TRANSIT-ORIENTED DEVELOPMENT: AN ALTERNATIVE TO SPRAWL

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ABSTRACT

Transportation modes have historically influenced forms of growth. The personal automobile has perhaps had the most impact, producing a form of development known as sprawl. This unplanned form of development has become a predominate pattern of growth in many parts of America, which has brought about a number of social, economic, and environmental challenges. In addition to these challenges, sprawl often produces amebic forms without clearly defined centers. Instead, sprawl typically consists of low-density development, single-use zoning, and wide roads. This creates an environment that is almost exclusively designed for vehicles and dangerous for pedestrians. Because sprawl usually lacks an identifiable communal center, it can be challenging to distinguish one place from another in the city.

Shifting to mass transit allows for other growth patterns which may potentially reduce or overcome these negative impacts. One alternative growth pattern is transit-oriented development (TOD). TODs are compact, high-density, walkable, mixed-use centers in greenfields or as redevelopment of existing under utilized properties near existing or proposed transit stops or corridors. This thesis proposes a TOD in the Donelson community of Nashville, Tennessee, to demonstrate some of the advantages of TOD compared to sprawl and to establish an identifiable center for Donelson.

PREFACE

It is naive to suggest that TODs alone can eliminate and completely remediate the negative consequences associated with sprawl. However it is my belief that TODs are a more socially, economically, and environmentally sustainable growth pattern than sprawling suburbs. Therefore, TODs should be considered as part of a comprehensive approach to address the persistence of sprawl as the dominant pattern of growth to negate the detrimental impacts of sprawl.

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CHAPTER I

INTRODUCTION

The intent of this thesis is to demonstrate some of the advantages that transit-oriented development (TOD) has over the more common form of development known as sprawl. To do so will require an explanation of what sprawl is, how sprawl has become a dominant pattern of growth in the United States, and why sprawl should be discouraged. Specifically I am proposing a mixed-use, TOD for Nashville, Tennessee. This project proposes a walkable community that provides commuters access to Nashville's urban core and communities along the rail corridor by means other than personal automobiles. It also reduces the need to leave the community by providing housing, jobs, recreation, civic institutions, and conveniences within a comfortable walk. In addition to investigating the impact of transportation and urban design on sprawl, this thesis also intends to create a unique center or 'place' for the site, while also showing how TODs can improve the viability of mass transit in historically suburban areas and in turn stimulate economic development.

Additionally, I am proposing a TOD to demonstrate the environmental and economic feasibly of redeveloping sprawl. It is my intention to show how principles of TODs such as a mix of uses, increased density, and relying on mass transit can foster more environmentally responsible development while being economically and socially stimulating.

CHAPTER II

SPRAWL

WHAT IS SPRAWL?

One formal definition of sprawl is: the process in which the spread of development across the landscape greatly exceeds population growth (Ewing, Pendall, and Chen, 2002). Characteristics of the unplanned landscape created by sprawl are: a population that is widely dispersed in low density development; rigidly separated homes, shops, and workplaces; a network of roads marked by unwalkable blocks and unsatisfactory access; a high reliance, or possibly total dependence, on private automobiles for transportation; and a lack of well-defined, thriving activity centers such as downtowns and town centers. Most of the other features usually associated with sprawl—the lack of transportation choices, relative uniformity of housing options or the difficulty of walking—are a result of these conditions (Ewing, Pendall, and Chen, 2002).

There are many contributing factors that perpetuated sprawl, such as federal housing programs following the Great Depression in the 1930s, the widespread use and affordability of personal automobiles in the 1940s, transportation programs and interstate development of the 1950s and 1960s, rapid rise in population following WWII, higher degrees of personal affluence, as well as the desire to live closer to nature and as a way to escape the polluted, dangerous urban core (Hayden, 2003).

EVOLUTION OF SPRAWL

Transportation has a major role in the evolution of sprawl in America and is a focus of this thesis. There is an observable correlation between the evolution, accessibility, and mobility of transportation types in America over time and the resultant form of developed area. Figure 1 shows how the spatial form of cities changed as various modes of transportation were introduced and the development patterns that proliferated as a result. Acknowledging this correlation suggests that changing modes of transportation will produce a different form of growth. Therefore, shifting from the automobile to transit can result in future high-density centers, such as TOD, as opposed to low-density suburban development of the past.

Figure 1 identifies, five transportation related eras in America and how they influenced the eight development pattern eras. The transportation related eras are: Walking - Horsecar Era from 1800-1890, Electric Streetcar Era from 1890-1920, Recreational Automobile Era from 1920-1945, Freeway Era from 1945-1995, and the Transit Era from 1995 and beyond (Hanson, 1995). These transportation eras were instrumental in establishing eight development pattern eras. These include: borderlands (1820), picturesque enclaves (1850), streetcar suburbs (1870), mail-order & self-built suburbs (1900), sitcom suburbs (1940), edge nodes (1960), rural fringes (1980), transit-oriented development (1995) (Hayden, 2003).

During the early 1800's, walking was the primary form of transportation in American cities. This resulted in compact cities that were uniformly developed within a 30-minute walk of the city center, see the spatial form in Figure 1. These walking cities had areas of distinct activities such as industrial and residential. The residential areas were inhabited largely according to income, with wealthy citizens living in larger homes, walled off for privacy, further from the ills of the city center and accessed by horse drawn carriage (Hanson, 1995).



Figure 1: Effect of Transportation On Spatial Form & City Development Patterns (Gardner, 2013; Adapted from Hanson, 1995 and Hayden, 2003)

By the 1820s American cities had become highly industrialized, and as a result polluted. During this period people began to seek escape from the grime of daily city life by moving to the 'borderlands' - the zone of land immediately at the periphery of cities and the first development pattern. This was fueled by businessmen investing in the expansion of horse drawn street car rail lines out of the city. Figures 2 and 3 show a horsecar in downtown Minneapolis and a personal horse and buggy in Nashville,



Figure 2: Horsecar in downtown Minneapolis (Hanson, 1995)



Figure 3: Personal horse and buggy in Nashville (Evans, 2011)

respectively. These were the typical forms of transportation that allowed access to a narrow ring of land around the city's edge, which middle class families quickly inhabited. Eventually the desire for borderland living in a pastoral setting and the growth of the hinterland led to the subdivision, sale, and development of property for residential use.

This lifestyle was promoted by the coupling of physical land development, which was now enabled by horsecars, with social undertones. Dolores Hayden asserts that from the beginning of suburban development, religion, social and gender norms played important roles in encouraging migration from the city. She explains that the dream has always been for male homeownership, and the idea of female

domesticity has been promoted since the 1840s as a way to heighten a woman's religious significance. Further, she identifies two inspirational leaders: Andrew Jackson Downing and Catharine Ester Beecher. Together, through publications and practice, these two had broad influence in shaping the romantic, remote yards and houses favored by middle class suburban families. The influence from religion, gender roles, and inspirational leaders resulted in the creation of the triple dream, house plus land plus community, which were drivers for suburbanization made possible through transportation advances (Hayden 2003).

By the 1850s the work of Downing (Figure 4) and Beecher (Figure 5) led to architects and landscape architects designing 'picturesque enclaves' - the second development pattern. These were communities of curving paths with homes wrapped

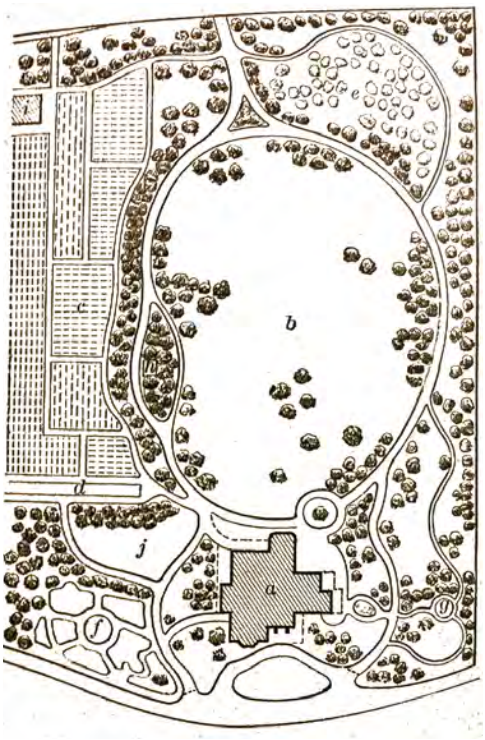


Figure 4: Plan of a Suburban Villa Residence (Downing, 1860)



Figure 5: A Christian House (Beecher, 1869)

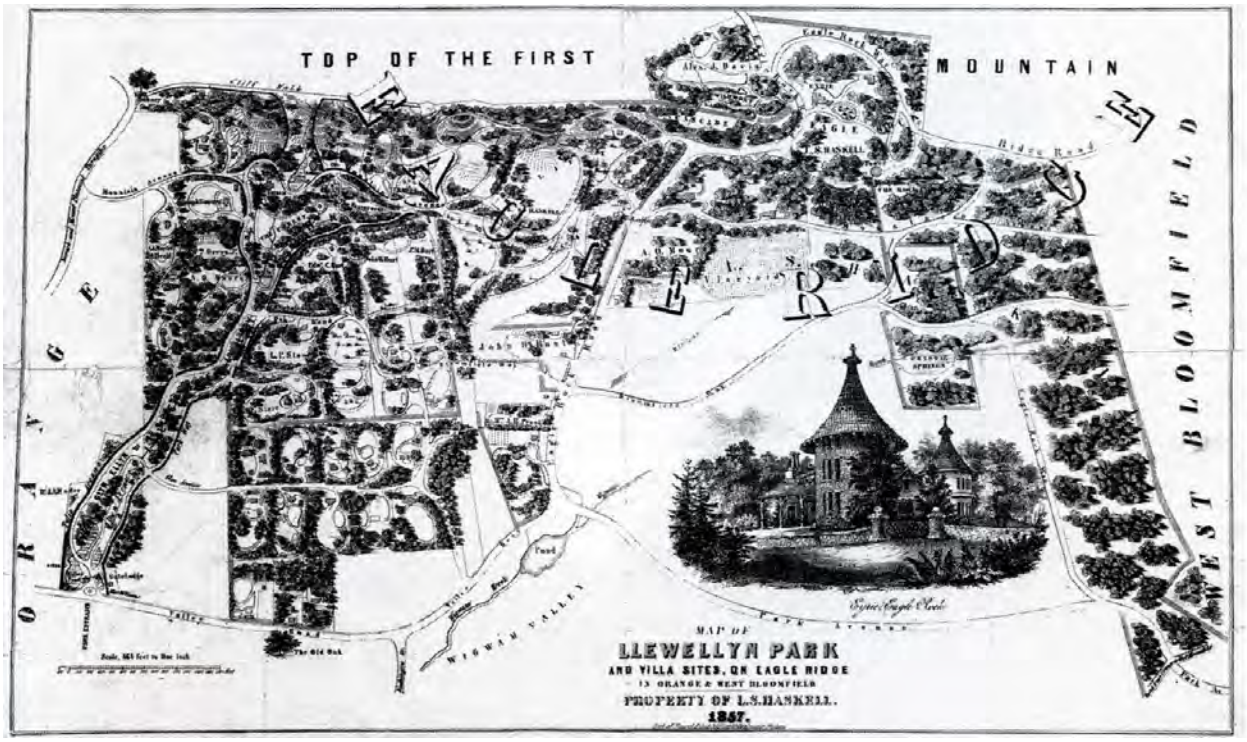


Figure 6: Plan of Llwellyn Park (Hayden, 2003)

in lush plantings adjacent to parks. Communitarians were especially fond of this type of settlement. To them perfecting their homes and landscapes was outward evidence of the superiority of their religious and political beliefs. Communitarian settlements, by groups like the Shakers, eventually became the model for horsecar suburbs like Llewellyn Park, (Figure 6), which is widely credited as introducing the masses to this form of development

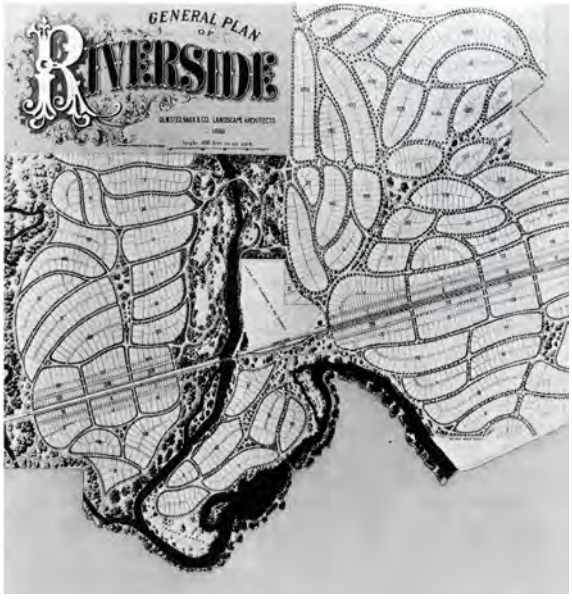


Figure 7: Plan of Riverside, Illinois (Hayden, 2003)



Figure 8: William T. Allen House Riverside, Illinois (Groundspeak, 2013)



Figure 9: Electric Streetcar in front of the Capitol in Nashville (Tennessee State Library and Archive, 2013)

(Hayden 2003).

Riverside, designed by Fredrick Law Olmstead and Calvert Vaux in 1869, is a late and perhaps most well known, example of a picturesque enclave (Figure 7). The William T. Allen house (Figure 8) is an example of the homes at Riverside. However unlike Llewellyn Park, Riverside was served by electric streetcar as opposed to horsecar. Riverside marks the transition from the horsecar era to the streetcar era. Over time as neighborhoods such as Llewellyn Park attracted the wealthy, they lost their grandeur and seclusion; cottages were razed in order to build larger homes, and communal spaces were filled in to increase profitability (Hayden 2003).

Nearing the end of the Walking-Horsecar Era, cities had increased in both scale and their need for concentrated commercial, retail, and specialized services. Logically, the downtown central business district emerged as a single center most accessible to the entire urban area.

However with new immigrants arriving daily and cramming into the still polluted city center, and with land in the borderlands and picturesque enclaves quickly building out, pressure was mounting to expand development further into the countryside (Hanson, 1995).

This demand was soon met. The 1890s to 1920s were the transportation era known as the Electric Streetcar Era and subsequently introduced the streetcar suburbs as a predominant development pattern, (Figure 1). The existing horsecars soon replaced their horses with the newly invented electric traction motors which powered the electric streetcars (Figure 9). Since travel speeds had been increased to over 15 miles per hour, land further beyond the city's edge was then feasibly accessible for daily commuting. Corridors of communities, known as streetcar suburbs, began building up along streetcar lines radiating from the city center. With so much land available adjacent to these corridors there was no need to develop trolley lines between the corridors, and thus the city took on a star-shaped formation as shown in Figure 1 (Hanson 1995).

From the 1870s onward to their peak in the 1910s, streetcar suburbs were developed as base versions of the picturesque enclaves, but the



Figure 10: Flyer of Gross Park (Hayden, 2003)



Figure 11: Flyer of Grossdale (Hayden, 2003)

focus was on profit, not planning. Ultimately, greed and the lack of planning became the streetcar suburbs' downfall. Developers subdivided land, built housing and aggressively marketed their projects on the largest scale that had ever been seen. Figure 10 and Figure 11 show plans and marketing of Gross Park and Grossdale by Samual Gross near Chicago and are examples of streetcar suburbs. Eventually the land closest to the streetcar lines was developed. This led to the extension of streetcar lines in order to access additional undeveloped land. However the streetcar lines were overextended, became unprofitable, and suffered from poor management and aging equipment (Hayden, 2003).

By the 1920's the electric streetcar had transformed cities into metropolises up to 20 miles in diameter. Many geographers and planners agree that the electric streetcar era in the 1920s established the era of greatest transportation efficiency in America. By this time, streetcars allowed access between downtown, streetcar suburbs, and mill towns. However, a second transportation revolution had already begun. The rising popularity of the personal automobile brought about sweeping change - private transportation and the ability to travel as each individual chose. At first they were a leisurely convenience of the wealthy that also allowed new growth between streetcar corridors further out into the countryside (Hanson, 1995). As a result, the city once again took on a circular shape, although less dense than the Walking-Horsecar Era, as can be seen in the Recreational Automobile Era of Figure 1.

By the 1930s, automobiles were affordable for the middle class and allowed access to remote land that was previously inaccessible from rail corridors. This land was further out and cheaper than living in the city. Developers, seeing the opportunity for a new market and seduced by the prospect of making more money, began the standardization, prefabrication, and mass production of homes in 'mail-order suburbs'. Companies such as Sears Roebuck & Company sold homes from a catalogue and delivered them by truck to private lots for owners to construct. This resulted in lower

densities that made streetcar lines less profitable and eventually ended the service. However this was also during the Great Depression and there were large numbers of unemployed and homeless. The government rolled out a series of programs to meet the nation's housing needs. Whether on purpose or by oversight, the government effectively legislated its way into a position where it could intervene in the development process on behalf of finance, insurance, real estate, timber, manufacturing, and auto interests to support them with public funds. It set the stage for a new era of suburban development dominated by large firms with federal backing (Hayden, 2003).

Shortly after these programs began, the United States entered World War II, and rationed supplies such as food, rubber, and metal. Therefore, these supplies were diverted from domestic use in order to support the war effort. As a result, new home construction slowed, which led to massive pent up demand post war. In order to accommodate demand, relatives and strangers crowded together in single-family homes. Demand only grew as returning veterans with wartime savings ready to marry and start new households returned home from war. The stage was set for a rash of capitalism-driven consumption of household goods never before imagined. As new homes came online in the 1950s, demand for furniture and appliances soared as well. This time became referred to as the 'sitcom suburbs' as model suburban streets became of exclusivity to people of similar age, race and income with lifestyles reflected in nationally popular sitcoms of the time. The new government programs such as the Federal Housing Administration (FHA) and Veterans Affairs (VA) loans facilitated these young families' ability to own a piece of 'the dream', although most of these homes were built by large developers on huge tracts of land with no planning (Hayden, 2003).

Levittown in Long Island, New York, as seen in Figures 12 and 13, is the classic example of this large scale type of development. William Levitt, his sons, and other developers prospered with developments like Levittown because public policy



Figure 12: Levittown Aerial View (Rogers, 2001)



Figure 13: A Levittown Street (Learn Sustainable, 2009)

promoted rampant suburbanization, provided financing for highway construction, required lenders to invest in new home construction, insured private mortgages, and offered low interest loans through the Federal Housing Administration (FHA) and Veterans Administration (VA) (Hanson, 1995).

As Hayden notes, in the sitcom suburbs, the triple dream for housing deflated to a traditional house stuffed with appliances and furniture, equipped with two cars, and surrounded by a yard. The idea of situating a house in a planned neighborhood with pedestrian access to schools, shops, and parks as in the picturesque enclaves or providing public transit as in the streetcar suburbs all but disappeared. The sitcom suburbs did not offer “the most house for the money” in societal terms, but people of the time did not recognize this. In retrospect, Americans are now beginning to understand that designing quality neighborhoods is less expensive than subsidizing developers to sell single-family houses (Hayden, 2003).

The post-World War II Freeway Era (Figure 1), marked the rise of the automobile. This era differs from the previous transportation eras because it did not begin due to new innovations in transportation, but rather the new role of existing transportation. During the early Recreational Automobile Era, the automobile was a luxury used for

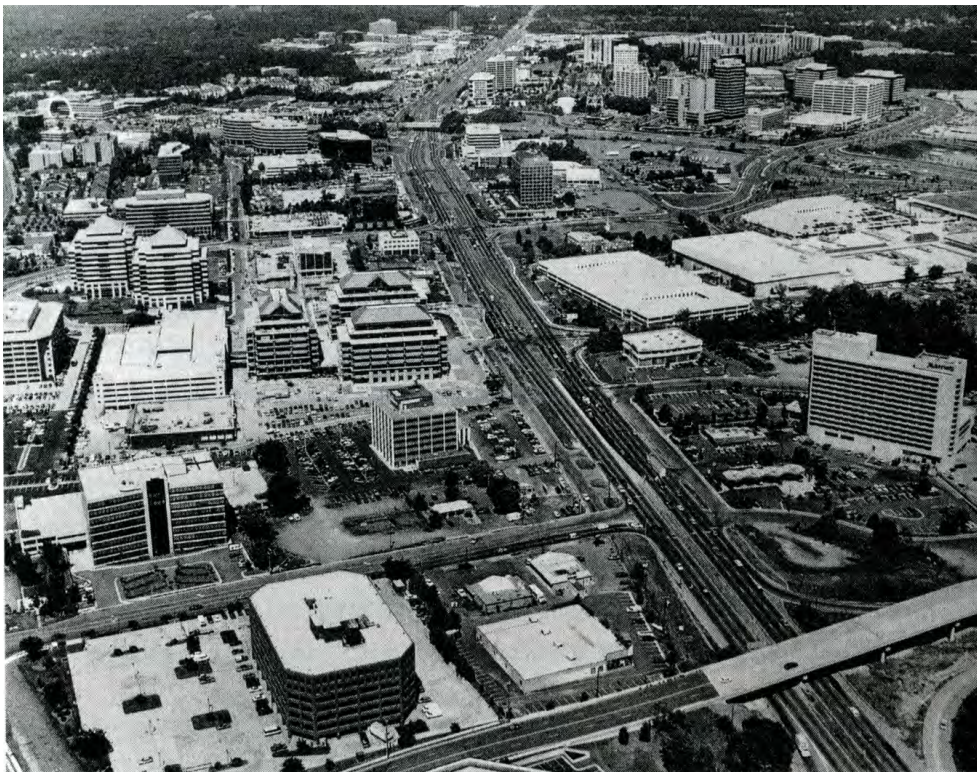


Figure 14: Tysons Corner, Fairfax County, Virgina - 1989 (Hayden, 2003)

leisure driving. In the new Freeway Era, automobiles were no longer a luxury, but a necessity because the distance from home to work and other destinations had grown so large. Coupled with the 1956 Interstate Highway Act, private access to the automobile was reshaping the city. Resembling the city form of the earlier Electric Streetcar Era, the Freeway Era also produced a pattern of development that was tied to transportation infrastructure, only this time is was the interstate (Hanson, 1995).

Around the 1960s 'Edge Nodes', such as Tyson's Corner in Figure 14, began developing in the interstate reliant suburbs. Edge nodes are characterized as places with 5,000,000 or more square feet of leasable office space, 600,000 square feet or more of leasable retail space, have more jobs than bedrooms, and are perceived as

one place. Generally these areas are centered around shopping malls. These nodes were placeless because they typically consisted of segregated zoning along wide roads designed for vehicles and dangerous for pedestrians and a did not foster a distinct visual identity for their community rather, they resembled one another. Edge nodes were allowed to propagate for several reasons, including: the rise of automobile ownership, massive government road building programs, as well as companies with automobile interests such as: General Motors, Firestone Tires, Mack Truck, and Standard Oil which were active in buying out electric trolley lines to eliminate competing transportation modes from which they did not profit.

Originally intended to allow through travellers a means for avoiding city center traffic congestion, by the 1970s the interstate had instead facilitated the rise of the edge city and thus the demise of the central business district. A central downtown location was no longer the most advantageous because the interstate made any land adjacent to it feasible for automobiles to access it (Hanson, 1995). The interstate interchanges of edge cities quickly populated with visually similar malls, gas stations, hotels, big box stores, and ever-decreasing housing densities. It is no longer necessary to live close to work because the publicly subsidized freeways now allow employees to commute from residences far beyond the city, from scattered less dense areas. Theses areas are know as the 'rural fringe', the present development pattern (Hayden, 2003).

The fringes saw rapid development starting in the 1980s. Land was cleared and wildlife removed as people sought the 'country style' and unspoiled rural landscapes. A wide range of housing choices became available in this zone. They range from old

farmhouses, inexpensive communities of trailers or manufactured housing, retirement communities, and tract houses, as well as more ostentatious tract mansions. The bigger the houses and yards, the longer the distances became, and the higher the likelihood to commute by car (Hayden, 2003).

THE TAKEAWAY FROM THE EVOLUTION OF SPRAWL

Following War World II the nation had critical employment and housing needs. There were many unemployed and homeless, as well as a growing demand for housing. In an effort to provide housing and boost the economy the government made investments in the nation's infrastructure and provided individuals with assistance to make the leap to homeownership. However, automotive and oil companies' attacks on public transit, construction of interstates by the government, and the affordability of automobiles ultimately lured individuals further and further out of the city, into low-density, unplanned-sprawl. From the people's point of view, they were now able to obtain what had been out of their reach for so long, their own home and yard. Flush with excitement by the prospect of homeownership, the population rushed to the decision to build in the suburbs without considering the social, economic, and environmental consequences.

NEGATIVE CONSEQUENCES OF SPRAWL

Sprawl has a range of negative consequences including social, economic, and environmental problems. Suburban drivers, pedestrians, bicyclists and transit riders are all affected by the impact of sprawl and cars. Drivers in auto-oriented communities favor sprawl because they have the freedom to access roads and free parking on their own schedule. However, this leads to longer commute times and heavy traffic. Low-density

sprawling communities are frustrating and dangerous to pedestrians because they are not built at the human scale, but rather are scaled for cars. Large, multi-lane, high-speed roadways are intimidating and dangerous for pedestrians to cross. Additionally, the distance to destinations of interest, or need, are usually beyond the range a pedestrian is willing to walk. Safety is also an issue for bicyclists travelling through sprawl. Roads are dominated by cars, and sidewalks are the pedestrians' realm. Most sprawling areas have no way to accommodate the bicyclist. Finally, commuters using mass transit in sprawling suburbs often do so with great inconvenience. Because these areas are typically low in density, bus and rail are typically less efficient, with lengthy distances between stops, and long waits. As a result, bus and rail service in sprawling suburbs usually suffers from low ridership, serves a narrow economic demographic and likely depends upon government subsidies in order to provide the service.

NEGATIVE SOCIAL CONSEQUENCES OF SPRAWL

Those living in sprawling suburbs have longer commute times and distances to travel for work, to shop, or for recreation. As a result of sprawl, cars, attached garages, and consumerism, the social experience of the Walking-Horsecar Era has been striped away from the city and replaced by solitary, isolating commutes. The car and garage have been agents of social isolation, while consumerism has created a suburban landscape robbed of identity. The suburbs are overrun with chain stores, restaurants, gas stations, and hotels repeated over and over in nearly every city. These suburban destinations are designed for vehicular access, and therefore promotes a more sedentary and unhealthy lifestyle.

NEGATIVE ECONOMIC CONSEQUENCES OF SPRAWL

By attempting to escape the city and return to nature, a growing population has relentlessly consumed the land surrounding the dense, historic core of American cities. The expansion was largely funded by the public, as the federal government used taxes to expand highways, utilities, and other infrastructure out into the countryside. Further, those lured out into sprawling areas by the perception of less expensive housing soon discovered that operating costs for personal transportation become a large percentage of their income.

NEGATIVE ENVIRONMENTAL CONSEQUENCES OF SPRAWL

Expansion of development into undeveloped watersheds increases impervious surfaces, which introduces additional stormwater runoff volume and degrades water resource quality. Additionally, this expansion is rapidly consuming agricultural lands and robbing American landscapes of their natural resources and beauty. Further, the low-density nature of sprawl, almost always requires it to be accessed via automobile. Therefore the number of cars on the road has increased which results in a rise in air pollution from exhaust.

CHAPTER III

CASE STUDY OF SPRAWL IN ATLANTA

The historic growth of Atlanta, in many ways, parallels the evolution of sprawl covered in Chapter II. It is an extreme example of how post-World War II reliance on automobiles and interstates creates distant suburban edge nodes of low density and inefficient transit, triggering the previously mentioned consequences of sprawl.

In the mid-nineteenth century, the state of Georgia built the southern terminus of the Western and Atlantic railroad to connect with Chattanooga, Tennessee. By the late nineteenth and early twentieth centuries, several rail lines converged at this site now know as Atlanta, which brought an influx of growth. Until the end of World War II local rail and streetcar lines converged downtown, and were the primary force shaping the city.

By the 1920s automobiles in Atlanta were used as leisure toys of the rich, as they were in many other cities at this time, and were of little consequence to the city's form. Even immediately following World War II they were generally not used for commuting to work, but rather as a shuttle to train stops and streetcar lines. Automobiles did allow for the growth in between the radial rail lines, which sprouted several middle to upper middle class communities such as Buckhead, Druid Hills, and Ansley Park. This created a spatial form similar to that of the Recreational Automobile Era in Figure 1.

The interstate system developed alongside the radial rail system from a century earlier and was envisioned to bring workers into downtown. Ironically, throughout the 1960s and 1970s transportation reports suggested the need for increased freeway capacity even as downtown residential decentralization was occurring along with employment decentralization. The population in the center city stopped growing, while suburban populations were rising.

As these shifts in population balance were occurring there was a long range planning effort by the Atlanta Region Metropolitan Planning Commission (ARMPC) to develop the Metropolitan Atlanta Rapid Transit Authority (MARTA). MARTA was envisioned to be a commuter rail network throughout the metropolitan area that would be in operation by 1983 when the population was projected to reach two million. Unfortunately the system was only approved in the city of Atlanta, Fulton County, and DeKalb County. It was defeated in Clayton and Gwinett counties, where each operated independent transit systems that lacked connectivity to the Atlanta - Fulton County - DeKalb County system (Sjoquist, 2009). Figure 15 shows the extents of the interstate throughout the region and the limits of MARTA. This fragmented system now carries less than 5% of commuters to work each day. This means there are more cars on the road, longer commute times, more air pollution, degraded air quality, and increases in air quality related illnesses such as asthma in spite of transit (Bullard, 1999).

Because there was not a comprehensive network linking these areas, as well as the fact that the culture of the automobile and decentralization was already deeply

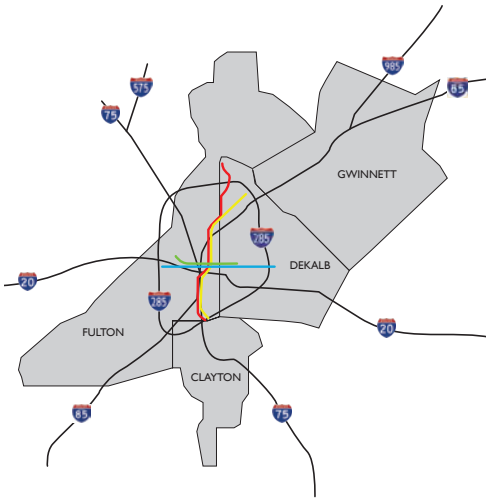


Figure 15: Metropolitan Atlanta
(Gardner, 2013)

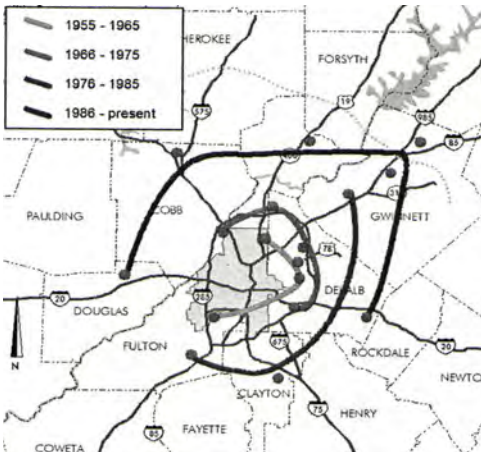


Figure 16: Suburban Atlanta Malls. (Sjoquist, 2009)

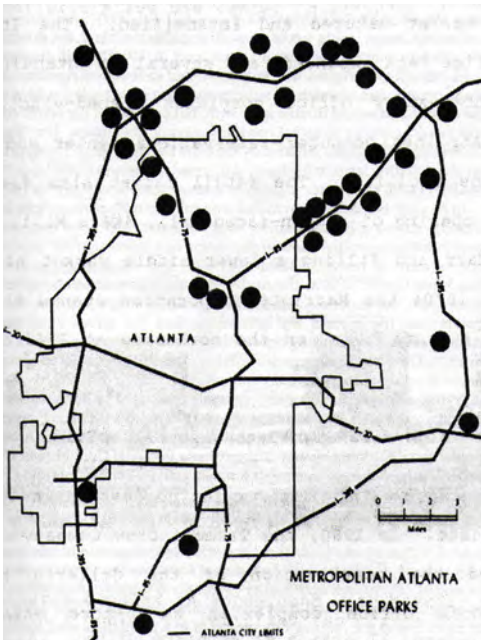


Figure 17: Pattern of office parks in Atlanta. (Sjoquist, 2009)

ingrained, MARTA never became a dominant force shaping the growth of the city.

As lanes were added to the interstates in the 1970s the pace of suburbanization accelerated. Regional malls began locating at major interstate interchanges outside of the city (Figure 16) which were quickly followed by office parks (Figure 17). By the mid-1970s, the suburbs had effectively turned the city inside out as they became comparable work centers to downtown, and were growing more independent. By 1985 these areas had developed as edge cities of the Freeway Era (Figure 1). These edge cities were beginning to form their own suburban downtowns with their own skylines. However they were more dispersed than downtown Atlanta and were oriented for automobiles rather than pedestrians.

The interstate had been intended to reinforce the supremacy of the city of Atlanta as the region's head by providing convenient access to the surrounding area. Unfortunately, it instead created competing edge cities (Figure 18) that were not transit focused and lacked high density residential areas. Even so, employment levels continued to grow

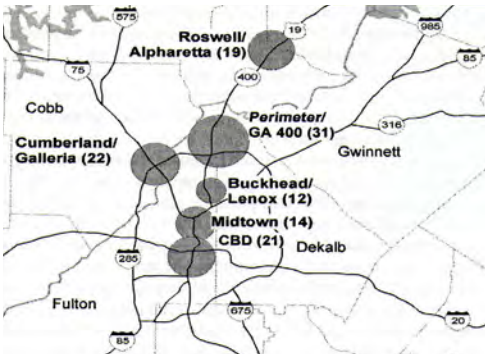


Figure 18: Edge Cities of Atlanta.
(Sjoquist, 2009)

throughout the 1990s in edge cities, which attracted more residential growth in further removed locations, and increasingly worse traffic congestion (Sjoquist, 2009). In the 1990s, nearly 70,000 people per month were moving to the suburban areas of Atlanta. Accordingly, from 1980 to 1990 the city of Atlanta's share of the region's jobs dwindled from 40% to 29% (Bullard, 1999).

The ongoing decentralization of Atlanta has led to the coining of the term 'edgeless city' by Robert Lang. He refers to Atlanta's sprawling development as a, "huge countrified city across a vast space"(Sjoquist 150), with single-family residential on large lots, often unconnected to sewer systems, lead by the outward expansion of highways and movement of jobs.

A 2004 report by the Metro Atlanta Quality Growth Task Force identified a range of land pattern consequences with Atlanta's sprawling growth. The list of unwanted superlatives ranked Atlanta in the top fifteen metros for the least dense metropolitan region (2.3 people per acre), and largest median single-family lot size (three quarters of an acre). This resulted in Atlanta's density dropping by half from 1970 to 2000, and the average newcomer consuming twice the amount of land over the same period (Sjoquist, 2009). Thus the average Atlantan drives 34 miles per day, which is more

than any commuter on the planet (Bullard, 1999). These findings highlight how the broken link between transportation and land use in Atlanta has been the key role in creating the dominate development pattern of low density, automobile dependent outer suburban growth (Sjoquist, 2009).

LESSONS FROM ATLANTA

Among the most valuable lessons to be learned from Atlanta are the need for density, regional cooperation, planning and transit options. These issues are entangled, and changes regarding one component impact the others.

First, Atlanta sought to strengthen the core city by extending the interstate outward with hopes of bringing growth inward. However, this actually had the opposite effect setting in motion a pattern of ever increasing land consumption, further from the city, with decreasing density. This unplanned, low-density development pattern, resulted in increased traffic congestion, increased commuting times, and degraded air quality.

Second, low density development made transit such as MARTA inefficient. If dense cores of development had been planned concurrently with MARTA, high density communities could have supported the system while reducing land consumption and obviating interstate expansion.

Further, MARTA was unable to achieve the support of the core counties that comprised metropolitan Atlanta. Without a comprehensive network, there were too many competing systems with too limited access and connectivity. Although these systems sought to provide a mass transit system, they placed their own goals ahead of the others and failed to recognize that regional cooperation would have likely been more successful for each jurisdictions' goals.

Since high density development and a shared regional transportation vision

were not achieved, MARTA was unable to curb outward development. This resulted in the automobile remaining as the dominate means of transportation and no feasible transit alternatives. Accordingly the region continued to develop to serve the automobile creating a landscape of sprawling suburbia.

To address these issues, Atlanta has begun implementing TODs. Lindbergh City Center at Lindbergh Station is one example of a successful Atlanta area TOD. This station averages over 23,000 boardings per weekday, and offers regional access by rail to this high density, mixed-use center (MARTA, 2009).

CHAPTER IV

TRANSIT-ORIENTED DEVELOPMENT AS A SOLUTION TO SPRAWL

As cities around the country continue to grow, the economic, environmental, and social problems of sprawl will continue to spread over our land unless an alternative growth strategy is applied. As the severity of these problems has increased, so has our collective recognition of the cause and effect relationship that ties transportation modes and development patterns. Therefore, implementing transit reduces auto dependence and enables a return to walkable core development that increases ridership, making transit and other TODs viable. This chapter outlines the economic, environmental, and social benefits of TOD, while also addressing criticism of TODs marketability.

Understanding that there is a link between transportation modes and development patterns suggests that shifting to efficient mass transit and coupling with higher-density land development may ease the problems associated with sprawl. Additional trends and beliefs such as rising gas prices, broadening senses of environmental responsibility, and shifts in household demographics and housing needs have led many cities to reinvesting in transit. For these reasons I believe America is in the early stages of the 'transit-era' which can facilitate the transit-oriented land development pattern. The 'transit-era' utilizes mass transit as the primary form of transportation which allows for high-density, compact, nodes of land development (Figure 1). Therefore, the alternative growth strategy I am proposing is the implementation of transit-oriented developments (TODs).

The professional transit community generally agrees that TOD is characterized as "a pattern of dense, diverse, pedestrian-friendly land uses near transit nodes that, under the right conditions, translates into higher transit patronage" (Cervero, 2004). There is not a formal universal definition because what is considered dense,



Figure 19: Contrast Between TOD and Sprawl (Gardner 2013)

pedestrian-friendly, and transit-supportive differs from one city to the next. Of the transit agencies that have adopted their own customized definition of TOD, most emphasize the importance of high-quality pedestrian environments - located within approximately ¼ to ½ mile radius of existing or proposed public transportation such as bus and commuter rail - mixed land uses, higher density developments, and increased ridership and revenues. Figure 19 diagrams the characteristics of TOD and contrasts them from the characteristics of sprawl.

TOD has the potential to offer a range of benefits for both the public and private sectors. Some of the primary benefits for the public sector include increased transit ridership & revenues, revitalization of neighborhoods, and economic development. Primary benefits for the private sector include increased land values, rents, and real estate performance, and increased affordable housing opportunities. There are also secondary benefits for both public and private sectors that result from the above listed primary benefits. Secondary public benefits include less traffic congestion & vehicle

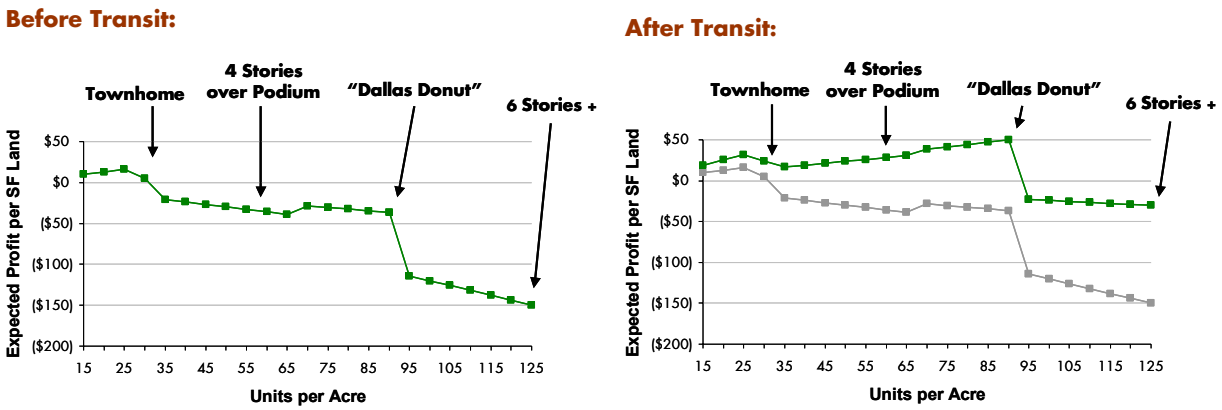


Figure 20: Potential Profit for Developments Near Transit (Reconnecting America's Center for Transit Oriented Development, 2008)

miles traveled (VMTs) costs, increased property & sales tax, reduced sprawl & open space conservation, reduced road & infrastructure expenditures, reduced crime, and increased social capital. The secondary benefits for the private sector include: increased retail sales, increased access to labor pools, reduced parking costs, and increased physical activity (Cervero, 2004).

ECONOMIC BENEFITS OF TOD

TODs can be of economic benefit to cities by revitalizing aging or declining urban areas, thereby broadening the tax base, decreasing infrastructure costs through compact infill development, and providing lower-cost housing by promoting compact growth patterns. Property values have been shown to rise when located near transit stations (Reconnecting America's Center for Transit Oriented Development, 2008). The first graph in Figure 20 shows that before transit is introduced the most profitable building type for a developer is lower density townhouses. This type of construction is relatively low cost and is capable of generating enough revenue to exceed the

cost of construction. However the second graph in Figure 20 shows that after transit is introduced, higher density development becomes more profitable. As a result of transit, it is possible to reduce construction cost and increase profit (Reconnecting America's Center for Transit Oriented Development, 2008). Decreasing parking ratios and increasing density also makes structured parking more economically viable Concurrently, adjacency to transit increases the potential for higher rents and sales prices. Coupling higher rents with higher sales prices results in the "highest and best use" shifting from the 25 dwelling units per acre townhouses to the 90 dwelling units per acre "Dallas Donut", or multi-story residential building wrapped around structured parking (Reconnecting America's Center for Transit Oriented Development, 2008).

The personal economic benefits of TODs are significant as well. TODs can increase a household's disposable income. Housing and transportation are the top two household expenses in sprawling communities. Transportation expenses are lowered by building dense, mixed-use communities within walking distance of public transportation and other conveniences and amenities which therefore eliminates or reduces the need for a personal vehicle and the expenses associated with operating and maintaining one.

ENVIRONMENTAL BENEFITS OF TOD

TODs have the potential to reduce traffic congestion and thereby reduce energy consumption rates and air pollution. Nationally, the environmental impact of traffic congestion costs 5.7 billion gallons of fuel, as estimated by the Texas Transportation Institute. For every gallon of gasoline a car burns, 1.15 pounds of CO_2 is produced (Williams-Derry, 2008). This translates to the production of over 6.5 billion pounds of CO_2 from traffic congestion. Studies revealed that residents in TOD-like communities of the San Francisco Bay Area, averaged roughly half the VMTs per year as those living

in conventional suburban areas. Since the typical personal vehicle averages 22.9 miles per gallon, or 26.3 pounds of CO_2 per gallon, decreasing ones VMTs results in a significant reduction in CO_2 emissions (Williams-Derry, 2008). Another California study shows that TODs reduced annual rates of driving by 20%-40% for those who live, work, or shop near transit stations. This same study found that when transit stations were reached by foot or bike, as apposed to car, greenhouse emissions fell by 2.5 to 3.7 tons per year per household.

Another environmental benefit of TOD is the reduction of sprawl and the conservation of open space. According to the "TCRP Report 74: Costs of Sprawl", 2.5 million acres of land could be saved over the next 25 years if contiguous, compact land development methods such as TOD were implemented. This report found that 10%-40% more land is consumed with sprawl-like development practices as compared with compact development.

Additionally compact, high density development like TOD reduces the amount of impermeable surfaces such as roadways, parking lots, and rooftops as compared to sprawl, and as a result can reduce impacts to water quality. Further, compact developments can preserve biodiversity because they reduce or eliminate the need to disturb land that may have otherwise been native wildlife habitats (Cervero, 2004).

SOCIAL BENEFITS OF TOD

TODs can be used as a method for developing stronger communities. This can occur because the compact, walkable nature of TODs coupled with the ease of access to daily conveniences encourages increased interaction among people in the community. Fitness and health are also improved as residents are walking or biking more frequently to their destination. Sprawling residential development can cause isolation since the home is most often accessed by car entering a private garage. In

this scenario the resident is insulated from others by car, garage, and home.

Another social benefit of TODs is that they provide mobility options. In TODs the young, the elderly, those who otherwise cannot drive, and those who do not own a car have an alternative means by which to commute. This improves residents' job prospects by providing access, which similarly broadens the workforce for regional employers.

TODs can also increase public safety. TODs promote active places throughout the day. This increases the number of 'eyes on the street' and thus deters crime. Finally, by integrating public transportation with these types of developments ridership is increased. This improves the effectiveness and feasibility of the public transportation system, thus allowing neighbors to interact with one another as they commute to work (Reconnecting America's Center for Transit-Oriented Development, 2008).

CRITICISM OF TOD

One of the primary criticisms of TOD is that there is insufficient demand for this type of development. The claim is that families want traditional lots with large homes, and therefore TOD does not have a large enough market to be successful. However, the Federal Transit Administration (FTA) has found that attitudes and demographics have changed and are more favorable for TOD. The International Futures Programme affirms this by projecting how shifts in household demographics are likely to occur between now and 2030 around the world (Figure 21). According to the study, the United States could experience a significant increase in the percent of one-person households, single-parent families, and couples without children. Additionally, one-person households and single-parent households are forecasted to comprise 28% and 27%, respectively, of all households by 2030 (International Futures Programme, 2011). No longer is the typical American household comprised of a male breadwinner, stay-

at-home mom, and kids. In 2000 the percent of non-traditional households (i.e. single parents, childless couples, divorced or never-married people, or two or more unrelated adults) was 76.5%. Also the number of immigrant households is on the rise. These residents often prefer living in cities because they have the most opportunities as well as public transit which many are accustomed to in their native country. Further, retired couples looking to downsize are projected to make up about 20% of the population in 27 states by 2025. They prefer walkable neighborhoods near transit because it gives them access to cultural amenities, shopping, and other destinations. Since there are so many segments of the population that no longer conform to the classic model household, homes and neighborhoods should evolve to meet the realities of our new demographics (Cervero, 2004). TOD can provide a variety of housing options that

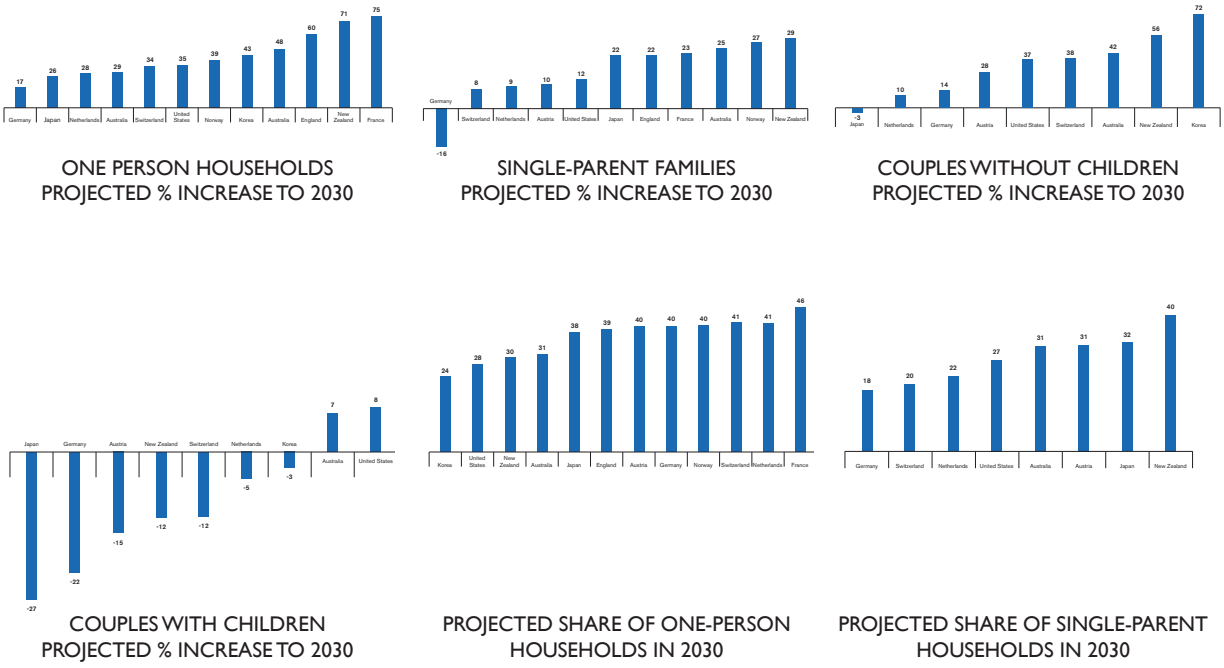


Figure 21: Shifts in Household Demographics to 2030. (International Futures Programme, 2011)

meet the needs of our changing families and households.

Evolving demographics are also to credit for a rise in TODs market demand. . This is a strength of TODs, as they typically offer a range of housing types, at different price points, in walkable neighborhoods, with conveniences, and access to public transit (Cervero, 2004).

Traffic congestion and commuting times are also cited as factors responsible for shifting attitudes about TOD. From 1990 to 2000 the average national commute to work increased by 13% to roughly 26 minutes. These heavily congested commutes have become associated with stress as well as the perception by commuters that they are being robbed of quality time that could be directed to other endeavors. As a result, Americans have become more willing to pay a premium for housing within proximity of rail stations (Reconnecting America's Center for Transit-Oriented Development, 2008).

CHAPTER V

CASE STUDY: PORTLAND'S SOLUTION TO SPRAWL

In contrast to Atlanta, Portland, Oregon and the region surrounding it are widely acclaimed by planning experts for their early innovation and adoption of planning guidelines that have significantly curbed sprawl. In 1973, Oregon became the first state in the nation to implement statewide land-use planning to address long-range growth. The primary goals of the planning efforts were to insure that land is used wisely and that natural resources are protected. One of the region's most effective tools was to establish urban growth boundaries (UGBs). UGBs are identified zones between urban and rural land. Portland's UGBs were drawn in order to contain enough land to accommodate the projected population growth and development for 20 years.

In 1978, Portland's voters approved the formation of Metro, the nation's first elected regional government. Composed of 27 regional jurisdictions, one of Metro's responsibilities was to establish a regional urban growth boundary. In addition to the regional UGB, Metro also developed a regional vision, known as the "Regional Framework Plan" to establish policies for land use, transportation, water quality, and natural areas.

By 1995, Metro had developed the 2040 Growth Concept (Figure 22). This concept encouraged the development of 'centers' that were to be compact, mixed-use areas of high-density housing, employment and retail with a pedestrian orientation as well as being well served by roads and public transportation. The perks of creating high-density centers allowed these developments to use less land per capita, improve accessibility between homes, jobs, services, and shopping, to promote walking, to increase social interaction, and to encourage additional use of public transit. Centers were established within a hierarchical system, with Portland having the highest priority followed by regional centers, town centers, station communities and main streets.

In addition to developing new planning tools, Portland resisted the national trend of the 1970s to heavily invest in highway building. Instead they used their funds to improve an existing highway and to develop a viable mass transit system. Their mass transit system was to include light rail, streetcars, and bus networks throughout the region. This vision led Metro to establish MAX, the region's light rail system and backbone that connects the developed centers throughout the region. By diverting funds earmarked for new highways, the 15-mile Eastside line was built and opened in

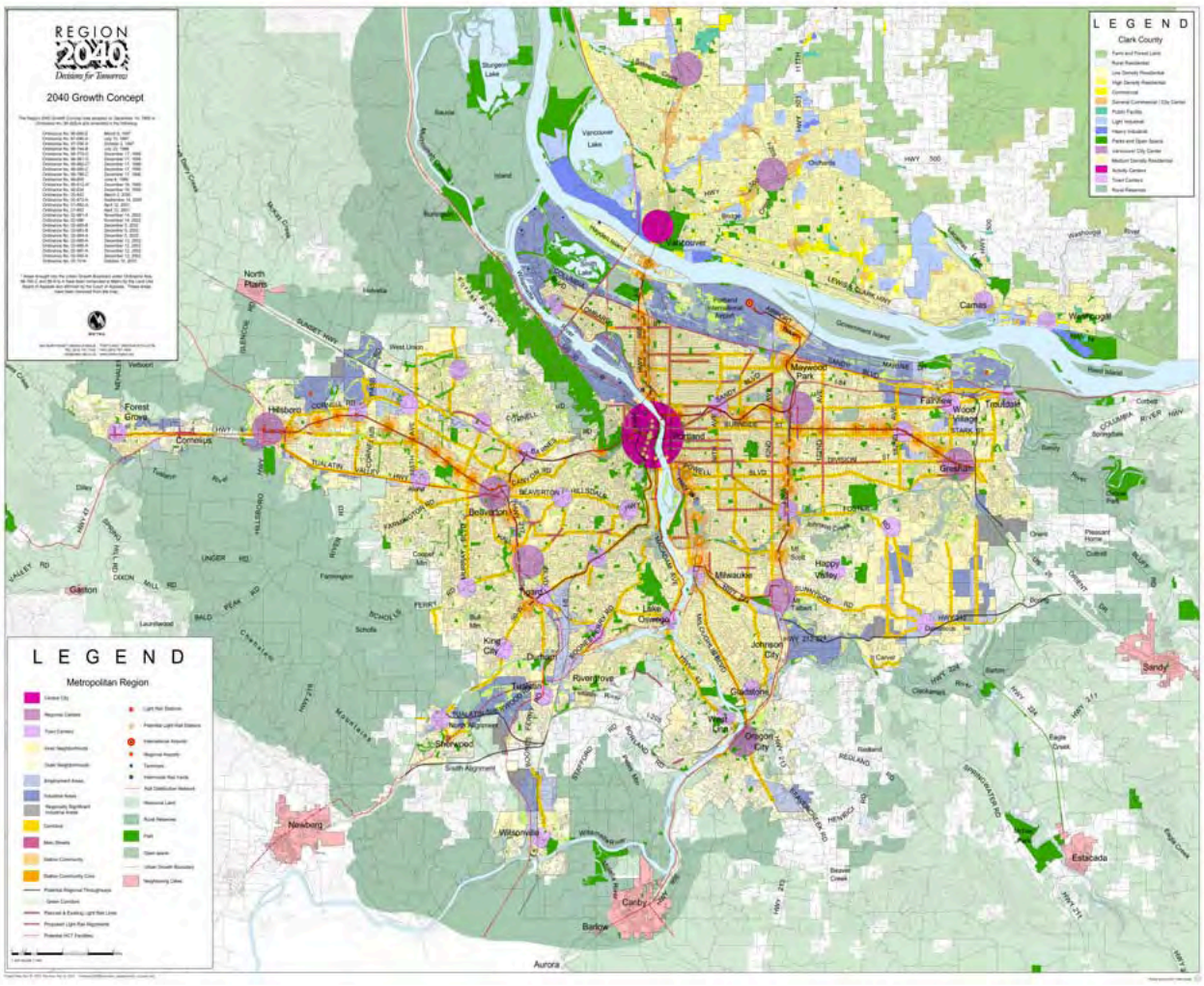


Figure 22: Metro Portland 2040 Growth Concept (Fabozzi, 2006)

the 1980s. By 1998 the 18-mile Westside line opened and connected Portland to the city of Hillsboro. In the following years lines connecting downtown to the airport and exposition center opened.

ORENCO STATION

With MAX in place, the region was able to continue their legacy of innovation by devising a new method of development, transit-oriented development. A regional consensus was reached that the best strategy was to focus new growth into compact, mixed-use TODs along MAX since Metro's 2040 Growth Concept projected one million new residents.

The crown jewel of TODs within Metro's system and along MAX is Orenco Station, an approximately 200-acre site located just west of Portland in Hillsboro, Oregon (Figure 23). It is classified as a town center according to Portland's hierarchy of centers established in the 2040 regional plan. The vision for the site called for an environment that would stimulate pedestrian activity and social interaction. The site was selected for its adjacency to MAX, and therefore the potential for supporting a TOD, but also to promote development near other rail stops as a way for better balancing jobs and housing throughout the region.

With this vision in mind, developers, designers and city planners worked to create new land use regulations for Orenco Station. A few examples of these regulations include standards for mixed-use buildings, narrow streets, narrow building setbacks, live/work units, and alley-loaded garages. This creates an environment designed with pedestrians' safety in mind and encourages street activity.

The first phase of development commenced in 1996 with the construction of the mixed-use "downtown" center, park, and residential district located approximately a quarter mile north of the MAX station (Figure 24). This phase included 428 single-



Figure 23: Orenco Station Illustrative Site Plan (http://www.terrain.org/unsprawl/10/orenco-plan.htm)



Figure 24: Downtown Orenco Station (Fabozzi, 2006)



Figure 25: Combination Townhouse and Live/Work Units (Fabozzi, 2006)



Figure 26: Garden Apartments at Orenco Station South (Fabozzi, 2006)

family units, 716 townhouses and live/work units (Figure 25), 203 condos, 503 apartments (Figure 26), as well as 218,000 square feet of retail and 30,000 square feet of office space (Fabozzi, 2006). The effectiveness of developing the town center around the transit stop can be seen in several ways. First, prior to opening Westside

MAX, of which Orenco Station is a major component, only 30% of respondents reported using transit. After Westside MAX opened, 83% reported routine transit use. Also, as a result of the higher density and mix of uses Orenco Station offers, 70% said they shopped at least once a week in the town center. Additionally, 85% were able to reduce their need to drive elsewhere for necessities or entertainment because of the close proximity to neighborhood businesses and amenities ("Mitigating Traffic Congestion - The Role of Demand-Side Strategies: Hillsboro, OR", 2006).

LESSONS FROM PORTLAND AND ORENCO STATION

Ultimately Orenco Station and the greater Portland area have been successful because of the coordinated effort at the state, regional, local, and even development level to strive for a similar vision. Additionally, they established priorities, such as efficient land use and the protection of natural resources, and developed new mechanisms and regulations that empowered them to achieve their goals.

By encouraging transit and promoting TODs like Orenco Station, Portland has created walkable mixed-use centers of high-density housing, employment and retail. Doing so reduced the need to develop land outside of these centers while it improved accessibility between homes, jobs, services, and shopping. TODs like Orenco Station enable walking which leads to increased social interaction, and encourages additional use of public transit. It is unlikely these accomplishments would have been possible if the centers relied on personal automobiles instead of transit.

CHAPTER VI

SITE SELECTION

As a native middle Tennessean, I have witnessed the tremendous growth of Nashville as I grew up. In the 1990s several large employers moved to the area and brought employees and new jobs. Housing and other infrastructure demands rose as these new residents arrived. This led to rapid suburban growth throughout the region. I have often credited this phenomenon for igniting my passion for urban design. The middle Tennessee region is a special place and I believe is poised for even greater prosperity into the future. Because of this bright outlook, I believe it is of paramount importance to grow in a manner that protects the qualities that make it special.

Although middle Tennessee has many great attributes it is also showing characteristics of a sprawling city. Figure 27 shows the development pattern of the ten-county middle Tennessee region in 1965 when the area had approximately 750,000 residents. Notice how the development is fairly compact, and primarily contained within Davidson County. By 2008, the population increased to approximately 1,700,000, with a great deal of that growth occurring in the city's fringes at low densities. Predictably, each of the major outlying developed centers is along an interstate, which has facilitated this growth by allowing these areas to be more easily accessible by private vehicle. The Nashville Area Planning Commission projects that the region will grow to 2,600,000 residents by 2035. The bottom left image of Figure 27 shows how the region may look if this growth occurs in the same pattern as it has from 1965 to 2008. In this scenario, the majority of the region will be developed and destroyed to accommodate a growing population. As this forecast assumes, we will likely still be commuting by personal vehicle to sprawling suburbs. In this case, rather than meeting the new neighbors, we will likely be stuck with them in traffic.

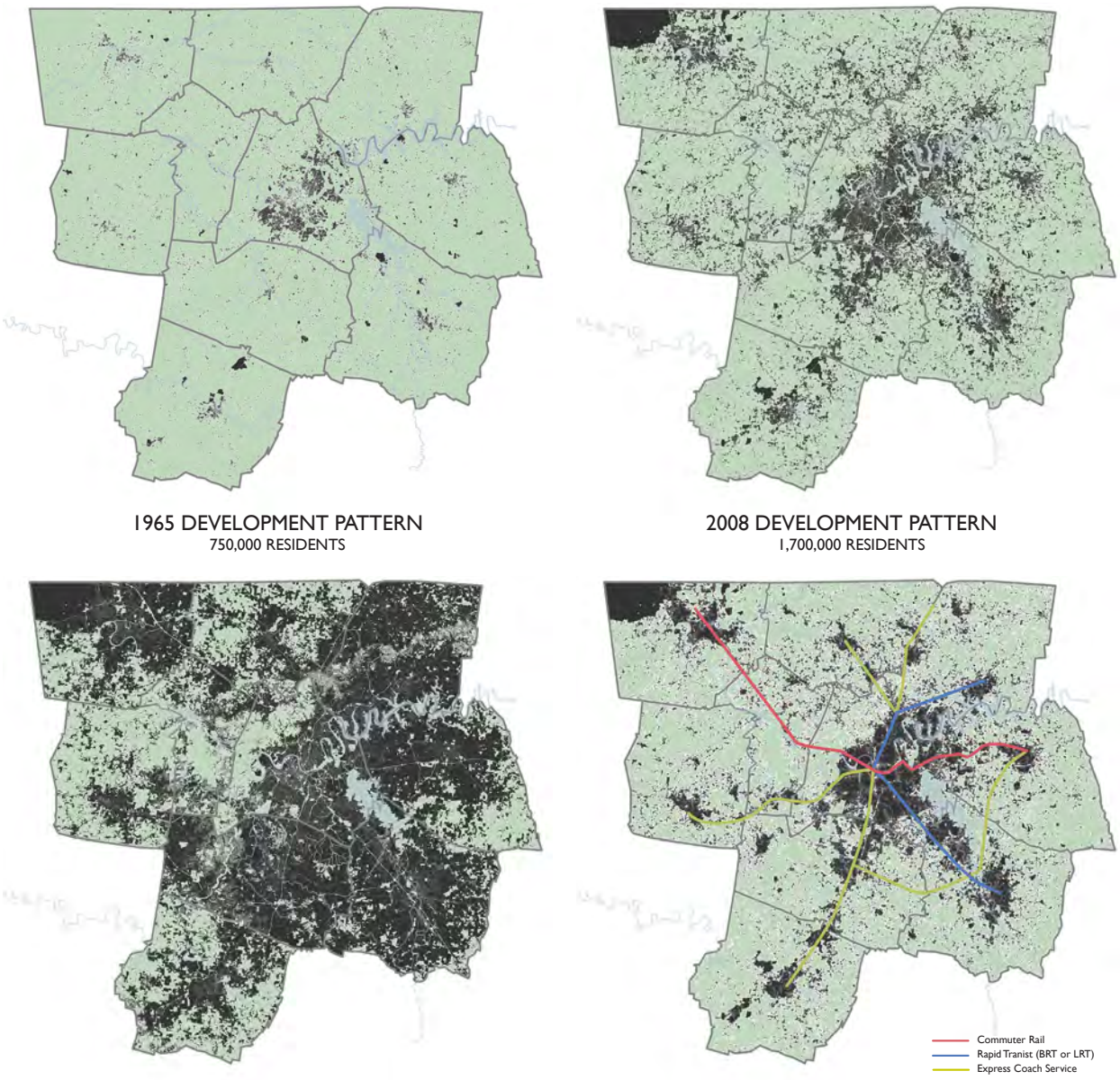


Figure 27: Growth of Middle Tennessee (Nashville Area Planning Commission and Cumberland Region Tomorrow, 2012)

TOD can be used as one alternative for avoiding this extreme scenario. The bottom right image of Figure 27 shows how the Cumberland Region Tomorrow projects growth of the region can occur if Nashville adopts smart growth strategies such as TOD. In this scenario, currently developed areas would be infilled with TODs or other higher density centers. Thereby, less suburban greenfields would be consumed to accommodate the population growth.

Since the outcomes and impacts of these opposing growth patterns are so significant, I knew I wanted to choose a site in the vicinity of Nashville to demonstrate how TOD can curb the negative social, economic, and environmental consequences associated with sprawl. In order to narrow down potential sites, I developed site selection criteria. Figure 28 is a diagram of the site selection criteria, which were

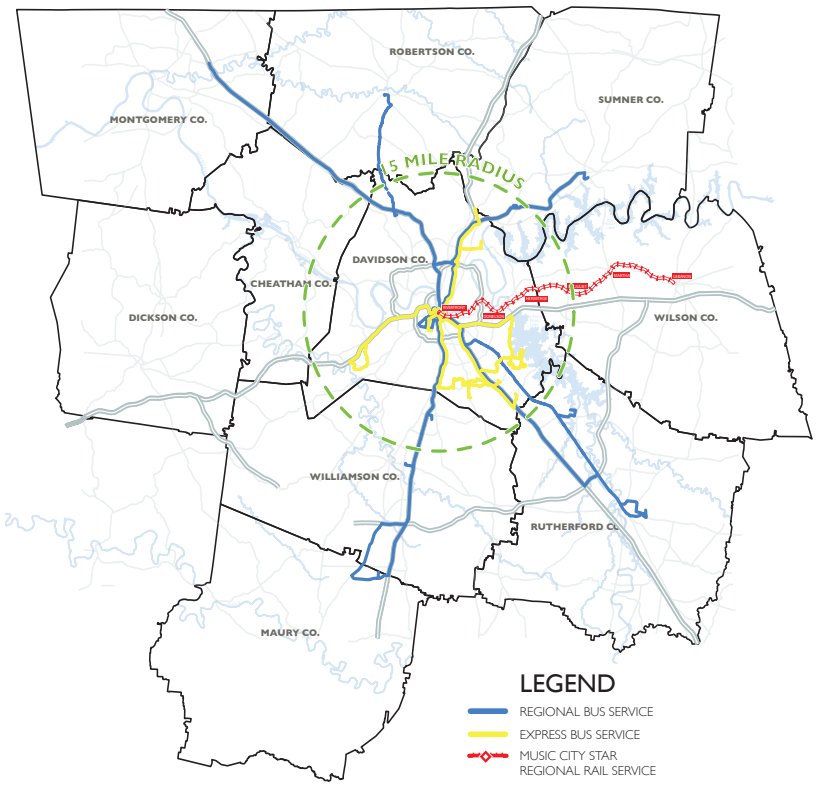


Figure 28: Site Selection Criteria (Gardner, 2012)

1. must be located in Davidson County, 2. must be adjacent to an existing rail line, and 3. must consist of primarily vacant or under used land. These three criteria were decided upon because TOD is a relatively new idea for the Nashville area, and I wanted to choose a site that could be a model for future TOD developments in Nashville. Therefore selecting a site within the city was important to showcase TOD's effectiveness of easing sprawl within the city. Locating a site along an existing rail line was crucial in order to utilize existing infrastructure thereby avoiding the cost of constructing a new rail line. Finally, creating an infill development on vacant or under used land around the city was inherent to the premise of the project as it will add density to the city rather than additional growth at the fringes.

There were many sites that met this criteria, and several were seriously considered, such as the Nashville Fairgrounds or the former Hickory Hollow Mall. I did not select the Nashville Fairgrounds because of the current controversy surrounding the site. In addition to hosting flea markets and the Tennessee State Fair, the site is also part of Nashville's professional racing history. Many Nashville residents are opposed to redeveloping this site for any use other than the flea market, fair and racing.

The former Hickory Hollow Mall site is also in Davidson County, adjacent to rail, and currently under used. However, there is significant topographic change from the rail line to the areas most suitable for redevelopment. Additionally, the site is over 200 acres, and therefore a larger undertaking than I desired.

Next I investigated sites along the eastern corridor of the Music City Star (Figure 29). There is currently a TOD under construction in Lebanon, the site furthest from downtown Nashville, which therefore eliminated that site. This meant there were only four sites with existing stations remaining. Two of those sites, Mt. Juliet and Martha, are in Wilson County and do not meet the first criterion. This left the decision between Hermitage and Donelson. When comparing the two, both sites

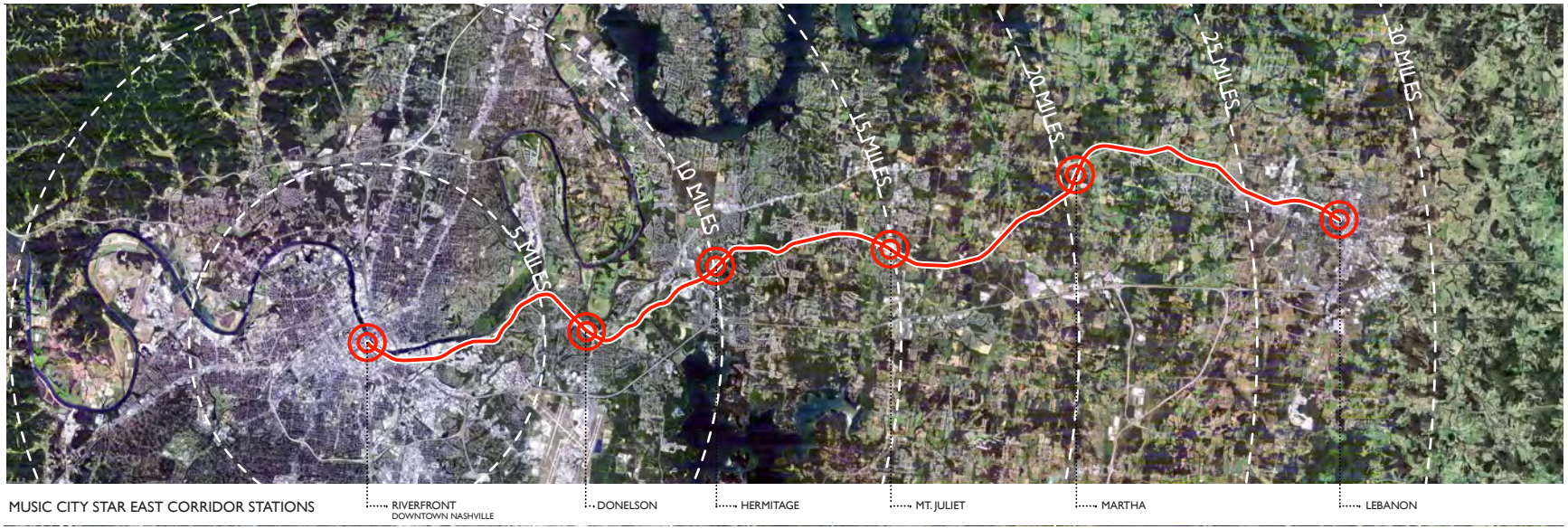


Figure 29: Eastern Corridor of the Music City Star (Gardner, 2013)

exhibited characteristics of sprawl, but the severity of those characteristics and their consequences was greatest at the Donelson location.

The Donelson site satisfied all of the site selection criteria. First, the site is located within Davidson County approximately 6 miles from downtown Nashville (Figure 29). Second, it is adjacent to an existing Music City Star park and ride stop (Figure 30). Third, the site lies along Lebanon Road, an under utilized, five-lane corridor, lined by aging and vacant commercial strips (Figure 31). In addition to meeting these criteria, the site also has nearby communal assets such as the Donelson Church of Christ, the Donelson Senior Center, Hickman Elementary & Donelson Middle Schools, as shown in Figure 32. These communal assets are important because they are the established, rare, physical institutions that currently foster community in Donelson. They provide the opportunity to strengthen the fabric of the community by integrating these institutions into the site and thereby the community.



Figure 30: Existing Donelson transit station (Gardner, 2012)



Figure 31: Lebanon Road (Gardner, 2012)



Figure 32: Existing Conditions Plan (Gardner, 2013)

CHAPTER VII

SITE INVENTORY AND ANALYSIS

The following inventory is based on the “Donelson - Hermitage - Old Hickory Community Plan” released by the Metro Planning Commission in 2004 and updated through 2011. It is important to remember that the data provided in the report is not isolated to only the Donelson community, but has compiled the data of these three communities. However, it still provides an appropriate level of detail to understand the Donelson community. Figure 33 highlights where these communities are relative to Davidson County and Figure 34 indicates the location of each community, as well as the location of Donelson Station.

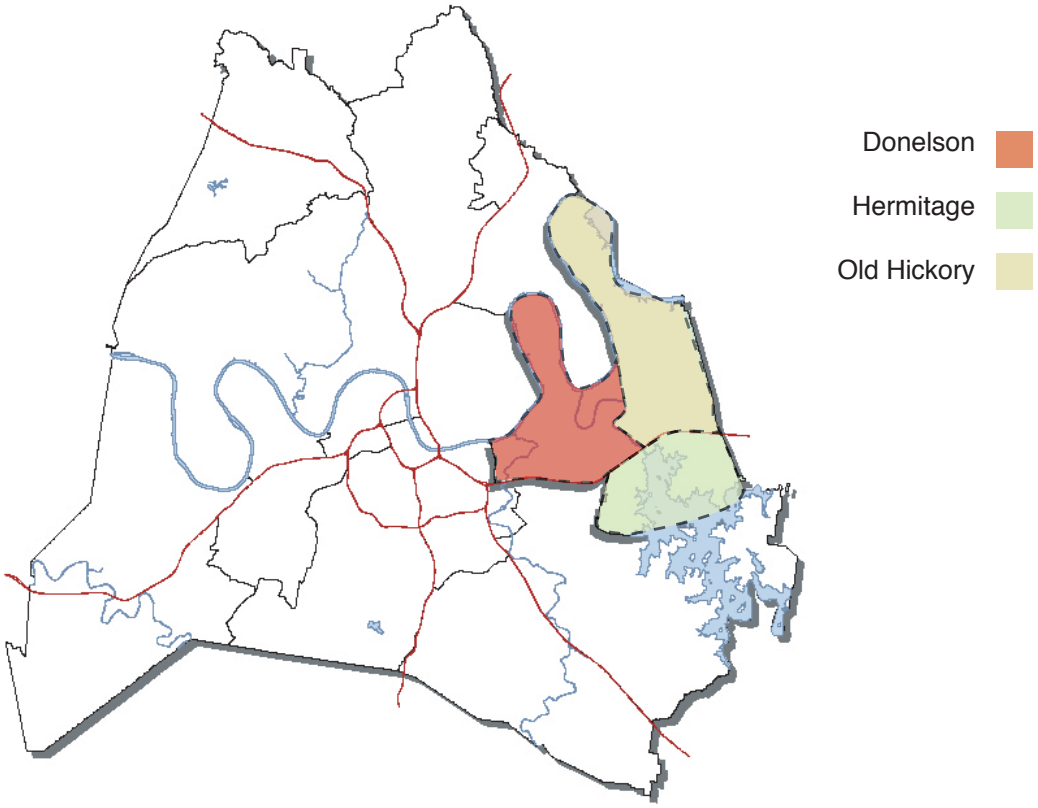


Figure 33: Donelson’s Location Relative to Davidson County (MNDCPC, 2011)

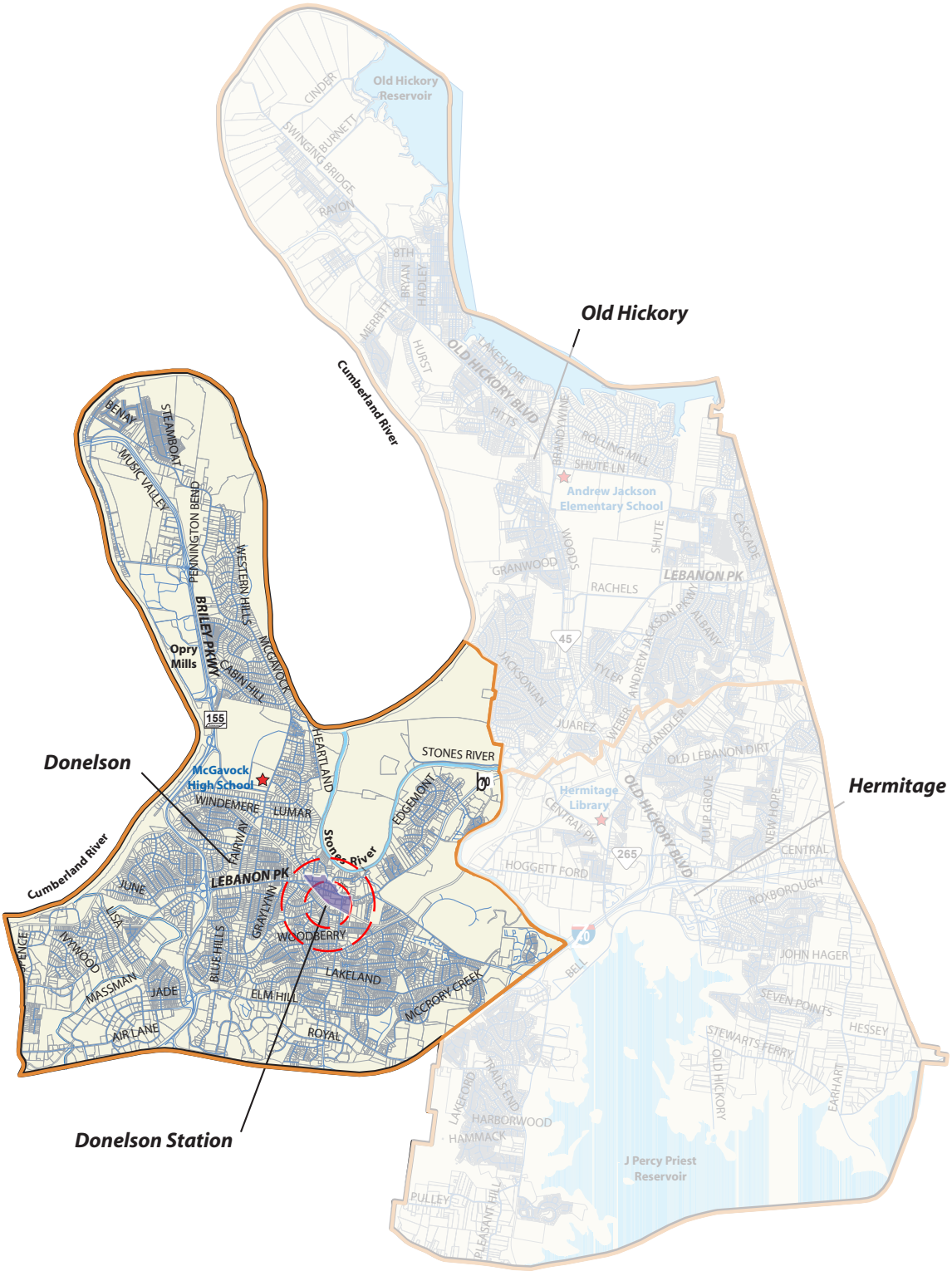


Figure 34: Community Plan (MNDCPC, 2011)

LAND USE

As Figure 35 indicates, existing land uses within the site are predominately 'commercial' and 'office or medical'. There are also a small number of 'community, institutional, or utility', 'vacant', and 'auto parking' uses. The overwhelming majority of the land use immediately adjacent to the site is 'residential – 1 unit'. The area adjacent to Lebanon Road (Figure 31) is largely composed of under utilized, aging or

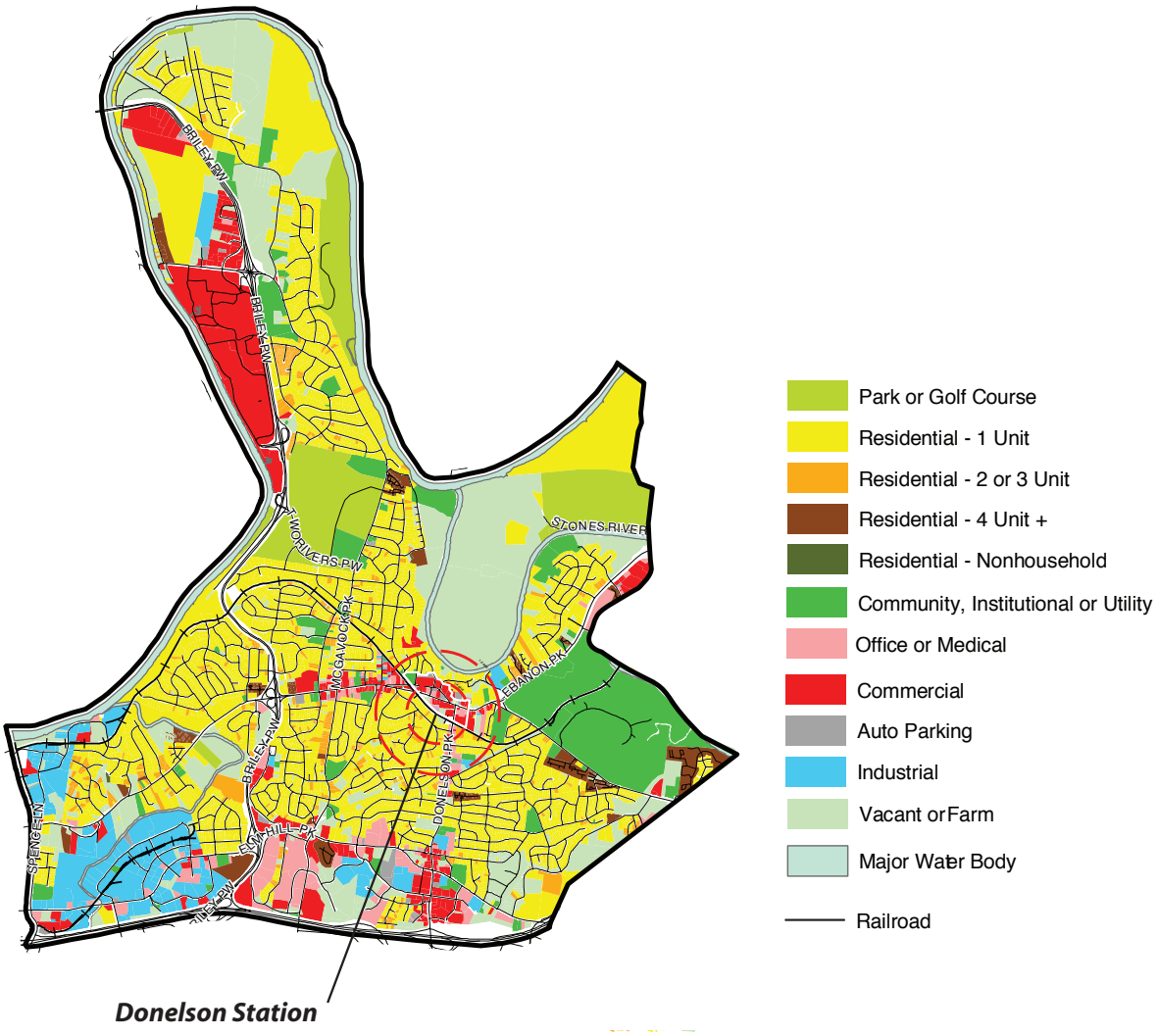


Figure 35: Land Use (MNDCPC, 2011)

vacant commercial strips, and a high number of parking lots. This type and condition of development make up the bulk of the site. Figure 36 illustrates the site's existing configuration of structures, floor to area ratio (FAR) of 0.17, and 1.51 dwelling units per acre. With these density figures, typical of sprawl, the site does not take advantage of its access to transit. Additionally, Donelson blends into all the other development along Lebanon Road because it lacks an identifiable city center. As such, this site is prime for redevelopment and is suitable for an infill project such as TOD.



Figure 36: Existing Figure Ground, FAR, and Dwelling Units Per Acre (Gardner, 2013)

AMENITIES & SERVICES

Figure 37 identifies many of the existing amenities and services in the Donelson community. Most uses such as supermarkets, shopping, restaurants, childcare, and civic are widely dispersed along Lebanon Road and therefore are difficult to access on foot. Other uses such as education are distributed at a much broader scale throughout the community, while the hotels are clustered in the southwest corner. Currently those arriving at the transit station cannot walk to these amenities and services because they are so widely distributed throughout Donelson. Therefore they must drive to these locations. Figure 38 demonstrates personal motorists' costs for driving to access services that can be reached by foot at Donelson Station. Developing a high density,

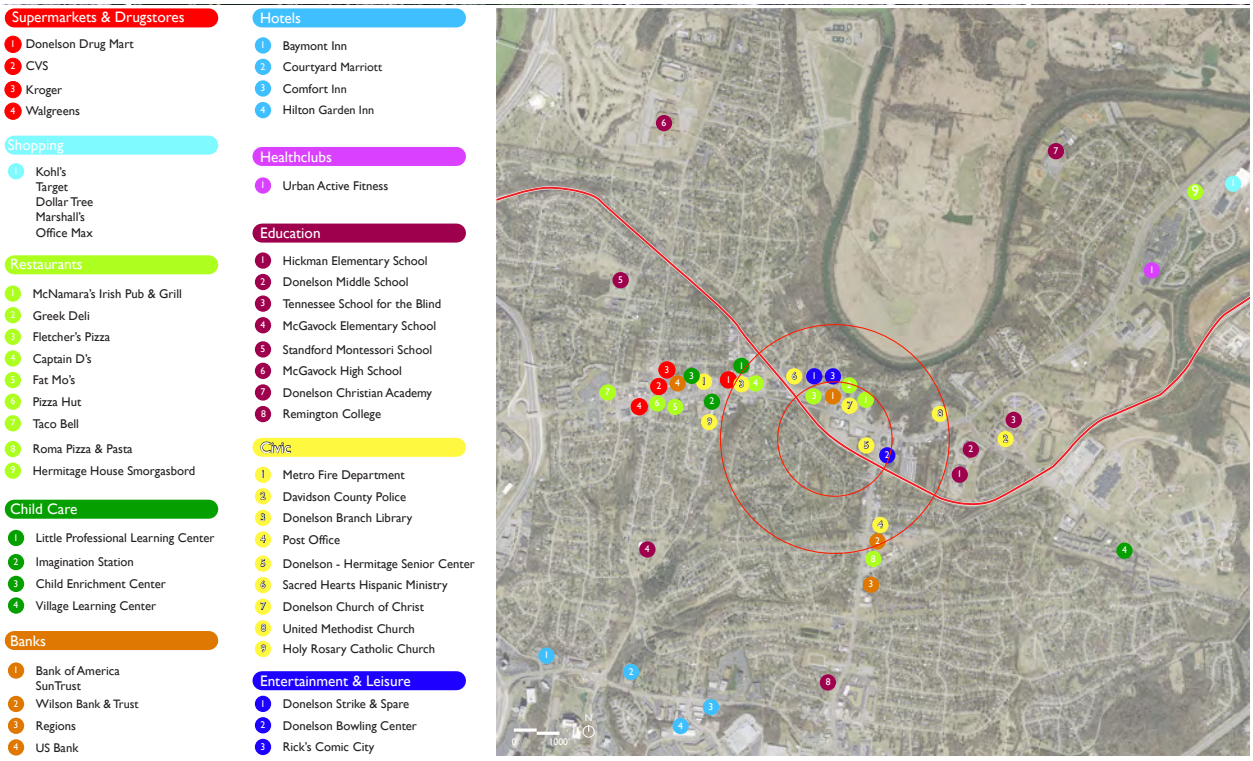
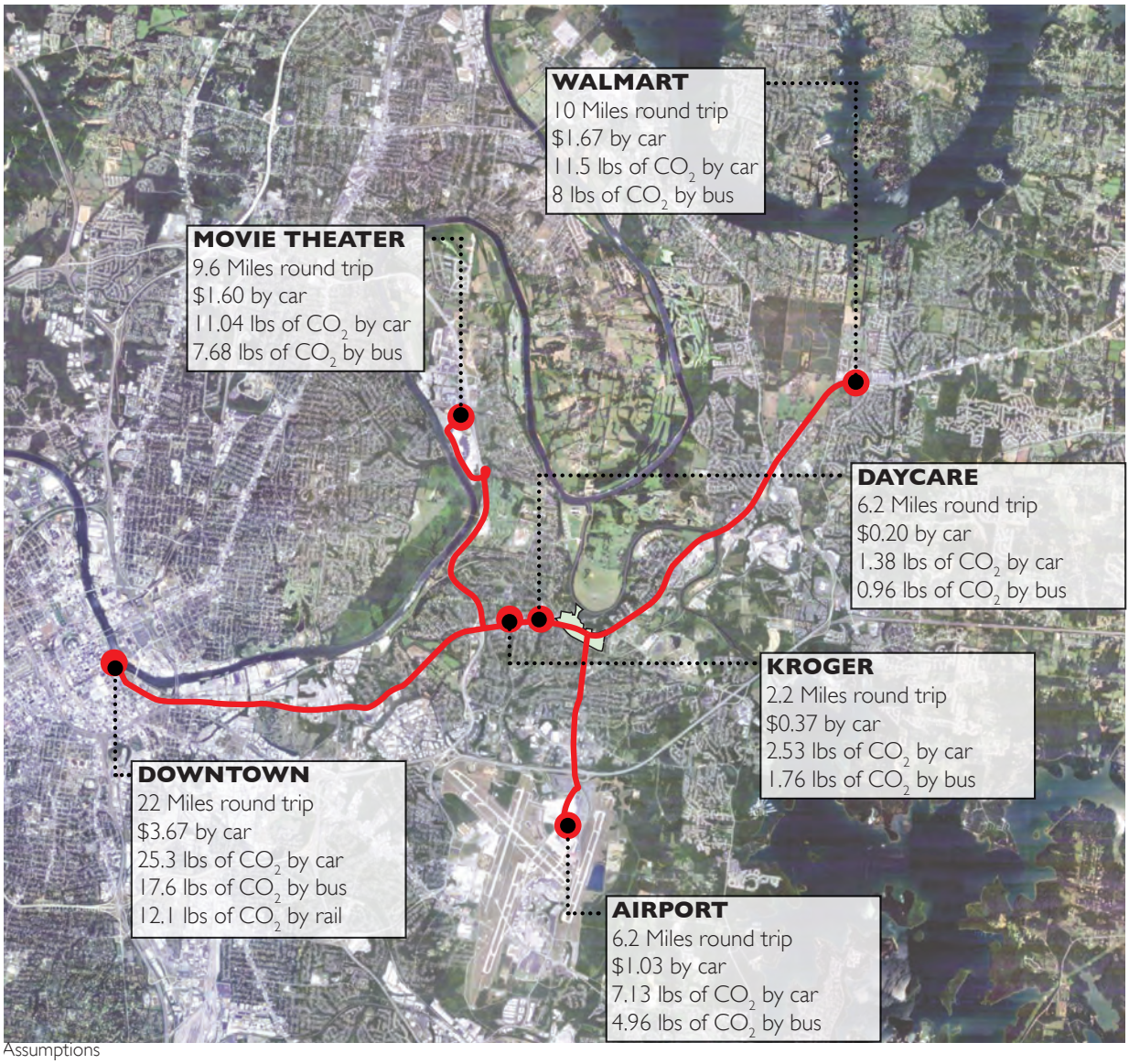


Figure 37: Existing Dispersed Area Amenities (Gardner, 2013)

mixed use TOD at Donelson Station is an opportunity to provide all of these uses in a central, walkable location.



Assumptions
1. Cars average 20 miles per gallon
2. Gas costs $3.50 per gallon
3. Cars emit 1.15 lbs of CO_2 per gallon, Bus emits 0.8 lbs of CO_2 per gallon, and Rail emits 0.55 lbs. of CO_2 per gallon. (Source: sightline.org)

Figure 38: Costs of Driving (Gardner, 2013)

PEDESTRIAN AND BICYCLE NETWORK

Pedestrians or cyclists attempting to walk or bike must do so at their own risk and without adequate infrastructure as there are currently fragmented segments of sidewalks and no bicycle lanes in or immediately adjacent to the site. Figure 39 illustrates the dangerous conditions that exist for pedestrians and cyclists. Although the 2004 Donelson - Hermitage - Old Hickory vision plan calls for bicycle lanes to be added along Lebanon Road, Donelson Pike, and Stewarts Ferry Pike. Also, there is an existing greenway following the southern edge of the Stones River, just north of the site (Figure 40). This provides the opportunity to further integrate Donelson Station into the larger Donelson community and even into neighboring communities.



Figure 39: Dangerous Conditions for Pedestrians and Cyclists (Gardner. 2012)

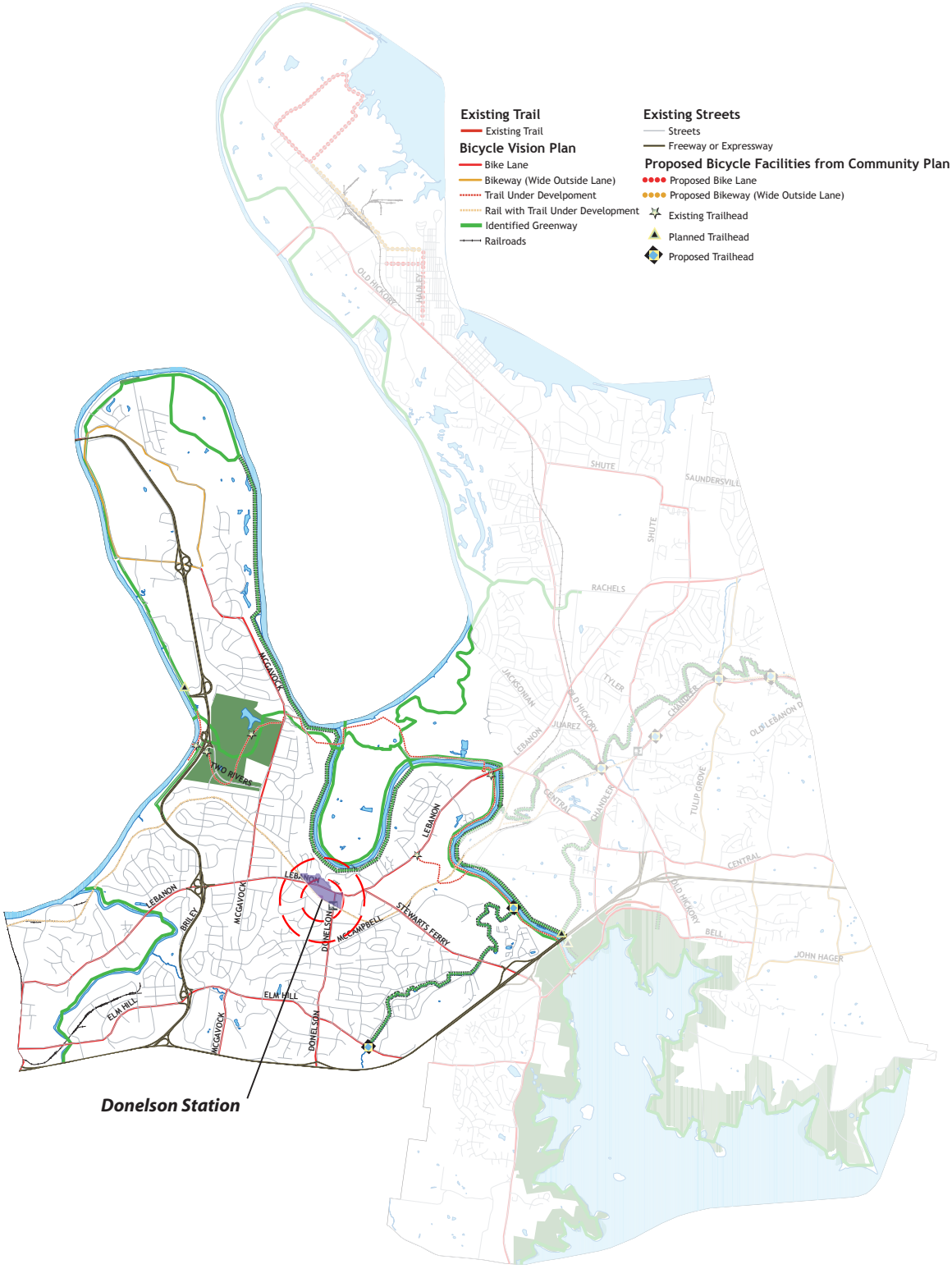


Figure 40: Pedestrian and Bicycle Network (MNDCPC, 2011)

VEHICULAR NETWORK

Unsurprisingly vehicular connections are very strong in this area. Motorists can take Lebanon Road (Figure 41), an arterial, from the site into downtown or access Briley Parkway just to the west of the site. The vehicular network (Figure 42) shows that drivers may also access Interstate 40 via Donelson Pike, an arterial, after passing the region's international airport or eastbound drivers may choose the Stewart's Ferry Pike arterial to access I-40.



Figure 41: Lebanon Road Through the Site (Gardner, 2012)

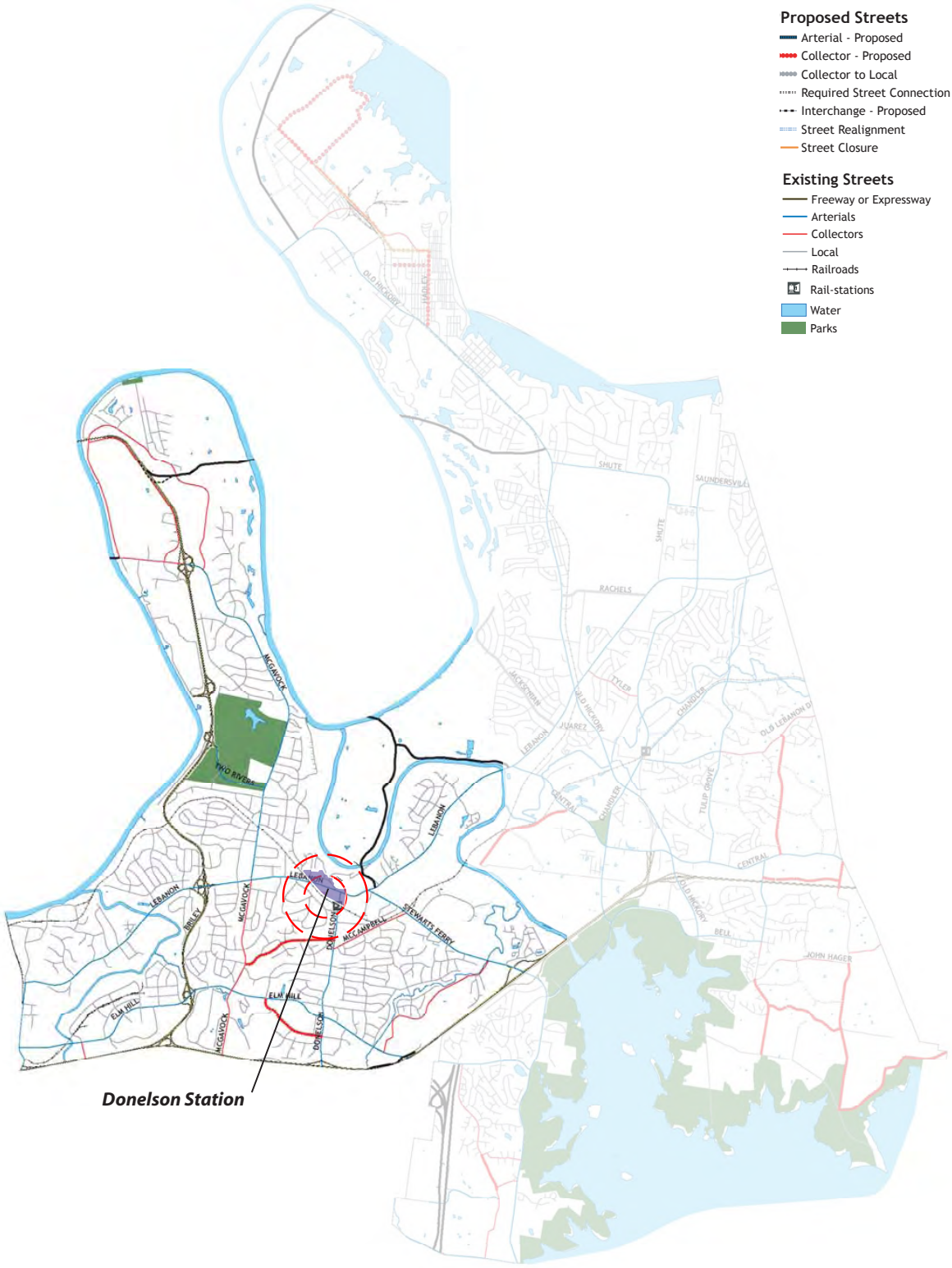


Figure 42: Vehicular Network (MNDCPC, 2011)

NATURAL FEATURES

The Stones River, a tributary of the Cumberland River, is an oxbow lake lying just north of the site. Along the edges of the Stones River is a floodplain and slopes greater than 20%. The proximity of the Stones River to the site allows for an opportunity to associate this natural element of the landscape to the urban design of Donelson Station. There is also another small portion of the western part of the site along Lebanon Road that also has slopes greater than 20%. Overall the area is mostly level or moderately sloping (Figure 43). Therefore, this area is topographically favorable for development.

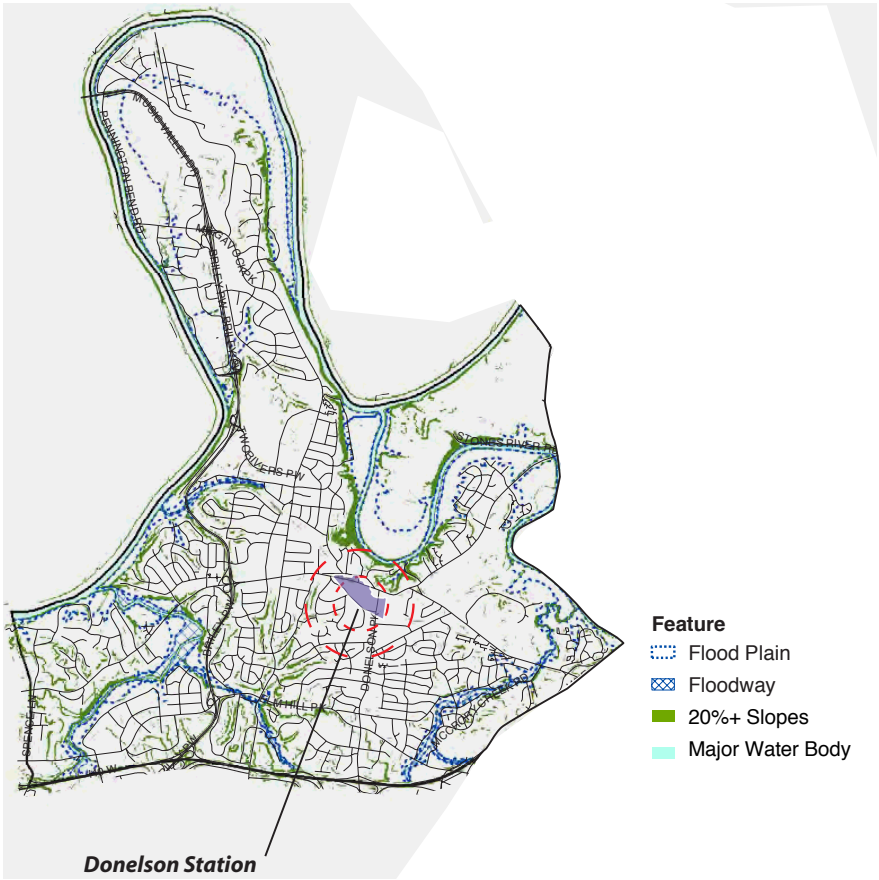


Figure 43: Natural Features (MNDCPC, 2011)

DEMOGRAPHICS

The Donelson, Hermitage, and Old Hickory communities have a combined population of 71,865 or 12.61% of the population of Davidson County. Since 1990 the population has grown by 14.45%, while Davidson County has only grown by 9.1% over the same period. This growth at the edge of the city is characteristic of sprawl as previously discussed. Only 31.5% are part of a traditional 'married couple family with children'. This is not particularly surprising as it demonstrates that the shifts in household demographics that were discussed in Chapter IV are also occurring here. Other key demographics indicate that 81.3% of commuters drive alone to work, while only 0.7% use public transportation, and 4.0% walk to work or work from home. Of those commuting to work, their average travel time is 23.7 minutes each way. This may suggest that many residents live too far away from transit to use it. If a higher density center were developed in Donelson, transit service to this community would be more feasible. Therefore, the entire community would benefit by having better access to transit.

HISTORIC RESOURCES

According to the "Donelson - Hermitage - Old Hickory Community Plan" The Bluefield Historic Neighborhood is a historically significant site in the immediate vicinity of Donelson Station (Figure 44). The Bluefield Historic Neighborhood, noted on the Historic Resources diagram (Figure 45), lies immediately south of Donelson Station. It is a single-family detached residential community. Although this neighborhood is within close proximity to the transit station, I believe it should be preserved since it is a vibrant and well-established neighborhood. Although not immediately adjacent to Donelson Station, the larger Donelson community is rich with historic resources (Figure 45).



Figure 44: Homes in the Bluefield Historic Neighborhood (Gardner, 2012)

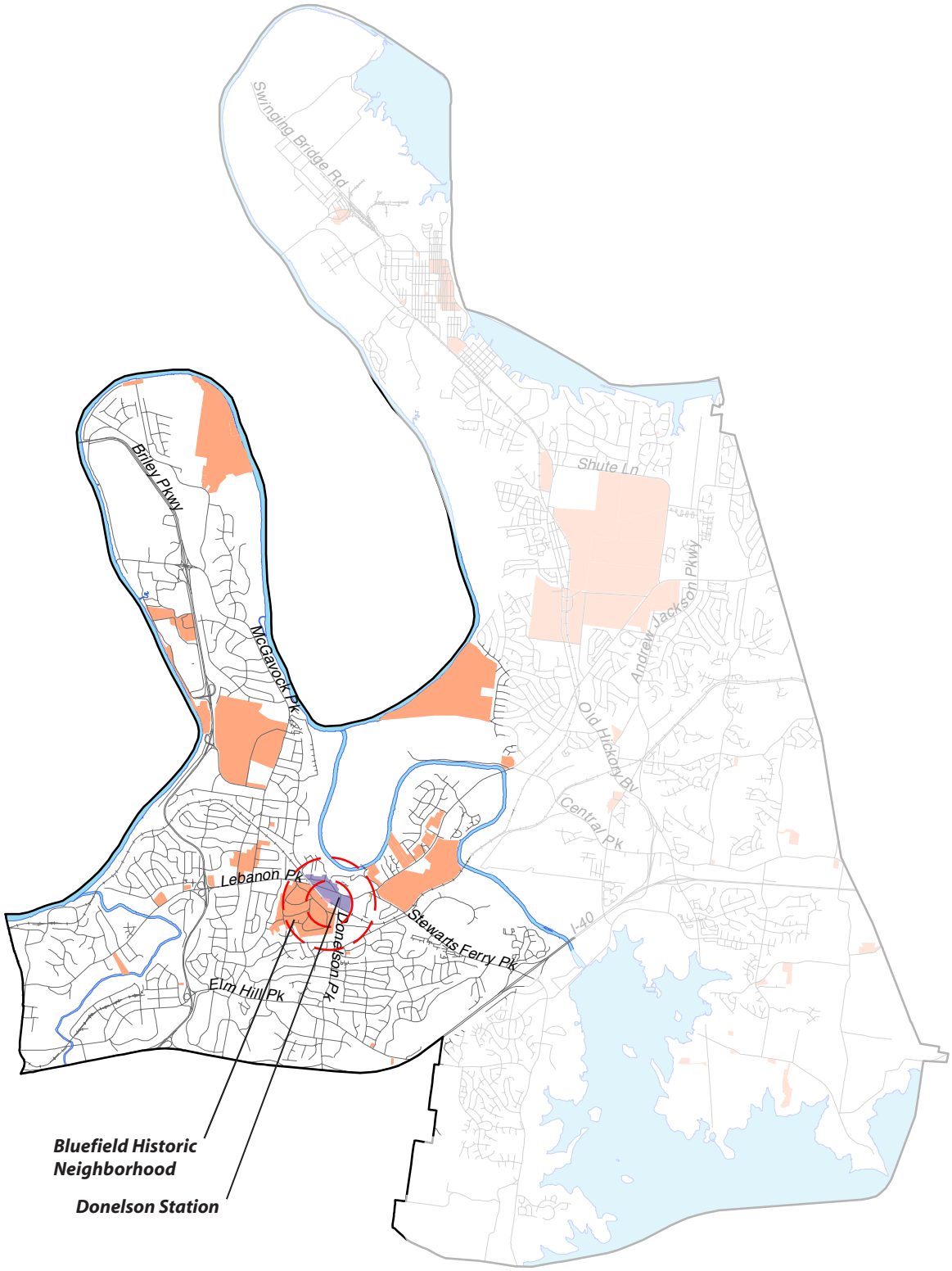


Figure 45: Historic Resources (MNDCPC, 2011)

INVENTORY AND ANALYSIS CONCLUSIONS

Although Donelson is one of the fastest growing areas in Davidson County, it continues to develop as suburban sprawl. The high number of 'vacant' and 'parking lot' uses suggest that the Donelson Station site is a good candidate for redevelopment. However the area's current FAR of 0.17 and 1.51 dwelling units per acre are significantly below the threshold capable of supporting transit. Because the site is adjacent to an existing transit station and currently has such a low density, development at Donelson Station should be at a higher density in order to make transit more feasible. Also the site is mostly level and is therefore topographically favorable for redevelopment.

The site is very well connected to the vehicular network. However this has caused amenities and services to be widely dispersed throughout Donelson, almost certainly requiring a car to access these destinations. Further exasperating mobility challenges are the fragmented segments of sidewalks and lack of biking lanes in and near the site. The lack of comprehensive pedestrian and biking infrastructure creates a dangerous environment for those who attempt to walk or bike in Donelson. This presents opportunities to both develop a complete pedestrian and bicycle network that facilitates walking and biking, as well as to provide a mix of uses located on site to bring amenities and services within a comfortable walk or bike ride. Not only will this encourage walking, and healthier living, while reducing VMTs, but it can also help establish Donelson Station as the identifiable center of Donelson. Further, implementing traffic calming strategies is crucial to establish a safe environment for pedestrians and cyclists.

The nearby Bluefield Historic neighborhood is vibrant and well established. Thus, it can immediately support commercial uses as they come online in Donelson Station. The site also has several nearby communal assets including the Donelson

Church of Christ, the Donelson Senior Center, Hickman Elementary & Donelson Middle Schools. These communal assets provide an opportunity to strengthen the fabric of the community by integrating these institutions into the site and thereby the community.

CHAPTER VIII

GUIDING PRINCIPLES, DESIGN METRICS, AND PROGRAMMING

Having a better understanding of the site made it possible to set goals and define program in order to ensure that the project truly provides benefits over sprawl. Target development metrics were also established in order to keep the proposal aligned with published TOD best practices. The guiding principles were categorized as social, economic, or environmental and are listed along with the design metrics in Figure 46. These principles and metrics ultimately influenced the programming and master plan of Donelson Station.

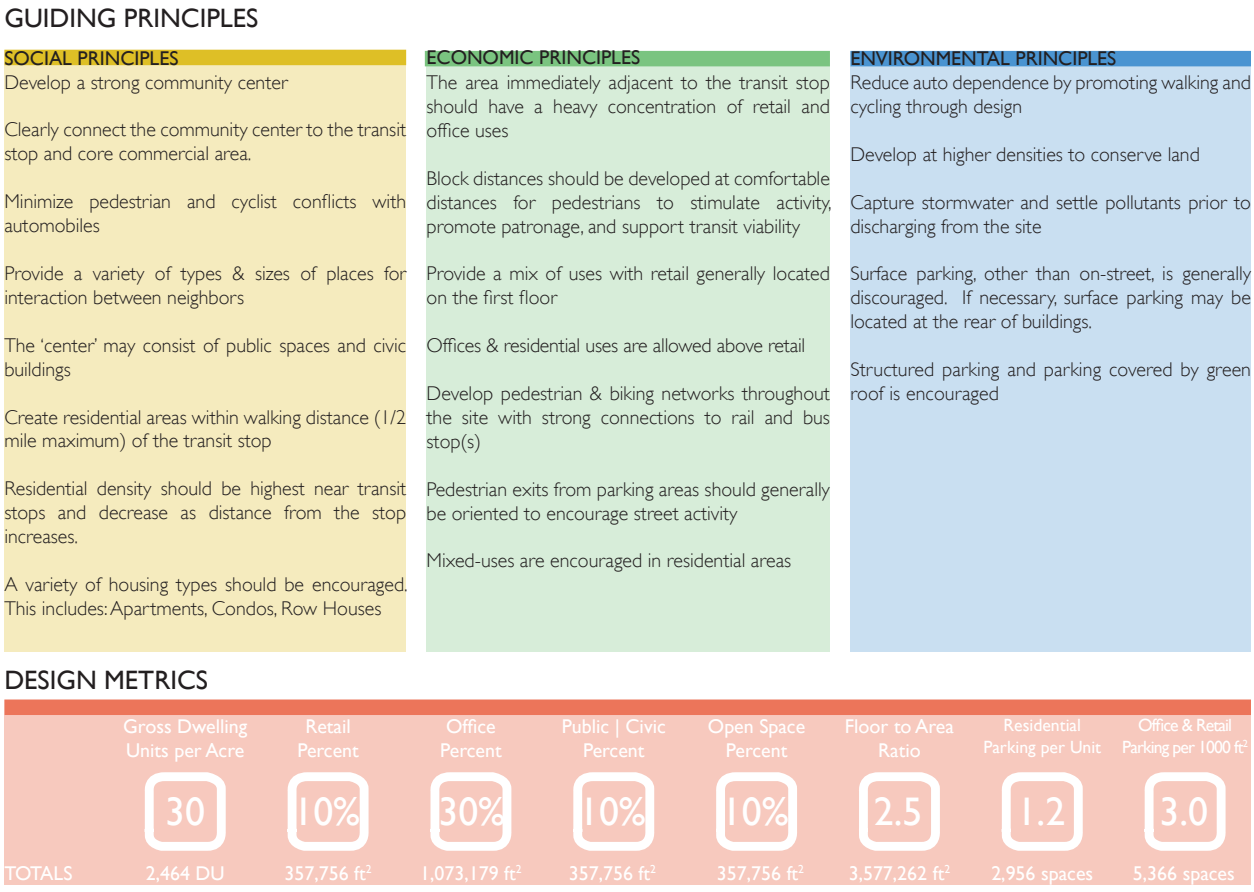


Figure 46: Guiding Principles and Design Metrics (Gardner, 2013)

SOCIAL PRINCIPLES

The social principles were to develop a strong community center, to clearly connect the community center to the transit stop and core commercial area, to encourage pedestrian and cyclist activity by minimizing conflicts with cars, and to provide a variety of housing types to meet the needs of shifting household demographics. Other social principles were to insure that the center consists of public spaces and civic buildings, create residential areas within walking distance of the transit stop, gradually decrease residential density as distance from the transit stop increases, and provide a variety of housing types.

ECONOMIC PRINCIPLES

The economic principles were to create an area immediately adjacent to the transit stop with a heavy concentration of retail and office uses, establish block distances that are comfortably walkable to stimulate patronage and transit viability, and to provide a mix of uses. Other economic principles were to locate retail on the first floor of mixed use buildings, develop strong pedestrian and biking connections to transit, orient pedestrian exits from parking areas to encourage street activity, and to encourage mixed uses in residential areas.

ENVIRONMENTAL PRINCIPLES

The environmental principles were to reduce auto-dependence by promoting walking and cycling through design, to develop at high-densities in order to conserve land that would otherwise have been developed as sprawl, to capture stormwater and remove non-point source pollutants prior to discharging from, and to limit surface

parking to parallel on street parking and provide structured parking covered by greenroofs.

DESIGN METRICS

The design metrics for Donelson Station were developed as both a target for the amount of square feet of each use, as well as an attempt to convince critics that the community would generate enough density to support transit. A range of sources were consulted for design metric considerations including Florida Department of Transportation (FDOT), Bay Area Rapid Transit (BART), the Urban Land Institute (ULI), as well as leaders in the field of TOD such as Calthorpe and Associates and the Lander Group.

By referencing these sources, I established target design metrics (Figure 46). The target gross dwelling units per acre were 30 and the target FAR was 2.5. Targets for each land use were also established. The percent of the site dedicated for retail was 10%, for office was 30%, for public and civic was 10%, and for open space was 10%. Finally parking rates were also established as 1.2 spaces per residential unit and 3 spaces per 1000 square feet of office and retail.

PROGRAMMING

Donelson Station is proposed as a TOD, therefore it will need facilities dedicated to transit. There is an existing Music City Star station, however it should be enhanced in order to accommodate the expected rise in users. Locating a bus stop within close proximity to the Music City Star station can also strengthen transit at the site. A large, open transit plaza free of obstacles can be used to facilitate quick transfers between rail and bus. A commercial core should be developed that includes the transit stop,

bus stop, and transit plaza.

Currently the Donelson community lacks visual distinction from other developed areas along Lebanon Road. A communal center can be established to strengthen the identity of this community. Civic programming such as a community center, library, school, and amphitheater all work to serve this purpose.

The Donelson community currently has low residential density and lacks a variety of housing types. In order to support ridership and transit revenues, higher density housing should be located in Donelson Station. Additionally, providing housing options to choose from such as condos, apartments, and row houses makes Donelson Station affordable to a wider range of residents and more accurately corresponds with shifting household demographics than traditional sprawl suburbs.

Promoting an environment that encourages walking and biking while reducing VMTs is an important quality of TODs. This environment can be created by providing a mix of uses as well as amenities and services that residents need on a regular basis within 1/4 to 1/2 mile walking distance of transit. Therefore the core commercial area should also include offices, a grocery store, a movie theater, a school, a hardware store, a daycare, and recreation to fulfill this need.

Although TODs emphasize the use of transit and promote walking, parking for personal vehicles will still be needed. In order to calm traffic and conserve land on street or structured parking are preferred.

Additionally, given the site's proximity to downtown Nashville and the airport, Donelson Station is a good location for a hotel. Visitors may board a bus at the airport to the hotel at Donelson Station. Locating the hotel near the transit stop can encourage visitors to use transit and alleviate their need to rent a car. Additionally hotel guests can be a boost to street activity and local shop patronage. Guests will have the choice of eating and shopping at Donelson Station or taking the train downtown.

Finally, since Donelson Station is a high-density development, it is important to

include space for recreation. Neighborhood greens, dog runs, and greenways can provide recreation space for residents as well as an additional social outlet.

CHAPTER IX
PROJECT NARRATIVE

The guiding principles, design metrics, and program were next synthesized to produce the project design. Donelson Station is a proposed 82.1 acre redevelopment infill TOD located adjacent to the eastern corridor of the Music City Star approximately 6 miles from downtown Nashville (Figure 47). The design emphasizes the importance of high-quality walking environments within 1/4 to 1/2 mile of the transit stop, mixed land uses, higher density development, and increased transit ridership and revenues (Figure 48). I begin my narrative of the Donelson Station TOD by first providing an overview of its four primary districts followed by a detailed description of how social,



Figure 47: Donelson Station's Connection to Downtown Nashville (Gardner, 2013)

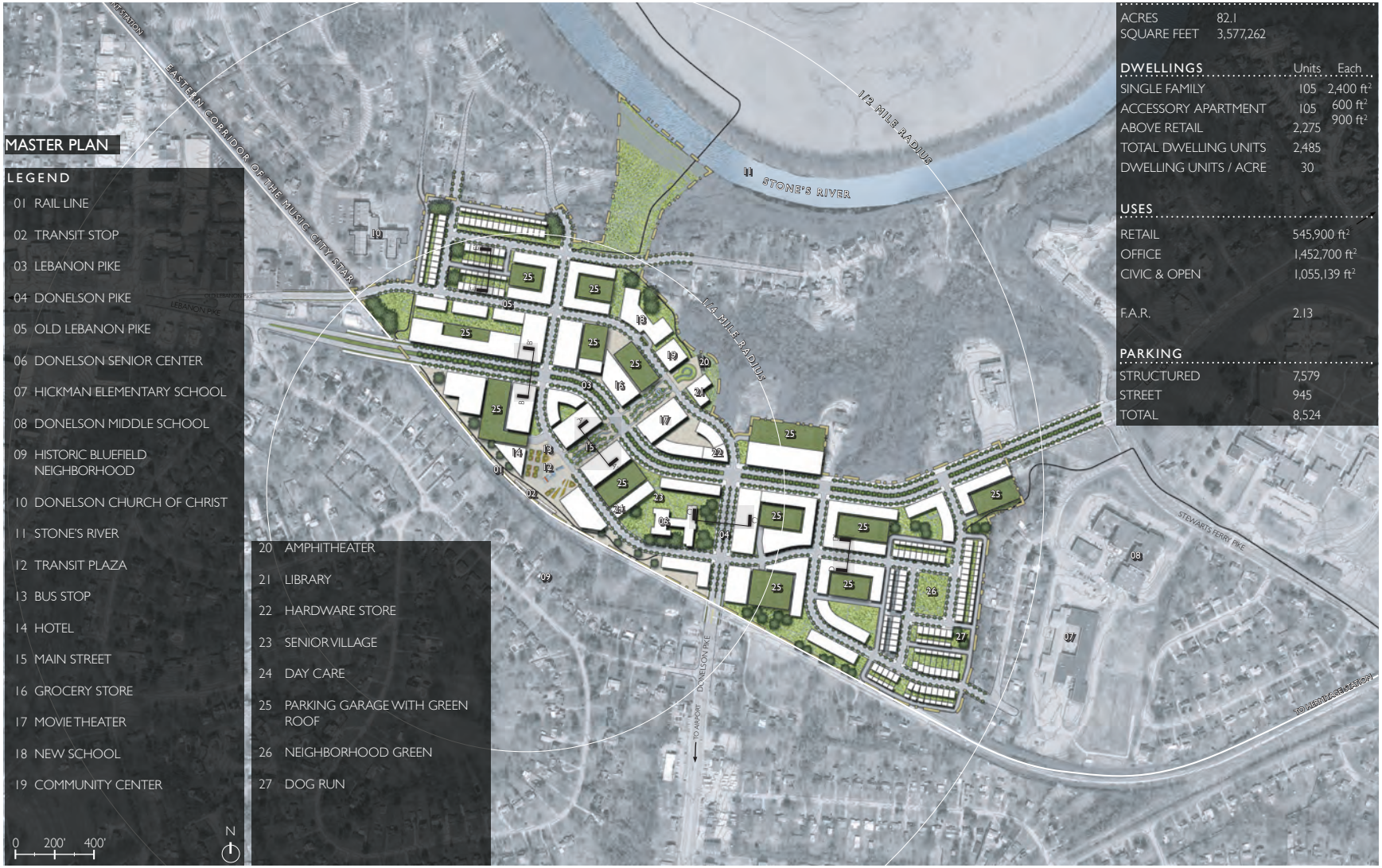


Figure 48: Donelson Station Master Plan (Gardner, 2013)

economic, and environmental guiding principles and metric informed their design.

The four primary districts of Donelson Station are the commercial core, the community center, the western neighborhood district, and the eastern neighborhood district (Figure 49). Overall Donelson Station will provide nearly 2,500 dwelling units, over 500,000 square feet of retail, 1.4 million square feet of office space, and one

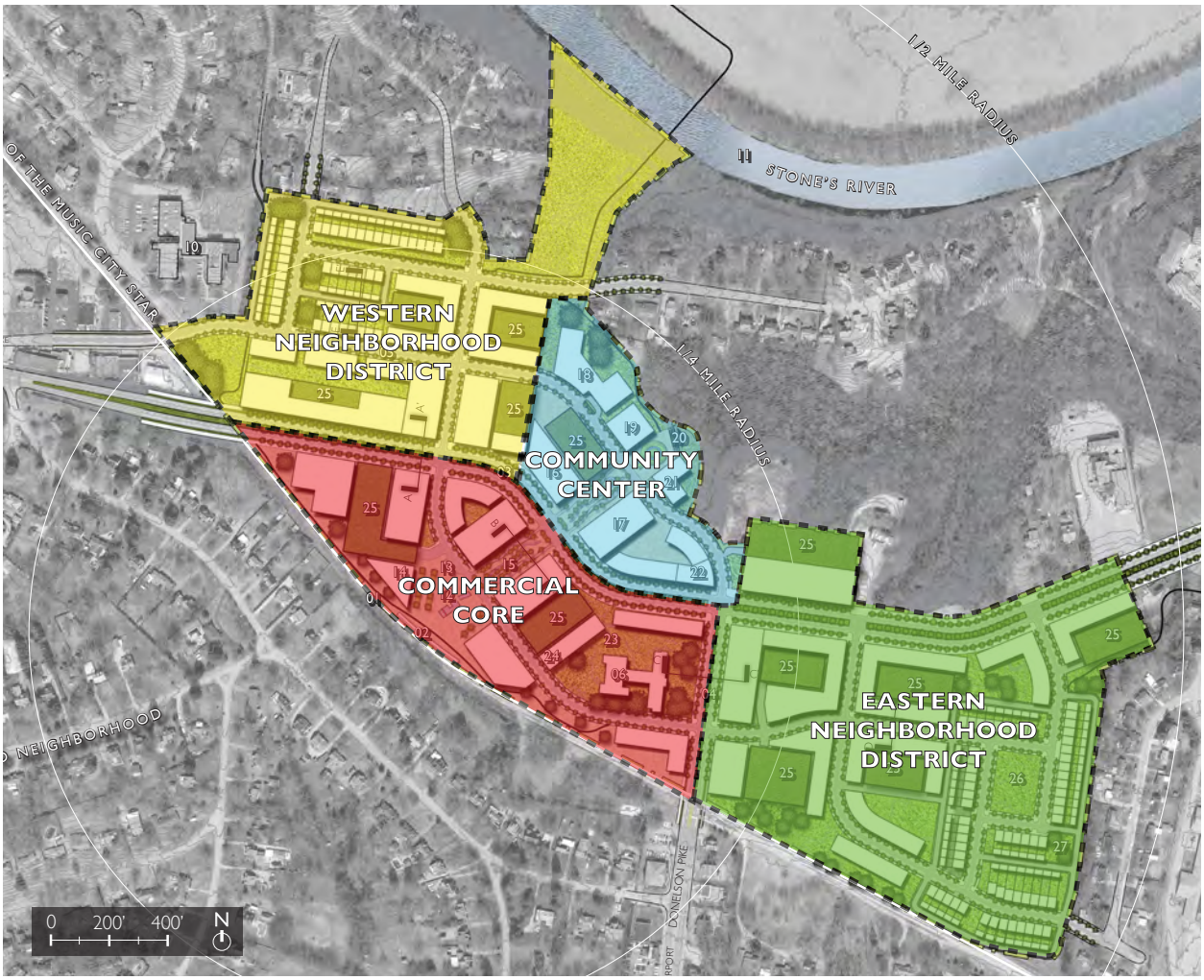


Figure 49: Donelson Station Districts (Gardner, 2013)

million square feet of civic and open space.

The commercial core (Figure 50) is composed of the Music City Star transit stop, transit plaza, bus stop, hotel, and mixed use high density office, retail and housing. This area will be very active as residents walk or bike to their office, to catch the train downtown, or as others arrive by train at the transit stop in the commercial core. Unobstructed access through the transit plaza allows commuters to quickly transfer between the transit stop and bus stop. Additionally, first floor retail lines either side of the plaza, which allows the busy traveler to quickly purchase convenience goods.



Figure 50: Commercial Core Plan (Gardner, 2013)

The community center (Figure 51) provides amenities and services that meet many of the daily needs of residents' and adds vitality to the community, although this is the only district without housing. This district offers shoppers convenient access to the grocery store, convenience retail, the hardware store and the movie theater. Beyond shopping and entertainment visitors to the community center district will enjoy access to the library, amphitheater, community center, and school.

The commercial core and the community center are linked by the main street (Figure 52). Along this street are the grocery store, movie theater, and many first floor retail stores with office spaces above. Additionally the bioswale is located within the median of this street. The bioswale captures rainwater from adjacent rooftops to settle stormwater pollutants while also mimicking the form of an oxbow lake.



Figure 51: Community Center Plan (Gardner, 2013)



Figure 52: Donelson Station Main Street Plan (Gardner, 2013)

There are two neighborhood districts, one in the west and one in the east of Donelson Station (Figure 49). Each is a comfortable walk from the commercial core, transit stop and community center. They each provide a mix of uses and recreation, which allows residents to fulfill daily needs without the aid of a vehicle. Additionally, a variety of housing types can be found in these districts. These districts help transition the density from the commercial core to the neighboring communities. The commercial core consists of high-density condos and apartments while the density of the neighborhood districts steps down to less-dense row houses and accessory apartments. This transition of density and housing types allows Donelson Station to blend with its neighboring communities while also allowing housing at a range of price points and sizes.

The western neighborhood district (Figure 53) will benefit from its interactions with the existing Donelson Church of Christ, existing ridgeline community, and proposed greenway connection linking Donelson Station over the Stone's River and into the East Nashville greenway network (Figure 54). These are all opportunities for



Figure 53: Western Neighborhood District Plan (Gardner, 2013)



Figure 54: Transportation and Greenway Network (Gardner, 2013)

social interaction between residents of Donelson Station and the greater Donelson community. Strengthening these experiences further establishes Donelson Station as the identifiable center of the Donelson community.

The eastern neighborhood district (Figure 55) utilizes the existing Donelson Senior Center as the anchor to the proposed Senior Village. The residential units in the Senior Village are targeted for senior living. Also, in order to promote interaction between the generations, a daycare has been located on the first floor of the western residential building in the Senior Village. The eastern district also enjoys a neighborhood green as well as a dog run. Both offer opportunities for recreation and social interaction. Additionally, this district is within close proximity to Hickman Elementary and Donelson Middle Schools (Figure 48), which once again allows for cross over social interaction between Donelson Station residents and the greater Donelson community.



Figure 55: Eastern Neighborhood District Plan (Gardner, 2013)

INFLUENCE OF SOCIAL PRINCIPLES

By creating a community center connected to the transit stop and core commercial area, this area becomes the site's primary social space (Figure 56). At the northeast end of the street is the community center. While in the community

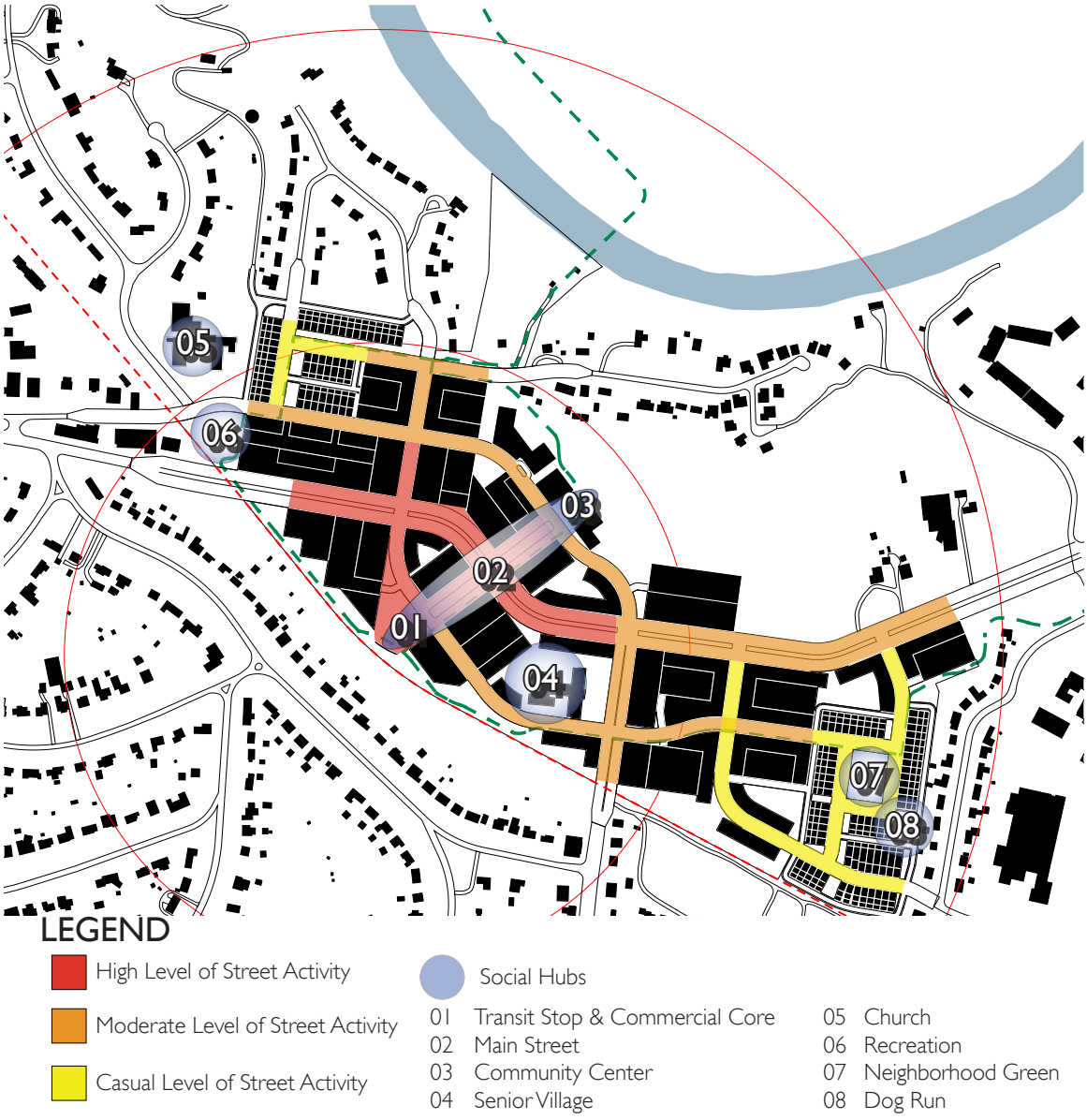


Figure 56: Social Activity (Gardner, 2013)

center visitors may cross the paths of others on their way to the library, amphitheater, community center, or school. These routine interactions provide an opportunity for neighbors to meet one another on a regular basis and enable the development of relationships between residents, which strengthens the community.

The commercial core district (Figure 50) is the gateway to the site when arriving by the transit stop. It is located at the southwest end of the main street and consists of the transit stop, transit plaza, office, retail, and hotel (Figure 57). This is an active space where pedestrians and cyclists arrive from the community to board the train or bus, or to transfer from one to the other. The transit plaza fountain and pool are welcoming and interactive elements. It is a space for office workers to take a quick



Figure 57: Transit Plaza (Gardner, 2013)

break, commuters to wait for the bus or train, or for the more spirited to splash and play. The fountain is also the symbolic headwater of the figurative oxbow bioswale that runs the length of the main street. By weaving through the transit plaza, main street, and community center, this component is further used as an organizing element of this axis. Additionally, this space allows for interactions between office employees, hotel guests, shoppers, and residents. There are also two parking garages in the commercial core which allow those from outside Donelson Station who live beyond walking distance of a transit stop to enjoy the core's amenities and services.

The main street connects the community center and the commercial core (Figure 52). Special attention was given to this street (Figure 58) because this

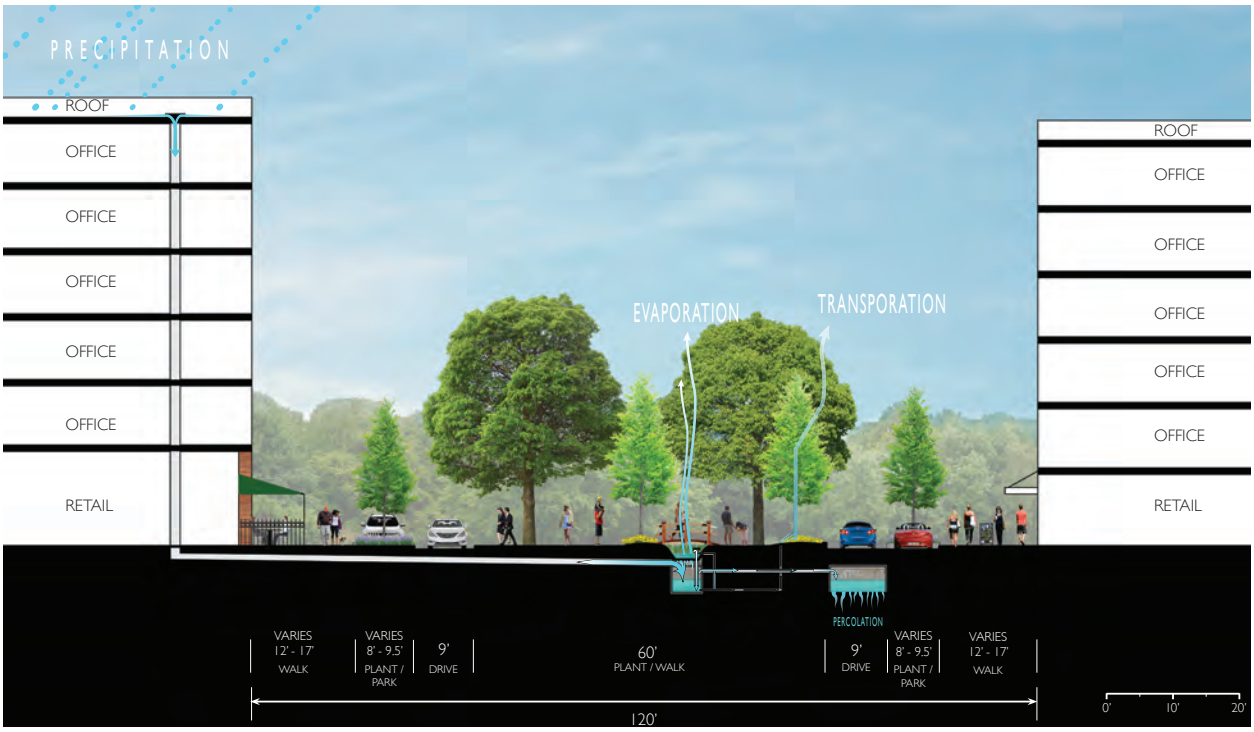


Figure 58: Section A-A' Main Street (Gardner, 2013)

connection exhibits the highest level of social activity in Donelson Station. First, the street is heavily landscaped to provide a comfortable inviting space for neighborly interaction. Second, spaces were provided for outdoor dining by setting back first floor restaurants and providing wide sidewalks. This encourages an active street and therefore further promotes social interaction. The spine created by the community center, commercial core, transit stop, and their connection through the main street is also important beyond their extents, drawing residents from the neighborhood districts and greater Donelson community. Additionally Figure 59 shows that the oxbow bioswale further strengthens the connection from the transit plaza, with the fountain shown in the distance, along the main street and to the community city. Using the



Figure 59: Oxbow Bioswale Along The Main Street (Gardner, 2013)



Figure 60: Section B-B' Lebanon Road (Gardner, 2013)

oxbow biowswale as an organizing element flowing along this axis helps define this as an active space intended to be traversed.

Linking each district while minimizing pedestrians and cyclists conflicts with vehicles was important to encourage walking and biking. Figures 58, 60, 61, 62, and 63 show that a safer walking and biking environment is created by providing wide sidewalks lined with street trees, narrowing traffic lanes, providing on street parallel parking and introducing bends in the road to calm traffic. This was particularly important along Lebanon Road as it is a five-lane road that bisects the site and is potentially problematic for pedestrian and cyclist safety. However, implementing these measures helps to slow traffic and reestablish priority for the pedestrian and cyclist.

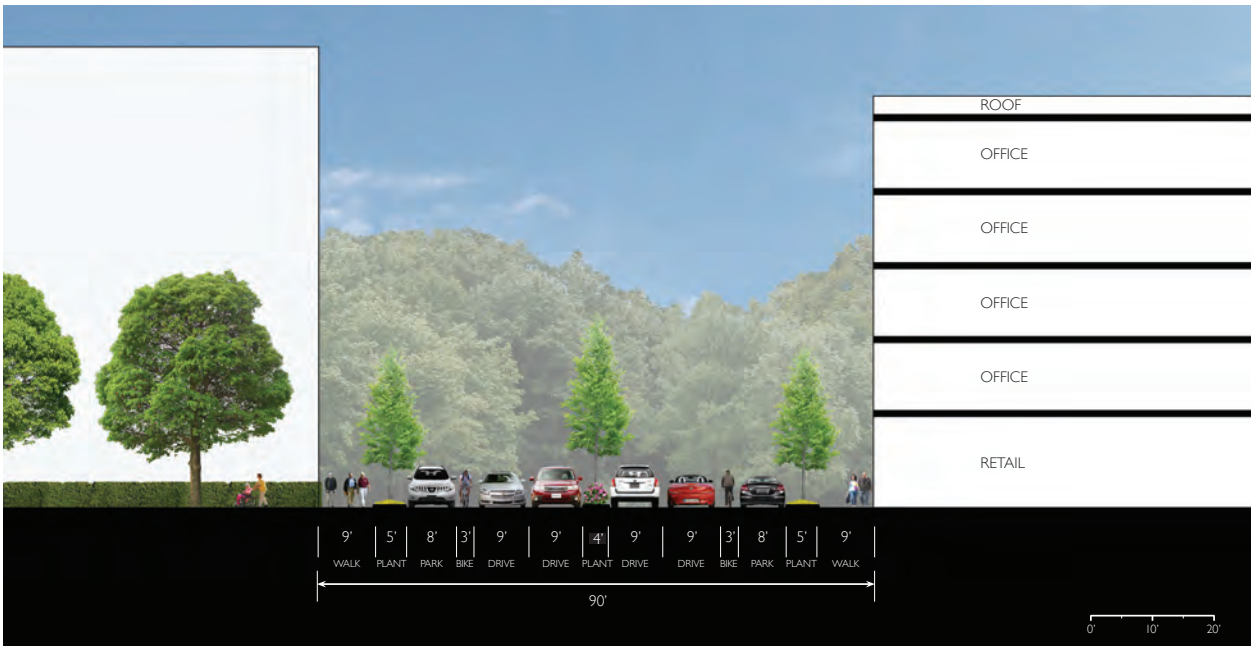


Figure 61: Section C-C' Donelson Pike (Gardner, 2013)

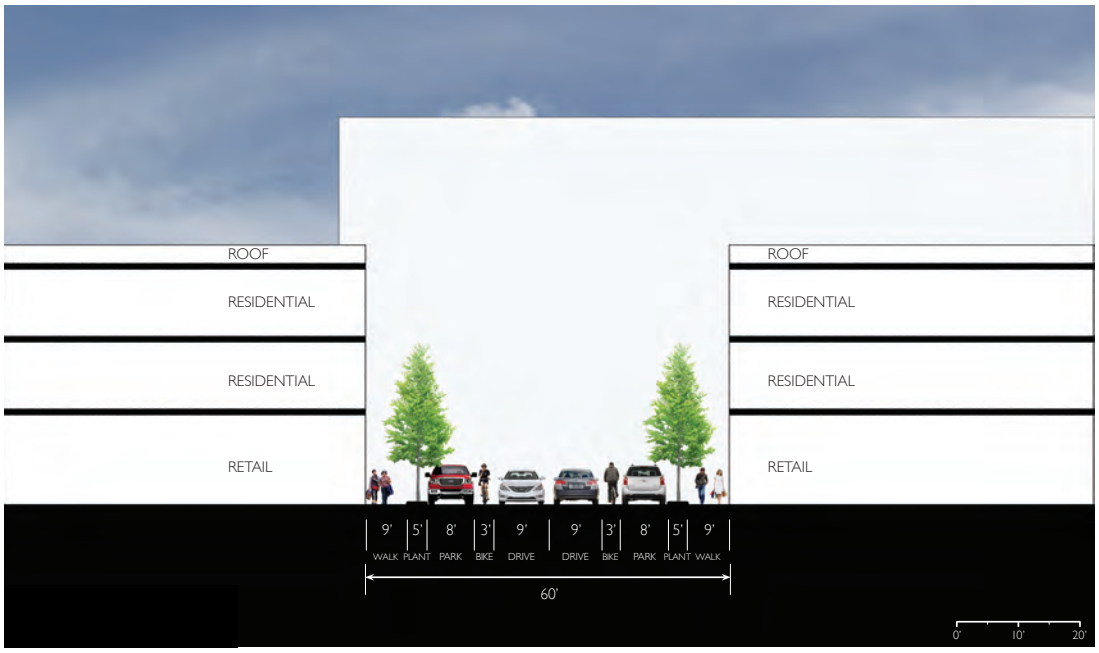


Figure 62: Section D-D' Typical Street (Gardner, 2013)

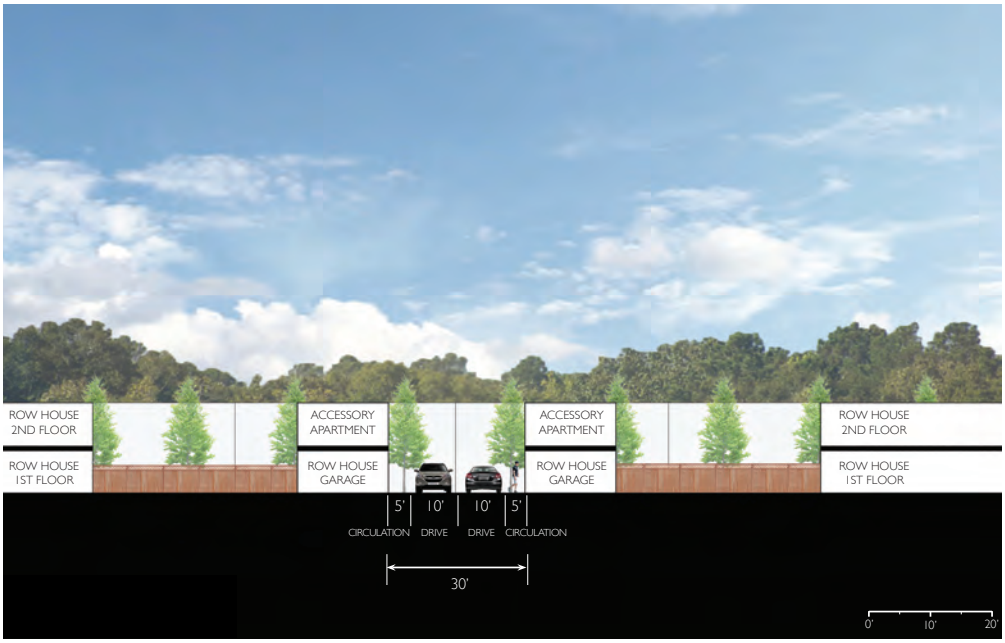


Figure 63: Section E-E' Typical Lane (Gardner, 2013)

A variety of housing types are encourage at Donelson Station as previously discussed trends in household demographics suggest that the single-family detached home, common in sprawl, no longer meets the needs of today's homeowners. For this reason condos and apartments are proposed over first floor retail. Additionally, row houses with accessory apartments over garages are also proposed. These row houses allow room for a couple with children, while the apartments and condos are more appropriately sized for singles or couples without children. Also, as seniors become an even larger segment of our population providing housing designed for their needs becomes evermore important. For this reason senior housing is proposed around the existing senior center (Figure 48).

Other social principles were also implemented. Public space such as neighborhood greens, dog runs and greenways were located throughout the site. Figure 64 shows residents enjoying the eastern neighborhood district green. This

provides space for recreation and neighborly interaction. Civic buildings were primarily located within the community center however the existing Donelson Church of Christ, senior center, Hickman Elementary School and Donelson Middle School were each integrated to the site at their current locations. All residential areas were located within a half-mile walk of the transit station, with the highest density being nearest the station. The residential density gradually decreased as the distance from the transit station increased in order to blend with the existing residential fabric of the neighboring communities. This blending was further accomplished by varying housing types. Condos and apartments were located closest to transit, while row houses with accessory apartments were located closer to the neighboring communities.



Figure 64: Neighborhood Green (Gardner, 2013)

INFLUENCE OF ECONOMIC PRINCIPLES

Establishing a core commercial area (Figure 50) near the transit stop, was achieved by locating the site's highest intensity development in the area bounded by the rail line, Lebanon Road, and Donelson Pike. The buildings in the core are the tallest and provide the most density of anywhere in Donelson Station. Most of the buildings are six stories, with the exception of the hotel that is ten stories, the residential buildings near the senior center are 5 stories, and the senior center is one story (Figure 65). A dense population in the commercial core, as well as close proximity to the transit stop provides economic benefits to businesses located there. These benefits are because it is convenient for residents in the core to shop there and it provides an influx of shoppers from outside Donelson Station arriving by transit.

Limiting block sizes to approximately 240 feet by 400 feet fulfills the second economic principle. This creates blocks that are comfortably walkable which encourages more people to walk along the streets and is inviting for transit riders to explore the community. Therefore these block sizes can stimulate patronage, trip generation, ridership, and transit viability. Street sections of Lebanon Road, Donelson Pike, interior streets, and lanes are shown in Figures 60 - 62 respectively. They show that throughout the site there are ample accommodations for the pedestrian and cyclist.

Providing a mix of uses in the core commercial area was another economic principle (Figure 66). The core is comprised of the transit stop, transit plaza, bus stop, hotel, retail, office space, and housing. It is also important to note the economic significance that this conglomeration of uses and services provides. As Figure 37 illustrates, the existing services and amenities are dispersed throughout the Donelson community. Because of this, it is not possible to walk to these places, and therefore travel by vehicle is almost certainly required.

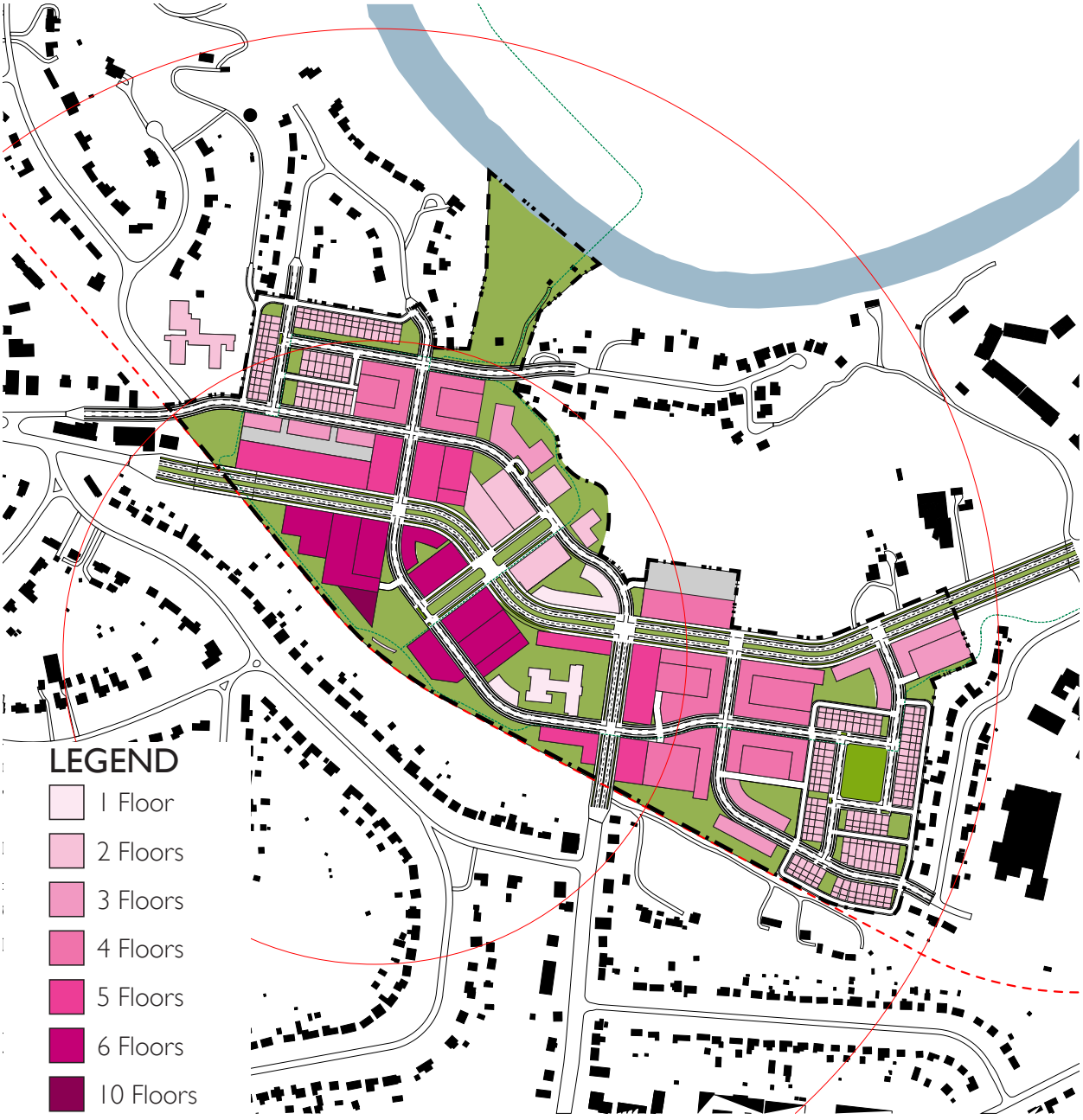


Figure 65: Height and Density Diagram (Gardner, 2013)

Other principles were employed to stimulate economic activity. First, pedestrian exits from parking areas were located to usher street activity to retail stores on the first floor of mixed use buildings throughout the site. This allows retail stores to capitalize on foot traffic generated from the parking areas as well as from consumers within their building. Also wide sidewalks and bike lanes were included along the streets in order

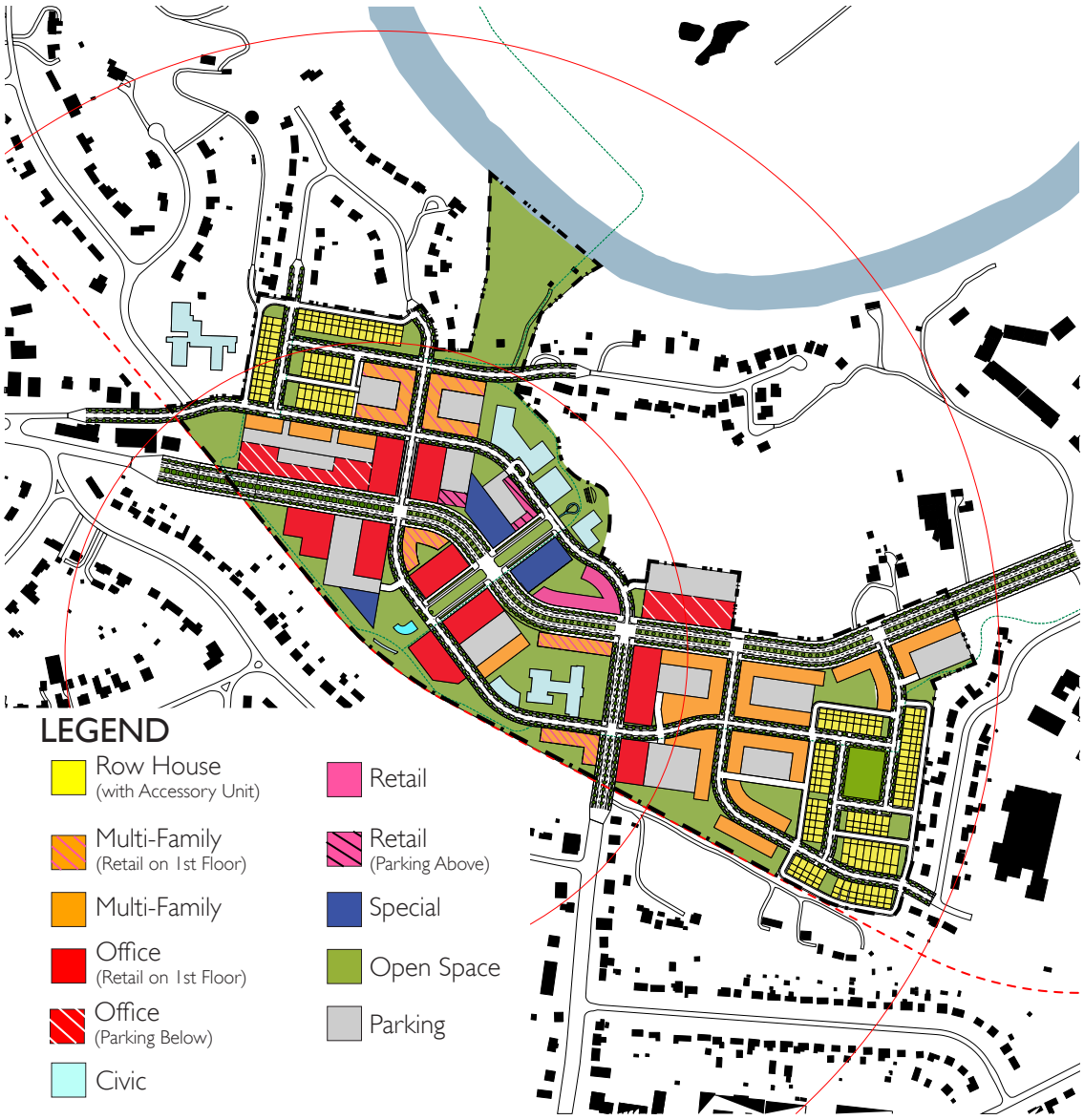


Figure 66: Land Use Diagram (Gardner, 2013)

to safely connect pedestrians and cyclists to transit. Creating this convenient access can increase ridership and revenues.

INFLUENCE OF ENVIRONMENTAL PRINCIPLES

The first environmental principle was to reduce auto-dependence by promoting walking and cycling through design. This was accomplished by providing sidewalks and traffic calming as well as offering the goods and services to satisfy most Donelson Station residents' daily needs within walking distance. By having a high-density commercial core within walking distance of the entire community, the need to drive personal vehicles is greatly reduced. Therefore the residents of the community will accumulate fewer VMTs, produce less carbon emissions by having a dense population within convenient walking distance of the transit stop.

Developing at high-densities in order to conserve land that would otherwise have been developed as sprawl was another principle. The height and density diagram (Figure 65) illustrates the density at Donelson Station. Multi-story office space located over first floor retail and multi-story housing next to these uses creates density within a mixed-use area (Figure 66). The existing density within a half-mile radius of the transit stop is 1.51 dwelling units per acre and a commercial floor to area ratio (FAR) of 0.17. The proposed Donelson Station will have densities of 30 dwelling units per acre and an FAR of 2.13. Knowing the existing and proposed dwelling units per acre and FAR, the amount of land required to build the same amount of square feet of uses at the existing rate as what is proposed in Donelson Station can be determined. Doing so reveals that approximately 2,000 acres of land can be preserved by developing at the higher level of density exhibited at Donelson Station rather than developing at the current density in Donelson (Figure 67). Therefore the higher density proposed at Donelson Station will reduce the pressure to develop at the city fringe.

Capturing stormwater and remove non-point source pollutants prior to discharging from the site was another environmental goal. Since Donelson Station will be developing a higher intensity of uses on a smaller footprint than typical

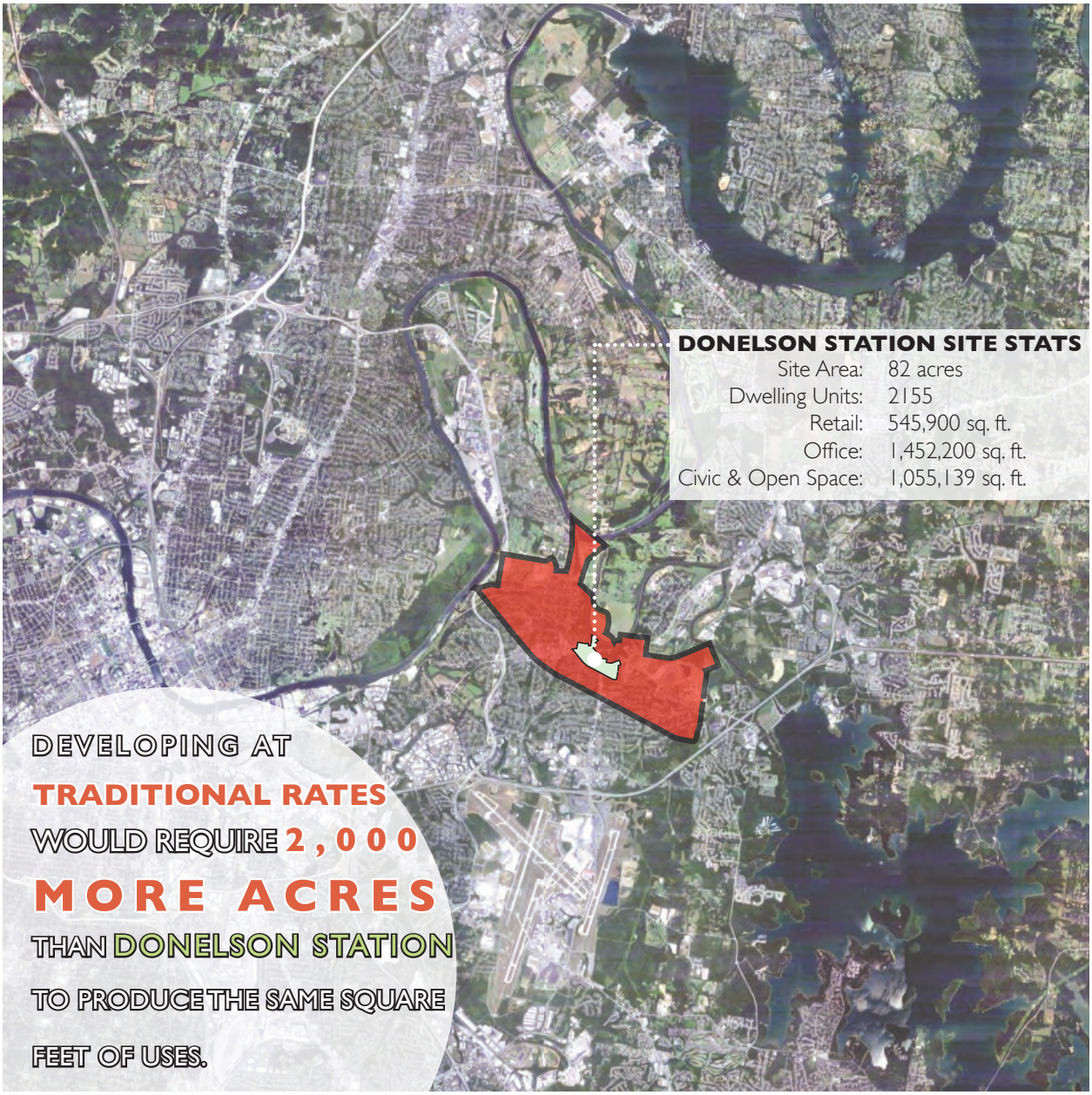


Figure 67: Development Footprints (Gardner, 2013)

sprawling development, it will be challenging to manage the site's stormwater. Rather than relying on land intensive settling ponds as sprawl communities are able to do, Donelson Station will harvest rooftop rainwater. Figure 58 shows the rainwater harvesting process along the main street. Rainwater will be harvested from rooftops lining the main street and directed to a storage basin below the bioswale. Once the rainwater arrives in the storage basin it is either used for irrigation or to fill the bioswale. In the bioswale the water is filtered and percolates into the soil and aquifers.

The bioswale serves a dual purpose. In addition to treating a portion of the site's stormwater, Figure 67 shows the bioswale is nestled into the activity of the main street as it undulates, with a gradually increasing meander. By mimicking the oxbox formation process, the attention of Donelson Station visitors is drawn to the site's adjacency to an oxbow on the Stone's River.

Limiting surface parking to parallel on street parking and providing structured parking covered by greenroofs was also an environmental objective. This is a two-fold principle. First, by limiting surface parking the amount of land area needed for parking is reduced. The needed parking can be located in multiple story structured parking lots. Covering the structured parking with greenroofs results in less reflected heat from the roof and filters stormwater.

INFLUENCE OF DESIGN METRICS

While the guiding principles were used to establish Donelson Station's social, economic, and environmental objectives, the design metrics were intended to insure that the site performance was improved over the existing sprawl condition. Striving for these targeted metrics yielded 30 dwelling units per acre, an FAR over 2, over 500,000 square feet of retail, 1.4 million square feet of office, 1 million square feet of civic and open space, and over 8,500 parking spaces. Developing in accordance with the

design metrics demonstrates that Donelson Station will generate the density required to support transit, as well as the desirable mix of uses.

CHAPTER X

CONCLUSION: CHALLENGES AND OPPORTUNITIES

CHALLENGES

It was challenging to locate the numerous components of the program in functionally ideal locations. For example, the area adjacent to the transit stop should be the commercial core, have high-density housing, include recreational space, and be connected to the community center. This was especially difficult for several reasons. First, half of the core area is in an historic neighborhood that I did not want to alter because this is a well established neighborhood. Second, the core is bounded on the north and east by five-lane highways, Lebanon Road and Donelson Pike respectively. This presented concerns for extending the high-density nature of the core across these corridors. Third, the existing senior center initially appeared to be an obstacle to design around. This is because it is a low density use, but it is located in the core which needed to be high density.

Other challenges to redeveloping this site as a TOD include current zoning, multiple land owners, and convincing those opposed to increased density of Donelson Station's merit. Most of the land within the site is currently zoned commercial and therefore will not allow for mixed uses, including residential. Also, there are multiple land owners to negotiate with in order to acquire the parcels that makeup this site. Finally those living near Donelson Station may be opposed to a higher density development because of their perception that it will generate more traffic.

OPPORTUNITIES

I eventually recognized that each of these challenges could be used as opportunities to create a unique and functional design. First, the historic neighborhood is a well-established, healthy area that can immediately support retail as it comes online. Second, Lebanon Road and Donelson Pike can be converted into boulevards lined with street trees, sidewalks, and storefronts. To make the road more pedestrian-friendly the lanes were narrowed to nine feet and on-street parking and bends were added to calm traffic. Third, the senior center is a community asset and provides an opportunity to accommodate Donelson's 'golden' residents. As life expectancy continues to rise and significant segments of the population continue to age, so will the importance of places designed for seniors. For these reasons I retained the senior center and propose the creation of the senior village – a campus of senior targeted housing, the senior center, and open space.

Changing the current zoning to allow for a mix of uses will likely only require proper governmental approvals as there are already sites within Davidson County, such as Lenox Village in South Nashville, that currently have this type of zoning. Additionally, there is another TOD, Hamilton Springs, currently being developed in Lebanon that can be looked to as a guide for receiving regulatory approvals for this type of zoning.

Part of the viability of TOD at Donleson Station or otherwise, is to show the surrounding community, including those who currently own the parcels within the site, how they will be positively impacted by the project. For those land owners, selling as a part of a comprehensive redevelopment project would likely result in a better sells price, as opposed to selling parcels for individual developments that would likely continue the sprawling tradition of the Donelson community. Additionally the existing site is outdated, lined by run down strip development, and does not adequately accommodate pedestrians.

There are several ways the proposed TOD is a benefit to both the residents of Donelson Station and those living in its vicinity. First, the site's adjacency to transit allows it to develop at a much higher density than what currently exists. This is a benefit because the increased density at the site supports the feasibility of transit at Donelson Station. This should comfort those concerned that higher density will add to traffic congestion. Since Donelson Station will be served by transit it will contribute less to congestion than typical developments that lack transit. This actually benefits the greater Donelson community by allowing them the option of using transit. By having a robust transit system, residents will have less dependence on automobiles.

Additionally the increased density afforded by transit allows Donelson Station the opportunity to develop as the communal center of Donelson. The higher density established by transit allows for the concentration of services, amenities, and conveniences in one walkable location rather than dispersed throughout the community. Further the combination of high density uses and the concentration of mixed uses can support transit by increasing ridership. Higher density will also allow Donelson Station to reduce the pressure to develop land in Donelson or elsewhere in the region. Lastly, Donelson Station is a boost to the local economy. It offers office, retail, and restaurants jobs to the Donelson area while also being a place for Donelson area consumers to purchase goods and services.

Ultimately, I believe that TOD is a viable option for Donelson. It has been carefully designed to create an identifiable community center, respects social, economic, and environmental principles, and achieves design metrics. Additionally, it improves a sprawling area and showcases how higher density can create a stronger, walkable community, that is supported by transit, and therefore has reduced reliance upon automobiles. It is my hope that careful implementation of pioneering TODs, such as Donelson Station, can help sustain long-term support of the 'transit era' and serve as a model for the region and beyond as a viable alternative growth pattern to sprawl.

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