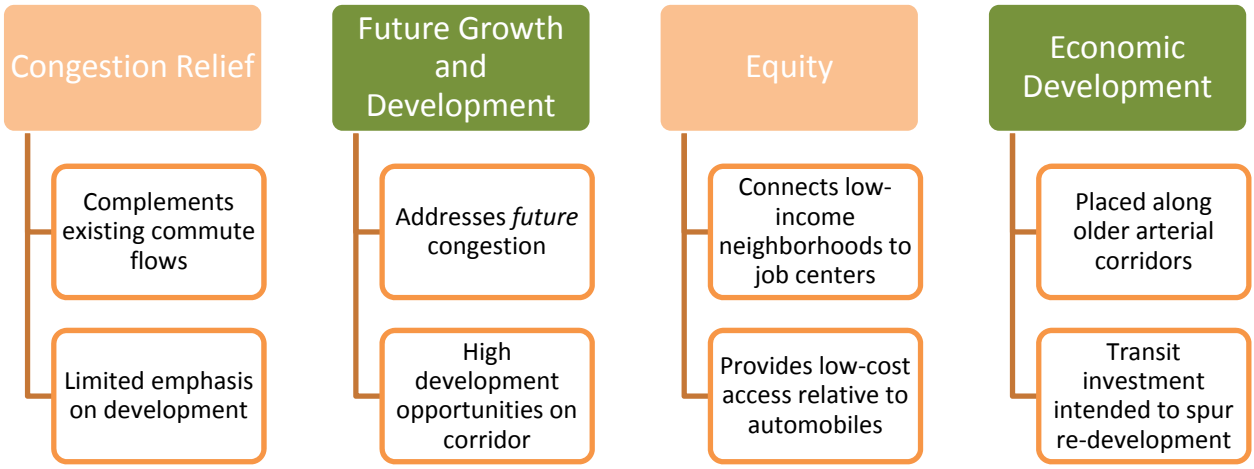


Figure 4: Transit investments result in increased land values within walking distance of stations that can create returns to private investors and generate public revenues; further investments in the transit network add value to all other points in the network. (Source: Strategic Economics)

However, not all stations areas have equal value capture potential, nor should station locations be selected solely on this potential. As shown in Figure 5, transit stations and corridors can serve one or more of four major purposes. The two purposes most aligned with goals of equity and value capture are "future growth and development" and "economic development."

Figure 5: Corridors serve different roles depending on their characteristics. Value capture is best suited to corridors and station areas whose primary purpose is future growth and development and economic development. (Source: Center for Transit Oriented Development)



To maximize the potential of a BRT system and distribute the benefits equitably throughout the community, the network must also balance congestion relief, a traditional focus of transportation planning with value capture and equity to underserved populations. Balancing these purposes is aligned with the performance indicators used in assessing BRT implementation in the region, as discussed further in **Section VI. Options for Closing the Gap.**

C. Relationship Between WTS Development and Bus Rapid Transit

BRT has received extensive interest from planners and policymakers in recent years because of its potentially lower cost compared to other forms of fixed-guideway transit, its potential to attract development at levels comparable to rail service, and growing understanding of the design and operational features necessary to achieve those results. BRT is viewed as a viable transit option not only in traditional urban centers, but also in mid-sized and suburban communities (for example, the EmX BRT system in Eugene, OR, and L.A.'s suburban Orange Line).

Figure 6: Cleveland's Health Line BRT connects two major employment nodes and has the potential to encourage more even mixed-use development between them. (Source: Flickr user TheBlade)

BRT systems currently serve approximately 22 million customers daily in 143 cities worldwide, fourteen of which are in the United States (see text box). The major determinants of the capital cost of a starter system are the target service levels, and design features such as dedicated running way, vehicle type, and streetscaping.[7] **Communities are cautioned to avoid the temptation of reducing costs by cutting key features that differentiate BRT from traditional bus service**, such as dedicated lanes, signal prioritization, smooth and quiet rides, pre-boarding payments, and at-grade passenger boarding, as these features allow BRT to compete with automobiles for speed, convenience, and quality of experience.

Places in the U.S. that currently have at least one BRT line:
Boston, Cleveland, Eugene (OR), Kansas City, Las Vegas, Los Angeles, Miami, New York, Oakland, Orlando, Phoenix, Pittsburgh, Snohomish County (WA), Stockton (CA)
Source: BRTdata.org

[7] U.S. Government Accountability Office, *Bus Rapid Transit: Projects Improve Transit Service and Can Contribute to Economic Development*, GAO Report No. GAO-12-811, July 2012.

There is likewise a growing understanding of the supportive policies necessary to maximize the economic development impacts of BRT in a particular location. For example, the Center for Transit Oriented Development suggests that a compact mix of land uses is necessary to encourage multi-purpose trips and trip-chaining that in turn supports transit ridership. The range of land uses needed to support a suburban neighborhood may include only residential and local-serving retail, while those required to support a successful urban center include office, retail, residential, and entertainment. This project uses a set of development types that were created specifically for the Madison region (see **Section VI. Options for Closing the Gap**), and are informed by this and other widely used frameworks.

Although BRT systems are still a relatively new phenomenon in the U.S., early evidence from U.S. cities is consistent with experiences in Canada and Australia, showing that **the physical features of BRT must convey a sense of permanence to developers, and that transit-supportive land use policies are necessary to ensure a mutually reinforcing development pattern**. Research indicates that there is no single, universally accepted best way to convey permanence and create supportive land-use policies. However, public investments can help assure private investments on the permanency by creating a sense of place through such developments as parks, government offices, and educational institutions.

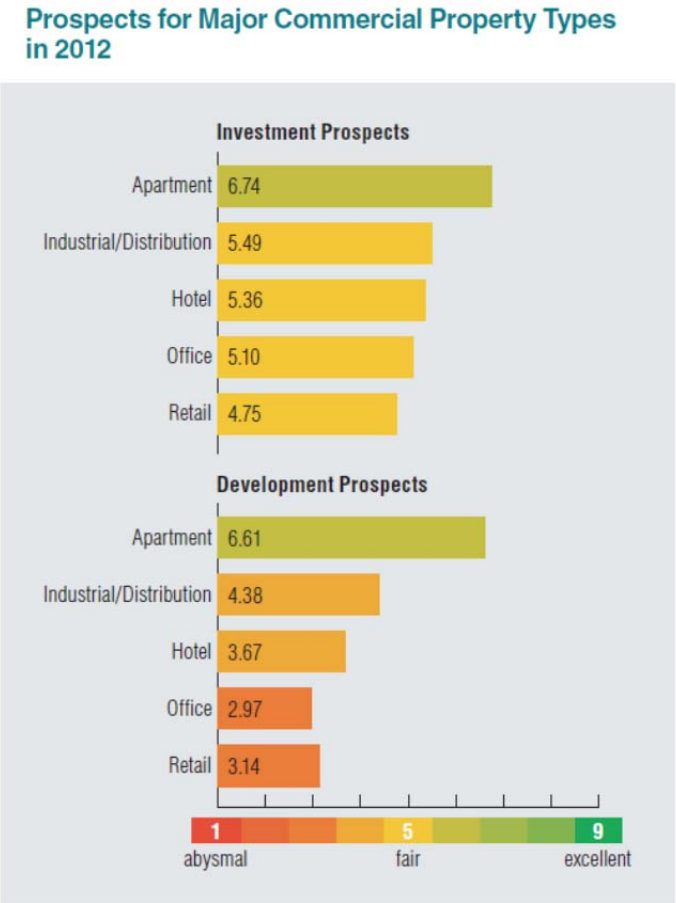


Figure 7: In the down market, investors rate apartments as the best opportunity for both investment and development. (Source: Emerging Trends in Real Estate 2012 Survey, ULI/PWC)

For the purposes of this project, the study team worked with CARPC to identify a broad set of features and policies that would constitute the "WTS encouraged" scenario in Dane County, without being prescriptive about the particular mechanisms. The results of this study also point to several recommendations for the region's approach to supporting WTS development (see **Section IX. Limitations & Opportunities for Meeting WTS Demand in Addition to TOD**).

A key assumption behind this study's approach is that many areas of Dane County can benefit from pursuing WTS development, not just those proposed to receive a BRT station. As the housing crisis and ongoing recovery has led would-be homebuyers and foreclosed owners toward renting and toward smaller properties closer to work, the private sector has responded by investing in more multifamily housing types.[8] Developers and investors expect households to continue to turn to rental housing as long as the single-family market remains soft. Investors see multifamily properties strongly positioned in the economic turnaround with demand for rental from people who are currently doubling up, and from young adults who are living at home with their parents but looking for their own space.

Of the various types of multifamily units, apartment buildings within walking distance of transit are considered to offer the best return on private and public investment (Figure 7). **National investors see these "transit-supportive" developments as lower-risk alternatives that will hold or increase their value.** Infill housing is projected to attract young people seeking financial and housing independence and empty-nesting or retiring parents wanting to downsize their homes. Older suburbs with access to Downtowns through mass transportation have also become appealing investment options. Investment in these housing types during the down market can support existing TOD, or lay the groundwork for it in the future by adding value to existing neighborhoods and broadening developer familiarity with new, more compact product types.

IV. Existing and Potential New Supply: Real Estate Market Trends and Current WTS Development Prospects

To inform the modeling efforts of this project, the project team analyzed recent trends in Dane County's population, household, and employment growth, and patterns in the residential and commercial real estate markets, with a closer focus on areas where BRT routes are envisioned. This section provides a summary of the detailed analysis in Appendix 2.

The review of quantitative data was supplemented by local stakeholder interviews. Details on the interview process, questions, and responses are in Appendix 8.

The analysis led to several broad conclusions:

- There is a **strong market for multi-family rental housing** throughout the county, and for **appropriately priced condominiums** in the city.
- The segmented **residential market** in large parts of Madison **supports a WTS development strategy** of creating new TODs at catalytic locations along the proposed

[8] ULI and PWC 2011.

BRT routes, while creating WTS nodes in farther-out areas of town that could eventually become TOD's.

- More aggressive measures are needed to encourage infill development in the city of Madison, and to attract family households and companies to occupy it.
- Developers may be more inclined than they used to be to pursue WTS development in suburban areas, subsequently supporting the concept of WTS in adjacent suburban and further outlying areas that show significant growth potential.
- Development in Madison and Dane County should look for infill development opportunities in non-location efficient communities that could benefit from transit-supportive design elements.

A. Historical and Recent Real Estate Market Trends

Residential Real Estate

Historical trends show that the population of both Madison and the county are steadily growing slowly, with the county outpacing the city, with extremely fast growth in some smaller communities including Cottage Grove, Sun Prairie, Verona, and Waunakee. From 1980 to 2011, Dane County's villages and third- and fourth-tier cities increased their share of county population from 24.3% to 36.1%. This population transfer helps explain the significant growth of residential developments, new home sales, and new rental units outside of Madison. In particular, **Madison is losing middle- and higher-income families to other jurisdictions, likely driven by a perception of better school districts, jobs, and newer housing outside Madison.** While Madison remains by far the largest employment center, it is also losing companies to other areas in the county that offer attractive commercial options.

Analysis of the county's residential real estate market shows that **the demand for multi-family rental housing is strong and remains an area of opportunity for local developers**. Rental housing makes up the majority of housing units in the City of Madison, with 51% of all households occupying a rented home. The Madison rental market benefits from a high composition of people in the 20 to 34 age range (34.5%). Combined with a large percentage of family households with only two people (48.6%), and a larger percentage of non-family households with two or fewer people (90.7%), the results are a higher propensity for rental units in the market. The strength of Madison's multi-family market can be seen in its 2% vacancy rate (2012), compared to 9.8% nationally and 3.5% to 4% in the Midwest on average. The trend is not just due to the large student population, and is not limited to Madison. Job creation outside the city attracts younger, mobile employees, who seek multi-family rental units both in Downtown Madison and in or near the communities where the jobs are located.

A range of multi-family options is also needed, including those for lower-income families who are priced out of neighborhoods near the University and may be attracted to areas in other parts of town. Since these families stand to benefit most from an effective, low-cost regional transit system, **housing prices at appropriate levels should be located along current and potential transit routes**.

Recent permitting data shows that the market is responding to demand: single-family homes have historically outpaced other building types, now multi-family homes dominate new permitting. Multi-family permits are expected to continue to make up the majority of residential permits issued in Dane County, as demographic and market characteristics show greater demand for multi-family units moving forward.

Two areas of the residential real estate market are creating some drag and will require some time to resolve: condominiums and foreclosures. The market for condominiums contrasts sharply from that of multi-family housing. In Madison, in particular, that market appears oversupplied. However, this appears to reflect over-pricing and poor floor plan design rather than lack of demand for condominiums. A review of foreclosure filings shows high levels remain relative to historical patterns, indicating that the issue of distressed properties in Dane County and the City of Madison may require considerable time to resolve before the market can return to a healthier condition.

Commercial/Retail Real Estate

The county's retail market has remained healthy overall despite larger issues in the national economy. Madison, in particular, has proven that well-located smaller retail spaces in existing neighborhoods can do well and can fill the void not provided by larger retail outlets. One of the more common requests realtors report hearing in Madison from potential homebuyers when looking for the right neighborhood is proximity to grocery stores and/or coffee houses. Many note the need for the neighborhood to be walkable. Though vacancy rates remain relatively healthy, local commercial brokers have warned that deals for new retail leases are very slow now and are taking considerably longer than in the past; as a result, **there is some concern that the city is "over-retailed," especially in the periphery**. Big box retailers such as Target, Woodmans, and Costco continue to expand to other municipalities such as Middleton, Fitchburg, and Verona where both population and household growth maintain a higher pace.

Commuting patterns show that the economic region extends far beyond the borders of Dane County: Madison employers effectively import labor from the county, and Dane County imports from other counties. The dominant employment centers remain in and surrounding the city of Madison, however **the city's dominance in the office space market is increasingly contested**.

While the Madison has seen small additions to office inventory since 2000, there were no new additions during 2011, and only 65,700 square feet of space absorption that year. This is the lowest level of completions and second-lowest level of market absorption over the previous decade. Market absorption Downtown has been more volatile historically than the rest of the market, with the loss of bigger tenants in some years greatly impacting vacancy rates. During 2011 Downtown Madison absorbed 21,300 square feet of space, an improvement over the 8,100 square feet absorbed in 2010. The addition of new office spaces in other municipalities outside of Madison, and the aggressive nature of cities competing for office tenants, will continue to put pressure on the Madison office market. Companies report that a major driver of the decision to locate in the suburbs is the desire to provide surface parking for office tenants.

Industrial Real Estate

Dane County has an expansive market for industrial space driven in large part by the region's focus on research in agriculture, bio-tech, high-tech, manufacturing, and medical industries. The Madison Metropolitan Area is ranked among the 20 metropolitan areas in the U.S. for high-tech industry. The region has invested heavily in higher education and economic development, and the number of business parks built in the region over the past decade shows the level of interest in businesses and institutions in Dane County's future. Business parks are disproportionately located in the cities, however, and are seeing slow absorption rates since the recent recession and ongoing recovery. Also, due to their low-density and large-footprint, **efforts to provide these locations with public transit will need to consider how to solve the "last mile" problem**, e.g. with bike sharing, shuttles, and/or attractive pedestrian linkages.

In contrast, almost all of the region's business incubators are located in Madison, primarily along Highway 151, and enjoy high occupancy rates. One example is the MGE Innovation Center, which is located in the University Research Park has helped more than 70 early stage high tech companies grow since 1989. Their success demonstrates that clustering close to Downtown Madison provides strong opportunities for collaboration and entrepreneurship (Figure 8).

Figure 8: Clustering of business incubators

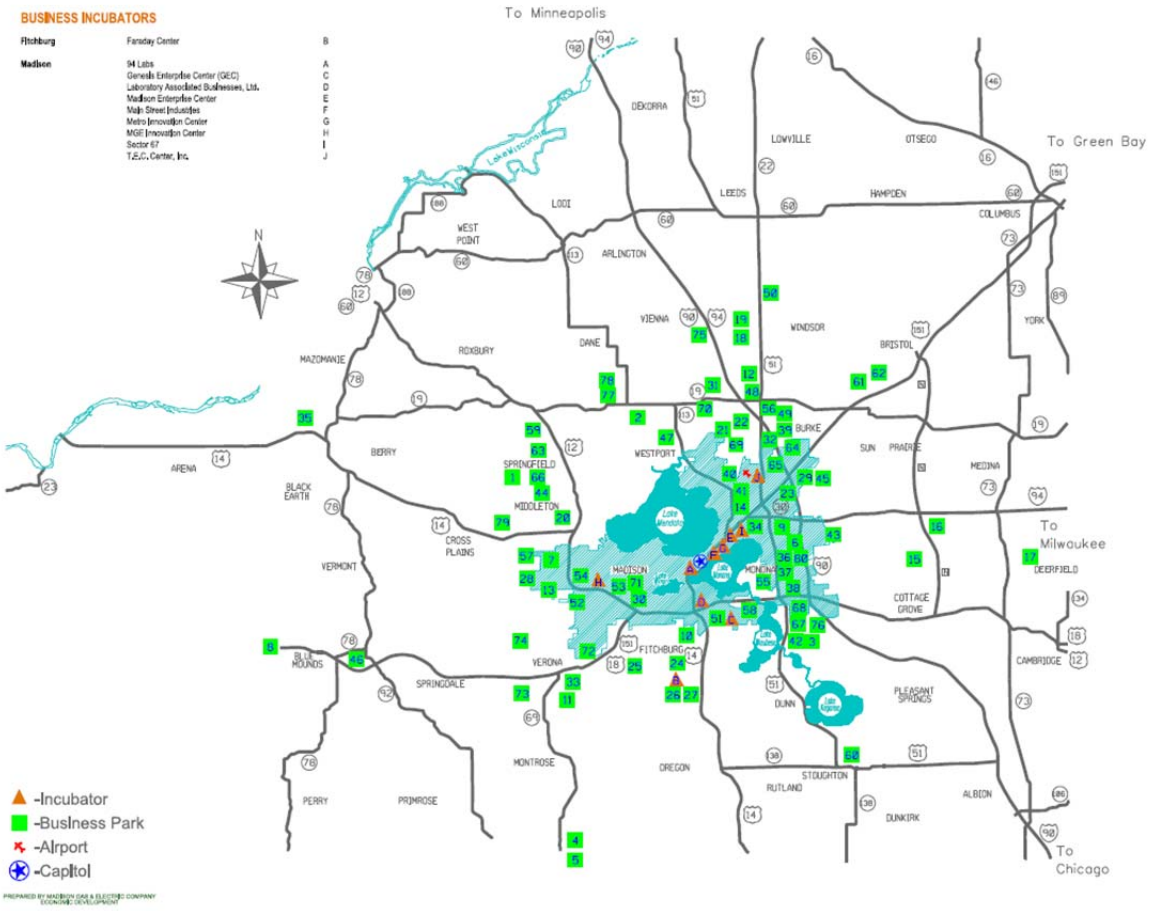


Figure 8: Clustering of business incubators along the Highway 151 corridor in close proximity to Downtown Madison provides strong opportunities for collaboration and entrepreneurship in a vibrant community environment. Source: Madison Gas & Electric Company, Economic Development.

B. Perspectives from Regional Stakeholders

To complement the analysis of historical and recent trends, the project team conducted a series of interviews with selected community stakeholders on the topics of express bus, BRT and the potential for TOD in the City of Madison and greater Dane County markets. This section presents a summary of the thoughts and concerns about express buses, BRT and potential associated TOD as expressed by various community members who actively participate in a variety of well-regarded public, private, and nonprofit organizations. See Appendix 1 & 8 for a list of interviewees, interview questions, and a more detailed summary of interviewee responses.

Overall, interviewees were not strongly advocating the immediate introduction of BRT in Dane County. However, few were against the concept of high capacity transit service in the long run. Most interviewees expressed interest in seeing this project studied further and most were interested in the costs to deliver the service on a passenger basis. Service models developed to accommodate regional growth trends (for example, the express service between Madison and Verona) are instructive in conceptualizing how express bus service and potentially BRT service could serve regional needs over the long term. Some questions regarding project costs were evaluated in a parallel BRT study and offers further discussion of feasibility within the areas to be served. Project feasibility will largely depend on funding mechanisms and costs to establish routes and service.

Interviewees raised several interesting concerns regarding the cap on levies in Dane County and its impact on future funds available for development through Tax Increment Financing (TIF). This appears to raise other issues moving forward given the more prescriptive comments made by local developers. **Experienced local developers appear to already find great difficulty in financing and developing infill sites**; the potential reduction in TIF funding in the City of Madison may reduce interest in redevelopment of primary corridors such as East Washington Avenue by those firms most experienced and qualified to build in these corridors.

Developers are showing increased interest in building more compact neighborhoods with mixed-use components in the continually growing suburban markets, where the complexities of TIF funding are either non-existent or less of a concern. These suburban developments are often in locations where Metro bus service is not available, putting further pressure on existing bus service to expand into areas with potentially lower ridership. **Filling in the corridors with new residents and workplaces along existing bus routes would help fill the capacity of existing bus service while increasing the feasibility for new express bus service in high volume locations.** If one believes the developers are correct in their assertion that higher concentrations of mixed-use development is the key to transit feasibility, and not the other way around, then this is an issue of upmost importance for the City of Madison and Dane County to consider moving forward.

C. Implications for Market Study and Scenario Modeling

The recent trends in Dane County's population and household growth, employment, and residential and commercial real estate markets, combined with the insights derived from interviewing local stakeholders, have several implications for future development patterns, and therefore on the market projection modeling and alternative scenarios modeling components of this project.

First, while the City of Madison has significant opportunities for infill development, it likely needs to **take more aggressive measures to retain and attract family households and companies** to those infill areas, and the developers necessary to create housing and building types those households and companies would inhabit. Equally important, the neighborhoods have to be attractive to families by offering important amenities, such as high quality day care, parks and other safe outdoor play areas. One area with potential to shift incentives in the real estate market would be TIF reform. Conversely, communities outside of the city, while currently successful in attracting growth, face a challenge to absorb growth in ways that preserve community character and quality of life.

Second, the residential market in many City of Madison neighborhoods is segmented between students and non-students, The presence of a large student body presents challenges to housing non-students in areas near the University, and former student homes on the fringe are now being occupied by lower-income families, particularly immigrant families, who are more likely to need better access to transit. Taking into account the proposed BRT routes and stop locations, this supports **a TOD strategy built around creating new TOD nodes at catalytic locations along the proposed BRT routes** and creating WTS nodes in areas that could have BRT service over the longer term as non-student residential development continues to push outward.

Third, there continues to be a significant market for multi-family rental housing throughout the county, and for appropriately priced condominiums in the city. In the city of Madison the multi-family market was historically strong and still is. The multi-family rental market is also growing in other municipalities in Dane County, with the factors driving that growth increasing the presence of reverse intra-suburban commuting patterns. Some of the easier opportunities for developers to create transit-oriented and transit-supportive development may exist in suburban areas due to perceived and real barriers to infill redevelopment in the City of Madison. This supports **a strategy focused on filling in corridors with new residents and workplaces along existing bus routes** to help fill the capacity of existing bus service, while increasing the feasibility for new express bus service or BRT in high volume locations. It also supports the concept of WTS development in adjacent suburban and outlying areas that show significant growth potential.

Finally, the overall slow to moderate rate of growth in most areas of the county indicates that significant shifts in sustainability outcomes cannot rely solely on shaping the development patterns of new growth. The scope of the scenario modeling undertaken in this study focuses on the impacts of absorbing new demand for WTS development. The modeling assesses the impacts both on the underlying built environment of the neighborhoods where growth would

occur, and also on overall measures of sustainability at the county level. While the continued dominance of the city of Madison in terms of population and employment base make it a natural focus for future transit planning, the diffusion of both people and jobs in recent years into outlying areas indicates that any future transit system must be regional in nature, with a clear long term vision for linking outlying areas that is rooted in plans and policies undertaken today.

V. Gap between Supply and Demand: Projected Demand for WTS-Compatible Real Estate Products

This section presents a summary of the projected market demand for housing that could be absorbed in transit-supportive communities in Dane County from 2010 to 2035, along with the market findings for retail and workspace that could be absorbed in WTS areas. A model was used to estimate the demand for new WTS-compatible real estate products that could be located within a half-mile radius of a proposed express bus or BRT station area, or in areas of a half-mile radius that have the underlying characteristics that could support transit service in future Dane County. These projections provide the basis for allocating future demand to specific areas in Dane County in the scenario modeling, presented in **Section B. Alternative Development Scenarios (TOD)**. The approach used to estimate market demand for WTS is provided in Appendix 4.

A. Housing

Dane County's projected housing demand is shifting due to aforementioned major changes in demographics that will continue through the forecast period of 2035. Indications are that a substantial portion of households will demand more housing options in close proximity to transit and within more walkable neighborhoods. **Based on a review of the 58 potential BRT station areas within Dane County, there are strong opportunities to build TODs that would capture a substantial portion of the projected new housing demand through 2035.**

Changes in future housing demand will require a shift away from historical development patterns of single-family homes on lots of greater than one-sixth of an acre. Recent trends show the decline in demand for larger lot housing, and future household projections show a growing decline in total demand for this housing type. The percentage of single-family homes has trended downward since 1970 when single-family housing stock comprised 60% of all housing types. Substantial growth occurred with single-family attached units, including townhouses, seeing a nearly 250% increase since 1990. The largest growth occurred with owner-occupied condominiums including townhouses, duplexes, and multi-family units, with an increase of 334% from 1990 to 2010. These changes in the composition of housing inventory signal the longer term trends that support WTS development in Dane County.

The following table shows a breakdown of housing types in 2010 and projected forward to 2035 under historical development patterns (Figure 9).

Figure 9: Dane County Recent Development Trend Forecast to 2035 by Housing Type

	2010		2035 Recent Development Trends		Change 2010 to 2035	
Housing Type	***Units***	***% of Total***	***Units***	***% of Total***	***Units***	***% of Total***
SFD-Suburban Lot	102,673	47.5%	135,809	48.8%	33,136	53.2%
SFD-Urban Lot	14,001	6.5%	18,211	6.5%	4,210	6.8%
Single-Family Attached	13,818	6.4%	17,118	6.2%	3,300	5.3%
Duplex	12,728	5.9%	14,265	5.1%	1,537	2.5%
Multi 3-9 Units in Bldg.	21,933	10.2%	27,574	9.9%	5,641	9.1%
Multi 10+ Units in Bldg.	48,764	22.6%	62,949	22.6%	14,185	22.8%
Other	2,106	1.0%	2,340	0.8%	234	0.4%
Total	**216,022**	**100%**	**278,265**	**100%**	**62,243**	**100%**

Source: U.S. Census, ESRI, and Peloton Research Partners 2013

New housing development under this scenario results in an increase of 33,136 single-family homes on suburban lots, or a total increase of over 32%. The change in this housing type represents 53.2% of the increase in occupied housing units under this scenario. Single-family urban lots would increase by 4,210, or 30% over 2010. This is considered significantly short of anticipated demand. Single-family attached housing is expected to grow by 24%, adding 3,300 units between 2010 and 2035. This amount is also considered short of projected future demand. Multi-family units are expected to see significant growth with buildings housing ten or more units growing by 29% and adding a total of 14,185 units. The combined total of multi-family unit growth over the 25 years is 19,826 and represents 32% of the total occupied unit growth in this scenario. Given the substantial growth of the Baby Boomer and Millennial Generations in Dane County over the forecast period, the multi-family numbers are expected to fall short of future demand.

Market analysis performed for this study show that demographic and preference shifts will result in significant demand for smaller and multi-family housing units in compact, walkable communities. Figure 10 shows the demand for housing types by 2035 under a Demographic Shift scenario versus that of the Dane County Recent Development Trends scenario.

Figure 10 Dane County in 2010 Compared to DS Scenario in 2035, by Housing Type						
	2010		2035 Demographic Shift Estimates		Change 2010 to 2035	
Housing Type	***Units***	***% of Total***	***Units***	***% of Total***	***Units***	***% of Total***
SFD-Suburban Lot	102,673	47.5%	120,245	43.2%	17,572	28.2%
SFD-Urban Lot	14,001	6.5%	21,239	7.6%	7,238	11.6%
Single-Family Attached	13,818	6.4%	20,967	7.5%	7,150	11.5%
Duplex	12,728	5.9%	14,260	5.1%	1,532	2.5%
Multi 3-9 Units in Bldg.	21,933	10.2%	30,753	11.1%	8,821	14.2%
Multi 10+ Units in Bldg.	48,764	22.6%	68,680	24.7%	19,916	32.0%
Other	2,106	1.0%	2,121	0.8%	15	0.0%
Total	**216,022**	**100%**	**278,265**	**100%**	**62,244**	**100%**

Source: U.S. Census, ESRI, and Peloton Research Partners 2013

Very significant changes in the growth of various housing types occur over the time period of these two scenarios, the most notable being the slower growth in demand for single-family homes on suburban lots, as they decline from 33,136 units demanded under the Recent Trends 2035 scenario to 17,572 under the Demographic Shift (DS) 2035 estimates. In the previous table, single-family suburban demand represented 53.2% of the change in units versus 28.2% under the DS estimates. The smaller single-family lots increase to 11.6% of total unit growth versus only 6.8% under the previous example. Single-family attached units experience a similar change representing 11.5% of total change under the DS estimates versus only 5.3% under the Trends scenario.

Strong demand for multi-family results in the number of units in buildings with 10 or more units growing by 19,916, close to the change in the number of single-family suburban homes. Multi-family units in all buildings with 3 or more units are projected to comprise 46.2% of unit growth between 2010 and 2035 under the DS estimates.

Figure 11: Dane County Recent Trends in 2035 Compared to Demographic Shift Estimates in 2035, by Housing Type						
	2035-Recent Development Trends		2035-Demographic Shift Estimates		(Surplus)/Gap	Surplus/Gap
Housing Type	***Units***	***% of Total***	***Units***	***% of Total***	***Units***	***% of RDT***
SFD-Suburban Lot	135,809	48.8%	120,245	43.2%	*(15,564)*	-11.5
SFD-Urban Lot	18,211	6.5%	21,239	7.6%	3,028	16.6
Single-Family Attached	17,118	6.2%	20,967	7.5%	3,850	22.5
Duplex	14,265	5.1%	14,260	5.1%	*(5)*	0.0
Multi 3-9 Units in Bldg.	27,574	9.9%	30,753	11.1%	3,179	11.5
Multi 10+ Units in Bldg.	62,949	22.6%	68,680	24.7%	5,731	9.1
Other	2,340	0.8%	2,121	0.8%	*(219)*	-9.4
Total	**278,265**	**100%**	**278,265**	**100%**	**-**	**-**
Surplus/Gap					***15,788***	

Source: U.S. Census, ESRI, and Peloton Research Partners 2013

This comparison shows the changes that occur with specific building types between these two scenarios. Single-family suburban homes show a net decline of 15,564 within the Demographic Shift occupied housing stock figures. Single-family detached housing declines from 55.3% of the occupied housing stock to 50.8% under the Demographic Shift estimates. Small-lot single-family detached, single-family attached, and multi-family units all show increases in the Demographic Shift estimates above that of the Recent Trends (Figure 11).

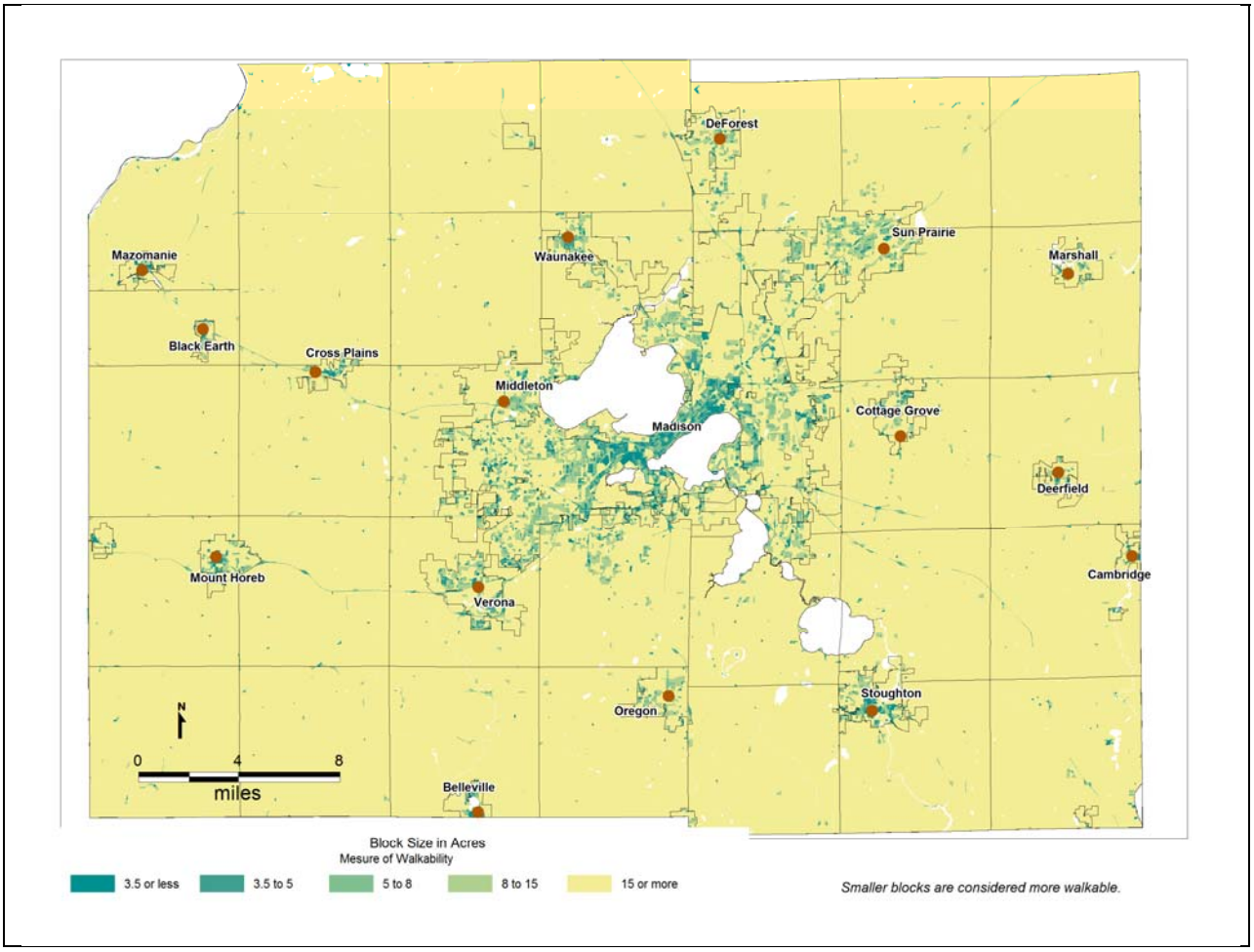
The table above shows the shift in demand for housing types. The table does not indicate where these housing types will be located. Development trends during the past decade have resulted in an estimated 85% of housing units being developed in areas that are not walkable or transit-supportive[9]. If such development trends continue, most of the housing units, both single-family detached (large and small-lot) and attached and multi-family units will be developed in similar areas. As noted above demand estimates indicate a preference for walkable transit-supportive (WTS) areas.

Note that block size is only one measure of walkability. In its simplest terms, the size of a block tells us how easy it is to walk from one point to another, with smaller blocks being more accessible while larger blocks indicate larger, more auto oriented land use patterns . However, a small block without destinations might be walkable though not necessarily inviting to pedestrians. Other aspects of walkability include a mix of uses (multiple types of destinations within walking distance) and the quality of walking experience.

[9] The percentage is based on the total new housing units from 2000 to 2010 compared to the portion that were developed in Census blocks greater than 3.5 acres.

The walkable measure of 3.5 acres is not limited to Downtown Madison. As Figure 12 illustrates, there are many walkable areas throughout Dane County, particularly within the local town centers. These smaller block sizes often correlate with nearby destinations and a pleasant walking experience because all three features were typically part of pre-WWII development patterns.

Figure 12: Census Block Size as a Measure of Walkability in Dane County



The table below shows the housing demand, based on estimated demographic shifts, for Walkable, Transit-Supportive (WTS) development (Figure 13).

Figure 13: Demand for Walkable, Transit-Supportive Housing Types				
	2035-WTS Scenario		Change 2010 to 2035	
Housing Type	***Units***	***% of Total***	***Units***	***% of Total***
Conventional Suburban				
SFD-Suburban Lot	120,245	43.2%	17,572	28.2%
Walkable Transit-Supportive				
SFD-Urban Lot	21,239	7.6%	7,238	11.6%
Single-Family Attached	20,967	7.5%	7,150	11.5%
Duplex	14,260	5.1%	1,532	2.5%
Multi 3-9 Units in Bldg.	30,753	11.1%	8,821	14.2%
Multi 10+ Units in Bldg.	68,680	24.7%	19,916	32.0%
Total WTS Demand			*44,657*	*71.8%*
Other	2,121	0.8%	15	0.0%
Total	**278,265**	**100%**	**62,244**	**100%**

Source: U.S. Census, ESRI, and Peloton Research Partners 2013

Therefore total demand for housing in WTS areas estimated at 44,657, or approximately 72% of 62,244. Realizing not everyone will choose to live in a WTS community type, the 44,657 is scaled back 20% to account for WTS supportive housing that might be built outside of a WTS community for a potential shift of 35,726 WTS housing units. This estimate is based on market analysis that indicates that preferences for smaller single-family and multi-family housing, combined with demographic and preference shifts, correspond to demand for WTS.

A portion of the estimated WTS demand can be met by housing developed in the area around proposed bus rapid transit stations (BRT shed). This report focuses analysis on the portion of WTS demand that can be met in the BRT shed. **The total number of WTS-compatible housing in 2035 under the WTS Scenario is 35,726 units. This analysis allocated 15,204 of these housing units to the BRT shed, as well as 12,161 households to small downtowns, or Town Centers as they are referred to in this study, throughout Dane County. However, further research is needed to identify opportunities for increasing WTS development in the Town Centers, as well as Dane County as whole** (see section VII. WTS Development Potential in Dane County).

These estimates are used as the basis for modeling three scenarios to estimate the growth of WTS-compatible housing that may be absorbed in WTS communities in Dane County.

Housing tenure was also considered in this study and is assumed to stay the same as a percentage for each housing type. This was due to the shifts in housing types offsetting any significant changes in overall tenure percentages (Figure 14). In other words, while overall ownership tenure is not expected to change dramatically, the number of owned single-family is expected to be replaced by a higher percentage of condo and attached housing type ownership.

Figure 14: 2010 Housing Tenure in Dane County

	% Owner-Occupied	% Renter-Occupied
SFD Large-Lot	93%	7%
SFD Small-Lot	93%	7%
Multi & Attached	21%	79%

Source: U.S. Census, ESRI, and Peloton Research Partners 2013

B. Retail Space

Based on calculations for potential retail spending, **new household growth in Dane County is projected to provide support for approximately 15.2 million square feet to 20.8 million square feet of WTS-compatible retail space from 2010 to 2035.** A portion of this spending is attributed to daily visitors in the area, accounting for an estimated 2.6 million square feet of retail in 2010 and a total of 3.4 million in 2035[10]. Additional induced demand deriving from existing residents was calculated and added to total space demand. Induced demand was calculated as 5% of existing total household spending adjusted for WTS-appropriate retail. A conservative capture rate of existing household spending was used to not overestimate the demand in WTS communities.

The change in retail space demand determined for 5-year increments was further filtered by capture rates of 10%, 20%, and 30% for the county-level analysis. These figures reflect low to high expected capture rates of annual space demand into WTS areas. The numbers are considered very conservative at the 10% capture rate.

[10] The change per period in retail space demand was calculated for 5-year increments over the forecast period.

The table below provides the square footage calculations and the potential capture of retail space in WTS areas from 2010 to 2035 (Figure 15).

Figure 15: Change in Square Foot Demand Per 5 Year Interval in Dane County

	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035
Dane County Total Square Feet	1,532,709	684,689	678,789	673,599	976,545
Adjusted for Vacancy	1,609,345	718,923	712,728	707,278	1,025,372
Select Visitor Spending	175,129	175,129	175,129	175,129	175,129
Induced Local Spending	662,565	698,666	734,767	770,868	806,969
Total Retail Square Feet	1,784,474	894,053	887,858	882,408	1,200,502
WTS Capture Rates Scenarios – Dane County					
Annualized Capture Rate					
10%	35,689	17,881	17,757	17,648	24,010
20%	71,379	35,762	35,514	35,296	48,020
30%	107,068	53,643	53,271	52,944	72,030
Annualized Capture with Induced Demand					
10%	48,941	31,854	32,452	33,066	40,129
20%	97,882	63,709	64,905	66,131	80,299
30%	146,822	95,563	97,357	99,197	120,448

Source: Peloton Research; ESRI 2012; ULI; and BOMA. Note that the significant decline 2010 to 2015 and rise in 2030 to 2035 are due to "unsmoothed" data in the model and do not reflect projected changes in market conditions.

Based on these findings the annual potential for retail space absorption in WTS areas would range between 35,689 and 72,030 square feet from 2010 to 2035, given capture rates that vary from 10% to 30%. Total WTS-appropriate retail demand, including induced demand, ranges from 48,941 square feet at a 10% capture rate in 2010 to 120,448 square feet at a 30% capture rate in 2035.

C. Workspace

Workspace is a very important component of WTS areas, especially for TODs. The work commute trip is the primary trip of transit users during the work week, and TODs that provide workspace have higher levels of success. Dane County has a strong job market with good long-term prospects for future job growth. **A variety of office and commercial spaces have the potential to locate along the transit corridors and potential future transit corridors of the City of Madison and Dane County by 2035.**

Calculations for future WTS compatible workspace demand are based on the assumption that a variety of office and commercial space will be located in WTS areas to meet future demand from new job growth and induced demand from existing companies in the market (Figure 16).

Induced demand is the capture of existing space demand into WTS areas due to their availability, such as in the form of BRT station areas. The calculation for existing space assumes 20% of existing Class A to C office space will turnover in the market every 5 years. A 5% annual increase in the amount of space turning over is assumed for each 5-year period. Additionally, a 90% occupancy factor is assumed for the induced space.

The following table shows the calculations for new work space demand in square feet for Dane County based on changes in the 5-year periods from 2010 to 2035. The large increase in 2035 reflects an unsmoothed data point in the base job forecasts. The total space demand over this forecast period will be accurate despite the last period jump.

The total annualized demand for new workspace ranges from 827,137 square feet for the period 2010 to 2015 up to 1.3 million square feet for the period 2030 to 2035. These figures are further filtered in the table below to show the portion of total demand that can be reasonably projected for WTS areas. The rates of 10%, 20%, and 30% are again applied as sample capture rates of workspace demand (in 5-year periods and annual estimates) as a basis for the iterative allocation process in the alternative scenario modeling.

Figure 16: Annualized Square Feet of Workspace Demand WTS Capture Rates Scenarios across 5 year study period – Dane County					
Capture Rate	2010-2015	2015-2020	2020-2025	2025-2030	2030-2035
Total Dane New Work Space Demand	1,795,686	1,795,691	1,795,696	1,795,701	2,431,054
Annualized New Demand	359,137	359,138	359,139	359,140	486,211
Total Existing Potential Demand	2,340,000	2,687,849	3,087,407	3,546,360	4,073,539
Annualized Induced Space Demand	468,000	537,570	617,481	709,272	814,708
Total of New/Induced Space Demand	4,135,686	4,483,540	4,883,103	5,342,061	6,504,593
Annualized Total of New and Induced Space Demand	827,137	896,708	976,620	1,068,412	1,300,919
Annualized Capture Rates for WTS (based on New & Induced Demand)					
10%	82,714	89,671	97,662	106,841	130,092
20%	165,427	179,342	195,324	213,682	260,184
30%	248,141	269,012	292,986	320,524	390,276

Based on these estimates, the demand for WTS compatible workspace will range from 82,714 square feet to 390,276 square feet annually from 2010 to 2035 depending upon the level of capture and the specific five-year period.

VI. Options for Closing the Gap: Alternative Development Scenarios

A. Regional Development Types

The scenario modeling process was designed to show how the demand projections from the previous section could be accommodated within current and future WTS areas. To facilitate county-wide modeling at the level of TODs, typically defined as the half-mile radius around a

station area, and WTS areas that might evolve into TODs, the project team created a set of development types that characterize the region's development patterns. The development types serve as a more digestible foundation with which to model alternative scenarios, both with and without the introduction of BRT. These regional development types were formulated using maps, photos, and data for all proposed station areas along the proposed BRT routes, as of Winter 2012, and for towns outside of the City of Madison that currently are not proposed to have a BRT station that have a walkable, relatively dense core and a concentration of commercial activity.

Figure 17: Regional Development Types

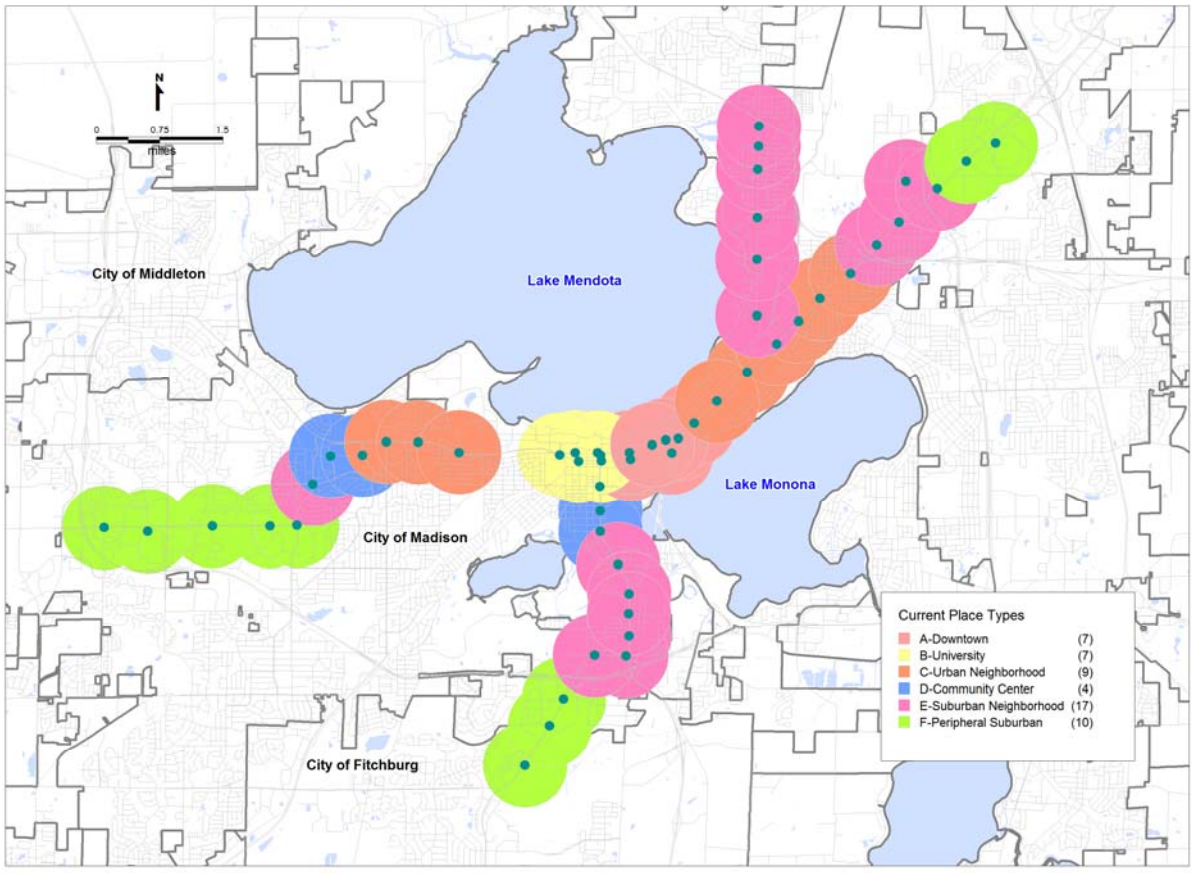


Figure 17: A set of regional development types can be used to characterize the station areas in the proposed BRT system, which in turn helps enable the method of alternative development scenarios used in this analysis.

The development types, explained in greater detail below, include (Figure 17):

- **Downtown** (Regional Urban Core) **–** high density and a high mix of uses in a compact, highly connective street network, situated within the employment and cultural center of the region
- **University –** proximity to, and inclusion of, the University of Wisconsin; high residential density and high number of jobs, with low VMT, but fewer jobs than Regional Urban Core

- **Urban Neighborhood –** predominantly single-family detached residential and small-scale multi-family residential uses served by a single commercial corridor; urban in form, but relatively few jobs compared to the Regional Urban Core
- **Community Center –** at the edge of the urban context, with small, higher-intensity employment or commercial zones surrounded by low-density residential uses; high average VMT
- **Suburban Neighborhood –** low-density residential served by occasional commercial; among the lowest residential density, and the lowest jobs density, with a high average VMT
- **Peripheral Suburban –** highly segregated uses and very low network connectivity; highest average VMT, lowest density residential, but has more jobs than the Suburban Neighborhood place type because of the presence of large format retailers and office parks
- **Town Center (Main Street Community) –** at the center of cities and villages located just outside the city of Madison; varying density along a main street, transitioning into single-family detached residential (To see map of Town Center's see figures 25 & 26).

Appendix 6 summarizes the qualitative and quantitative characteristics of all development types, along with visual depictions of their potential for transformation as they absorb demand for WTS development.

The data for each development type other than the Main Street Communities reflects the average of all members of that category as represented in the "transit shed" formed by the proposed BRT system. For the Main Street Communities, block-level data sources were used to select representative places that met certain thresholds of residential density and employment activity.

System-wide, the introduction of transit into the region will allow the benefits and efficiencies of compact mixed-use development to extend further from the urban core than market forces might otherwise permit, helping to knit together the region in a more coherent form.

The proposed BRT hosts many examples of each development type, with the exception of Main Street Communities, found primarily in small downtowns outside of the transit shed. As shown above, an agglomeration of proposed BRT stations in and near Downtown Madison creates a grouping of transit zones that can be characterized as a Regional Urban Core (peach). The University development type (yellow) is concentrated to the west and southwest of this area. Neighborhoods that are Urban in nature are located farther west of the University of Wisconsin and northeast of the Downtown along the Isthmus. Two nodes of Community Centers are

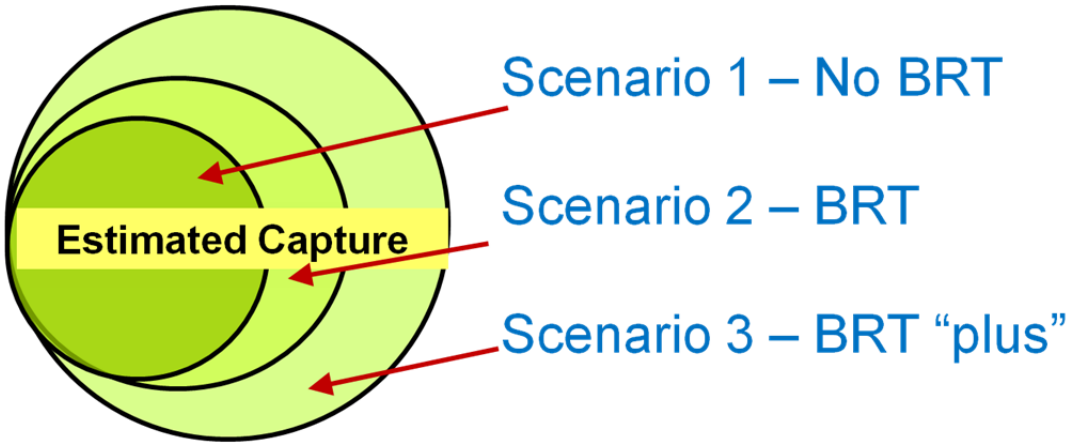
present (blue), providing a transition zone of mixed commercial activity serving both the Urban neighborhoods that are closer to Downtown and the Suburban (pink) and Peripheral Suburban (green) neighborhoods located farther out. All station areas overlap with that of adjacent stops; the gap to the west of the University of Wisconsin is a proposed station area that was not included in the analysis due to right-of-way and topography issues that suggest it may represent a longer-term opportunity for a BRT stop.

In response to the presence of BRT and a supportive regulatory framework, and based on the principles of compact, walkable mixed-use development, these development types will likely evolve over time into more complex, higher-performing community nodes offering a broad array of cultural, commercial, and recreational amenities, housing types, employment opportunities, and transportation choice. How these principles might be expressed as a practical matter will, of course, vary from one development type to another on the basis of a number of factors, including both market considerations and physical constraints and opportunities.

B. Alternative Development Scenarios (TOD)

To evaluate where projected demand for WTS development might be met in Dane County, the project team modeled the following three scenarios:

- **Scenario 1 – "No BRT":** Projected demographic shifts shape preferences in the residential and commercial real estate markets toward walkable, transit-supportive and transit-oriented development patterns, however transit service will be limited to modest service level increases proportionate to increases in population density.
- **Scenario 2 – "BRT":** Projected demographic shifts take place in the context of a BRT system being constructed in the Madison region, with the first route opening in 2015.
- **Scenario 3 – "BRT-plus":** This is the "encouraged WTS" scenario. Projected shifts in preferences for WTS development occur when the BRT system is built, and appropriate land-use policies and incentives to support the construction, rehabilitation, and redevelopment of property that allows for compact, walkable neighborhoods to evolve, in particular around key BRT stations are put in place.



Based on the project team's background research into existing and future potential means of promoting WTS with TOD in the region, and in conjunction with CARPC, Scenario 3 was further defined as follows:

- Dane County or the City of Madison successfully pursue one or more mechanisms to support TOD infrastructure financing[11]
- Business credits and other incentives are created to attract employers to the BRT shed (e.g. significant tax incentives for reuse)
- Policies and incentives for affordable housing, including workforce housing, ensure a mix of price points in station areas, increase the tie between new residents and the BRT system
- TOD Overlays are implemented in key station areas in the City of Madison via station area plans
- TIF reform in the City of Madison successfully remove perceived and real barriers to development, making more projects economically feasible at a wider range of price points

For each scenario, an estimate was calculated of the share of the demand for transit-supportive residential building types and commercial space that would be attracted to, and could be met in, the BRT shed (Figure 18). Through an iterative process between the market analysis (Section V) and the modeling effort to accommodate demand within the transit shed, the following levels of growth are estimated to occur within the transit shed over the time horizon:

[11] See, for example, http://www.epa.gov/smartgrowth/pdf/2013-0122-TOD-infrastructure-financing-report.pdf

Figure 18: Projected Growth in BRT Transit Shed & Town Centers			
Household Allocation			
	BRT Shed	**Town Center**	**Total**
2010 Current Total	44,544	16,529	61,073
Household Growth over 2010 Current			
2035 Baseline	6,935	5,547	12,482
Scenario 1: No BRT	9,590	7,671	17,261
Scenario 2: BRT	11,940	9,550	21,490
Scenario 3: BRT "plus"	15,204	12,161	27,365
Job Allocation			
	BRT Shed	**Town Center**	**Total**
2010 Total	104,459	14,462	118,921
Job Growth over 2010 Current			
2035 Baseline	10,928	5,926	16,854
Scenario 1: No BRT	11,903	6,454	18,357
Scenario 2: BRT	13,439	7,287	20,726
Scenario 3: BRT- "plus"	16,057	8,707	24,764
Population Allocation			
	BRT Shed	**Town Center**	**Total**
2010 Total	100,776	41,186	141,962
Population Growth over 2010 Current			
2035 Baseline	11,376	14,530	25,906
Scenario 1: No BRT	21,696	27,712	49,408
Scenario 2: BRT	27,013	34,503	61,516
Scenario 3: BRT- "plus"	34,397	43,935	78,332

Note that the baseline values shown here are based on the MPO's projections, adjusted for underlying land use to enable comparisons across scenarios to calculate net residential densities. The baseline scenario analysis is in Appendix 7. Summary values are shown in this section as comparison.

CNT created an algorithm to show how growth under each scenario can occur in the BRT shed, taking into account high-opportunity redevelopment opportunities (2012 CARPC infill analysis), existing and aspirational land use mixes, existing and potential residential and commercial

densities, and the preservation of a mix of development types to accommodate a range of preferences.

As noted in the description of development types, absorbing growth can change the categorization of a station area over time. Each iteration of the algorithm re-assigned development types based on the associated changes in underlying data. Each run was evaluated by the project team to ground-truth the potential outcome based on market trends and community perspectives, with subsequent refinements to the model as needed. For example, large areas characterized as University development were initially treated as available for development and job concentration was viewed the same as Regional Urban Core. Consequently, early runs of the algorithm showed dense urban core extending into campus. This was resolved by adding upper-bound limits for University station areas, such that they can accommodate some growth while still remaining University in character.

The maps on the following pages show the modeling exercise outcomes. Two maps are included for reference: the first shows the names and locations of all station areas included in the modeling process; and the second showing the development types as reflected in 2010, introduced above, for comparison (Figures 19, 20).

Scenario 1 reflects net new growth of approximately 9,600 households and commercial space to accommodate 11,900 net new jobs (Figure 18: Scenario 1: No BRT over Current 2010). This scenario assumes marginal increases in transit service and increasing consumer preferences for walkable, transit-supportive communities. Projected household growth in the study area between 2010-2035 is 22% under this scenario, compared to 16% growth projected by the MPO. On the employment side, Scenario 1 envisions 11% growth from 2010, compared to 10% projected by the MPO. The impact of this growth on the form and function of individual station areas can be observed by comparing the second and third maps below (Figure 21).

The University (yellow) and Regional Urban Core (peach) areas experience some growth but retain their role and development characteristics. Significant residential growth along Park Street could take shape in the form of Urban neighborhoods in places that are currently more Suburban in nature. An intensification of development toward Fitchburg, primarily residential in nature, is sufficient to shift these areas from a Peripheral Suburban development pattern to the Suburban category. Going west from the University, new commercial activity in areas with abundant infill capacity intensifies the development pattern into several Community Center nodes, attracting residential growth into adjacent areas that consequently intensify into Suburban neighborhoods. Similarly, heading northeast from the Downtown core, significant infill capacity is modeled as evolving into two Community Center nodes surrounded by and interspersed with Urban neighborhoods. In the near term under this scenario, it is envisioned that the far eastern and northern corridors in the study area would remain largely Suburban

and Peripheral Suburban in nature, despite also having attracted some new residential and commercial development.

Figure 19: Reference Map of BRTS Stops

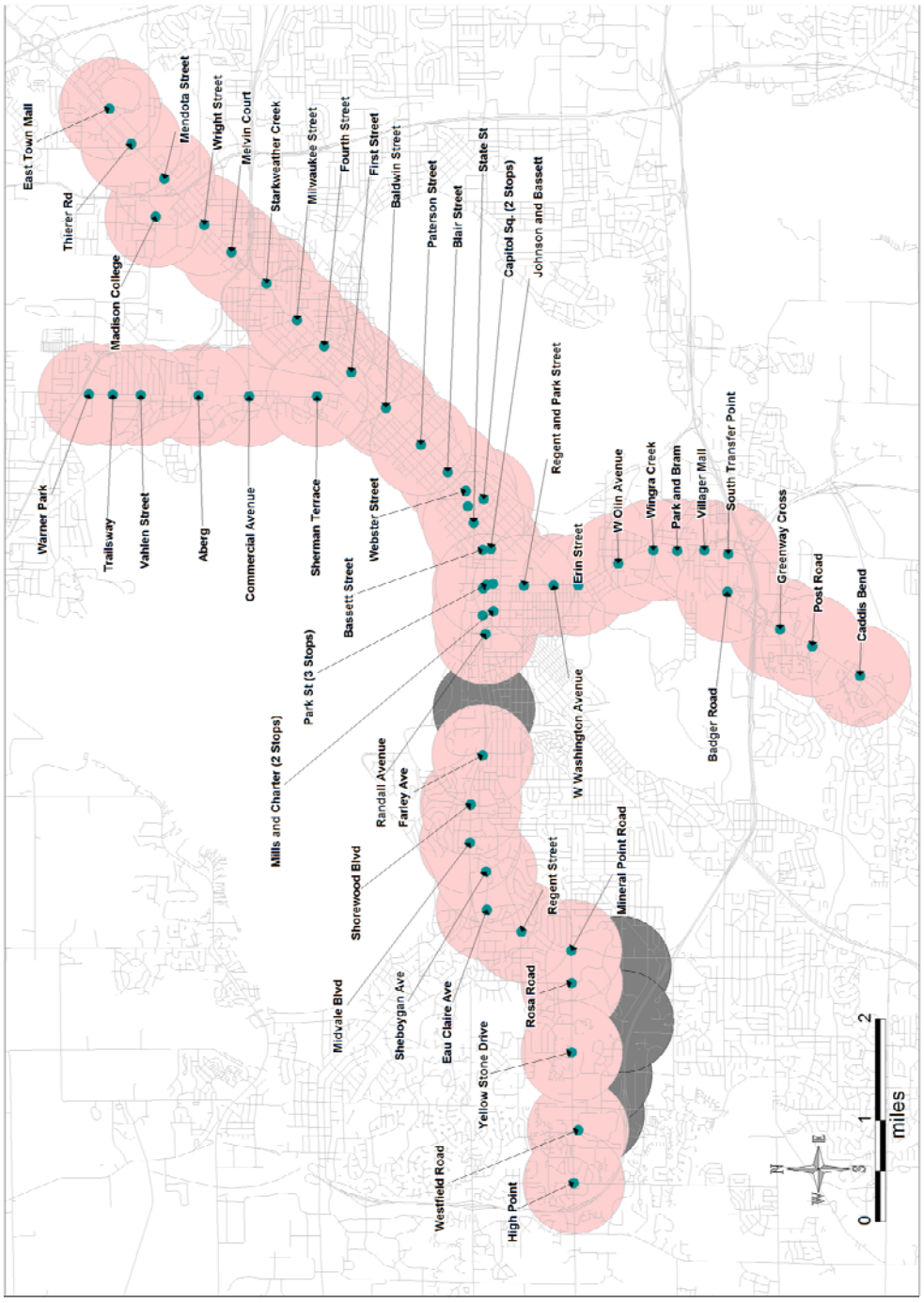


Figure 19: Proposed BRT Stations. *(Note: Shown in Grey on Map - one station to the west of the university was omitted on the recommendation of the MATPB, as was an alternative alignment of the western BRT route.*

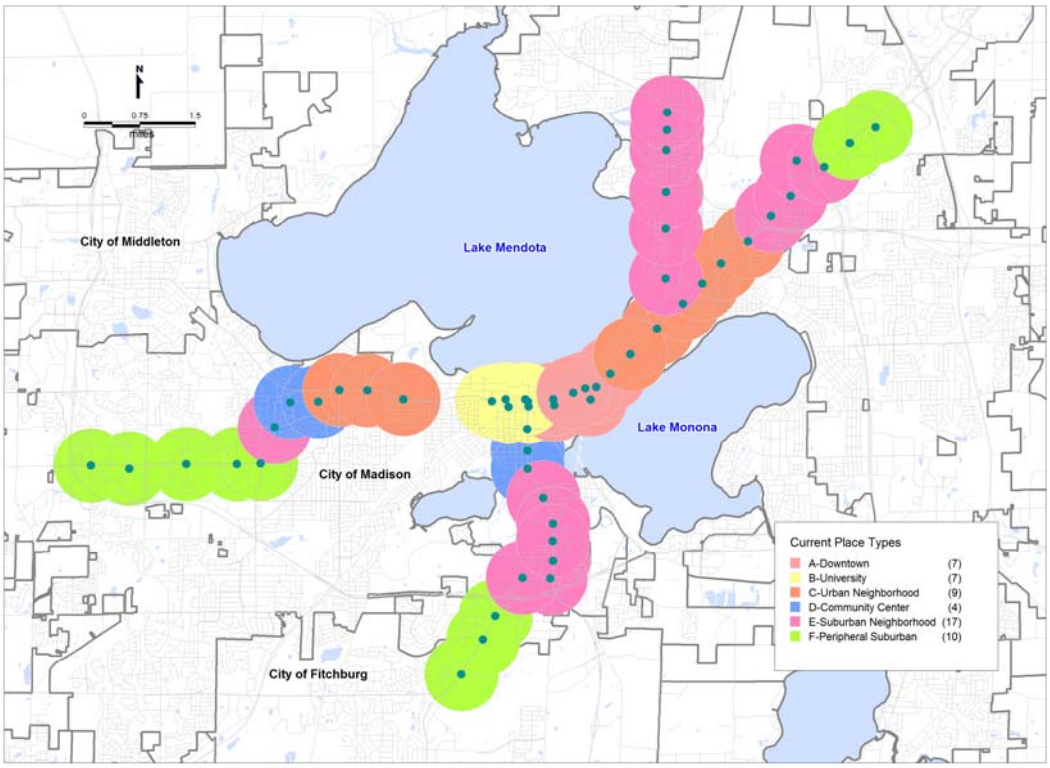


Figure 20: Current Place Type Assignment

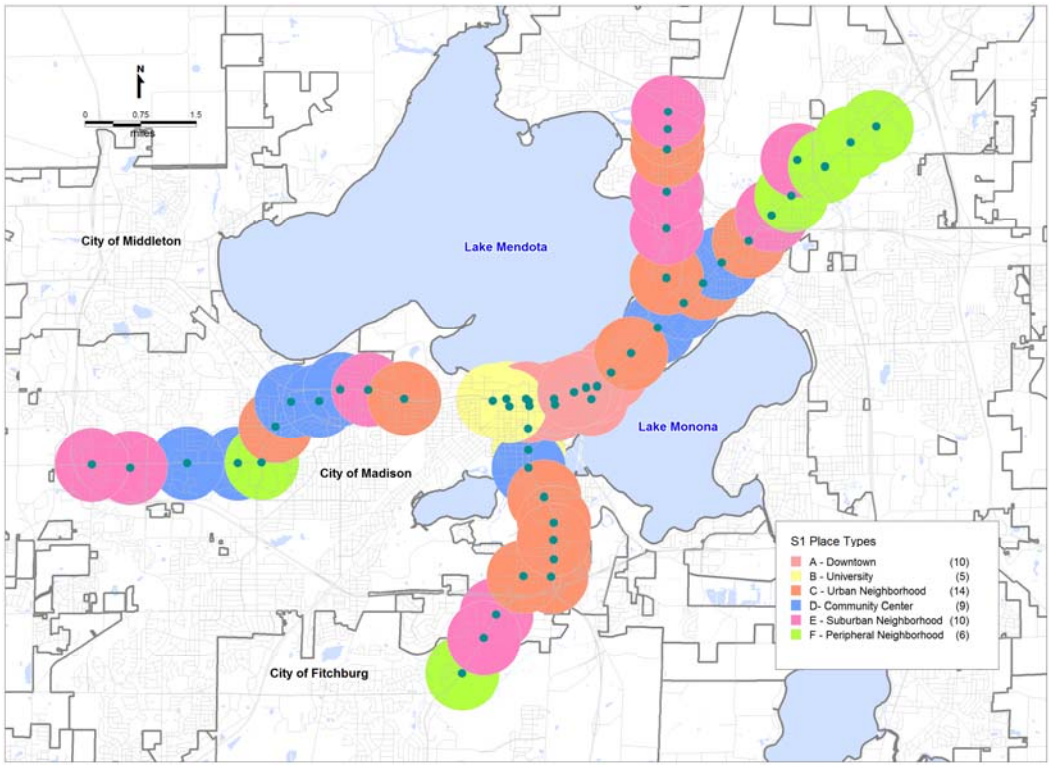


Figure 21: Scenario 1 Place Type Assignment

Scenario 2 includes the proposed BRT system and depicts a potential with net new growth of approximately 11,900 households from 2010-2035, along with commercial space accommodating approximately 13,400 net new jobs (Figure 18: Scenario 2: BRT over Current 2010). These projected values represent 27% growth in households and 13% growth in employment in the study area from 2010-2035, compared to 16% and 10%, respectively, as projected by the MPO (Figure 22).

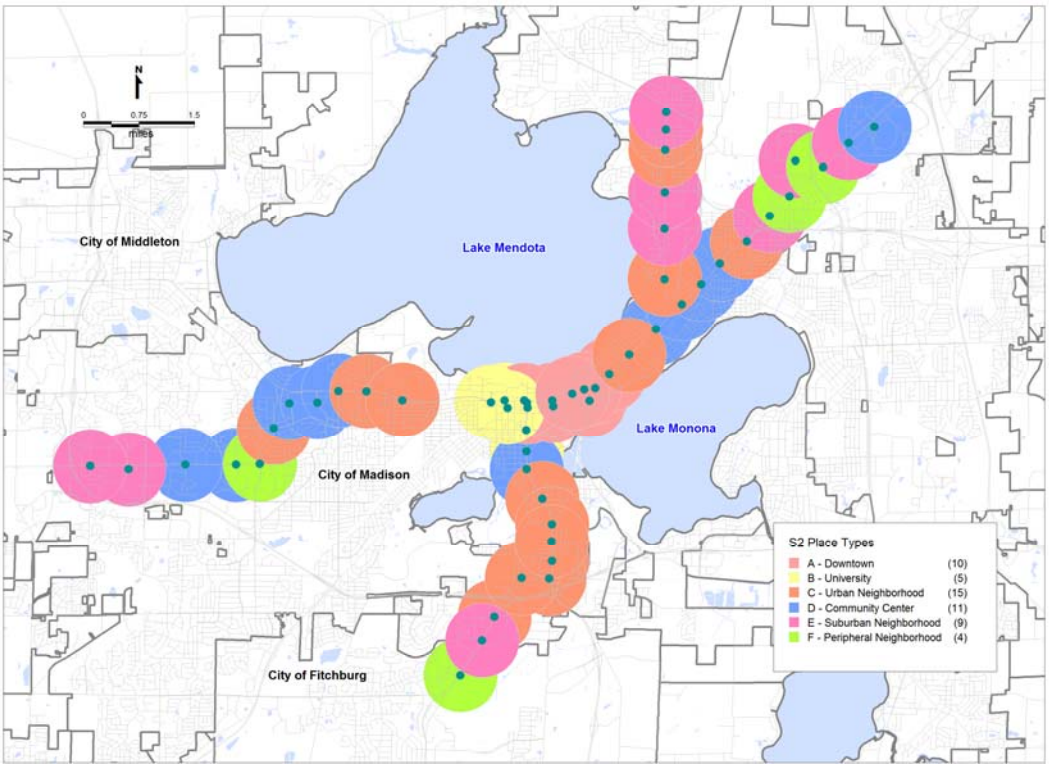


Figure 22: Scenario 2 Place Type Assignment

Scenario 2, with the introduction of BRT we see greater commercial growth in the near east side, to the point that the characteristics of a Community Center can increasingly be seen throughout one large node of adjacent station areas. Significantly, under this scenario this modeling exercise envisions greater potential for redeveloping and intensifying the commercial area at and around East Towne Mall, the end station of the eastern route. The development potential along the northern and southern routes of the BRT system also increase under Scenario 2, the character of the station areas remains largely as envisioned under Scenario 1 (i.e. predominantly Urban neighborhoods along the southern route and a mix of Urban and Suburban neighborhoods along the northern route). Heading west of the University, additional residential development adjacent to the Community Centers creates the opportunity for the area around one station to transition into an Urban neighborhood under Scenario 2, while

under Scenario 1 it was envisioned as Suburban. Station areas that "toggle" in this way tend to be on the margins of the statistical thresholds that define two different development types.

Scenario 3 shows potential net new growth in the BRT shed of approximately 15,200 households and commercial space to accommodate 16,000 net new jobs (Figure 18: Scenario 3: BRT "plus" over Current 2010). In this TOD BRT "plus" scenario, projected shifts take place in preferences for WTS, the BRT system is built, and appropriate land use policies and incentives are put in place to support developing TODs around key BRT stations. These projected values represent 34% growth in households and 15% growth in employment in the study area from 2010-2035, compared to 16% and 10%, respectively, as projected by the MPO. Under this modeled scenario, more growth is channeled into areas abutting the eastern and southern BRT routes, while the western and northern routes largely retain the form and function modeled under Scenario 2. On the near east side, residential infill development is more uniform leading eastward toward the mall, while adjacent station areas offer a range of development types to accommodate variation in consumer preferences (Figure 23).

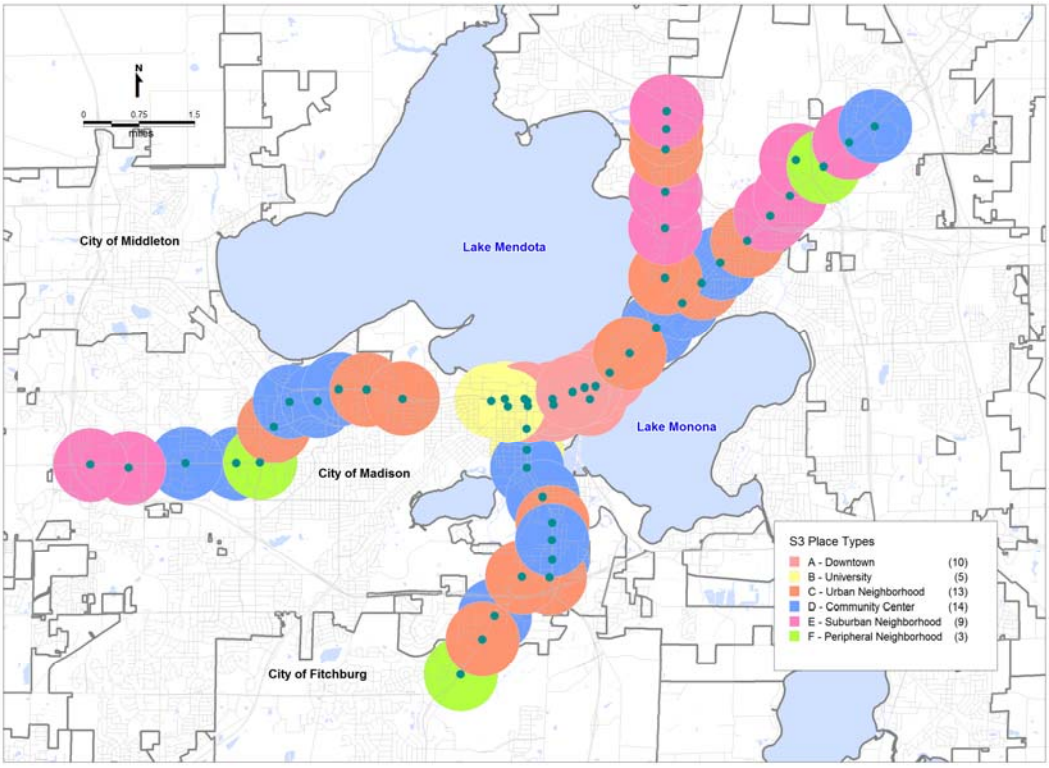


Figure 23: Scenario 3 Place Type Assignment

To the south, corridors linking the City of Madison to the City of Fitchburg could accommodate significant growth, slowly shifting the character of the areas immediately surrounding BRT

station areas into a mix of Urban neighborhoods and Community Centers, with room to grow around the BRT southern terminus.

VII: WTS Development Potential in Dane County

A. Meeting Unmet WTS Demand

This analysis evaluates how the results of the Scenario 3 (S3) modeling results will impact the transit supportiveness of the underlying built environment (See Appendices 5 and 7 for a discussion of transit supportiveness as a measure and how it is assessed for current and future scenarios, respectively.)

Characterizing development pattern's level of transit supportiveness provides a quantitative perspective and a framework for understanding how projected demographic changes could shape the region. **Transit supportive block groups are based on the Location Efficiency model outputs, including Vehicle Miles Traveled (VMT), Auto Ownership, and Transit Journey to Work Use.** Given the role that transportation choice plays in shaping a neighborhood the Location Efficiency outputs serve as a good measure of urban form (see Appendix 5b for specifics on categorization method).

Neighborhoods with lower household VMT, lower auto ownership, and higher transit use are typically more pedestrian oriented and offer greater transportation options

The following maps and tables (Figures 25-28) are based on the analysis of the household allocation totals and measured using the Location Efficiency H+T outputs and how those would impact transit supportiveness. Looking at the allocation of households this way offers an alternate way of looking at the change that could occur throughout Dane County under the 2035 BRT "plus" Incentives scenario. Put another way, **where the allocation dealt with the distribution of households – this anlayis looks at the impact those households could have on the Transit Supoortive qualities of a neighborhood.** The figures presented build on the household allocation and while the geographies are similar – the BRT shed and the High and Moderate Transit Supportive areas are not directly comparable. This is in part given the moderate Transit Supportive areas extend beyond the BRT Shed to town centers, such as Middleton. As a result, the total shift of houseolds noted below does does not directly compare with the total household allocation to the BRT Shed listed in Figure 18.

The following maps show how WTS households and jobs could shift from 2010 to 2035 under the BRT "plus" incentives development assumptions. The maps show that the WTS nature

within Dane county extends beyond the proposed BRT alignment and grows considerably from 2010 to 2035 (See Figures 25 & 26). The dark brown color on the map is highly walkable, transit supportive, and has multiple transit connections. The light brown color on the map has less concentrated WTS qualities. The dark yellow on the map has limited WTS traits with limited or no transit service. The dark and light green areas on the map are non-transit supportive.

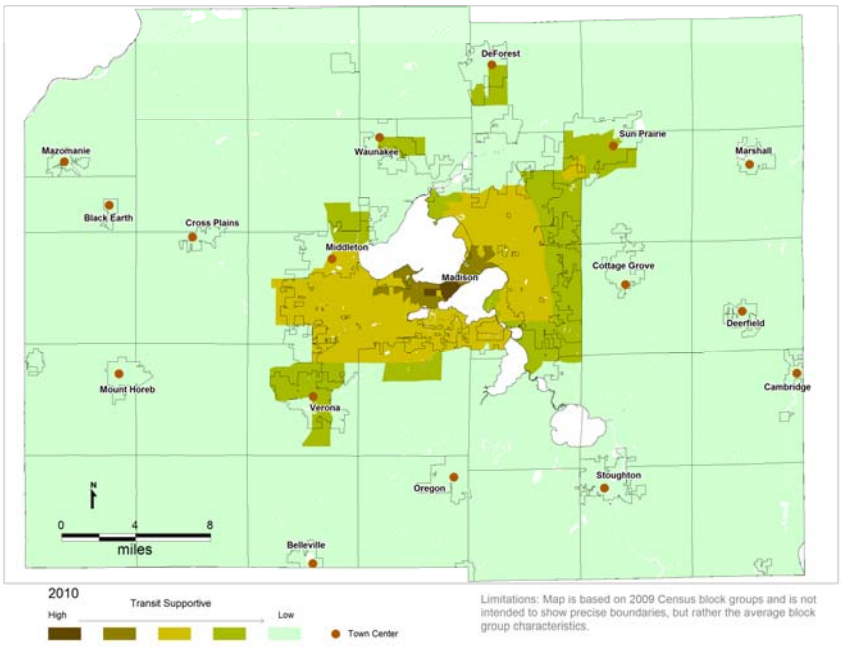


Figure 25: Map of Transit Supportive Typology for Dane County block groups 2010

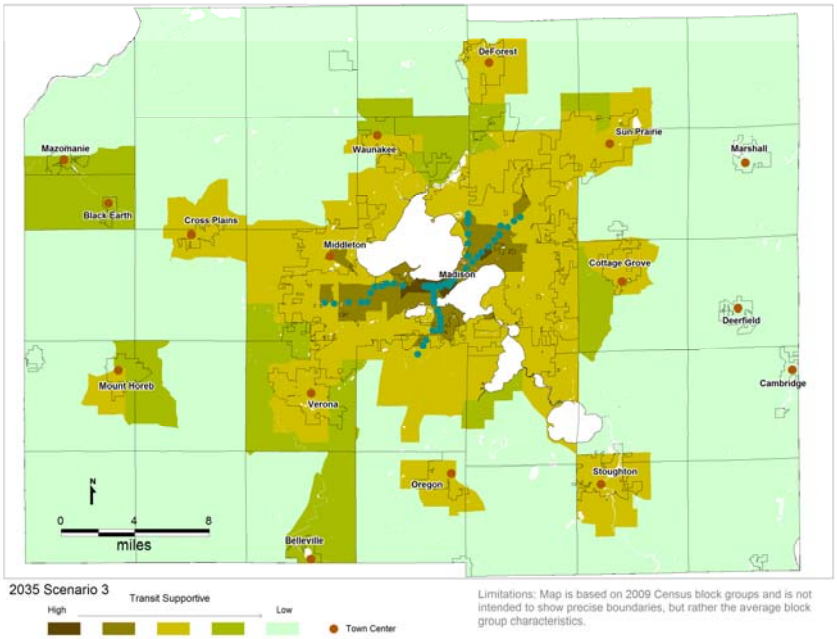


Figure 26: Map of Transit Supportive Typology for Dane County block groups 2035 Under BTR "plus" Scenario

Following this classification, the Strong and Moderate WTS communities will both experience household and job growth, with the largest growth in the Peripheral WTS communities, with 58% of Dane County households and 57% of the county jobs in 2035 (Figures 27, 28 below). There is a shift of 7,200 households into the more WTS block groups between the 2035 MPO Development Trends and the 2035 BRT "plus" scenario.

This shift of 7,200 households from the Peripheral WTS, with limited or no transit service, to a Moderate or Strong WTS offers an opportunity to evaluate the impact of the BRT system on households moving to a WTS community and the region as a whole. Despite this shift of 7,200 households into a WTS area, the overall demand for WTS housing types is far greater; opportunities for potential new WTS areas outside of Madison and the proposed BRT system must be explored.

Figure 27: WTS County 2010, 2035 Recent Development Trends, 2035 BRT "plus" Incentives Households

WTS County Growth Patterns	2010 Households	2035 Recent Development Trends Households	2035 BRT+ Incentives Households	Difference 2010 & 2035 Recent Development Trends Households	Difference 2010 & 2035 BRT+ Incentives Households	Difference 2035 Recent Development Trends & 2035 BRT+ Incentives Households
Strong WTS (Isthmus/Dark Brown on Map)	15,928	19,702	20,280	3,774	4,352	578
% of County	8%	7%	7%			
Moderate WTS with Transit Access (light Brown on Map)	42,545	47,033	53,658	4,488	11,112	6,624
% of County	21%	17%	19%			
Combined Strong & Moderate WTS Areas	58,473	66,735	73,938	8,262	15,465	7,202
Peripheral WTS - Limited or no transit (dark yellow on Map)	113,648	168,382	162,060	54,734	48,412	-6,322
% of County	56%	61%	58%			
Non Transit Supportive	31,627	43,154	42,274	11,527	10,647	-880
% of County	16%	16%	15%			
Combined Peripheral and Non WTS	145,275	211,536	204,334	66,261	59,059	-7,202
Total	203,748	278,271	278,271	74,523	74,523	(0)

Figure 28: WTS County 2010, 2035 Recent Development Trends, 2035 BRT "plus" Incentives Jobs						
WTS County Growth Patterns	2010 Jobs	2035 Recent Development Trends Jobs	2035 BRT+ Incentives Jobs	Difference 2010 Jobs & 2035 Recent Development Trends Jobs	Difference 2010 Jobs & 2035 BRT+ Incentives Jobs	Difference 2035 Recent Development Trends & 2035 BRT+ Incentives Jobs
Strong WTS (Isthmus/Dark Brown on Map)	52,769.6	51,724	50,534	(1,046)	(2,235.6)	(1,190)
% of County	17%	12%	12%			
Moderate WTS with Transit Access (light Brown on Map)	78,609.1	91,655	96,759	13,046	18,149.9	5,104
% of County	25%	22%	23%			
Peripheral WTS - Limited or no transit (dark yellow on Map)	155,810.4	241,516	238,595	85,706	82,784.6	(2,921)
% of County	50%	57%	57%			
Non Transit Supportive	23,096.4	35,517	34,524	12,421	11,427.6	(993)
% of County	7%	8%	8%			
Total	310,285	420,412	420,412	110,126	110,127	0

The housing preference survey demonstrates that the demand for WTS supportive housing units is estimated at 44,657, (72%) in 2035. Realizing not everyone will choose to live in a WTS community type, the 44,657 is scaled back 20% to account for WTS supportive housing that might be built outside of a WTS community for a potential shift of 35,726 WTS housing units. This analysis allocated 15,204 households within the BRT shed (see Figure 18). When the 15,204 is subtracted from the 35,726 potential shift toward WTS neighborhoods, there are an estimated 20,522 households that have a preference for WTS housing types that are potentially unmet[12]. **Where these 20,522 households choose to live and the housing types they have access to will have a big impact on the land use and transportation composition of Dane County.**

Figure 29 shows the potential VMT and GHG savings that could be realized for these 7,200 households that were presented in the H+T Transit Supportive maps and tables. Given the shift of where households will be living from a non-transit supportive to a transit supportive, there is a difference in household VMT savings of 9.5%, from 20,896 to 18,913. This translates to a household GHG reduction of 0.85, metric tones, a regional VMT savings of 14.2 million miles, and a total transportation cost savings of $22.2 million. The figure also demonstrates the potential savings if the additional WTS housing preference demand of 20,522 were developed in WTS areas. Under this scenario, the VMT savings could reach 40.6 million miles and have a total transportation cost savings in Dane County of $90.8 million.

[12] It should be noted that the comparison to estimate the total WTS demand is based on housing units and the WTS allocation in this analysis is based on households and the two aren't necessarily comparable on a one to one basis. (*See Section V*).

Figure 29: Potential Impact of Shift Toward WTS Development		
	Estimate Diverted VMT & GHG Under BRT "plus"	Estimate Diverted VMT & GHG for WTS Housing Type Demand
Average Annual VMT where BRT+ Incentives Allocated less Households than 2035 Recent Development Trends	20,896	
Average Annual VMT where BRT+ Incentives Allocated more Households than 2035 Recent Development Trends	18,913	
Difference in Annual VMT	1,983	
Percent Change in Annual VMT & GHG/Household	9.5%	
Household shift from Peripheral to a WTS Community	7,200	20,522
Annual VMT Savings	14.3 million (County Savings = .34%)	40.6 million (County Savings = 1 %)
Household GHG Savings	0.85 metric tons	
Annual GHG Savings	6,152 metric tons	17,534 metric tons
Annual Household Cost Transportation Savings*	$3,084 (Household Savings = 22%)	
Dane County Estimated Current Annual Transportation Costs	$2.6 billion	
Estimated Annual Household Transportation Cost Savings if Shift Toward WTS is Realized	$22.2 million (County Savings = 1%)	$63.2 million (County Savings = 2%)

**Assumes a reduction in household VMT of 1,983 and an average household reduction in vehicles from 2 to 1.5.*

At the time this report was written, the recently published 2013 Wisconsin DOA county level population projections were not available. This analysis is based on the previously published 2008 population projections.

The 2013 population projection for Dane County (593,440) is 9% lower than what was previously projected in 2008 (653,876). The lower population projections reduce the previous estimate of household growth by 5%. In terms of net growth, the demand for WTS housing will still be strong, with an estimated 35,511 new households seeking a WTS lifestyle. Demographic shifts such as smaller household sizes, aging population, and Millennials seeking an urban lifestyle will all contribute to this steady demand for WTS.

While there is still strong demand for WTS in Dane County, there may be less demand in areas outside of the BRT Shed. As a result, the potential WTS areas outlined in this section must be carefully evaluated in terms of their potential to succeed as a WTS community, as there will likely be smaller or fewer Dane County WTS areas in the future. In some cases, such as the DeForest site shown on Figure 31, a full WTS build-out may no longer be a realistic objective. However, higher level WTS principles could still be incorporated into its future to help create a more pedestrian friendly community. An equally important consideration is the BRT transit investment, and to the extent that it can serve additional communities, which will have a big impact on promoting WTS in Madison and throughout Dane County.

To support WTS housing demand it is necessary to look beyond Madison and the proposed BRT system. The map in Figure 30 shows Dane County job centers and how they relate to the proposed BRT system. While Madison remains the largest employment center in the County, a number of communities hold potential for further development given their concentration of jobs.

Extending the BRT to serve some of these neighboring places would take advantage of their WTS qualities, help boost transit ridership, and decrease household VMT and auto ownership. In other cases, there are opportunities to redevelop and create new WTS communities by incorporating a mix of uses and developing at a pedestrian scale.

Planning for WTS on a Regional Scale

As this research has shown, the proposed BRT system and associated TOD in the Madison area will only address a portion of demand for walkable, mixed-use places, given the historical development patterns and resulting limited potential for high capacity transit.
The map below highlights the range of WTS opportunities in Dane County and how under the BRT “plus” scenario they will likely look in terms of their Transit Supportive Typology. If these areas were further developed keeping to WTS principles then transit supportive levels will likely increase in these areas (Figure 31).

Figure 30: Dane County and Madison Area Jobs/Square Mile and Total Jobs

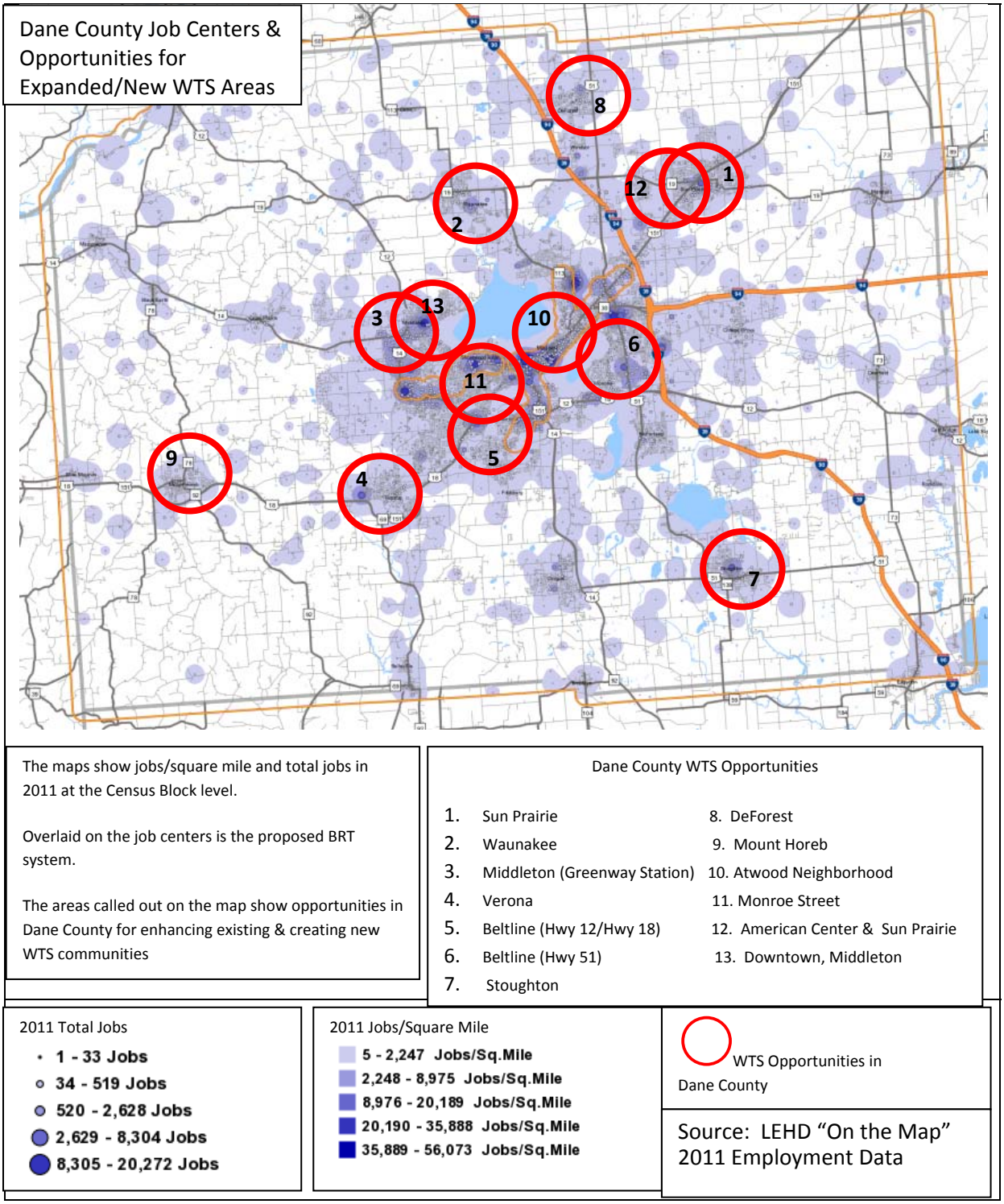
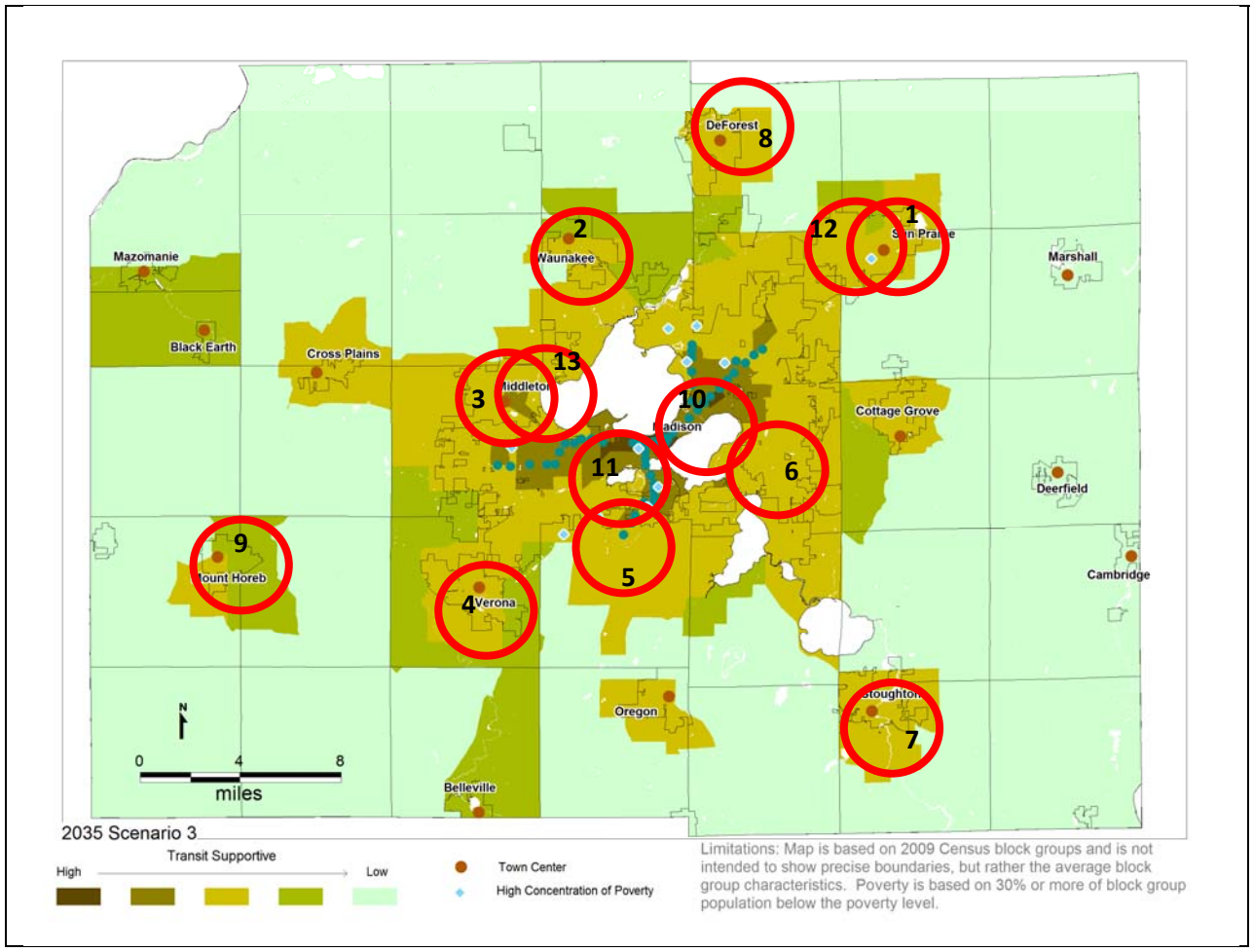


Figure 31: Dane County Transit Supportive Typology & Potential Expanded/New WTS Areas



And, as the figure highlights, there are opportunities beyond Madison to both enhance existing WTS communities and to create new ones by assuring future development adheres to basic pedestrian and mixed-use principles, such as smaller blocks that have sidewalks, many connections with the street network, a mix of housing and retail, and smaller-scale parking lots coupled with increased public transit options. The map also shows how these WTS opportunities relate to high concentration poverty areas and where those connections between WTS and poverty can be made.

Each of these WTS areas holds opportunities for increased development consistent with WTS principles. However, each represents a very different set of necessary policy and investment approaches in order to promote mixed-use, walkable transit communities.

For the purposes of this discussion, the classification used to help organize the potential station areas is used to describe these WTS opportunities:

1. **Urban Neighborhoods** (Atwood Neighborhood, Monroe Street)

   Urban Neighborhoods are compact walkable neighborhoods in close proximity to Downtown Madison and the University. These neighborhoods hold opportunities for infill and redevelopment. This development should include a mix of retail, employment, and higher density housing.

2. **Suburban & Peripheral Suburban Neighborhood** (Verona, Beltline Hwy 12/Hwy 18, Beltline Hwy 51, Waunakee, Greenway Station, The American Center, Sun Prairie West Side Development)

   Close proximity to Madison, these areas serve as job centers and are typically oriented toward a single land use type. There is opportunity to extend high quality transit to these areas to better meet the jobs and housing needs of area residents. Extending the proposed BRT system to these areas would help meet this need and could be used as a catalyst to develop in a WTS manner.

   a. *Suburban Neighborhood*: Greenway Station is centered on a limited access road with a water fountain as the focal point and surrounded by large parking lots and other office/retail space. Potential to extend the BRT system to the Greenway Station and plan for some infill development in the large parking lots to help meet the demand for housing compatible with a WTS community exist (Figure 33).

Figure 33a: Greenway Station

Source: http://www.greenwayshopping.com/about/

Source: Google Maps

b. *Peripheral Suburban*: The American Center is a good example of a Peripheral Suburban center. The American Center is located just east of the current proposed East Towne Mall BRT terminus and as such is a strong candidate for BRT given its mix of office related activities (Figure 33b).

The American Center business park sits on 447 acres and is home to over 72 commercial or office related businesses[13]. Metro currently offers limited commuter bus service to the American Center and Capitol Square. BRT service to the American Center would help increase access to its employment opportunities and introduce the concept of location efficiency.

Figure 33b: The American Center Aerial & Proposed BRT Extension

Source: Google Maps (above); Design Visions for Regional Transportation Corridors. Madison Design Professional Workgroup May 2013 (below).

c. *Peripheral Suburban*: The Sun Prairie West Side Development is similar to Greenway Station and is expected to generate more traffic given its anchor retailers, consisting of a Woodman's Supermarket (225,000 square feet), Costco Warehouse (152,000),

[13] http://www.amcenter.com/

and a planned 17 screen Marcus Cinema (100,000 square feet). Room for another big box retailer is also available.

This area is expected to continue to grow. As one developer has stated, "on the West Side of Madison, your growth is done because you're up against Middleton and you're up against Verona," The developer then stated that, "the growth now is all north and east and we're right in the heart of that.[14]"

Given the financial investment that has occurred at this site, it is difficult to imagine the course of development changing entirely to one that fully adopts the WTS principles. However, certain aspects could be incorporated, such as planning for a pedestrian mall or central public space, sidewalks, some higher density housing, and quality transit service, such as an extension of the proposed BRT system from its current terminus of East Towne Mall. This would help make this area more accessible on an equity level, both for providing access to the jobs located there, and for shopping and other day-to-day needs.

3. **Main Street Community (Town Center)** (Stoughton, Sun Prairie, Middleton, Mount Horeb)

Existing Town Centers were built along a traditional street grid network so they are highly walkable and hold a mix of uses, including retail and some higher density housing. Existing Town Centers are typically surrounded by single land use types, often residential subdivisions. In Middleton and Sun Prairie there are large scale auto-oriented shopping areas in close proximity to the Town Center. Stoughton and Mount Horeb are surrounded by agricultural land. Opportunity to further develop these Town Centers on infill sites with mixed-use, WTS oriented development exists.

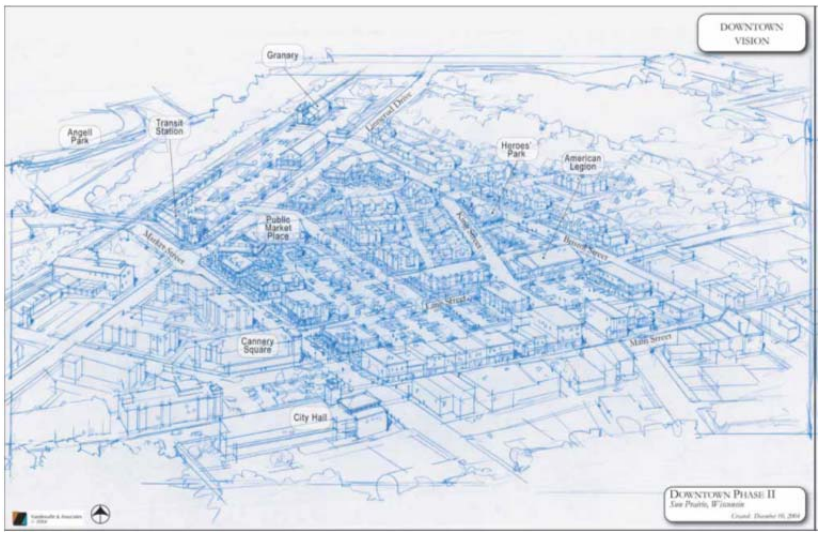
An example of local redevelopment planning efforts is observable in an Environmental Conditions report, as part of the Future Urban Development Area (FUDA) Planning.[15] The report first identifies environmental concerns in Sun Prairie followed by solutions to help address them; among the solutions is infill redevelopment.

[14] Wisconsin State Journal. "Retailers flock to Sun Prairie Interchange November 11, 2012 http://host.madison.com/business/retailers-flock-to-sun-prairie-interchange/article_fb630b51-5e78-5cec-89e2-770947bdb896.html

[15] Sun Prairie Future Urban Development Area Planning. Capital Area Regional Planning Commission. July, 19, 2013 Final Draft.

The infill redevelopment sites outlined in the Downtown Phase II Master Plan could accommodate 450 residential units and 55,000 square feet of commercial space (Figure 34).

Figure 34: Downtown Sun PrairiePhase II Plan



Source: Vandewalle & Associates. Appeared in Sun Prairie Future Urban Development Area Planning. Capital Area Regional Planning Commission. July, 19, 2013 Final Draft.

The report notes that this redevelopment can create a number of local benefits:

- Encourage the intensification of under-utilized land.
- Placemaking, removal of blighting influences, improved property value, increased activity, greater
- Support for local businesses
- More efficient use of land and infrastructure

There are also challenges related to infill redevelopment that are important to note. Among these challenges are increased development costs given the difficulties assembling adequate land across different parcels and multiple owners, environmental contamination, and in some cases resident oppositions uncertain of the proposed changes.

4. **Potential New Town Centers** (DeForest)

   There are also opportunities to plan for new town centers, as is the case with the planned development in DeForest at Highway 19 and Highway 51. This area is currently a job center as the home of a Pepsi-Cola bottling facility and other smaller businesses. Given there is little other development in this area, it has the opportunity to incorporate some smaller scale mixed-use retail and some higher density housing with future planned developments to help absorb some of the demand for WTS housing types.

   These opportunities in Dane County are all vibrant in their own way as they are market-oriented and demand-driven. These development types have often occurred in silos with little regard for the other. However, they are all relevant to each other and throughout the region. This is particularly important given the projected demand for WTS compatible housing types and the capacity of each of these areas to absorb that housing if it is incorporated into the planning process.

VIII. BRT Case Studies

A. Modeled statistical characteristics of development types under alternative scenarios

The development types created for this analysis are based on a set of qualitative and quantitative characteristics, the latter of which are defined as ranges of values. As such, and as observed above, **growth can occur within a station area without transitioning into a fundamentally different development pattern**. It is instructive to examine some of these modeled quantitative shifts to understand how an intensification of development as modeled under the alternative scenarios takes shape in the built environment.

For this purpose we refer to three selected station areas to show how their modeled statistical signatures change from 2010 to 2035 under Scenario 3 (BRT “plus” or “encouraged WTS”). As described above, the project team conferred on several iterations of these potential future scenarios to come to a consensus that the implied development pattern is broadly feasible given underlying market conditions, projected demand for WTS development, the infill potential of specific station areas, and design considerations. Simultaneously, this process was used to identify specific station areas that would provide an interesting focus for the community design workshop. The three case studies presented here are the same locations selected for the workshop exercise (Figure 35).

Figure 35: The three locations selected for further exploration at the community design workshop are East Towne Mall, Wingra Creek, and Post Road (Fitchburg)

Broadly, the modeled indicators in Figure 39 reflect the average changes at all three locations into compact, transit-supportive or transit-oriented development areas. It is important to note that the indicators are place-based as they apply to the ½ mile radius around the BRT stop. So while the BRT station area is expected to grow in term of jobs and households – the aggregate savings may not seem as large given the current base of households that currently live there and the high level of growth that would be needed to impact the existing station area average. On the other hand, the savings at the household level, in particular those households that move from a non-location efficient area to one that is transit supportive, will likely experience much greater savings given they could drive and own less vehicles given the transit supportive qualities of their new neighborhood (see section VII: WTS Development Potential in Dane County for discussion of household savings).

Figure 36: Wingra Creek Station Area

Modeled Future Statistical Signature for Wingra Creek

At the Wingra Creek station area, a high level of transit supportiveness in 2010 suggests that the area has the potential to transition under

Scenario 3 from a Suburban neighborhood to an Urban neighborhood by 2035 (Figure 36). Net residential density, expressed in households per acre, increases slightly due to the addition of 53 acres classified for residential land uses over time. Gross household density, which treats all land uses the same increases from 3.6 to 4.4. The two measures of walkability are similarly affected by the way residential acreage is treated in the modeling process, as they are assumed to be proportionate to changes in residential density for the purposes of this broad analysis. **Transit connectivity increases in the Wingra Creek area**, leading to an uptick in transit ridership for the work commute (from 5.2% to 7.2%) and a slight decline in average rates of car ownership, from 1.69 per household to 1.64 per household under Scenario 3.

The sustainable development performance indicators introduced above are also shown here. Affordability of transportation costs is shown to improve somewhat over the study period, from 20.2% of income to 19.7%, however note that values estimated for 2035 reflect only changes in transportation costs; changes in income are not modeled. The job shed ratio for transit dependent populations improves relative to County averages. The availability of a range of viable transportation options is observable in the projected decrease in annual miles driven by private automobile, from 16,519 miles per household per year to 16,083 miles. Consequently, greenhouse gas emissions from household transportation is expected to decline from 7.12 tons of CO_2 per household per year to 6.93 tons.

Modeled Future Statistical Signature for Post Road

Figure 37: Post Road Station Area

The Post Road station area is located near the terminus of the southern BRT route, in the City of Fitchburg. The area is projected to transition from Peripheral Suburban in character to an Urban neighborhood by 2035 under Scenario 3 (Figure 37). Net residential density, expressed in households per acre, remains constant, while gross density increases from 2.4 to 4.3. Transit connectivity increases at the Post Road transit station area, leading to an uptick in transit ridership for the work commute (from 3.4% to 5%) and a slight decline in average rates of car ownership, from 1.73 per household to 1.69 per household under Scenario 3.

The sustainable development performance indicators show similar gains here as for Wingra Creek, i.e. small positive shifts. Affordability of transportation housing costs is shown to improve somewhat over the study period, from 20.9% to 20.3%, however note again that real income is assumed to remain constant. As in the Wingra Creek area, the job shed ratio for transit dependent populations improves slightly relative to County averages. The availability of a range of viable transportation options is observable in the projected decrease in annual miles driven by private automobile, from 17,468 miles per household per year to 16,846 miles. Consequently, greenhouse gas emissions from household transportation is expected to decline from 7.53 tons of CO_2 per household per year to 7.26 tons.

Figure 38: East Towne Mall Station Area

Modeled Future Statistical Signature for East Towne Mall

The eastern route of the proposed BRT system is envisioned to end at the East Towne Mall in the near term (Figure 38). The station area was viewed by the project team as potentially catalytic because of general trends in mall redevelopment, the availability of an enormous amount of redevelopable land, enabling a range of preferences for various building types to be met, and the appeal to future residents to locate near both the highway and a BRT stop. Under scenario 3 this area is projected to transition from peripheral suburban in character to a community center. The modeling scenario suggests that redevelopment could accommodate over 1,000 new residents (from 700 to 1,713) without significantly shifting net residential density very much due to the conversion of a large amount of acreage to residential purposes. Gross residential density on the other hand increases from 1.4 to 3.4 households per acre, reflecting the shift to a mixed-use area from predominantly large-format retail. Transit connectivity is shown to increase, with work commuting on transit gaining over two percentage points (from 2.6% to 4.7%) over the study period, and car ownership rates declining slightly (from 1.75 automobiles per household to 1.74).

The sustainable development performance indicators show modest-and-positive changes as in the other two selected station areas. Affordability of transportation costs is shown to improve

somewhat over the study period, from 21.3% to 21.0% (Figure 39). As in the Wingra Creek area, the job shed ratio for transit dependent populations improves slightly relative to County averages. The availability of a range of viable transportation options is observable in the projected decrease in annual miles driven by private automobile, from 17,468 miles per household per year to 16,846 miles. Consequently, greenhouse gas emissions from household transportation is expected to decline from 7.53 tons of CO_2 per household per year to 7.26 tons.

Figure 39: Change in Built Form Characteristics and Project Indicators for Case Study Locations (2010-2035), As Modeled Under Scenario 3							
Name of BRT Stop		**Wingra Creek**		**Post Road**		**East Towne Mall**	
2010 Transit Supportiveness		High		High-Mid		Mid	
2010 Development Type		Suburban Neighborhood		Peripheral Suburban		Peripheral Suburban	
2035 Development Type		Urban Neighborhood		Urban Neighborhood		Community Center	
Year		**2010**	**2035 (S3)**	**2010**	**2035 (S3)**	**2010**	**2035 (S3)**
Built Form Variables	Households (HH)	1,746	2,163	1,181	2,149	700	1,713
	Gross household density	3.6	4.4	2.4	4.3	1.4	3.4
	Net household density	9.7	10	9.9	9.9	7.5	6.4
	Walkability A (see Note 1)	0.25	0.27	0.21	0.21	0.16	0.17
	Walkability B (see Note 1)	8.0	6.9	18.7	20.1	22.1	30.0
	Transit Connectivity (measure of rides/wk)	10,199	12,852	4,335	7,713	6,320	7,555
	Car ownership (per HH)	1.69	1.64	1.73	1.69	1.75	1.74
	Transit Commuters (%)	5.2	7.2	3.4	5.0	2.6	4.7
% Income spent on transportation (see Note 3)		20.2%	19.7%	20.9%	20.3%	21.3%	21.0%
Job shed ratio for transit-dependent population		1.24	1.22	1.29	1.28	0.90	0.89
Annual driving (miles/household/year)		**16,519**	**16,083**	**17,468**	**16,846**	**18,568**	**17,627**
Greenhouse Gas (GHG) Savings Tons of CO_2 from transportation per household per year		**7.12**	**6.93**	**7.53**	**7.26**	**8.00**	**7.59**

Notes: (1) Walkability A uses intersection density (intersections/acre). Walkability B uses average block size in acres. (2) This measure only takes into account regularly scheduled, fixed-route transit service. (3) The values estimated for 2035 are modeled for a typical regional household based on 2005-2009 ACS block group data (median income $58,755; household size of 2.39; and 1.28 workers per household) and reflect only changes in transportation costs; changes in income are not modeled.

Significant household VMT and GHG savings are observed at the neighborhood level. The 3 Case Study station areas demonstrate that when the character of the neighborhood is transformed – there is also a shift in household transportation. At all 3 station areas household transit use increases and VMT and related GHG emissions decrease.

B. Conceptual Designs Illustrating Projected Transit-Supportive / Transit-Oriented Growth

A design workshop held in Madison in April 2013 produced conceptual designs for the three sample sites chosen from among the station areas along the proposed BRT routes. Each site was selected with the intent of illustrating the potential impacts of building WTS at these locations over a 25 year period. These illustrated examples could then be used as models for future development elsewhere in the region. The workshop relied on a traditional charrette format, a type of workshop specifically structured to encourage interaction between designers and community stakeholders, by incorporating a series of feedback sessions to better inform the process.

An estimated target development program was produced to guide the design team at the community workshop. This program was based on the relative magnitude of the modeled site-specific growth projections (above) expressed in households and employment, the availability of infill acreage as calculated by CARPC, and a closer review of each location for its market potential. The target development programs for all three station areas are included in the sections below that represent the conceptual designs for each station area.

Two of the selected sites are located in the City of Madison and one is in the City of Fitchburg. Participation was particularly encouraged from stakeholders in both cities and the broader region. A full list of workshop participants is in Appendix 7.

Over 60 community members participated in some or all of the feedback sessions over the course of three days. The designers solicited input from the participants and incorporated their preferences into the concept plans. The plans which are intended to help the community understand how thoughtful, locally informed design can accommodate transit oriented growth in an appealing and market responsive way.

Starting with the target development program generated in consultation between CNT and Peloton Research Partners, the design team (led by Seth Harry & Associates, with assistance from local design professionals) also undertook an on-site inspection of the three focus areas prior to the formal start of the workshop.

Target Development Programs

Based on the projected amount of growth, expressed in the number of households and employment (job growth – number of jobs), that would occur at each station area through 2035 under the BRT-"plus" scenario (S3), and the infill acreage by CARPC, an estimated target development program was produced to guide the design team at the community workshop (Figure 40).

Engagement with local community members allowed the consultant team to more fully examine the details of the built environment at each station area location. Specific

Figure 40: WTS/TOD Target Development Program for Selected Transit Station Areas

New Residential Units (2010-2035)				
Station Area	Total	Multi-Fam.	Attached SF	SF
Wingra Creek	700-900	385-495	175-225	140-180
Post Road	600-800	300-400	132-176	168-224
East Towne Mall	950-1100	618-715	190-220	143-165

Office Space (s.f.)		
Station Area	Low	High
Wingra Creek	136,478	181,970
Post Road	141,703	188,937
East Towne Mall	183,657	244,875

Retail/Other Space (s.f.)		
Station Area	Low	High
Wingra Creek	168,891	225,188
Post Road	152,105	202,806
East Towne Mall	279,116	372,155

Total Space (s.f.)		
Station Area	Low	High
Wingra Creek	305,369	407,158
Post Road	293,807	391,743
East Towne Mall	462,772	617,030

parcels could then be evaluated more closely to determine their development capacity and connection to surrounding uses, tempered by the development constraints and opportunities identified by local workshop participants. Preliminary designs were further developed post-workshop; with the total projected market value of real estate development and redevelopment calculated for each final design.

Conceptual Design: Wingra Creek

The area around **Wingra Creek** station is rated as having a high level of transit supportiveness in 2010, and the scenario modeling suggested the area **has the potential to transition from a Suburban neighborhood to an Urban neighborhood by 2035 under Scenario 3**. The Suburban neighborhood development type has one of the lowest residential densities and the lowest job density of the seven development types created for this study. Commercial uses, typically in the form of larger format retail uses, serve the area residential uses. As noted above, suburban neighborhoods tend to offer greater potential for incremental change due to the nature of the existing development patterns in these neighborhoods and the ability of transit to attract and support a mix of uses in a compact, walkable form.

To absorb WTS demand in a way that transitions the area into an Urban neighborhood development type, future development will increasingly blend uses rather than segregating them; commercial frontages will move to the edge of the sidewalk (i.e. smaller setbacks) with parking designated to the rear of buildings, enhancing pedestrian friendliness. New building types will include higher-density residential and vertical mixed use.

Increased street connectivity will complement the more diverse mix of housing types, ranging from single-family detached residential to small-scale multi-family residential uses. **The area will offer more employment opportunities as it transitions into an Urban neighborhood**, including more mid-size office space and locally serving retail, as part of a neighborhood commercial node situated around a small and attractive public space directly adjacent to the BRT stop.

WINGRA CREEK
Site Aerial
Seth Harry & Associates, Inc.

The exploratory concept plans were guided by the site-specific market capacity (potential absorption), as expressed in the target development program, further influenced by existing physical conditions. The illustrative example shows the redevelopment of over 650,000 square feet of current uses into multi-family residential, commercial, and office space. An additional 497,000 square feet in new development - averaging three stories in height, is included for a total of 1,491,000 square feet of new multi-family residential, commercial, and office space. The multi-family homes are envisioned as a mix of apartments (325 units) and condos (117

units). In addition, 120 single-family attached homes and 114 single-family detached homes on smaller lot sizes accommodate a range of household types. The total projected change in market value attributable to the WTS development scenario is estimated at over $230,000,000 by 2035 (Figure 41, See Appendix 9 for a detailed breakout of this value, by station area, in five-year increments).

Figure 41: New Market Value Development Potential 2015 to 2035
(in 2013 dollars)

Station Area	Residential	Office Space	Retail/Other	Total New Development
Wingra Creek	$124,542,409	$39,410,705	$70,263,658	**$234,216,772**

Source: Peloton Research Partners, 2013

Conceptual Design: Post Road

The development pattern as modeled in Scenario 3 suggested that the **Post Road** station area is well positioned to absorb significant WTS residential growth and some commercial growth by 2035. The modeling envisioned this area **transforming slowly from *peripheral suburban* to an *urban neighborhood***. The typical peripheral suburban development type has highly segregated uses and very low street network connectivity. Employment is in the form of large format (big box) retail, strip shopping centers, and office parks located along major arterials, which differentiate this development type from the more residential nature or characteristics of the Suburban Neighborhood type.

Transitioning to a built form with Urban neighborhood characteristics will require more compact, mixed-use development, on infill parcels, including converting surface parking to structured parking, and an improved pedestrian environment with enhanced street connectivity and direct pedestrian access to the station. **Introducing BRT to this area will have a moderate impact on development intensification in the near term, and over the long run, incremental intensification can be achieved on an ongoing basis with help from supportive policy and regulatory initiatives.** As with the Wingra Creek station area, the Post Road station area will

offer more employment opportunities as it transitions into an Urban neighborhood in the form of mid-size office spaces and locally serving retail.

The conceptual design for the Post Road station area was likewise informed by the site-specific target development program. At this location, the illustrative plan shows a redevelopment of 757,000 square feet of current uses into multi-family residential, commercial, and office space, and 70 single-family attached homes and 4 single-family detached homes. New development would add 809,000 square feet of new space with a mix of building types averaging two stories in height. A total of 1,618,000 square feet of new multi-family residential, commercial, and office space is projected around this station area. The multi-family homes are envisioned as a mix of apartments (239 units) and condos (117 units). In addition, the station area would have 370 new single-family attached homes and 143 single-family detached homes on smaller lot sizes. The total change in the market value of real estate development under a WTS development scenario at this station area is estimated to be nearly $270,000,000 by 2035 (Figure 42).

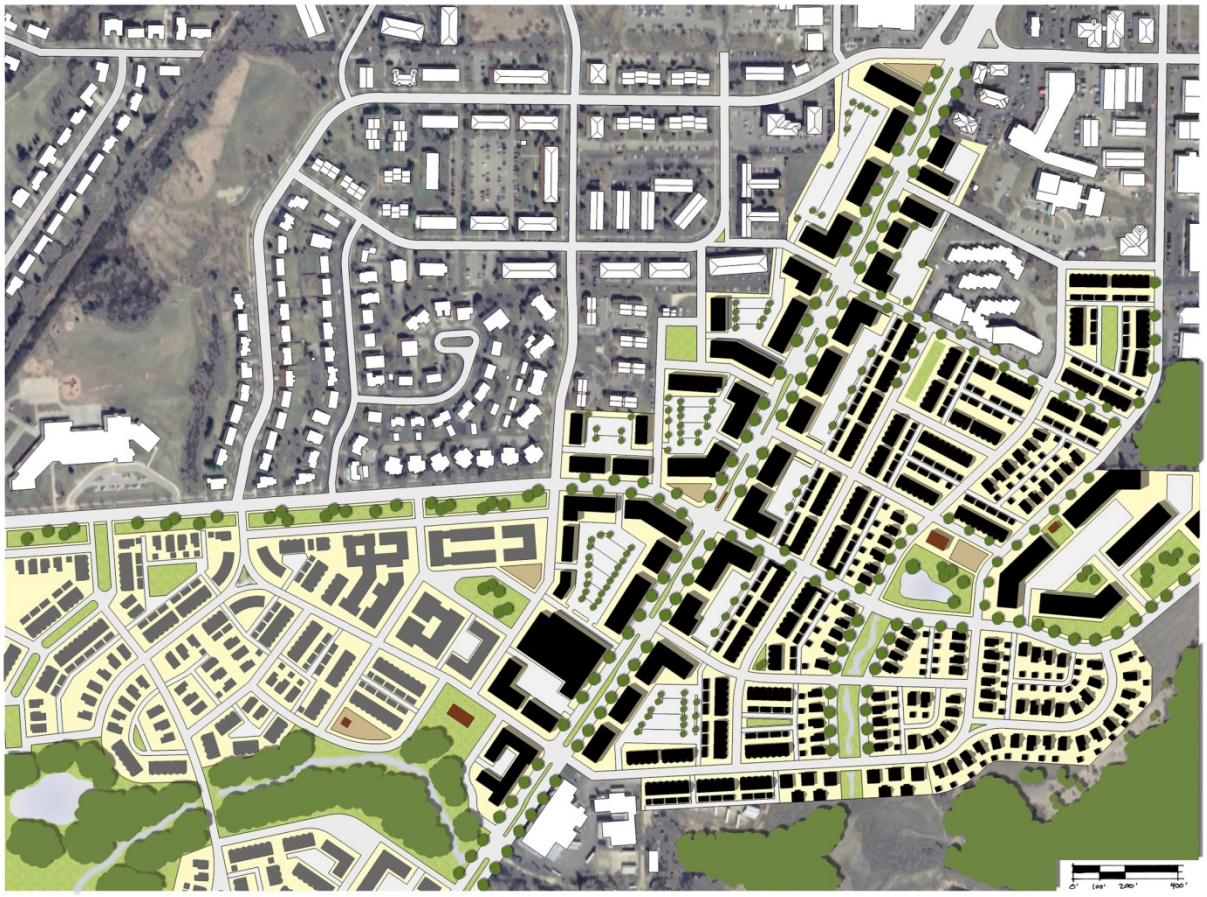


Figure 42: New Market Value Development Potential 2015 to 2035
(in 2013 dollars)

Station Area	Residential	Office Space	Retail/Other	Total New Development
Post Road	$161,801,554	$41,748,948	$64,942,808	**$268,493,310**

Source: Peloton Research Partners, 2013

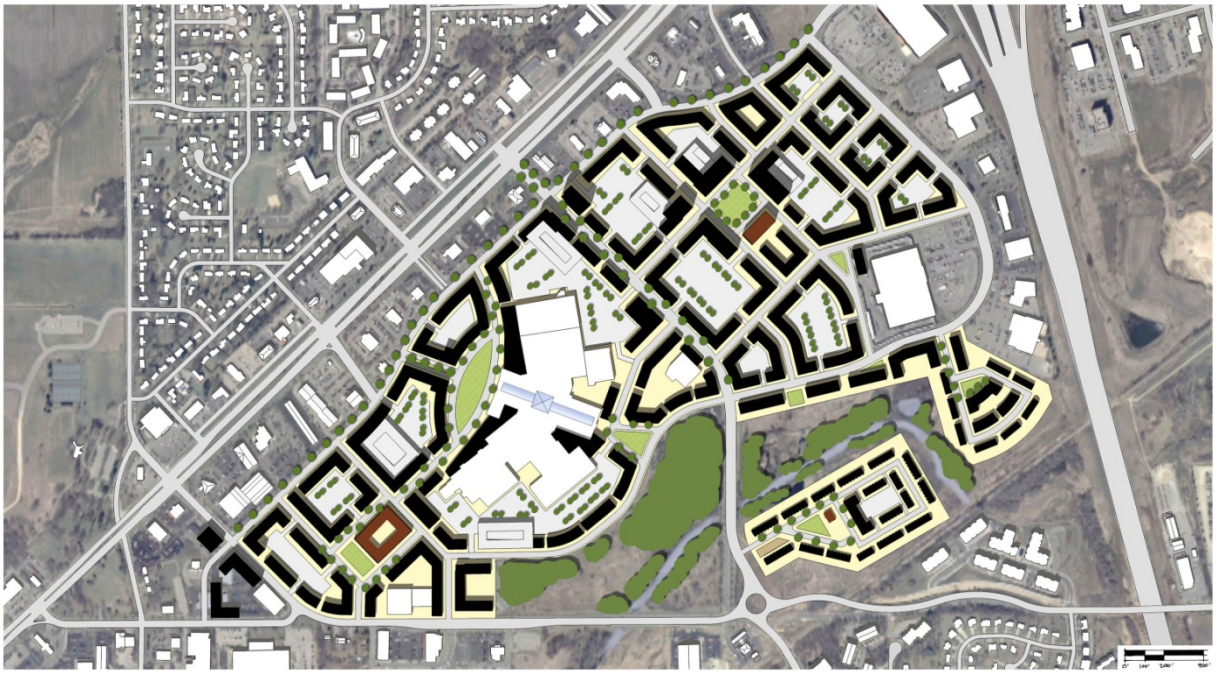
Conceptual Design: East Towne Mall

The station area around the proposed **East Towne Mall** BRT stop is characterized as *Peripheral Suburban*, with highly segregated uses and very low street network connectivity in a physical environment that discourages walking. Commercial activity in this area is comprised primarily of major retailers operating in larger retail formats and includes the East Towne Mall with over 800,000 square feet of gross leasable space. The retail space in and around East Towne Mall is positioned to capitalize on the major arterial frontage of East Washington Street and the nearby highway interchange. A residential neighborhood abuts the Mall property to the east, and includes predominantly single-family detached homes. Another predominately single-family neighborhood is located on the other side of the arterial. Pedestrian access between these residential areas and the Mall is limited. **Relatively high levels of employment and commercial activity in the mall area are key factors in transitioning the neighborhood into a**

Community Center in the scenario modeling. To make this transition, this area will need to increase the proportion of mixed-use on-site by adding residential uses on existing and infill sites, including underutilized surface parking areas. Other surface parking lots can be converted to structured parking over time. Improved street-connectivity and pedestrian access will integrate retail with other nearby uses.

The presence of BRT would strengthen and reinforce the commercial vitality of the mall and the other retail uses in the area. Higher-density housing attracted by improved transit will further benefit commercial vitality. A finer-grained street network will also improve pedestrian access in the station area, which in turn encourages the use of the transit system. And by leveraging the potential of underutilized parking lots for other, higher value uses, the economic productivity of the underlying real estate is greatly enhanced.

The market capacity of the station area around the East Towne Mall was estimated at between 462,000 - 617,000 square feet of commercial/office space, between 618,000 - 715,000 square feet of multi-family residential (approximately 618 - 715 multi-family units), along with 190 - 220 single-family attached homes and 143 - 165 units of single-family detached housing. To meet this potential development capacity, the design team proposed a “dual neighborhood” concept that takes advantage of the mall building to anchor an elliptical green that serves as the town square for the neighborhood on the western side of a “main street” corridor. The green is lined with restaurants and other food services, currently located inside the building, allowing them to provide highly-appealing outdoor seating.



EAST TOWNE MALL
Site Aerial
Seth Harry & Associates, Inc.

Figure 43: New Market Value Development Potential 2015 to 2035

(in 2013 dollars)

Station Area	Residential	Office Space	Retail/Other	Total New Development
East Towne Mall	$141,604,416	$82,322,525	$122,975,624	**$346,902,566**

Source: Peloton Research Partners, 2013

On the eastern side of the main street, another mixed-use neighborhood emerges and over time and centers around a park. To serve both neighborhoods, the location of the BRT stop is proposed to be shifted slightly to the end of the main street nearest East Washington Avenue. The vision entails redevelopment of approximately 1,044,000 square feet of mixed multi-family residential, commercial, and office space, along with new development of approximately 2,616,000 square feet of mixed-uses. The new development would incorporate a mix of housing types including 559 apartments, 114 condos, and 181 new single-family attached, townhouse-style homes. Approximately 518,760 square feet of space would remain for the addition of new retail, dining, and entertainment space on-site. The total increase in market value of real estate development around East Towne Mall station area is estimated at nearly $347,000,000 by 2035 under the WTS scenario (Figure 43).

IX. Limitations & Opportunities for Meeting WTS Demand and TOD

Major U.S. metropolitan areas have embraced the potential of TOD in recent decades and have been able to pursue TOD goals with relative ease due to their concentrations of population that sustain an extensive multimodal transit network. However, small- and mid-sized regions also have the opportunity to accommodate projected growth in a range of TOD place types anchored by scale-appropriate transit service, such as light rail or BRT, and in doing so can help maintain regional quality of life and community character. **Dane County is well positioned to benefit from lessons learned nationally and internationally on how to maximize WTS potential and has the potential to become part of the vanguard seeking to do so using the anchor of BRT.**

On other points there is more explicit ambiguity in the literature, such as the degree to which development incentives are necessary to attract private investment in BRT station areas, and whether alignments and stations should target areas where major institutional, employment, and activity centers already exist or where underutilized land will allow for significant new development and value capture. These viewpoints can be reconciled by recognizing the multiple equally valid purposes of a transit system in serving a community's needs, as described above, and the fact that individual station areas can each serve one or more of those purposes.

Despite the variability in approaches, a 2008 study by the Breakthrough Technologies Institute[16] of four BRT systems in developed countries, including those in Cleveland and Boston, found that "the type and level of investment occurring near BRT stations appears comparable to the experience with TOD near rail transit… [and that] the public agencies and private developers interviewed generally were enthusiastic about the potential of BRT to attract TOD, with many developers reporting that BRT has a 'very positive' impact on their property values." For the purposes of this study, we took these perspectives into account in preparing our approach, and calibrated these findings by interviewing local-stakeholders, (see Appendix 8).

[16] Breakthrough Technologies Institute, "Bus Rapid Transit and Transit Oriented Development: Case Studies on Transit Oriented Development Around Bus Rapid Transit Systems in North America and Australia," April 2008.

1. Transit Village Partnerships Successful TOD planning is done in partnership with local governments, transit agencies, neighborhoods and developers.	**2. Station Area Planning** "Flexible" federal transportation funds have been used in many communities as a source to pay for TOD land use plans up to ½ mile from stations.
3. Revise Development Codes In most communities development codes will need to be revised to allow TOD as a clearly permitted use.	**4. Development Ready Transit** Plan and design transit improvements to welcome and encourage TOD by connecting transit to the community.
5. Plan for a Mix of Uses Mixing uses in a TOD or along the line (residential, shopping, work, leisure) helps reduce automobile use and increases walking and transit use.	**6. Link TOD to Community Livability** For most communities a successful TOD strategy and a successful community livability strategy are one and the same
7. Pedestrian-Friendly Projects Focus on pedestrian-friendly projects to avoid the complication of sequencing development with new transit facilities.	**8. Put Limits on Parking** Parking is one of the most important land uses in a TOD. Attention needs to be put on controlling the amount and location of parking.
9. Increase Density Density makes a difference in travel behavior, establishing minimum densities and raising maximums are effective strategies.	**10. Places to Come Back To** When done best, transit investments can be a powerful place making tool to help create places to come back to, not simply to leave from.

Figure 44: The ten strategies outlined here are representative of the planning and policies necessary to support successful TOD and are equally applicable to BRT-based TOD. (Source: Arrington, G.B., "TOD in the United States: The Experience with Light Rail", Parsons Brinkerhoff Planning and Transport Research Centre, January 2005.)

Recognize also that there are WTS neighborhoods outside of the existing and proposed transit network. While the current household densities in these WTS neighborhoods might not support fixed transit service, this research has shown that with smart planning these WTS neighborhoods could benefit the most in terms of reduced auto dependence and VMT savings if their WTS characteristics are used as a base for future development.

WTS neighborhoods outside of the existing transit network could benefit the most in terms of reduced auto dependence and VMT savings

A key piece of this analysis is identifying an appropriate set of supportive policies that may accompany the implementation of BRT in the region. The region already enjoys extensive conventional bus service, particularly in the City of Madison, and several corridors feature the compact, mixed-use, and walkable built form that is highly supportive of transit use. Among other factors, the large student population, proximity of the University to the Capitol square,

compact and mixed land use, and the special geographic constraints presented by Lake Monona and Lake Mendota create a mutually reinforcing context for corridor-based TOD that extends far in either direction from the Downtown. Indeed, a major motivation to pursue BRT in the region is that bus overcrowding is an issue along main corridors,[17] with six-minute average headways insufficient to meet demand during peak travel times. The Madison Area Transportation Planning Board (MATPB) concluded that adding more buses to relieve congestion on an *ad hoc* basis is a "stop-gap measure" and a suboptimal use of Metro resources, and undertook several studies that ultimately identified a need for high-capacity, fixed-guideway transit service.[18]

The strategies and policies that will make the most difference in moving the needle on Dane County's TOD potential are locally controlled land-use and zoning regulations in areas outside of these successful TOD corridors, and identifying underutilized portions of these generally successful corridors that require incentives and/or removal of barriers for redevelopment or more intensive development. For example, a 2004 Transit Cooperative Research Program (TCRP) study suggests that doubling residential density from 10 units/acre to 20 units/acre within one mile of a station results in a 77% higher rate of rail transit usage (from 24.3% of residents to 43.4%).[19] While the regulatory framework that guides land use and zoning varies across the country,[20] some common themes emerge in the literature on best practices in supporting TOD and BRT-based TOD. In addition to the policies, strategies, and supportive planning activities summarized by Arrington in Figure 44, **Dane County municipalities that wish to get the most out of their current and future transit service should consider implementing a either full form-based codes** or a **hybrid between form-based code and traditional land use planning.** Form-based code allows a finer grain of land use mixes and street connectivity, and a mix of financing mechanisms that leverage whole areas rather than specific sites or facilities. The City of Madison's new zoning code, a hybrid code that addresses both form and uses, is a step forward; the City of Fitchburg is likewise taking proactive measures through a form-based code as one tool to guide the community's growth in ways that preserve and enhance residents' quality of life.

[17] Transportation Development Plan 2013-2017, available online at madisonareampo.org

[18] Madison Area Transportation Planning Board, Transport 2020 Alternatives Analysis Study, available online at madisonareampo.org.

[19] Transportation Research Board, "TOD in the United States", TCRP Report No. 102, 2004. There is some risk in applying research from rail-based TOD to a BRT-based analysis of TOD demand, therefore we exercise caution in applying such findings to this study.

[20] Dittmar, Hank, and Gloria Ohland, eds., *The New Transit Town: Best Practices in Transit-Oriented Development*, Island Press, 2004.

X. Conclusion

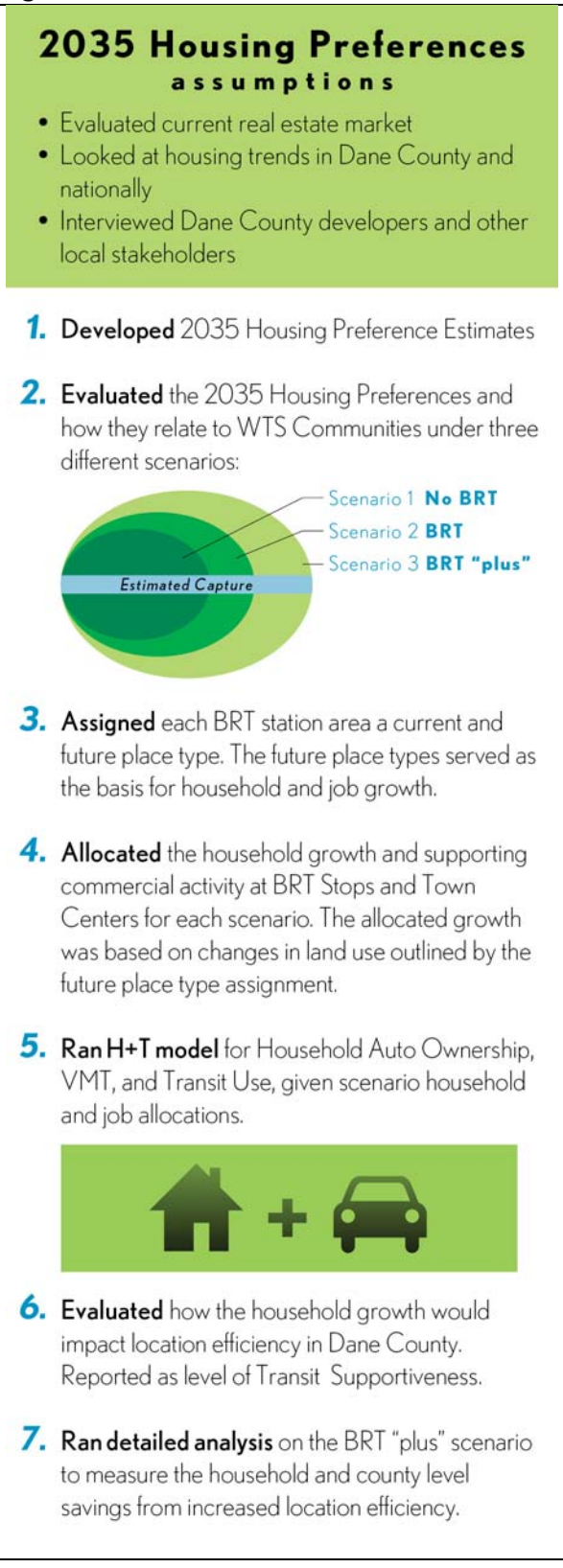
This study addresses two of the key challenges in implementing the CSRC project in Dane County:

- Creating a broader set of vibrant, walkable, mixed-used places
- Leveraging the proposed investment in high-capacity transit

Figure 45 walks through the process that the project team used to address these two challenges. The research began with a thorough evaluation of the current real estate market in Dane County and across the nation. This process was augmented by a series of interviews with developers and local stakeholders to provide community insight on the housing market. Based on this analysis, housing preference estimates were **developed,** which showed a shift toward WTS housing types. This shift in housing preference was then **evaluated,** and the preference to live in a WTS community was presented for three scenarios: No BRT, BRT, and BRT "plus." Each scenario had a different capture rate for households and jobs that would locate in a WTS community.

Every BRT station area was then **assigned** a current and future place type that served as the basis for how that station area would develop over time. Based on this assignment, household and job growth were then **allocated** to the transit area, and the results of that allocation were modeled using the **H+T model** to measure the impact of household and job

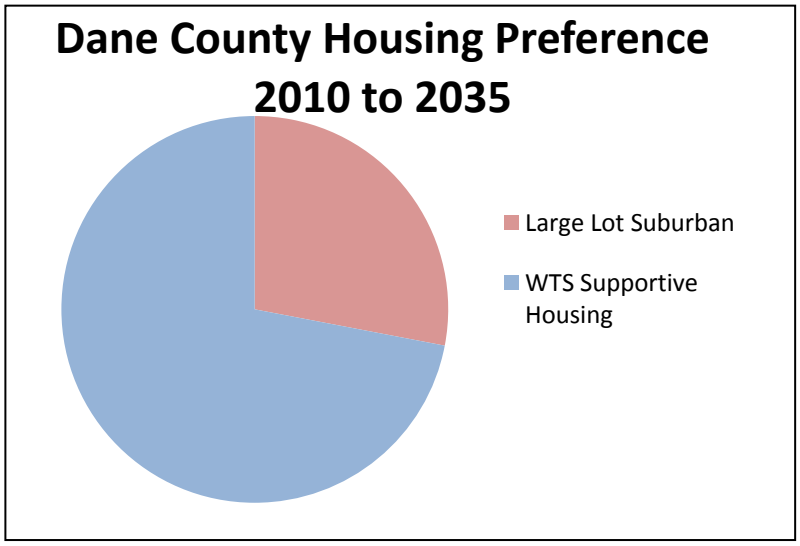
Figure 45 Review of Method



growth on auto ownership, VMT, and transit use. These H+T model outputs were then **evaluated** to show how location efficiency could change under the three development scenarios. A **detailed analysis** was run on the BRT "plus" scenario to measure household- and county-level savings from increased location efficiency.

This analysis has a number of key findings that stem from the discovery that more and more Dane County households will favor housing that is supportive of WTS, which is estimated to comprise 72% of all housing in 2035.

Figure 46: Dane County Housing Preference in 2035



Demand for a WTS community is also expected to increase. Even if the 15,200 households that were allocated along the proposed BRT route under the BRT "plus" scenario are all constructed, there will still be an unmet demand for approximately 20,500 additional WTS households.

The direct benefits of implementing the Bus Rapid Transit system were measured based on the BRT "plus" scenario, and would have significant economic and environmental impacts if the full demand were met.

On the low end, if the 2035 BRT "plus" development scenario was realized, Dane County would save:

- $22.2 million in annual household transportation expenditures
- 6,152 metric tons of GHG emissions
- 14.3 million VMT per year

At the high end, if all of the WTS demand were met, the benefits will include saving:

- $63.2 million in annual household transportation expenditures
- 17,534 metric tons of GHG emissions
- 40.6 million VMT per year

Individual households utilizing the BRT system would experience significant benefits as well.

For a household earning the region's typical median income of $58,775, owning one fewer vehicle per household and driving 10,000 fewer miles per year would save that household $6,559 annually, or 11% of gross income. For a household earning just 80% of regional median income, the benefit would be even higher. BRT would further benefit the local economy by improving access to job centers for employees and workforce retention for employers.

Other benefits beyond the scope of this study include:

- Raising Dane County's profile and reputation as a leader in adopting farsighted transportation system enhancements
- Significantly reducing outlays for civil infrastructure investment by switching from expansive single-family to compact WTS land-use formats

Further benefits can result from:

- **Increasing local access to amenities**: Plan mixed-use development with access to nearby local services.
- **Reducing block size:** Provide midblock pedestrian crossings in existing blocks, and plan smaller blocks for new developments and substantial redevelopments. Redefine alleys as localized mixed-mode, mixed-use streets.
- **Making more intensive and efficient use of land:** Increase both residential and employment intensity throughout the region.
- **Reducing or eliminating minimum parking requirements:** Remove parking minimums to free up land for more productive purposes.
- **Increasing transportation network densities and pedestrian character**: Provide more thru connections and safer local quality. Refocus transportation regulations away from increased speeds and more toward location efficiency.
- **Improving both local and regional transit access**: Provide better area coverage, increased frequencies of service, improved connections to job- and amenity-rich centers, and access to on-demand services, such as car-sharing, to fill missing links and last-mile trip needs.
- **Making more of the region location-efficient:** Use these performance measures to set goals for redevelopment areas and to ensure that planned developments produce results that are continuously moving in the right direction.
- **Building effective public and investor demand for these results:** Report on progress openly and continuously, keeping a steady eye on the value of achievement.

While most of the "good urbanism" in Dane County is in the city of Madison, most of the projected growth is happening in the suburbs. Some of these communities, such as Verona, Sun Prairie, and Middleton Heights, are outside of the planned service area for the BRT. For

the others, however, the system will provide an anchor for developing compact urbanized centers.

BRT, therefore, will serve two very different purposes: providing access to regional employment centers and catalyzing local WTS development in select areas. In a few corridors, BRT will save time by running express, but will not necessarily increase transit mode share.

To realize significant reduction in personal vehicle use (VMT), barriers to infill and higher-density development in existing areas must be lowered, and the existing bus service must be improved outside the city of Madison and seamlessly connected to the new BRT.

Securing the full benefit of investment in BRT will require pro-development rules that are just emerging, such as Fitchburg's form-based code, as well as an aligning mechanism for real estate market development and a marketing strategy promoting traveler choice.

Appendix 1: CRSCC Market Study Oversight Committee Membership

The purpose of the Committee was to guide the market study work performed by the project team to help ensure it meets needs of region; assist with communication and outreach to help ensure stakeholders and public are adequately informed and engaged; and help identify potential contacts for interview and surveys. The following individuals served on the Committee:

Curt Brink, Smart Growth Greater Madison

Natalie Erdman, Executive Director, Madison Community Development Authority

Jim LaGro, Professor, UW-Madison Urban and Regional Planning

Delora Newton, Executive Vice President, Greater Madison Chamber of Commerce

Kevin Richardson, Town Engineer, Town of Windsor

Phil Salkin, Governmental Affairs Director, South Central Wisconsin Realtor's Association

Bill Schaefer, Executive Director, Madison Area Transportation Planning Board

Todd Schmidt, Village Administrator, Village of Waunakee

Dave Trowbridge, Transportation Planner, Madison Planning and Development (unconfirmed)

Michael Waidelich, Principal Planner, Planning Division, City of Madison

Chad Wuebben, President, Encore Construction

Appendix 2: Analysis of Historic Growth and Real Estate Trends

This Appendix presents a detailed analysis of recent trends in population movement, household size, and residential real estate in Dane County and its municipalities, as well as a review of employment trends and distribution of employment by industry, based on locally available data sources.

A. Population, households, and household size

Over the past 32 years, the rate of population growth in both Dane County as a whole and in the City of Madison has been slow and steady. As shown in Figure A2.1 below, Dane County grew at an average annual rate of 1.6% during the period 1980-2012, but more slowly during the more recent period of 2000-2012 (1.3%). Still, these rates of growth outpaced the City of Madison (1.2% from 1980 to 2012 and 1.1% from 2000 to 2012), as a result of which the proportion of the county's population that resides in the City has declined from over half to less than half since 1980.

Figure A2.1: City of Madison and Dane County Population Change, 1980-2012

	Total Population					Annual Percent Change	
	1980	1990	2000	2010	2012*	2000 to 2012	1980 to 2012
Dane County	323,545	367,085	426,526	488,073	491,555	1.3%	1.6%
City of Madison	170,616	190,766	208,054	233,209	234,625	1.1%	1.2%
City as % of County	52.7%	52.0%	48.8%	47.8%	47.7%		

*Estimates 1/1/12; Source: City of Madison Comprehensive Plan, Wisconsin Dept. of Administration

Figure A2.2 shows population growth for key Madison area communities from 1980 to 2012. For the decade 2000-2010, the fastest-growing communities by far were Cottage Grove (53%), Verona (51%), and Sun Prairie (44%). However, overall size of the population in the City of Madison is still vastly higher than anywhere else: well over 230,000 in 2012 compared to less than 30,000 in the next-largest municipality of Sun Prairie.

Figure A2.2: Population Growth for Selected Madison Metropolitan Area Communities, 1980-2012

Community	Total Population					Percent Change		
	1980	1990	2000	2010	2012	1980 to 1990	1990 to 2000	2000 to 2010
Cottage Grove	888	1,131	4,059	6,192	6,230	27%	259%	53%
Fitchburg	11,973	15,648	20,501	25,260	25,246	31%	31%	23%
Madison	170,616	190,776	208,054	233,209	234,625	12%	9%	12%
Maple Bluff	1,351	1,352	1,358	1,313	1,314	0%	0%	-3%
Middleton	11,779	13,785	15,770	17,442	17,903	17%	14%	11%

Monona	8,809	8,637	8,018	7,533	7,523	-2%	-7%	-6%
McFarland	1,783	8,232	6,416	7,808	7,839	362%	-22%	22%
Shorewood Hills	1,837	1,680	1,732	1,565	1,567	-9%	3%	-10%
Stoughton	7,589	8,786	12,354	12,611	12,630	16%	41%	2%
Sun Prairie	12,931	15,352	20,369	29,364	29,840	19%	33%	44%
Verona	3,336	5,374	7,052	10,619	10,856	61%	31%	51%
Waunakee	3,866	5,897	8,995	12,097	12,277	53%	53%	34%
Westport	2,748	2,732	3,586	3,950	3,962	-1%	31%	10%

Source: Wisconsin Dept. of Administration, US Census

It can be instructive to also look at change in the number of households, the basic consumer unit that acts in the housing market. Madison has about the same share of the county's households as it does population: approximately half or over 100,000 of the county's estimated total in 2011. Mirroring the population changes shown above for various Dane County municipalities, we see in Figure A2.3 below that the City of Madison's share of the county's households has declined since 2000 because its rate of household growth was below that of the county as a whole, while villages and third- and fourth-tier cities claimed households at a rate well above that of the county average.

Figure A2.3: Growth in Households in Dane County and Constituent Municipalities

	Number of Households			
Category	**2000**	**2010**	**2011 Estimate**	**Percent change 2000-2011**
Towns	28,576	30,557	30,632	7.2%
Villages	21,558	27,891	27,957	29.7%
3rd-4th Cl. Cities	34,331	42,793	42,898	25.0%
City of Madison	89,019	102,516	102,775	15.5%
Dane County	173,484	203,757	204,262	17.7%

Source: U.S. Census Bureau, Wisconsin DOA and CARPC

As shown in Figure A2.4, households got smaller all over the county between 1980 and 2010 except in third- and fourth-tier cities, which saw an increase in persons per household between 1990 and 2010. Towns saw the greatest decrease in persons per household, from 3.01 on average in 1980 to 2.57 in 2010. In the City of Madison, where households tend to be markedly smaller on average than elsewhere, the decline was from 2.38 to 2.17 persons per household. The most recent Regional Transportation Plan suggests that decreasing household size can be attributed to local and national trends of higher divorce rates, families choosing to have fewer children, postponement of marriage, and an aging population.

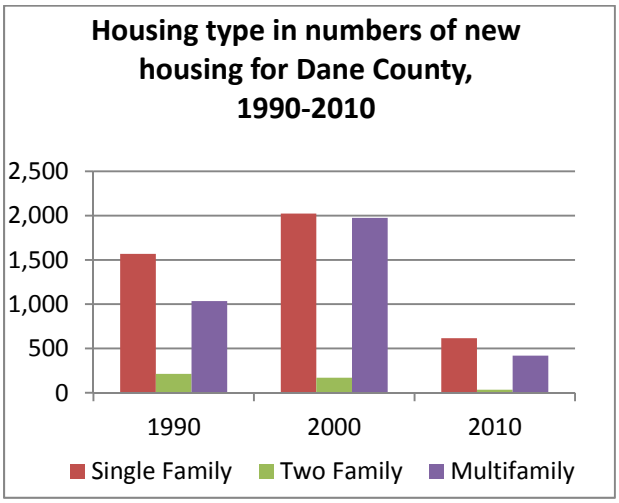
Figure A2.4: Household Size in Dane County and Constituent Municipalities							
	Persons Per Household				2011 Households		
Category	1980	1990	2000	2010	Persons	Households	Persons/HH
Towns	3.01	2.80	2.59	2.57	79,071	30,632	2.57
Villages	2.85	2.74	2.72	2.61	73,275	27,957	2.61
3rd-4th Cl. Cities	2.54	2.29	2.35	2.37	103,095	42,898	2.37
City of Madison	2.38	2.30	2.19	2.17	233,890	102,775	2.17
Dane County	2.56	2.46	2.37	2.33	489,331	204,262	2.33

Source: U.S. Census Bureau, Wisconsin Dept. of Administration and CARPC

B. Housing

Trends in new housing for Dane County from 1990-2010, seen below in Figure A2.5, demonstrate a large quantity of new single-family and multifamily housing in 1990 and 2000, with single family consistently out-pacing the others. The creation of two-family housing was relatively low compared to single- and multifamily types, and became increasingly less popular over time as single-family detached options became relatively affordable by comparison following 2006.

A universal drop in new housing development is shown for the year 2010, reflecting the economy-wide housing downturn that began in 2006. Indeed, between 2007 and 2008 the number of single-family new units almost halved (from 1,229 to 629) and those numbers have remained steady since then. Data for 2013; however, does suggest a rebound in the market is occurring. Conversely, multifamily housing saw an increase in its share of total new housing development, jumping from 41.7% in 2007 to 59.8% in 2008. As of 2011 and for the first time in over 20 years, multifamily housing overtook single family housing in Dane County with 822 developments compared to 618 (CARPC and Dane County Department of Planning, 2011).



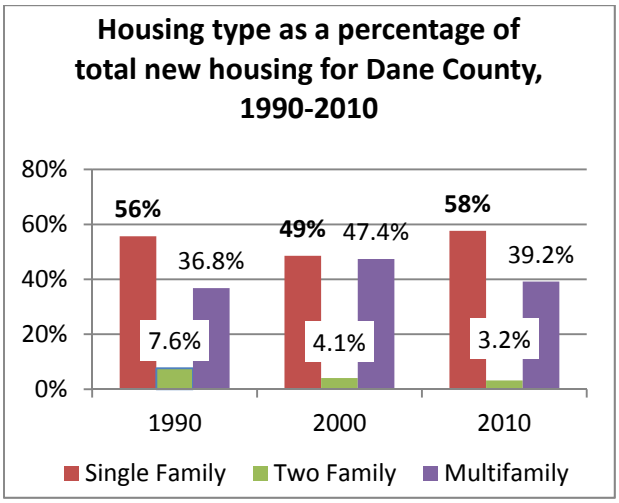


Figure A2.5: New single-family developments consistently out-paced other types in the Madison region from 1990-2010 (Source: CARPC 2011) however more recently multi-family developments have been dominant.

C. Labor Force and Employment Characteristics

Employment grew by 36% in Dane County from 1980 to 1990 and by 23% between 1990 and 2000. Following this healthy growth, the 2000-2010 decade saw a drop to 7% in its employment growth due to the economic recession. Figure A2.6 paints a detailed picture of labor force, employment and unemployment rates for Dane County since 2005. The size of the labor force has grown steadily: minor declines in 2010 and 2011 were recovered according to 2012 estimates, which show a 1.4% increase in labor force. Employment, too, has gradually increased since 2005 with a small decline of 1.1% in 2009. From 2007 to 2010, the labor participation rate declined from 60.6% to 58% and stabilized for 2011. The labor participation rate as of July 2012 increased slightly to 58.4%.

Figure A2.6: Dane County Labor Force And Unemployment Trends

Year	Labor Force	Average Annual Labor Force Change	Persons Employed	Average Annual Employment Change	Unemployment Rate	Population	Average Annual Population Change	Labor Participation Rate
2005	286,918	--	277,809	--	3.2%	458,297	--	60.6%
2006	290,457	1.2%	281,043	1.2%	3.2%	464,513	1.4%	60.5%
2007	293,777	1.1%	283,855	1.0%	3.4%	468,514	0.9%	60.6%
2008	295,604	0.6%	285,560	0.6%	3.4%	471,559	0.6%	60.6%
2009	300,199	1.6%	282,500	-1.1%	5.9%	473,622	0.4%	59.6%
2010	299,832	-0.1%	282,891	0.1%	5.7%	488,073	3.1%	58.0%
2011	298,714	-0.4%	283,668	0.3%	5.0%	489,331	0.3%	58.0%
2012*	303,014	1.4%	287,043	1.2%	5.3%	491,555	0.5%	58.4%

Source: U.S. Census, Wisconsin Department of Workforce Development (LAUS), Wisconsin Dept. of Administration (Population and Housing Estimates); *indicates estimates through July 2012 only.

Since 2000, the City of Madison has maintained 65.5% of Dane County employment. In recent decades, the size of the labor force in Dane County has not kept up with its growth in employment, resulting in labor supplied from outside the county boundaries. Similarly, the Cities of Madison and Middleton have had higher employment growth than the rest of the county and also import labor from outside their city limits (Regional Transportation Plan Update 2035).

Figure A2.7 shows unemployment rates for the City of Madison and Dane County compared to the state and the U.S. since 1990. The sharp spike in unemployment in Madison and Dane County beginning in 2008 was followed by a gradual recovery that mimics the pattern for the state and national levels. Happily, unemployment rates for the City of Madison and Dane

County have been consistently lower than the state and U.S. since 1990. As of June 2012, Dane County's unemployment rate was 5.3% and compared to 7.6% for the U.S. (Bureau of Labor Statistics).

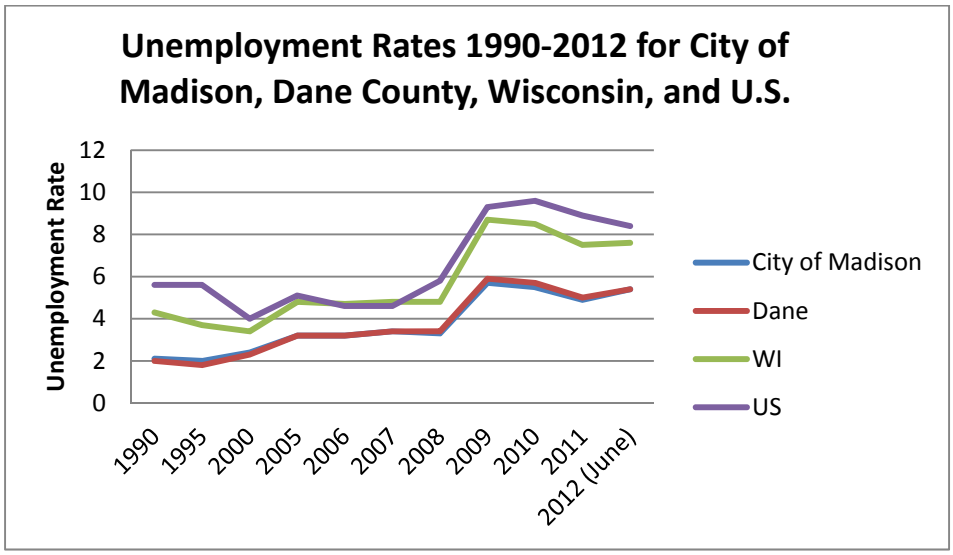


Figure A2.7: Unemployment rates in Madison and Dane County are consistently lower than state and national levels, but the local/regional direction of change tracks closely. Source: Local Area Unemployment Statistics, Worknet.wisconsin.gov

The leading industry sector since 1990 has been the Education and Health Services industry, which supplied 78,634 jobs for the first quarter of 2012. Other leading industries include Trade, Transportation, & Utilities (50,000 jobs) and Professional and Business Services (40,000 jobs). The number of jobs in the Professional and Business Services industry grew by 140% from 1990 to 2011, while employment in the Information industry increased by 119% for the same time period (and and by 12% from 2010 to the first quarter of 2012 alone).

Dane County has seen growth of at least 25% in many of its industry sectors from 1990 through 2011, and two other industries saw growth at nearly that level: Trade, Transportation, and Utilities (19%), and Construction (24%). A sector with notable decline was Public Administration (-14%). Manufacturing declined by 4% on average, however in the period 2010-2011 saw positive growth of 4%.

D. Residential and Commercial Market Trends

From this broad overview of population and household growth trends, changes in household size, and trends in employment and various industry sectors, we now review recent market trends and current conditions for housing, retail, office, and industrial development in the Dane County region.

1. Single-Family Homes and Condominiums

Sales activity for single-family homes and condominiums is still in recovery in both the City of Madison and Dane County as a whole. Sales as of the time of this analysis had not yet returned to the levels seen in 2000, when both the City and the County had smaller populations.

The Dane County housing market has experienced significant volatility over the past decade, especially in the single-family housing and condominium markets. The region saw high levels of sales activity and pricing going into 2005 before the national financial bubble burst and the onset of the global financial crisis was in full effect.

There was very close correlation between the real estate sales cycle for Dane County and the City of Madison from 1991 through the first 9 months of 2012. Both markets experienced sales peaks in 2005, and followed by decline for three years, then a brief rise in 2009 and most recently through the third quarter of 2012. Sale activity in both Madison and Dane County has yet to return to the levels seen in 2000 when both areas had smaller populations.

Figure A2.8 below compares the sales activity of Dane County with that of the City of Madison from 1991 through the first 9 months of 2012. Single-family sales activity in Dane County increased by 105% between 1991 and 2011, while sales in the City of Madison increased by 97.5% over the same time period. Both markets experienced increased sales of more than 30% from 2000 to 2005 and declines of more than 8% the following year. From 1991 to 2012, the City of Madison single-family home sales have comprised 42.8% to 47.9% of Dane County's single family sales. Madison most recently comprised 46.1% of Dane County sales for the first 9 months of September 2012.

Local realtors in the City of Madison have indicated that the condominium market has not fully recovered in 2012, due in large part to the amount of higher-priced, less competitive units on the market and a considerable backlog of new projects pending.

It is important to note again the decline in the City of Madison's share of county population over the past three decades. In 1980 Madison comprised 52.7% of the total population of Dane County while in 2011 it made up only 47.8% of the county's population. Towns additionally saw declines in share of population as they were often annexed into municipalities. Dane County's villages and other cities managed to grow their share of the county's population significantly over the past three decades. From 1980 to 2011, Dane County's villages and third- and fourth-tier cities grew their combined total share of county population from 24.3% to 36.1%. This transfer of population helps explain the significant growth of residential developments, new home sales, and new rental units outside of the City of Madison.

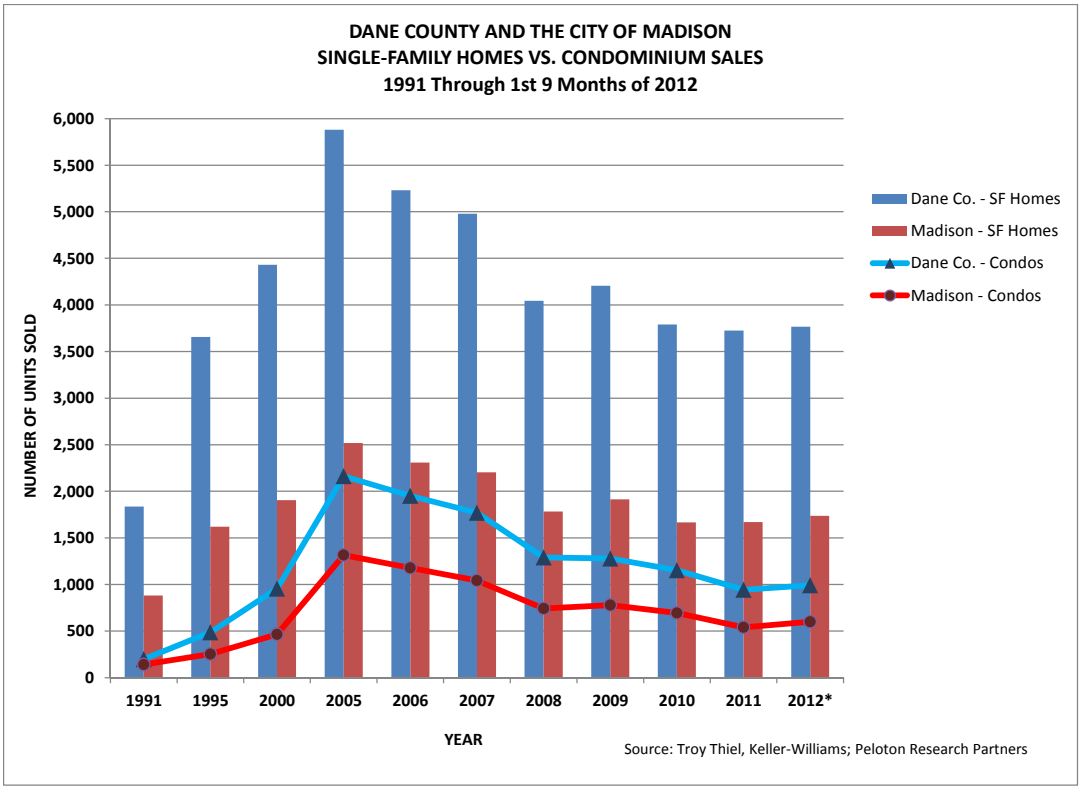


Figure A2.8: From 1991 to 2012, single-family home sales in the City of Madison have comprised 42.8% to 47.9% of Dane County's single family sales. Source: Troy Thiel, Keller-Williams; Peloton Research Partners

2. Multi-Family Housing

Rental housing makes-up the majority of housing units in the City of Madison with 51% of all households occupying a rented home. The Madison rental market benefits from a high composition of people in the 20 to 34 age range (34.5%). Combined with a large percentage of family households with only two people (48.6%), and a larger percentage of non-family households with two or fewer people (90.7%), the results are a higher propensity for rental units in the market. The impacts of high rental demand can be seen in the annual vacancy rates of apartment buildings in the Greater Madison area of Dane County. Figure A2.9 below shows the vacancy rates during the first quarter of each year from 2006 to 2012.

The Madison multi-family market is very strong, with a 2% vacancy rate as of late 2012, compared to 9.8% nationally and 3.5% to 4% in the Midwest on average.

The vacancy rate has been declining steadily in the market, in synch with overall decline in the for-sale housing market and the economy in general. National vacancy rates for apartments in August 2012 were 9.8%,

while rates in the Midwest were only 3.5% to 4% on average. By comparison the Madison market is very strong. Figure A2.9 shows a vacancy rate of 2% for the first quarter of 2012, reflecting vacancies among 52,000 apartments located in the ZIP codes of the Cities of Madison, Monona, Middleton, Fitchburg, and Cross Plains. The vacancy rate in portions of these locations can be lower still: local CPA firm Baker-Tilly conducted a survey of 1,700 units, primarily in the student housing area around the University of Wisconsin and in newer rental communities, and found there was a 0% vacancy rate in August of 2012.

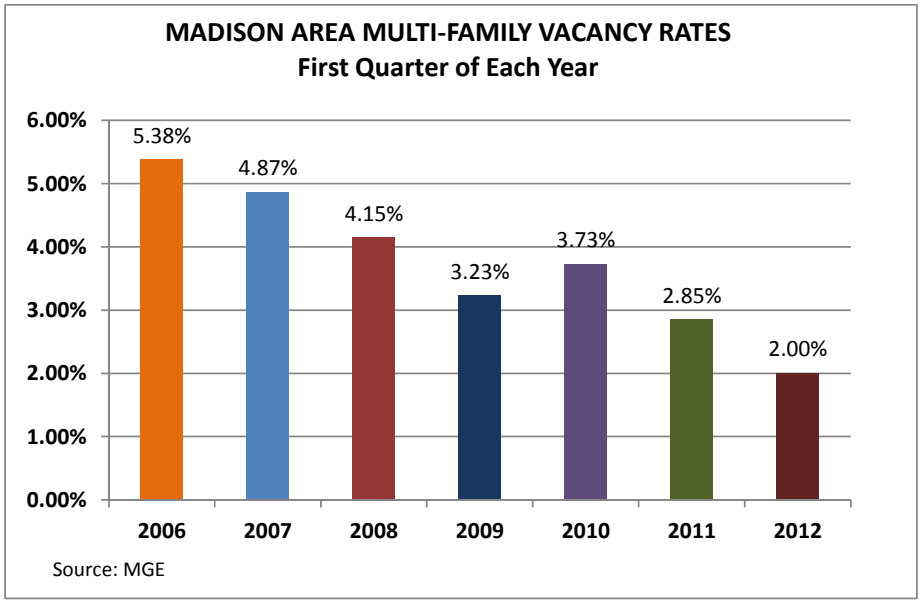


Figure A2.9: Annual vacancy rates for apartment buildings in the Greater Madison area demonstrate the impacts of high rental demand. Source: MG&E

University students have helped drive up the price of rentals units in the neighborhoods surrounding the UW campus. Additional pressure has come from the introduction of higher-end, Class A apartment buildings in the market targeted to young professionals. Rents at these apartments can exceed $4,000 per month, considerably higher than the cost per month at more suburban apartment complexes on the West and East sides of Madison. Figure A2.10 shows the monthly rental rates on a per-square-foot basis for good-quality to new rental apartments in the University area (including Downtown) and the East and West sides of Madison.

Figure A2.10: Monthly Rental Rates in Central Madison			
Unit Type	Monthly Rental Rate Per Square Foot		
	University/Class A	West Madison	East Madison
Studio	$1.80 to $2.00	n/a - n/a	n/a - n/a
1-Bedroom	$1.60 to $1.70	$1.10 to $1.30	$1.05 to $1.15
2-Bedroom	$1.50 to $1.60	$1.00 to $1.10	$0.95 to $1.05

Source: Baker-Tilly

Prices on a square foot basis drop dramatically for suburban rental units in West Madison. This is due to the more conventional nature of pricing for these rentals, with monthly rates reflecting an emphasis on a per-unit basis and not a student-driven per-room basis. The rents in East Madison are even lower than that of West Madison, with monthly rates ranging from $.95 to $1.15 depending on number of bedrooms. Eastside apartments are typically further away from campus and less attractive to students. The renters in these apartments tend to be blue-collar workers and small families. Students locating to the far end of West or East Madison to find more affordable rentals typically rely more on public transit than those in the immediate vicinity of campus.

Lower-income families and students priced out of neighborhoods near the university can find lower-cost housing on the East and West sides of town, where they would benefit from high-quality, low-cost public transit.

3. Residential Permit Activity

Dane County experienced a decline in the number of residential permits issued starting in 2005. Similar to the decline in single-family and condominium sales activity, permit activity declined with the onset of the national recession. Single-family permits declined 75% from 2003 to 2011, dropping from 2,505 to 618 permits issued. Multi-family permits experienced a similar decline from 2003 to 2011, dropping 69% during the time period. Detailed annual permitting numbers are shown in Figure A2.11 for the period 1990 to 2011 for single family, duplex, and multifamily housing types.

Local builders have responded to market conditions by pulling substantially fewer permits for new construction. The more tempered level of permit activity experienced between 2008 and 2011 will help speed up a recovery in the local housing market. The issuance of multi-family permits is expected to continue to make up the majority of residential permits issued in Dane

County, as demographic and market characteristics show greater demand for multi-family units moving forward.

Figure A2.11

New Dane County Housing Units by Type of Structure

1980 to 2011

Year	Single Family		Two Family		Multifamily		Total
	Number	%Total	Number	%Total	Number	%Total	Number
1990	1,568	55.6%	214	7.6%	1,036	36.8%	2,818
1991	1,629	57.6%	212	7.5%	989	34.9%	2,830
1992	2,125	64.1%	276	8.3%	915	27.6%	3,316
1993	2,120	52.7%	290	7.2%	1,612	40.1%	4,022
1994	1,744	47.3%	330	9.0%	1,611	43.7%	3,685
1995	1,422	41.6%	270	7.9%	1,725	50.5%	3,417
1996	1,700	55.8%	284	9.3%	1,061	34.8%	3,045
1997	1,522	49.1%	246	7.9%	1,331	42.9%	3,099
1998	1,826	48.8%	236	6.3%	1,679	44.9%	3,741
1999	1,945	48.1%	286	7.1%	1,810	44.8%	4,041
2000	2,023	48.5%	170	4.1%	1,975	47.4%	4,168
2001	2,288	48.1%	162	3.4%	2,303	48.5%	4,753
2002	2,450	53.8%	244	5.4%	1,862	40.9%	4,556
2003	2,505	45.8%	294	5.4%	2,667	48.8%	5,466
2004	2,359	49.7%	290	6.1%	2,093	44.1%	4,742
2005	2,241	47.8%	292	6.2%	2,152	45.9%	4,685
2006	1,377	42.3%	238	7.3%	1,640	50.4%	3,255
2007	1,129	52.8%	118	5.5%	893	41.7%	2,140
2008	629	35.3%	88	4.9%	1,067	59.8%	1,784
2009	600	47.6%	18	1.4%	642	51.0%	1,260
2010	617	57.7%	34	3.2%	419	39.2%	1,070
2011	618	42.0%	30	2.0%	822	55.9%	1,470

Source: CARPC survey of local units of government and Dane County Department of Planning and Development (number of permits issued)

4. Dane County and City of Madison Foreclosure Activity

Like many counties in the United States, Dane County continues to experience lingering problems with high-levels of foreclosure filings and distressed properties. The high in 2010 represented a 477.8% increase in the number of foreclosures over 2000. From 2010 to 2011 the number of foreclosure filings declined 22.3% in the county, the first decline in the number of filings since 2004. Higher levels of foreclosure activity occurred in Black Earth, Dane, Deerfield, Cambridge, Sun Prairie, and DeForest, while areas located west and northwest of Madison, including Waunakee, Middleton, Verona, and Belleville had much lower levels of foreclosure

activity. The latter areas have seen higher job growth and lower levels of turnover of housing inventory.

Figure A2.12

Dane County Foreclosure Filings 2000-2011

Year	New Foreclosure Filings	Annual % Change	Total % Change Since 2000
2000	306	-	-
2001	370	20.9%	20.9%
2002	421	13.8%	37.6%
2003	462	9.7%	51.0%
2004	422	-8.7%	37.9%
2005	477	13.0%	55.9%
2006	752	57.7%	145.8%
2007	898	19.4%	193.5%
2008	1,312	46.1%	328.8%
2009	1,695	29.2%	453.9%
2010	1,768	4.3%	477.8%
2011	1,374	-22.3%	349.0%

Source: DaneCountyMarket.com; Peloton Research Partners

By comparison, filings in September 2012 show that the City of Madison had 166 foreclosures, with the Isthmus having the lowest level of activity and neighborhoods toward Fitchburg the highest. Local real estate agents in the City of Madison note the increase in the number of sales in 2001 was caused in part by more transactions involving distressed properties which then led to lower overall median price levels.

Based on the remaining high number of foreclosure filings relative to historical levels, the issue of distressed properties in Dane County and the City of Madison may require considerable time to resolve before the market can stabilize to healthier levels.

5. Retail Market – Greater Madison

The Madison retail market has remained healthy overall despite larger issues in the national economy. As noted above, Madison has benefitted from a lower unemployment rate of 5%

versus the rate of 8% nationally. The decline in housing prices has lowered housing costs for new home buyers, providing a boost in disposable income to some.

Local retail landlords have seen strong occupancy rates, and new retailers, including larger national retailers, continue to come to Madison. In August 2012, the vacancy rate was reported as 4.8% for general retail space not located in a mall or power center. Area power centers had a vacancy rate of 4.0%, while regional mall space at East Towne and West Towne Malls had a reported vacancy rate of only 2.4%.

Total vacant space was 2,589,375 square feet out of total retail inventory of 40,670,600 square feet, for a total vacancy rate for all retail space of 6.4%.

Figure A2.13

MADISON AREA RETAIL SPACE		
Total Retail Inventory	40,670,600	Sq Feet
Total Vacant	2,589,375	Sq Feet
In-Line Retail Space	4.8%	Vacancy
Regional Mall Space	2.4%	Vacancy
Power Centers	4.0%	Vacancy
Other Misc. Retail	8.9%	Vacancy

Source: CBRE

Lease rates at area retail centers vary considerably depending upon location and the quality and visibility of the retail space. Older generation retail spaces in East Madison typically range from $12 to $17 per square foot (for a lease that is net of taxes and other expenses, i.e. “triple net” or “NNN” in industry parlance) while new generation spaces in a higher-profile, quality center can range from $30 to $35 per square foot (also NNN).

State Street in Downtown Madison remains a popular, high-pedestrian district and maintains near zero vacancy with asking lease rates in-line with that of quality mall space. Madison has proven that well-located smaller retail spaces in existing neighborhoods can do well and can fill the void not provided by larger retail outlets. One of the more common requests realtors in Madison hear from potential homebuyers when looking for the right neighborhood is whether there is a nearby grocery and/or coffee house. Many note the need for the neighborhood to be walkable.

Though vacancy rates remain relatively healthy, local commercial brokers have warned that deals for new retail leases are very slow now and are taking considerably longer than in the past. There is some concern among that the City of Madison is over-retailed, especially in the periphery. Big box retailers such as Target, Woodmans, and Costco continue to expand to other

municipalities such as Middleton, Fitchburg, and Verona where both population and household growth maintain a higher pace.

6. Office Market Overview – Greater Madison

The Greater Madison office market includes a diverse range of varied-quality space spread across the region. Downtown Madison comprises approximately 21% of the area's office inventory, not including owner-occupied, government-owned, or medical office space. According to Grubb-Ellis Oakbrook Realty, total inventory of leased office space in buildings over 10,000 square feet was 13,927,700 square feet in Madison at the end of 2011.

Figure A2.14: Office Inventory, City of Madison

Year End	Total Inventory	Total Completions	Total Absorption
'00	9,408,000	544,900	433,000
'01	10,046,000	808,400	618,000
'02	10,715,000	574,400	190,000
'03	11,346,000	388,000	299,000
'04	11,376,000	229,400	288,000
'05	11,596,900	282,000	329,000
'06	11,968,100	402,000	158,100
'07	12,223,100	231,000	363,200
'08	13,204,100	594,000	247,100
'09	13,512,000	283,000	56,000
'10	13,875,400	229,310	140,000
'11	13,927,700	0	65,700

Source: Grubb-Ellis Oakbrook Realty

Figure A2.14 shows the total office inventory back to 2000 with annual new space additions (completions) and total leased space absorption. As shown here, there were no new additions of office space during 2011 and only 65,700 square feet of space absorption that year. This is the lowest level of completions and second-lowest level of market absorption over the previous decade.

Downtown Madison has seen small additions to office inventory since 2000. Market absorption downtown has been more volatile historically than the rest of the market, with the loss of bigger tenants in some years greatly impacting vacancy rates. As shown in Figure 2.15, during 2011 downtown Madison absorbed 21,300 square feet of space, an improvement over the 8,100 square feet absorbed in 2010. The addition of new office spaces in other municipalities

outside of Madison, and the aggressive nature of cities competing for office tenants, will continue to put pressure on the Madison office market.

Suburban office markets outside the Central Business District (CBD) continue to attract more tenants and lower vacancy rates in Class B & C spaces, while the CBD continues to maintain a lower vacancy rate in Class A spaces (9.7% for the 3rd Quarter of 2012). The desire to provide surface parking for office tenants was one of the major decisions given for companies choosing suburban office spaces in Greater Madison over spaces in the CBD.

Figure 2.15: Market Absorption, Downtown Madison

Year End	Downtown Inventory	Downtown Completions	Downtown Absorption
'00	2,705,000	0	74,000
'01	2,687,000	0	21,300
'02	2,659,000	13,000	(239,000)
'03	2,642,000	0	(39,000)
'04	2,532,000	49,200	40,500
'05	2,489,400	0	115,000
'06	2,694,300	133,350	43,900
'07	2,649,000	0	67,600
'08	2,991,300	0	13,900
'09	3,008,000	16,400	11,600
'10	3,024,000	0	8,100
'11	2,891,000	0	21,300

Source: Grubb-Ellis Oakbrook Realty

7. Industrial Market – Dane County

Dane County has an expansive market for industrial space driven in large part by the region's focus on research in agriculture, bio-tech, high-tech, manufacturing, and medical industries. The Madison Metropolitan Area is ranked among the 20 metropolitan areas in the U.S. for high-tech industry. The region has invested heavily in higher education and economic development, and the number of business parks built in the region over the past decade shows the level of interest in businesses and institutions in Dane County's future.

According to MG&E's 2011 report on business parks, there are now 80 commercial centers and business parks located in Dane County with over 2,500 acres of combined sites available in 63 of these. The City of Madison has 39% of Dane County's business parks. Since 2000, a total of 46 new parks have opened in the county with 19 of those being located in the City of Madison. At the end of 2011, Madison had 34% of the currently available acres ready for development.

Nine out of 10 business incubators in the region are located in the City of Madison, primarily along Highway 151, with high occupancy rates that show their popularity and success. Clustering close to Downtown Madison provides strong opportunities for collaboration and entrepreneurship.

There was a 60% decline in the number of acres absorbed in all the region's business parks between 2010 and 2011. In addition to the 80 business parks in Dane County, there are 10 business incubators. Two new incubators were added during 2010 through 2011, and 9 out of the 10 incubators are located in the City of Madison. The occupancy rate at these facilities was 93% at the end of 2011, a very healthy figure and indicator of their popularity and success.

Unlike the business parks that are spread more broadly across the Madison region, the incubators tend to be located primarily along the Highway 151 corridor. This clustering of businesses in close proximity to downtown Madison provides strong opportunities for collaboration and entrepreneurship in a vibrant community environment. Current metro transit provides stops within close proximity to the majority of business parks and incubator facilities in the Madison region. The vast scale of acreage in the business parks and the large separation of buildings on the sites will make identification of centralized station locations to service express buses a challenge for transportation planners in the region moving forward. Efforts to provide these locations with public transit should consider how to solve the "last mile" problem, e.g. with bike sharing, shuttles, and/or attractive pedestrian linkages.

C. Conclusions

The following conclusions may be drawn from this overview and analysis of recent trends in Dane County's population and household growth, employment, and residential and commercial real estate markets.

- Madison is losing family households to other jurisdictions, likely driven by an interest in better school districts, jobs, and newer housing.

- The dominance of students in the housing of neighborhoods around the University has priced-out non-students to outlying areas of the city and beyond. Higher-density housing has moved more students closer to the University. Former student homes on the fringe are now being occupied by lower-income families, particularly immigrant families. This latter population typically faces a higher burden in terms of combined housing and transportation costs, and therefore greater need for effective, lower-cost transportation options, e.g. public transit.

- The market for multi-family rental housing in the City of Madison is strong and remains an area of opportunity for local developers.

- A major influx of condominium projects that entered the market starting in 2005, particularly in Downtown, has led to 17 months of inventory listed on the market as of September 2012. Local realtors have suggested that the glut of inventory is a reflection of over-pricing and poor floor plan design and is not a reflection of low market demand for condominiums.

- Multi-family rental demand is growing in other municipalities in Dane County due to the creation of new jobs in those markets combined with the younger, more mobile population moving to those markets and often taking those jobs. Epic Systems provides a good example of this in Verona, and at the same time many of the company's employees choose to live in the Downtown core, strongly impacting occupancy levels of multi-family units there.

- Madison is losing companies to other areas in Dane County. Other jurisdictions are very aggressive in attracting companies away from the City of Madison – offering better terms, lower rents and land prices, less red tape, and faster project processing. Madison has gained a reputation over the previous years as being unfriendly to business, a reputation that Mayor Soglin and his staff are working to change.

Appendix 3: Stakeholder Interview Process and Detailed Responses

A list of potential interviewees was gathered from several resources including the Greater Madison Chamber of Commerce, CARPC, members of the Wisconsin Realtors Association, and local members of the banking community. A total of 25 individuals representing 18 diverse organizations were interviewed in Dane County in Fall 2012. The final candidates were selected randomly based in large part on their availability. These participants are employed in both the public and private sectors in diverse industries including: commercial and residential real estate development, hospitality, retail grocery, fashion retailing, trade associations, tourism, technology business, financial services, real estate brokerage, city administration, and nonprofit sustainability advocates.

A series of structured and open-ended questions were asked of the interview participants to allow for exploratory dialogue on of the subjects of transportation, infill development, city policies, characteristics of government and business employees, commute patterns and transportation needs of employees and customers, local business climate, business locations decisions, opinions on existing bus service and transportation options, knowledge and interest in BRT, interest in infill development, and the potential influence of a BRT line on developer's decisions to build in infill locations. All participants were familiar with BRT, with only minimal confusion between the differences between BRT, express bus, and streetcar concepts. Given the diversity of the stakeholders and their organizations, an effort was made to broaden the focus of more real estate-specific questions to include topics related to workforce issues, student needs, visitor and tourist opportunities, and merchant concerns. Questions that were most relevant to a specific interviewee or organization were posed only to those interviewees (see below for the full list of questions posed).

The interviewees were scheduled for up to 30 minute interviews, though the time of the actual interviews averaged closer to 45 minutes. All participants were generous with their time and showed strong interest in both the BRT and TOD studies. Aside from answering the structured questions, all participants provided substantial background information on living and working in Dane County, their own personal experiences with transportation options and local transportation infrastructure, and when relevant, their personal experiences working with local real estate developments. Employers provided important feedback regarding their own personal challenges dealing with employee transportation needs and the needs of their customers.

Interviews were conducted with the following individuals:

- Todd Carpenter, Partner - Baker Tilly
- Kate Crowley, CPA - Baker Tilly

- Christian Caulum, Senior Real Estate Associate - Grubb & Ellis - Oakbrook
- Stephen Zanoni, General Manager - Madison Concourse Hotel
- Natika Wattanasuttiwong, Rooms Manager - Madison Concourse Hotel
- Delora Newton, Executive Vice President - Greater Madison Chamber of Commerce
- Helen Boyne, Vice President of Operations & Technology - ShopBop
- Deb Archer, President & CEO - Greater Madison Convention & Visitors Bureau (GMCVB)
- Diane Morgenthaler, Vice President of Marketing & Strategic Planning - GMCVB
- Katrin Madayag-Ard, Organizational Research Manager - GMCVB
- Janine Wachter, Director of Convention of Event Services - GMCVB
- Gregg McManners, Executive Director - Monona Terrace Convention Center
- Thomas Keller, CCIM - Keller Real Estate Goup
- Brad Binkowski, President - Urban Land Interest (ULI)
- Helen Bradbury, President - Stonehouse Development
- Matt Meier, Vice President – Alexander Company
- Jeff Rosenberg, President of Land Development & Acquisition – Veridian Homes
- Gary Gorman, CEO – Gorman & Company
- Phil Salkin, Governmental Affairs Director - Wisconsin Realtor's Association - So. Central
- Tod Sloane - Epic Systems
- Lisa Olson, Director of Cooperative Services - Willy Street Co-op
- Anya Firszt, General Manager - Willy Street Co-op East
- Troy Thiel, Realtor - Keller Williams Realty
- Matthew Mikolajewski, Office of Business Resources Manager - City of Madison
- Aaron Olver, Director of Economic Development - City of Madison

Interviews with these individuals were based on the following questions:

Q1. Are you familiar with Bus Rapid Transit (BRT)?

Q2. Are you familiar with the study analyzing BRT for Dane County?

Q3. What do you think of the prospects for BRT in the City of Madison now and in 2035?

Q4. What do you think of the prospects for BRT in Greater Dane County now and in 2035?

Q5. How many of your employees currently use transit to get to work?

Q6. Why do you or your employees that use transit choose to do so?

Q7. Are there improvements or incentives you see that would improve the use of local transit by you or your employees?

Q8. Are you interested in developing on infill sites in the City of Madison in the near future?

Q9. Would the presence of a BRT station adjacent a prospective site in the City of Madison be a greater incentive for you to purchase and develop that site with TOD?

Q10. Would you see the addition of BRT in the community as a stimulator for development on infill sites? Let's use the East Washington Corridor as an example.

Q11. Could you build on an infill development site without the use of TIF funds? Again, let's use the East Washington Corridor as an example.

Q12. We've established the importance this market places on parking. Do you see opportunities to build projects that have minimal to no parking, especially if well-served by immediately adjacent transit options?

Q13. How do visitors arrive to your facilities?

Q14. Do you believe BRT would improve the transportation options for visitors and tourists to Madison and Greater Dane County?

Q15. What are the opportunities that BRT provides the community?

B. Summary of responses

1. Long term prospects for BRT in the City of Madison and Dane County

All participants identified the cities of Middleton, Fitchburg, Verona, and Sun Prairie as areas that may support long-term demand for express bus service to and from the City of Madison.

All interviewees were familiar with this bus format with minimal confusion regarding differences between express buses and BRT. All participants questioned whether the City of Madison had the level of ridership to support a dedicated BRT line versus express service at this time. All felt current ridership levels were too low at this time to support full implementation of BRT. Looking to 2035, 20 out of 25 participants felt it was important to explore the BRT alternative for long-range transportation planning, and 17 of these participants noted the need for faster connectivity with adjacent communities in the future. Similarly, all interviewees expressed concern about ridership levels in Dane County as a whole, however most felt the timeline for connecting some areas in the county with faster bus service would come sooner than others. Middleton, Fitchburg and Verona were noted as those with greatest short-term prospects due primarily to current commuting patterns. Three participants noted Verona as having an immediate need, primarily to and from Epic Systems, that is currently being

supplemented by special Metro express bus service. Looking to 2035, all participants identified the cities of Middleton, Fitchburg, Verona, and Sun Prairie as areas that may support long-term demand for express bus service between those cities and the City of Madison.

2. Transit Usage for Commuting

Stakeholders from the hospitality industry noted that up to 35% of employees rely on public transit to arrive at work. Representatives of the retail industry noted that 15% to 20% rely on some combination of bus or bus and bicycle transportation to work. One company encourages those who ride bicycles as part of their commute to the workplace to track ridership through special bar codes located on their desks. The device keeps track of reduced emissions and reduce carbon footprint of employees. Only three of the other organizations noted any use of public transit by their employees and none of these riders rode full-time. Several respondents noted that many state employees working downtown ride the state van pool buses while a significant number of UW employees ride special buses or shuttles; these employees would also be targeted by future BRT service.

The overwhelming majority of interviewees noted their own use of a car to arrive to work on a daily basis. Most noted that the time to drive was much less than that of taking transit, and many noted the need to have their cars available to run to errands, attend meetings, and pick-up children. Four of the interviewees noted their use of bicycles to commute at least part-time. The top five reasons interviewees offered for why people choose to commute by transit were: the cost of parking (e.g. $100 to $250 per month to park downtown); limited availability of parking; a preference for free time to read while riding transit; less stress or hassle; and that it's a free service provided by employer. Respondents had several suggestions that would improve their or their employees' level of transit commuting: faster service and travel time (less stops and fewer delays at transfer stations); more direct routes and better connections; improving safety and cleanliness at transfer stations; more bus shelters; and closer park-and-ride areas. Multiple interviewees also mentioned that Madison Metro recently received an award for being the best system of its size in North America.

Interviewees who raised issues about the transfer stations were asked if they thought faster, direct bus service such as express service or BRT could help solve these issues, and most responded affirmatively. However, several questioned how the employees would get to the BRT station areas if they did not live near one. Employers in both the hospitality and retail industries noted that their employees live all over the City of Madison and sometimes other areas of the county and are therefore not arriving from any one specific area. These employers in particular were curious as to how their employees could make the connection with BRT in an efficient manner in the future.

3. Prospects for infill development, creating TODs, and the relative appeal of a BRT station

All representatives of the real estate and development industry expressed interest in developing properties on infill sites within the City of Madison. All had built in the city in the past, and all were actively pursuing current development opportunities in the city. The presence of a BRT station adjacent to a prospective site in the City of Madison could be a greater incentive to purchase and develop the site, but most said it depends on how the parking can be provided. If the site was located adjacent the University of Wisconsin and required essentially no parking, then the station would be a plus; if structured parking were required, then TIF would be necessary to offset the cost. Others responded that a BRT station would be less important than the surrounding land uses and the cost of land. One respondent who said a BRT station would be attractive pointed out that the site would need to support subsidized residential development for residents seeking lower-income and workforce housing.

"The presence of buses and bus stations are not currently a determining factor in our selection of development sites [because] our buyers and renters are averse to local bus service. There needs to be a paradigm shift in how bus service is perceived and operated in Madison. A dedicated BRT service may be the type of change needed to make this transition. This type of service would be more appealing for new development compared to existing service. There has to be a commitment by the municipality […] to improve the service to a level that will appeal to future development."

--Madison area developer

When asked more specifically about infill development, with the East Washington corridor as an example, two notable themes developed. First, all of the participants agreed that higher density is important for transit to work, and that development and density drive transit (not the other way around). All interviewees agreed that the presence of more transportation options, and more specifically express buses or BRT, would enhance the opportunity for infill development, though none felt it would be the driver of infill development. There was full consensus that increased residential and commercial density in the county would have a bigger impact on the feasibility of BRT than BRT would have on the feasibility of more infill development.

One developer avoids projects in the City of Madison that require TIF due to a number of disincentives.

"The 'equity kicker' is a primary disincentive that has the city share in the success of a project without sharing in its risk. […] Should a project be successful, the developer pays back the financing in full and is additionally required to pay the city a share of the project's upside. […] The developer therefore takes the majority of risk, at substantial upfront costs, for an opportunity to share a smaller profit."

All interviewees expressed interest in developing along the East Washington Avenue corridor. Three noted they would seek maximum heights and densities on these sites based on the supportable economics, with the primary concern being the ability to provide parking on the site. All interviewees from the real estate and development industry believe that some form of subsidy is required along the East Washington corridor to attract redevelopment, and all cited the example of the Constellation project at the 700 block of East Washington Avenue, a market-rate project that required substantial public financing to work. Even with TIF support, some interviewees had the experience of concluding that a recent project concept was not economically feasible.

Key along the East Washington corridor, said one interviewee, is the ability to use TIF or other forms of subsidy to offset the cost of creating parking and to support lower-cost office spaces and commercial buildings that can compete with options outside of Madison. This respondent said the City is working to reform TIF policy because the current administration understands that affordable space is key to bringing jobs back to the Madison urban area. Another interviewee said that the amount of incremental property tax generation that can be used toward the project is half that of other familiar markets, which make it possible to redevelop only a few of the proposed infill sites. An overhaul of the current TIF policy, he suggests, is vastly more important than whether a bus station is in proximity or not.

One interviewee volunteered the perspective that the city of Madison cannot support the necessary intensity of development to support TOD due to the scattered nature of available redevelopment sites and a relatively large proportion of land not on the tax rolls. This respondent suggested that much of the remaining land is single-family subdivisions that do not support intensive development. Elsewhere in the city, restrictive height limits, added site costs, parking costs, and neighborhood opposition to density make it difficult to produce compact urban form; instead, pursuing compact suburban forms would circumvent the issue of high parking costs and need for special financing.

4. The role of parking capacity in development

Respondents said that parcels with no or limited parking are discounted by the market, and two specifically suggested that the discount on these properties was 20% or more. Three developers noted strong market resistance and large discounts on projects they recently built with lower parking ratios (in structured facilities). Three developers noted they would not consider building without parking. That said, all respondents had personal experience working on projects that had minimal to no parking on-site. One developer had success with two projects that catered to students with no cars.

Parcels with no or limited parking are discounted by the market, and two specifically suggested that the discount on these properties was 20% or more. That said, all respondents had personal experience working on projects that had minimal to no parking on-site.

5. Perspectives from the tourism and hospitality industries

All interviewees from the hospitality, tourism, and visitor promotion industries noted that the primary means of arrival are rental cars, taxis, shuttle buses, or walking from adjacent hotels. There was general agreement that the existence of BRT would improve the transportation options for visitors and tourists to Madison and Greater Dane County, though some suggested that potential ridership would be impacted by the availability of hotel-provided free shuttle service from the airport and in the vicinity of their facilities. Most noted that taxi service in the region was very limited and questioned how visitors and tourists would get to their destinations once they arrived at a BRT station, especially in poor weather.

One interviewee pointed out that different kinds of facilities attract visitors with different kinds of transportation needs. People attending events at Monona Terrace typically stay in nearby hotels and simply walk to the facility and around the Capitol area. Visitors traveling from the edges of the city or from adjacent cities typically do not require transportation to the Terrace, and the small scale of other downtown meeting spaces may not create a great deal of transit demand. Events at UW Stadium and the Alliant Center, on the other hand, get large concentrations of attendees that may value express bus service directly to and from those facilities. Similarly, Epic Systems has approximately 1,500 visitors per week that require transport from Downtown Madison to Verona and back on a daily basis. These visitors, and the company's employees, are transported to the company's campus via a combination of charter bus, shuttle bus, carpools, and specially designated direct Metro service.

6. Perspectives from economic development and trade associations

Stakeholders representing trade associations, business, and economic development suggested that BRT is a long-term proposition that Dane County needs to consider as the population continues to grow, demographics and preferences change, and automobile ownership declines along with home ownership rates. One interviewee said that New Urbanist projects in Sun Prairie, Fitchburg, East Madison, and Middleton are a step in the right direction, but some don't even have regular bus service; these communities would need a higher proportion of multi-family units to achieve the densities needed to support high concentrations of transit riders on BRT. The same respondent suggested that 30+ units per acre are needed to support BRT, and that even Downtown Madison struggles to reach that density due to a high concentration of older single-family units and restrictive height limits.

"New Urbanist projects in Sun Prairie, Fitchburg, East Madison, and Middleton are a step in the right direction, but some don't even have regular bus service. These communities need a higher proportion of multi-family units to support BRT."

-- Economic development interviewee

Another interviewee said that the City of Madison has lost significant business in recent years to surrounding communities that have been more aggressive and friendlier with incentives, which has resulted in a smaller share of the job market and reverse commuting patterns. The distances between homes and employment centers may make express buses or BRT more appealing compared to regular bus service, this respondent suggested, especially for large employers that are connected to the city via congested corridors; the challenge would be creating adequate park and ride facilities.

Appendix 4: Assumptions of Market Demand Model for Dane County

Peloton Research Partners (Peloton) developed a model to estimate the demand for new WTS development in Dane County during the time period of 2010 to 2035. The model forecasts the potential demand for new housing units, retail space, and workspace that could be located within a ½ mile radius of a proposed express bus or BRT station area, or in areas that have the underlying characteristics that could support transit service in the future.

Initial estimates for future WTS demand were based on demographic projections created by CNT using population forecast data provided by the Metropolitan Planning Organization (MPO). CNT translated the MPO's forecasts from Transit Area Zones (TAZ-level) to both the Census Tract and Census Block Group levels for all of Dane County, in five-year increments from 2010 to 2035.

The four primary trends that are relevant to communities considering TOD, and form the basis of the approach to this market analysis, are:

- Baby boomers are creating increased demand for condominium units, townhouses, and smaller single-family homes as they look to downsize residences in an effort to lower maintenance requirements and create greater flexibility to travel.
- Members of the Millennial generation have higher preferences for living in urban environments and prefer the flexibility of multi-family rental housing in walkable environments.
- Members of both generations have rated walkability and access to alternative transportation options as important features when choosing a neighborhood to live (70% to 80%).
- Household sizes in the U.S. continue to decline with the growth of empty-nester households and smaller household formations of the younger demographic.

1. Housing Demand

Peloton analyzed data projections to determine the impacts on future housing demand of the projected changes in the number of households, age groups, and job growth. Historical growth patterns and the development of the county's housing stock were reviewed from 1970 to 2010, and projections were made for the number of occupied housing units by housing type from 2010 to 2035. New WTS housing demand was forecast to 2035 and derived from an analysis of

changes to market preference in five-year increments in Dane County over the 25-year forecast period. A comparison was made between extrapolated historical development patterns and that of potential WTS development to calculate how shifts in demand would affect changes in housing stock during the forecast period. A key assumption of the WTS model is that demand for new housing derives from both new population growth (new demand) and existing Dane County households (unmet demand).

County-level housing demand is first measured by determining the demand for housing options in compact, walkable, mixed-use developments. WTS communities that currently have limited or no bus service are typically located within a ½ mile of a potential transit corridor with prospects for future transit service. Demand for housing in WTS communities is driven primarily by shifts in life stages and lifestyles. For this analysis, household demand is translated directly to housing types in the forecasts, as follows.

The first scenario assumes no express bus service or BRT is yet available, as well as very limited changes to existing planning and land use policies to encourage and support the development of WTS communities.

The second scenario assumes that either express bus or BRT service has been introduced, providing efficient service along key residential and employment corridors, as identified in the parallel study undertaken by the MPO; however, this scenario also assumes that very limited changes have taken place to existing plans and policies to encourage and support the development of WTS communities.

The third development scenario incorporates the full impacts of policy changes and government support to support and encourage WTS development. The resulting capture rate of WTS demand would be at the highest level for new housing, retail, and workspace under this scenario. The higher capture rate would not only reflect the increased desirability of WTS communities, but would additionally reflect the ability of developers to meet market WTS demand with fewer market constraints and lower development costs. An efficient and attractive BRT system is assumed to provide increasing levels of ridership that support the operation of the service.

A stabilized housing occupancy rate of 95% was assumed to account for potential vacancies in new housing in WTS areas.

Potential housing demand is assessed by housing type. The housing types analyzed include: single-family detached homes on suburban lots (1/6 acre or larger), single-family detached homes on urban lots (less than 1/6 acre), single-family attached homes (townhomes), duplexes, multi-family units in buildings with less than 10 units, multi-family units in buildings of 10 or more units, and other housing (including mobile homes).

Peloton created localized capture rates to measure WTS demand by housing type in Dane County. This was done following an analysis of key demographic characteristics in Dane County communities including: family composition, housing types, household size, household incomes, age groups, marital status, vehicles per household, commuting patterns, and industry of employment among others. The analysis also took into account the unique demographic and geographic characteristics of Dane County, including urbanized environments that have a higher-percentage of residents in multi-family housing (e.g. in the City of Madison) and rural environments with longer-term development potential (e.g. in communities such as Waunakee).

2. Retail Space Demand

The demand for new retail space was derived from a calculation of new retail spending by new households combined with retail spending by daily visitors. Only retail spending categories that are suited to potential retailers in WTS areas were included. These spending categories include: convenience purchases, grocery, restaurants and dining, personal needs, pharmacy, small specialty retail, and bookstores among others. Quasi-retail commercial operations with store fronts, including banks and financial service providers, were included in potential household retail spending.

The retail spending in all WTS-appropriate categories was calculated for all households in Dane County. The spending per household was then divided by regional average sales per square foot for those spending categories to determine the retail square footage supported per household. Spending was adjusted to varying household sizes for a more refined estimate of spending per household. This number was then multiplied by the number of new households to determine potential new retail space demand. Total retail space demand was multiplied by a 95% occupancy factor to take into account the potential vacancies within new spaces.

Daily visitors to Dane County are a growing sector of the retail market and a significant potential source of new retail demand in WTS areas in the county. Retail demand deriving from visitors was conservatively calculated as 20% of the Dane County population multiplied by daily per capita spending of $20. This suggests that the average visitor spends $20 per day in Dane County on items that fit the categories appropriate for retail in WTS areas, including food and beverage. It should be noted that the analysis does not account for spending on hotels and lodging. The number of visitors includes daily workers from outside Dane County.

Total visitor spending in Dane County was multiplied by an occupancy factor of 95% and then divided by the same regional sales per square foot number used for household spending. The results are the total square feet of retail supported by visitor spending. The total amount of retail space deriving from both visitor and household retail spending was added to retail space

demand from existing residents to determine the total retail potential in WTS areas of Dane County over the 25-year forecast period.

A range of capture rates was used to determine the amount of new potential retail space that could be allocated within a typical area of ½-mile radius (the size of a typical transit station area) in Dane County. These capture rates and retail space totals were analyzed in five-year increments from 2010 to 2035. The county-level capture rates of 10%, 20%, and 30% were determined to provide appropriate levels of retail space potential in an area with a ½-mile radius, depending upon market context. WTS areas with higher urbanization and limited retail would achieve the higher capture rate for future retail uses. These sample capture rates provide a basis for testing parameters and reviewing assumptions during the scenario modeling, which involves an iterative process of allocating demand to individual WTS areas.

3. Workspace Demand

New workspace is a function of new job growth. Estimates of potential demand of new workspace within WTS areas in Dane County required an initial review of the number of new jobs forecast in the county from 2010 to 2035. The amount of total new workspace needed to support new business and employment growth can be estimated through a calculation of new job growth by job type and the amount of space needed per employee. Organizations that track workspace statistics include the Urban Land Institute (ULI) and the Business Owners and Management Association (BOMA).

The number of jobs per broad industry category were determined and multiplied by the industry standard workspace requirements for that job. An occupancy factor of 85% was then multiplied by total new workspace demand to account for potential vacancies. The resulting total workspace was then allocated between office, commercial, and industrial spaces. This was done to better categorize appropriate spaces with potential to be located in a WTS area. A percentage of each of the space types was identified as most appropriate, and county-level capture rates of 10%, 20%, and 30% were utilized to determine the potential capture of workspace specifically within areas of a ½-mile radius in size. The estimates of potential workspace at the county-level provide a starting point for allocating future employment growth along transit corridors and in specific WTS areas.

Appendix 5: Evaluation of Current Development Patterns

Two evaluation tools were used in this study to assess current and future development patterns: (a) a set of sustainable development performance indicators, and (b) a measure of the transit-supportiveness of a development pattern. These two tools are described in detail in this Appendix and then applied to a baseline evaluation of current development patterns.

A. Performance indicators for BRT implementation in the Madison region

A parallel initiative of the CRSC, led by a working group comprised of various community stakeholders, is to create a set of sustainability indicators to track and guide long term planning and development efforts in the County. The working group has achieved consensus on a set of draft goals, and has begun the challenging task of developing a set of candidate indicators.[21] In the meantime, CARPC approved a set of indicators for the purposes of this project, to estimate the potential longer-term impacts of the BRT system as it is implemented and station areas are built out. The indicators presented here for the purposes of this analysis are not a substitute for a set of indicators developed through a broad stakeholder engagement process to stimulate long-term policy direction.

Here we explain the indicators selected for this project and present a snapshot of Dane County employing those metrics. As shown in Figure A5.1, these indicators cover a range of economic, social, and environmental issues that pose challenges in the Madison region as elsewhere.

Indicator 1: Percent of income spent on transportation

Housing and transportation costs comprise the largest two components of most households' expenses, and efficient development patterns help keep these costs relatively low. Rapid transit such as BRT can serve as a backbone for efficient development patterns. Here transportation costs are modeled as a percentage of income for a typical Dane County household in the region (e.g. average household size, median income, average number of commuters) using the Center for Neighborhood Technology's Housing and Transportation (H+T®) Index.[22] As shown above, transportation costs in Dane County are estimated to consume approximately 24.3% of the typical household's income. While combined costs of housing and transportation would better capture the tradeoffs that people make when seeking to optimize both the largest and second-largest proportion of the household expenditures, housing costs are not modeled as part of this project. Income is assumed for the purposes of comparison to remain constant over the study period.

[21] See http://www.capitalregionscrpg.org/blog/?p=350

[22] See methods for the H+T Index online here: http://www.htaindex.org/downloads/HTMethods.2011.pdf.

Figure A5.1: Project Indicators with County-Level Metrics and a Snapshot of Dane County					
#	**Indicator Purpose**	**Description of County-Level Metric**	**Goal**	**County Snapshot**	**Data Source(s)**
1	Capture cost of living and its link to growth pattern	Transportation costs for typical County household, as a percentage of income	Decrease	24.3% of income	H+T Affordability Index 2009
2	Assess change in jobs/housing mismatch for transit-dependent workforce	Average number of jobs accessible within a 30 min transit commute for the 20% lowest-income block groups, compared to the average number for all block groups that have transit	Stable or Increase	1.21 See Note	Demographic data from ACS 2005-2009, H+T Affordability Index 2009
3	Assess the availability of high-quality, competitive transportation options	Estimated annual VMT per household, modeled for region's typical household	Decrease	20,712	H+T Affordability Index 2009
4	Quantify transportation-related CO_2 emissions	Metric tons of CO_2 per household per year from transportation	Decrease	8.96	H+T Affordability Index 2009
Note: Reflects commute sheds for Metro Transit service only.					

Figure A5.1: Overview of performance indicators used in this study to assess the potential impacts of meeting demand for TOD under various BRT and station area buildout scenarios. (Source: Center for Neighborhood Technology, CARPC)

Indicator 2: Jobs-housing mismatch for transit-dependent workforce

Two common goals for a major investment in rapid transit are to improve physical access to the region's employment centers for those dependent on transit for their mobility, and to improve the competitiveness of transit as a mode of transportation for "choice commuters" who are not dependent on transit. Each goal can have different design implications for the transit investment. This metric captures job accessibility (number of jobs) within a 30-minute commute on regularly scheduled transit starting from the poorest block groups served by the current transit network, compared to the average value for all serviced block groups. Currently in Dane County, the measure of accessibility for the transit-dependent workforce (1.21) is above the average for the transit shed as a whole.

Indicator 3: Competitive transportation options

A high-quality new transportation option, if competitive with existing options, should diversify the modes of transport people use to conduct daily activities, from commuting to work to attending a cultural event, to visiting a shopping district. Rapid transit is intended to augment the existing bus network by integrating with it. This metric therefore seeks to assess the availability of high-quality, competitive transportation options by tracking annual vehicle miles traveled per household. The data here are modeled for a typical Dane County household using the H+T® Affordability Index. Currently the typical Dane County household is estimated to drive 20,712 miles per year, on average.

Indicator 4: Annual carbon dioxide emissions from transportation per household
Guiding growth in sustainable ways involves increasing the efficiency of land use patterns and the transportation network available to move through those patterns. One effect should be to reduce carbon dioxide emissions from transportation. Here the data are presented as metric tons of carbon dioxide (CO_2) per household per year, modeled for a typical Dane County household using the H+T® Affordability Index. Currently the typical Dane County household is estimated to produce 8.96 tons of CO_2 per year, on average. This value is directly linked to the indicator that captures the availability of competitive transportation options.

B. Transit Supportiveness of Current Development Patterns

The schematic characterization of current development patterns employs a statistical signature created by CNT to describe the built environment in every block group in Dane County and to use those built environment characteristics to estimate the degree to which the development pattern is currently TOD-compatible.[23] TOD compatibility at the block group level is assessed on the basis of estimated VMT per household, estimated rate of automobile ownership per household, and estimated share of commuters using transit currently. Note that current TOD compatibility at this level of analysis simply means that, at the block group level, an area likely has the built form and concentration of households and/or jobs necessary to support some form of transit.

The categorization approach used these three datapoints and a standard statistical method called Chi Square Minimization that mathematically groups similar places.[24] The project team used the current distribution of each variable across all block groups to provide the algorithm with the upper and lower bounds for each variable, and also identified which bound for a given variable should be associated with higher TOD compatibility. The GIS-based algorithm itself then grouped the county's block groups into five levels of "transit supportiveness," from high to low. The project team collaborated to ground-truth these statistically derived characterizations, and to describe selected examples of each in greater detail using qualitative narrative and selected statistics.

Note that the block group level is an intermediate geography between the county level and the station-area level, and significant variation in built environment characteristics can occur within a block group. This intermediate step is useful for linking the many publicly available data

[23] These statistics include two measures of residential density, two measures of walkability, two measures of current transit service availability, and one measure of employment access.
[24] For a detailed description of this method, see http://www.reconnectingamerica.org/assets/Uploads/Making-Smart-Choices-TOD-Selector-Analysis-of-South-Suburban-Corridors-CNT.pdf.

sources that use Census-defined geographies, and is largely used to calibrate the assumptions employed in the scenario modeling, which provides estimated market demand for TOD-compatible real estate products at specific locations along the proposed BRT routes.

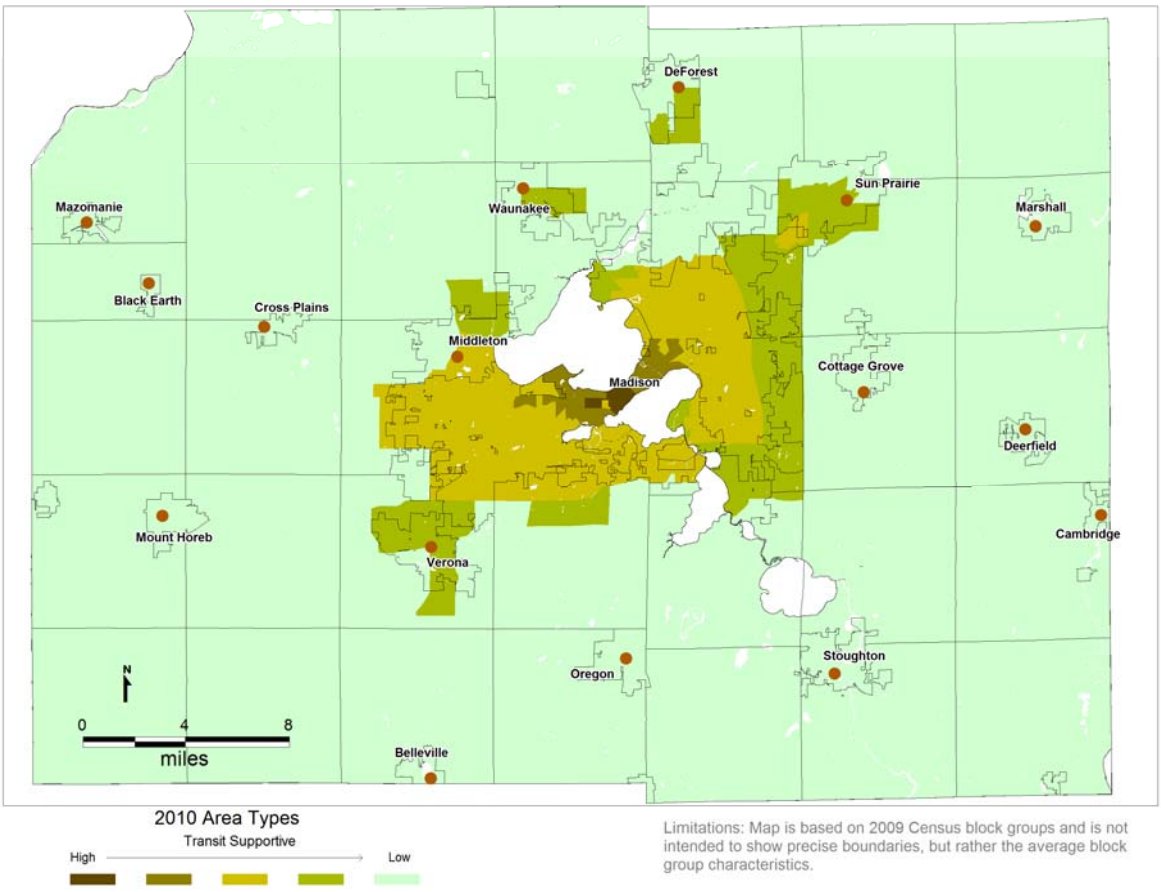


Figure A5.2: Dane County can be characterized in terms of five general development types, each with a different statistical signature that describes its built environment and the TOD-compatibility of the overall development pattern. Within each block group, significant variation can occur that is obscured at this level.

As shown in Figure A5.2, this method produced five level of transit supportiveness that capture the transition from dense, compact development patterns to suburban and rural development patterns in Dane County. As stated above, categorization based on data at the block group level necessarily obscures variation within a given block group. So, for example, the highly walkable older commercial cores of Mount Horeb, Sun Prairie, and Stoughton are not represented at this level. This level of analysis likewise does not differentiate among land uses, for example the professional / commercial campus owned by Epic in Verona is not differentiated from the otherwise largely residential character of that community.

Areas with a **high level of transit supportiveness** comprise the smallest geographic area, and have the most intensive development, including both downtown Madison and the University of Wisconsin. There are a wide variety of building types, from sixteen-story buildings to single-family detached homes, in addition to the state capitol and many university buildings. Probable uses include government offices, private offices, educational, cultural, civic, retail, and both multi-family and single-family residential. Residential neighborhoods in areas with a high level of transit supportiveness are characterized by houses built close together, on small lots, and built up to the sidewalk.

Areas with **high-mid transit supportiveness** surround the urban core and are predominantly residential in use, with commercial and office uses located along the major corridors. As one moves further from the core, residential neighborhoods begin to have larger lots with houses set farther back from the street. Street networks are continuous, and corridors feature small clusters of commercial and office uses as well as occasional multi-family housing nearby. Many of these corridors and nodes have urban characteristics, with buildings built up to the street edge, parking in the rear of the lot, and buildings built incrementally over time. Parts of the corridors and nodes may also be more suburban in nature as lots have redeveloped over time.

Mid-level transit supportiveness characterizes most suburban neighborhoods, which are predominantly residential in nature with some auto-oriented commercial nodes, though industrial parks may also be present due to low land values and proximity to the urban core. Development is typically segregated by use, with relatively few connecting routes. Residential development is generally low-density and takes the form of both low-rise, garden style apartment buildings and single-family detached houses in separated clusters. The most common commercial nodes and corridors are strip-style shopping centers with big-box retail anchors, regional malls, pad site retail and commercial, and large format retail. Buildings are generally one-story high and set at the rear of a large parking lot. Office buildings are generally up to four stories high and set in a large parking lot, connected to one another with curving roads. Large shopping centers and office parks are often co-located at major arterial and highway intersections, usually with separated parking.

Extending out beyond these suburban neighborhoods, areas of **mid-low transit supportiveness** generally follow major arterials to encompass smaller towns lying well outside of the urban core. Like the neighborhoods they border, these areas contain many single-use developments built along major arterials. These developments are generally more segregated from other land uses compared to neighborhoods at the next-higher level of transit supportiveness, with a less intensive street network, and serve primarily single-family residential uses. Houses and lots tend to be larger, and residential developments are often surrounded by undeveloped land.

Commercial activity tends to take place at the edges of an older town core in shopping strips. The towns generally have a small but dense street network, with a small downtown core of commercial buildings and predominantly single-family detached residential neighborhoods nearby on smaller lots well connected by the street network.

At the **low end of transit supportiveness**, small towns are surrounded by open land, predominantly used for farming. Small farms and homesteads dot the landscape along the major roads as they lead into the small villages and towns. The towns generally have a traditional older core, including small-scale commercial buildings and single-family detached homes. Extending out from the original core are often layers of successive residential development, transitioning from the original street grid into a more organic street network, with some cul-de-sacs typical of recent suburban development. In most cases, commercial uses have moved out of the original center to small strip shopping center located at the edge of town on the main thoroughfares leading into town. An industrial use, whether a current of legacy use, is typically found at the outskirts of the town. These towns are typically less than one square mile in size, though increasingly see suburban residential development at their edges.

Since this categorization method used statistics at the block group level, each level of transit supportiveness has an average statistical signature, as shown in Figure A5.3. The first seven variables are the set of data used by CNT to describe the built environment in every block group in Dane County, while the last three (***in bold italics***) are those derived from the first seven, using regression analysis to estimate the degree to which the development pattern at the block group level is currently TOD-compatible.

As shown in Table A5.3, the area types differ markedly across the input variables (of which seven are shown here) as well as the three output variables (shown in ***bold italics***). A major characteristic of the area types is their density; whether computed as gross density or net density, the value declines rapidly from Urban Core to Rural/Village. The first measure of walkability (intersection density, where higher density translates to higher walkability) follows suit, while the second Walkability measure (average block size in acres, an inverse measure)

Figure A5.3: Statistical Signature of Area Types					
	High	**High-Mid**	**Mid**	**Low-Mid**	**Low**
Gross residential Density (households / acre)	10.37	3.94	1.52	0.44	0.04
Net residential density (households/resid. acre)*	21.97	7.75	3.61	2.56	1.79

Figure A5.3: Statistical Signature of Area Types					
	High	**High-Mid**	**Mid**	**Low-Mid**	**Low**
Walkability A (intersections/acre)	0.45	0.36	0.21	0.10	0.02
Walkability B (avg. block size in acres)	4.15	9.98	19.82	50.82	223.44
Transit Connectivity (measure of trips/week)	47,718	18,880	5,157	147	See Note
Transit Access Shed (acreage, within 30 min)	611	280	92	13	See Note
Employment Gravity Index (dimensionless)	64,689	39,944	24,103	8,595	3,234
Average driving habits (miles/household/year)	13,579	16,485	19,256	23,250	27,568
Average auto ownership (autos/household)	1.2	1.6	1.8	1.9	2.1
Average transit habits (% transit commuters)	22.2	8.4	2.3	0.4	See Note

*Net residential density calculates total number of households per residential acre. It therefore more closely matches perceived residential density.
Note: This measure reflects regularly scheduled, fixed-route service only.

rises markedly across the area types. Transit connectively, a measure of the frequency of transit trips available within a given area and usually related to density, moves from nearly 50,000 to less than 200 (regularly scheduled, fixed-route transit is not available within the Rural/Village area type.) In contrast to connectivity, the Transit Access Shed is a measure of the acreage of land that can be reached within a 30-minute commute on transit, not including a walk to a station or stop of up to 10 minutes. However, Connectivity and Access Shed are correlated because areas with high connectivity tend to have a dense transit network that enables movement over a large area in relatively little time.

The Employment Gravity value measures the proximity to the region's jobs; here the value is aggregated from the block group level to each area type, weighted by the number of households in each component block group to derive an average that is representative of the area type as a whole. Here we see that the gravity value drops from about 65,000 to about 3,250. A dimensionless index only gives a sense of scale; for comparison, in the next section we derive an employment access value using actual count of jobs for a selected location within each area type. Finally, the three model outputs demonstrate that these built environment characteristics produce different transportation behavior, with automobiles ownership rates ranging between 1.2 and 2.1 per household, on average, and driving habits ranging from 13,600 miles per household per year to 27,600 miles.

C. Case Studies Illustrating Dane County Development Patterns

Five case studies were developed to illustrate in greater detail the concept of "transit supportiveness", each selected as broadly representative of the transit supportiveness level to which is belongs. The examples were selected by CNT and its project partners SHA based on their similarity to average values in the statistical signature of each level of transit supportiveness, with the exception of those selected to represent Low-Mid and Low, for which an intersection was selected deliberately to illustrate the variation that can occur within a broad category.

High: Park Street and University Avenue

Park Street has institutional uses along the corridor and runs south from downtown. It is adjacent to a seven-block-square area of large-lot, multi-story buildings surrounding the state capitol at the heart of the Urban Core, where uses are predominantly government and private offices with an occasional residential building. Two other major corridors extend out from the downtown: State Street is predominantly mixed-use with two- to four-story buildings and lively ground floor commercial businesses, and transitions smoothly to the west into the university campus. East Washington Avenue is predominantly industrial in character, with two- to four-story buildings housing office and industrial uses running east. The rest of the Urban Core is predominantly single-family detached, with some purpose-built multi-family buildings, and single-family houses that have been converted to apartments. The intersection of Park Street and University Avenue is at the heart of the University of Wisconsin, and has many of the elements found in the Urban Core area type. Along University Avenue there are small scale mixed-use commercial buildings, built up to the edge of the sidewalk. Both university residences and private residences are located nearby, in addition to educational buildings and commercial buildings. Buildings range in height from two stories to over 10 stories. This area is a transition between the urban fabric of downtown Madison and the university campus.

<u>Case Study 1</u>:

Park Street and University Avenue (High)

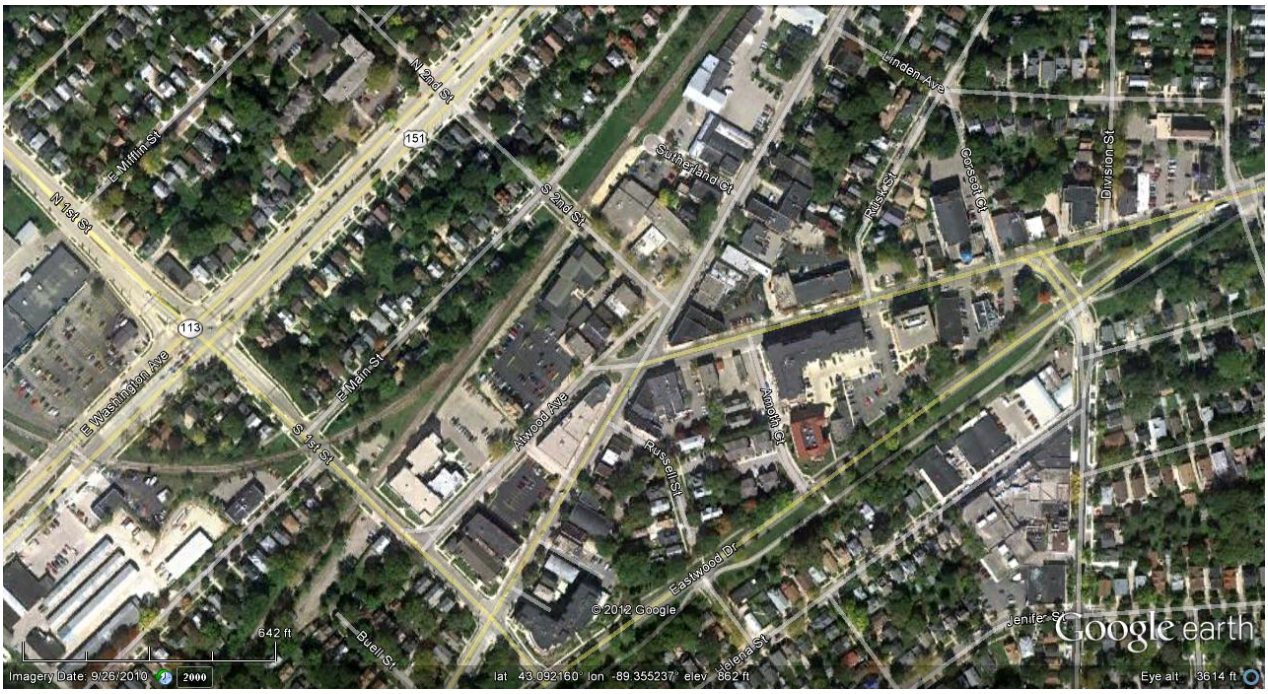
Key Characteristics:

- Transition between urban fabric of downtown Madison and the university campus
- University, small scale commercial, & residential uses
- Mixed-use commercial buildings built to sidewalk edge
- Both single- and multi-family residential
- Buildings from 2 to over 10 stories

High-Mid: Atwood

The Atwood neighborhood in the Urban Edge Area Type is typical of this type with its small commercial node surrounded by pre-war single-family detached residential neighborhoods. The commercial node, located at Atwood Road and Winnebago Road, is approximately six blocks in area, and is comprised of one to three story mixed-use buildings with ground floor commercial uses and upper floor offices and residential uses. Atypical of other neighborhoods in the Urban Edge, the commercial node is not located on the main corridor, Washington Avenue, but is instead located two blocks off the corridor, between two rail lines, suggesting that the corridor was developed after the establishment of Atwood. Infill multi-family residential uses have recently been built in the neighborhood, near the center, but residential building types remain predominantly single family. Houses are built close together on narrow lots, in a pre-war fashion, and East High School is located nearby on Washington Avenue.

A number of industrial uses line major corridors in the Urban areas such as East Washington Avenue and north along Sherman Avenue, along with occasional suburban type commercial uses. South of the Urban Core along Park Street, commercial uses line the street in an urban form, becoming more suburban to the south. Single-family detached neighborhoods support the commercial uses on the corridors. Along Monroe Street, running to the southwest from the Urban Core, there are small urban-form commercial nodes with single-family detached neighborhoods to support them. Campus Drive, heading west from the Urban Core, is designed as a high speed arterial, with more suburban, auto-oriented uses along it, parts of which are contained within the Urban area type. Post-war development along Campus Drive includes both single-family detached and multi-family housing.



<u>Case Study 2</u>: Atwood (High-Mid)

Key Characteristics:

- Commercial / small office uses along avenue with residential neighborhoods on either side
- Commercial buildings predominantly 1-2 stories, built to sidewalk or set back at rear of parking lot
- Single-family detached residential neighborhoods
- Most structures date from 1920s to 1960s

Mid: Grand Canyon Dr. & Odana Rd.
Grand Canyon Drive and Odana Road are lined with low-rise commercial and office buildings, surrounded by parking lots. Strip shopping centers and large format retail providers dominate the landscape. Each use is segregated from the other, and low-density residential uses are located relatively far away from commercial offerings. The parcels are large enough to accommodate from 9,000 sf to 165,000 sf buildings and their associated parking. With more intensive development, could transition into the Urban area type, creating an urban node outside of the downtown core.

<u>Case Study 3</u>: Grand Canyon and Odana Roads (Suburban)

Key Characteristics:

- Predominantly residential neighborhoods and auto-oriented commercial nodes
- Wider roads lined by low-rise commercial strips, large-format retail, and office buildings, usually ringed by large parking lots
- Low-density residential developments distant with relatively few connecting routes

Sun Prairie is a large town representative of the Outer Suburban area type. A small, highly walkable town core has one- to three-story commercial buildings along the main street and some side streets, surrounding by older residential neighborhoods and some recent residential infill consisting largely of townhomes. County Highway N extends east and west from the center, and to the east, the road is very suburban in nature. Strip shopping centers and pad sites abut the highway, with structures set far back with fronting or surrounding parking lots. Outside of the main arterial, residential developments have been built out from the center of town over time on comparatively large lots with curving street networks, some adjacent to farming activities. A major highway interchange allows for quick access to East Towne Mall and the city of Madison from the east.

<u>Case Study 4:</u>

Sun Prairie (Low-Mid)

Key Characteristics:

- Small, relatively dense, highly walkable town center
- Small core of older single-family detached and newer townhomes
- Major arterial road very suburban in nature, nearby highway lined

Low: Deerfield

Deerfield is a small town in eastern Dane County which is about 1 square mile in area. A two-and-a-half block main street forms the center of the town, with one and two story buildings holding everyday retail uses. The main street abuts a rail line, with industrial uses along that line, and an old residential street leading north out of the town across the tracks. A four-five block radius surrounding the main street is residential in nature with housing constructed in the 1950s or 1960s. Newer residential development extends beyond the main core of the town, built in a suburban form since the 1980s.

<u>Case Study 5</u>: Deerfield (Low)

Key Characteristics:

- Small town with short main street where 1-2 story buildings offer everyday retail
- Industrial uses abut a rail line through town
- Core ringed by 4-5 blocks of older homes, newer suburban-style residential beyond that

To create a statistical signature for each case study location, a sample area of ½-mile radius was selected (in the case of Sun Prairie and Deerfield, a central intersection was selected). Figure A5.4 below shows the statistical characteristics of each case study location, using both the sustainability indicators generated in for Dane County as a whole, and the built environment variables used to generate the area types. For greater clarity, only selected built environment variables are shown here.

Figure A5.4: Built Form Characteristics and Project Indicators for Case Study Locations

Case Study Name			Park & University	Atwood	Grand Canyon & Odana	Sun Prairie Main & Bird	Deerfield Main & Liberty
Transit Supportiveness			High	High-Mid	Mid	Low-Mid	Low
Built Form Variables	Households (HH)		5,101	2,604	801	1220	33
	Gross household density		11	5.2	1.59	2.43	0.07
	Net household density		50.3	11.6	3.4	3.4	1.9
	Walkability A (see Note 1)		0.39	.37	0.18	0.24	0.02
	Walkability B (see Note 1)		6.6	5.9	23.3	15.0	174.0
	Transit Connectivity (measure of rides/wk)		33,502	19,533	9,086	See Note (2)	See Note (2)
	Car ownership (per HH)		1.2	1.6	1.8	1.9	2.1
	Transit Commuters (%)		32.5	7.7	3.68	0	0
Sustainability Indicators		**County Values**	**Values Estimated for Each Case Study Example**				
% Income spent on transportation (see Note 3)		24.3	16.0	21.3	23.0	24.7	29.2
Job shed ratio for transit-dependent		1.21	1.51	1.24	N/A	See Note (2)	See Note (2)
Annual driving (miles/household)		20,712	12,989	16,499	18,579	21,134	27,178
Tons of CO_2 from transportation per household per year		8.96	5.63	7.2	8.01	9.11	11.71

Notes: (1) Walkability A uses intersection density (intersections/acre). Walkability B uses average block size in acres. (2) This measure only takes into account regularly scheduled, fixed-route transit service. (3) Values based on the 2009 H+T Index dataset, which relies on ACS 5-Year Averages from 2005-2009.

Appendix 6: Summary of Regional Development Types

REGIONAL URBAN CORE

The Regional Urban Core Place Type is characterized by high density and a high mix of uses in a compact, highly connective street network, and is situated within the employment and cultural center of the region. For example-- the state capitol is located within a Downtown place type, along with many other government offices. Commercial uses are located along the major corridors leading in and around the capitol grounds. Residential uses range from high-rise residential buildings to single family detached houses on small lots. Both vertical and horizontal mixed-use are found in the Downtown. This place type has the highest residential density and highest number of jobs of the region, with the lowest average VMT and smallest average block size.

Land Uses
- Residential
- Office
- Government
- Retail/ Entertainment
- Cultural

Building Types
- High-Rise Office w/Ground Floor Commercial
- High-Rise MF Residential
- Mid Rise Mixed Use Commercial and Residential
- Low Rise MF Residential
- Single-Family Attached
- Single-Family Detached Residential

Quantitative Characteristics (2010/2035 potential)
- Avg. Number of Households: 7,268/8,453
- Avg. Net Household Density (u/a): 61.3/65.8
- Avg. Population: 15,015/15,858
- Avg. Jobs: 22,587/21,885
- Avg. VMT per Household: 13,085/12,949
- Avg. Autos per Household: 1.2/1.2
- Avg. % Commuters by Transit: 30/28.6
- Avg. Block Size: 4.6/4.3

Aspirational Goals: Add additional density and/or vitality (both economic and use-based), while preserving historic buildings.

REPRESENTATIVE IMAGES OF PLACE TYPE POTENTIAL

EXISTING (2010)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

POTENTIAL (2035)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

UNIVERSITY

The University Place Type is characterized by its proximity to ,and inclusion of, the University of Wisconsin. The campus is urban in form, and embedded in the surrounding fabric, spreading into adjoining neighborhoods and conforming to the local street and block network. University buildings are interspersed with commercial and residential buildings and a highly connective street network exists. Vertical mixed-use is found in the University place type, although horizontal mixed-use is more prevalent. This place type has a high residential density and high number of jobs, with low VMT, but has fewer jobs than Downtown.

Land Uses
- University Buildings
- Retail/ Entertainment
- Office
- Residential
- Athletic

Building Types
- University (Educational/Labs/ Dining/Dormitories/Sports Facilities)
- Mixed-Use Residential over Commercial (Mid-High Rise)
- Low, Mid, and High-Rise Apartment
- Single-family detached homes converted to offices or apartments

Quantitative Characteristics (2010/2035 potential)
- Avg. Number of Households: 2,739/4,874
- Avg. Net Household Density (u/a): 34.2/41
- Avg. Population: 10,688/11,886
- Avg. Jobs: 13,615/17,089
- Avg. VMT per Household: 13,351/12,796
- Avg. Autos per Household: 1.3/1.3
- Avg. % Commuters by Transit: 23.7/19.0
- Avg. Block Size: 6.5/5.9

Aspirational Goals: More neighborhood services and income diversity.

REPRESENTATIVE IMAGES OF PLACE TYPE POTENTIAL

EXISTING (2010)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

POTENTIAL (2035)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

URBAN NEIGHBORHOOD

The Urban Neighborhood Place Type is characterized by predominantly single-family detached residential and small-scale multi-family residential uses served by a single commercial corridor. These places may have small centers located on or near the main corridor which act as neighborhood nodes. Vertical mixed-use is occasionally found in this place type, and the street network is often well connected. Along the commercial corridors, older buildings are built closer to the sidewalk, while newer buildings are often been set back from the sidewalk with parking located in front of the building. This place type is urban in form, but has relatively few jobs as compared to the Regional Urban Core, mostly focused on serving local needs.

Land Uses
- Residential
- Retail
- Office
- Industrial

Building Types
- Low-Rise Commercial
- Industrial/Warehouse
- Low-Rise Office
- Low-Mid Rise Mixed-Use Residential/Commercial
- Small Scale MF/SFA
- SFD Residential
- Low-Mid Rise Apartment

Quantitative Characteristics (2010/2035 potential)
- Avg. Number of Households: 2,305/2,986
- Avg. Net Household Density (u/a): 14.1/17.9
- Avg. Population: 4,434/6,045
- Avg. Jobs: 3,694/4,283
- Avg. VMT per Household: 15,831/15,126
- Avg. Autos per Household: 1.6/1.5
- Avg. % Commuters by Transit: 10.2/14.5
- Avg. Block Size: 9.5/9.7

Aspirational Goals: Add jobs, retail, and higher density housing in the form of vertical mixed-use along corridors and at nodes. Retain and retrofit existing buildings that add value but currently have a marginal use. Promote historic preservation where applicable.

REPRESENTATIVE IMAGES OF PLACE TYPE POTENTIAL

EXISTING (2010)

* This image is illustrative in nature, and not a literal representation of a specific place or building.

POTENTIAL (2035)

* This image is illustrative in nature, and not a literal representation of a specific place or building.

SUBURBAN NEIGHBORHOOD

The Suburban Neighborhood Place Type is characterized by predominantly low density residential uses served by occasional commercial uses along major corridors. The street network has low connectivity, concentrating traffic on major arterials for all trips, encouraging larger format, generic retail uses. Buildings are generally segregated by use, and commercial uses are set back from the street with parking lots out front. Residential uses include low-scale walk-up apartments, townhomes, and single-family residential. This place type has among the lowest residential density, and the lowest jobs density, with a high average VMT.

Land Uses
- Residential
- Retail
- Office

Building Types
- Low-Rise Commercial
- Low-Rise Office
- Shopping Mall
- Strip Shopping Centers
- Low-Rise Walk-Up Apartment
- Townhomes
- SFD Residential

Quantitative Characteristics (2010/2035 potential)
- Avg. Number of Households: 1,063/1,384
- Avg. Net Household Density (u/a): 7.2/7.9
- Avg. Population: 2,141/2,819
- Avg. Jobs: 1,687/1,723
- Avg. VMT per Household: 17,993/17,295
- Avg. Autos per Household: 1.7/1.7
- Avg. % Commuters by Transit: 4.2/6.3
- Avg. Block Size: 17.4/18.2

Aspirational Goals: Encourage long-term transformation of commercial frontages, moving parking to the rear, while including vertical mixed use and higher density residential building types.

REPRESENTATIVE IMAGES OF PLACE TYPE POTENTIAL




COMMUNITY CENTER

The Community Center Place Type is characterized by higher employment and commercial levels than seen in the surrounding context, making it a node of activity. This place type is primarily located at the edge of the urban context, and has small, higher intensity employment or commercial zones surrounded by low density residential uses. Mixed-use, where present, is horizontal in form, making the addition of vertical mixed-use a logical progression. This place type has a high jobs population but low residential density, and has a high average VMT.

Land Uses
- Retail
- Office/Hospital
- Residential

Building Types
- Commercial (single-use or lifestyle center)
- Mid-High Rise Office (single-use)
- Hospital
- Low-Rise Apartment Buildings
- Single Family Detached Residential
- Townhomes

Quantitative Characteristics (2010/2035 potential)
- Avg. Number of Households: 2,062/2,832
- Avg. Net Household Density (u/a): 11.5/13.2
- Avg. Population: 3,993/5,408
- Avg. Jobs: 3,777/5,912
- Avg. VMT per Household: 15,957/15,504
- Avg. Autos per Household: 1.6/1.5
- Avg. % Commuters by Transit: 8.8/10.6
- Avg. Block Size: 13.1/12.4

Aspirational Goals: Add vertical mixed-use (residential) in commercial nodes. Enhance street connectivity and the pedestrian environment, particularly around station areas, and improve connectivity to the regional transit system.

REPRESENTATIVE IMAGES OF PLACE TYPE POTENTIAL

EXISTING (2010)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

POTENTIAL (2035)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

PERIPHERAL SUBURBAN

The Peripheral Suburban Place Type is characterized by highly segregated uses and very low network connectivity. Building uses are often grouped together in low density campus formats and often have low connectivity to other uses. Large format retail, strip shopping centers, and office parks are found along the major arterials. Residential uses include single-family detached and low-rise, walk-up apartment buildings. The Peripheral Suburban place type has the highest average VMT, lowest density residential, but has more jobs than the Suburban Neighborhood place type because of the presence of large format retailers and office parks.

Land Uses
- Retail
- Office
- Residential
- Industrial
- Park

Building Types
- Low-Rise Office (typically in office parks)
- Large Format Retail
- Strip Shopping Centers
- Low-Rise Apartments
- Single-Family Detached Residential

Quantitative Characteristics (2010/2035 potential)
- Avg. Number of Households: 721/940
- Avg. Net Household Density (u/a): 5.5/5.0
- Avg. Population: 1,961/2,876
- Avg. Jobs: 2,394/3,145
- Avg. VMT per Household: 18,185/17,988
- Avg. Autos per Household: 1.8/1.8
- Avg. % Commuters by Transit: 3.5/3.6
- Avg. Block Size: 29.6/39.5

Aspirational Goals: Densify and reduce VMT by diversifying uses in proximity to one another, and by converting surface parking to structured parking and infill development parcels. Enhance street connectivity and the pedestrian environment, particularly around station areas, and improve connectivity to the regional transit system.

REPRESENTATIVE IMAGES OF PLACE TYPE POTENTIAL




EXISTING (2010)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

POTENTIAL (2035)

* This image is illustrative in nature, and not a literal representation of a specific place or buildings

MAIN STREET COMMUNITY

The Main Street Community Place Type is found at the center of cities, villages, and towns located just outside the city of Madison. The type is characterized by development of varying density along a main street, transitioning one block off the main street into single-family detached residential. In some cases, the main streets are defined by mixed-use buildings built up to the edge of the sidewalk, with shared parking, and in others, suburban style development has occurred, with parking lots in front of commercial buildings. Office and commercial buildings are often one or two stories, with limited mixed-use.

Land Uses
- Retail
- Office
- Residential

Building Types
- Single-use Commercial
- Single-use Office
- Strip Shopping Centers
- Single-Family Detached Residential

Quantitative Characteristics (2010/2035 potential)
- Avg. Number of Households: 870/1,510
- Avg. Net Household Density (u/a): 3.4/4.3
- Avg. Population: 2,168/4,480
- Avg. Jobs: 761/1,219
- Avg. VMT per Household: 24,017/22,840
- Avg. Autos per Household: 2.0/1.9
- Avg. % Commuters by Transit: 0.2/0.8
- Avg. Block Size: 155/119

Aspirational Goals: Encourage redevelopment in a more pedestrian-friendly format, with parking lots in the rear of buildings. Encourage small-scale mixed-use along main commercial frontages, historic preservation, and connectivity to the regional transit system.

REPRESENTATIVE IMAGES OF PLACE TYPE POTENTIAL



Appendix 7: Baseline Analysis of Projected Growth (2010-2035)

This Appendix demonstrates the use of the "transit supportiveness" analytical tool in evaluating the baseline scenario of projected growth that largely reflects an extrapolation of existing trends in Dane County, as reflected in data obtained from the Metropolitan Planning Organization and from the Wisconsin Department of Administration (DOA). CNT used these data to model how the characteristics of Dane County's block groups may change over time, in five-year increments.

The MPO provided its baseline and forecast data for the period 2010-2035 at the level of the transit analysis zone (TAZ), which CNT aggregated to the Census block group level using standard statistical weighting methods. The MPO's overall forecasts are based on county-level data provided by the DOA, calibrated and distributed across the county to take into account CARPC's urban service area population forecasts, local and neighborhood plans, estimated road upgrades, as well as any major infrastructure or other development projects considered "in the pipeline" at the time of the analysis. While the forecast takes into account some amount of infill potential along major arterial roads, the proposed BRT system was not explicitly built into the modeling that produced the projections. These forecasts can therefore be considered a baseline set of projections that largely reflect an extrapolation of existing trends.

A. Projected Residential and Employment Growth, 2010-2035

As shown in Figure A7.1 below, many of the areas expected to see the fastest rates of growth in terms of households are in the municipalities and unincorporated areas outside of the city of Madison, while significant portions of the city and immediately adjacent municipalities are expected to see comparatively little growth, zero growth, or even negative growth (attrition).

How this household growth is distributed throughout the region depends in part on economic decisions of businesses regarding hiring and location. Turning to projected employment growth shows a different result, as shown in Figure A7.2.

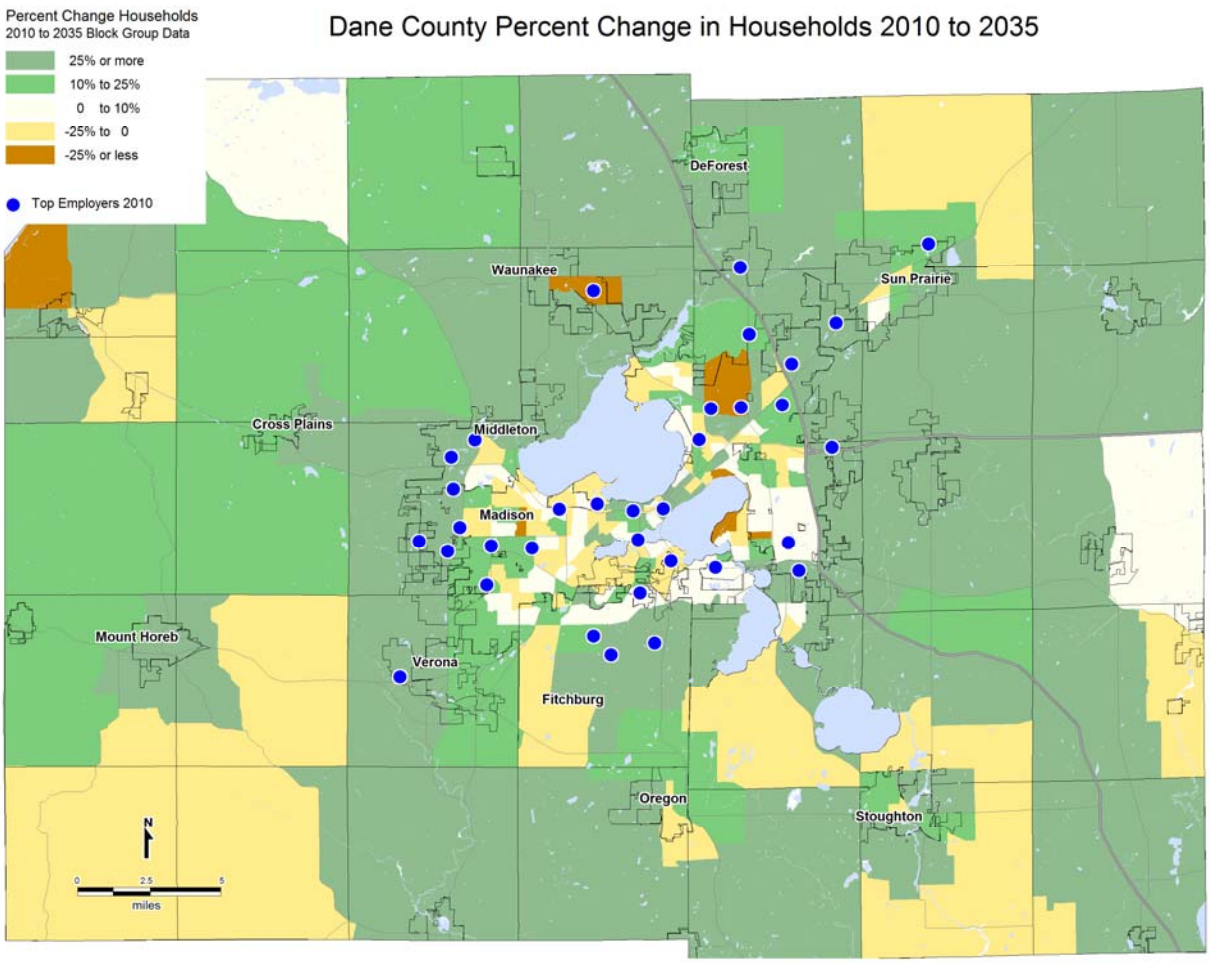


Figure A7.1: Many of the areas likely to see the fastest rates of growth in terms of households are in the municipalities and unincorporated areas outside of the city of Madison.

These patterns of projected residential and employment growth in Dane County through 2035 will shift the characteristics of the communities where the growth is projected to occur, leading to shifts in transit supportiveness. We calculated the projected growth patterns in five year increments using straight-line methods, then re-calculated the variables that quantify the characteristics of the built environment for all block groups. Variables that capture walkability and transit access were recalculated proportionate to projected changes in residential density, as observed in the base year dataset. As shown in Appendix 5, projected transit supportiveness at the block group level is assessed on the basis of estimated VMT per household, estimated rate of automobile ownership per household, and estimated share of commuters using transit.

Again, note that transit supportiveness at the block group level means that an area likely has the built form and concentration of households and/or jobs necessary to support some form of

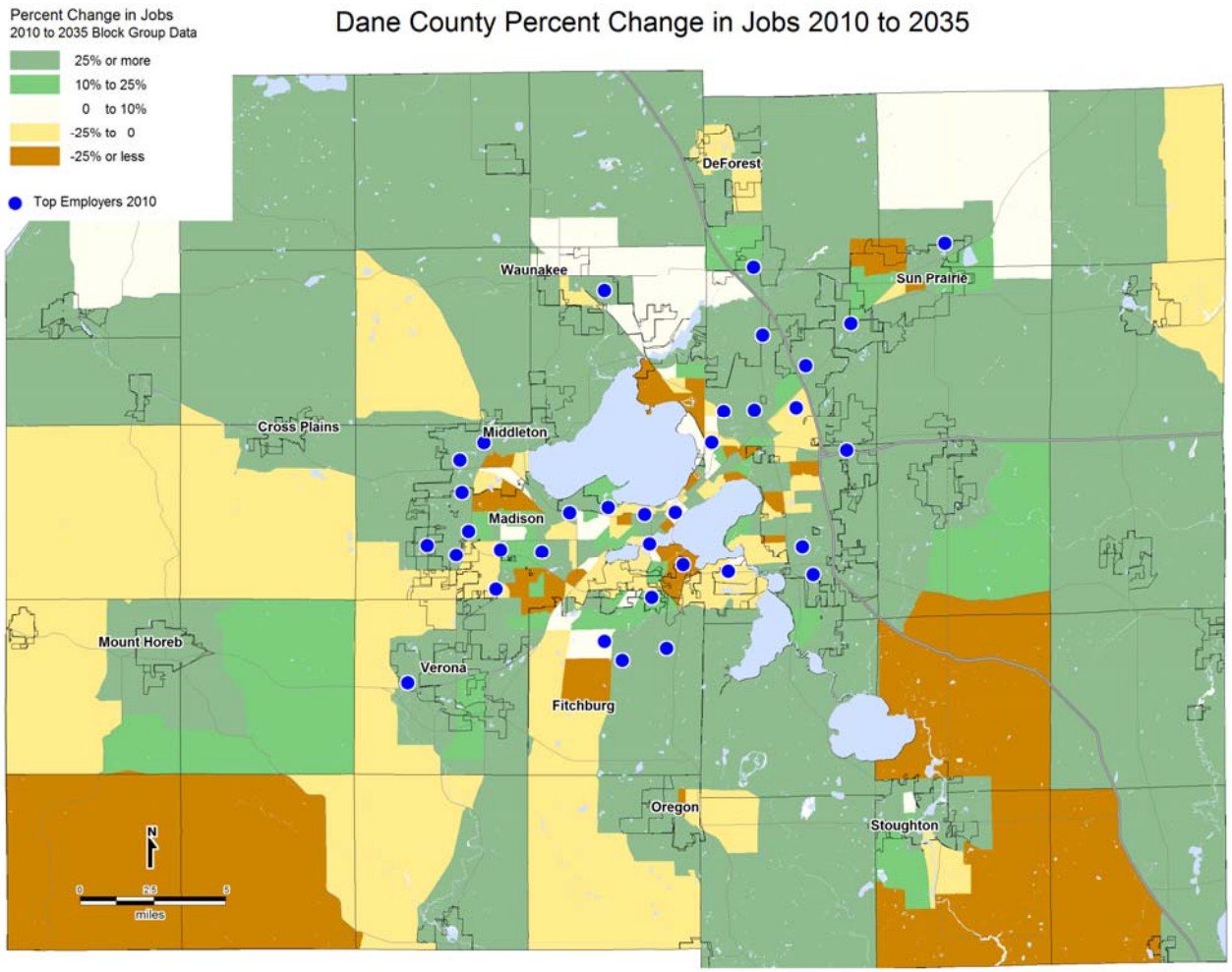
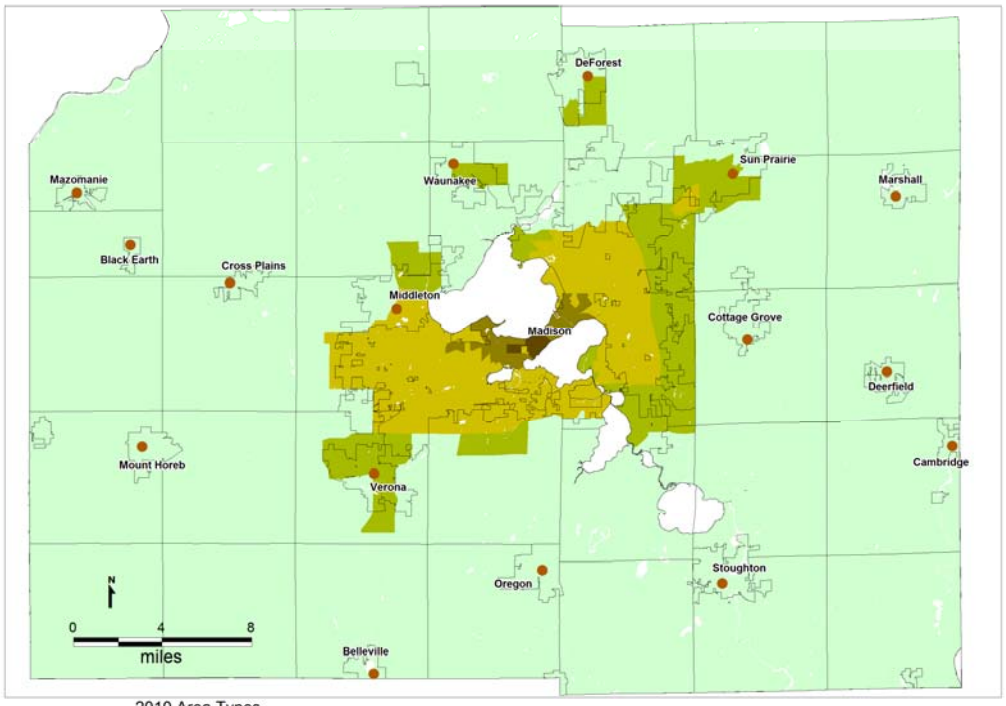


Figure A7.2: As with household growth, many of the areas likely to see the fastest employment growth are in the municipalities and unincorporated areas outside of the city of Madison.

transit, and that variation in built form within small areas can be obscured when using block group level averages. The previously shown map showing current conditions in 2010 is included here again for comparison.

The growth projected to take place in Dane County through 2035 is shown here as increasingly fusing together the region in a smoother continuum of built form, with both urbanized and suburban areas growing outward. Radiating outward from core, the development pattern becomes more intensive, which shows here as an increase in the transit supportiveness of most areas. At the same time, a great deal of rural character is preserved, as shown by the predominance of “Low” transit-supportive areas. The changes observable here visually can also be quantified. As shown in Figure A7.3 below, the variables used to evaluate transit supportiveness improve for each category between 2010 and 2035.

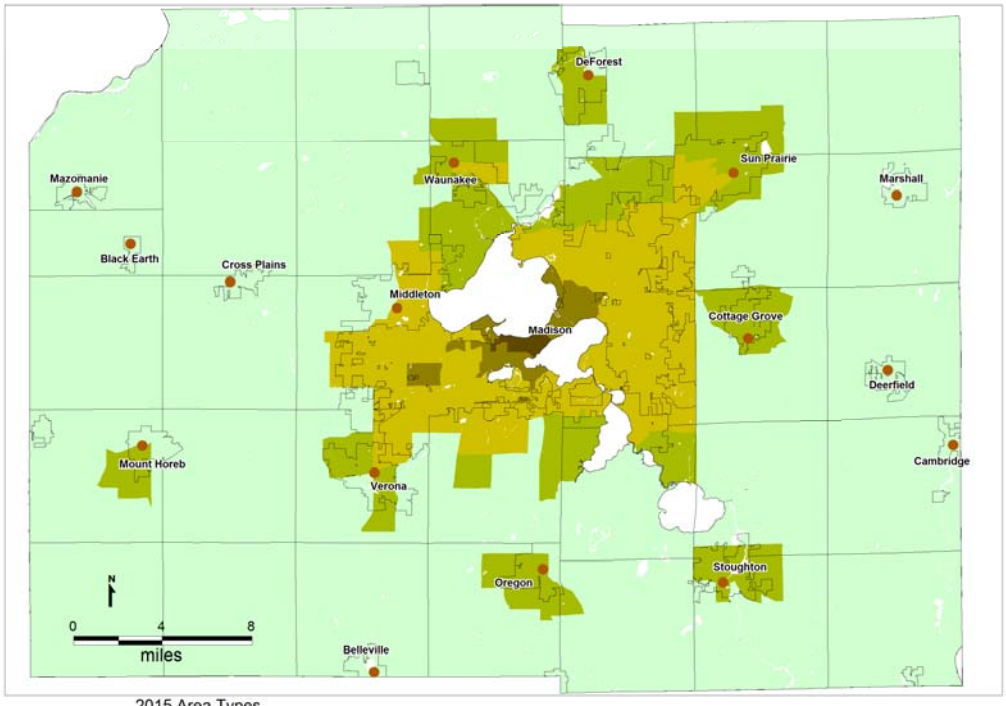


2010 Area Types

Transit Supportive

High — Low

Limitations: Map is based on 2009 Census block groups and is not intended to show precise boundaries, but rather the average block group characteristics.

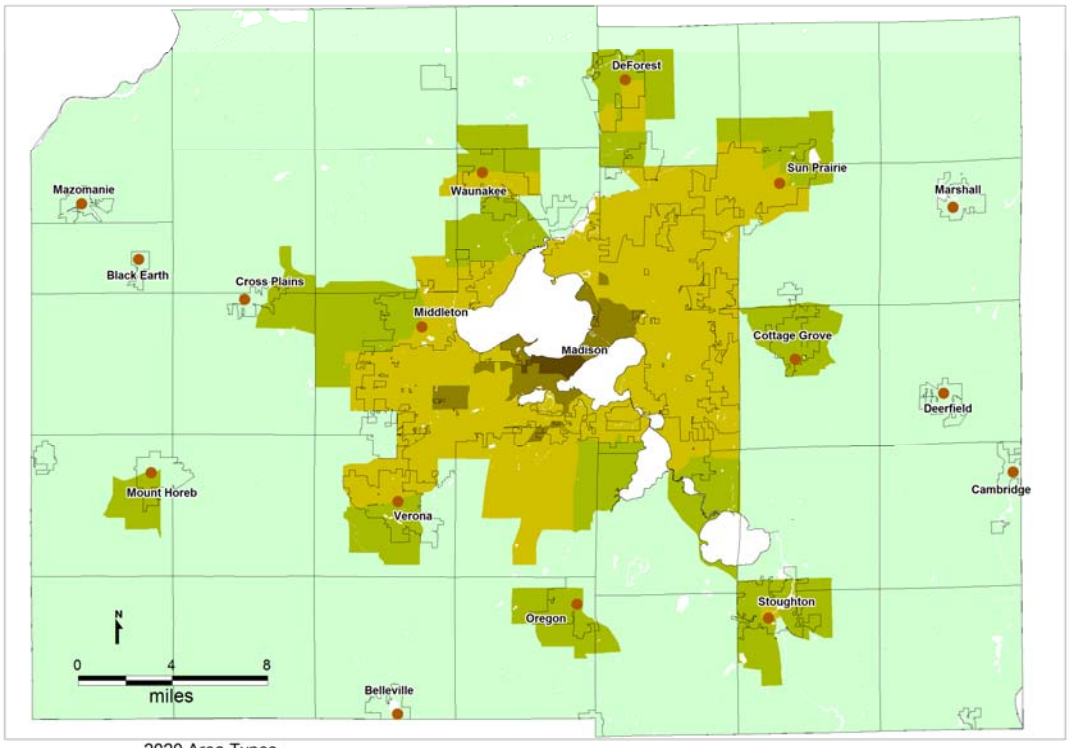


2015 Area Types

Transit Supportive

High — Low

Limitations: Map is based on 2009 Census block groups and is not intended to show precise boundaries, but rather the average block group characteristics.

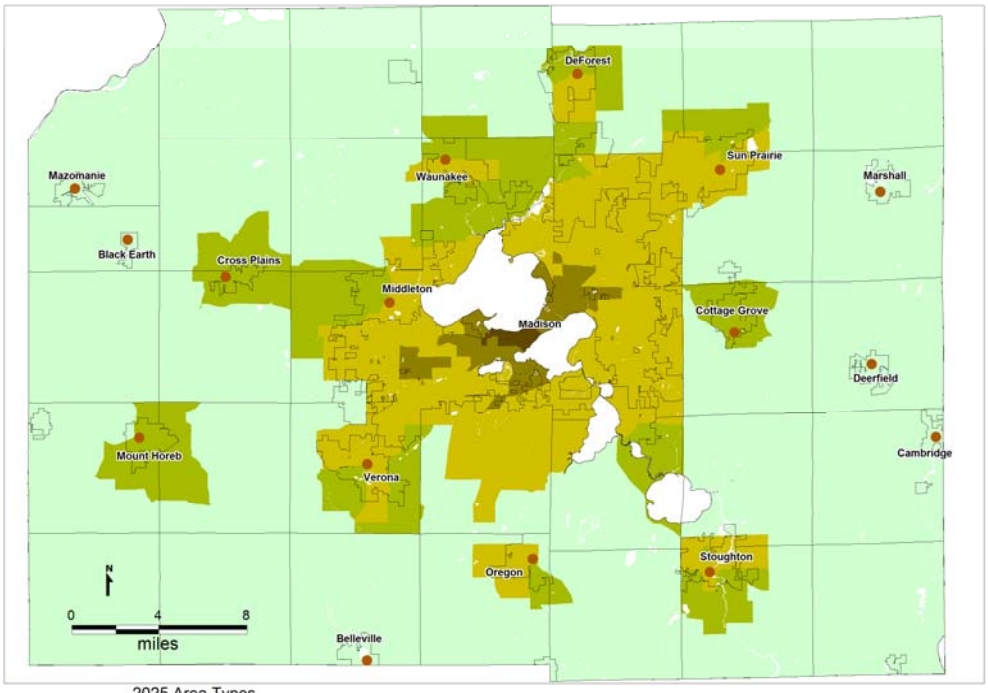


2020 Area Types

Transit Supportive

High — Low

Limitations: Map is based on 2009 Census block groups and is not intended to show precise boundaries, but rather the average block group characteristics.

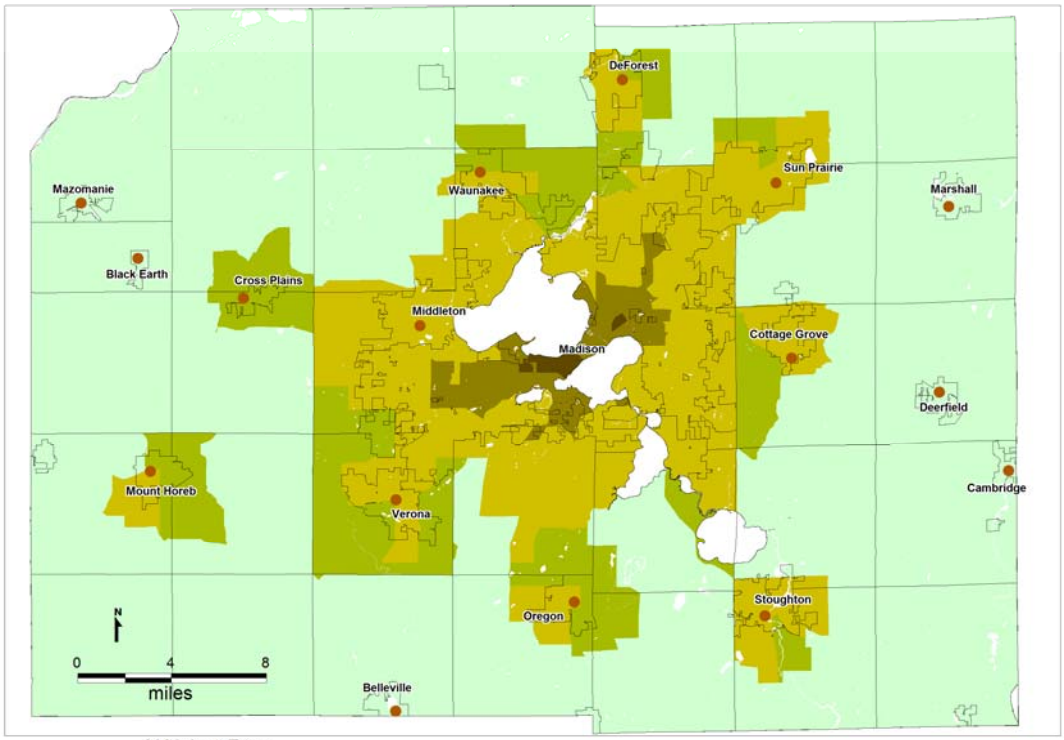


2025 Area Types

Transit Supportive

High — Low

Limitations: Map is based on 2009 Census block groups and is not intended to show precise boundaries, but rather the average block group characteristics.

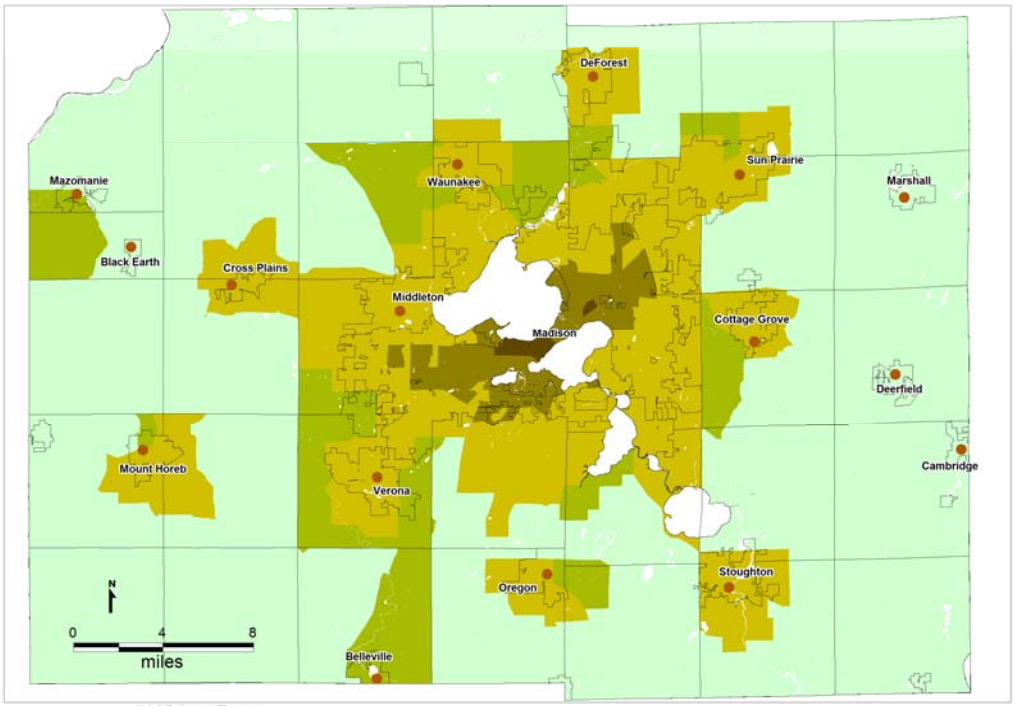


2030 Area Types

Transit Supportive

High — Low

Limitations: Map is based on 2009 Census block groups and is not intended to show precise boundaries, but rather the average block group characteristics.



2035 Area Types

Transit Supportive

High — Low

Limitations: Map is based on 2009 Census block groups and is not intended to show precise boundaries, but rather the average block group characteristics.

An increase in transit supportiveness means that the viability of walking, bicycling, as a means of transportation increased, and that those who drive are able to drive shorter distances to meet their needs; as a result, modeled transportation behavior is seen to change. Viewing these changes quantitatively, the variables used to evaluate transit supportiveness show small but consistent changes for each category between 2010 and 2035. To illustrate the difference over the period, the categories are defined the same way for both 2010 and 2035, i.e. a block group that belonged to the "Mid" group in 2010 was also part of the "Mid" group in 2035.

Figure A7.3: 2010 vs. 2035 Transportation Model Findings Using 2035 Baseline Projections

Transit Supportiveness	Car Ownership (automobiles/household)		Driving (miles/year/household)		Commuting by Transit	
	2010	2035	2010	2035	2010	2035
High	1.2	1.2	13,019	12,908	29.6 %	31.2%
Mid-High	1.6	1.5	15,537	14,927	11.0 %	13.6%
Mid	1.8	1.8	18,524	17,974	2.8 %	3.6%
Low-Mid	1.9	1.9	21,465	20,511	0.6 %	1.1%
Low	2.1	2.0	25,498	24,191	0.1 %	0.4%

Results modeled for the regional typical household using the transportation model of from the 2009 H+T Affordability Index.

Residents of areas defined as highly transit supportive in 2010 are projected under an extrapolation of existing trends to drive about 111 fewer miles per household per year, while residents of "low" transit-supportive areas are estimated to need 1,307 fewer miles per household to meet their needs. Average miles driven for a block group as a whole is correlated with car ownership rates; as the need to drive long distances for various trip purposes is reduced, the need for additional vehicles decreases. This is shown as slight declines in the rates of car ownership. Finally, we see small but consistently positive changes projected across the board in the average rate of transit usage for commuting to work within communities characterized at varying levels of transit supportiveness.

The project team used this block group level analysis to better understand the underlying transportation dynamics of the region, where projected growth is expected to occur under an extrapolation of existing trends, and how the expected shape of that growth would impact key aspects of transportation behavior. The approach in this project, as described above, involved an analysis of real estate demand for transit-supportive development types, taking into account shifts in demographics that drive changing consumer preferences.

Appendix 8: Workshop Participants

Over 60 community members participated in some or all of the three-day design workshop held in April 2013. The list below reflects all participants who signed in at the registration desk or otherwise made their presence known to the workshop staff. It also includes members of the community who agreed to assist the workshop process in a voluntary capacity that helped shape the workshop products. Organizational affiliations for participants, if any, are included to the extent available.

Tim Anderson, Design Professionals
Deb Archer, Greater Madison Convention and Visitors Bureau
Steve Arnold, Fitchburg Common Council
Zach Barnes, Pedestrian and Bicycle Ambassadors Program
Jon Becker, CRANES
Sabrina Bradshaw, UW Madison Office of Sustainability
Curt Brink, Smart Growth Greater Madison
Christine Chambliss
Mike Chechvala, Madison Area Transportation Planning Board
Pam Christianson, MG&E
Ed Clarke, Madison College
Kate Crowley, Baker Tilly
Suzanne Dorsey, Kelley Williamson Company
Natalie Erdman, Madison Community Development Authority
Jay Ferm, Planet Bike
Nancy Fey, Madison Plan Commission
Joyce Frey, City of Fitchburg Economic Development
Ken Golden, CARPC / Madison Area Transportation Planning Board
Will Green, Mentoring Positives
Art Hackett, Eken Park Neighborhood Association
Cynthia Higgins, Lake Edge Neighborhood Association
Paul Jadin, Thrive
Don Jones
Chuck Kamp, Madison Metro
Kathy Kamp, Wisconsin Partnership for Housing Development
Arlan Kay, Architecture Network
Lori Kay, Architecture Network
Rich Kedzior
Scott Kolar, DMI Bike Committee

Frank Kooistra, UW Madison Office of Sustainability
Dorothy Krause, Fitchburg Common Council / Dane County Board
Jim LaGro, UW Madison Urban and Regional Planning
Maya Lea
Ed Linville, Linville Architects
Donna Magdalina, SASY Neighborhood Association Council
Dan McAuliffe, CARPC
Gregg McManners, Monona Terrace
Joe Mingle, East Isthmus Neighborhood Planning Council
Delora Newton, Chamber of Commerce
Archie Nicolette
Gary Peterson
Patty Prime, Tenney/Lapham Neighborhood Association
Michael Reese, Dentist, City of Fitchburg
Phil Salkin, Wisconsin Realtors' Association South Central
Bob Sanders, Kelley Williamson Company
Emily Scali
Bill Schaeffer, Madison Area Transportation Planning Board
Ben Schmidt, U.S. Bank
Jody Schimek, UW Madison Landscape Architecture
Nicole Solheim, Gorman & Co.
Stephen Steinhoff, CARPC
Arvin Strange, South Metropolitan Planning Council
Eric Sundquist, Madison Plan Commission
Troy Thiel, Keller Williams Realty
Wade Thompson, City of Fitchburg
Matt Wachter, Madison Housing Initiatives Specialist
Robbie Webber, SSTI
Anita Weier, Madison Common Council
Jay Wendt, City of Madison
Dan Williams

Appendix 9: Proposed Station Areas Real Estate Development

Figure A9.1: Detailed Real Estate Development Values

PROPOSED STATION AREA	SPACE TYPE*	TOTAL SPACE OR UNIT COUNT	REAL ESTATE DEVELOPMENT VALUE IN 5-YEAR INCREMENTS				
			2015-2019	2020-2024	2025-2029	2030-2034	Total
Wingra Creek	RETAIL	334,400	$16,302,000	$17,117,100	$17,972,955	$18,871,603	$70,263,658
	OFFICE	209,000	$9,143,750	$9,600,938	$10,080,984	$10,585,034	$39,410,705
	APARTMENTS	325	$10,606,750	$11,137,088	$11,693,942	$12,278,639	$45,716,418
	CONDOS	117	$5,004,563	$5,254,791	$5,517,530	$5,793,407	$21,570,290
	SFA	120	$5,760,000	$6,048,000	$6,350,400	$6,667,920	$24,826,320
	SFD	114	$7,524,000	$7,900,200	$8,295,210	$8,709,971	$32,429,381
		Totals =	**$54,341,063**	**$57,058,116**	**$59,911,021**	**$62,906,572**	**$234,216,772**
Post Road	RETAIL	301,350	$15,067,500	$15,820,875	$16,611,919	$17,442,515	$64,942,808
	OFFICE	215,250	$9,686,250	$10,170,563	$10,679,091	$11,213,045	$41,748,948
	APARTMENTS	239	$8,071,875	$8,475,469	$8,899,242	$9,344,204	$34,790,790
	CONDOS	117	$5,166,000	$5,424,300	$5,695,515	$5,980,291	$22,266,106
	SFA	300	$14,850,000	$15,592,500	$16,372,125	$17,190,731	$64,005,356
	SFD	139	$9,452,000	$9,924,600	$10,420,830	$10,941,872	$40,739,302
		Totals =	**$62,293,625**	**$65,408,306**	**$68,678,722**	**$72,112,658**	**$268,493,310**
East Towne	RETAIL	518,760	$28,531,800	$29,958,390	$31,456,310	$33,029,125	$122,975,624
	OFFICE	424,440	$19,099,800	$20,054,790	$21,057,530	$22,110,406	$82,322,525
	APARTMENTS	559	$18,864,000	$19,807,200	$20,797,560	$21,837,438	$81,306,198
	CONDOS	114	$5,030,400	$5,281,920	$5,546,016	$5,823,317	$21,681,653
	SFA	181	$8,959,500	$9,407,475	$9,877,849	$10,371,741	$38,616,565
		Totals =	**$80,485,500**	**$84,509,775**	**$88,735,264**	**$93,172,027**	**$346,902,566**