



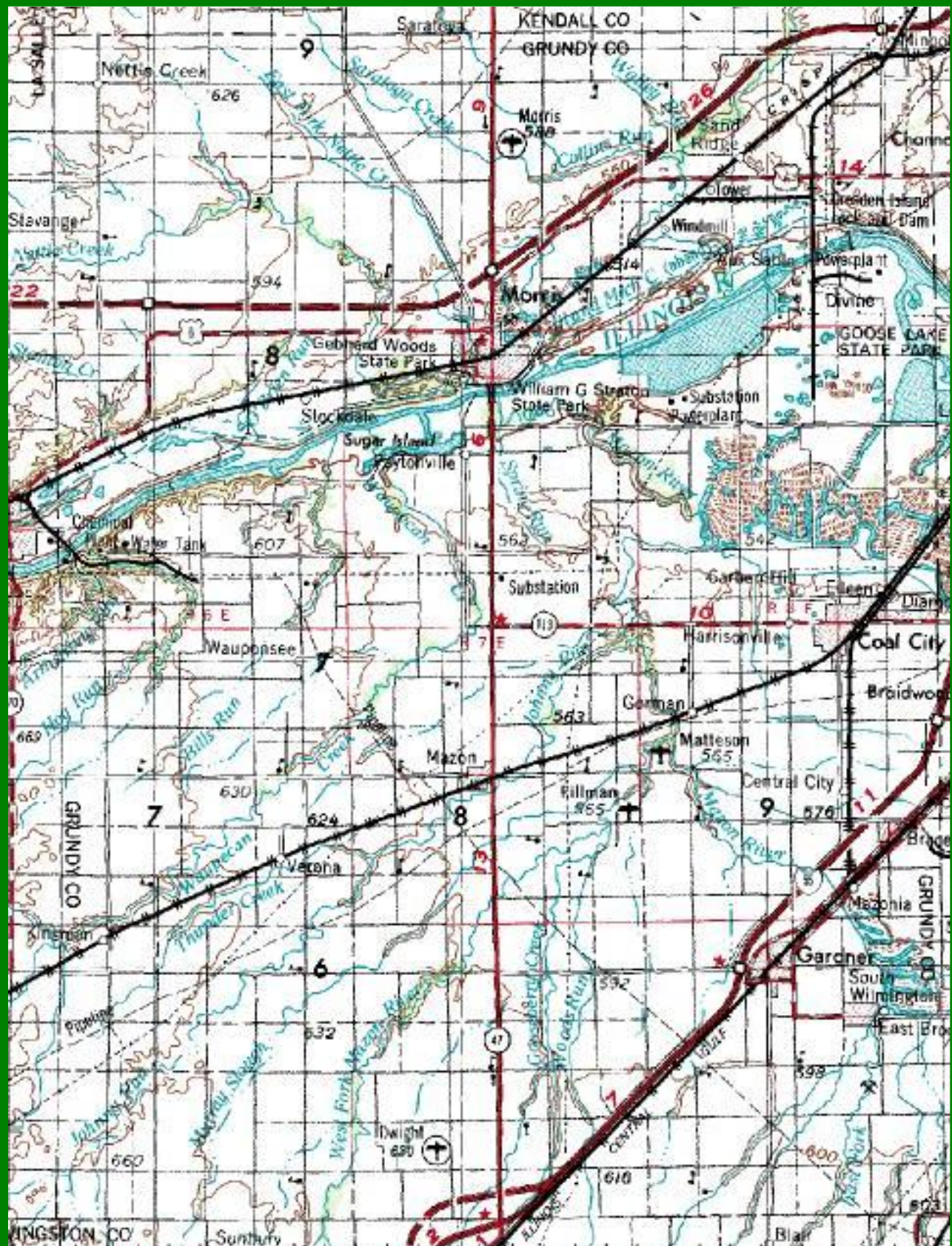
GRUNDY COUNTY GREENBELT AND GREENWAY PLAN

**By
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**A project submitted in partial fulfillment of the requirements for the degree of
MASTER OF URBAN PLANNING AND POLICY
at the
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GRUNDY COUNTY GREENBELT AND GREENWAY PLAN

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Cover: Grain Elevator in Saratoga Township between Morris and the northern border of Grundy County along the former Fox and Illinois Union Railway interurban line. Passenger service was terminated in 1931. Freight service continued until 1938.

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GRUNDY COUNTY GREENBELT AND GREENWAY PLAN

ABSTRACT

Grundy County is experiencing exurban sprawl resulting in environmental degradation, unsustainable development, and a lack of transportation choices. This planning dilemma is caused by local governments that are facilitating low density highway-oriented land uses by attempting to fully accommodate a predicted onslaught of population growth. The Greenbelt and Greenway Plan implements a *slow-growth* methodology to accommodate a measured amount of new residents and businesses by maintaining the county's population in constant proportion to that of the Chicago metropolitan area. Land is allocated for development in each municipality at minimal densities necessary to support more efficient travel modes such as mass transit. Urban growth boundaries are implemented to protect vital natural resources, agricultural areas, and open space while ensuring that development occurs within and contiguous to the municipal centers. Additional transportation alternatives are created by connecting population and employment centers with bicycle and pedestrian pathways. The Greenbelt and Greenway Plan demonstrates that Grundy County can accommodate its fair share of population growth through the year 2030 while protecting more than 50 square miles of land from development compared to existing plans. Minimal reductions of 20 percent in household transportation costs and emissions can be achieved with the potential to reduce county total vehicle miles traveled and fuel usage by up to 60 percent in comparison to a projected sprawl scenario.

GRUNDY COUNTY GREENBELT AND GREENWAY PLAN

PART I – BACKGROUND

INTRODUCTION

Grundy County, Illinois, is located in northeastern Illinois about 50 miles southwest of the Chicago Loop and about 75 miles northeast of Peoria. The county consists of about 430 square miles and, according to the United States Bureau of the Census (Census Bureau), had a population of 37,535 in the year 2000. The county seat and largest city, Morris, had a 2000 population of 11,928. The county is bordered by Kendall County to the north, Will County and Kankakee County to the east, Livingston County to the south and LaSalle County to the west.

Grundy County is predominantly a rural agricultural environment facing increasing growth and development pressures as the Chicago metropolitan area expands. These pressures are coming primarily from the northeast and east along the I-80 and I-55 highway corridors. Grundy County does not have any type of forest preserve district nor does it have any proactive plan to protect farmland and open space. In addition, the area has very few transportation alternatives to the passenger automobile and lacks an adequate amount of bicycle and pedestrian pathways/routes.



Figure 1 – Chicago metropolitan area. Adapted from “Natural Connections: Green Infrastructure in Wisconsin, Illinois, and Indiana” by the Openlands Project and Center for Neighborhood Technology.

These shortcomings will be addressed through a two-part approach. First, the greenbelt portion of the plan will identify specific areas around municipalities that will serve both as Urban

Growth Boundaries (UGB's) and open space. Second, the greenway section of the plan will identify linear routes in the form of highways, pathways and waterways that will be protected from development and provide new transport options. The Greenbelt and Greenway Plan will implement selected components of the author's final recommendations for the *Grundy County 2020 Comprehensive Plan* (2020 Land Use Plan) and complement the watershed plans described below.

SUPPORTING PLANS

GRUNDY COUNTY 2020 COMPREHENSIVE PLAN

Overview

Reference is made to the final recommendations for the 2020 Land Use Plan (draft) by this author, dated September 27, 2004. The 2020 Land Use Plan (draft) provides innovative guidance to help Grundy County maintain its rural character while accommodating a measured amount of growth and development as the Chicago region expands. The Grundy County Regional Planning Commission (Planning Commission) reviewed and edited the 2002 Land Use Plan (draft) and accepted comments from municipalities, townships, watershed coalitions, the U.S. Environmental Protection Agency (U.S. EPA), other public/private interest groups, and county residents in general. The 2020 Land Use Plan (draft) is expected to be approved by the Planning Commission by December of 2005 and presented to the Grundy County Board for further review and final approval.



Figure 2 – Property annexed into Coal City in 2005
(photograph by author).

The proposed land classification system in the 2020 Land Use Plan (draft) consists of three main elements, all of which have been retained by the Planning Commission:

- Primary Centers (larger municipalities);
- Rural Centers (smaller municipalities); and
- Agricultural/Environmental Protection Areas.

The main focus of this land classification system is that the vast majority of growth and development will occur adjacent and contiguous to the municipalities in compact form. This methodology increases the sustainability of each of the primary/rural centers by encouraging

physical design that makes them more complete and self-contained communities, i.e., a diverse and balanced amount of residential, industrial, and commercial land uses. To a limited extent, the land use plans of the larger municipalities such as Morris, Minooka and Channahon promote similar concepts.

Planning Dilemma

The visions and needs of Grundy County residents and stakeholders vary greatly and conflict in certain respects. Members of the Grundy County Board specifically solicited input from the author to revise their previous Land Use Plan so that it would assist them in preserving the rural character of the area. Members of two separate area watershed groups, whose activities are described in more detail below, are strong supporters of growth limitations to achieve their goals of protecting waterways. Members of the Planning Commission are primarily interested in capitalizing on rising land values by encouraging unlimited economic/residential growth and development. The Grundy County Economic Development Council and business leaders have similar objectives. These latter organizations seek zoning that will help to achieve a vision of highway-oriented development along the majority of their major transportation corridors. The 2020 Land Use Plan (draft) and the subject Greenbelt and Greenway Plan attempts to balance all of these stakeholder interests.

While the Planning Commission has tentatively adopted the majority of recommendations in the 2020 Land Use Plan (draft), it has made deletions and alterations of key elements. These changes greatly weaken the ability of the document to be an effective tool to ensure that growth and development occurs in the most rational and efficient form. The Planning Commission is not expected to substantially adhere to particular guidelines of the 2020 Land Use Plan (draft) that are designed to contain urban sprawl. They are likely to retain the bulk, if not all, of their previous zoning regulations and the current form of the county land use map (*Appendix 1*). Specifically, the proposed land classification system will be compromised substantially as the county zoning ordinance will continue to allow subdivision of farmland for low-density residential uses.



Figure 3 – Low-density highway-oriented development on Rt. 47 looking south from I-80 in Morris (photograph by author).

The aforementioned municipalities also have zoning and land use maps that appear to contradict their comprehensive plans as evidenced by recent approvals of residential, industrial, and commercial subdivisions that promote sprawl through low-density, highway-oriented development patterns. As noted in the 2020 Land Use Plan (draft), Channahon in Will County has annexed a 17-mile linear stretch of land along Route 6 that

extends deep into Grundy County. This action along with annexations by the neighboring municipalities of Minooka and Morris has created a solid stretch of incorporated land that covers a significant portion of the upper one-third of the county. These municipalities, in addition to Coal City, Diamond, and other urban centers further south, are in the process of creating a solid conglomeration of incorporated land along the eastern one-third of the county.

The annexations are evidence of competition amongst the municipalities to capture potential high tax revenue commercial corridors. Execution of the Greenbelt and Greenway Plan will fully help local government and industry boosters in achieving their growth and development goals by allocating adequate land for conversion to residential uses and employment centers. This will occur primarily within and contiguous to the Primary Centers and Rural Centers in compact form. This approach also assists in accomplishing the objectives of other stakeholders by insuring that open space and farmland is protected between the municipalities so that each community can retain its unique character.



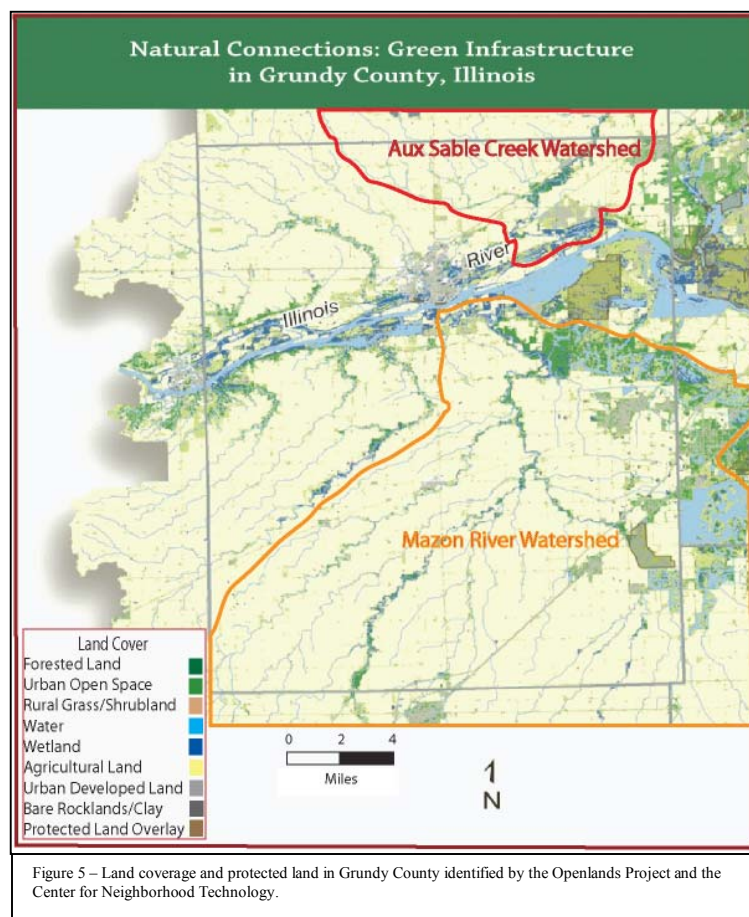
Figure 4 – Big box retail in Morris will likely continue to the east along Rt. 6 and north of I-80 along Rt. 47 without proactive planning (photograph by author).

NATURAL CONNECTIONS: GREEN INFRASTRUCTURE

In early 2004, the Openlands Project and Center for Neighborhood Technology finished an initial phase of their regional green infrastructure plan for a 14-county contiguous area in northeastern Illinois in addition to portions of Wisconsin and Indiana, including Grundy County (*Figures 1 and 5*). A primary goal of this project is to preserve regional sustainability by identifying “green infrastructure,” an interconnected system of natural areas, open spaces, and waterways for recreational uses and wildlife habitat. This provides a foundation for acquiring, restoring, and

managing areas targeted for protection.¹ The Greenbelt and Greenway Plan relies upon this inventory and the watershed plans below to prioritize waterways and adjacent land for preservation.

MAZON RIVER WATERSHED RESOURCE PLAN



Reference is made to the *Mazon River Watershed Resource Plan*, revised in September 2004, by the Mazon River Watershed Planning Committee with assistance from the U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), and the Grundy County Soil and Water Conservation District. The document describes conditions in the watershed, identifies significant trends, and addresses challenges and opportunities to improve conditions through natural resources management. The Mazon River Watershed covers a total of 333,570

acres in six separate Illinois counties. About 95 percent is rural land use such as cropland, woodland or grassland. Approximately 41.7 percent of the watershed is located on 139,136 acres in Grundy County. This covers about 50 percent of the county, all of which is south of the Illinois River (Figure 5).²

AUX SABLE CREEK WATERSHED TECHNICAL DOCUMENT

The *Aux Sable Creek Watershed Technical Document*, dated March 2001, provides a detailed inventory and description of the watershed and outlines methodologies to protect and enhance natural resources within its area. The Aux Sable Creek Watershed Planning Committee together

with the Aux Sable Creek Watershed Technical Advisory Committee authored the report with funding provided, in part, by the Illinois Environmental Protection Agency (IEPA). The Aux Sable Creek Watershed is predominantly located in southeastern Kendall County but also covers 25,980 acres in northeastern Grundy County, including the western 75 percent of Aux Sable Township and the northeastern 25 percent of Saratoga Township (*Figure 5*). This includes a large portion of industrial areas developed and proposed by local authorities along the I-80 and Route 6 corridors between Morris and Minooka. A detailed description of the watershed is provided in the document and includes: soil types, wetlands, land uses, and topography. Of note is that urban built-up use covered about 0.62 percent of land within the watershed as of 2001.³

GUIDING PRINCIPLES AND STATISTICS

LAND USE CONTROLS

The adjacent counties of Will and Kendall are the fastest growing counties in Illinois. This has exerted increasing pressure for rapid development in Grundy County. The Greenbelt and Greenway Plan offers a measured approach for accommodating the influx of population so that it occurs at a level higher than its historic rate but lower than projections under a sprawl scenario. This technique effectively serves as a form of growth control to protect Grundy County's rural character, open space, and natural resources while insuring that infrastructure and services are provided in the most economical manner. Land use controls raise concerns about regulatory "takings" and the level of authority local government has in restricting the rights of private property owners. However, there is extensive precedent in land use law where growth restrictions by local governments have been upheld by courts at both the state and federal levels.

Pennsylvania Coal Co. v. Mahon (US Sup Ct, 1922) was the first case that acknowledged the idea of "reciprocity of advantage" to justify land use restrictions. The reciprocity concept can be defined by stating that "the surround of social order and mutuality – schools, police, marketplace, etc. – that is a huge portion of any property's value, a value thus created by those many other people who have no deed to the land, but whose interests are nevertheless deeply implicated in it."⁴ This was most recently confirmed in *Keystone Bituminous Coal Association v. DeBenedictis* (US Sup Ct, 1987) with the U.S. Supreme Court stating that "while each of us is

burdened somewhat by such restrictions, we, in turn, benefit greatly from the restrictions that are placed on others.” These and other cases helped to solidify the legitimacy of the police power in controlling land use.

In the landmark case, *Golden v. Planning Board of Town of Rampapo* (NY Ct App, 1972) and in later court rulings across the country, the courts have held that local governments have broad authority to use various techniques for growth controls as long as they relate to an objective of balanced and well-organized communities. The court cautioned that government cannot freeze populations at present levels and must have a role in population assimilation. However, it validated the use of comprehensive plans backed by detailed planning to create the mechanisms necessary for timed growth and in determining the most appropriate use of land. “This broad interpretation of local land use authority has become a clear trend among courts nationally and has fueled a great expansion of local invention to deal with the problems of sprawl, the provision of infrastructure, the costs of development, and, recently, the protection of natural resources and the environment.”⁵

In *Construction Industry Association of Sonoma County v. City of Petaluma* (U.S. Ct. App., 9th, 1975), the court cited both *Village of Belle Terre v. Boraas* (U.S. Sup. Ct. 1974) and *Ybarra v. City of Town of Los Altos Hills* (U.S. Ct. App. 9th 1974) in finding that the concept of public welfare is broad enough to include a desire to expand in a methodical and cost-effective fashion in order to preserve rural character. This specifically included the use of a greenbelt as an UGB for open space and to protect the area from sprawl. The Belle Terre and Ybarra cases both upheld regulations that had the purpose and effect of permanently restricting growth. In *Burnham v. Board of County Commissioners of Monroe County* (Fla. App. 3rd, 1999), the court upheld a permit allocation system that followed the *Rampapo* prescription of consistency, concurrency and compactness. This effectively validated a population cap that reduced the historical growth rate for Monroe County by more than one-half since 1992. This approach addressed numerous problems caused by a population explosion in Monroe County and the Florida Keys.

In 1978, the “metropolitan service district” or Metro was created in the Portland, Oregon, area to oversee numerous planning issues confronting the entire region that could not be handled adequately by local governments. This includes implementation of the UGB program required by the State of Oregon. The program mandates that growth and development adequately and efficiently utilize existing infrastructure within urban areas before expansion into rural locations can occur. The court in *City of Salem v. Families for Responsible Government* (Or. App. 1983) held that an UGB cannot encompass more land than is needed for future growth. In *Shea Homes Ltd. Partnership v. County of Alameda* (Cal, App. 2003), the court found that preservation of agricultural and open space was a legitimate planning approach as long as housing needs were met. Comparable enabling legislation by the State of Illinois requiring UGB’s would certainly enhance the potential benefits of the Grundy County Greenbelt and Greenway Plan as all counties and municipalities would be subject to compliance. The Rampapo decision recognized that growth management is a regional issue and cannot be properly addressed through the approach of local land use controls. The court was unsuccessful in urging that the State of New York provide guidance over land use decisions.

SUSTAINABILITY AND IMAGEABILITY

In general, the approach of land use planning by local governments in Grundy County is twofold. The first is to create economic development to reduce the mismatch between the population and the lack of local employment. Grundy County does indeed need jobs according to calendar year (CY) 2000 statistics from the Illinois Department of Employment Security (IDES), Labor Market Information Unit. These data are contained in the 2020 Land Use Plan (draft), *Table 17 - Residence County to Workplace County Commuting Patterns, 2003*, and show there are almost 3,500 more workers that leave Grundy County than enter it for employment. The appropriate role of local government planning is to guide industrial and commercial development to rectify this problem. This must be done while achieving the maximum number of goals and objectives as laid out in the respective land use plans of Grundy County and the municipalities.



Figure 6 – Downtown Galena, Illinois. A vibrant, walkable, and sustainable small town urban environment (photograph by author).

- Employment must be brought into the developed communities as opposed to outlying highways, when differing land uses do not conflict. Mixed and contiguous land uses generate vibrant communities and economic activity where more people can easily patronize numerous establishments close to each other and nearby residential areas.
- Compact development patterns make each of the communities more self contained, reduce transportation costs, and provide sustainability as they facilitate the long term prospect of mass transit with less reliance on the automobile.



Figure 7 – Multi-level Home Depot store on Halsted St. in Chicago's Lincoln Park neighborhood. Parking is on the roof.

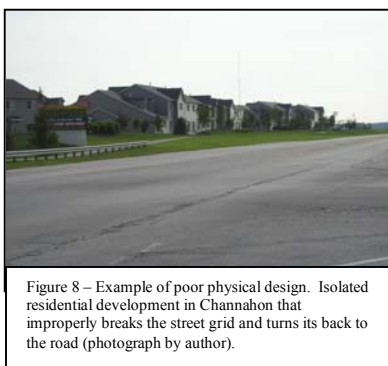


Figure 8 – Example of poor physical design. Isolated residential development in Channahon that improperly breaks the street grid and turns its back to the road (photograph by author).

- Architectural standards of quality and context-sensitive development, which promotes mixed land uses in a form of pedestrian scale with narrow streets, sidewalks, and buildings built up to the curb in traditional urban form are preferred as opposed to Euclidean style zoning which often separates land uses inefficiently and unnecessarily.
- Envision development at the level of the pedestrian and not that of the automobile. There is nothing imageable or pleasant about highway traffic and land uses adjacent to highways in the form of strip malls and big box stores. Bring commercial uses into the community and make them fit the urban form to create a sense of place and character that will attract pedestrians within walking distance from residential areas.
- Continue the traditional street grid to promote connectivity and diffuse traffic congestion as opposed to isolated subdivisions off of highways. Physical design that mandates the use of arterials (Route 6 or 47) by personal vehicles to run errands, which are the bulk of auto trips, is a key indication that the layout of the community is not as efficient as it could be.

The second approach of land use planning by Grundy County and its municipalities is to fully accommodate projected population increases through low-density residential subdivisions. This is a common methodology by local governments in the Chicago region and other metropolitan areas that can contribute to urban sprawl. There are three primary traits used to describe sprawl: unrestricted outward expansion into undeveloped locations; low density; and scattered development.⁶ While there can be some benefits to these types of development patterns, they are outweighed by the costs more often than not as discussed above and below. By understanding the demographics of the region as a whole, Grundy County can make more informed land use decisions that will provide maximum benefits both within and outside its borders.

- Cities traditionally have been the primary places for an abundance of cultural activities, shopping, entertainment, etc. The country offers quiet, spaciousness and a more natural environment. People move to the suburbs and exurban fringes seeking the benefits of both urban and rural life. They are often willing to do this via the tradeoff of higher transportation expenditures for lower housing costs. These benefits are difficult to measure in terms of economic value. However, various studies have shown that the prices of residential homes decrease within a range of between 1.5 and 6 percent per mile as distance increases from the urban core. For areas nearer this latter range and with expensive housing, sprawling land uses provide a significant benefit in terms of lower land and home prices.
- A 2000 study by the National Research Council found that, over the period 2000-2025, Midwest regions could experience a reduction of about 5 percent in overall real estate development costs through a compact growth scenario which increased density by 20 percent over sprawl type development. With proper design, density reductions of this magnitude can be virtually undetectable to an uninformed layperson.⁷ A 1995 study by the U.S. Office of Technology Assessment determined that planned higher density developments save more than \$10,000 per dwelling unit for the cost of capital facilities and 45 percent in amount of land developed with fiscal reductions of 25 percent for roads, 15 percent for utilities and 5 percent for schools.⁸
- Overall population in the Chicago area is rising but much of the migration to counties such as Grundy comes from people already in the region. Studies have shown that close to 20 percent of the city of Chicago is vacant. About one-half of this or more than 9,800 acres had been developed at one time.⁹ The Northeastern Illinois Planning Commission (NIPC) projects population declines for 37 municipalities, mostly inner suburbs, based upon continued inefficient sprawling land uses.¹⁰ These are all areas with fully established infrastructure. It makes no sense to strain local budgets in Grundy County for new infrastructure when it is underutilized elsewhere in the region. It is true that the population (much of which is “white flight”) has historically migrated outward to escape a number of problems in the urban setting such as poor schools, crime, and lack of employment opportunities. However, land use controls help to confront the racial and class segregation this causes by limiting the amount of real estate available for development and reducing tendencies to abandon the city. Further, impoverished areas of many cities have been experiencing a renaissance of growth and development with young professionals moving into urban areas. This has been evidenced in Chicago with the rebirth of the Cabrini Green and Grand Boulevard neighborhoods in recent years.
- Studies by the Sierra Club and the American Farmland Trust have shown that residential development costs local governments up to 20 percent more in services for schools, roads, etc., than it collects in revenues. It can be a perpetual downward spiral with local governments seeking economic development through housing but falling further behind in tax revenues for needed services. A 1996 Chicago regional study by Persky and Wiewel at

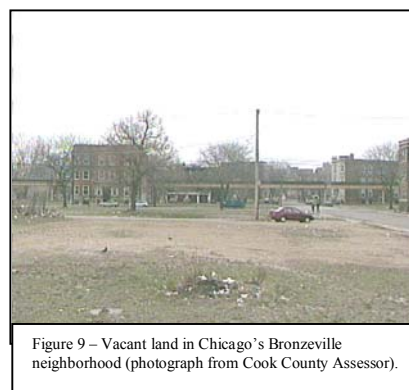


Figure 9 – Vacant land in Chicago’s Bronzeville neighborhood (photograph from Cook County Assessor).

the University of Illinois revealed that, with regard to suburban households, only those with incomes of more than \$75,000 provided enough tax revenue to reimburse the costs they impose. Within the city of Chicago, middle income households earning between \$30,000 and \$75,000 were able to pay their way. It was concluded that net costs to the region amount to between \$1,500 and \$2,300 per year when establishing one middle income household in the suburbs as opposed to the city of Chicago.



Figure 10 – New residential development off Rt. 6 in Channahon that is likely straining the municipality's budget (photo by author).

- A *Crain's Chicago Business* survey found that Chicago city taxes on a 100,000 square foot commercial building were \$490,000 while suburban costs for similar structures were as low as \$164,000. The Persky and Wiewel analysis also concluded that suburban taxes in addition to labor costs in these localities are substantially lower. However, they also found that movement of companies from the city to the suburbs provides little or no net gains for the region. The hidden costs of this pattern includes the rising number of inner city low-income individuals that cannot get to jobs (lack of transit and inability to afford vehicles), increasing traffic congestion, and taxpayers who must pay for the costs of new infrastructure needed to service development. The study found that the region could save from \$150 to \$500 per worker per year if plants established themselves on city sites instead of suburban locations.¹¹

OPEN SPACE/FARMLAND PRESERVATION AND TRANSPORTATION

The Planning Commission and local government members are not necessarily against open space per se. However, they perceive that creating open space: should not be under the purview of the County; will restrict property rights of land owners; is unattainable given past efforts that failed to authorize funding; and conflicts with economic development goals. Grundy County government is in a weak position given the fact that most growth and development in Illinois is driven by annexations and projects implemented at the municipal level. Therefore, it is critical that all levels of local government are proactive in coordinating the protection and/or development of open space, farmland and alternate transportation corridors.

- The *Aux Sable Creek Watershed Technical Document* outlines the need within the watershed to protect farmland and its associated food production capability and economic activity. Farmland maintained in its current use reduces urban sprawl, preserves natural resources, and reduces conflicts between agricultural and residential land uses. Efforts by the State of Illinois to implement these protections were initiated, in part, through a 1980 executive order by Governor James R.



Figure 11 – Prime farmland in Grundy County. Thousands of acres are threatened if present development trends are allowed to continue (photograph by author).

Thompson and subsequent legislation:

- *Conservation Right – Conservation Easement*: Land owners can preserve land/water in its natural condition to prevent development.
 - *Valuation of Land in a Conservation Easement*: Valuation of conservation at a particular percentage of its fair market value depending upon the type of easement and population.
 - *Property Tax Relief*: Assessment of farmland for its agricultural use as opposed to its potential development use.
 - *Agricultural Districts*: Land owners can propose a minimum of 350 acres to be preserved for agricultural uses with approval by county boards.
 - *Right-to-Farm*: Provides protection to farmers from nuisance lawsuits.
 - *Agricultural Protection Zoning*: Maintaining agricultural zoning to prevent conversion to other land uses.¹²
- A survey of numerous studies found that a range of between 5 percent and 80 percent of natural habitat is required to adequately support wildlife depending on the species and geographic location studied. More than 75 percent of these studies identified up to 50 percent of the total landscape as necessary to prevent a decline in area sensitive species populations. About 50 percent of the studies recommended preservation of at least 20 percent of natural habitat for these purposes. Consequently, it is recommended that planners seek to preserve 20 to 60 percent natural habitat in a given geographic area.¹³ These are very broad guidelines that give planners a general idea of the amount of corridors to sustain wildlife. Of course, more research is necessary to identify all species in the Grundy County area and their habitat needs.
- The Illinois Department of Transportation (IDOT) *Prairie Parkway Preliminary Engineering Study, Transportation System Performance Report* (TSP) notes that the imbalance between housing and local job availability will result in longer commute times and necessitate the need for a new transportation corridor. However, in 1970, about 50 percent of the population and 60 percent of employment in the region were located in Chicago according to NIPC. By 2030, based upon expected local land use patterns, NIPC projects that less than one-third of the region's population and jobs will be located in Chicago.¹⁴ NIPC's projections are very probable. However, the TSP assumes that poor land use decisions will continue and does not consider that proactive planning measures can effectively counter these trends.¹⁵ This could be done through enabling legislation by the State of Illinois, similar to that in the State of Oregon, mandating that counties and municipalities utilize UGB's. Oversight of this program similar to Metro in Portland, Oregon, would ensure an efficient regional approach to implementation.
- It is unclear if the personal vehicle will continue to be the predominant mode of transportation in 2030 and beyond. The U.S. Department of Energy projects that the looming oil supply peak will occur by 2037.¹⁶ The International Energy Agency estimates that the oil production peak will occur between 2010 and 2020.¹⁷ Most analysts and experts



Figure 12 – Automobiles exiting the Congress Expressway at Wells Street in Chicago on October 16, 1960 (photograph from CTA). Chicago's massive expressway system was built over a period of 18 years at a cost of about \$1.1 billion. The result was rush-hour traffic that was slower on the expressways than traffic had been on the boulevards. (Condit, 1974)

agree that this peak will occur when about the halfway point is reached in extracting oil from known reserves. As the oil supply peak approaches, fuel costs will increase while mobility and vehicle use will decrease.

- The difficulty in retrofitting the built environment with transportation alternatives will become apparent as the oil peak approaches. Hence, the sustainability and cost effectiveness of new and expanded roadways is questionable over the long-term. A good rule of thumb is to plan conservatively if there is any doubt about the sustainability of a development project. According to data of the Federal Highway Administration (FHWA), the construction costs for a typical four-lane interstate highway average about \$23 million per mile. Real costs of new highway construction will likely increase over time due to rising land acquisition costs.¹⁸ Therefore, construction costs of the Prairie Parkway could approach \$700 million for a 30-mile route. In the alternative, the region can be made more sustainable by applying this funding to mass transit in coordination with efficient land use techniques.
- A June 2005 bipartisan panel of former top government officials organized by Securing America's Future (SAFE) found that a hypothetical scenario of world events could significantly alter the U.S. economy. This is despite the fact that these circumstances removed only 3.5 million barrels of oil from a world market of 83 million. Consequently, the panel found that the following events in the U.S would be likely: global oil prices of \$161 per barrel (~3 times present levels); gas prices of \$5.74 per gallon (~2 times current costs); heating oil prices of \$5.14 per gallon; and a drop in the S&P 500 of 28 percent, among others.¹⁹
- According to NIPC, about 500,000 vehicle miles traveled (VMT) per annum can be saved through the construction of a single 200-unit apartment complex located near a train station.²⁰
- For CY 2000, the Census Bureau estimated that about 2,000 Grundy County residents, or 5.3 percent of the population, were living in poverty (approximately less than \$10,000 household income). In addition, 637 county households or 4.5 percent did not have any vehicle available, while 4,072 county households or 28.5 percent have only one vehicle. Census Bureau Consumer Expenditure Survey (CES) figures show that, nationally, when household income drops below \$14,000, the amount spent on transportation approaches 40 percent after taxes.²¹ Construction of the Prairie Parkway, I-80/Route 6 Brisbin Road Interchange, and road expansion projects, in lieu of creating transportation alternatives, including mass transit, discriminates against low-income households

NEED AND PURPOSE

A *slow-growth* land use methodology focusing within and adjacent to existing urban centers can effectively accommodate a substantial amount of new development and population growth in the Chicago region while allowing Grundy County to maintain its rural heritage. This can be accomplished primarily through compact development patterns, in correlation with infill of vacant land, and retrofitting current low-density land uses that have preexisting infrastructure

and services. As a result, the effective use of mass transit and other transportation alternatives will be increased to eliminate the perceived “need” for projects such as the Prairie Parkway and I-80/Route 6 Brisbin Road Interchange. This proposed alternative includes many benefits such as reduced infrastructure costs; protection of biodiversity, open space and farmland; and lower levels of air and water pollution, among others.

As part of the implementation guidelines of the 2020 Land Use Plan (draft), it was recommended that a more in-depth sub-plan or Open Space Plan be devised to increase sustainability within the county. A key element, deleted from the 2020 Land Use Plan (draft) by the Planning Commission, is as follows:

Develop and coordinate farmland and open space preservation in addition to bicycle and pedestrian pathways, to create an interconnected system of greenbelts and greenways that will, in part, serve as urban growth boundaries, preserve wildlife corridors, protect natural resources, provide a buffer between development and agriculture, and become part of the Prairie Parklands Macrosite. These concepts will be implemented through a *Greenway/Greenbelt, Farmland Preservation, and Alternate Transportation Plan*.²²

It is from this objective, which is outlined under several of the goals of the elements in the 2020 Land Use Plan (draft), that the subject Grundy County Greenbelt and Greenway Plan is derived. The Prairie Parklands Macrosite consists of more than 22 significant natural sites in the counties of Grundy, Will, LaSalle, and Kankakee. These areas are owned and/or operated by various agencies such as the U.S. Department of Agriculture, Forest Service; Illinois Department of Natural Resources, Forest Preserve District of Will County; and the Channahon Park District.²³ The Grundy County Greenbelt and Greenway Plan can be facilitated through a joint effort of the County with the municipalities to create greenbelts/UGB’s around the urban areas and greenways adjacent to highway and waterway corridors. Successful implementation will:

- Prevent municipalities from merging so they can retain their individual character;
- Contain inefficient sprawl and prevent highway-oriented development;
- Provide open space and a transition area between urbanized and agricultural land uses;
- Allow for movement of wildlife and protection of watersheds; and
- Provide for bicycle and pedestrian pathways as transportation alternatives.

PART II - GREENBELT PLAN

HISTORICAL PERSPECTIVE



Figure 13 – Street scene in Greendale, Wis (circa ~1939).

Greendale, Wisconsin, was one of three “new towns” built by the U.S. government as part of the New Deal relief package created by the Resettlement Administration under Franklin D. Roosevelt in 1935 to help counter the devastating effects of the depression. Elbert Peets was appointed as head of site design for Greendale with assistance from Jacob Crane. Peets was a landscape architect with expertise in American Colonial and European Renaissance civic planning. Greendale and the other new towns were called “greenbelt towns” because they were each to be surrounded by several thousand acres of open space, not only for recreational and agricultural use, but primarily as protection from encroachment and blight. The sizes of the communities were to be set within the restrictive greenbelts.²⁴ While the primary focus was to create jobs during the depression, a major objective of the program was also to incorporate environmental and social planning, to provide decent housing for city workers and to demonstrate efficient subdivision techniques.²⁵

The Greendale site was located on a tract of 3,410 acres of farmland about eight miles southwest of downtown Milwaukee, Wisconsin. The bulk of the land, 2,000 acres, was designated as a one-half mile greenbelt surrounding the residential area, which was to contain 750 homes on 335 acres. Working farms would make up about 1,000 acres outside of the greenbelt while the remaining land would be returned to its natural state. A linear parkway and pathway followed a creek through the middle of the development. Jacob Crane viewed the Greendale plan as a model for future metropolitan land preservation. Broad Street is Greendale’s primary thoroughfare with a community complex, shops, and a village hall located at the apex.²⁶

Greendale “was to be a workingman’s town...in actuality and in appearance it must be direct, simple, practical, free of snobbishness, not afraid of standardization.” The small budget reduced frills and gave way to functionality. There was a varied housing mix of about one-half single family or detached units and one-half row houses and duplexes. Density of about ten to twelve

units per acre was comparable to some English garden cities. The residential sites provided privacy and escape while the commercial center on Broad Street encouraged socializing and collective identification.

The greenbelt permanently limits expansion of the community it surrounds so that the planned utilities, civic institutions, and structures do not need to be added to and patched out past their social and economic limits. In addition, it prevents intrusion from the outside by other developing areas. It prohibits, or at least hinders, the disfigured fringe development that affects our cities.²⁷



Figure 14 – Street scene in Greendale, Wis (circa 2004, photograph by author).

A 1978 Greendale resident preference survey provides some insight to the question as to whether the original plan of the Resettlement Administration or the less dense development that occurred after 1950 provided more resident satisfaction. The survey findings support the original garden city hypothesis that most suburban residents will adjust to and actually choose compact living arrangements if architectural and site

relationships are in harmony with human scale and a generous amount of open space is provided. Further, the more diverse population of the Village Center area seems to be more fully and economically satisfied than the newer Overlook neighborhood which is more typical of suburbia.²⁸ Unfortunately, Greendale succumbed to the perils of post World War II suburbanization when the government abandoned the project and sold off all of the land. Most of the greenbelt was allowed to be subdivided for homes that became part of the very sprawl it was supposed to prevent.

The original physical design of Greendale created a successful mixture of high density single family and multi-unit housing clustered within walking distance of the main business district and plentiful parks. This pedestrian friendly community encouraged bonding amongst residents while allowing for privacy as necessary. The 2,000 acre greenbelt provided more than ample open space and helped blend the village with the outside farm land. The Greenbelt and Greenway Plan for Grundy County can be implemented successfully if it is supported by

complimentary regional planning, long-term commitment to goals and objectives, and management expertise. However, the problems of the depression that led to the greentowns, overcrowded inner city housing, extremely high unemployment, and a stagnate housing industry, do not exist any longer. Present day planning priorities include addressing the lack of affordable housing, reducing/stopping sprawl, creating in-fill development and revitalizing inner cities/towns. The primary new town development concepts that can be applied in planning today are the time-tested physical design and spatial relationship techniques and supporting research used in creating the homes, streets, parks, greenbelt, and business district of Greendale.

EXURBAN SPRAWL

Exurban Sprawl is defined as a varied landscape of extremely low density residential areas, such as subdivisions, manufactured homes, estates, and farmettes or hobby farms. This phenomenon often results when land usage is converted from large active farms and forests outside of traditional small towns. It is possibly the most destructive type of urban sprawl. The costs for utilities and other services for this type of land use often exceed the amount brought in by revenues. Densities of exurbia range from 300 to 999 persons per square mile, making transportation alternatives to single occupancy vehicles prohibitive. By assuming an average of 2.5 persons per household, this equates to about 120 to 400 homes per square mile or an average of 1.6 acres to more than 5 acres per residence.

In the 1980's, the 11.5 percent rate of growth of exurban counties in the U.S. was second only to suburban counties. During the 1990's, the prevalence of exurbia skyrocketed by growing about 18 percent and accommodating about one-third of new population, representing more than 10 million people. Research has found that metropolitan areas with strong urban containment policies and boundaries have been more successful in preventing development outside of the urban areas. Perhaps the key aspect to growth restrictions is the disallowance of urban facilities such as sewer and water lines. Another method is through the use of minimum lot sizes, although, they can actually contribute to rapid exurban sprawl



Figure 15 – Exurban sprawl in eastern Grundy County (photograph by author).

if these sizes are not large enough. Those metropolitan areas with successful containment strategies include Portland, Seattle, San Diego, Miami and Sacramento.

Nelson and Sanchez analyzed the effectiveness of various urban containment methods in the 35 largest U.S. metropolitan areas for the period 1990-2000. About one-third of these areas did not have any such controls. It was found that, compared to urban areas without containment strategies, those with such policies or with natural boundaries were associated with increasing urbanized land densities. The research also analyzed exurbanized land use changes, which had increased during the period for all but three of the metropolitan areas studied. As opposed to areas without containment policies, regions with strong containment guidelines were found to be linked to lower level changes in the amount of exurbanized land. Therefore, aggressive land regulations in areas outside containment boundaries appeared to restrict exurban land development.

The researchers also found that urban containment policies do not restrict population growth as compared to areas with no growth restrictions. In fact, those metropolitan areas with natural containment, such as oceans and mountains, had higher population growth than unrestricted regions. They were unable to conclude that containment induces growth, however, it does not appear to restrict it. Consequently, growth and economic development is not impeded through constrained land supply as many critics allege.²⁹

A legitimate concern is the reduced land supply and the impact this has on economic activity. It should be noted that the study focused on metropolitan regions and not individual counties. Certainly, land use restrictions in one county could have negative economic impacts on that locality as opposed to surrounding areas in the region without controls. This demonstrates the importance of implementing UGB's at the regional or state level. As pointed out in the research, local governments in the U.S. rely heavily on property taxes and will experience less revenue with land use controls. This can be offset by a regional shared property tax base or, as is the practice in many Western European countries, relying more on sales tax revenues.

RECENT DEVELOPMENT PATTERNS

As noted in the 2020 Land Use Plan (draft), Grundy County has historically zoned large swaths of land for manufacturing and industrial use. A major portion of this area covers land extending from Morris to Minooka along the I-80 and Route 6 corridors. Most of this land has continued to be used as agricultural as the prospects for conversion were largely unrealized. However, rising land values in recent years have resulted in plans by the municipalities to finally develop this area. As a result, the municipalities are facilitating development through a planned I-80 interchange at Brisbin Road between Morris and Minooka. A total of almost 13 square miles or about 8,224 acres of unincorporated land was zoned for industrial, utilities, business and commercial in 1995 according to the *2010 Grundy County Comprehensive Plan*.

The 2020 Land Use Plan (draft) shows that this total has increased by about 270 percent to more than 35 square miles or 22,485 acres as of 2005. Annexations in recent years by Morris, Minooka, and Channahon have enveloped much of the aforementioned area. The most recent land use plans and Census Bureau data for these three municipalities indicate incorporated areas along with their total square mileage and acreage. This information is summarized below.

- Morris
 - 2000: 7.16 square miles or 4,582 acres (Census Bureau).
 - 2003: 31.61 square miles or 20,230 acres, of which 10.12 square miles or 6,474 was zoned for development; and more than 20 square miles or 13,000 acres zoned for development by about 2020 (Morris Comprehensive Plan, May 2003).
- Minooka
 - 1999: 3.31 square miles or 2,119 acres (Minooka Comprehensive Plan, March 1999).
 - 2000: 3.10 square miles or 1,984 acres (Census Bureau).
 - 2002: 15 square miles or 9,600 acres in Grundy County alone with about another 15 square miles or 9,600 acres in Kendall County and Will County combined, for a grand total of about 30 square miles or 19,200 acres zoned in 2002 (Minooka Comprehensive Plan, March 1999, and 2002 Land Use Map).

▪ Channahon

- 1996: 15.62 square miles, or 9,999 acres, of which 4.08 square miles, or 2,613 acres appeared to be developed (Very little of this, if any, appeared to have been developed in Grundy County at the time.).
- 2000: 0.95 square miles or 608 acres (Census Bureau).
- 2003: The Channahon Land Use Map shows the planned land use total remaining at 15.62 square miles, or 9,999 acres with about 10.05 square miles or 6,432 acres designated for development. However, the Land Use Map has about 20 square miles or 12,800 acres designated for development in Grundy County (Channahon Comprehensive Plan, March 1996, and Update, November 2003).

Since the year 2000, these three municipalities have designated an additional total of about 55 square miles, or 35,200 acres for development, representing about 13 percent of the entire County of Grundy. This statistic in of itself may not seem noteworthy. However, when compared to the combined total of about 10 square miles, or 6,400 acres (11.2 square miles and 7,174 acres according to the Census Bureau) that were within the corporate limits of these three municipalities in Grundy County during about the 1996 to 2000 period, the contrast is significant. This does not take into account the fast-growing villages of Coal City and Diamond in addition to the existing smaller municipalities which have grown very little. After the largest three urban areas, all other municipalities add about another 7.7 square miles or 4,948 acres according, to 2000 Census Bureau figures.

SLOW-GROWTH METHODOLOGY

Calculations for growth and development in residential and nonresidential areas were made pursuant to the methodology outlined in the highly regarded textbook, *Urban Land Use Planning*, by Edward J. Kaiser, David R. Godschalk, and F. Stuart Chapin, Jr.³⁰ Historical population totals were obtained from the Census Bureau for Grundy County, the six-county area covered by NIPC, and the state of Illinois as shown in *Table I*. Projected NIPC area and state populations were obtained from the NIPC Internet Web Site and the Illinois Department of Commerce and Community Affairs, respectively.

TABLE 1 - Historical Population Comparisons of Grundy County with NIPC Area and Illinois						
County	1960	1970	1980	1990	2000	2004
Grundy	22,350	26,535	30,582	32,337	37,535	41,069
Percent of NIPC Area Population	0.359	0.380	0.431	0.445	0.464	0.493
Percent of IL Area Population	0.222	0.239	0.268	0.283	0.311	0.323
Cook	5,129,725	5,492,369	5,253,655	5,105,067	5,376,741	5,327,777
DuPage	313,459	491,882	658,835	781,666	904,161	928,718
Kane	208,246	251,005	278,405	317,471	404,119	472,482
Lake	293,656	382,638	440,372	516,418	644,356	692,895
McHenry	84,210	111,555	147,897	183,241	260,077	296,389
Will	191,617	249,498	324,460	357,313	502,266	613,849
NIPC Totals	6,220,913	6,978,947	7,103,624	7,261,176	8,091,720	8,332,110
Percent of IL Area Population	61.71	62.79	62.17	63.52	67.15	65.54
Illinois	10,081,158	11,113,976	11,426,518	11,430,602	12,051,000	12,713,634

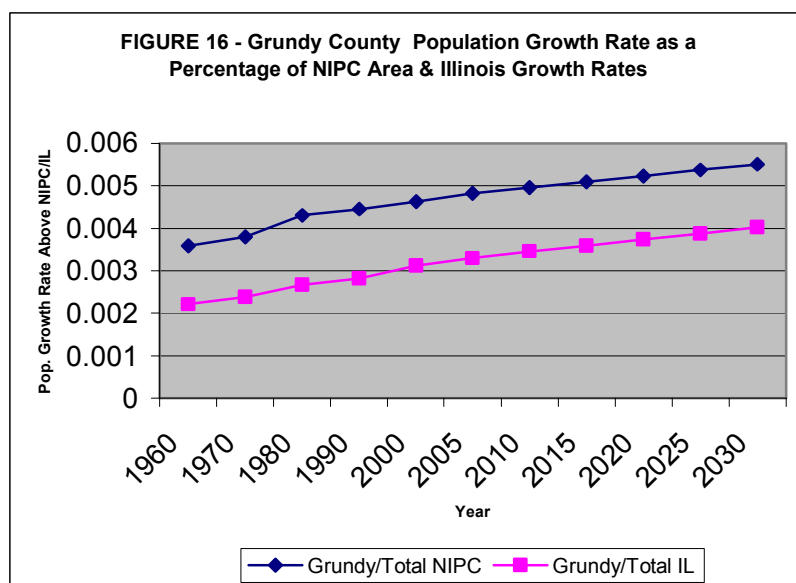
SOURCE: U.S. Census Bureau

Jack Pfingston, Forecast Program Manager, NIPC, provided projected population totals for Grundy County which were compiled by Woods and Poole Economics, Inc (W&P). All of the population projections are shown in *Table 2*. The six-county NIPC area population has risen from about 62 percent of the Illinois population in 1960, to about 67 percent in 2000, and is expected to continue increasing to about 73 percent by 2030. This reflects the continual trend of the state population to gravitate toward the Chicago region. However, it should be noted that NIPC projects population declines in numerous inner-ring municipalities within the region by 2030. This is evidence that the population within the six-county NIPC area is spreading out away from the city of Chicago.

TABLE 2 - Population Projection Comparisons of Grundy County with NIPC Area and Illinois						
Area	2005	2010	2015	2020	2025	2030
Grundy	40,490	43,230	46,090	49,070	52,120	55,360
Percent of NIPC Area Population	0.482	0.495	0.509	0.523	0.537	0.552
Percent of IL Area Population	0.330	0.345	0.360	0.374	0.388	0.402
NIPC Area	8,397,599	8,725,047	9,052,494	9,379,941	9,707,388	10,034,835
Percent of IL Area Population	68.46	69.72	70.68	71.49	72.23	72.95
Illinois	12,266,000	12,515,000	12,808,000	13,121,000	13,440,000	13,756,000

SOURCE: Illinois Department of Commerce and Community Affairs and NIPC

Data in *Table 1* and *Table 2* depict historical and projected Grundy County population growth rate increases, as percentages of population growth in the six-county NIPC coverage area and Illinois, for the period 1960 to 2030. These statistics are also reflected in *Figure 16* below. As can be seen from the data, Grundy County is projected to continue its historical trend of capturing higher percentages of the population over time in comparison to the larger geographical areas. For the period 1960 to 2000, the Grundy County percentage of the NIPC area population increased from about 0.36 percent in 1960 to 0.49 percent in 2004. By 2030, the percentage is expected to increase to about 0.55 percent. For the period 1960 to 2000, the Grundy County percentage of Illinois' population increased from about 0.22 percent in 1960 to



0.32 percent in 2004. By 2030, the percentage is expected to increase to about 0.40 percent. The increases in Grundy County show the tendency of outlying areas or “edge cities” to capture higher percentages of population compared to Chicago and its inner suburbs as sprawl continues in the metropolitan area.

“Knowledge about past populations and assumptions about future populations are fundamental to planning decisions in every aspect of community life.”³¹ Analysis of the aforementioned data and review of comprehensive plans for the largest municipalities in Grundy County show that there is a questionable trend in how planning occurs in relation to population forecasting. “Planners are mechanically producing numbers that are not forecasts, using these numbers as if they are forecasts, and making plans as if the role of planning were simply to accommodate what is forecast.”³² In other words, satisfying predicted future population demands does not adequately address the detrimental impacts that unabated development causes.

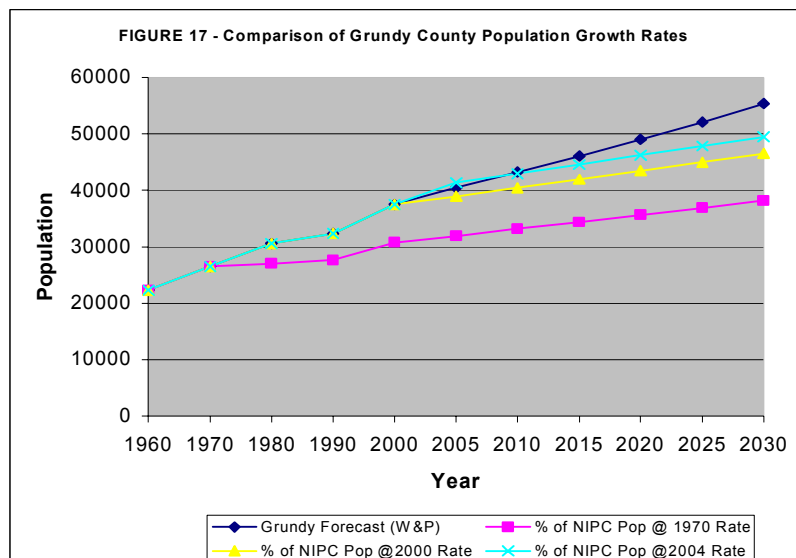
The challenge is to create a methodology whereby Grundy County can accommodate its “fair share” of population growth and stop the urban sprawl that is infiltrating its borders. Fair share is a measurement of the percentage of population that will be accommodated in Grundy County compared to the Chicago metropolitan region or the State of Illinois. As described in the Background section, there are competing interests in Grundy County of those attempting to preserve rural character and others seeking expansive growth and development. The Greenbelt and Greenway Plan seeks a compromise by using the year 2000 population percentage which is substantially higher than historic levels but less than that predicted through 2030. *Table 3* and *Figure 17* below depict Grundy County historical and projected population growth rates under the following scenarios:

- *Fast-Growth:* Grundy Forecast by W&P, which is unconstrained/urban sprawl.
- *Medium-Growth:* 0.493 percent of population pursuant to NIPC area for 2004.
- *Slow-Growth:* a) 0.464 percent of population pursuant to NIPC area for 2000.
- *Slow-Growth:* b) 0.323 percent of population pursuant to Illinois for 2004.
- *Slow-Growth:* c) 0.311 percent of population pursuant to Illinois for 2000.
- *Ideal Slow-Growth:* d) Percentage of the population pursuant to the 1970 ratio of 0.0038 (hypothetical projections from 1970).

Historic	1960	1970	1980	1990	2000	2004
U.S. Census Bureau	22,350	26,535	30,582	32,337	37,535	41,069
0.380% of NIPC Pop (1970 Rate)*	22,350	26,535	27,009	27,608	30,766	31,680
Hypothetical	2005	2010	2015	2020	2025	2030
Grundy Forecast (W&P)	40,490	43,230	46,090	49,070	52,120	55,360
0.380% of NIPC Pop (1970)*	31,929	33,174	34,419	35,664	36,909	38,154
0.464% of NIPC Pop (2000)	38,954	40,473	31,992	43,511	45,030	46,549
0.493% of NIPC Pop (2004)	41,392	43,006	44,620	46,234	47,848	49,462
0.311% of IL Pop (2000)	38,205	38,980	39,893	40,868	41,861	42,846
0.323% of IL Pop (2004)	39,623	40,427	41,374	42,385	43,415	44,436

*NOTE: Based on maintaining 1970 proportion.

As can be seen from the data, the Grundy County estimated 2004 population of 41,069 has already exceeded the hypothetical 2030 population of less than 39,000 that would have resulted if proactive planning measures had been initiated in 1970. However, a projected 2030 population of 46,549 can be achieved by using a very moderate slow-growth methodology that would maintain Grundy County’s population at 0.464 percent of the NIPC area. This is almost 16 percent less population than the unconstrained projection of 55,360 made by W&P under a continued urban sprawl methodology.



RESIDENTIAL AREAS

Table 4 below depicts year 2030 projected populations for Grundy County under a slow-growth scenario by extrapolating the year 2000 Grundy County to NIPC area population ratio of 0.464 percent. It should be noted that the population figures extrapolated are those of the municipalities as it is assumed that further growth will not take place outside of the municipalities. Therefore, the total population for Grundy County by 2030 under this methodology will be 46,549 with 35,922 residing within the municipalities and 10,627 living outside the urban areas. The average of 2.6 persons per household is used for each municipality to reflect the county year 2000 average. Census statistics show declining populations per household over time, however, the larger municipalities in Grundy tend to have a higher average of occupants per home. The number of dwelling units (DU's) is calculated for 2030 by dividing projected population by 2.6. This is adjusted based upon the year 2000 vacancy rate for each municipality.

The number of 2,883 new DU's projected for Grundy County in 2030 is determined by subtracting the number existing in the year 2000 from the total estimated number. This includes a total of 2,062 single family or detached DU's. The percentage of new attached DU's for each municipality by 2030 is a minimum of 10 percent in the smaller municipalities and up to as much as 35 percent in the larger incorporated areas. This creates a more comparable mix of detached

and attached housing in each community. The overall attached housing total is increased slightly from about 26 percent in the year 2000 to about 28 percent in 2030.

CITY	2030 Population	2.6 per DU	2030 Total DU	1-Vacancy Rate (2000)	Adjusted 2030 DU	2000 No. DU	2030 New DU	2000 % DU Attached	2030 % DU Attached	2030 New DU Detached	2030 New DU Attached
Braceville	982	2.6	378	0.95	398	300	98	4.00	20.00	78	20
Carbon Hill	486	2.6	187	0.95	197	157	40	13.00	15.00	34	6
Channahon	4,007	2.6	1,541	0.97	1,589	1,032	557	3.00	30.00	390	167
Coal City	5,949	2.6	2,288	0.96	2,383	1,958	425	22.80	25.00	319	106
Diamond	1,728	2.6	665	0.92	722	597	125	21.90	25.00	94	31
East Brooklyn	153	2.6	59	0.9	65	51	14	0.00	10.00	13	1
Gardner	1,744	2.6	671	0.96	699	580	119	20.00	25.00	89	30
Godley	486	2.6	187	0.96	195	137	58	7.50	10.00	52	6
Kinsman	135	2.6	52	0.92	56	50	6	4.20	10.00	6	1
Mazon	1,121	2.6	431	0.96	449	359	90	13.30	15.00	77	14
Minooka	3,250	2.6	1,250	0.98	1,276	883	393	23.50	30.00	275	118
Morris	14,792	2.6	5,689	0.95	5,989	5,084	905	38.30	35.00	588	317
South Wilmington	770	2.6	296	0.97	305	287	18	2.40	10.00	16	2
Verona	319	2.6	123	0.96	128	92	36	2.10	10.00	32	4
TOTALS	35,922		13,816		14,451	11,567	2,884			2,063	821

Note: Minooka statistics reflect 66% of residential area in Grundy County.

Note: Channahon statistics reflect 44% of residential area in Grundy County.

The 2030 Land Use Plan (draft) documented a change in total household expenditures for housing in Grundy County that increased from about 24 percent in 1962 to 31 percent in the year 2000. W&P computes wealth indexes which are primarily based on per capita income weighted by source of income. The wealth index for Grundy County in the year 2000 is 106.18 and is projected to decline to 104.16 by the year 2030, a drop of almost 2 percent. This is indicative of a decline in those households that obtain higher levels of income through assets such as interest and dividends. Conversely, this equates to a rise in households that receive transfer payments from government programs and tend to have lower net worth.³³ While the increase in detached units by 2030 is small, it provides opportunities for those household budgets most affected by the increasing cost of housing and declining wealth index.

A primary goal of the Greenbelt and Greenway Plan is to establish/maintain more compact development both in downtowns and contiguous to the municipalities. This approach serves to lower infrastructure costs and to make transit a possible alternative as opposed to low density and “leap-frog” noncontiguous growth. A 1995 survey of municipal bus service in the U.S.

found that locations with gross densities of from 1,000 to 4,000 persons per square mile had bus service available to 69.4 percent of households while lower-density areas only had bus service available to 41 percent or less of households.³⁴ The monetary costs of high quality public transportation, in addition to the consumption of materials and energy, can exceed those of private vehicles in low density and low demand areas. Based upon this analogy, proposed average new residential development densities are targeted for about a very moderate 8 DU's per acre. Establishment of mass transit serves to:



Figure 18— Electric buses in Dayton, Ohio (photograph by author).

- improve the mobility of individuals who do not have access to an automobile due to age, health, or income;
- fortify CBD's and reduce the demand for highway-oriented travel;
- decrease pollution and dependency on foreign oil.

“With dwindling reserves of liquid fuels and with the inevitably higher cost of foreseeable substitutes, the long-term viability of an auto-dominated urban pattern is uncertain.”³⁵

The next step consisted of further subdividing the additions to housing stock amongst the various types of DU's as shown in *Table 5, Allocation of New Dwelling Units by Housing and Density Types*. The 821 total new attached DU's for 2030 in *Table 4* above (last column) has been subdivided into equal numbers of households for four separate categories: conversion from other uses (high density inner core apartment or condominiums); three-story walkup apartments; higher density townhomes; and lower density townhomes. The total number of detached single family units was divided into roughly a three to one split of higher and lower density DU's,

TABLE 5 - Allocation of New Dwelling Units by Housing and Density Types								
Housing Types	Assumed Density (Dus/acre)				Acreage Requirements			
	DUs	Net	Gross	Neighborhood		Net	Gross	Neighborhood
A. Conversion from other uses	205	80	64	54		3	3	4
B. 3-story walkup apartments	205	40	32	26		5	6	8
C. Townhouses (higher density)	206	15	12	10		14	17	20
D. Townhouses (lower density)	205	12	10	8		17	21	25
E. Single family detached (higher)	1,547	7	6	5		221	276	341
F. Single family detached (lower)	515	5	4	3		103	129	172
Total	2,883	159	127	106		363	453	570

respectively. Estimates of average density in DU's per acre were calculated for each group of new homes. Net density depicts only the actual land used for the residences themselves while gross density includes the streets and associated right of way in addition to undevelopable land. Neighborhood density includes all of the aforementioned land in addition to areas for shopping, schools, and parks.

Table 6, Summary of Allocation by Housing Type for Municipalities, builds upon the aforementioned tables by calculating totals for each type of DU for all of the municipalities pursuant to the slow-growth methodology. The 14 tables in *Appendix 2* represent the acreage requirements for each of the municipalities in similar fashion to *Table 5*. The *Grundy County Greenbelt Map (Figure 20)* depicts each of the municipalities with UGB's according to the aforementioned calculations.

CITY	2030 New DU's	%DU's Attached	DU's Detached	%DU's Detached (Low Density)	Single Family (Low Density)	Single Family (High Density)	2030 DU Attached	%DU's Attached	Town-homes (Low Density)	Town-homes (High Density)	3-Story Walkup Apts./ Condos	6-10 Story Walkup Apts./ Condos
Braceville	98	0.20	78	0.25	20	59	20	0.33	6	6	6	0
Carbon Hill	40	0.15	34	0.25	8	25	6	0.33	2	2	2	0
Channahon	557	0.30	390	0.25	97	292	167	0.25	42	42	42	42
Coal City	425	0.25	319	0.25	80	239	106	0.25	27	27	27	27
Diamond	125	0.25	94	0.25	23	70	31	0.33	10	10	10	0
East Brooklyn	14	0.10	13	0.25	3	10	1	0.33	0	0	0	0
Gardner	119	0.25	89	0.25	22	67	30	0.33	10	10	10	0
Godley	58	0.10	52	0.25	13	39	6	0.33	2	2	2	0
Kinsman	7	0.10	6	0.25	1	4	1	0.33	0	0	0	0
Mazon	90	0.15	77	0.25	19	57	14	0.33	4	4	4	0
Minooka	393	0.30	275	0.25	69	206	118	0.25	29	29	29	29
Morris	905	0.35	588	0.25	147	441	317	0.25	79	79	79	79
South Wilmington	18	0.10	17	0.25	4	12	2	0.33	1	1	1	0
Verona	36	0.10	32	0.25	8	24	4	0.33	1	1	1	0
TOTALS	2,883		2,062		516	1547	821		214	214	214	178

INDUSTRIAL, COMMERCIAL AND EMPLOYMENT CENTERS

Reference is made to *Table 7* below, *Grundy County Employment in 2000 and Projected for 2030* by industry for Grundy County. The data for 2000 was obtained from the IDES Labor Market Information Unit. Data in that table shows year 2000 total employment by industry for Grundy County to be 19,320. Given this employment total and that the population of Grundy County was 37,535 in 2000; the ratio of total workers to population was about 52 percent. The

ratio for the state of Illinois as a whole is about 50 percent. The projected 2030 population of 46,549 for Grundy County under a slow-growth scenario multiplied by 52 percent indicates that a total of 24,205 jobs will be needed in the county by that time. To maintain Grundy County's ratio of about 52 percent population in the labor force, provisions need to be made to allow adequate space to accommodate an increase of 4,885 jobs by 2030. *Table 7* also includes W&P's projected employment total of 30,340 by the year 2030. This total is reflective of a continued sprawl scenario and is relative to W&P's projected population total of 55,360 for Grundy County by 2030. The percentages for each job category from the W&P employment statistics were calculated and used to compute the number of jobs in 2030 under a slow-growth scenario.

TABLE 7 - Grundy County Employment in 2000 and Projected for 2030					
Industry Type	2000 Employment	2000 Employment %	W&P 2030 Employment	W&P 2030 Employment %	Greenbelt/Greenway 2030 Employment
Agriculture, Forestry & Fishing	1,041	5.39	880	2.90	702
Mining	41	0.21	70	0.23	56
Construction	1,107	5.73	1,890	6.23	1,508
Manufacturing	1,901	9.84	1,700	5.60	1,356
Transportation, Communication & Utilities	3,107	16.08	4,530	14.93	3,614
Wholesale Trade	545	2.82	1,040	3.43	830
Retail Trade	3,236	16.75	4,470	14.73	3,566
Finance, Insurance & Real Estate	522	2.70	2,260	7.45	1,803
Services (General)	4,335	22.44	6,348	20.92	5,064
Services (Educational)	1,418	7.34	2,076	6.84	1,656
Private Households, Self Employed	1,179	6.10	1,726	5.69	1,377
Government	889	4.60	3,350	11.04	2,673
Total, All Industries	19,320	100.00	30,340	100.00	24,205
SOURCE: Illinois Department of Commerce and Community Affairs					
* Note: The numbers for private households, self employed are from the Bureau of the Census and extracted from the services (general) category.					

The purpose of this portion of the Greenbelt and Greenway Plan is to determine the amount of acreage necessary for industrial, commercial and office centers to ensure adequate employment within Grundy County for the year 2030 based upon a slow-growth methodology. Total *economic base employment* (base or basic) is the foundation of a community's employment as it creates additional jobs in regional-scale retail and consumer services. Projected total basic employment in Grundy County for the year 2030 under a slow-growth scenario from *Table 7* is as follows: 3,614 persons in transportation, communications and public utilities (TCPU); 1,356

in manufacturing; 702 in agriculture, forestry and fishing; 830 in wholesale trade; and 56 in mining for a total of 6,558.

Reference is made to data from the Illinois Department of Commerce and Community Affairs shown in *Table 15, Major Employers for Grundy County in 2003*, in the 2020 Land Use Plan (draft). This information along with data from the Grundy County Economic Development

Business	Street Address	City	Zip	Type	Acreage	Employees	Density
Access Ag., Inc./Mazon Farmer Elev.	2490 W. Grand Ridge	Mazon	60444	Grain Storage	21	20	0.96
Akzo/Nobel Surface Chemistry	8005 N. Tabler Road	Morris	60450	Chemicals	282	150	0.53
Alcoa Engineered Products	5555 E. Route 6	Morris	60450	Alum. Prods.	158	280	1.77
Aldi, Inc.	P.O. Box 40	Dwight	60420	Distributor	128	75	0.59
Aux Sable Liquid Products	6155 E. Route 6	Morris	60450	Liquid/Gas	158	59	0.37
Bimet Corporation	425 E. Route 6	Morris	60450	Env. Controls	37	50	1.35
Brownie Products	423 Industrial Drive	Gardner	60424	Frozen Foods	3	77	22.06
Calpine	8805 N. Tabler Drive	Morris	60450	Elect. Equistar prop.	0	100	
Chicago Aerosols	1300 E. North	Coal City	60416	Chemicals	14	50	3.70
Complete Industrial Enterprise	539 Bedford	Morris	60450	Whole.Indust.Supp.	74	100	1.35
Costco Wholesale	3800 N. Division	Morris	60450	Whole.Durables	128	148	1.15
Equistar Chemicals	8805 Tabler Road	Morris	60450	Chemicals	824	532	0.65
Exelon	6500 N. Dresden Road	Morris	60450	Energy	960	1550	1.61
G&D Trucking (Hoffman Transp.)	1802 N. Division	Morris	60410	Trucking	4	5	1.25
Hierz Scrap	4345 S. Verona	Verona	60479	Scrap/Waste	8	8	1.01
Innovative Industries	1351 N. East Street	Morris	60450	Vents	2	5	3.29
Interstate Wire	3727 Division Street	Morris	60450	Nonfer. Wire	9	62	7.14
ITW Filtration	804 Commercial Drive	Mazon	60444	Mach./Equip.	4	190	47.50
Jefferson Smurfit Container Corp.	1000 Armstrong Street	Morris	60450	Paperboard	18	192	10.67
Jemco Engineering	400 E. Wapella Street	Minooka	60447	Light Fixtures	2	72	32.00
Joliet Valves-McJunkin	113 S. Ridge Road	Minooka	60447	Valves	46	62	1.35
Kinder Morgan, LP Pipeline	4755 E. Route 6	Morris	60450	Energy	88	50	0.57
Kinsman Mutual Telephone	155 N. Wilson	Kinsman	60437	Energy			
Lyondell Chemicals, LP	8805 N. Tabler Road	Morris	60450	Chemicals Equistar Pro	0	560	
Midwest Generation - Collins Station	4200 Pine Bluff Road	Morris	60450	Energy	17	165	9.78
Newberg/Perini Stone & Webster	35100 S. State Route 53	Braceville	60407	Not in Grundy			
Northwestern Corporation	922 Armstrong Street	Morris	60450	Vend./Calc. Mach.	47	100	2.14
R.R. Donnelley & Sons	801 N. Union Street	Dwight	60420	Not in Grundy			
Reichhold Chemicals	6350 E. Collins Road	Morris	60450	Chemicals	109	113	1.04
Relco Equipment	113 Industrial	Minooka	60447	Loco. Manuf.	41	56	1.37
Sponge Cushion	902 Armstrong Street	Morris	60450	Clothing	426	88	0.21
Storm Trap LLC	2495 Bungalow Road	Morris	60450	Plumbing	53	10	0.19
Technical Propellants	6440 E. Collins Road	Morris	60450	Chemicals	23	25	1.11
U.S. Cold Storage	601 Twin Rail Drive	Minooka	60447	Storage	8	77	9.80
Utility Concrete Products	2495 Bungalow Road	Morris	60450	Concrete	58	65	1.12
Verona Rubber Works, Inc./AMT Corp	425 Division	Verona	60479	Rubber Products	45	50	1.12
TOTALS					3,792	5,146	1.36

Note: Acreage in bold for pertinent companies indicates estimate based upon average of .74 acres per employee.

Council, Grundy County Chamber of Commerce, and Experian Business Reports was used to identify acreage, number of employees and density for base employment. This data is compiled in *Table 8* above.

According to *Table 8*, a total base employment of 5,146 workers is accommodated on about 3,792 acres of land for a density of about 1.36 employees per acre of land. This represents more than 90 percent of the calculated base employment of 6,558 from *Table 7* when subtracting the agriculture, forestry and fishing total of 1,049, which is not included in *Table 8*, to arrive at a total of 5,678. The ratio of basic employment to non-basic employment is the *economic-base ratio* which can be calculated from the data in *Table 7* for the year 2030 or *Table 8* for the year 2000. The calculation pursuant to *Table 7* is as follows:

Base multiplier = $\frac{\text{Total employment}}{\text{Basic employment}}$	3.69 = $24,205 \div 6,558$
-----------------------------------------------------------------------------	----------------------------

The *economic-base multiplier* is 3.69 as this many jobs are created when basic sector employment increases by one: the one basic job and the 2.69 non-basic jobs. Basic sector jobs are expected to comprise 27 percent (when including agricultural, forestry and fishing) of employment by the year 2030.

Projections could be made to maintain the same ratios of basic employment and total employment for the necessary total of 24,205 jobs (4,885 new jobs) in Grundy County required for the population in 2030 under the slow-growth methodology. This would equate to a total of 1,324 new basic jobs. However, W&P employment projections show that basic employment will decline from 29 percent to 24 percent as shown in *Table 9, 2030 Land Acreage Projections for Employment* below. A total of only 262 new basic jobs will be generated as the total employment economic-base multiplier is expected to change from 3.69 to 4.13. As shown in *Table 7*, this is primarily due to the fact that the total number of manufacturing jobs between the years 2000 and 2030 will decline in number by more than 200 or more than 10 percent. In contrast, office related employment is projected to increase in number by almost 3,800 or more than 66 percent based upon W&P projections. Reference is made to *Table 8, Grundy County*

2000 Base Employment above. The table depicts the density of employment by dividing the number of employees by number of acres to determine density of 1.36 employees per acre. A 1979 study of industrial employment gross densities for 18 U.S. cities found a median value of 8.4 (jobs per acre) with a range from 3.3 in Phoenix to 24.4 in Seattle (cited in Roberts 1983, 60). In general, industrial employment densities have been declining in recent years as companies prefer large single-level facilities.³⁶ Part of the strategy for Grundy County is to integrate new higher density industrial development of about 10 to raise the average base gross density above the current 1.36 employees per acre. As shown in Table 9, given the limited projections by W&P, the amount of base employment impacting land use is a fairly nominal 262 new workers requiring only an additional 26 acres of land.

TABLE 9 - 2030 Land Acreage Projections for Employment in Grundy County								
	2000 Employment	2000 % of Employment	2030 Total Employment	2030 % of Employment	2030 Total New Employ.	2030 New Density	2030 New Acreage	2030 Total Acreage
Base ¹	5,594	29	5,856	24	262	10	26	3,819
Office ²	5,746	30	9,540	39	3,794	12	316	
Retail ³	4,343	22	5,074	21	731	12	61	
Public ⁴	1,418	7	1,656	7	238	10	24	
N/A ⁵	2,220	11	2,079	9	-141			
Total	19,321	100	24,205	100	4,884		427	
1. Base does not include agriculture, forestry & fishing.								
2. Office includes finance, insurance & real estate; services (general); and government.								
3. Retail includes retail trade and construction.								
4. Public is educational services.								
5. N/A (not applicable) includes agriculture, forestry & fishing, and private households/self employed.								

In its guidelines for effective implementation of Transit-Oriented Development (TOD), NIPC uses employment density assumptions of 32 for high density areas and 12 for suburban center locations.³⁷ Theoretically, the constraint placed on land supply by the UGB will increase real estate prices, however, the extent of this effect is unclear. Rising land prices will likely be offset by increasing floor area ratios that will occur under higher density development.³⁸ This approach is most feasible if adjacent counties also implement similar land use density policies.

The new density standards listed in *Table 9* were used to calculate the remaining acreage necessary to accommodate new non-basic employment for 2030. The office category in *Table 9* includes finance, insurance, and real estate, services (general), and government from *Table 7*. The retail category includes retail trade and construction. The Greenbelt and Greenway Plan

encourages construction of traditional downtown buildings of up to about five to six stories in height for office and retail space. These would be primarily located in downtown Morris but could also be feasible for downtown Minooka and Coal City. The retail category in *Table 9* includes the retail and construction categories from *Table 7*. Retail facilities with densities averaging about 70 employees per acre are possible if they are required to fit the urban form of more traditional downtown stores with multi-floors.

Future retail development should be controlled by context-sensitive design standards which encourage locating in the CBD's of the Primary Centers and Rural Centers. As an alternative, they can be sited on the perimeters of urban areas if they are within walking distance of residential areas. The traditional big-box design should be tempered to reflect the small scale of Grundy County's communities. Considering the economic uncertainty of locating higher density office and retail structures in downtown areas, very conservative densities of 12 are projected to ensure maximum land availability. This requires a total of 377 acres for office and retail combined as shown in *Table 9*.

Public facilities are estimated at about 10 employees per acre and consist primarily of schools that are mainly low density to accommodate space for athletics/sports activities. Under the slow-growth methodology, an increase of 238 employees requiring 28 acres of additional land is anticipated for public facilities. The remaining employment in *Table 9* is identified as N/A (non-applicable) as it consists of private households and self-employed in addition to the category of agriculture, forestry and fishing.

As shown in *Table 9* above, the total new 2030 developed acreage required for base and non-base employment under the slow-growth methodology is 427 acres. This amount has been divided amongst each of the municipalities pursuant to the ratio of population as shown in *Appendix 2*.

Table 10 below depicts the population projected for each municipality under the slow-growth methodology in terms of both total numbers and proportion in the county. Land area for each incorporated area in the year 2000 was obtained from the Census Bureau. At that time, there was

a total of about 12,122 acres in the municipalities, representing about 4.1 percent of the total acreage in Grundy County. Total new residential and employment acreages for each of the municipalities are also shown from the aforementioned calculations. The total amount of new space required for the municipalities for the year 2030 under the slow-growth methodology is 997 acres, an increase of about 8.2 percent.

The total incorporated land area necessary for the municipalities is almost 21 square miles or 13,119 acres, representing about 4.4 percent of the total overall land acreage in Grundy County. This is only about a 0.3 percent increase in the total amount of land developed in the county from the year 2000. This is far less than the total of 55 square miles or 35,200 acres allocated under the uncontrolled growth scenarios for the municipalities of Morris, Minooka and Channahon alone. This is an increase of about 8.9 percent in developed acreage for a total of 13 percent of Grundy County's land area in these incorporated areas under the unconstrained urban sprawl scenario.

CITY	2030 Population ²	Proportion of Population	2000 Total Acreage ³	2030 New Housing Acreage	2030 New Employment Acreage	2030 Total New Acreage Required	2030 Total Acreage
Braceville	982	0.027	851	16	12	27	878
Carbon Hill	486	0.014	115	8	6	13	129
Channahon ¹	4,007	0.112	608	64	48	111	719
Coal City	5,949	0.166	1,517	94	71	165	1,682
Diamond ¹	1,728	0.048	550	27	21	48	598
East Brooklyn	153	0.004	32	2	2	4	36
Gardner	1,744	0.049	672	28	21	48	720
Godley ¹	486	0.014	320	8	6	13	333
Kinsman	135	0.004	45	2	2	4	49
Mazon	1,121	0.031	384	18	13	31	415
Minooka ¹	3,250	0.090	1,984	52	39	90	2,074
Morris	14,792	0.412	4,582	235	176	410	4,993
South Wilmington	779	0.022	365	12	9	22	386
Verona	319	0.009	96	5	4	9	105
TOTALS	35,931	1.000	12,122	570	427	997	13,119
1. Statistics only include portions in Grundy County.							
2. Does not include population outside of municipalities.							
3. Source: U.S. Census Bureau							

OPEN SPACE

Acreage and Population Ratios

The Grundy County Greenbelt Map (*Figure 20*) shows the incorporated areas for each of the municipalities as they existed in about the year 2000. The new acreage totals from *Table 10* were transposed onto the map to show both the additional land area required for development and the new boundaries of the municipalities. An UGB was then created for each city and town adjacent to the new boundaries and extending out approximately one-quarter mile to create the greenbelts. An inventory of Grundy County parks and open space shows a total of about 3,768 acres as listed in *Appendix 3*. The Grundy County population in the year 2000 was 37,535. Therefore, the ratio of open space acreage to population was $3,768/37,535$ or about 0.1 acre for every person. By creating a one-quarter mile greenbelt around each of the municipalities, an estimated total of more than 15 square miles or 10,000 acres of open space is created.

The grand total of open space in Grundy County would be almost 14,000 acres or about 0.3 acres per person for the anticipated 2030 population of 46,549 under the slow-growth methodology. In comparison, this is well above the Chicago Park District's standard of 20 acres open space per 10,000 population (1 acre per 500 people) or 0.002 acres per person. It should be recognized that open space is much harder to preserve in high density urban areas while Grundy County is very rural in comparison. Daniel Burnham recommended 1 acre of open space per 100 population or 0.01 acres per person in his 1909 plan for Chicago. This is the same as the nationally accepted recommended minimum standard according to Corlands, the acquisition section of the Openlands Project. This standard includes a breakdown of 6 community park acres and 4 neighborhood park acres for every 10 acres of open space. Community parks should consist of at least 20 acres, be within 0.5 to 3 miles of several residential neighborhoods, and have recreational facilities. Neighborhood parks should be at least 5 acres in size and within a 5 to 10 minute walk of residents' homes.³⁹ Greenbelts will function as community parks for the larger Grundy County municipalities while they can serve as both community and neighborhood parks in the smaller urban areas.

Preservation Programs

In 2004, an Open Space/Conservation Task Force in Grundy County suggested a goal of preserving 160 acres of farmland per year at a cost of \$2.4 million or \$15,000 per acre. Theoretically, if such a program had been initiated in the year 2000, an estimated 4,800 acres of open space would then be preserved by the year 2030. This represents a substantial shortfall or about one-half the estimated total determined by the Greenbelt and Greenway Plan. However, zoning at either the county level or that of the municipalities could dictate that the balance be maintained as agricultural/open space. The Open Space/Conservation Task Force advised that procurement of funds could be by referendum, in addition to land and cash donations by individuals and foundations. It was also recommended that open space not designated for recreational purposes could be rented out to farmers at a yearly rate of up to \$150 or more per acre, depending on lessee profitability. This would bring in substantially more revenue than property taxes.⁴⁰



Figure 19 – Open Space west of Morris in Erienna Township adjacent to the CSX Transportation tracks. There had been a stop here known as Stockdale when the line was operated by the CRI&P Railroad. For many years, herds of sheep were loaded and unloaded at this location. This conservation area is within the proposed greenbelt for Morris (Photograph by author.).

Recommendations from the 2020 Land Use Plan (draft) include using several methods to protect farmland and open space. First, the Farmland Protection Program administered by the USDA,

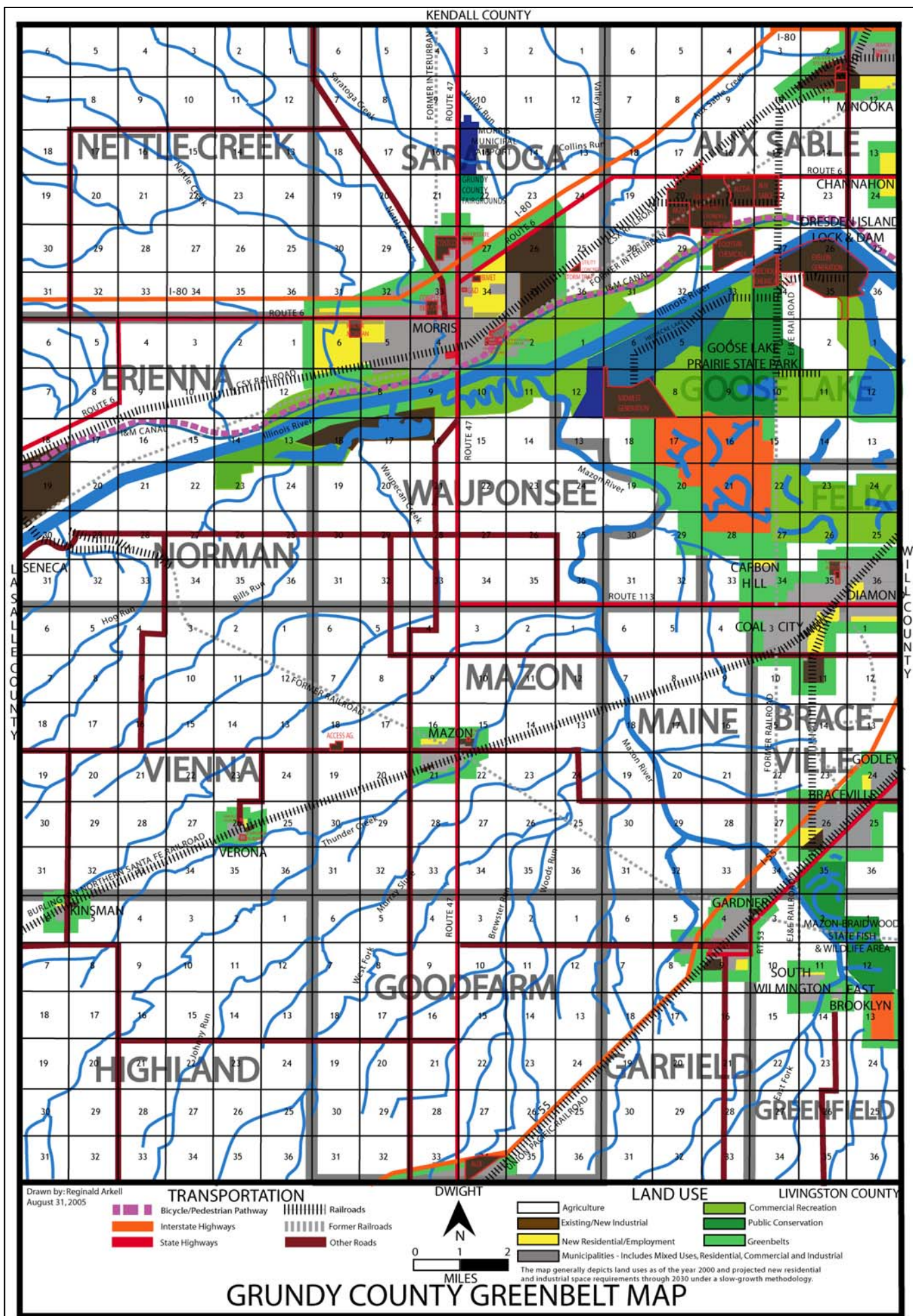
NRCS, provides financial assistance in purchasing conservation easements/development rights or other interests from landowners. The USDA, NRCS provides up to 50 percent of fair market value to assist in buying these interests so that productive farmland can be maintained for agriculture. Second, pursuant to the Farmland Preservation Act, the Illinois Department of Agriculture in association with county governments can enroll property in Agricultural District or “ag areas” for a minimum of 10 years with potential for re-enrollment every 8 years. Local ordinances and laws cannot change the zoning classification to different uses or restrict farming practices for lands with these designations.

The 2020 Land Use Plan (draft) recommends the aggressive use of two State of Illinois open space programs. The Open Space Land Acquisition and Development (OSLAD) program provides grants up to \$750,000 with local matches for land purchases. Funding is provided by a dedicated percentage of the real estate transfer tax. Limited funding from the federal Land and Water Conservation Fund (LWCF) is also administered through the OSLAD program. From 1999 to 2003, the Open Lands Trust (OLT) program has complemented the OSLAD program by providing \$160 million for open space. About one-half of this was dedicated for use by local governments which are required to match funding amounts. The remainder was for use by the Illinois DNR to obtain parklands and open space. Maximum grant awards for OLT funding is \$2 million. Funding for both the OSLAD and OLT programs was retained by the 2005 fiscal year Illinois State budget.

The Food and Agricultural Act of 1962 created the Resource Conservation and Development Program (RC&D) which began in 1964. Reauthorization of the program occurred through the Food and Agricultural Act of 1981 and the Farm Security Act of 2002. The legislation established authority with the USDA through the NRCS to assist state and local governments and nonprofit entities with technical expertise and funding. There are 368 RC&D areas throughout the U.S. This includes 13 RC&D’s covering most of Illinois with the curious exception of 13 counties in the northeastern portion of the state, including Grundy County. Each RC&D usually covers several counties which are represented by citizen volunteers. These councils have successfully completed more than 31,000 projects throughout the country over the last 40 years

in the areas of land conservation, community development, water management, and environmental improvement.⁴¹

Implementation of the Greenbelt and Greenway Plan can be facilitated by including Grundy County in an RC&D District. One option is to petition the Prairie Rivers RC&D which was created in 1989 and includes the counties of Bureau, LaSalle, Livingston, Marshall, Putnam, Peoria, Stark, Tazewell and Woodford. This may be beneficial for Grundy in retaining its rural character as these counties are predominantly non-urban. Another alternative is to combine with the counties of Kankakee, Ford and Iroquois as they are devoid of an RC&D and are also predominantly rural. Inclusion of the counties of Kendall and Will with Grundy in an RC&D is another alternative, however, they have succumbed to urban sprawl and have not embraced a slow-growth methodology. Sponsoring organizations could include the following: each of the county governments; local watershed groups; other environmental organizations; and philanthropy groups such as the Morris Community Foundation. The RC&D will help coordinate stakeholders to improve community sustainability by balancing interests of environmental protection and economic development.



PART III - GREENWAY PLAN

INTRODUCTION



Figure 21 – Illinois & Michigan Canal National Heritage Corridor (photograph by author).

As outlined in the 2020 Land Use Plan (draft), Grundy County has very few transportation options other than the personal vehicle for transportation. An established bicycle and pedestrian pathway exists from east to west the entire width of the county along the Illinois and Michigan Canal National Heritage Corridor (I & M Canal). A primary objective of the Greenway Plan is to make connections to this pathway, to link population centers, and to provide

alternate transportation routes for employment and daily errands. These linkages will also provide ample opportunities for recreation. The vast majority of residential streets within the urban areas are currently appropriate for both vehicle and bicycle traffic. However, when cyclists and pedestrians attempt to leave neighborhoods, additional travel becomes more challenging. There are a number of options for creating connecting pathways. Ideally, they should be physically separate from roadways for both safety reasons and to encourage physical exercise. Arterials such as Route 47 and Route 6 have heavy traffic that increases hazards for cyclists. Portions of these and other similar roads have sidewalks which are appropriate for pedestrian traffic but not for bicycles.

There is generally not adequate space within the municipalities to create an additional throughway for bicycles that is separate from both the sidewalks and the roadways. The solution is to create bicycle lanes on the far right sides of municipal roads, with clear markings to provide safer access to these roads. Markings can be any of the following: a white line between the vehicular roadway and bicycle lane with a second line at the curbside; solid paint or various designs within the bicycle lane that also provide visual warning to vehicles; and physical barriers such as pylons and/or raised pavement. For major roads just outside of the municipalities, there are additional options such as: a wide paved shoulder with markings similar to the in-town lanes; pathways located adjacent to roads on paved shoulders; separate pathways located on the opposite side of roadway ditches; routes that utilize abandoned railroad beds (rails-to-trails); and

routes adjacent to active railroads (rails-with-trails). The Mazon River Watershed and the Aux Sable Creek Watershed offer opportunities for canoe routes and land preservation along the shorelines. Generally, it is recommended that these greenways consist of at least 300-foot buffers on both sides of the waterways to provide ample space for wildlife.⁴²

As outlined in The Greenbelt Plan section, Grundy County contains a variety of both public and private parks/open space within the municipalities and in outlying areas. While this includes Illinois state parks, there are no county parks or plans for a forest preserve district. Frederick Law Olmstead, who designed many great parks during the late nineteenth and early twentieth centuries stated, “A connected system of parks and pathways is manifestly far more complete and useful than a series of isolated parks.”⁴³ This philosophy and the following concepts are the driving influence behind the Greenway Plan:

- to protect roadways outside of municipalities from highway-oriented development;
- to provide realistic transportation options to connect urban centers, reduce dependency on vehicular use and improve air quality;
- to increase recreational opportunities and promote human health;
- to link greenbelts and provide corridors for wildlife habitat, movement/protection;
- to provide open space buffers and environmental protection to preserve natural resources for future generations; and
- To enhance economic development along multi-use trails and bicycle lanes.

The *Grundy County Greenbelt and Greenway Plan Map (Figure 41)* depicts the roadways and waterways targeted for preservation in addition to the recommended bicycle routes and paths.

TRAVEL CORRIDORS

ILLINOIS AND MICHIGAN CANAL NATIONAL HERITAGE CORRIDOR



Figure 22 – I&M Canal Signage
(photograph by author).

Grundy County is very fortunate to have a historic multi-purpose trail as part of the I&M Canal located from northeast-southwest within the upper one-third of the county. The I&M Canal was built from 1836 to 1848 and covers nearly 100 miles, connecting the Great Lakes with the Mississippi River watershed. The adjacent crushed limestone trail is the same path in which mules had pulled barges along the canal during the mid to late nineteenth century. The trail extends in Grundy County from

about Bell Road on the east to the eastern edge of Seneca on the west (see *Figure 41*). The corridor is already well developed in terms of the generous amount of historical markers and connections to open space such as William G. Stratton State Park and Gebhard Woods State Park. The county seat of Morris has a convenient connection to the I&M Canal and trail which crosses underneath the main north-south thoroughfare of Route 47. The recently completed Route 47 four-lane bridge also traverses the Illinois River and has a dedicated bicycle and pedestrian pathway that is physically separate from the flow of traffic.

MORRIS URBAN AREA

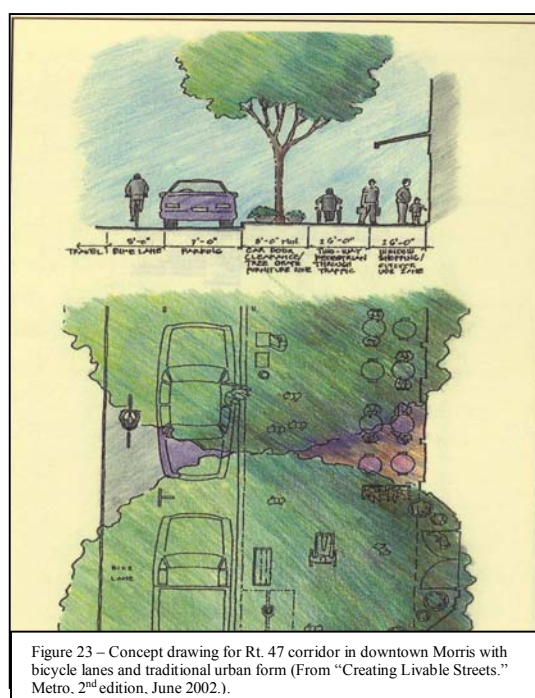


Figure 41, Grundy County Greenbelt and Greenway Plan Map, depicts the anticipated greenbelts and greenways. The *City of Morris Comprehensive Plan*, dated May 2003, Section 3, outlines travel routes and provides a future transportation plan map. There are similarities and differences with this plan and the Greenbelt and Greenway Plan as described below.

As outlined in the Greenbelt Plan section above, a substantial amount of employment expansion in the county would take place in downtown Morris. Specifically, the 4-lane Route 47 corridor, from the Illinois River northward to at least the Jewel Food

Store (1414 N. Division), would accommodate high-density office and commercial uses. Traffic lanes on Route 47 in this area would be reconfigured to accommodate four-foot bicycle lanes in each direction between the right hand side of the right lanes and the curbs. Space for parallel parking on the curbside would also be allotted as shown in *Figure 23* above.

Route 47 currently traverses the little-used CSX Railroad tracks in downtown Morris via an overpass. While the bridge maintains the flow of traffic when train traffic passes through, the structure creates a visible obstruction that greatly detracts from the imageability and vibrancy in the heart of the city. The bridge also creates about a one-half mile long barrier on Route 47 that

essentially disallows any development in this prime commercial area. It is recommended that this bridge be dismantled to reinstate connectivity with the streets intersecting with Route 47. This will also reestablish the grade crossing of the CSX Railroad tracks with Route 47. Railroad traffic is minimal as only a few freight trains pass through on a daily basis. This area will be targeted for transit-oriented development centered at the former Chicago Rock Island and Pacific Railroad (CRI&P) station which is currently the office for the Grundy County Chamber of Commerce. This structure will eventually be put back into service when Metra's Rock Island District commuter passenger rail service is extended west from Joliet. A similar station would also accommodate passengers in Minooka. Eventual implementation of commuter service will increase the amount of trains and traffic disruptions. However, commuter trains in Morris would be stopping at the station to the west of Route 47 (*Figure 24, 25*) and would not block the intersection significantly longer than any of the traffic lights on that road.



Figure 24 – Route 47 bridge over the CSX Railroad track in downtown Morris looking east.



Figure 25 – CSX Railroad track in downtown Morris looking west from Route 47 bridge.

NORTH TO KENDALL COUNTY

The designated bicycle lanes from downtown Morris to the north will continue onto the Route 47 overpass of I-80 to the Grundy County Fairgrounds and airport as proposed in the Morris Comprehensive Plan. The bicycle lanes will then move to the Route 47 roadway shoulders which should each be a minimum of four feet in width. Also similar to the Morris Comprehensive Plan, there will be a connecting bicycle pathway on the shoulders along Gore Road where a substantial amount of highway-oriented development has already taken place. These bicycle lanes will serve to provide a crucial transportation alternative for those persons

residing in Morris who work in the motels, restaurants and other services on the north side of I-80. The bicycle lanes on Gore Road will then connect to a Commonwealth Edison (ComEd) utility easement located about one-half mile west of and parallel to Route 47 in Saratoga Township. This easement was originally the right-of-way for an interurban railroad between Morris and Yorkville, the county seat of Kendall County to the north.



Figure 26 – Grundy County Fairgrounds on Rt. 47 (photograph by author).

The portion of the ComEd easement between I-80 and the northern border of Grundy County extends about five miles. The plan is for the easement to become a potential rails and trails corridor. A comparable right-of-way was identified as an option among many others in the Prairie Parkway Plan Study by IDOT. This will not only provide a crushed limestone pedestrian



Figure 27 – Abandoned interurban right-of-way north of Morris is an opportunity for a bicycle path or “rails-with-trails” (photograph by author).

and bicycle route, but will also accommodate a single or double railroad track for transit use if necessary. The rail line and trail could be separated from the trail with a barrier such as fencing, vegetation, a ditch or a combination of these. This corridor would be extended to Yorkville along the original right-of-way to facilitate movement of residents between the two urban areas for shopping and employment. It is absolutely

critical that land use patterns cluster development in nodes both within the terminus cities and along this route to increase viability of the route and lure people from automobiles.

EAST TO INDUSTRIAL EMPLOYMENT

It is recommended that a designated bicycle route be created on Cemetery Road from Morris eastward to Tabler Road and then north to the industrial employment centers between Morris and Minooka. These include the largest employers in the county such as Equistar Energy, Alcoa Engineered Products, and Akzo/Nobel Surface Chemistry. This provides a secondary bicycle route to the rails-with-trails corridor along the CSX Railroad described below. The Cemetery Road route also connects with the I&M Corridor pathway at Armstrong Street in Morris.

SOUTH TO DWIGHT

As depicted in the City of Morris Comprehensive Plan, it is recommended that the bicycle pathway traverse the Illinois River on the new Route 47 bridge and continue south. This will head past the Morris city limits to the southern border of Grundy County at Dwight. It is recommended that Route 47 be avoided due to heavy traffic. Therefore, outside of Morris, the bicycle way will head west on Pine Bluff Road for about one-half mile before turning south on Dwight Road. The bicycle way jogs west again for another one-half mile at the Wauponsee and Mazon Township line and then continues south over I-55 to Dwight. The majority of the roadway is bituminous or higher quality pavement with the exception of about the southernmost three miles, some of which is gravel. A connection is made on roadway along the Livingston County border with the northeast-southwest bicycle route to Godley, which is described below. The north-south bicycle way will not require further improvements along its route as most traffic will be on Route 47.

CSX RAILROAD

The CSX Railroad currently consists of a single track, although, the route had been double-tracked at one time. The corridor serves as an opportunity to implement a unique rails-with-trails corridor whereby the vacant right-of-way of the second track will be used as a bicycle and pedestrian pathway. It is envisioned that the pathway may be converted back to a railroad track in the distant future to accommodate frequent

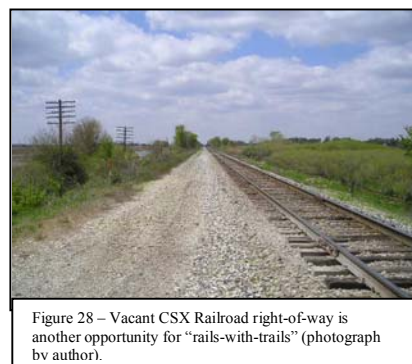


Figure 28 – Vacant CSX Railroad right-of-way is another opportunity for “rails-with-trails” (photograph by author).

commuter train service when necessary. In the meantime, this is a tremendous opportunity to provide an additional transport mode on a route that already exists. Additionally, the route connects the downtown areas of Morris and Minooka to the primary industrial employment areas located between these municipalities. An alternative pathway is the reactivation of the interurban right-of-way that had generally paralleled the CRI&P Railroad to the south until about the 1930's. However, a general survey of the interurban route found that it is visibly nonexistent in many areas. A third option is to build a pathway parallel to the CSX Railroad tracks but not on the abandoned right-of-way. These last two options would be much more costly than the

rails-with-trails alternative. It is unnecessary to extend the route west of Morris to Seneca as the I&M Trail Corridor already serves this purpose.

MINOOKA TO GARDNER VIA COAL CITY

The Elgin Joliet and Eastern Railroad (EJ&E) operates a branch line which extends into Grundy County from the northeast through Minooka directly south to service the Dresden power plant facility. The rail line had extended farther south along the eastern edges of the Goose Prairie State Park and Carbon Hill, through Coal City, and as far as the vicinity of Gardner and South Wilmington in southeastern Grundy County. A survey of the right-of-way from the park southward revealed that most of it has been preserved and now accommodates power lines. It is currently used by all-terrain vehicles, bicycles, and pedestrians.

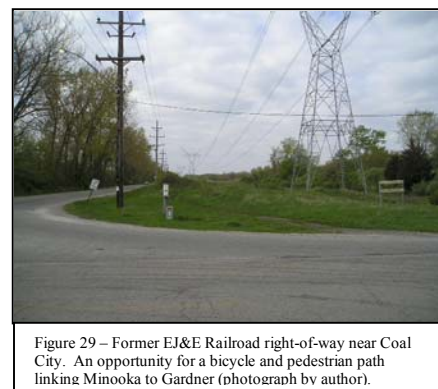


Figure 29 – Former EJ&E Railroad right-of-way near Coal City. An opportunity for a bicycle and pedestrian path linking Minooka to Gardner (photograph by author).

It is likely that the EJ&E will continue to use the railroad to service the power plant. The plan proposes converting the unused right-of-way to a designated recreational trail which will extend to the north adjacent to the EJ&E track where it will become another rails-with-trails corridor. It will also connect with the CSX Railroad rails-with-trails pathway. The route will provide an



Figure 30 – Former EJ&E Railroad right-of-way near Coal City (photograph by author).

important link between the southeastern Grundy urban communities to the employment centers of the Dresden facility, Twin Rails Industrial Park in Minooka, and the industrial/utility employment centers west towards Morris. The route will also extend south to service the Gardner, South Wilmington, and East Brooklyn Communities, with a connection to the Mazonia/ Braidwood Fish and Wildlife Area.

DIAMOND TO SENECA VIA COAL CITY

The primary east-west bicycle route south of Morris will begin in Diamond along Route 113 and continue through Coal City where it will connect with the north-south path of the former EJ&E

Railroad. The route will continue west from Spring Road, which is about one mile south of Route 113. A connection will be made with the north-south bicycle way about 1½ miles west of Route 47. The proposed bicycle route heads north for about 2½ miles before continuing west to Seneca. Generally, this east-west bicycle way will be on bituminous roads outside of the municipalities where higher quality pavement exists.

GODLEY TO DWIGHT VIA BRACEVILLE AND GARDNER

To facilitate further connectivity for the urban centers in the lower one-third of Grundy County, a northeast-southwest bicycle way is proposed along the old Route 66 corridor which roughly parallels the Union Pacific Railroad and I-55. This will connect the municipalities of Godley, Braceville, Gardner, and Dwight. The bicycle way will be on the paved shoulders of old Route 66, which is now Route 129, for its entire length in Grundy County. About two miles west of the Will County line, there will be a link to the north-south route bicycle way along the former EJ&E Railroad. This will provide connections to South Wilmington and East Brooklyn to the south and Coal City and other urban areas to the north. A connection would be made to the north-south bicycle way in Dwight at Route 47.

DESIGN STANDARDS

OVERVIEW

Standards outlined by the American Association of State Highway and Transportation Officials (AASHTO) in its 1999 *Guide for the Development of Bicycle Facilities* will be used as applicable for design purposes. Other than I-80, the main east-west thoroughfare through the northern one-third of Grundy County is Route 6. Assuming that growth and development is achieved through a slow-growth methodology, Route 6, Route 47 and other thoroughfares will function adequately without being enlarged to four lanes.

Bicyclists are entitled to the same rights and responsibilities to roadways as motor vehicle operators according to the Illinois Vehicle Code. However, in 1998, the Illinois Supreme Court ruled in *Boub v. Wayne Township* (Ill. Sup. Ct, 1998) that bicyclists are not the intended users of roadways. Illinois is the only state in the nation where this holds true. Consequently, bicyclists cannot sue local governments for damages caused by poor roadway conditions unless they are

riding in designated bicycle lanes/routes. Local government presently does not have any incentive to create bicycle lanes/routes because they then become liable for maintenance. On May 20, 2005, the Bicycle Safety Restoration Act (HB2390) failed to pass the Illinois Senate. It would have reinstated bicyclists as intended and permitted users of roads while protecting local government from unreasonable responsibility for roadway conditions.⁴⁴ Similar legislation is anticipated and will be crucial to the success of the Greenbelt and Greenway Plan.

RAILS-WITH-TRAILS

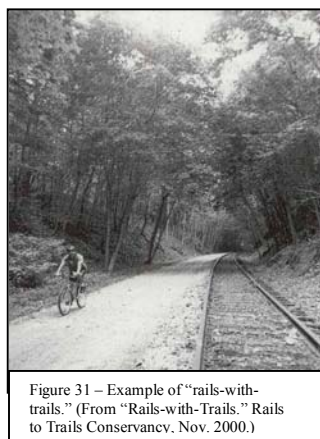


Figure 31 – Example of “rails-with-trails.” (From “Rails-with-Trails.” Rails to Trails Conservancy, Nov. 2000.)

According to a November 2000 publication of the Rails to Trails Conservancy (RTC), there were a total of more than 1,000 multi-use trails utilizing abandoned railroad right-of-ways in the U.S. A lesser known concept is rails-with-trails. There are 61 rails-with-trails pathways in the U.S. with another 20 in various planning stages. These are pedestrian and bicycle paths parallel/adjacent to active railroad lines. They are logical alternatives as the corridors increase transportation choices and can help to accommodate travel demand through their connections with urban residential and employment centers. They also provide for the recreational needs of the population in terms of walking, jogging and cycling opportunities.

Communities have been very successful in negotiating rails-with-trails projects with railroad companies. Trail managers for about one-third of the 61 rails-with-trails described their working relationship with the railroads as supportive, positive or good, with only 8 percent stating that railroads were initially opposed. The vast majority of existing rails-with-trails have state, county or city insurance coverage comparable to that of other trails. Railroads are increasingly mandating that trail organizations indemnify them against liability. There were no claims against the railroad companies at the time of the publication. In addition, there was only one accident involving a train and a trail user. That particular trail had been operating safely for 34 years before the accident. A rail-with-trail may be substantially safer than walking or cycling along a busy main road and likely will reduce the number of people who walk on the railroad track itself.

The RTC survey found that 71 percent of rails-with-trails used barriers between the tracks and trails such as: fences, vegetation, cement walls, and grade separation. Various fence types were used including: chain link, rail, wire, wrought iron, vinyl or steel pickets. There have not been any studies to determine the effectiveness of these barriers, however, it can be assumed that they can have a channeling effect if constructed properly.⁴⁵ A 1999 draft report by the Institute of Transportation Engineers (ITE), Technical Committee on Rails-with-Trails, stated that a fence is unnecessary if there has not been significant trespassing in the past. Any type of barrier will be ineffective against those who are determined to walk on the tracks. The ITE report recommends “no trespassing signs” and a heavy fine of \$500 for first-time offenders.⁴⁶ It is suggested that the proposed rails-with-trails corridors for Grundy County, as outlined below, use a fence with iron posts about 4-5 feet high and barbed wire. This design is similar to that of many suburban Chicago commuter railroad stations which use the fences between tracks to effectively channel passengers to designated crosswalks.



Figure 32 – Example of “rails-with-trails” with fencing
(From “Trails for the Twenty-First Century,” Island Press: Wash. DC. 2001.)

OFF-ROAD BICYCLE PATHS

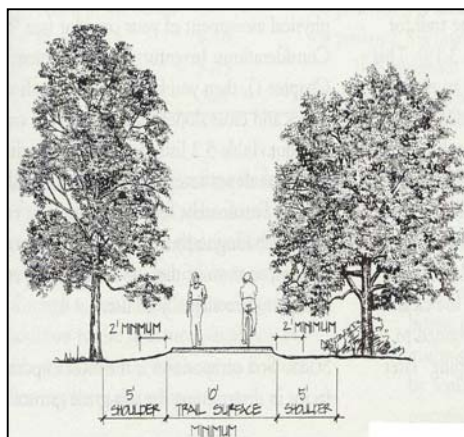


Figure 33 – Recommended trail (10') and shoulder widths (5').
(From “Trails for the Twenty-First Century,” Island Press: Wash. DC. 2001.)

All off-road bicycle pathways will be a minimum of 10 feet in width and will have 2-foot-wide cleared and graded shoulders on one or both sides as necessary. Vertical clearance should be a minimum of 8 feet with 10 feet necessary for overpasses and tunnels. Trails should consist of the following three layers: a sub-grade of native soil mass at the lowest level; a sub-base covering of at least 6 inches of gravel; and the trail surface material of granular stone such as crushed limestone at least two inches in thickness.

Crushed limestone is the choice material due to its relatively low cost per mile of about \$80,000-\$120,000 and its durability; it will last about 7-10 years without maintenance. The material has a

natural appearance and accommodates virtually all types of uses, including wheel chairs, but not inline skates or skateboards. The material is not ideal for locations with heavy flooding or steep inclines as it tends to erode under these circumstances. The sub-base not only conveys and distributes the weight on the trail surface to the sub-grade, but it also prevents water from percolating underneath the trail to the surface. When at all possible, an open system of drainage with swales, ditches and sheet flow, in addition to detention ponds will be used. Sheet flow promotes even water dispersal over the trail and prevents ruts and gullies. This system is most cost effective and promotes natural infiltration to replenish groundwater.⁴⁷

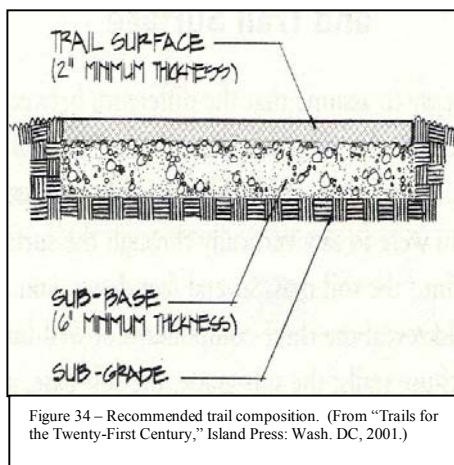


Figure 34 – Recommended trail composition. (From “Trails for the Twenty-First Century,” Island Press: Wash. DC, 2001.)

URBAN AREAS

I-80 functions as a physical barrier that separates about the northern one-third of Grundy County from the southern two-thirds. There are overpasses/underpasses/interchanges at Seneca Road, Route 47 and Ridge Road. Federal funding has been approved for a planned interchange at Brisbin Road. None of the existing routes presently have areas designated for pedestrian and/or bicycle traffic to traverse I-80. It is recommended that the speed limit for existing four-lane roads with curbs and no shoulders in downtown municipal areas, such as Route 47 in Morris, be reduced to 35 mph to provide a more pedestrian-friendly environment. There are generally two alternatives for re-marking these roads for bicycle access, to minimize the need and added expense for more physical alterations: shared lanes; and wide curb lanes. Costs for re-marking are comparable to typical street striping costs.

Shared Lanes

Under the shared lanes scenario, the right or curb lanes will allow use for both cars and bicycles. The AASHTO Guide states:

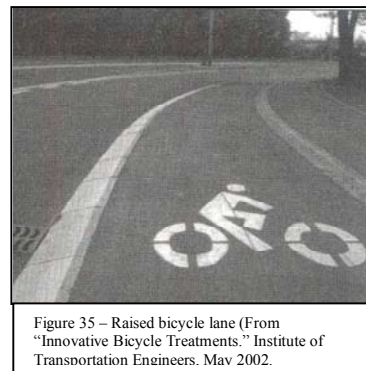
To varying extents bicycles will be ridden on all highways where they are permitted. All new highways, except those where bicyclists will be legally prohibited, should be designed and constructed under the assumption that they

will be used by bicyclists. Bicycle safe design practices should be followed to avoid the necessity for costly subsequent improvements.⁴⁸

Assuming the right lane is 12 feet wide, there is adequate space to allow cars to pass bicyclists by crossing the center line or moving into the other lane. The shared lanes will be marked with green side markings, intermittent diagonal lines and words identifying their use as such. As the area grows, and if fixed-route transit service is established, the shared lanes could be converted to use by buses and bicycles with cars prohibited. Shared bicycle and bus lanes are a method of transportation demand management (TDM) that can effectively constrain automobile traffic in the area.

Wide Curb Lanes

The wide curb lanes or wide outside lanes alternative generally requires that the right-most through traffic lanes have a minimum width of 14 feet. This width is adequate if the vehicle speed limit is maintained at 35 mph. Curb gutters are a hazard to bicyclists. Therefore, the distance of these lanes is measured from the lane stripe to the inside edge of the gutter as opposed to the curb. This allows adequate space to allow both vehicles and bicycles to share



these lanes without conflict. While it is not necessary, it would be preferable to create a bike lane 4 feet wide adjacent to the outside curbs through roadway markings as outlined in the Undeveloped Areas, Bicycle Lane section below. The use of wide curb lanes or bicycle lanes requires that the inside vehicle lanes be reduced to 10-foot widths which may require cutting into the existing median. Although AASHTO guidelines suggest that a 12-foot width is necessary for the inside lanes, 10-foot widths are feasible and actually desirable for their tendency to calm or reduce the speed of traffic.

UNDEVELOPED AREAS

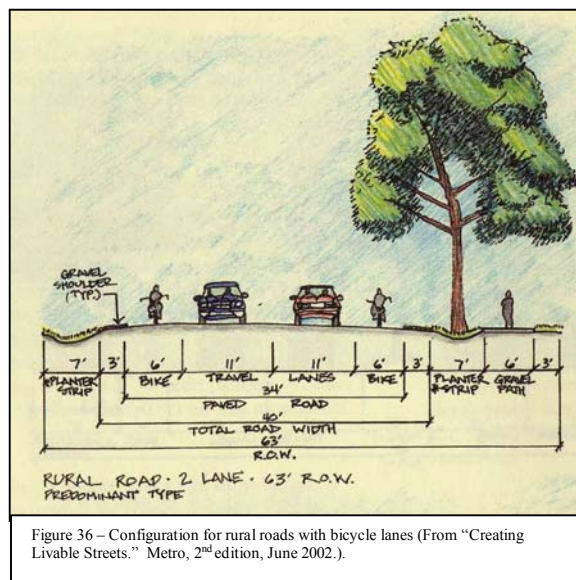
There are generally three alternatives for bicycle pathways in rural areas: adjacent to roadways on paved shoulders; separated bicycle routes; and roadway bicycle routes. The second alternative includes bicycle routes that parallel roadways on the opposite side of ditches or those that parallel railroad tracks or use former railroad beds.

Bicycle Lanes

In outlying areas and in accordance with the AASHTO Guide, roadways such as Route 47 and Route 6 could have paved shoulders for use as bicycle lanes. According to the AASHTO Guide, a bicycle lane is:

A portion of the roadway which has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists.⁴⁹

These shoulders would be one-way facilities on both sides of the roads. Due to vehicle speeds of up to 55 mph, shoulder widths of five feet are recommended in accordance with the AASHTO Guide. Again, solid line markings on each side of the shoulder in addition to wordage and diagonal lines would clearly designate these areas for bicycle use only. Shoulders would continue to temporarily accommodate disabled vehicles as before. Local governments would be responsible for keeping these shoulders clear of loose gravel and debris to ensure safety. Studies have shown



that well-marked bicycle lanes increase certainty for both vehicle operators and bicyclists as they will each know where the other will be. Consequently, it would not be necessary for drivers to swerve into oncoming traffic to make sure they will not hit bicyclists.⁵⁰

Separate Bicycle Paths

The most desirable alternative to non-motorized transportation is separate bicycle paths, also known as “greenways” or “multi-use trails.” They often traverse a park-like corridor of land and have either no or minimal disruptions from vehicular traffic. These corridors also have the added benefit of providing land for the movement of wildlife. Multi-use trails are predominantly used for recreational purposes, which they serve well. The challenge is to increase their usage for routine trips between residential areas, schools, commercial and industrial areas. According to the AASHTO Guide, a bicycle path is:

A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way.⁵¹

Roadway Bicycle Routes

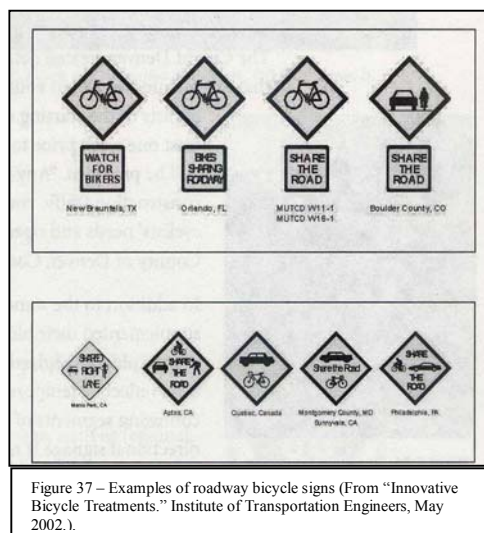
The preferred alternative recommended by the Greenbelt and Greenway Plan for the majority of the rural area is to create bicycle routes on roadways that parallel major state highways, such as Route 47 and Route 6. Through this method, bicyclists are separated from busy vehicular traffic to increase safety and provide more pleasurable riding conditions. In addition, roadway improvements are generally not necessary other than the use of bicycle route signs as described below.

SIGNAGE

It is recommended that bicycle route pavement markings be supplemented with a signage system to provide additional information for roadway users. Typically, these signs would be 12 inches wide with varying lengths that identify the municipality or county, depict a bicycle, and the wording “bike route.” These signs provide a number of advantages, such as:

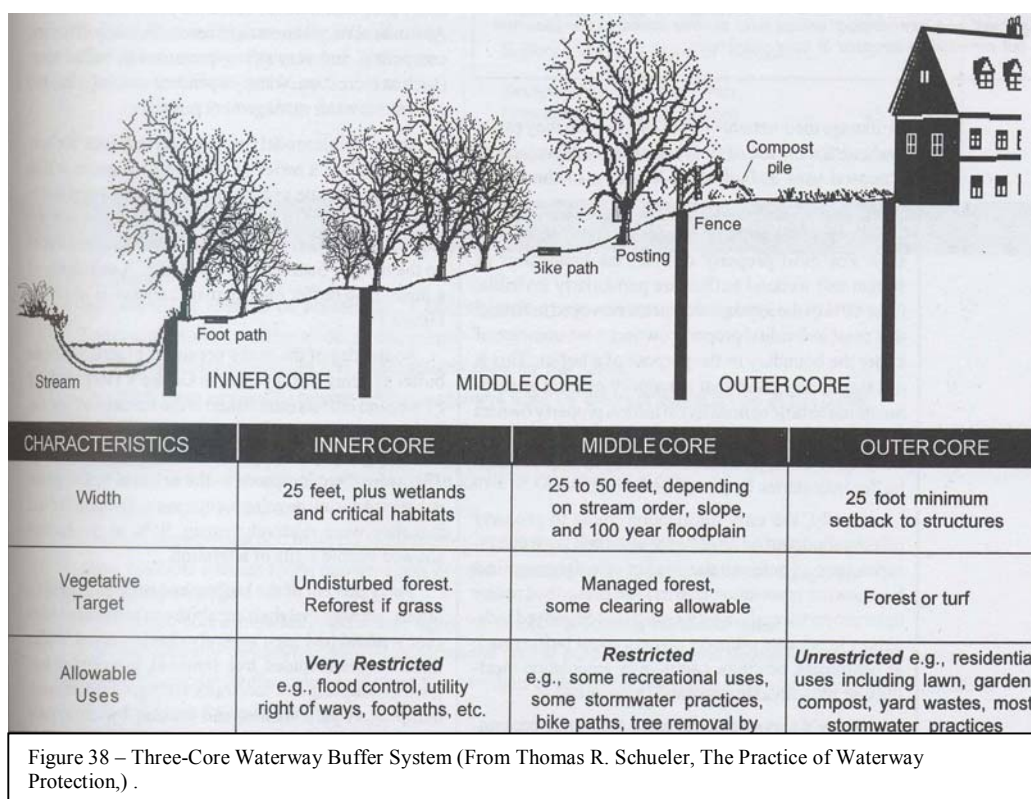
- to legitimize bicyclists as users of roadways;
- to remind motorists that they are sharing the road with bicyclists;
- to encourage people, who might otherwise be intimidated, to consider riding a bicycle as an alternate method of transportation; and
- to direct bicyclists to ride in the appropriate locations.

Signs can be placed on existing poles to reduce costs, which can range up to \$200 per sign, including installation.⁵²



WATERWAYS

Land use best management practices (BMP's) for waterway protection include the use of a three-zone buffer totaling a minimum of 100 feet with an inner core, middle core, and outer core (Figure 38). The inner core is at least 25 feet wide, adjacent to the stream and with additional space for wetlands and critical habitats as necessary. The goal for ground cover in this portion is vegetation consisting of natural forest or reforestation. Land uses are very restrictive but will allow utility right of ways and footpaths. The middle core should be about 25-50 feet wide, depending on amount of floodplain, slope and level of stream. Managed forests are preferable with clearing of some forests permitted. Land uses are less restrictive with allowances for bike paths and stormwater management. The outer core is least restrictive but does require building setbacks of at least 25 feet. Forest, turf, and garden vegetation are allowed in addition to many stormwater management practices.⁵³



Ordinances should minimize the amount of clearing and grading necessary for home construction and access. This reduces the amount of soil erosion, controls sediment, and conserves trees/forested areas to help the area retain its natural appearance and hydrology. Buffers serve to

increase adjacent property values, minimize flood destruction in developed areas, and reduce sediment removal costs from developed areas.⁵⁴ Retention of natural landscaping increases imageability by reducing the sterility that often results from new developments built with a lack of site and building design guidelines. Waterway buffers help to reduce the significant impact of impervious surfaces on waterways by allowing for infiltration of runoff from adjacent developed areas. A number of studies have shown that biological diversity is impacted significantly by impervious surfaces which approached as little as 10 or 15 percent.⁵⁵ Buffers of 100 feet may not be practical for waterways in urban locations. However, runoff to streams can be reduced significantly with the use of permeable pavement and natural landscaping to promote water infiltration into the ground.



Figure 39 – Vacant land along the Claypool Ditch north of Coal City is an opportunity for a buffered greenway.

FUNDING

There are several federal and state sources for funding bicycle and pedestrian facilities as shown in the table below.⁵⁶ The most recent federal transportation bill passed during the summer of 2005 authorizes an estimated \$3 billion for the expansion of cycling and walking trails. Costs to create these routes can range from about \$100,000 to \$500,000 per mile in the suburbs.⁵⁷

FIGURE 40 - Alternate Transportation Funding Programs			
IDOT		IDNR	
Funding Programs	Financial Provisions	Funding Programs	Financial Provisions
Illinois Transportation Enhancement Program	80% Federal Money 29% Local Money	National Recreational Trail Funds (SYMMS)	80% Federal Money 29% Local Money
Congestion Mitigation & Air Quality Improvement Program (NE/E IL CMAQ)	80% Federal Money 20% Local Money	Land & Water Conservation Program (LAWCON)	80% Federal Money 20% Local Money
Scenic Byways	80% Federal Money 20% Local Money	Illinois Bicycle Path Grant Program	50% Federal Money 50% Local Money
Federal Transit Act (FTA)	80% Federal Money 20% Local Money		

ILLINOIS TRANSPORTATION ENHANCEMENT PROGRAM

The Transportation Equity Act for the 21st Century (TEA-21) provides Transportation Enhancement Program funding for projects that improve quality of life and the environment in addition to increasing the aesthetics of roadways. Federal funds are available for 80 percent of projects costs when the requesting entity provides the remaining 20 percent. The program is administered by IDOT. The most recent solicitation period was June 1, 2005 through August 1, 2005. Applications must be related to the following criteria.

- Pedestrian and bicycle facilities
- Historic preservation
- Rehabilitation of historic transportation facilities
- Landscaping and scenic beautification
- Scenic and historic highways scenic easements
- Transportation museums
- Outdoor advertising control
- Safety education for pedestrians and bicyclists
- Rails-to-trails corridor preservation
- Archeological planning and research
- Mitigation for roadway runoff and wildlife connectivity⁵⁸

CONGESTION MITIGATION & AIR QUALITY IMPROVEMENT PROGRAM

The Congestion & Air Quality (CMAQ) Improvement Program was originally authorized under the Intermodal Surface Transportation Equity Act of 1991 (ISTEA) and reauthorized under TEA-21 in 1998 to reduce congestion and criteria air pollutants generated by transportation sources. The program is administered jointly by the Federal Transportation Administration (FTA) and the Federal Highway Administration (FHWA) and provides 80 percent federal funding if 20 percent

in local monies are contributed. Projects that can be funded include travel demand strategies that reduce overall single vehicle occupancy trips and VMT. These also include pedestrian and bicycle projects such as the creation of trails and bicycle lanes, storage facilities, and public education efforts. Funds are also available for employer outreach, guaranteed ride home programs, transportation management organizations and other options for reducing trips.⁵⁹

SCENIC BYWAYS

The National Scenic Byways (NSB) Program is administered by the FHWA to recognize and preserve roadways with unique historical, recreational, natural, cultural and archeological features. The NSB program was established under ISTEA and reauthorized by TEA-21. The FHWA provides 80 percent federal funding if 20 percent in local monies are provided. Applicants must coordinate with the State scenic byways coordinator and have a byway management plan in place. Potential roadways include those with provisions for bicycles and pedestrians when feasible. Scenic byways should also have strong continuity with minimal gaps to enhance the travel experience. Options that enhance eligibility include: making the roadway a destination itself; accommodating tour buses; provisions for increased tourism such as roadside rest areas; promotion activities; and addressing multi-lingual needs.⁶⁰

NATIONAL RECREATIONAL TRAIL FUNDS

The National Recreational Trail Fund Act was created through ISTEA resulting in establishment of the Recreational Trails Program (RTP). The RTP continued with TEA-21 in 1998. The RTP supports bicycle and pedestrian pathway development by providing 80 percent in federal funding to local governments and other entities that are able to supply the remaining 20 percent in funding. Funds can be used for the acquisition, construction, enhancement and maintenance of non-motorized and motorized recreational trails.⁶¹

TRANSPORTATION AND COMMUNITY AND SYSTEM PRESERVATION PILOT PROGRAM

The Transportation and Community and System Preservation Pilot Program (TCSP) was developed by the FHWA through coordination with other agencies, including the FTA, FRA, and U.S. EPA. The TCSP provides 100 percent grant funds for projects that:

-
- enhance the efficiency of the transportation system;
 - reduce the effect of transportation on the environment;
 - reduce the amount of capital expenditures necessary for infrastructure;
 - enhance job access efficiency; and
 - encourage private sector development.

Projects can include those that improve conditions for bicyclists and pedestrians while improving road safety. Most significant is that TCSP funds can be used for implementation of urban growth boundaries to guide development and for green corridors programs related to locations designated for compact and efficient development.⁶²

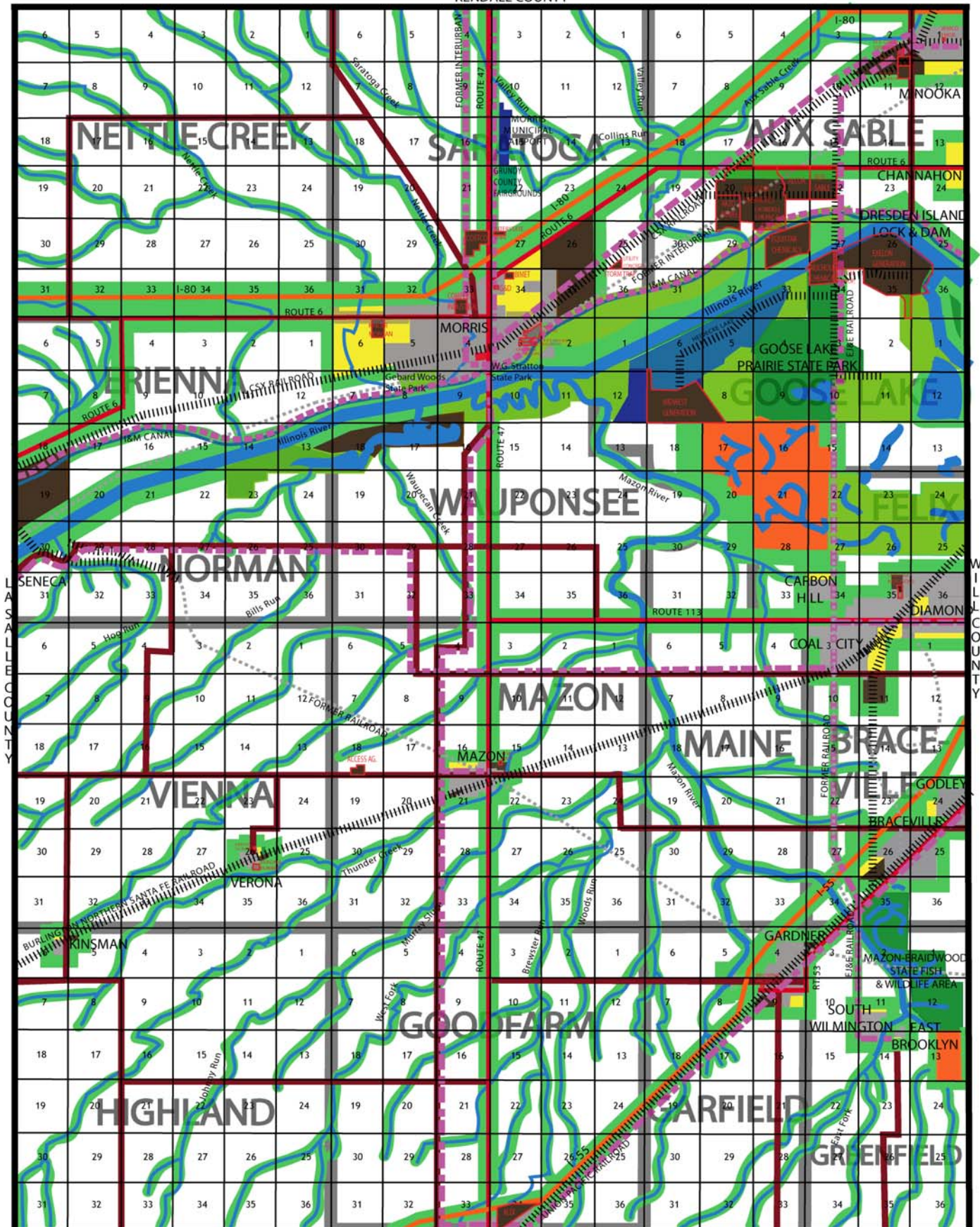
LAND & WATER CONSERVATION PROGRAM

The Open Space Lands Acquisition and Development Program (OSLAD) provide State grant monies to local governments to acquire and develop land for open space and public parks. State funds are obtained from real estate transfer taxes. The Land and Water Conservation Fund (LWCF or LAWCON) program is a similar federally funded program with comparable objectives. Federal funds for LWCF are obtained via revenue generated from OSLAD leases. The Illinois Department of Natural Resources (IDNR) manages both programs. Acquisition costs can be reimbursed up to a maximum of \$750,000 while development/refurbishment projects are eligible for up to \$400,000 in funding. Requesting agencies must initially provide 100 percent financing upfront, with 50 percent to be reimbursed after the project is completed.⁶³

ILLINOIS BICYCLE PATH GRANT PROGRAM

The IBPGP has been in existence since 1990 to assist local governments in obtaining, building and refurbishing non-motorized bicycle pathways and associated facilities. The program is administered by the IDNR, Office of Capital Development. Up to 50 percent of costs can be obtained from State funds that are generated through vehicle title fees collected through implementation of Section 3-821 (f) of the Illinois vehicle code. Requesting agencies must provide matching funds. There is not a ceiling on the State funding available for acquisition costs for linear corridors, however, the maximum annual amount available for development projects is \$200,000. The IDNR must receive grant request applications by March 1st of each calendar year. Grants are awarded on a competitive basis and notification is made to the

requesting entity within 6 months of the application deadline. Minimum trail width must be 8 feet to obtain funding under this program and generally cannot exceed 100 feet in width.⁶⁴



Drawn by: Reginald Arkell
August 28, 2005

TRANSPORTATION

- Bicycle/Pedestrian Pathway
- Interstate Highways
- State Highways
- Railroads
- Former Railroads
- Other Roads

The map generally depicts land uses as of the year 2000 and projected new residential and industrial space requirements through 2030 under a slow-growth methodology.

DWIGHT



LAND USE

- Agriculture
- Existing/New Industrial
- New Residential/Employment
- Municipalities - Includes Mixed Uses, Residential, Commercial and Industrial

LIVINGSTON COUNTY

- Commercial Recreation
- Public Conservation
- Greenbelts/Greenways
- Existing Rural Residential

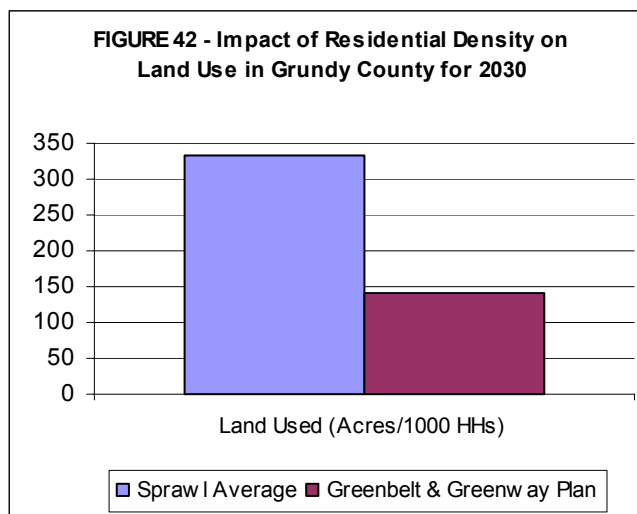
GRUNDY COUNTY GREENBELT AND GREENWAY PLAN MAP

PART IV – SUSTAINABILITY BENEFITS

LAND USE

In October 2000, the Brisbin Road Interchange project was initiated in an effort to encourage economic development for Grundy County and alleviate increasing truck traffic on Ridge Road in Minooka, Route 6 in Channahon, and Route 47 in Morris. In mid-2001, Parson's Transportation completed a feasibility study which found a "need" for an interchange on I-80 at Brisbin Road to accommodate the area's explosive residential growth. This concept had been included in Grundy County's Land Use Plan for many years and was retained, although it was not part of the recommendations for the 2020 Land Use Plan (draft). Total project costs (Phase 1-3) of \$13 million were estimated for the Brisbin Road Interchange project. In 2002, financing for Phase 2 Engineering and Land Acquisition were authorized as part of the Governor's Five Year Transportation Plan. Funding for the Phase 3 Engineering and Construction Costs in the amount of \$6 million has apparently been earmarked as part of the new Federal Transportation Bill.⁶⁵ The 2020 Land Use Plan (draft) and the Greenbelt and Greenway Plan eliminate the perceived "need" for the Brisbin Road Interchange Project as the alleged explosive and sprawling residential growth will not occur under a slow-growth methodology.

Implementation of the Greenbelt and Greenway Plan offer numerous benefits to Grundy County that can be quantified, in part, pursuant to the calculations depicted in *Table 11* below. The statistics in *Section A* of *Table 11* were computed using John Holtzclaw's Efficiency Calculator which determines the advantages of higher density physical design in terms of land use, transportation, and air pollution.⁶⁶ As the figures show in *Section A*, by increasing Grundy County's average density from the sprawl average of about 3 DU's per acre that is taking place now to almost 8 (7.94 per *Table 5*) DU's per acre, about 200 acres per 1,000 households can be preserved from development (*Figure*



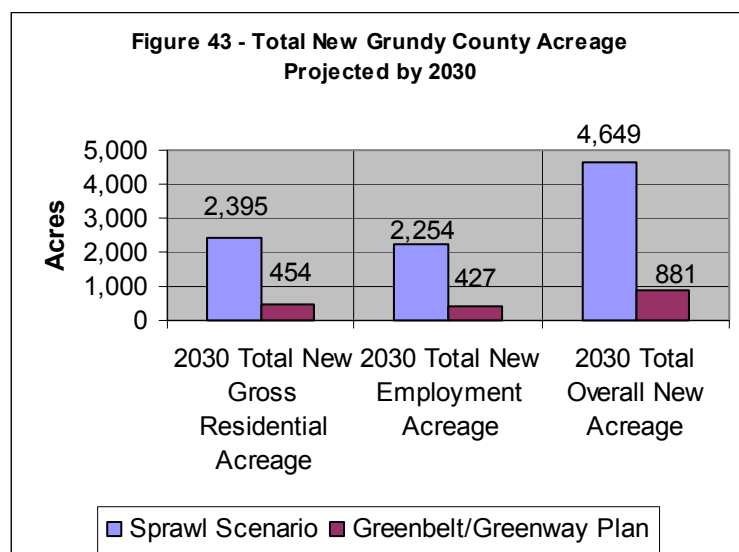
42). Total water consumption is cut in half due to reductions in use for lawns and washing vehicles. The average daily number of buses per hour able to serve each bus stop within a ¼ mile walk from home increases from 0 under the sprawl scenario to 13 pursuant to the Greenbelt and Greenway Plan. See the *Impact of Transit and Bicycle/Pedestrian Path* section below for further explanation.

TABLE 11 - Impact of Residential Density on Land Use per 1,000 Households						
Section A John Holtzclaw's Efficiency Calculator	Density (HH per residential acre)	Land Used (Acres/1000 HHs)	Roads + Sidewalks (Sq Yds/1000 HHs) ¹	Water Use (Gals./HH each day) ²	Local Shopping (Employees/Acre) ³	Transit Service (Average Buses) ⁴
Sprawl Average	3	333	233,333	1,031	2	0
Greenbelt & Greenway Plan	8	126	88,161	533	4	13
Section B	2030 Total DU's	New 2030 Total New Net Residential Acreage	2030 Total New Roads + Sidewalks Acreage	2030 Total New Gross Residential Acreage	2030 Total New Employment Acreage	2030 Total Overall New Acreage
Sprawl Scenario	6,856	2,285	110	2,395	2,254	4,649
Greenbelt & Greenway Plan	2,883	363	91	454	427	881
Notes:						
1. Calculation assumes 10 yard wide half-street and sidewalk along a 70 yard front for each 1 acre lot, or 700 sq. yards per residential acre.						
2. Indoor: Kimberly Knox, San Francisco Water Dept Cons (personal commun.). 55 g/p-d for multi-family units ('50 du/res ac). Assumes 80% is indoor use (44 g/p-d) and 3.8 persons per HH. Outdoor: Sakrison, "Water Use in Compact Communities: The Effect of New Urbanism Growth Management and Conservation Measures on Residential Water Demands," Washington Dept of Ecology, 1998, Table 11 for 4, 7 and 12 du/ac, and extrapolated to higher and lower densities.						
3. Service & Retail Employees per acre = $0.1704 + 0.4814 \times \text{Density}$. [$R^2 = 0.32$]						
4. Average daily no. of buses/hour at each bus stop within a 1/4 mile walk of home. Transit service = $2.6905 \times \text{Density} - 8.2799$, but not below 0. [$R^2 = 0.30$]						

The statistics in *Section B* of *Table 11* build upon Hotzclaw's efficiency calculator by computing total residential acreage used under the unconstrained sprawl scenario as opposed to the Greenbelt and Greenway Plan. The total number of new dwelling units by 2030 under the projected sprawl scenario was determined by taking the W&P projected Grundy County 2030 population of 55,360 from *Table 3* and dividing it by the average of 2.6 persons per household to arrive at a total of 6,856 DU's. This is almost 2.4 times the total number of 2,883 DU's under the slow-growth methodology of the Greenbelt and Greenway Plan obtained from *Table 5*.

As can be seen from the calculations in *Section B* of *Table 11* and *Figure 43* below, the lower density in combination with the unchecked population growth under the sprawl scenario serves to greatly widen the difference in amount of land developed compared to the Greenbelt and Greenway Plan. In fact, for residential development alone, 2,395 acres (3.7 square miles) will be consumed by 2030 as Grundy County and its municipalities strive to meet W&P's projected

population totals, as opposed to the 454 acres (0.71 square miles) expected to be used pursuant to a slow-growth methodology.



The total amount of new land allocated for employment increases by 2030 in Grundy County pursuant to a slow-growth methodology is 427 acres (0.67 square miles) as shown in *Table 11, Section B* (from *Table 9*). By applying the ratio of 2030 new net residential acres under each scenario to the known 427 new employment acreage under the Greenbelt and Greenway Plan, it

is projected that 2,254 acres (3.5 square miles) would be necessary to accommodate new employment based upon W&P's population projections. Therefore, the grand total of land required for development by 2030 pursuant to the sprawl scenario is 4,649 acres (7.26 square miles) or about 5.3 times more than the 881 acres (1.38 square miles) calculated pursuant to a slow-growth methodology (*Table 11, Section B and Figure 43*).

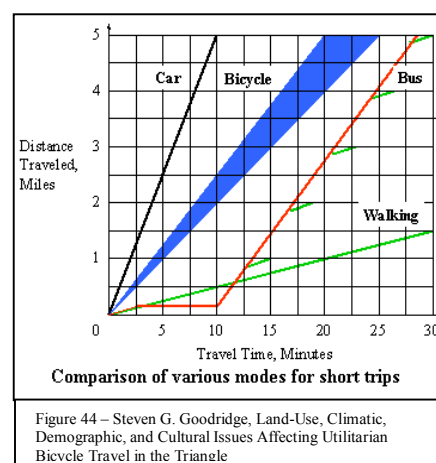
As extreme as this appears, it pales when compared to what is actually occurring. The City of Morris Route 6/Brisbin Road Corridor Plan, dated March 2005, by Teska Associates, Inc., identifies their planning area as extending along I-80 from Morris' boundary to Brisbin Road within Saratoga Township, Sections 13, 14, 23, and 24. It is bounded by Ashley Road on the west, Whitman Road on the north, Brisbin Road on the east, and the municipal limits of Morris and Channahon on the south and covers about 4 square miles or 2,560 acres.⁶⁷ As noted in the *Part I - Background* section above, by considering the Grundy County, City of Morris, City of Minooka, and City of Channahon Comprehensive Plans, a total of 55 square miles or 35,200 acres are earmarked to be developed. This represents more than 7 times the land slated for development pursuant to W&P's sprawl scenario and almost 40 times more than the acreage necessary to implement the Greenbelt and Greenway Plan.

The Greenbelt and Greenway Plan will limit future development for all of Grundy County through the year 2030 to less than 2 square miles or about 900 acres as shown in *Table 11* and *Figure 43* above. Sustainability will be increased by a higher density, more compact physical form that will eliminate the extension of FPA, i.e., sewer and water services and the construction of a new sewage treatment plant on the east side of Morris. Grundy County will also retain its traditional agricultural and rural character in addition to forming a barrier to urban sprawl from the southwestern portion of the Chicago region.

TRANSPORTATION

Impact of Transportation Costs on Income

The average bicycle commute time and distance in the U.S. is 16 minutes and 3.5 miles, respectively, while the average commute time for all other modes is 22 minutes.⁶⁸ Under the Greenbelt and Greenway Plan, virtually all employment within each municipality will continue to be within cycling distance from residential locations within the respective urban locations. The convenience of bicycling will also help determine how attractive it will be to lure car owners from their vehicles. *Figure 44* compares the time necessary for



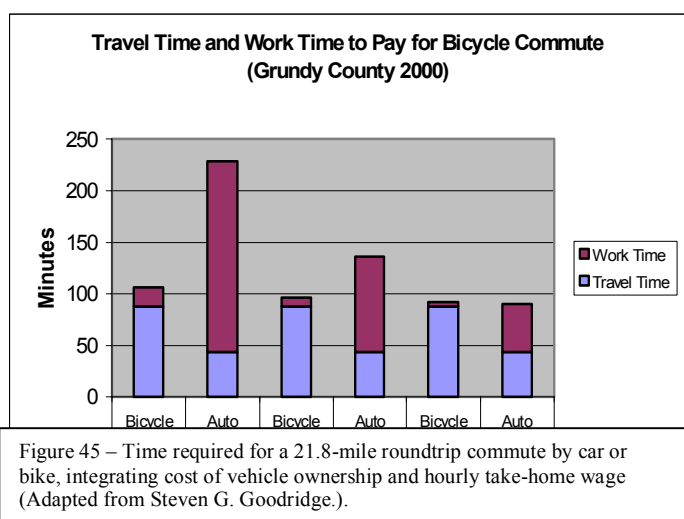
short trips by different modes. The graph assumes the following: average auto speed in urban/suburban traffic – 30 mph; average bicycle speed - 12-15 mph; average bus speed (w/bus stops at 1/8th mile and bus stop wait of 7.5 minutes) - 15 mph; and walking - 3 mph. According to the graph, delay time for cycling as opposed to driving an automobile is only a few minutes for short distances.⁶⁹

Travel behavior is very difficult to change as many people are hesitant to abandon the comfort and convenience of their personal vehicles. Other factors such as weather and the value of time are also disadvantages to bicycle travel. However, a number of studies have shown that people will change these habits when presented with alternatives of attractive bicycle/pedestrian pathways.⁷⁰ Studies of travel patterns in six communities revealed that residents in highly walkable communities had more non-vehicular trips than residents in less walkable

neighborhoods. The majority of these non-vehicular trips were for going to work and running errands.⁷¹ Over time, traffic congestion and rising fuel costs will entice others to consider these alternatives.

As documented in the Background section, Census Bureau figures show that 4.5 percent of Grundy County residents do not have a vehicle while 28.5 percent only have one vehicle. The following analysis applies specifically to long run cost considerations by households that are considering the purchase of a vehicle as opposed to a bicycle for commuting purposes. It is acknowledged that commuting represents only a small number of trips. Consequently, once the commitment is made to purchase a vehicle, the low marginal cost of all trips will be much less than the average cost of only considering commuting trips. Vehicular travel also offers desirable convenience and flexibility. However, the decision by a household to purchase additional vehicles is much more discretionary as the bulk of non-commuting trips can be performed by the vehicles already owned.

Average commute time for Grundy County workers in 2000 according to the Census Bureau was 21.8 minutes (*Appendix 4*), which equates to about 10.9 miles one-way given an assumed average of 30 mph. *Figure 45* provides a comparison between the commuting travel time and work time to pay for a bicycle as opposed to paying for an automobile, given the wage rates



indicated and one-way travel distance of 10.9 miles. The chart assumes the following fixed costs: relatively inexpensive vehicle (insurance, registration, repairs, etc.) - \$4,000 per year or \$15.38 per work day; and bicycle - \$400 per year or \$1.54 per work day. As can be seen, the work time necessary to pay for an automobile at lower wages is virtually prohibitive.

For example, at \$5.00 per hour take-home pay (realistic rate based on Illinois' minimum wage of \$6.50) an employee must work a full three hours per day, plus drive 44 minutes roundtrip, just to pay for an automobile while the time necessary to pay for a bicycle is only about 18 minutes per day, plus cycling time of 87 minutes. At a rate of \$10.00 take-home pay, the combined work time and travel time necessary to pay for the auto is still more than 1.4 times that spent for an employee using only a bicycle. Of course, the work time differences continue to decline as wages and travel distances go up and the benefits to car ownership increase.⁷² It should be noted that the aforementioned annual vehicle operating costs of \$4,000 is very conservative. In its annual analysis of owning and operating a vehicle, the American Automobile Association (AAA) determined that costs for a midsize car are estimated at 69.1 cents per mile or \$6,910 per year.⁷³ Consequently, the advantages to purchasing a bicycle for transportation as opposed to a vehicle can be even more pronounced.

Reference is made to p. 10 in the *Part I - Background* section above which documents the projected impacts of a hypothetical scenario of world events by a June 2005 SAFE bipartisan panel. The panel found that, given certain circumstances, a disruption in oil supply could result in U.S. gasoline costs of \$5.74 per gallon. Using *Figure 45* above, workers earning \$5.00 per hour (after taxes and other deductions) and commuting by automobile would add more than 30 minutes onto their work day just to pay the extra fuel costs. Consequently, more than one-half of their total travel and work time is allocated to paying transportation costs. Further, this would amount to almost 3 hours per day more that these individuals allocate to travel costs as opposed to bicycle commuters. Even those earning \$10.00 per hour would be allocating more than 20 minutes per day, or more than 1 hour more in total travel and work time than bicycle commuters. People choose the location of their homes based upon the value of time and the distance they are willing to commute to employment, shopping, schools, and other amenities. As vehicle ownership costs will inevitably rise in proportion to income over time, people will decide at some point that the extra expense of vehicle ownership is not worth it, and will choose to either purchase more fuel efficient vehicles, take transit and/or move closer to their employers. The Greenbelt and Greenway Plan will insure that Grundy County is prepared for this eventuality.

Holtzlaw's Efficiency Calculator

A primary objective of the Greenbelt and Greenway Plan is to help create an effective transportation system that maximizes efficiency, equity, safety, and reliability. *Table 12* below consists of further statistics showing more detailed transportation impacts from higher density physical design using John Holtzclaw's Efficiency Calculator.

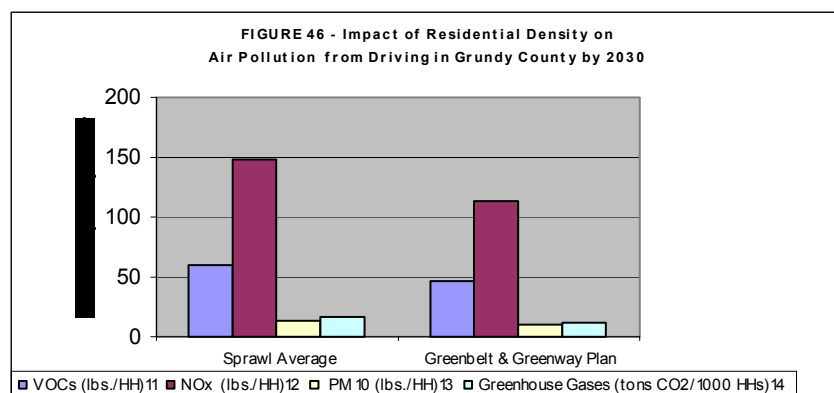
TABLE 12a - Impact of Residential Density on Autos and Driving per Household per Year						
	Vehicles (Avg. no. of vehicles) ¹	Parking (Parking Places) ²	Mileage (Avg. VMT) ³	Fuel Use (Gals. Of Fuel) ⁴	Fuel Costs ⁵	Auto Costs ⁶
Sprawl Average	2.03	14	22,844	1,142	\$2,513	\$22,439
Greenbelt & Greenway Plan	1.71	12	17,515	876	\$1,927	\$18,070

TABLE 12b - Impact of Residential Density on Air Pollution from Driving per Household per Year				
	VOCs (lbs./HH) ⁷	NOx (lbs./HH) ⁸	PM10 (lbs./HH) ⁹	Greenhouse Gases (tons CO2/1000 HHs) ¹⁰
Sprawl Average	61	148	13.71	15.99
Greenbelt & Greenway Plan	46	114	10.51	12.26

Notes:

1. Vehicles/household = $2.4437 - 0.3749 \ln(\text{Density})$. [$R^2 = 0.46$]
2. Based on 7 parking spaces per vehicle.
3. VMT/household = $32237 \cdot \text{Density} - 0.3135$. [$R^2 = 0.54$]
4. Based on 20 mpg.
5. Based on \$2.20 per gallon.
6. Calculations are based on gasoline cost, plus other average 1999 operating costs (5.3 cents/mi) and ownership costs (5,534/yr) from AAA.
7. 0.053 lbs. VOC/gallon
8. 0.13 lb Nox/gal
9. 28 lb CO2/gal
10. 0.012 lb PM10/mile

The compact development patterns of the Greenbelt and Greenway Plan promote less dependency on the personal vehicle by bringing all aspects of the community closer together while making implementation of transit possible. The result is almost a 25 percent reduction in VMT, fuel usage and fuel costs, in addition to almost 20 percent decrease in vehicle costs as shown in *Table 12a*.⁷⁴ Air quality is also improved with close to 25 percent reductions in Volatile Organic Compounds (VOC), Nitrogen Oxides (CO2), Particulate Matter (PM10), and greenhouse gases as depicted in *Figure 46*. It should be noted that these benefits can be increased dramatically with additional average land use density increases.



Census Transportation Planning Package

Alternate methods can be used to measure the impacts of the Greenbelt and Greenway Plan on sustainability. Statistical data was obtained from the Census Transportation Planning Package (CTTP 2000) for Grundy County which depicts the travel patterns of commuters in the year 2000. The following data is located in *Appendix 4: Table 1. Selected Characteristics by Place of Work, 1990 and 2000*; and *Table 2. Mode to Work by Travel Time, 2000*. Analysis of *Table 2* in *Appendix 4* reveals that about 12,380 out of 14,205 Grundy County commuters or about 87 percent drive alone in a personal motorized vehicle. Another 1,385 individuals or about 10 percent of commuters get to work via carpools. A total of 320 or just over 2 percent of commuters either bicycled or walked to work. Only 80 persons or less than 0.5 percent of commuters get to work via some type of transit. The remainder took other modes of motorized transportation such as taxicabs and motorcycles. These statistics are indicative of a transportation system that offers very few realistic alternatives to the motor vehicle for commuting purposes. This dependency on one single mode of transport makes Grundy County residents very vulnerable to rising gasoline prices and the looming oil supply peak. In addition, traffic congestion plaguing much of the Chicago region will infiltrate Grundy County if provisions are not made to offer alternatives of fixed-route transit and bicycle routes.

Table 13 uses the CTPP 2000 data to quantify the number of commuter miles driven, gallons of fuel used, and the cost of fuel used on a daily basis by individuals working in Grundy County. As can be seen from the data, Grundy County workers on a daily basis in the year 2000 took a total of 27,530 trips (13,765 roundtrips), covering more than 400,000 VMT. The following assumptions are made: average vehicle fuel efficiency is about 20 miles per gallon; a gallon of

regular gas costs \$3.00; and vehicles average 40 mph. Calculations show that more than 20,000 total gallons of fuel which cost more than \$60,000 were required for these trips on a daily basis. The vast majority of these daily commuter trips or 87 percent are for single-occupancy vehicles: 348,373 VMT; 17,419 gallons of fuel; and \$62,256 in fuel expenditures.

Mode	Mean Travel Time (mins.)	Total One-Way Trips	Fuel Cost Per Gallon	Average MPG	Average MPH	Average Trip Miles	No. of Trips	Daily Miles (Per Person)	Total Daily Miles (All)	Total Gallons	Total Fuel Cost
Drove Alone	21.1	12,380	3.00	20	40	14.1	2	28.1	348,373	17,419	\$62,256
Carpool (2)	28.4	1,185	3.00	20	40	18.9	2	37.8	44,820	2,241	\$6,723
Carpool (3+)	25.8	200	3.00	20	40	17.2	2	34.3	6,868	343	\$1,030
TOTALS		13,765							400,062	20,003	\$60,009

SOURCE: Calculated from Census Transportation Planning Package (CTPP 2000)

Impact of Transit and Bicycle/Pedestrian Paths

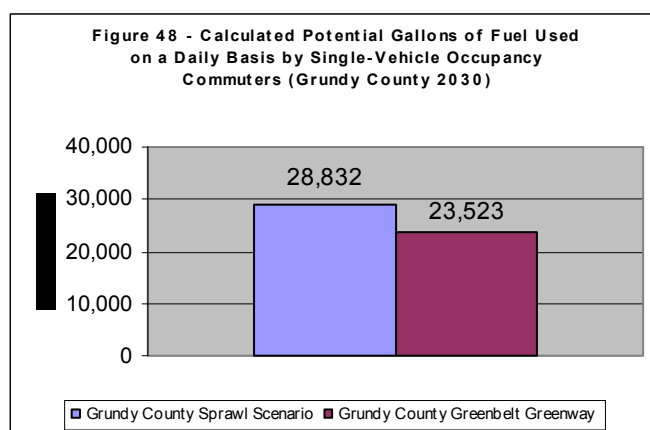
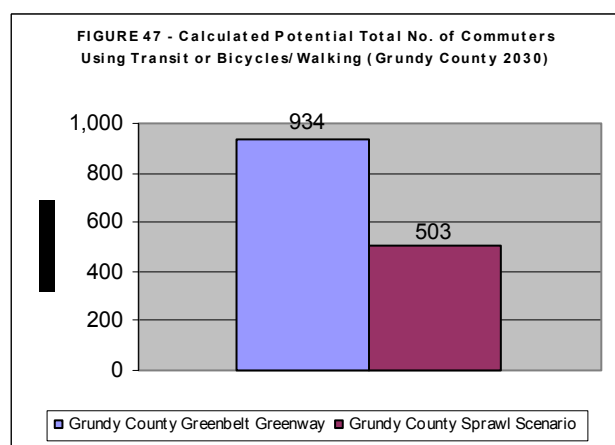
The above statistics for single-occupancy vehicles can be reduced substantially through implementation of the Greenbelt and Greenway Plan. An analysis of CTPP 2000 data for counties other than Cook in the Chicago metropolitan area and in counties adjacent to Grundy County found transit ridership levels for commuters of up to almost 2 percent. Those who walked or bicycled to work in these counties ranged up to 3.3 percent. These percentages represent realistic goals for Grundy County commuters if the Greenbelt and Greenway Plan is implemented as shown in *Table 14*. Again, there were 14,205 commuters in Grundy County

	Commuters in 2000	Commuters Transit (%)	Commuters Bike/Walk (%)	2030 Population	2030 Projected Commuters	2030 Transit Use	2030 Bike/Walk	2030 Total Commuters on Transit/Bike/Walk
Grundy County Greenbelt Greenway	14,205	2.00	3.30	46,549	17,616	352	581	934
Grundy County Sprawl Scenario	14,205	0.60	1.80	55,360	20,951	126	377	503
Total No. Commuter Vehicles Removed (one-way)						227	204	431
	Fuel Cost Per Gallon	Average MPG	Avg. Trip Miles	No. of Trips	Daily Miles (per person driving alone)	2030 Total Commuter Daily VMT	2030 Total Commuter Daily Gals. Fuel	2030 Total Commuter Daily Fuel Costs
Grundy County Sprawl Scenario	3.00	20	14.1	2	28.2	576,633	28,832	\$86,495
Grundy County Greenbelt Greenway	3.00	20	14.1	2	28.2	470,451	23,523	\$70,568
Total Reductions						106,183	5,309	\$15,927

SOURCE: Calculated from Census Transportation Planning Package (CTPP 2000)

during the year 2000, of which 85 or 0.6 percent was taking transit and 320 or 2.3 percent were riding a bicycle or walking. The number of commuters can be projected for the year 2030 based

upon estimated population totals pursuant to the Greenbelt and Greenway Plan (17,616 commuters) in comparison to unconstrained population according to a sprawl scenario (20,951 commuters). By establishing transit service, a total of 352 commuters or single-occupancy vehicles could be taken off the road or 226 more than the 126 that would use transit if present build-out patterns continue. In addition, 581 commuters using bicycles or walking to work could remove another 204 single-occupancy vehicles from the road compared to the continued sprawl scenario. This would be a total of 934 commuters using transit, bicycles or walking under a slow-growth methodology as opposed to 503 if development patterns continue unchanged as depicted in *Figure 47*. Further, by implementing the Greenbelt/ Greenway Plan, the estimated daily dependency on the personal vehicle for commuting purposes in Grundy County by 2030 could be reduced by a total of 431 roundtrips (862 trips); 106,183 VMT; 5,309 gallons of fuel [28,832-23,523 (*Figure 48*)]; and fuel costs of \$15,927 (@\$3.00 per gallon).



Pace Bus in the Chicago region generally requires residential and employment densities of about 3,000 persons per square mile before establishing fixed-route bus service.⁷⁵ This equates to about 1.8 DU's per net acre or 1.4 DU's per gross acre, using average household size of 2.6. According to long-range service planning analysis by Tri-Met, the public transit authority for Portland, Oregon, employment density of about 4 jobs per gross acre produces comparable transit ridership to 3 DU's per gross acre.⁷⁶ Density for both residential and employment areas will be well above these levels under the Greenbelt and Greenway Plan. As shown in Holtzclaw's Efficiency Calculator (*Table 11*), fixed-route bus service becomes more feasible with higher residential densities. At about 8 DU's per net acre (6 DU's per gross acre), the calculator shows that up to 13 buses per hour or about 140 per day are practical within a ¼ mile

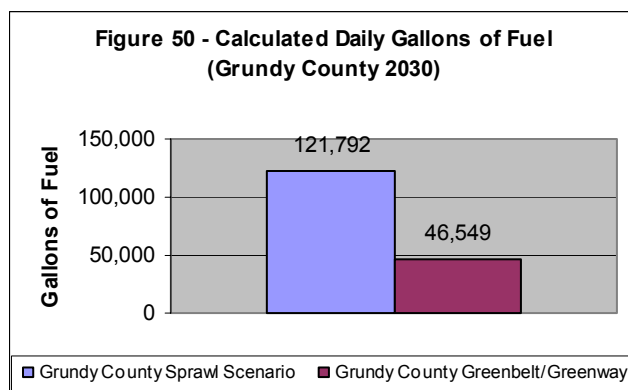
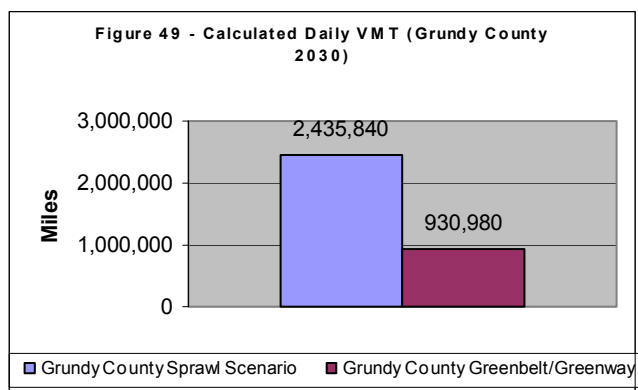
walk for most residents. Households generally make between 8-10 trips per day with about 25 percent of these for commuting purposes. Under the slow-growth scenario, Grundy County will have 24,205 households by the year 2030. This equates to about 200,000 trips per day. Pursuant to the Greenbelt and Greenway Plan, if Grundy County residents were to use transit for 2 percent of both commuting and other trips, buses could potentially capture 4,000 trips per day (~30 trips per bus or ~30 passengers per revenue hour). This would be above the national average of 25.4 passengers per revenue hour. The national average farebox recovery rate is 21.3 percent.⁷⁷ Pace's most recent goal for farebox recovery is 41 percent.⁷⁸ Therefore, under the Greenbelt and Greenway Plan, fixed-route bus service in Grundy County is likely to be feasible. However, farebox recovery might be below Pace's current target level unless bus ridership can exceed 2 percent of total trips.

Illinois Department of Transportation AVMT

Statistics obtained from the Illinois Department of Transportation reveal that the annual average vehicle miles traveled (AVMT) for Grundy County in the year 2000 was 600,339,321 (1,640,271 daily).⁷⁹ By dividing this number by 366 days, the calculated average daily vehicle miles of travel is 1,640,271. Therefore, commuting VMT represents about 24 percent of total VMT in Grundy County as workers traveled 400,062 miles in 2000 (*Table 13*). IDOT AVMT for Kane County in the year 2000 was 2,939,379,687 (8,031,092 daily) which, when considering their population of 404,119, calculates to an annual average of 7,274 VMT (20 miles per day) per person. Given that Grundy County had AVMT of 600,339,321 (1,640,271 daily) and a year 2000 population of 37,535, this calculates to an annual average of 15,994 VMT (44 miles per

TABLE 15 - Calculated Total Annual and Daily VMT, Gallons of Fuel and Fuel Costs for Vehicles Pursuant to the Greenbelt/Greenway Plan vs. Sprawl Scenario (Grundy County 2030)							
	2000 AVMT	Days in Year	2000 Daily VMT	2000 Population	2000 Daily VMT per Person	2030 Population	2030 Daily VMT per Person
Grundy County Sprawl Scenario	600,339,321	366	1,640,271	37,535	44	55,360	44
Grundy County Greenbelt/ Greenway	600,339,321	366	1,640,271	37,535	44	46,549	20
	2030 AVMT	2030 Total Daily VMT	Fuel Cost Per Gallon	Avg. MPG	Avg. MPH	2030 Total Daily Gals. Fuel	2030 Total Daily Fuel Costs
Grundy County Sprawl Scenario	891,517,440	2,435,840	3.00	20	40	121,792	\$365,376
Grundy County Greenbelt/ Greenway	340,738,680	930,980	3.00	20	40	46,549	\$139,647
Total Reductions	550,778,760	1,504,860				75,243	\$225,729
AVMT Source: Illinois Department of Transportation							

day) per person as shown in *Table 15*. Therefore, the lack of transportation alternatives in Grundy County results in double the VMT per person as opposed to Kane County. By implementing the Greenbelt and Greenway Plan, it is feasible to reduce per capita VMT in Grundy County to the level in Kane County. By doing so, a total reduction of 1,504,860 VMT (Figure 49) and 75,243 gallons of fuel (Figure 50) costing \$225,729 could be realized in Grundy County on a daily basis by 2030 (Table 15).



PART V - CONCLUSION

Coordination of land use and transportation planning by Grundy County and its municipalities through a slow-growth methodology can effectively counter poor quality and inefficient development that has penetrated the area. The distance people are willing to travel has been increasing as low density development patterns continue in Grundy County and other areas of exurbia throughout the United States. The population is seeking the benefits of both the country and the city by relocating to exurban areas where lower land prices offset the higher transportation costs. These land use patterns are straining budgets of local governments and mandating that families operate two or more vehicles, resulting in rising gridlock on our roadways. The Greenbelt and Greenway Plan serves to implement portions of the 2020 Land Use Plan (draft) and offers a realistic alternative in making Grundy County more sustainable by promoting efficient land uses, reduced infrastructure costs, protection of natural resources/farmland, and creation of transportation alternatives.



Figure 51 – Vacant land between Coal City and Diamond has potential for a greenbelt so that each can retain its distinctive character (Photo by author.).

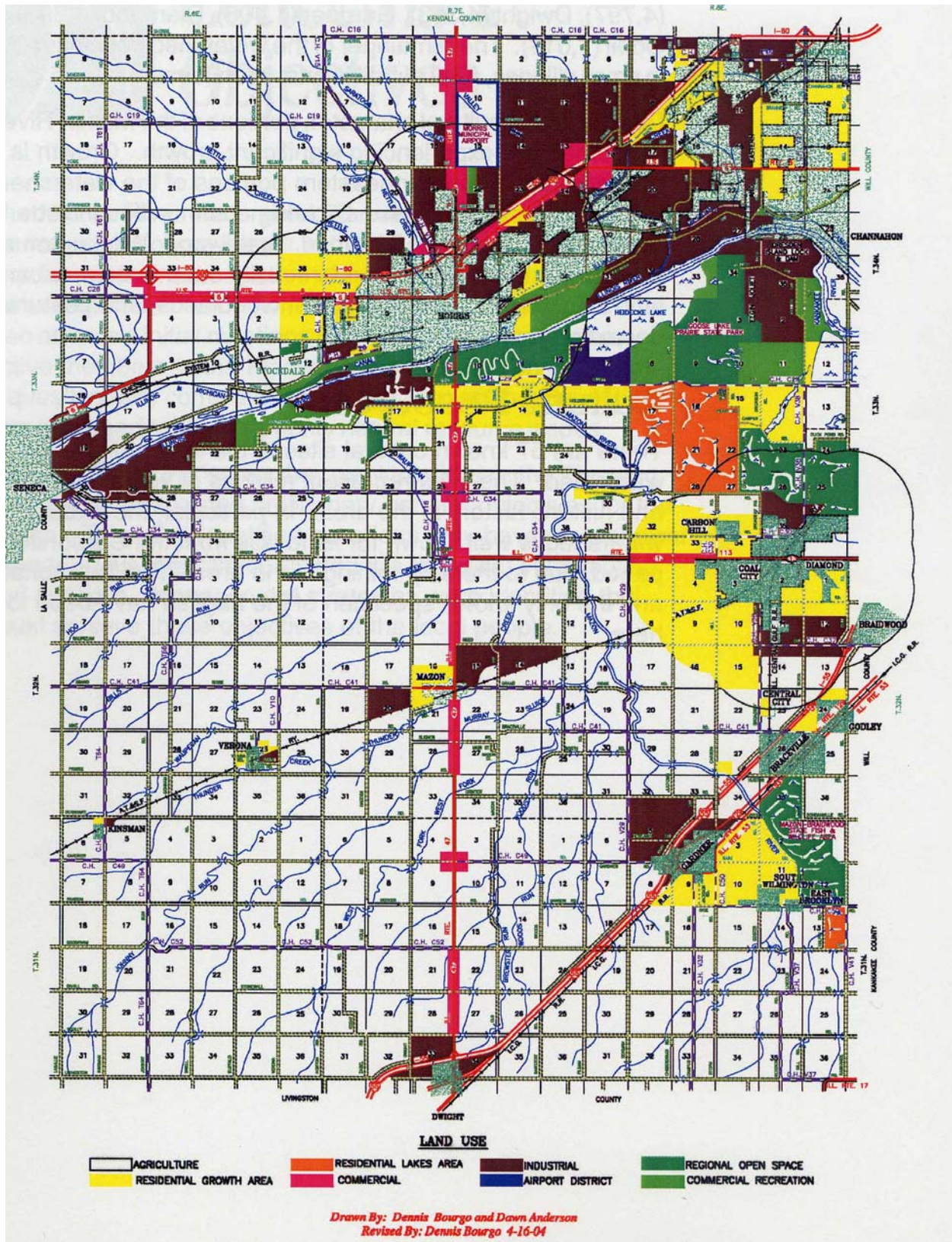
The Greenbelt and Greenway Plan identifies a growth rate which represents Grundy County’s “fair share” by balancing the historic slow expansion levels with the much faster projected growth under a sprawl scenario. The Plan’s slow-growth land use methodology, focusing within and adjacent to existing urban centers reveals that Grundy County can effectively maintain its rural character while accommodating new population.

This includes infill of vacant land and retrofitting current low-density land uses that have preexisting infrastructure and services. As a result, the effective use of mass transit and other transportation alternatives are increased to eliminate the perceived “need” for new streets or roadway expansions such as the Prairie Parkway and Route 47.

The Greenbelt and Greenway Plan demonstrates that, through the year 2030, land consumption in Grundy County can be reduced to less than 20 percent that of a sprawl scenario and less than 3 percent of the amount of land projected to be developed by the municipalities of Morris, Minooka and Channahon. Further, household transportation costs can be reduced by a minimum of almost 20 percent while air pollution can be cut by up to 25 percent or more. Future total AVMT and fuel costs for Grundy County drivers can be potentially cut by more than one-half.

All levels of government are desperately searching for ways to reduce expenditures with the limited availability of financing due to competing transportation projects in addition to other priorities at the state and federal levels. The Greenbelt and Greenway Plan offers an innovative methodology to promote measured growth and development that respects both public interests and private property rights. Creation of enabling legislation by the State of Illinois requiring all counties and municipalities to implement greenbelt and greenway plans would greatly enhance the Plan's success in Grundy County. A regional effort beyond the advisory level can effectively harness adversarial parochial interests of local governments to insure that land use and transportation planning occurs in the most efficient and rational form.

APPENDIX 1 – PRESENT GRUNDY COUNTY LAND USE MAP - YEAR2010 UPDATE



APPENDIX 2 – ALLOCATION OF NEW DWELLINGS BY MUNICIPALITY

BRACEVILLE: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	6	40	32	26	0.15	0.19	0.23
C. Townhouses (higher density)	6	15	12	10	0.40	0.50	0.57
D. Townhouses (lower density)	6	12	10	8	0.50	0.63	0.74
E. Single family detached (higher)	59	7	6	5	8.43	10.54	13.01
F. Single family detached (lower)	20	5	4	3	4.00	5.00	6.67
Total	97				13	17	21

CARBON HILL: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	2	40	32	26	0.05	0.06	0.08
C. Townhouses (higher density)	2	15	12	10	0.13	0.17	0.19
D. Townhouses (lower density)	2	12	10	8	0.17	0.21	0.25
E. Single family detached (higher)	25	7	6	5	3.57	4.46	5.51
F. Single family detached (lower)	8	5	4	3	1.60	2.00	2.67
Total	39				6	7	9

CHANNAHON: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	42	80	64	54	0.53	0.66	0.77
B. 3-story walkup apartments	42	40	32	26	1.05	1.31	1.64
C. Townhouses (higher density)	42	15	12	10	2.80	3.50	4.02
D. Townhouses (lower density)	42	12	10	8	3.50	4.38	5.21
E. Single family detached (higher)	292	7	6	5	41.71	52.14	64.37
F. Single family detached (lower)	97	5	4	3	19.40	24.25	32.33
Total	557				69	86	108

COAL CITY: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	27	80	64	54	0.34	0.42	0.50
B. 3-story walkup apartments	27	40	32	26	0.68	0.84	1.05
C. Townhouses (higher density)	27	15	12	10	1.80	2.25	2.59
D. Townhouses (lower density)	27	12	10	8	2.25	2.81	3.35
E. Single family detached (higher)	239	7	6	5	34.14	42.68	52.69
F. Single family detached (lower)	80	5	4	3	16.00	20.00	26.67
Total	427				55	69	87

DIAMOND: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	10	40	32	26	0.25	0.31	0.39
C. Townhouses (higher density)	10	15	12	10	0.67	0.83	0.96
D. Townhouses (lower density)	10	12	10	8	0.83	1.04	1.24
E. Single family detached (higher)	70	7	6	5	10.00	12.50	15.43
F. Single family detached (lower)	23	5	4	3	4.60	5.75	7.67
Total	123				16	20	26

GARDNER: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	10	40	32	26	0.25	0.31	0.39
C. Townhouses (higher density)	10	15	12	10	0.67	0.83	0.96
D. Townhouses (lower density)	10	12	10	8	0.83	1.04	1.24
E. Single family detached (higher)	67	7	6	5	9.57	11.96	14.77
F. Single family detached (lower)	22	5	4	3	4.40	5.50	7.33
Total	119				16	20	25

EAST BROOKLYN: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	0	40	32	26	0.00	0.00	0.00
C. Townhouses (higher density)	0	15	12	10	0.00	0.00	0.00
D. Townhouses (lower density)	0	12	10	8	0.00	0.00	0.00
E. Single family detached (higher)	10	7	6	5	1.43	1.79	2.20
F. Single family detached (lower)	3	5	4	3	0.60	0.75	1.00
Total	13				2	3	3

GODLEY: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	2	40	32	26	0.05	0.06	0.08
C. Townhouses (higher density)	2	15	12	10	0.13	0.17	0.19
D. Townhouses (lower density)	2	12	10	8	0.17	0.21	0.25
E. Single family detached (higher)	39	7	6	5	5.57	6.96	8.60
F. Single family detached (lower)	13	5	4	3	2.60	3.25	4.33
Total	58				9	11	13

KINSMAN: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	0	40	32	26	0.00	0.00	0.00
C. Townhouses (higher density)	0	15	12	10	0.00	0.00	0.00
D. Townhouses (lower density)	0	12	10	8	0.00	0.00	0.00
E. Single family detached (higher)	4	7	6	5	0.57	0.71	0.88
F. Single family detached (lower)	1	5	4	3	0.20	0.25	0.33
Total	5				1	1	1

MAZON: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	4	40	32	26	0.10	0.13	0.16
C. Townhouses (higher density)	4	15	12	10	0.27	0.33	0.38
D. Townhouses (lower density)	4	12	10	8	0.33	0.42	0.50
E. Single family detached (higher)	57	7	6	5	8.14	10.18	12.57
F. Single family detached (lower)	19	5	4	3	3.80	4.75	6.33
Total	88				13	16	20

MINOOKA: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	29	80	64	54	0.36	0.45	0.53
B. 3-story walkup apartments	29	40	32	26	0.73	0.91	1.13
C. Townhouses (higher density)	29	15	12	10	1.93	2.42	2.78
D. Townhouses (lower density)	29	12	10	8	2.42	3.02	3.60
E. Single family detached (higher)	206	7	6	5	29.43	36.79	45.41
F. Single family detached (lower)	69	5	4	3	13.80	17.25	23.00
Total	391				49	61	76

MORRIS: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	79	80	64	54	0.99	1.23	1.45
B. 3-story walkup apartments	79	40	32	26	1.98	2.47	3.09
C. Townhouses (higher density)	79	15	12	10	5.27	6.58	7.57
D. Townhouses (lower density)	79	12	10	8	6.58	8.23	9.80
E. Single family detached (higher)	441	7	6	5	63.00	78.75	97.22
F. Single family detached (lower)	147	5	4	3	29.40	36.75	49.00
Total	904				107	134	168

SOUTH WILMINGTON: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	1	40	32	26	0.03	0.03	0.04
C. Townhouses (higher density)	1	15	12	10	0.07	0.08	0.10
D. Townhouses (lower density)	1	12	10	8	0.08	0.10	0.12
E. Single family detached (higher)	12	7	6	5	1.71	2.14	2.65
F. Single family detached (lower)	4	5	4	3	0.80	1.00	1.33
Total	19				3	3	4

VERONA: Allocation of New Dwelling Units by Housing and Density Types (Slow Growth Methodology)							
Housing Types	<u>Assumed Density (Dus/acre)</u>				<u>Acreage Requirements</u>		
	DUs	Net	Gross	Neighbor- hood	Net	Gross	Neighbor- hood
A. Conversion from other uses	0	0	0	0	0	0	0
B. 3-story walkup apartments	1	40	32	26	0.03	0.03	0.04
C. Townhouses (higher density)	1	15	12	10	0.07	0.08	0.10
D. Townhouses (lower density)	1	12	10	8	0.08	0.10	0.12
E. Single family detached (higher)	24	7	6	5	3.43	4.29	5.29
F. Single family detached (lower)	8	5	4	3	1.60	2.00	2.67
Total	35				5	7	8

APPENDIX 3 – GRUNDY COUNTY PARKS AND OPEN SPACE INVENTORY

Area	Location	Acres
<u>State Parks</u>		
Goose Lake Prairie		
State Park	Adjacent to Heidecke Lake	2,537.00
Heidecke Lake State		
Fish & Wildlife Area	Southeast of Morris	1,300.00
Mazonia Braidwood Fish and Wildlife Area	Rt. 53 and Huston Rd. SE at Braidwood	1,017.00
<u>Carbon Hill</u>		
City Park	Lacey St. and Holcomb St.	9.00
<u>Gardner</u>		
East Park	Center St. and Jefferson St.	1.25
West Park	Washington St. and Jackson St.	1.25
<u>Mazon</u>		
City Park	Center St. and Warren Dr.	2.00
<u>Morris (2003 Morris Comprehensive Plan)</u>		
McKinley Park	McKinley St. E of Rt. 47	2.05
Goodwill Park	Rt. 47 between North and Chapin	1.62
Chapin Park	Chapin St. W. of Rt. 47	1.48
Lions Park	N. of Hickory Lake	3.85
Goold Park	One block W. of Chapin Park	13.77
William G. Stratton State Park	SE Morris on N side of Ill. R.	15.00
Gebhard Woods State Park	SW Morris on N side of Ill. R.	29.00
Illinois and Michigan Canal Trail	Linear path on S side of Morris	3.00
John Roth Lighted Ball Park	Part of Shabbona Middle School	
Hickory Lake West	Hickory Lake Subdivision (Private)	0.50
Morris Country Club	18-hole provate golf course	
Nettle Creek Golf Club	18-hole provate golf course	
TOTALS		4,938

APPENDIX 4 – CENSUS TRANSPORTATION PLANNING PACKAGE (CTP 2000)

Geographic Area: Working in Grundy County, Illinois**TABLE 1. SELECTED CHARACTERISTICS BY PLACE OF WORK, 1990 and 2000**

Selected Characteristics (Universe: All Workers)	1990		2000		Change 1990 to 2000	
	Number	Percent	Number	Percent	Number	Percent
Workers 16 years or over	14,370	100	14,770	100	400	2.8
Sex						
Male	8,673	60.4	8,240	55.8	-433	-5.0
Female	5,697	39.6	6,535	44.2	838	14.7
Mode to work						
Drove alone	11,852	82.5	12,380	83.8	528	4.5
2-person carpool	1,348	9.4	1,185	8.0	-163	-12.1
3-or-more-person carpool	262	1.8	200	1.4	-62	-23.7
Bus or trolley bus	20	0.1	30	0.2	10	50.0
All other transit ¹	0	0.0	55	0.4	55	**
Bicycle or walked	451	3.1	320	2.2	-131	-29.0
Taxicab, motorcycle, or other mode	48	0.3	34	0.2	-14	-29.2
Worked at home	389	2.7	565	3.8	176	45.2
Travel time to work (Universe = Workers who did not work at home)						
Less than 5	1,028	7.4	1,025	7.2	-3	-0.3
5 to 9	2,575	18.4	2,725	19.2	150	5.8
10 to 14	1,852	13.2	2,120	14.9	268	14.5
15 to 19	1,889	13.5	1,705	12.0	-184	-9.7
20 to 29	2,667	19.1	2,595	18.3	-72	-2.7
30 to 44	2,575	18.4	2,290	16.1	-285	-11.1
45- 59	750	5.4	840	5.9	90	12.0
60 or more	645	4.6	895	6.3	250	38.8
Mean travel time (minutes)	20.4	(X)	21.8	(X)	1.4	(X)
Median travel time (minutes)	19.1	(X)	15.8	(X)	-3.3	(X)

TABLE 2. MODE TO WORK BY TRAVEL TIME, 2000

(Universe = Workers who did not work at home)

	Mean travel time (mins.)	Total	Less than 10 minutes	10 to 19 minutes	20 to 29 minutes	30 to 44 minutes	45 -59 minutes	60 or more minutes
Total	21.8	14,205	3,750	3,825	2,595	2,290	840	895
Row percent		100	26.4	26.9	18.3	16.1	5.9	6.3
Column percent		100	100	100	100	100	100	100
Drove alone	21.1	12,380	3,350	3,310	2,330	2,015	660	715
Row percent		100	27.1	26.7	18.8	16.3	5.3	5.8
Column percent		87.2	89.3	86.5	89.8	88.0	78.6	79.9
2-person carpool	28.4	1,185	160	340	195	235	130	120
Row percent		100	13.5	28.7	16.5	19.8	11.0	10.1
Column percent		8.3	4.3	8.9	7.5	10.3	15.5	13.4
3+ carpool	25.8	200	38	70	18	43	8	28
Row percent		100	19.0	35.0	9.0	21.5	4.0	14.0
Column percent		1.4	1.0	1.8	0.7	1.9	1.0	3.1
Bus or trolley bus	35.8	30	0	8	10	4	14	4
Row percent		100	0.0	26.7	33.3	13.3	46.7	13.3
Column percent		0.2	0.0	0.2	0.4	0.2	1.7	0.4
All other transit¹	74.3	55	0	0	10	4	20	20
Row percent		100	0.0	0.0	0.0	0.0	0.2	0.0
Column percent		0.4	0.0	0.0	0.4	0.2	2.4	2.2
Bicycle or walked	8.1	320	185	95	34	0	4	0
Row percent		100	57.8	29.7	10.6	0.0	1.3	0.0
Column percent		2.3	4.9	2.5	1.3	0.0	0.5	0.0
All other modes¹	51.3	34	15	4	0	0	4	14
Row percent		100	44.1	11.8	0.0	0.0	11.8	41.2
Column percent		0.2	0.4	0.1	0.0	0.0	0.5	1.6

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