# Appendix 1: Documentation

## Community Assessment

## Regional Context

**Sources:**

- **University of Louisville, Kentucky State Data Center**
- **Kentucky Cabinet for Economic Development**
- **Barren River Area Development District (BRADD) Website - http://www.bradd.org**

Situated in the Barren River region in South Central Kentucky, Warren County is one of the fastest-growing regions in the State. Bowling Green, its principal city, is about a 2 hour drive from Louisville (114 miles south) and one hour from Nashville (60 miles north). **(See Figure 1: Regional Context)**

The Barren River Area Development District (BRADD) is one of the 15 districts created by the State of Kentucky to assist planning at a regional level. BRADD consists of ten counties: Allen, Barren, Butler, Edmonson, Hart, Logan, Metcalfe, Monroe, Simpson and Warren.

- Overall, the district is sparsely populated at 72.08 persons per square mile compared to the state average of about 109.23 persons per square mile (year 2010).

- Less than 15% the size of the district, Warren County accounts for more than 40% of the district population, and is the most dynamic in terms of growth, population density, and development trends.

- During the period 2000-2010, the district has registered an overall growth of about 11.4%, varying from a minimal 0.6% in Metcalfe County to about 23% in Warren County.

- Across the district, the middle range of the population age (35 to 60 years) and the elderly (85 years and over) constitute the majority of growth throughout the region. Warren and Allen Counties have significant growths in their younger workforce populations as well.

- Poverty levels across the district are high and near the state average of about 16%. Metcalfe, Monroe and Hart counties have registered even higher levels. Unemployment levels are particularly high in Monroe County.

Warren County's labor market area[1] is comprised of about a 60-minute driving range which includes its six contiguous counties: Simpson, Logan, Butler, Edmonson, Barren and Allen; and also Hart, Todd and Ohio counties in the north and Sumner County, Tennessee in the south. Todd, Ohio and Sumner counties are not part of BRADD **(See Figure 1).**

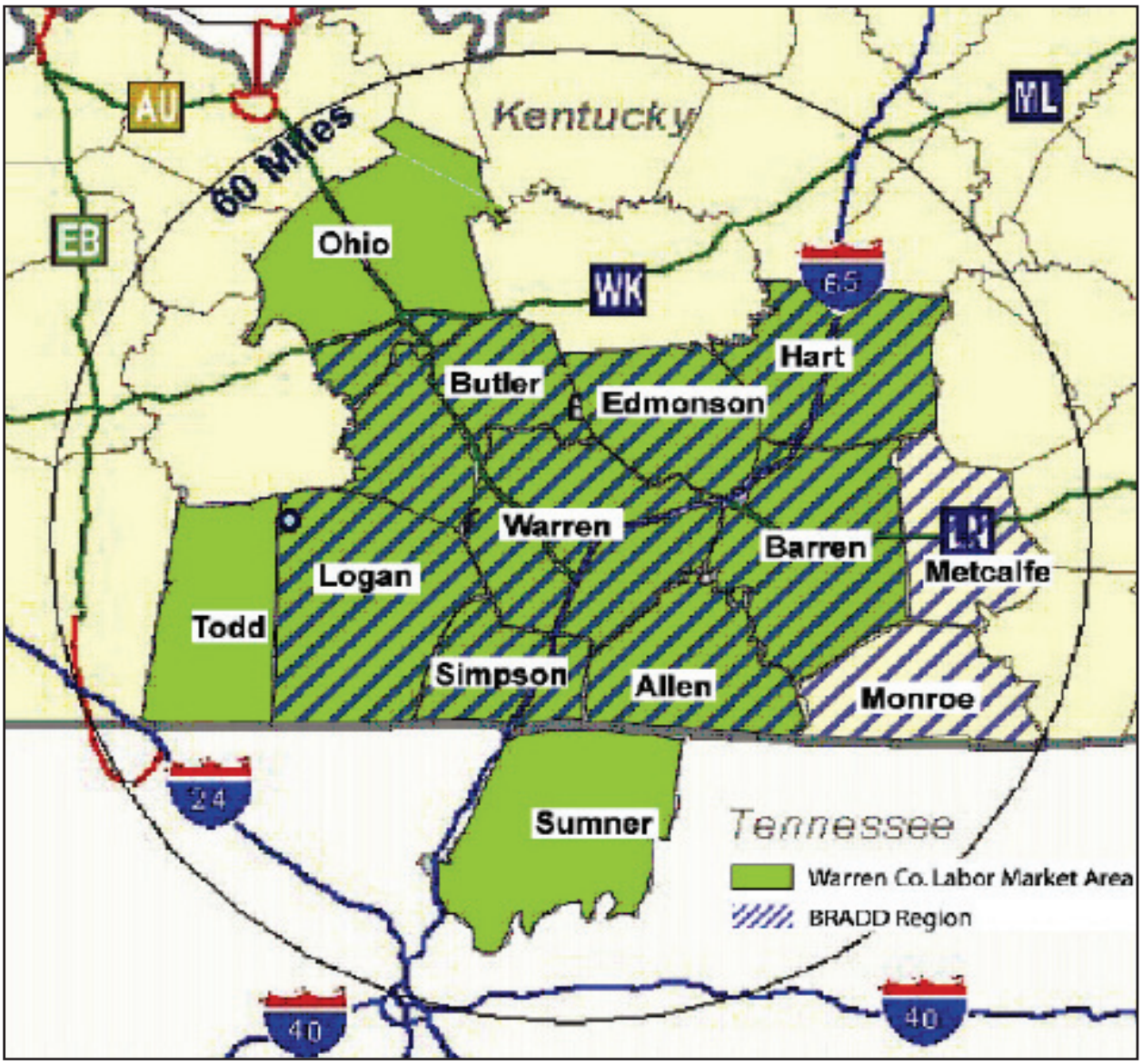



**Figure 1: Regional Context of Warren County**
Source: The Kentucky Cabinet for Economic Development website (adapted).

According to the 2000 census, approximately 10,855 workers commuted to Warren County from surrounding counties and approximately 5,905 county residents commuted to jobs outside Warren County. In 1990, the in and out migration numbers were 4,000 and 1,950 respectively. While commuting both into and out of the County has increased over the years, most Warren County residents working elsewhere continue to go to Simpson County, while most residents from elsewhere working in Warren County commute from Edmonson County. **(See Figure 2: Daily Commuting Patterns)**

[1]According to the Kentucky Cabinet for Economic Development, counties whose centroids are within the 60 minute drive zone are considered to be in the labor market area – all contiguous counties are classified as part of the labor market with the exception of non-Kentucky contiguous counties which have been excluded by the above mentioned 60-minute drive range and have a border with the Mississippi and/or Ohio Rivers.

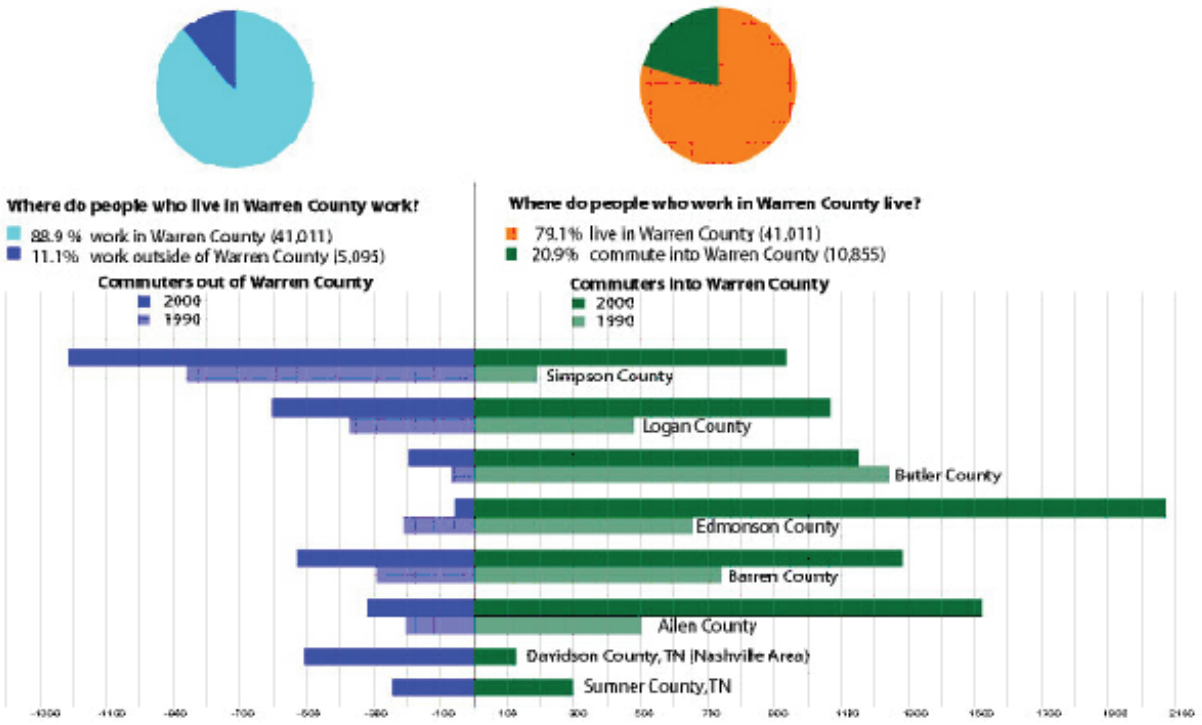



**Figure 2: Daily Commuting Patterns**
Source: University of Louisville, Kentucky State Data Center

As these data show, Warren County is a regional employment center and not, like some neighboring areas, a bedroom community. Twenty-one percent of the total workforce is comprised of people from surrounding counties, while 89 percent of employed Warren Countians also work here. Additionally, the data show that Nashville is not a major source of jobs for Warren County residents, as only one percent of the workforce commutes to the Nashville area.

## Population and Growth

**Sources:**

- **American Community Survey 2008**
- **2000 Census**
- **1990 Census**
- **University of Louisville, Kentucky State Data Center 2009**
- **Warren County 2030 Long Range Transportation Plan**

In 2010, the US Census reported that the County population was 113,792, while the City of Bowling Green was at 58,067. Two thirds of Warren County's population is urban, which includes most of the population in Bowling Green, leaving one-third rural.

**Table 1: Population by Decade (1970-2010)**

| Jurisdiction | 1970 | 1980 | 1990 | 2000 | 2010 | % Growth* |
|---|---|---|---|---|---|---|
| Barren River ADD | 185,827 | 217,041 | 222,766 | 255,225 | 284,195 | 1.07 |
| Warren County | 57,432 | 71,828 | 77,720 | 92,522 | 113,792 | 1.72 |
| Bowling Green | 36,253 | 40,450 | 42,278 | 49,296 | 58,067 | 1.18 |
| Oakland | 144 | 264 | 232 | 259 | 225 | 1.12 |
| Plum Springs | 185 | 393 | 364 | 447 | 453 | 2.26 |
| Smiths Grove | 756 | 767 | 703 | 782 | 714 | -0.14 |
| Woodburn | 351 | 330 | 357 | 327 | 355 | 0.03 |

Source: 2000, 2010 US Census
* % Growth compunded annually.

**Table 2: Projected Population Growth (2000-2030)**

| Jurisdiction | 2000 | 2005 | 2008** | 2010 | 2015 | 2020 | 2025 | 2030 |
|---|---|---|---|---|---|---|---|---|
| Barren River ADD | 255,737 | 266,694 | 267,411 | 281,970 | 297,136 | 313,081 | 330,167 | 346,778 |
| Warren County | 92,522 | 99,439 | 105,862 | 109,372 | 119,083 | 129,541 | 141,164 | 152,843 |
| Bowling Green | 49,296 | 52,550 | 55,097 | 55,660 | 59,760 | 63,255 | 66,750 | 69,452 |
| Oakland | 259 | 256 | 262 | 310 | 335 | 362 | 390 | 410 |
| Plum Springs | 447 | 458 | 479 | NA | 575 | 625 | 675 | 710 |
| Smiths Grove | 782 | 756 | 781 | 860 | 890 | 920 | 950 | 1050 |
| Woodburn | 327 | 336 | 349 | 370 | 395 | 423 | 450 | 490 |

Kentucky State Data Center, Estimates and Projections Released July 1 2009
** Estimated population (U.S. Census Population Division)

According to the 2030 Long Range Transportation Plan (LRTP), the city of Bowling Green is projected to have a moderate but steady annual compound growth rate of 1.15 percent, slightly higher than the Barren River Area but lower than the County's 1.37 percent projected growth. Of the remaining four small cities, Oakland, Plum Springs and Woodburn are projected to grow at about 1.5 percent and Smiths Grove to grow at a slightly slower pace of 0.98 percent. The annual population growth rates for Bowling Green are projected to fluctuate between 1.0 and 1.4 percent until 2025 and then gradually drop to 0.8 percent in the late 2020s. After exhibiting high growth rates up to the 1990s, the County's annual growth rate is projected to fluctuate moderately around 1.5 percent until 2015 and then steadily fall to 1.2 percent by 2030.

**Table 3: Population by Sex, Age and Race in Bowling Green and Warren County**

| | 2000 | | | | 2010 | | | | Change | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Bowling Green (BG) | | Warren County (WC) | | Bowling Green (BG) | | Warren County (WC) | | BG | WC |
| | Number | % | Number | % | Number | % | Number | % | % | % |
| Male | 18,751 | 46.1 | 36,726 | 47.9 | 23,841 | 48.4 | 45,356 | 49 | 27.1 | 23.5 |
| Female | 21,890 | 53.9 | 39,947 | 52.1 | 25,455 | 51.6 | 47,166 | 51 | 16.3 | 18.1 |
| 65 years and over | 5,334 | 13.1 | 8,524 | 11.1 | 5,895 | 12 | 9,677 | 10.5 | 10.5 | 13.5 |
| **RACE** | | | | | | | | | | |
| White | 35,110 | 86.4 | 69,566 | 90.7 | 39,842 | 80.8 | 79,376 | 87 | 13.5 | 15.7 |
| African American | 4,950 | 12.2 | 6,250 | 8.2 | 6,267 | 12.7 | 7,913 | 8.6 | 26.6 | 26.9 |
| Other race(s) | 581 | 1.4 | 857 | 1.0 | 2,196 | 4.4 | 2,767 | 2.78 | 277.97 | 222.9 |
| | | | | | | | | | | |
| Hispanic or Latino (of any race) | 275 | | 429 | | 2,011 | 4.1 | 2,466 | 2.7 | 631.3 | 474.8 |

Source: 1990, 2000 US Census

In both Bowling Green and Warren County population growth in people 65 years and older have yielded lesser percentile of the total population than in 1990 indicating an influx of younger population into the area. Students of Western Kentucky University [2] and Bowling Green Technical College consitute a significant share of the City population. The percentage of people 65 years and more is slightly higher in the city than the county , but the city population is relatively younger (28.6 years) compared to the county (32.2 years).

In 2000, the average household size of the County, 2.46 persons per household, is slightly higher than the City's (2.27 pph). In 1990, the County and the city had household sizes of 2.52 and 2.29 respectively. A smaller household size may imply an increase in per capita housing stock. This can also tanslate into greater utilitiy needs if the services are not shared (multi-family housing, etc). The average family sizes of the city and county are much closer at 2.91 and 2.97. The student and younger workforce population in the city contribute to the significant disparity in the houshold sizes of the city and the county.

In 1999, Median Household Income in Bowling Green was $29,047, substantially lower than that in Warren County at $36,151 [3]. This is also reflected in the poverty status profile for county and the residents: 22 percent of Bowling Green residents and 15.4 percent of the county residents live in poverty. AQs shown in the table below, about 30% of renter households pay more than 35 percent of their income on housing, indicating a need for additional affordable housing.

[2]WKU had an enrollment of 20,855 students in fall 2010.

[3]Census 2000. Economic Characteristics

## Table 4: Housing with Monthly Costs of 35 Percent or More of Household Income

| | Specified Owner Occupied Housing | | | Specified Renter Occupied Housing | | |
|---|---|---|---|---|---|---|
| | Total | More than 35% of Household Income | % | Total | More than 35% of Household Income | % |
| **Bowling Green** | 7,588 | 1,023 | 13.5 | 10,099 | 2,987 | 29.6 |
| **Warren County** | 16,979 | 2,167 | 12.8 | 12,404 | 3,449 | 27.8 |

Source: 2000 US Census

## Land Use and Zoning

**Sources:**

- **Warren County Property Valuation Administrator Database**
- **City-County Planning Commission of Warren County GIS**
- **Bowling Green Downtown Redevelopment Authority**
- **Bowling Green "District Revitalization Strategy"**
- **United States Department of Agriculture, National Agricultural Statistical Services**
- **Warren County 1990 Comprehensive Plan**
- **Subdivision Regulations**
- **Zoning Ordinance**

Beyond the city limits of Bowling Green, Warren County is still predominantly rural in character. Ninety percent or approximately 300,000 acres of it is classified as agriculture or open space. Much of the land north of the Dripping Springs Escarpment is covered by a blanket of deciduous forest, shrubs, and grassland. While some of this land is used for silviculture, much of it is simply undeveloped, open space. This portion of the County also contains fragmented patches of pastureland, much of which is located adjacent to the network of County roads. Land south of the Escarpment is primarily pastureland or cropland. In 2002, Warren County had the 5th most cropland, over 111,000 acres, of all counties in Kentucky and the third highest number of farms. In 2007, approximately 58,000 acres were farmed for hay, 29,000 for corn, and 24,000 for soybeans[1]. The majority of cultivated crops are concentrated in the portions of the County classified as prime farmland—south of Bowling Green between KY 68-80 and I-65 and northeast of Bowling Green in the areas around 31W and I-65. **(See Figure 3a: Existing Land Use-Warren County)**

**Table 5: Existing Land Use – Warren County**

| Existing Land Use | Acres | Percent of Total Land |
|---|---|---|
| **Agriculture** | 303,168.3 | 90.0 |
| **Single Family Residential** | 18,382.9 | 5.5 |
| **Multi-Family Residential** | 1,013.8 | 0.3 |
| **Commercial** | 3,479.2 | 1.0 |
| **Institutional** | 1,037.2 | 0.3 |
| **Government** | 3,298.1 | 1.0 |
| **Industrial** | 3,661.6 | 1.1 |
| **Vacant** | 2,909.1 | 0.9 |
| ***Total*** | *336,950.0* | *100.0* |

Despite agriculture continuing to play a significant role in the social identity of Warren County, it comprises a relatively small portion of the local economy and job market. Although Warren County has by total acreage among the highest amounts of farmland in the state, individual farms are relatively small—the national and state averages are 500 acres and 166 acres respectively, whereas Warren County's average is 145 acres.[2] With only two percent of the County's workforce employed in the agricultural sector and Warren County's total farm cash receipts in 2006 not making the top-ten state wide, it appears that farming in Warren County – as in many other places – is transitioning.

[5]2007 USDA National Agricultural Statistical Services

[5]Source: UK Government Agricultural Summit 2007

**Table 6: Existing Land Use – City of Bowling Green**

| Existing Land Use | Acres | Percent of Total Land |
|---|---|---|
| **Agriculture** | 7,130.8 | 32.2 |
| **Single Family Residential** | 5,292.0 | 23.9 |
| **Multi-Family Residential** | 853.8 | 3.9 |
| **Commercial** | 2,500.3 | 11.3 |
| **Institutional** | 438.3 | 2.0 |
| **Government** | 2,267.7 | 10.3 |
| **Industrial** | 2,611.3 | 11.8 |
| **Vacant** | 1,017.7 | 4.6 |
| ***Total*** | *22,111.8* | *100.0* |

Agriculture does make up the largest single land use within the City of Bowling Green, at 32.2% of total land. Nevertheless, the land use data demonstrates that Bowling Green is comprises the more "urban" areas of Warren County, constituting, for instance, 84% of total multifamily land in the county, approximately 72% of commercial land, 71% of industrial land and 69% of governmental land (**See Figure 3b: Existing Land Use-Bowling Green**).

As anticipated, the area south of Bowling Green – with flatter terrain, soils suitable for development and a location close to major arterials – has become the subject of developers' interest. **(See Figure 4: Development Status)** Rezoning data between 2002 and 2007 confirm a trend of reclassifying large, disconnected parcels from agricultural to single family—often "large lot"—residential between Routes 65 and 68 south of Bowling Green. **(See Figure 5: Development Trends: Warren County 2002-2007 Zoning Changes)**

The population capacity of the land between KY 68 and the Barren River outside of Bowling Green far exceeds projected population over the planning horizon, indicating that not all of it needs to be developed. **(See Figure 6: Development Trends: Major Growth Corridors)** Approximately 87,500 acres are classified as agricultural or vacant in this growth corridor. If 70 percent of this land is used for residential (with the remaining 30 percent allocated to other uses such as the road network, commercial, industrial, etc.), that leaves 61,200 potentially available for development. At a density of 1 dwelling unit per acre and at Warren County's current average household size of 2.46, this area could hold in excess of 150,600 people (63,000 dwelling units) or roughly four times the projected growth.

In fact, comparison of existing land use and zoning indicate that much, if not all, of the projected population between now and 2030 could be accommodated in existing urban areas. Of the approximately 8,100 acres within the city limits of Bowling Green currently classified as either vacant or agricultural existing land use, 1,300 are zoned for some type of residential. **(See Figure 7: Land Available for Residential Development in Bowling Green)** Based on the current permitted densities and the existing average household size of 2.46 persons, those 1,300 acres could hold up to 37,000 people, which is just shy of the 37,640 additional residents projected to reside in Warren County in 2030. Building permits in Bowling Green between 2000 and 2008 indicate that some of this infill is in progress. Most of the clusters of residential development are located toward the edges of town, in the same directions that growth is occurring outside of city limits. **(See Figure 8: Development Trends: 2000-2008 Bowling Green Building Permits)**

**Factors for Future Change**

1. The 1990 Comprehensive Plan directed industrial development to be concentrated in a few, carefully delineated districts in an effort use existing utility service and manage industries' interface with the rest of the community. This policy resulted in the creation of Kentucky Trimodal Transpark. **(See Figure 6: Development Trends: Major Growth Corridors)** Envisioned as an "environmentally friendly, high-tech business and commerce park," Transpark is located on US 31W and Highway 68/80 northeast of Bowling Green on a 1,200 acre mixed use site. In addition to providing space for industrial companies, the master plan incorporates elements such as hotels, restaurants, doctors' offices, and bicycle trails into a campus-like setting. In cooperation with the Kentucky Community and Technical College System and Western Kentucky University, a 31,000 square foot Technical Training Center with classroom and lab space was built for workforce training. Plans to relocate the airport to Transpark were stifled upon FAA's rejection of a need-based funding request. The Transpark has attracted several large tenants. Four months after officials broke ground in the park in 2003, Magna International, a large auto parts company, began building a 900,000 square foot facility and bringing in what has amounted to over 1,100 jobs and an estimated $212 million in investment. In November 2007, Bowling Green refinanced about $26.8 million in bonds for the project with general obligation bonds in order to facilitate the sale of land. While the exact timeframe for and pace of development are uncertain, the park, in combination with completed and planned infrastructure projects (e.g. extension of public water and wastewater lines, road construction and improvement), will not only stimulate industrial growth, but also residential and commercial.

2. The two utilities in the area, Warren County Water District (WCWD) and Bowling Green Municipal Utility (BGMU), are simultaneously preparing for and stimulating development in the two major growth corridors. **(See Figure 9: Anticipated Utility Demand)** WCWD's 2008 Water Capital Improvements Plan anticipates the bulk of new future potable water demand to come from Three Springs/Elrod Road, Rich Pond, Old Scottsville Road, and Glen Lily districts and has planned most of its capacity expansion projects there. Three Springs/Elrod Road, which includes the South Central Kentucky Industrial Park and several large subdivisions (e.g. Bailey's Farm, Hidden River, Hunter's Crossing, Ivan Downs, McCoy Place, and Remington Place, The Springfield, and Sutherland Farm), has experienced the most rapid residential growth in Warren County for the previous 15 years and is expected to continue to be a "hot spot." It will get a new storage tank, expanded water mains, and pump station improvements between 2009 and 2010. WCWD anticipates growth in the Rich Pond area due to the construction of a new joint middle and high school. A new water main and reconfiguration of water supply sources is planned for this area between 2011 and 2020. Residential growth is also expected to continue in the Glen Lily district, near the intersection of Morgantown Road and Veterans Memorial Lane. A new storage tank, transmission pipeline, and pump station are also planned for between 2011 and 2020. Later in the planning horizon (between 2021 and 2030), WCWD expects to build new water mains and increased capacity of a storage tank in the area around Old Scottsville Road. BGMU and WCWD have jointly identified seventeen future wastewater service areas, most of which are south and northeast of Bowling Green.

3. In addition to anticipated "greenfield development" surrounding Bowling Green, the land use pattern in downtown is also primed for change. In 2002, Bowling Green adopted a Downtown Revitalization Strategy to improve the cohesion and viability of the 80 core blocks of the city, approximately 580 acres located east of Western Kentucky University, north of the US/31W Bypass, west of the Barren River, and south of the CSX rail line to be implemented by the Downtown Redevelopment Authority. Since the adoption of the plan, the Authority has made improvements to pedestrian connectivity and the streetscape surrounding Fountain Square Park and assisted in the rehabilitation of several commercial and residential historic buildings.

4. Downtown Bowling Green is also being transformed through the implementation of a Tax Increment Financing (TIF) project.[3] The targeted TIF area now includes properties stretching from Western's campus to the Barren River, near US Route 31-W and Kentucky Street. In addition to a recently completed $25 million 4,000+ seat minor-league ballpark (for the Bowling Green Hot Rods), the vision for the TIF district includes Circus Square Park, which opened in the summer of 2008, and the Southern Kentucky Performing Arts Center (SKyPAC) currently under construction, among other plans. To date, completed projects have raised approximately $66 million. The City will receive 80 percent of the taxes paid by those and future projects.
   Circus Square Park is located on the block bordered by College Street, Sixth Avenue, State Street, and Seventh Avenue, and historically served as a community green. The recent renovation re-established the park's function as a community gathering place, with a center alleyway which encourages pedestrian use and promotes connectivity to the surrounding area, a "performance and activity plaza" that includes an interactive fountain, a lawn for special events, an outdoor pavilion to be used as a seasonal marketplace, and an outdoor dining area. A historic building, formerly used by a car dealership will be adaptively reused for offices and commercial space.

   Plans for SKyPAC were in progress prior to the TIF project. The ongoing construction is scheduled to be completed in October 2011. However, a parking structure that would have been built downtown near the SKyPAC and Bowling Green Ballpark sites is likely to be replaced by surface parking, with the garage being moved adjacent to the WKU campus as part of a mixed-use project that will include a variety of student housing and a potential hotel.

5. Western Kentucky University (WKU), an important presence in the development dynamics of Bowling Green, is positioning itself for change. In September 2007, WKU announced its *A New Century of Spirit* campaign, which aims to raise more than $200 million over the next five years in order to "affect profound attitudinal, intellectual, financial, and physical changes in the campus." The plan has set several measurable benchmarks that will affect enrollment— and ultimately, the number of people living in Bowling Green. By the 2011/2012 school year, it aims to increase undergraduate enrollment by approximately 1,150 students, from 16,067 to 17,217 and the number of graduate students by approximately 185, from 2,597 to 2,783. This will necessitate planning for the

neighborhoods surrounding WKU's main campus, which over the years have experienced increasing traffic circulation and parking problems, as well as a pressures on the quality of the housing stock as formerly single family residences were converted into student housing. An increase in enrollment may also re-stimulate an effort to coordinate WKU's bus service, Big Red Shuttle, which is operated by the University and runs a loop-route on-campus only, and the City bus system, GO BG. This opportunity was explored as a result of the Downtown Revitalization Strategy, but was not implemented at the time because it was determined that the City did not have a vehicle large enough to accommodate the ridership that would result from this merger. Such an improvement in the transit system could affect land use.

6. Presently, land use decisions (i.e. review of development proposals and rezonings requests) are to be made in the context of the three broad "Development Districts"—Urban Density Development (UDD), Rural Density Development (RDD), and Rural Conservancy District (RCD)—established in the 1990 Comprehensive Plan.

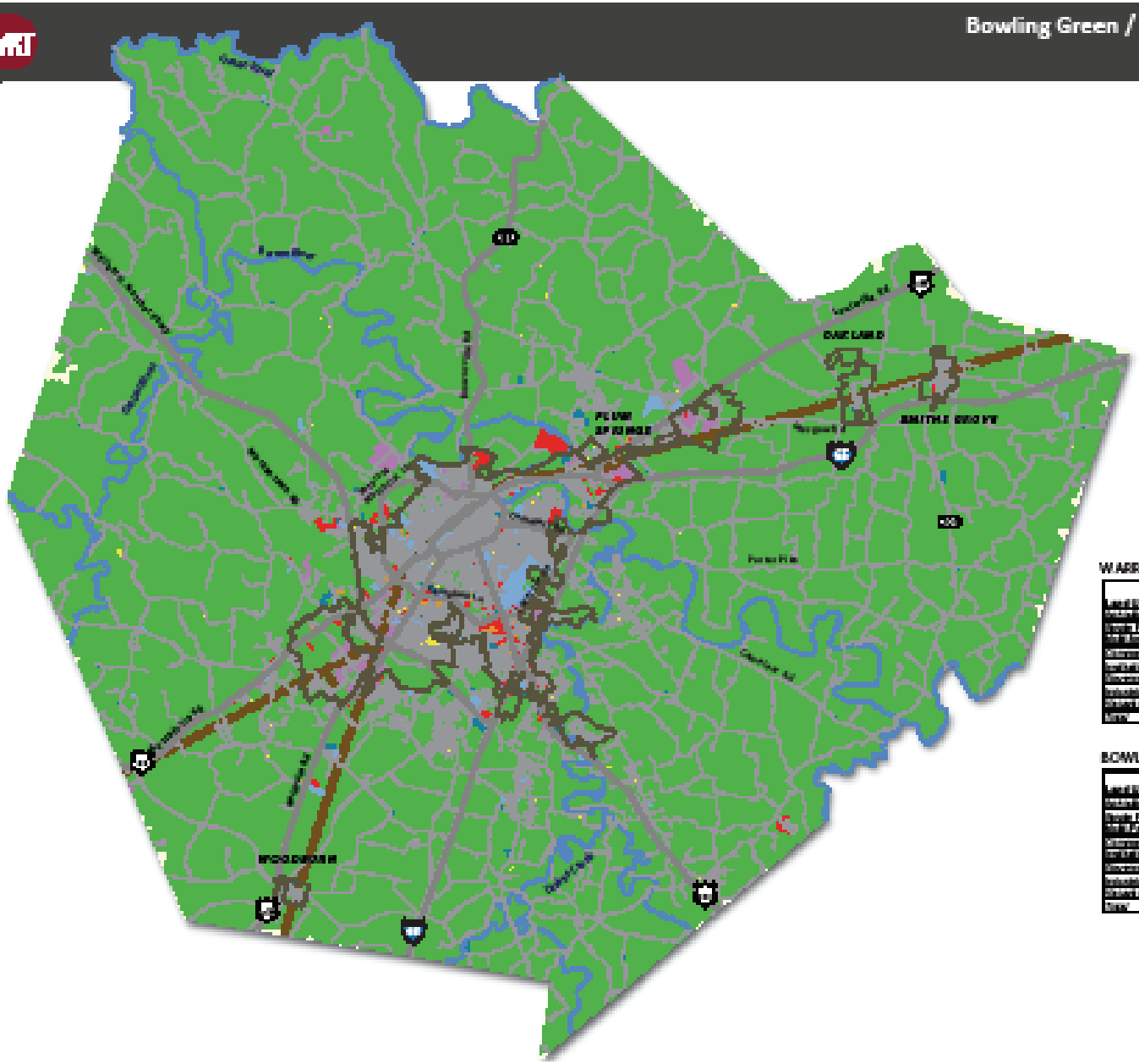
   The UDD District is made up of those parcels within the corporate limits of Bowling Green, Plum Springs, Oakland, Smiths Grove, or Woodburn or within 1,500 feet of public sanitary sewer. Properties meeting one or more of the following criteria comprise the RCD District:

   - outside corporate limits of Bowling Green, Oakland, Plum Springs, Smiths Grove, or Woodburn and served with less than 250 gallons per minute (gpm) public water flow at 20 pound per square inch (psi) residual pressure;
   - located more than 5 roadway miles from a fire station;
   - severe soil limitation with respect to septic tank and absorption field system;
   - within the 100 year floodplain;
   - where public road pavement width is less than 16 feet;
   - designated as a wildlife or nature preserve; and,
   - contains concentrations of intermittent Karst lakes or other areas which historically flood during storms with a frequency of less than 100 years.

   The balance of land in the County that meets neither the criteria of UDD District, nor RCD District, is part of the RDD District.

   Generally, only low density single family development is intended to occur in RCD and RDD Districts. In fact, land use decisions do not strictly follow these guidelines. This, combined with overly broad guidelines in the 1990 Comprehensive Plan regarding what constitutes suitable and compatible neighboring uses, and a general readiness to accommodate utility service extension requests, has resulted in a scattered development pattern in the rural parts of southern Warren County. **(See Figure 10: Development Pattern Based on Current Zoning)** The resulting inability to reliably anticipate future neighborhood character or development on adjacent parcels results in uncertainty for property owners about their future property value. Uncertainty is also burdensome on developers, who cannot unequivocally determine to which standards they will be held.

# FIGURE 3a: EXISTING LAND USE




WARREN COUNTY

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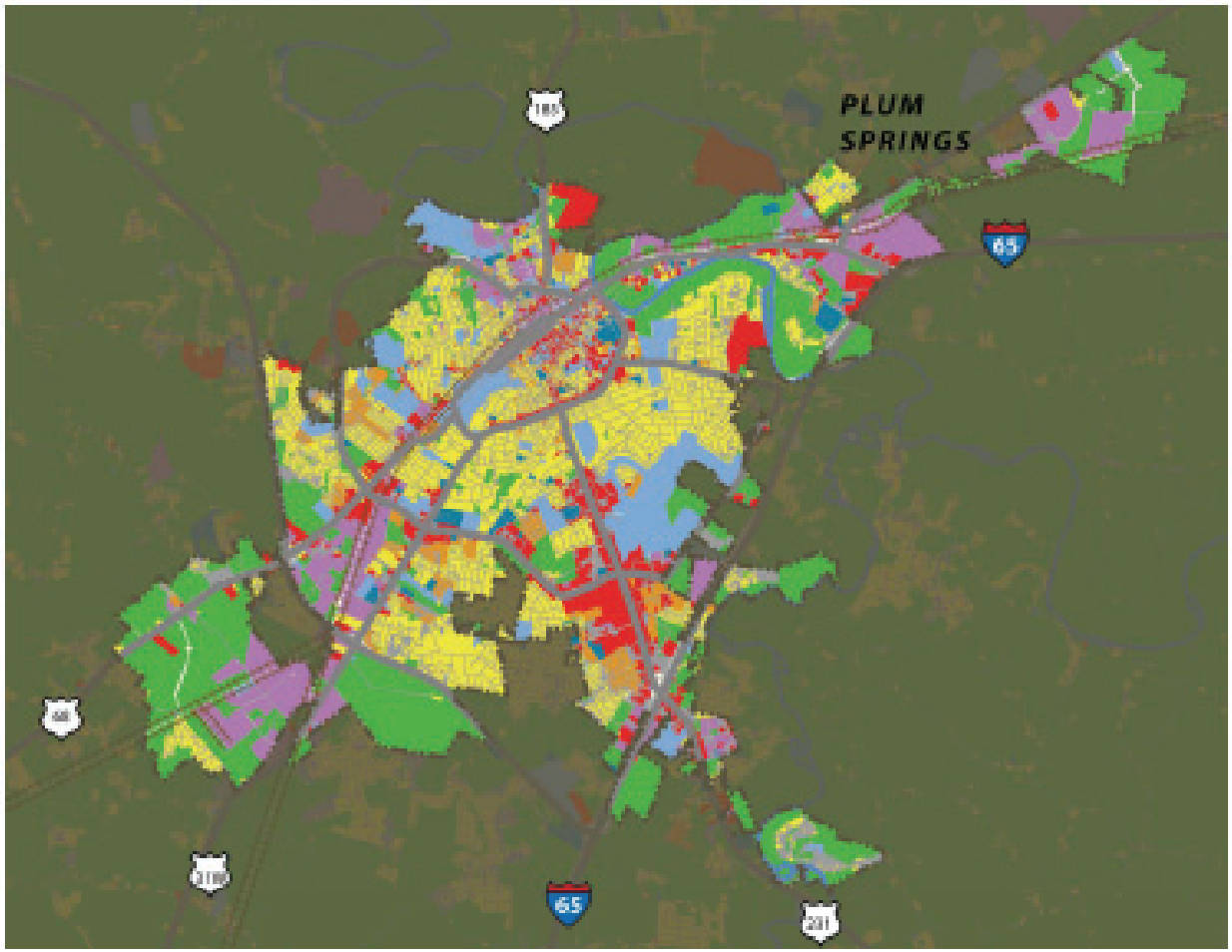
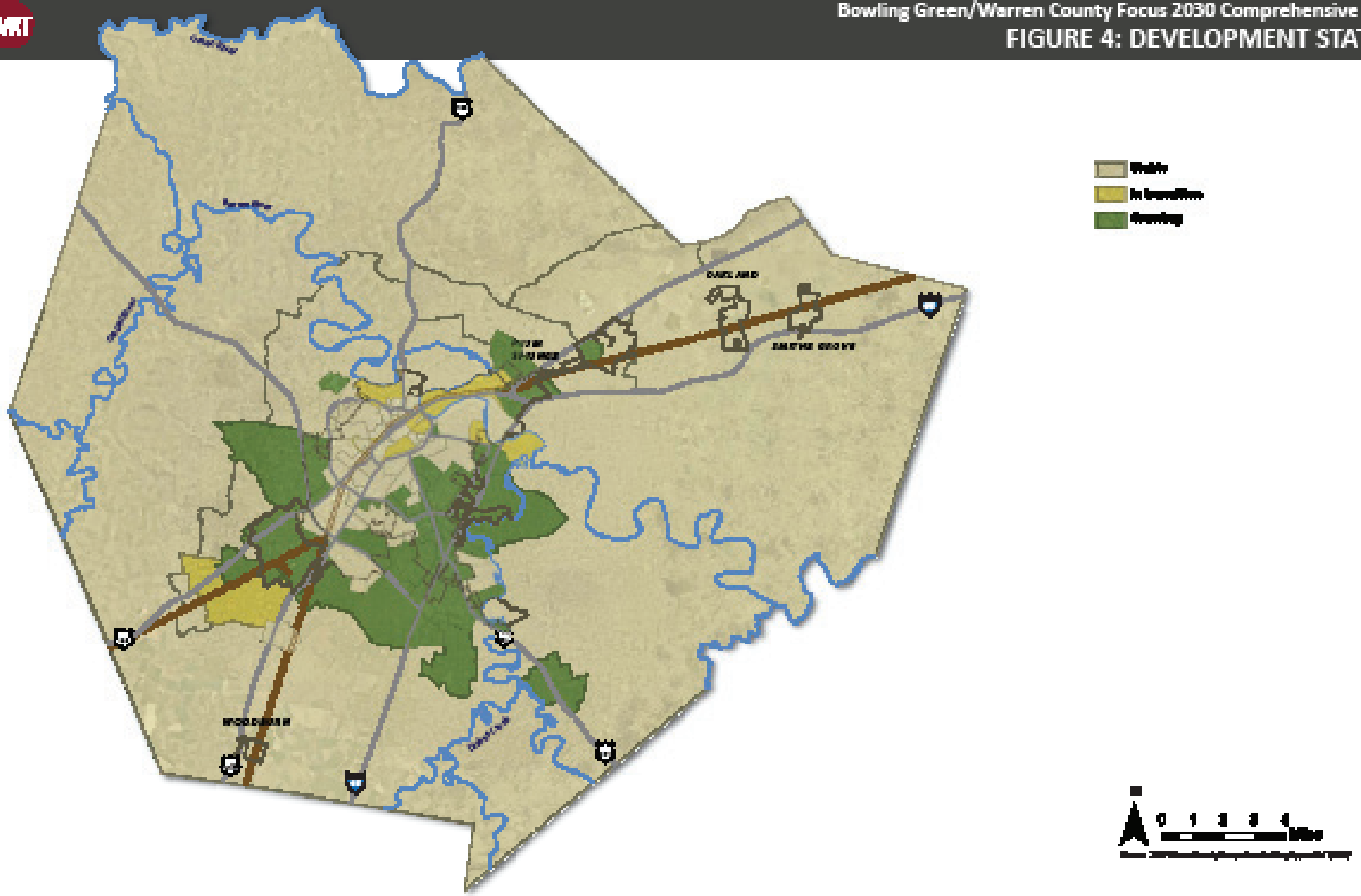
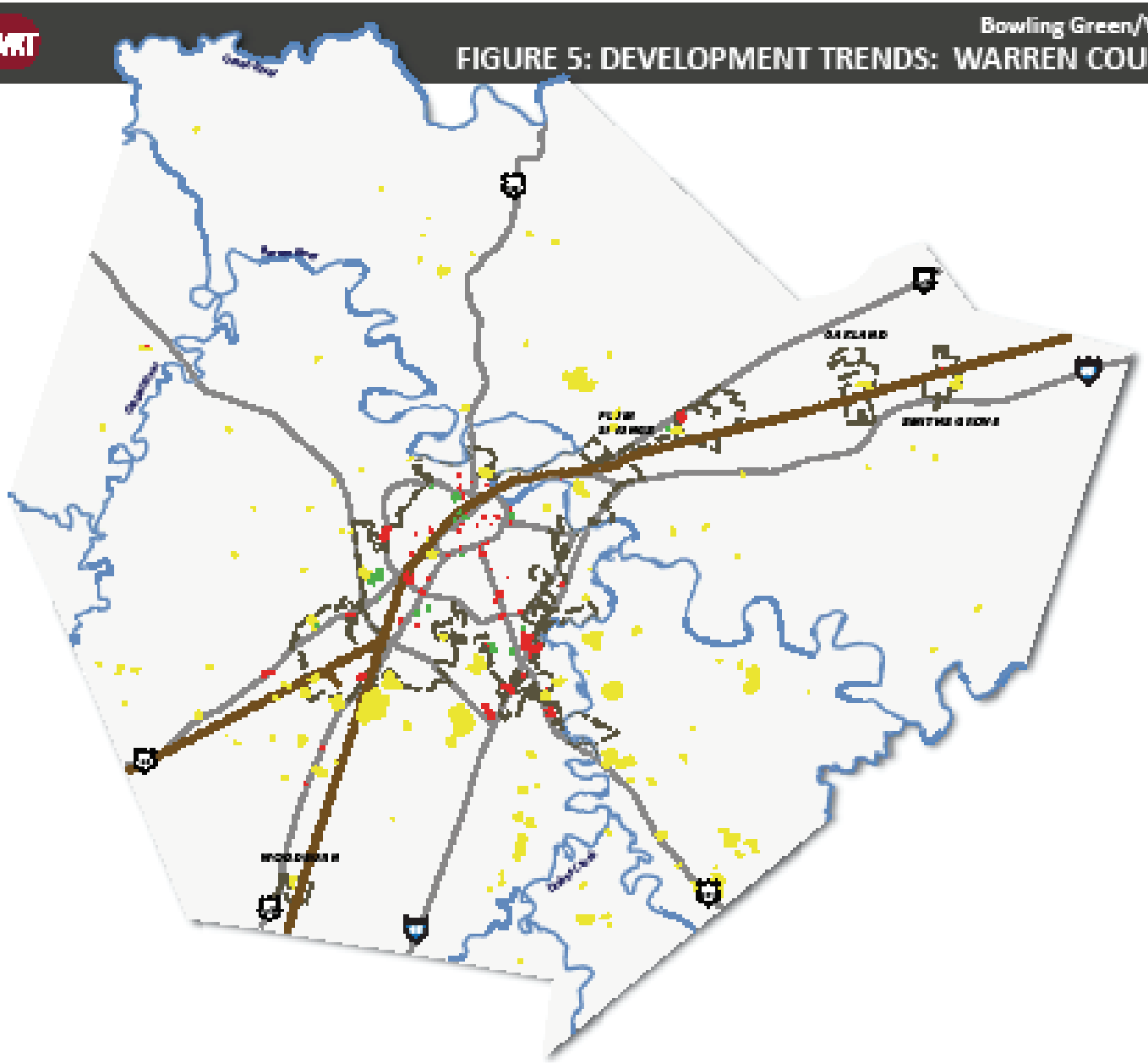
# FIGURE 3b: EXISTING LAND USE - BOWLING GREEN



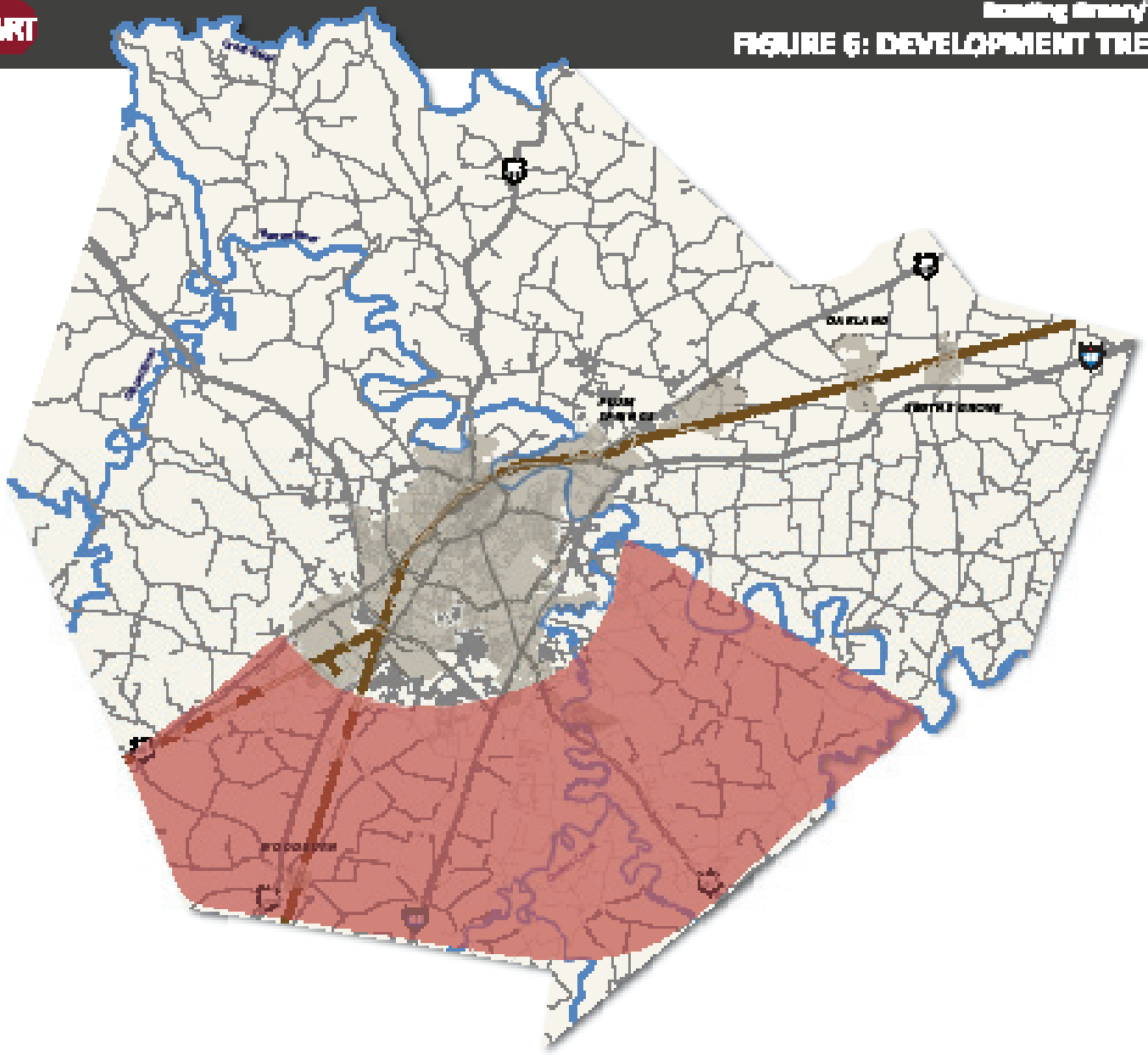
# FIGURE 4: DEVELOPMENT STATUS



# FIGURE 5: DEVELOPMENT TRENDS: WARREN COUNTY 2002 - 2007 ZONING CHANGES



## FIGURE 6: DEVELOPMENT TRENDS: MAJOR GROWTH CORRIDORS



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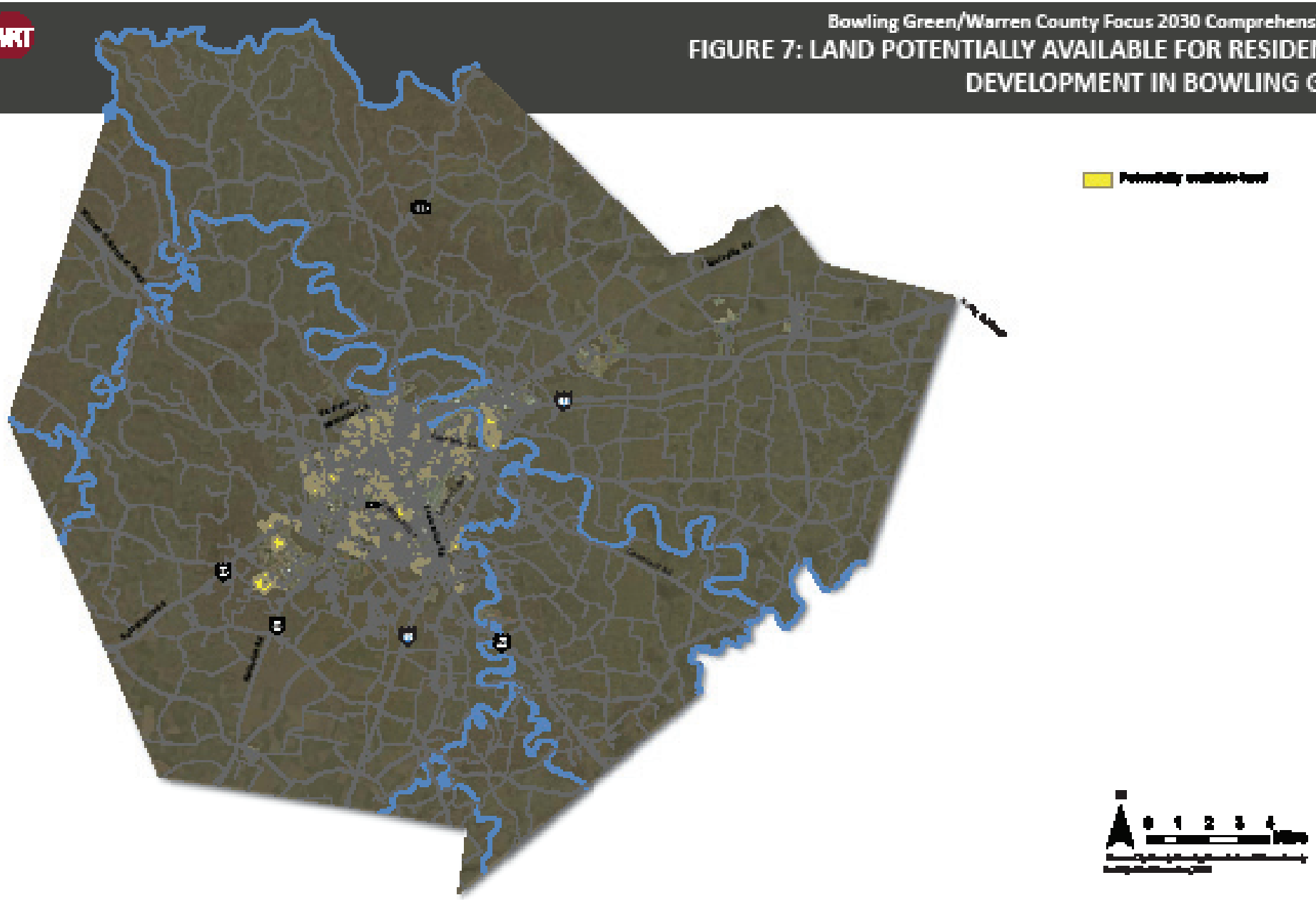
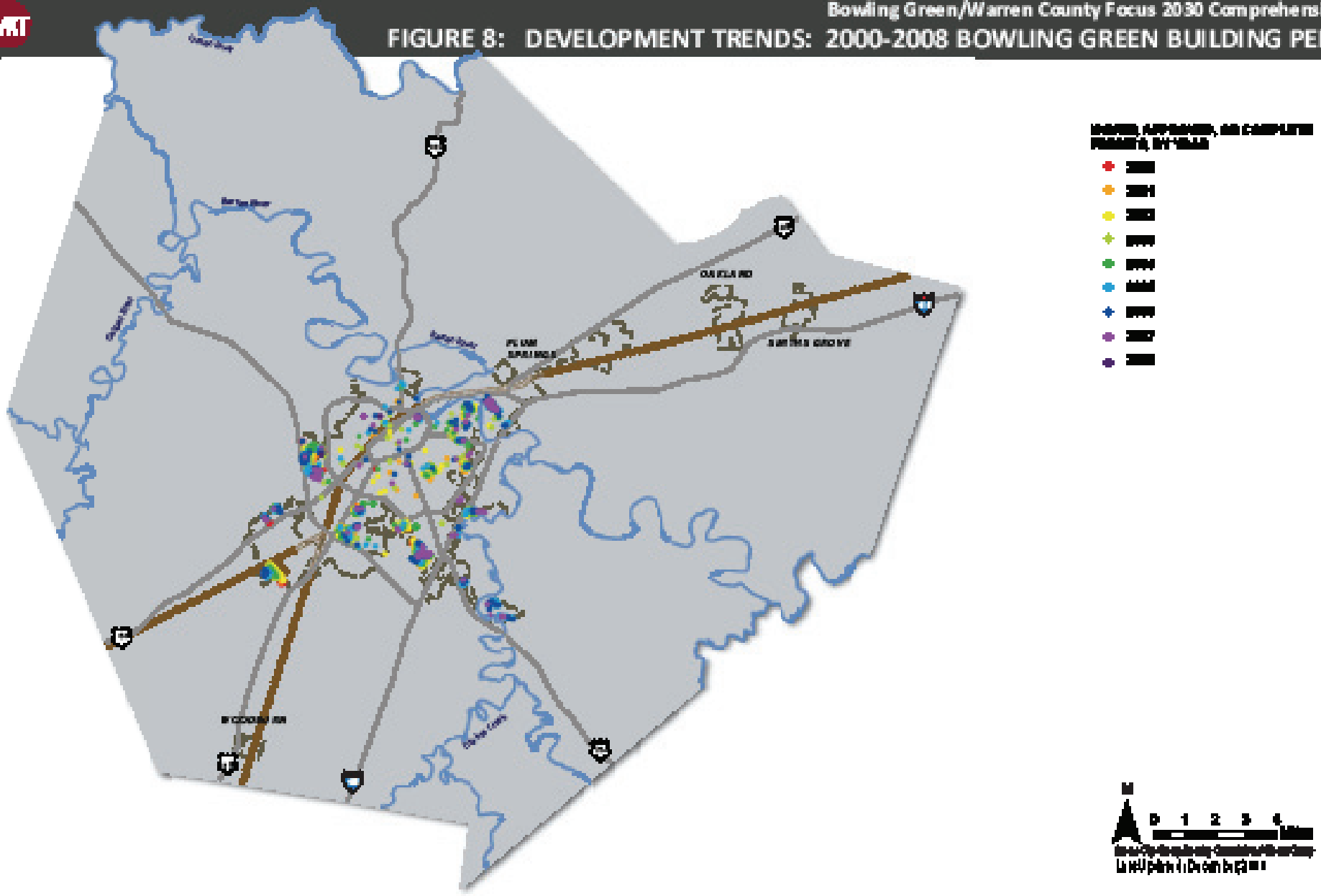
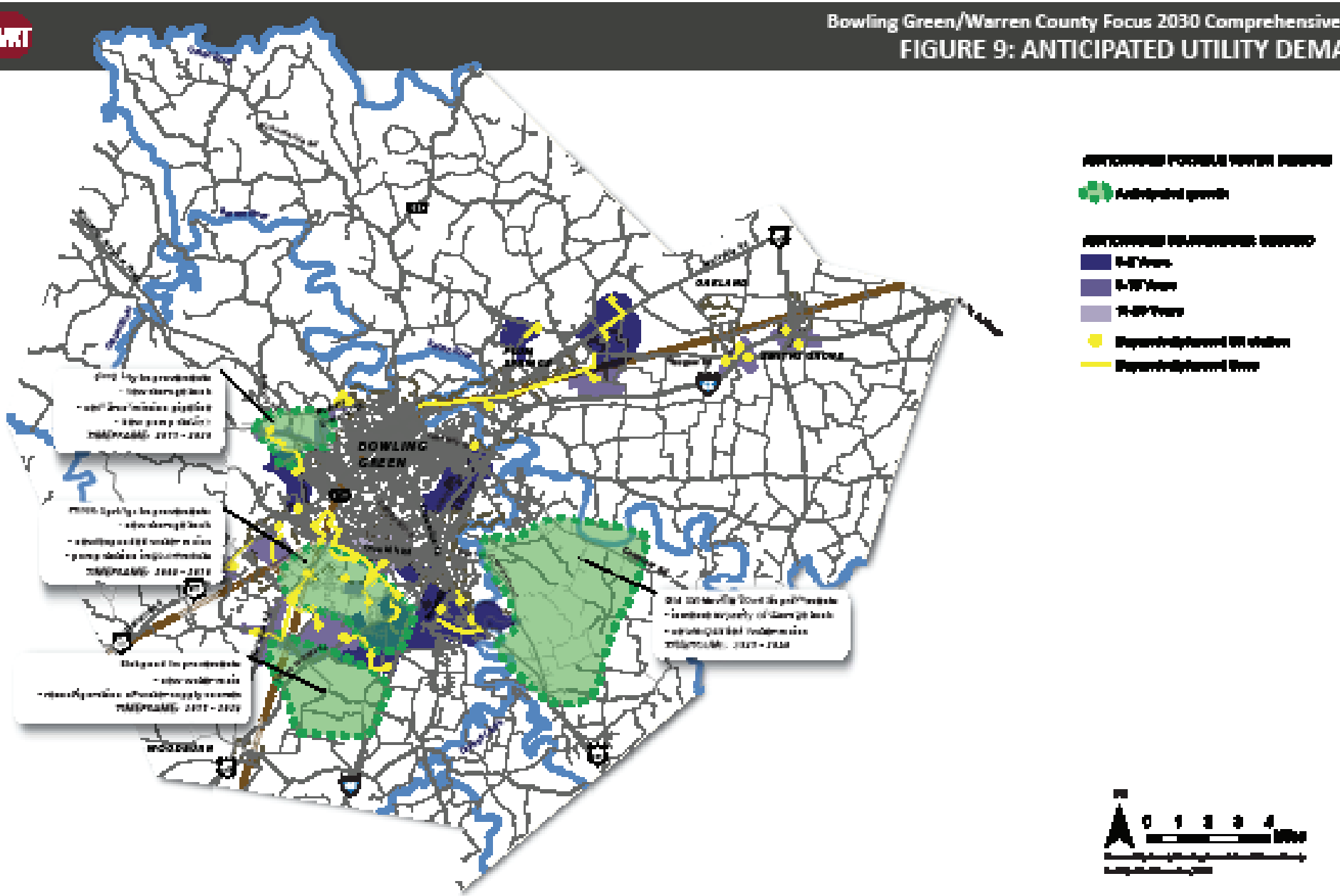
# FIGURE 7: LAND POTENTIALLY AVAILABLE FOR RESIDENTIAL DEVELOPMENT IN BOWLING GREEN



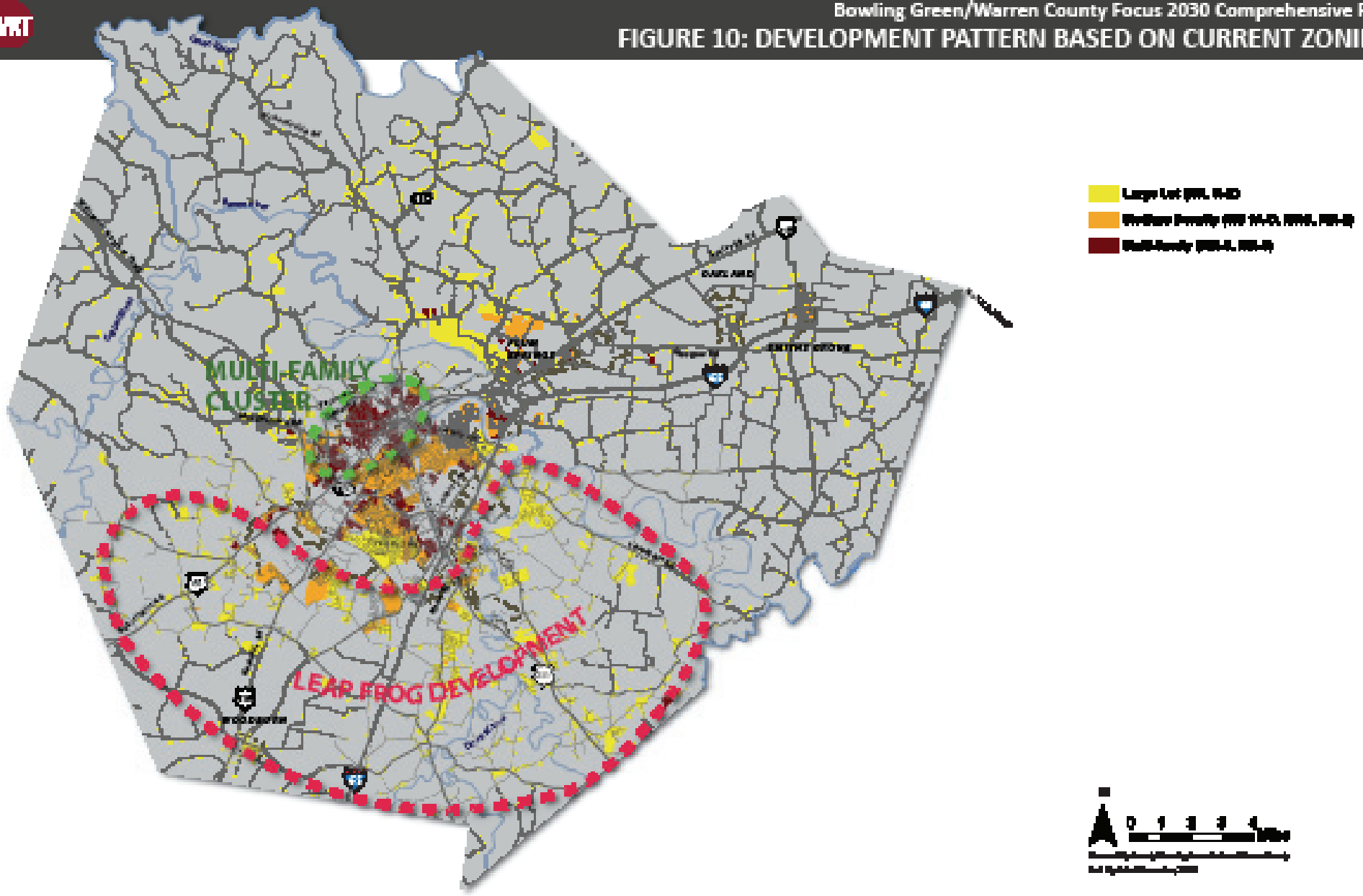
# FIGURE 8: DEVELOPMENT TRENDS: 2000-2008 BOWLING GREEN BUILDING PERMITS



# FIGURE 9: ANTICIPATED UTILITY DEMAND



# FIGURE 10: DEVELOPMENT PATTERN BASED ON CURRENT ZONING



## TRANSPORTATION

**Sources:**

- **Warren County Metropolitan Planning Organization (MPO)**
- **Kentucky Transportation Cabinet**
- **Warren County 2030 Long Range Transportation Plan**
- **Community Action Transit**
- **Western Kentucky University**
- **Federal Aviation Administration (FAA)**
- **southcentralky.com Website**

*Existing Facilities*

A collection of major highways, principal arterials, minor arterials and collectors provide varied levels of access and mobility in Warren County: I-65, the William H. Natcher Parkway, US 31W, US 68, US 231, and numerous state, county and local highways. Many of these roadways vary in size and character as they traverse different parts of the county (US31W, KY185, KY234, KY880 and KY446). **(See Figure 11: Existing Transportation Network and Figure 12: Functional Roadway Classification)**

I-65, which extends from Chicago, Illinois to Mobile, Alabama, traverses Warren County east of Bowling Green and is a primary source of regional connectivity. Recently widened from four lanes to six through much of the County, the Interstate connects the area, including Oakland and Smiths Grove, to Louisville in just less than two hours and Nashville in just over one. This proximity has been a stimulus of growth in the area — it has made it possible for businesses to establish headquarters and regional distribution centers in a location that offers comparable affordability, an educated workforce, and access to major metropolitan areas; and, it attracts people looking to live in a "small town atmosphere" within short reach of "big city" cultural, commercial and employment opportunities to meet their needs. William H. Natcher Parkway is part of the National Highway System and National Truck Network and will be part of the I-66 corridor project to internally connect the state of Kentucky. It intersects I-65, US 68, and US 31W and is the most major road connecting Bowling Green to the northwestern parts of the County and beyond. US 31W, US 68, and US 231 carry large volumes of local and regional traffic through Warren County into Bowling Green. US 31W was the primary interurban connection between Louisville, Bowling Green, and Nashville prior to the construction of I-65. It remains a major north-south route in the County because it is centrally located and near many developments. US 68 funnels traffic from the rural, southwestern portion of the County into downtown Bowling Green. It briefly merges with US 31W north of Bowling Green, until it cuts east and disperses traffic through the northeastern part of the County. Like US 31N and US 68, US 231 transitions from a rural road through most of Warren County into a heavily traveled, major urban arterial upon reaching Bowling Green. It connects Warren County with Butler County to the northwest and Allen County to the southeast. KY 101 is the only rural arterial in Warren County that does not pass through Bowling Green. Running through Smiths Grove and extending through to both Edmonson and Allen Counties, it is the major north-south route outside of the urban area in the eastern part of Warren County. All Rural Minor Collector roads are maintained by the Kentucky Transportation Cabinet (KYTC), including KY 259, KY 263 (Richardsville Road), KY 240 (Petros Road

and Woodburn-Allen Springs Road), KY 242 (Rich Pond Road), KY 432 (Blue Level Road), KY 526 (Mt. Olivet Road), KY 622 (Plano Road), KY 626 (Jackson Bridge Road), KY 743 (Boiling Spring Road), KY 884 (Three Springs Road), KY 961 (New Cut Road and Claypool-Boyce Road), KY 1083 (Galloways Road and Rockfield-Browing Road), KY 1297 (Sunnyside-Gotts Road), KY 1320 (Girkin Road and Penns Chapel Road), KY 1402 (Porter Pike), and KY 1435 (Barren River Road).

Four state highways, KY 185, KY 446, KY 880, and KY 234 (Cemetery Road) move traffic in and around downtown Bowling Green and the surrounding urbanized area. KY 185 is the only Barren River crossing in northern Warren County, running from US 68/Kentucky Street in Bowling Green to the County line and thereby positioning it as the major north/south spine in the central part of the County. KY 446 connects I-65 to US 31W/US 68 on the north side of Bowling Green. KY 880, known as the "Inner Beltline," loops around the city and includes portions of Veterans Memorial Lane, Campbell Lane, and Lovers Lane. Following the recent completion of an I-65 interchange, KY 234 serves as a significant gateway into downtown and completes the northeast portion of the Inner Beltline. The remainder of the urban arterial network is comprised of short segments of KY 844 (Three Springs Road) and KY 1402 (Porter Pike), and Broadway Avenue, Main Street, College Street, and State Street downtown.

*Level of Service*

Roads in Warren County classified as rural have a Level of Service (LOS) standard C; urban roads have a standard of D. The actual network-wide operating conditions were last determined in the 2004 Major Thoroughfare Plan comparing average daily traffic to existing capacity. **(See Figure 13: Roads Level of Service (2004))** In that plan, most of the routes classified as heavily traveled or congested are owned and maintained by the state or federal government. For example, the 2004 LOS of roads at 'no build' conditions (existing + already committed network) shows that failing roads are primarily radial arterials from the south of Bowling Green to Downtown and those that constitute the Inner ring (KY 880/ US 231). These include US 31w from KY242 to Natcher Parkway, I-65 from KY234 to KY446, US 68/ KY 80 from KY 432 to Campbell Lane, and US231 from KY 880 over Campbell to Natcher Parkway, and KY 185 from US 68 to KY 526.

Most failing roads are radial arterials from the south of Bowling Green to downtown and those that constitute the Inner ring (KY 880/ US 231). Without new improvements, in the year 2030 the congestion would extend further outwards and most arterial access ways to the city would fail to meet LOS standards.

Most portions of I-65 were widened from four to six lanes and were operating at a sufficient level of service according to the 2004 Major Thoroughfare Plan, except the segment from US 68 to KY 101 which was operating at level D. Some of the worst traffic congestion in the County occurs on US231 from the I-65 exchange into downtown. In both 2000 and 2004 the segment from I-65 to Lovers Lane fell below its LOS standard. This deficiency is largely because, in addition to handling a bulk of the commuter traffic coming from the southeast, US 231 is a major shopping destination, attracting people from surrounding counties on the weekends. The commercial strip pattern of development slows traffic due to numerous curb cuts and the lack of connection between plazas, which necessitates driving between each.

Many other major state or federally owned southern access ways into Bowling Green were performing below their LOS standard in 2004:

- US 31W is underperforming from Natcher Parkway into downtown. The segment from KY 234 to Bristow Road to the north of Bowling Green is also enduring congestion.
- US 231 coming into Bowling Green from the southwest (KY 622 to Cumberland Trace) and segments between KY 880 and US 31, and US 68 to KY 880 are failing.
- KY 185 from US 68 to KY 880/Gordon Avenue has worsened from an E to an F between 2000 and 2004.
- Most of the road segments in the KY 880 / US -231 loop have worsened to level F.
- US68/KY 80 in the southern downtown Bowling Green (between 880W and Business US 231) is performing at an F.
- KY 234 from the I-65 exchange to Hayes Lane / Hampton Dr is performing at a level of service F.
- Parts of Chestnut St, Small House Road, and Old Louisville Road in Central Bowling Green are also failing.

These worsening road conditions correspond to the pattern of new development, much of which is occurring around these roads, south and northeast of Bowling Green. As can be expected, without improvements, the congestion will spread significantly by 2030. **(See Figure 14: Roads Level of Service (2030))** Most arterial access ways to the city of Bowling Green are anticipated to fail. The pattern is stronger in the south-south east areas and north-north east areas, the two areas of expected future residential and commercial growth.

*Recently Completed, Programmed and Planned Roadway Improvement Projects*

Unique to Kentucky, the state itself is responsible for the provision of a local community's road needs, including interstate highways, major and minor arterials, and even rural collector roads. The Kentucky Transportation Cabinet (KYTC) maintains federal and state highways and implements most of the planned highway projects.

The Bowling Green – Warren County Metropolitan Planning Organization (MPO) is the primary entity responsible for orchestrating improvements to state and federal roads in Warren County. It oversees projects scheduled and funded in Kentucky's Six Year Highway Plan and the federally mandated Transportation Improvement Program (TIP). Many of the existing LOS issues enumerated in the previous section are addressed by widening and reconstruction projects in the 2007-12 TIP and the KYTC Six Year Highway Plan (2008-14). Most programmed projects target capacity expansion of failing roads, especially the radial arterials & the Inner Ring (KY 880/ US 231). **(See Figure 15: Programmed and Planned Roadway Projects and Figure 16: MPO 2030 Long-Range Highway Projects)**

Although most of the rural arterials in northern Warren County are meeting LOS standards, reconstruction and intersection improvements are planned to preserve existing capacities on KY 185 and KY 101. The southwest area of Warren County lacks a good collector network to support the expected growth in the area. This, in addition to the fact that there are no planned projects

to serve the overburdened US 231 and other arterials in the area, means that more congestion is expected as growth continues.

Three of the programmed projects are designed to accommodate major development possibilities, and are expected to stimulate growth in certain portions of Warren County.

- Construction of a 4-lane segment of US 68 from US 31W through Transpark is scheduled to begin in 2008—though there are unspecified environmental issues that may delay the start of the project. It will connect the industrial Park to the programmed I-65 interchange.
- Extension of William H Natcher Parkway to US-231 at Dye Ford Road is scheduled for construction in 2009. This segment will become part of the Outer Beltline.
- A new interchange at the Natcher Pkwy and Elrod Rd South is currently being studied.

In addition to implementing funded and scheduled projects, the MPO also reviews all unfunded and unscheduled recommended projects in the 2030 Long Range Transportation Plan, the Major Thoroughfare Plan, and other sources. Based on current roadway performance, fiscal constraints, growth projections, and anticipated future system needs, it creates a prioritized list of the most critical projects not part of Kentucky Six Year Highway Plan or TIP, but to be integrated into future funding cycles. Items on this "Unscheduled Projects" list includes some of the congested roads currently operating at or near LOS F — segments of US 68 in the city limits; US 231 from I 65 to KY 880, and of KY 234. Some items are designed to preserve capacity in anticipation of future demand, such as the reconstruction of KY 101 from Smiths Grove North to US 31 W, which is not currently operating below standard. Apart from these capacity preservation projects and improvements to existing roads, some of the unscheduled projects will establish brand new roads, road segments and interchanges and will have a major impact on the transportation system and regional development:

- The I-66 Corridor Planning Study was jointly conducted with the Bowling Green Outer Beltline Planning Study. This corridor would provide an improved, efficient interstate facility between the Natcher and Nunn Parkways. Two new corridors in addition to the I-65 corridor were considered. The shorter version has a new 14.8 mile route running closer to the city in the north and would serve new development on the northern side of Bowling Green.
- The Southwest Parkway consists of two segments connecting US 68 to 31W and US 31W to I-65, south of Bowling Green.
- An eastern connector for Bowling Green from US 231, south of Bowling Green to I-65, northeast of Bowling Green.

Both I-66 and the Bowling Green Outer Beltline have been designated as corridors of regional and national significance.

*Public Transit*

Most areas of Warren County and Bowling Green do not meet the general density threshold necessary to support public transit. Consequently bus service is limited to a small area in downtown Bowling Green (that has at least 4 dwelling units per acre) and 92.8 percent of the

workforce commutes to work alone by personal vehicle[4]. The current pattern of development—low density, scattered, on the fringes—perpetuates this situation. However, as the population ages and can no longer drive, roadways become increasingly congested in spite of widening and other improvements, and as the enrollment of WKU increases, providing a more accessible and extensive alternative to automotive travel will become necessary.

The Bowling Green Public Transit system currently operates as a division of Community Action Transit (CART) that serves all the ten counties of the Barren River District. This public transit program called 'Go BG' is a small bus system that operates from 7AM until 6PM on four fixed routes on weekdays. All routes currently begin and end at Beauty Avenue in the northern part of Bowling Green. Route 1 makes a loop through downtown and the surrounding area primarily connecting riders with institutional facilities. Route 2 serves the residential neighborhoods in the north part of Bowling Green to Wal-Mart, Bowling Green Technical College and other centers. Route 3 serves many commercial and a few residential areas along Scottsville Road. Route 4 is a large loop route covering the central part of the City, connecting its many residential neighborhoods, the WKU South Campus and Kroger. The existing route structure connects with many of the planned greenway projects. **(see Figure 17: Public Transportation)** On an average weekday, Routes 1, 2 and 3 have just over 80 passengers each while Route 4 serves about 40 people. As Table 7 below shows, the ridership has been steadily increasing over the past few years.

**Table 7: Bowling Green Public Transit Ridership**

| FY 2004 | FY 2005 | FY 2006 | Change 04-05 | Change 05-06 |
|---|---|---|---|---|
| 31,319 | 37,109 | 49,373 | 18.5% | 33.0% |

The WKU shuttle bus system provides a limited transportation service to its students on three routes: a Red Line inside the campus (Inner Loop); White Line to South Campus; and Green Line Shopping Shuttle to the main shopping and entertainment areas. Both of these transit systems have proposed upgrades and expansions to their transit services in the coming years but do not share their services.

Both the LRTP and the Go BG transit study recommend moving the transfer location from Beauty Avenue to a more central location, near Circus Square in downtown, to allow for easy extension of routes and eliminate unnecessary time and distance loss. The LRTP also suggests that multiple transfer hubs (such as the Greenwood Mall or the WKU South Campus Complex) could be developed rather than a single transfer point in the central portion of the city. The transit study recommends two new routes: A route between off-campus student housing located south of Campbell Lane along Patton Way and Thoroughbred Drive and the WKU campus. This route would also serve the Campbell Lane Kroger and could potentially serve the WKU south campus and a concentration of senior housing off Nashville Road. Route 3 has the most major destinations of Go BG's four transit routes. In addition to improving the frequency on route 3, a new shopping circulator is recommended to extend the reach of Route 3 further from the mall to other shopping and work destinations / hotels around Scottsville Road.

*Airport*

The Bowling Green – Warren County Airport located in eastern Bowling Green currently provides freight services but does not offer commuter passenger service.

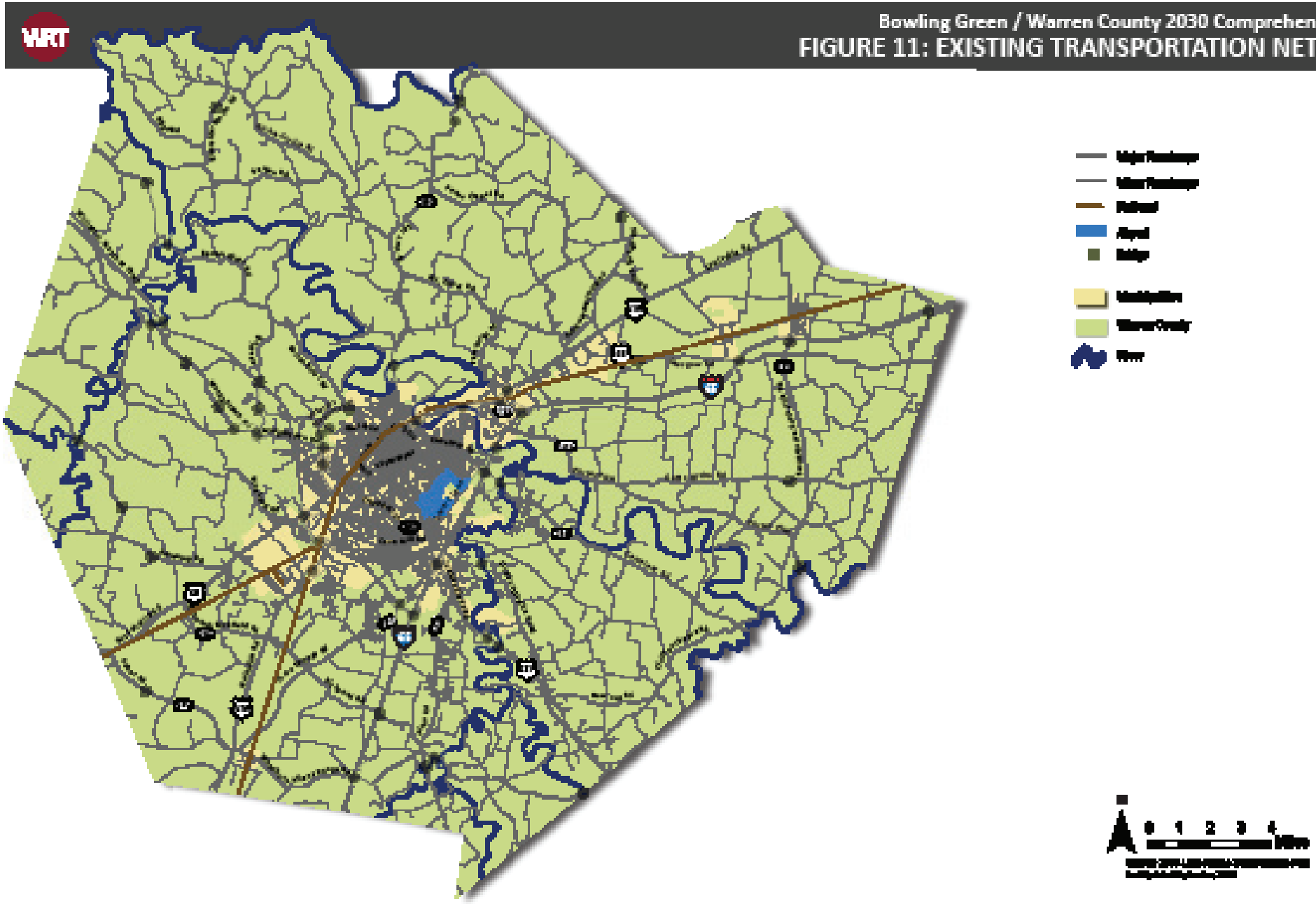
Located on a constrained site, the Airport's two operational runways have some inadequacies. The runway length is insufficient to handle existing and expected corporate aviation and commercial uses. The Airport is

[7]US Census, 2000

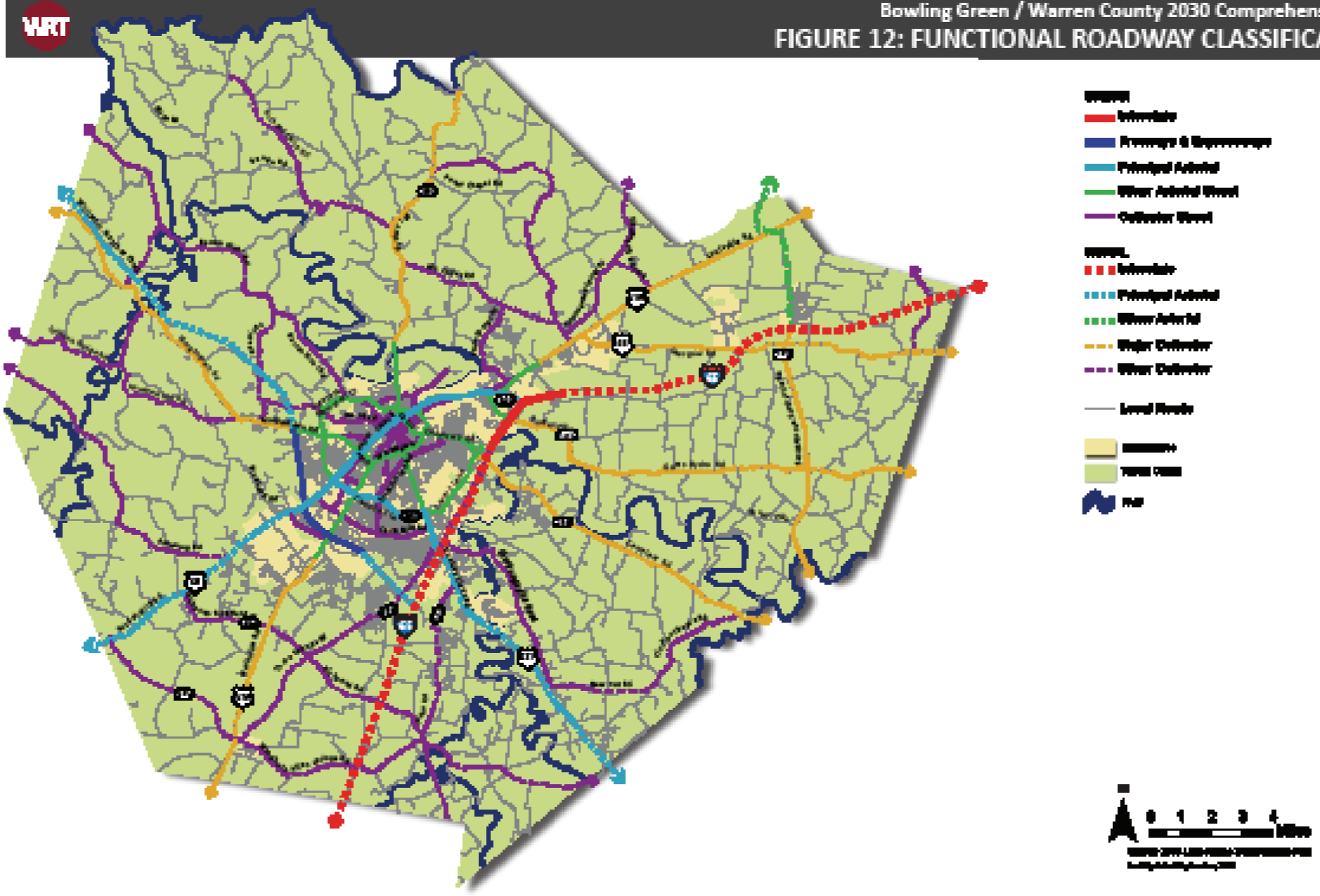
also not in compliance with Federal Aviation Administration (FAA) safety standards and facility requirements. A portion of the Runway Safety Areas (RSA) is outside Airport property, is only partly controlled, and contains obstructions. In addition, some areas of the Runway Protection Zone (RPZ) are occupied by single-family residences, which would require significant capital expenditure for acquisition and demolition. The current airport site also effectively blocks the eastward expansion of the City of Bowling Green.

PB Aviation, consultants for the Bowling Green Regional Airport, conducted a Benefit-Cost Analysis (BCA) comparing the base case of accommodating commuter service within the current airport terminal and the alternative of relocating the airport elsewhere (to the TriModal Transpark area). According to the year 2005 values, the relocation alternative would provide a savings of around $29.2 million over the bringing the Airport up to FAA standards**.** And apart from cost benefits, the relocation also offers better safety, the ability to attract new tenants and projects a positive regional image providing competitive first class facilities.

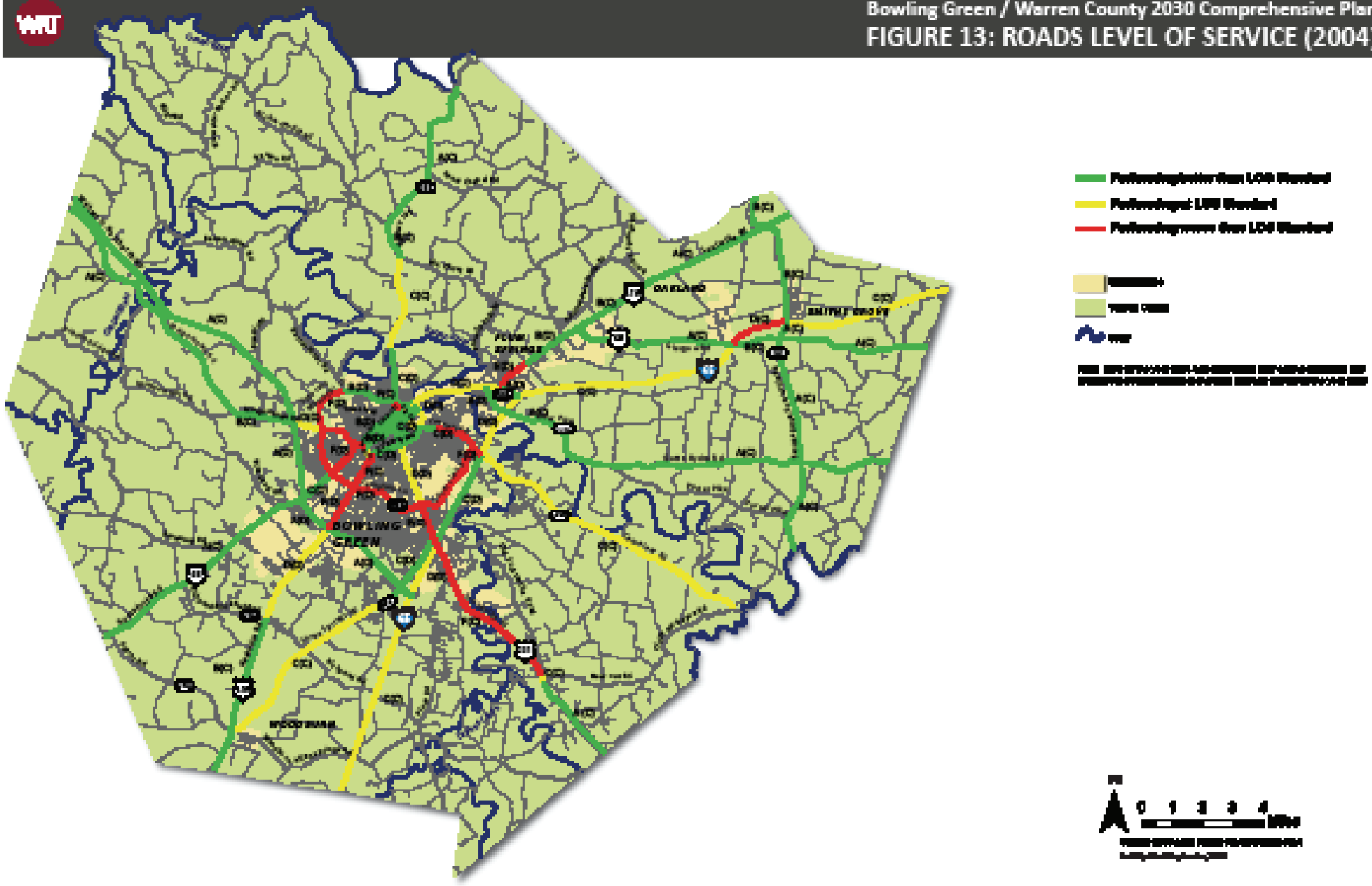
# FIGURE 11: EXISTING TRANSPORTATION NETWORK



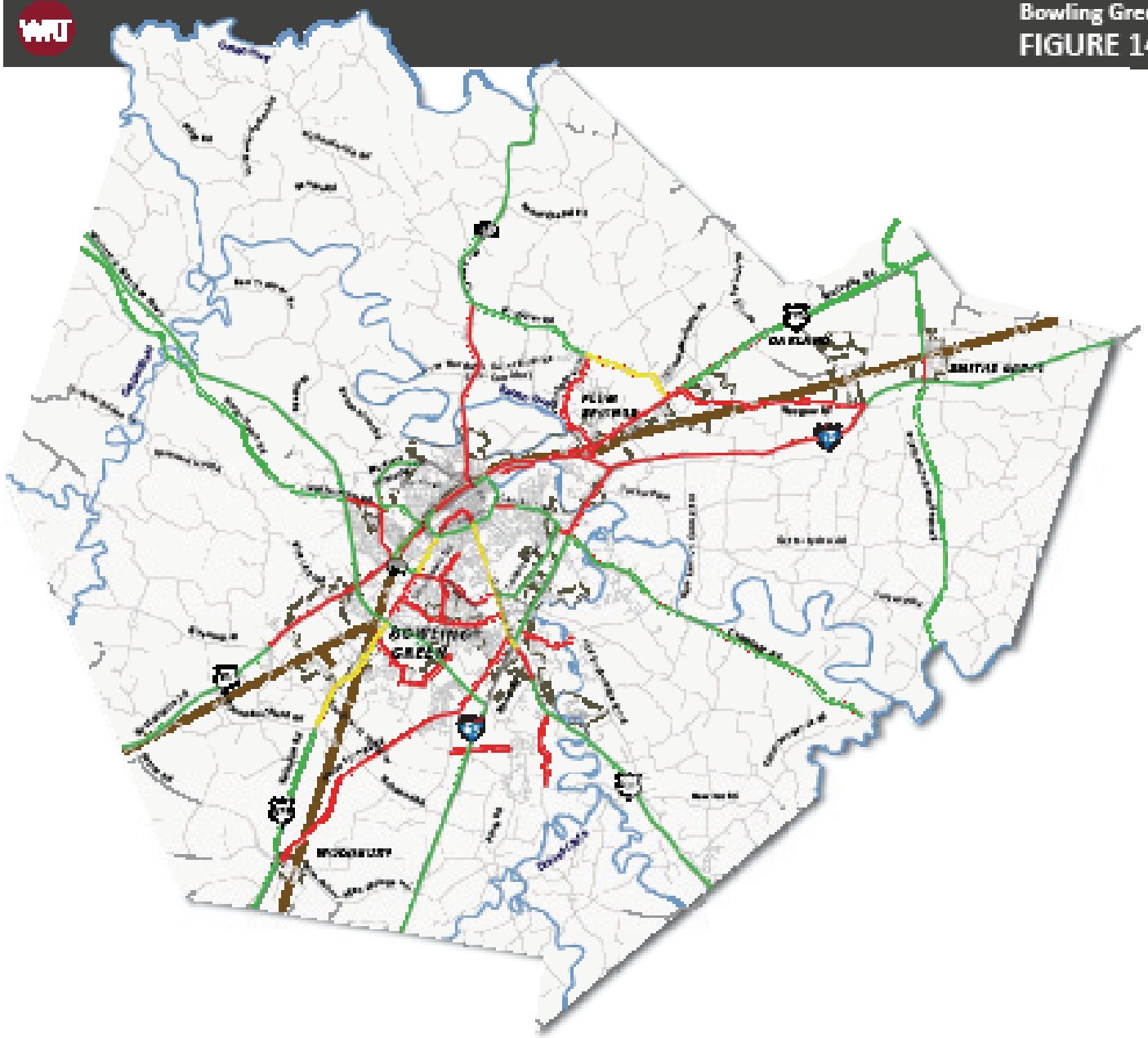
# FIGURE 12: FUNCTIONAL ROADWAY CLASSIFICATION



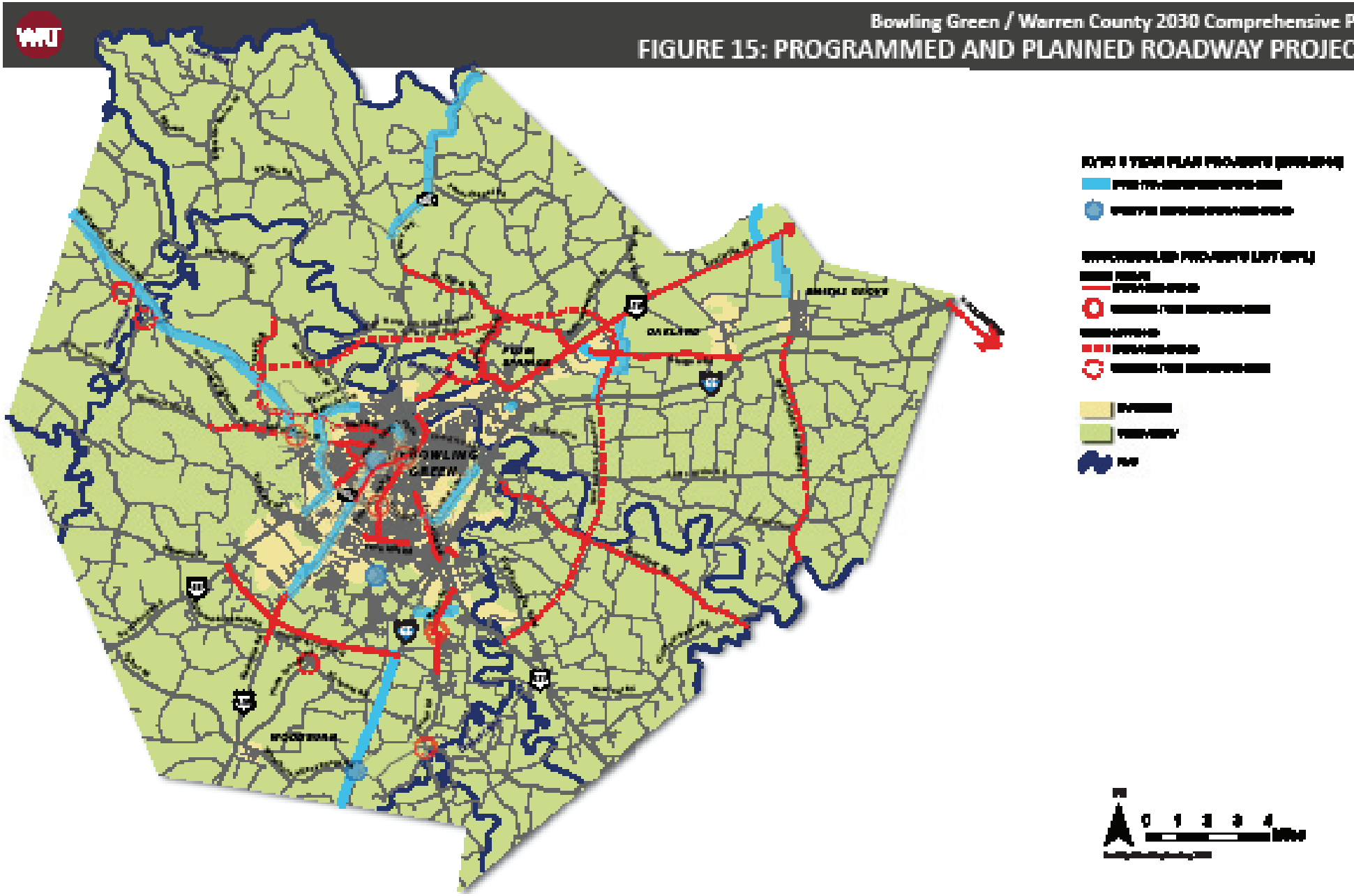
# FIGURE 13: ROADS LEVEL OF SERVICE (2004)



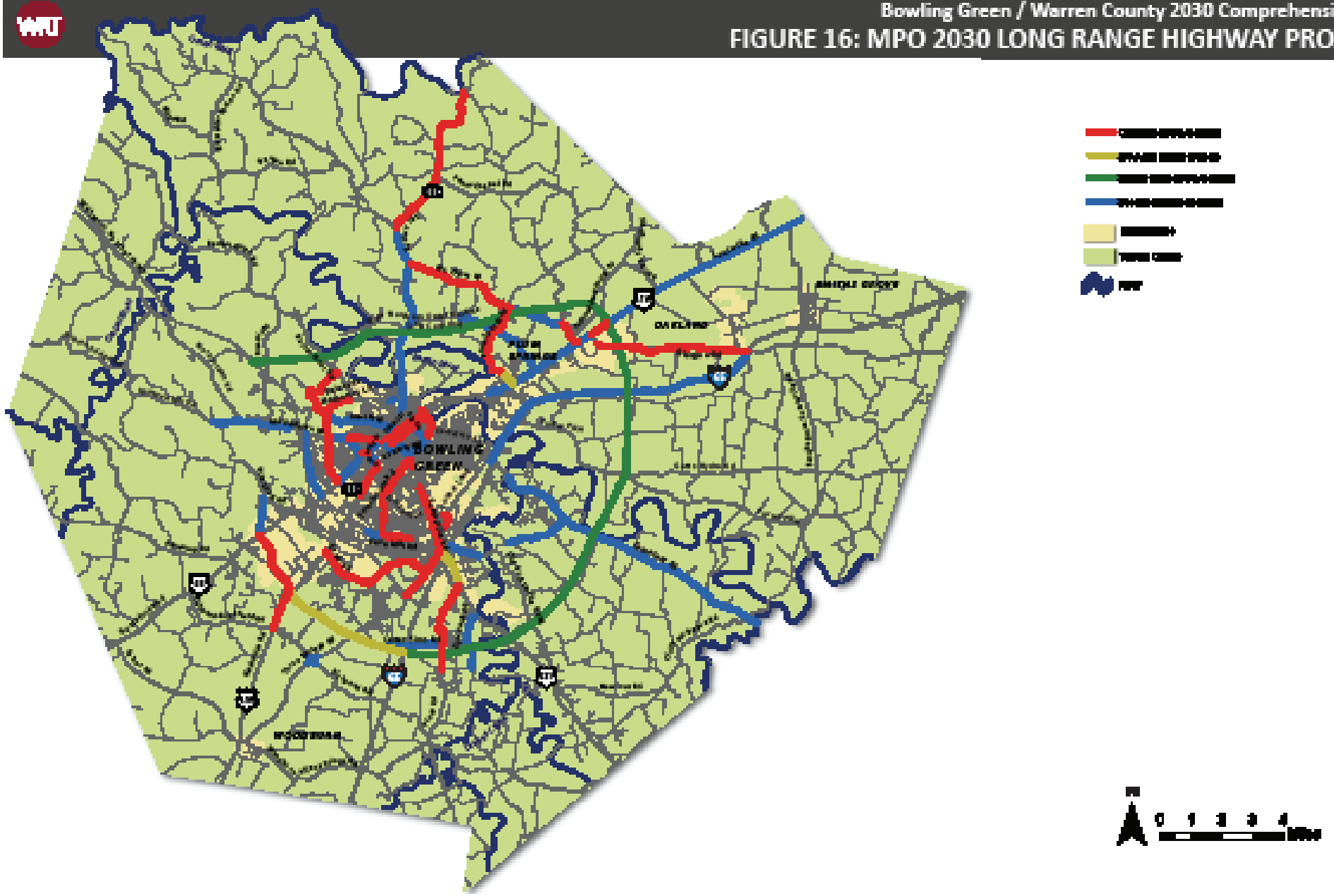
# FIGURE 14: ROADS LEVEL OF SERVICE (2030)



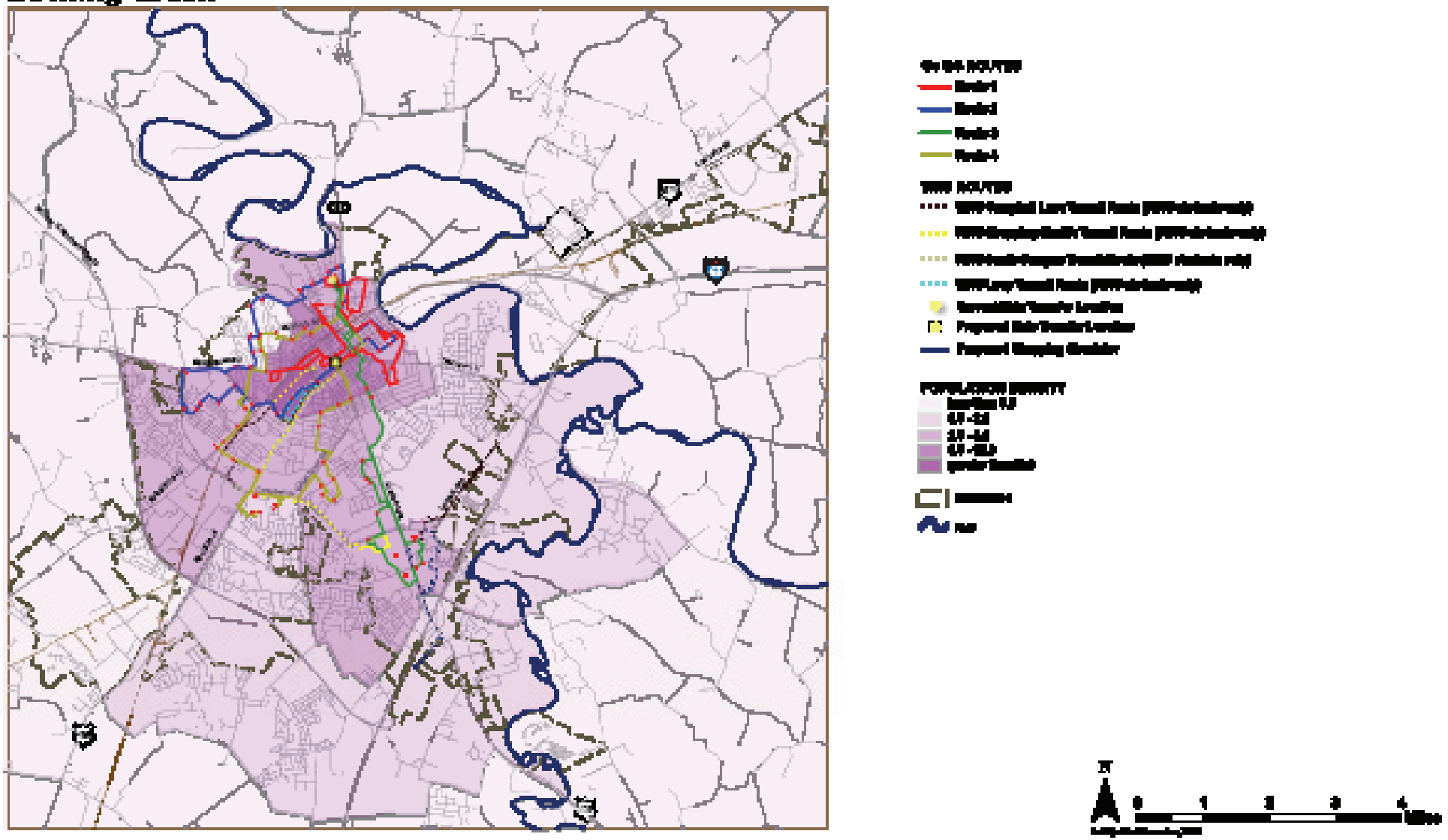
# FIGURE 15: PROGRAMMED AND PLANNED ROADWAY PROJECTS



# FIGURE 16: MPO 2030 LONG RANGE HIGHWAY PROJECTS



# FIGURE 17: PUBLIC TRANSPORTATION - BOWLING GREEN



## Infrastructure and Community Facilities

**Sources:**

- **Warren County Water District**
- **Bowling Green Municipal Utilities**
- **Barren River District Health Department**
- **Warren County School District**
- **Bowling Green Independent School District**
- **University of Louisville, Kentucky State Data Center**
- **Warren County Public Library**
- **Bowling Green Fire Department**
- **Warren County Fire Department**

*Sanitary Sewer*

Sanitary sewer service within the study area is delivered by two providers, Bowling Green Municipal Utilities (BGMU) and the Warren County Water District (WCWD).

BGMU, which utilizes a conventional gravity sanitary sewer collection system and whose piping system is totally separate from WCWD, has over 318 miles of interceptor and collector lines and 53 pump stations. WCWD, which also operates a conventional gravity system, operates a network of over 90 miles of sewer pipes and 47 pump stations to transport over one million gallons of wastewater per day.

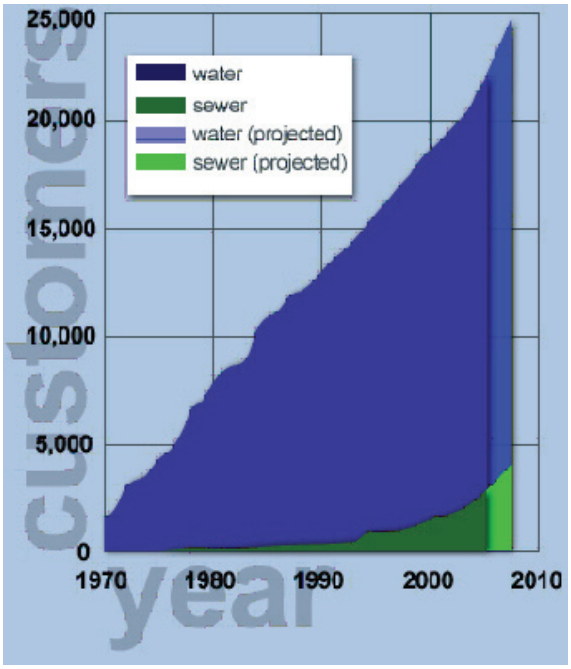



Figure 18: Warren County Water District: Customer Growth
Source: Warren County Water District

All waste within Warren County is processed at a treatment plant owned and operated by BGMU and located near the south bank of the Barren River on the north side of the City. Built in 1964,

the plant underwent renovations in 1976 and 1992 to reach its capacity of 10.6 million gallons per day (MGD), about one million gallons more than its average daily flow of 9.4 million gallons. Combined, BGMU and WCWD currently serve approximately 52,000 people residing in the existing service area.

The population served by public sewers is expected to increase by 32,000 between now and 2025. This increase in demand was attributed to three types of anticipated customers: existing customers who will move into households with a smaller average size, but use more water per capita than they currently do; existing Warren County residents who currently use an alternate form of wastewater treatment but to whom sewer service will be extended; and new residents locating in undeveloped areas and to which service will be provided. Most of the new service areas are located south of Bowling Green between US 68 and US 231. **(See Figure 19: Utilities: Wastewater)** BGMU and WCWD also expect greater industrial wastewater demand. This is largely related to Kentucky Transpark, which is located northeast of Bowling Green between 31W and I-65. Although the Park is being marketed toward "high tech" tenants, who have comparatively lower water consumption and wastewater generation rates than other possible types of tenants, it will still generate approximately 1.4 MGD of wastewater at build out.

The total projected wastewater flow in 2025—the calculation of which includes existing average daily flow, demand in planned future service areas, and flow resulting from infill, is expected to increase about 160 percent, from approximately 9.4 MGD in 2007 to 15 MGD in 2025. Even if actual growth is modest compared to projections, the plant's capacity will need to be increased.

In 2007, BGMU applied for and received a $25 million loan from Kentucky's Department for Environmental Protection's Division of Water to be used in Fiscal Year 08 to begin expansion of the plant.[1] Due to new effluent limits imposed by the State of Kentucky in 2006 after BGMU submitted its request for funding, BGMU is in the process of revising plans for expansion and reviewing alternative waste processing methods. It estimates that in order to comply with the new standards, it will need a construction loan of $40 million, for which it asked the Kentucky Infrastructure Authority in March 2008. The current timeline for the project estimates final design plans to be finished by the end of 2008, the bidding process to start at the beginning of 2009, and construction to follow for two to three years. Upon completion of the expansion, the plant will have a capacity of 15MGD, which meets the projected needs of the population through 2025.

Development standards for sewage disposal vary depending upon parcel location.
All new development in Warren County and Bowling Green is required to have an approved method of sewage disposal before a building permit will be issued. All "Urban Density" residential development must be served by public sanitary sewer. This includes all parcels within the corporate limits of Bowling Green and other municipalities in Warren County and those within 1,500 feet of an existing sewer line. Residential development in all other areas must use an alternative method approved by the Barren River District Health Department, which can include septic tanks and lateral fields, gravel-less leaching systems, artificial or constructed wetlands, sewage lagoons, modified or experimental systems, aerobic treatment systems, and home treatment units, depending upon location.

*Septic Systems*

Where sanitary sewer does not exist, development is served by private, on-site sanitation systems. For residential areas in Warren County this generally means septic tanks, which, as a rule of thumb, are not ideally suited for places with Karst topography and many of the soil types found in the County.

Ninety-four percent of the soils in Warren County have "very limited" functionality as absorption fields, the location where the waste percolates into the ground.[5]

The first issue arises when soil percolates too quickly. If waste reaches the aquifer before the impurities are completely removed, it contaminates the groundwater. Because groundwater moves at a rapid pace through a karstic cave system, even a small amount of untreated waste can spread through a large volume of water in a short amount of time. On the other hand, if soil is either too compact or fine-grained to absorb the waste, it can pond on the surface and runoff directly into creeks and streams before it is treated. While this does not prevent the use of septic tanks outright, it does necessitate more elaborate and more expensive systems (e.g. larger absorption fields, longer piping, etc.) that are more subject to failure.

Currently, the Barren River District Health Department is responsible for issuing septic tank permits. Neither the CCPC, nor the local governments (Warren County and Bowling Green) have decision-making power over the approval or denial of a septic system permit request. The extent of the CCPC's influence is limited to controlling the type and density of development through zoning regulations and the approval or denial of development applications.

*Potable Water*

Potable water service is delivered by the same two entities that deliver wastewater service, BGMU and WCWD. **(See Figure 20: Potable Water & Fire Flow)** BGMU has over 235 miles of water mains and serves 18,200 water customers. WCWD, which maintains over 1,000 miles of pipeline, along with 31 pumping stations and 28 storage tanks throughout a 530-square-mile area, serves approximately 23,000 local water customers at an average of 6.4 million gallons of water each day. It also maintains a joint operations agreement with Butler County Water System, Inc. and Simpson County Water District, through which it delivers service to over 7,800 additional customers.

All potable water within Warren County, including water ultimately conveyed by WCWD, is processed by BGMU. The plant, built in 1928, has been renovated five times since it was originally constructed, most recently at the end of 2006. The plant, which draws water from the Barren River, treats an average of 16 million gallons per day, and currently has a capacity of 30 million

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[8]The Natural Resources Conservation Service classifies "septic tank absorption fields" as "areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Saturated hydraulic conductivity, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

gallons per day (MGD). The distribution system stores 14 million gallons in storage tanks and reservoirs. Average daily water consumption is approximately 19.4 MGD. Ninety-eight percent of the County is served by public water.

BGMU has no near or medium-term plans to increase the capacity of its water treatment plant, after having completed its most recent expansion to 30 MGD in 2006. However, the Utility is closely monitoring demand in light of the drought conditions Warren County has been experiencing of late. In making its assessments, BGMU considers such factors as the state of the local, regional, and national economy, industrial growth, conservation measures, and development. Consumption is outpacing the most up-to-date projections, which were done prior to the 2006 expansion and forecasted a peak demand of 60 MGD in 2050. Peak demand reached 22 to 23 MGD during the summer of 2007, a pace which, if continued, would elevate consumption to 60 MGD much sooner than anticipated.

BGMU and WCWD use water meter installation data to predict future population growth as well as the composition of demand for service. The data show that water demand has increased at a steady rate since 2000 in both districts, but that the nature of demand is different amongst them. The increase in the number of meters in the Warren County Water District is the result of *new* construction (residential, commercial, and industrial) in formerly undeveloped areas. In contrast, the increase within the BGMU District is largely attributable to redevelopment within the City limits, which is tending to follow demographic trends (namely, a decrease in household size) with smaller, but more densely packed dwelling units. This is increasing the demand within existing service areas. Industrial and commercial demand has been fairly steady, but is expected to increase as Transpark attracts more tenants. To meet anticipated water demands, a million-gallon water tank was constructed at Transpark and put into service in May 2005. The additional water also goes toward domestic demand and fire protection in northern Warren County.

The CCPC adheres to the following guidelines: 250 gallons per minute (GPM) fire flow at 20 pounds per square inch (PSI) residual pressure for single family detached resident development; and a minimum flow of 600 GPM at 20 PSI residual pressure for all multi-family, single family attached housing, commercial, and industrial development.

While BGMU and WCWD have a combined goal of ultimately providing potable water throughout the County, and water infrastructure within the corporate limits Bowling Green is sufficient to meet standards, certain parts of Warren County have inadequate water pressure and rate of flow for fire fighting, which can serve as the basis for denial of a rezoning request or development plan. Specifically, the CCPC adheres to the following guidelines, based on land use and utility policies in the 1990 Comprehensive Plan:

- All single family detached resident development outside the City of Bowling Green must be served by water lines providing at least 250 gallons per minute (GPM) fire flow at 20 pounds per square inch (PSI) residual pressure.

- All multi-family, single family attached housing, commercial, and industrial development shall provide water systems with a minimum flow of 600 GPM at 20 PSI residual pressure.

The adequacy of these standards is disputed by volunteer firefighters serving the unincorporated portions of Warren County, who, based on anecdotal information, regularly have to truck their own water to fires because flow and pressure on site are too weak.

*Stormwater*

Warren County's topography and geology make it susceptible to severe flooding, which has propelled an ongoing series of storm water studies, revisions to design criteria, and continuous capital improvements projects. State and local measures have been taken to monitor and reduce storm water runoff produced by point sources. The Kentucky Division of Water reviews and approves permit applications for industrial facilities that engage in manufacturing, processing or storage of raw material, construction sites larger than one acre and which remove or disturb soil, and municipal storm sewer systems.

In addition to cooperating with state efforts, the City of Bowling Green Public Works Department initiated efforts to work with communities throughout Kentucky to develop materials explaining stormwater best management practices and statewide requirements for achieving clean water and an overall reduction of pollutants associated with urban activities. The resulting manual was published in December 2004.

In compliance with the Federal Clean Water Act, the Federal Environmental Protection Agency (EPA), and the Kentucky Department of Water – and as a follow up to Bowling Green's best management practices manual – Warren County passed a stormwater management ordinance in 2006 enacting erosion prevention and sediment control procedures. Geared toward monitoring construction activities, the ordinance requires a grading and drainage plan, stormwater management plan, and general permit for development sites one acre or larger. In addition, Warren County is reviewing an Illicit Discharge Ordinance. Illicit Discharge refers to water that travels directly into the storm sewer without being treated from sources such as septic tank effluent; motor oil disposal; laundry wastewater; yard waste; and auto and household toxics disposal. This water flows into the Barren River, contaminates drinking water, and can ultimately threaten public health. These two ordinances, along with a Post-Construction Ordinance bring Warren County toward compliance with the mandated Federal stormwater requirements.

Since 2002, Warren County, along with other local governments, has been required by the State to submit five-year permit plans detailing what it will do to stop pollutants from getting into runoff water. In January 2007, Warren County, along with Bowling Green, Plum Springs, and the Kentucky Transportation Cabinet, renewed its annual $1 million per year expenditure on federally mandated stormwater pollution control through 2012. The funds are used for public education and involvement, detecting and eliminating illicit discharge of pollutants, controlling construction runoff, pollution prevention and good record-keeping.

*Public School System*

There are two school systems in the study area, the Bowling Green Independent School District, which has fixed district limits within a portion of Bowling Green, and the Warren County School District, which is responsible for facilities in the remainder of the County. **(See Figure 21: Public**

**Schools)** The Warren County School District operates thirteen elementary schools (Pre-K through 6th grade), three middle schools (7th through 8th grade), and four high schools (9th through 12th grade) and serves approximately 13,200 students. Seven facilities are operating near or above capacity, namely Greenwood High School, Drakes Creek Middle School, Rich Pond Elementary, Cumberland Trace Elementary, Bristow Elementary, Lost River Elementary, and Briarwood Elementary. These schools tend to be located in areas currently experiencing growth pressures—northeast, east, and southeast of Bowling Green.

The Bowling Green Independent School District includes five elementary schools (Pre-K through 5th grade), one middle school (6th through 8th grade), one high school (9th through 12th grade), and one alternate school and has a total enrollment of approximately 3,700 students. Four schools are operating near or above capacity—Bowling Green Junior High, T.C. Cherry Elementary School, Dishman-McGinnis Elementary School, and W.R. McNeill Elementary.

Many school facilities in growing areas – mainly near new developments in the County School District area – have been operating at or above their maximum capacity. Both Warren County and Bowling Green School district facilities plans address these capacity needs. However, budgetary issues may impact both school districts' ability to proceed with improvements as planned[6].

***Table 8: Warren County School System***

| *Elementary Schools* | *Middle Schools* | *High Schools* |
|---|---|---|
| A. Alvaton | N. Drakes Creek | Q. Greenwood |
| B. Briarwood | O. Henry Moss | R. Warren Central |
| C. Bristow | P. Warren East | S. Warren East |
| D. Cumberland Trace | | |
| E. Lost River | | |
| F. North Warren | | |
| G. Oakland | | |
| H. Plano | | |
| I. Rich Pond | | |
| J. Richardsville | | |
| K. Rockfield | | |
| L. Warren | | |
| M. William H. Natcher | | |

***Table 9: Bowling Green Independent School District***

| *Elementary Schools* | *Middle School* | *High School* |
|---|---|---|
| 1. T. C. Cherry | 6. Bowling Green Junior High | 7. Bowling Green High |
| 2. Dishman-McGinnis | | |
| 3. Parker-Bennett-Curry | | *Alternate School* |
| 4. Potter Gray | | 8. L.C. Curry |
| 5. W. R. McNeill | | |

As of August 2006, the Warren County School System had four projects underway and three in the pipeline pursuant to its Facilities Plan. The projects respond to a combination of existing capacity needs and future demand based on growth projections and information provided by the CCPC.

Two projects, the Warren County Area Technology Center (ATC) near Oakland and a new Alvaton Elementary School, opened during the 2006-2007 school year. A new elementary school in Plano opened in August of 2007.

[9]In May 2010, the Kentucky General Assembly failed to pass a budget.

The Warren County ATC is a 45,614-square-foot building which serves students from the Edmonson County and Bowling Green school districts. It offers programs in Health, Automotive Technology, Machine Tool, Industrial Maintenance, Construction Technology, and Welding, with the possibility of expanding its curriculum to meet the needs of area students and employers.

Alvaton ES accommodates up to 700 students in an energy-efficient school because of the use of geothermal heating and cooling and the use of insulated concrete forms (ICF) in construction. It has already earned the Energy Star Award from the Environmental Protection Agency. Plano ES will also be able to accommodate some 700 students, helping alleviate the explosive growth in enrollment at Rich Pond Elementary School and other schools.

Presently, the District is close to completing the construction of a new joint middle and high school at a site in Rich Pond, an area of the County that was experiencing significant development pressure. The South Warren Middle School and High School complex is expected to be ready for the 2010-2011 school year. At over 300,000 square-feet, this will be the largest school building in Kentucky. This was the District's first new high school since 1990 and, along with the other high schools in the system, is expected to meet capacity demands for the next fifteen years. Warren County extended water and sewer lines to the site in anticipation of increased demand by the school and related residential development. The high school portion will have a capacity of 1,200 and the middle school of 750.

Both Bristow Elementary School, located near Transpark in another quickly developing area of the County, and Richardsville Elementary School, located in rural Warren County north of Bowling Green, are being replaced on site, and are scheduled to be finished by the beginning of the 2010-2011 school year. Both buildings are being developed as green "net zero" buildings that will have zero energy consumption annually, thanks to the use of solar panels to generate electricity and energy-efficient design elements such as daylighting, geothermal heating and cooling, and ICF. For these projects, the District received $1.3 million in grant funding from the Stimulus Plan and through the U.S. Department of Energy. Bristow ES will accommodate an additional 200 students to bring its capacity to approximately 650. Richardsville ES' capacity will be increased by fifty.

The District also made updates to its main office on Lovers Lane, adding meeting space, four multi-purpose classrooms, and a swimming pool to replace the facility it was using at TC Cherry Elementary School.

According to the WCPS's 2006 Facilities Plan, there are three major projects planned for the mid-term. The first is an elementary school with a capacity of 600 at a new site on Elrod Road in the Ivan Downs subdivision, a planned community south of downtown Bowling Green. Land was purchased and construction was set to begin in 2010. Cumberland Trace Elementary, which is east of the airport, will be expanded in a few years to include 12 new classrooms. Lastly, the District plans to construct a new alternate school center with a capacity of 300 at a site to be determined.

The Bowling Green Independent School District's Facilities Plan also addresses capacity issues

through the ongoing or planned development of new or replacement facilities. T. C. Cherry Elementary School re-opened in August, 2009, completing over $18 million in districtwide construction and renovation projects. The new elementary school building increases capacity from 325 to 400 students.

The BGISD's Facilities Plan also identifies the need for four additional classrooms at Potter Gray Elementary School and one more classroom at Dishman-McGinnis Elementary; the timeframe for these projects was not established in the Facilities Plan.

Using Kentucky Data Center population projections for the County as a basis, it is estimated that 6,400 additional school-age children will attend public schools in Warren County by the year 2030. If the distribution of enrollment between type of schools remains similar to today's, over the planning horizon the school systems would need to add one new high school, one new middle school, and about five to six new elementary schools between them to meet demand. Based on growth trends, it is likely that a larger percentage of new students will reside in the Warren County School District.

*Library System*

The Warren County Public Library system has four permanent facilities: Bowling Green Public Library, the system's main branch; Graham Drive Community Branch, which replaced the former Depot and Sugar Maple Branches in December of 2007; Smiths Grove Branch; and Bob Kirby Branch. Additionally, the system maintains a mobile branch operating Monday through Friday.

The regional library system, which is partially funded by a half-cent property tax and a new library tax, has been in the process of restructuring due to budgetary shortfalls in recent years. In response to public comment regarding the possible impacts of these cuts, the library board has been working toward a solution that maintains an equitable distribution of facilities among various populations. The 1990 Comprehensive Plan does not contain a library level of service standard. However, to maintain its current level of service, the system will need an additional one to two branches (or equivalent expansion of an existing facility) by 2025.

*Fire Protection*

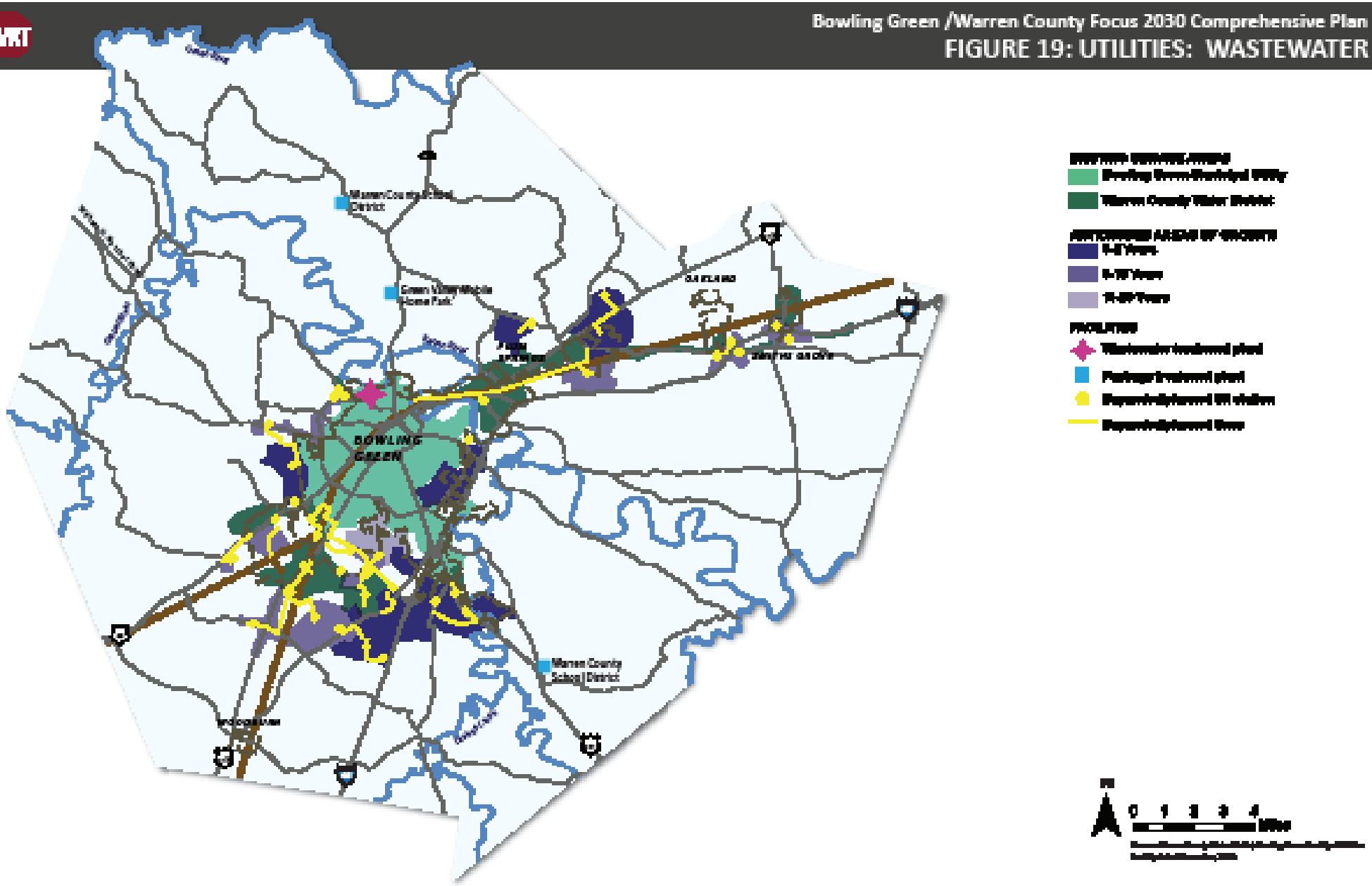
Bowling Green and Warren County are served by separate fire departments. Bowling Green Fire Department, which operates with a salaried staff, provides service to all areas within the municipal limits of Bowling Green. Its coverage is divided into five districts: Southside, Westside, Airport, Central, and Northside. Pursuant to 1990 Comprehensive Plan policies, and with the recent opening of the Greenwood Fire Station on Cherry Farm Lane, all of the development it serves is within five roadway miles of a fire station.

Warren County is served by nine volunteer fire stations. **(See Figure 22: Fire Protection)** Although all portions of the County are designated to a station, not all are within five roadway miles, a circumstance that makes those distant areas part of the Rural Conservancy District and ineligible for commercial, industrial, and multi-family residential development.

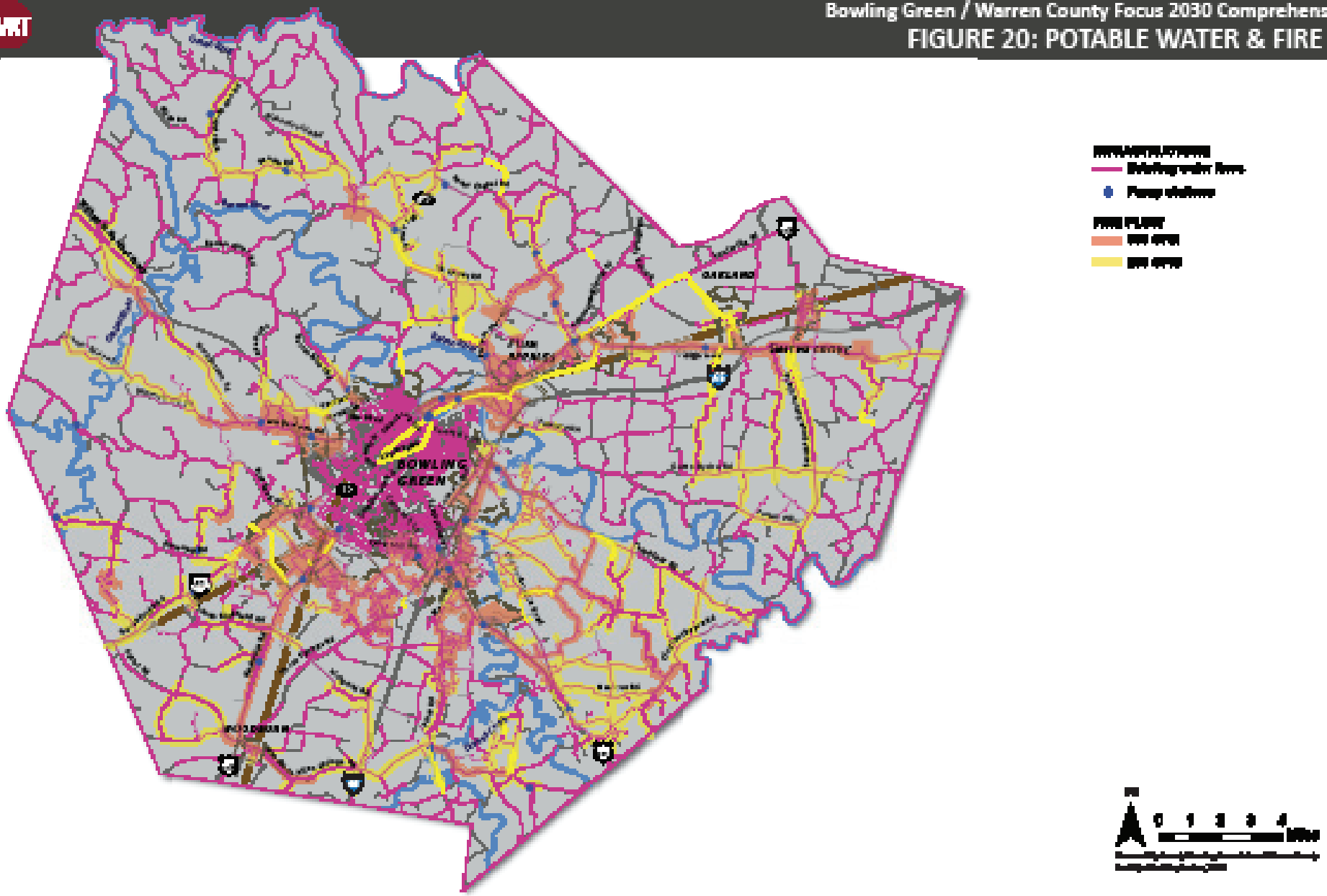
Although there are water flow and pressure requirements for new development (flow standards

range from 250GPM to 600PSI depending upon location and type and pressure must be equal to or greater than 20 PSI), according to anecdotal reports from the volunteer departments, fire flow in some unincorporated areas with development is not sufficient and water needs to be trucked in.

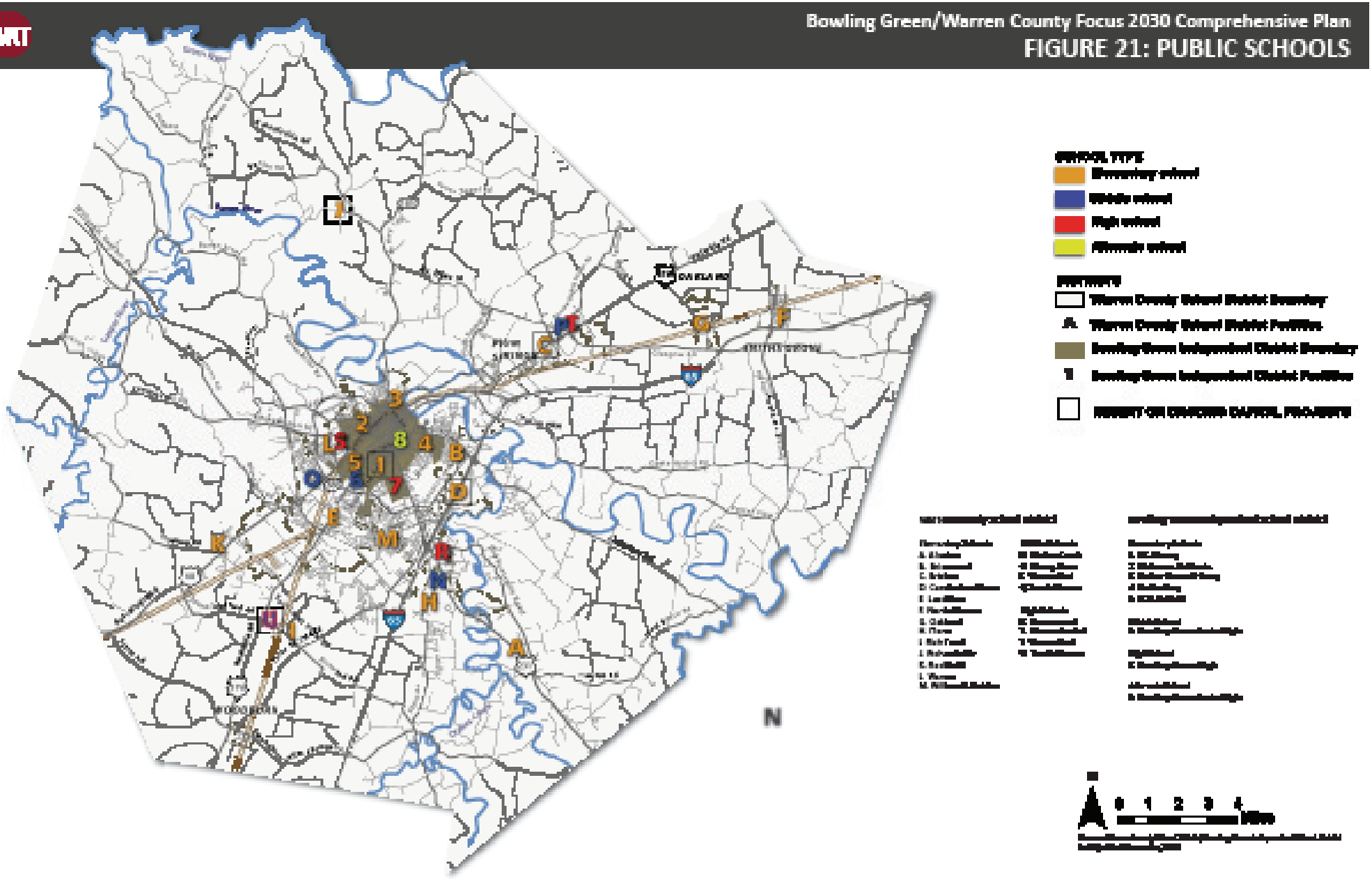
# FIGURE 19: UTILITIES: WASTEWATER



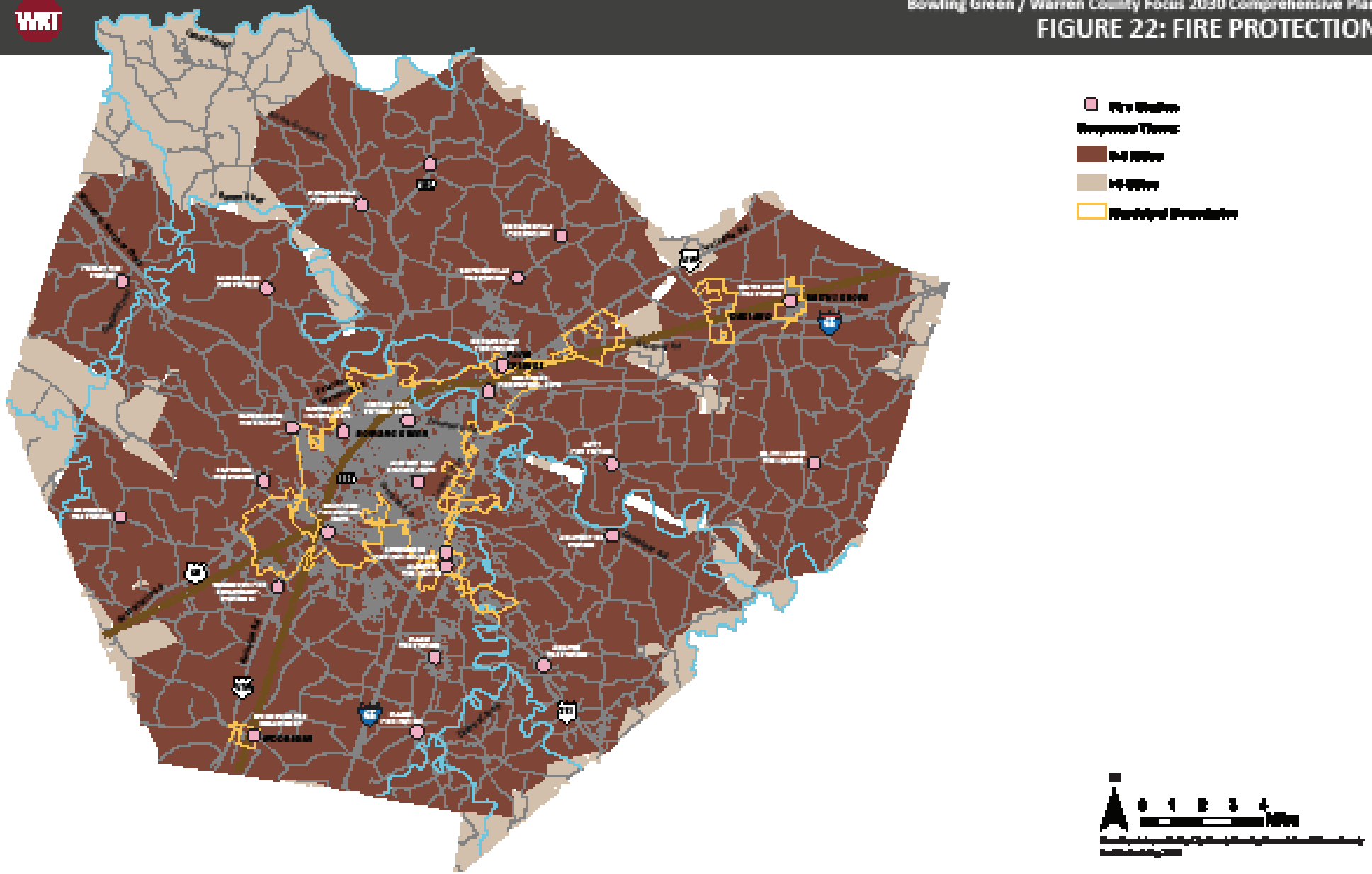
# FIGURE 20: POTABLE WATER & FIRE FLOW



# FIGURE 21: PUBLIC SCHOOLS



# FIGURE 22: FIRE PROTECTION



## Parks and Recreation

**Sources:**

- **Bowling Green Parks and Recreation Department**
- **Warren County Parking and Recreation Department**
- **Warren County 1990 Comprehensive Plan**
- **Peter Hamik, The Excellent City Park System, The Trust for Public Land**
- **Bowling Green Parks and Recreation Master Plan (1998)**
- **Greenbelt System Master Plan**
- **National Recreation and Park Association (NRPA)**

*Existing Facilities and Future Needs*

Warren County is served by two park systems – Warren County Parks and Recreation and Bowling Green Parks and Recreation. According to the 1990 Comprehensive Plan, when compared to national standards for total parkland acreage, the county system was deficient in its level of service while the city system was sufficient.

The City of Bowling Green Park System is well recognized[7] in the state and offers a variety of quality recreational programs and activities at its 27 facilities. The City's Parks and Recreation Department[8] currently maintains about 970 acres, which is 4.3% of land area of the city. It includes three golf courses: one 18-hole golf course (CrossWinds) and two nine-hole courses (Riverview and Paul Walker golf courses) that account for approximately 250 acres. Excluding golf courses and cemeteries, the city maintains about 515 acres.

While there is no ordained "optimum" size, a city's park system should be large enough to meet the goals outlined in the agency's master plan[9]. The National Recreation and Park Association recommends between 7.5 -10.5 acres per 1,000 residents, which would amount to about 403 to 558 acres for the year 2006. As of today, the City of Bowling Green is meeting that minimum requirement and is also well positioned to accommodate the needs of additional projected population in 2030. The City is also served by some County parks like Griffin Park and Phil Moore parks in the south of Bowling Green. However, the ability to serve residents with different types and services / amenities in different areas across the city is as important as overall acreage.

Mini Parks are less than an acre in size and serve limited populations living at a quarter-mile walking distance. Neighborhood Parks serve the immediately surrounding residential population in a half mile radius and can be anywhere between 6 to 30 acres. Community parks are larger in size and serve the surrounding community. The City of Bowling Green has a good amount of community parks but does not provide many smaller size neighborhood and mini parks. This could mean adding more acres of parkland in underserved neighborhoods and bringing them in line with the rest of the City.

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7 Bowling Green was recognized as Kentucky's 2006 Outstanding Parks and Recreation Department for Class I (large) departments by the Kentucky Recreation and Park Society.

8 As of 2009, the BGPRD had 60 full-time and 191 part-time and seasonal employees.

9 Peter Harnik, The Excellent City Park System, The Trust For Public Land., p20

**Table 10: Bowling Green Park Acreage and NRPA Standards**

| Category | Existing Acreage | Area requirement per NRPA standards | | |
|---|---|---|---|---|
| | | Per 1000 people | YR 2006* | YR 2030* |
| Mini Parks | 3.4 | 0.5 | 26.58 | 34.73 |
| Neighborhood Parks | 37.8 | 2 | 98.59 | 138.90 |
| Community Parks | 473.8 | 5 to 8 | 265.8 - 425.4 | 347.26 – 555.62 |
| | | 7.5 | 402.87 | 520.89 |
| Total | 515 | 10.5 | 558.35 | 729.25 |

* 2006 population data and 2030 population projections used to determine the number of park acres per 1,000 persons prescribed by the NRPA standard

Using a half-mile and 1-mile radius of service for neighborhood and community parks, respectively, **Figures 23a and 23b: Parks and Recreation** identifies possible service gaps in three areas: a) the southern and southeastern parts of the city between US 31 and US 231; b) areas south and east of Lovers Lane and US 231; and, c) the western portions of the County south of Transpark.

Regulations are in place to serve the open space needs of new developments: Single Family subdivisions containing more than ten lots of less than 1 acre in area shall be required to provide at least 6.5 percent of the total land area as "Common Open Space". Dedication of these parks can be considered once the subdivision is 50% developed. When implemented, these dedications of open space may serve the need for mini parks in the newly developing areas.

The Warren County Parks and Recreation Master Plan (1998) recommends development of three large community parks to serve the northern, southern, and eastern sections of the county. But with the current paucity of state funds and the economic downturn, development of new parks is not considered plausible in the near future.

*Greenways*

In addition to the park types mentioned above, linear green spaces along a natural or man-made corridor called 'greenways' are important pieces of the City and County park systems. These greenways serve varying modes of recreational transportation such as hiking, biking, cross-country skiing, horseback riding, etc. Natural corridors in Warren County include river frontage, stream valleys, or ridgelines. Man-made corridors include abandoned railroad lines, utility rights-of-way, or scenic highways. With only 10% of its 349,440 acres developed in 1990, the County had extensive green and open spaces - such as a park, wildlife refuge, golf course or undeveloped floodplain. As the County has been experiencing strong growth since then, planning for the required open spaces and greenways has become vital.

The Greenbelt System Master Plan (1999) defines the overall network of greenways, trails and pedestrian facilities for the entire county. **(See Figure 24: Paths and Trails (Greenbelt Plan))** According to the master plan, the Bowling Green –Warren County Greenbelt System will consist of a combined 464 miles[10] of pedestrian walks, bike routes, scenic drives and multi-use off road trails. Several roadways form a loop around Bowling Green: Cemetery Road, Fairview Avenue,

10 57.75 miles of pedestrian walks, 45 miles of vehicular / pedestrian / bike routes, 117.4 miles of multi-use off road trails, 165.8 miles of bike routes and 78.2 miles of scenic drives

Sixth Avenue, Veterans Memorial Boulevard, Campbell Lane and Lovers Lane. This "Inner Loop" connects several of the City's major parks and other destinations: Kereiakes Park, Roland Bland Park, the Depot Library, Hobson Grove Park, Russell Sims Aquatic Center at Preston Miller Park, Lost River Cave, and the Lovers Lane Soccer Complex. The greenway will eventually extend around this loop and through adjoining neighborhoods, wherever there is neighborhood interest. As the beltline is scheduled, an outer loop of greenways may be planned within the new roadway projects, accommodating shared use paths along them.

*Completed, Planned and Prioritized Projects*

The Greenbelt Master Plan is programmed into six phases over its thirty-year planning horizon as funding becomes available. Most of the Greenways Commission's short-range projects are concentrated within the City of Bowling Green focusing on the corridors close to the central area of the city. The immediate priority of the plan is to connect existing parks with their surrounding neighborhoods, such as the paths to Riverfront Park. Transportation Enhancement funds would be used to make these connections and improve safe access to Kereiakes Park and Covington Woods Park. When these projects are completed, there will be a four-mile trail originating in downtown Bowling Green, connecting four parks, two elementary schools, and one shopping center. The widening of Cemetery Road (KY 234) and Lovers Lane (KY 880) from Kereiakes Park to the Soccer Complex also include shared use paths.

Of the other prioritized projects established in the master plan, the path between BGMU Waterworks and Kereiakes Park is being constructed, and 2 miles of pathways at the Riverfront is already constructed. A one mile pathway at Lost River Park, Delafield and Boatlanding Area, and establishing linkages in the vicinity of Preston Miller Park are yet to be programmed. Streetscaping and bicycle accommodations at the Fountain Square Area have been completed. Other recently completed projects include the Lost River Cave shared use path and internal circulation at River Walk Park. Shared use paths connecting 8 schools, recreational facilities, neighborhoods, and other community businesses and facilities were programmed for construction in 2007. The 'Safe Routes to School' project includes sidewalk construction, educational activities and public awareness campaigns. Private developers of new residential developments have begun to add sidewalks to their subdivisions to comply with the Zoning and Subdivision Regulations. Since the Greenbelt System Master Plan was adopted, 18 developers have made commitments to building sidewalks or granting greenway easements in Bowling Green. The City plans to continue the new sidewalk plan at $1 million a year[11].

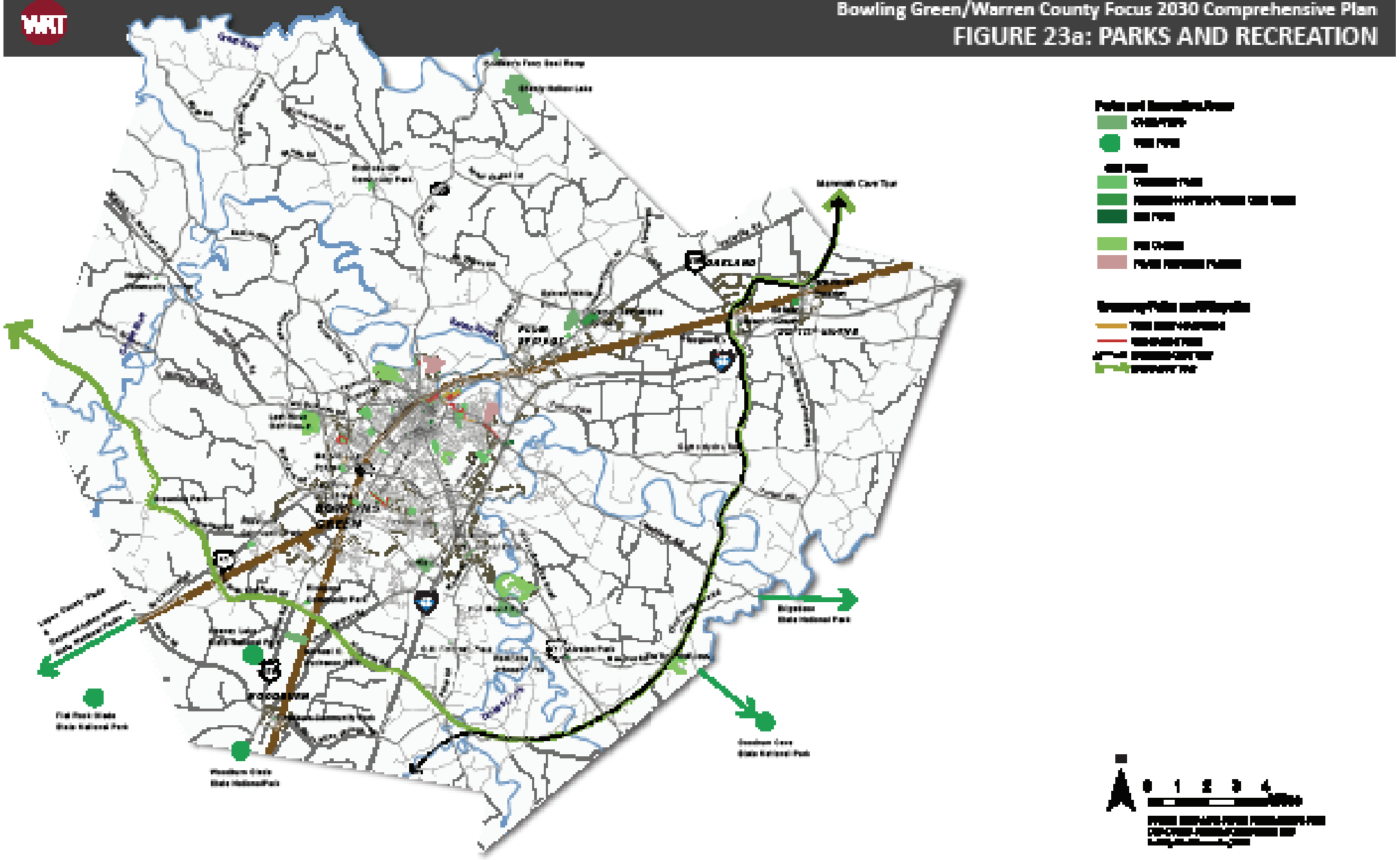
The Bowling Green downtown riverfront district plan calls for mixed housing, offices and retail on the downtown side, and includes many passive recreation facilities across the river that include a festival ground and park, a riverfront heritage trail, a transportation hub and tourist center, and an outdoor recreation and education area. This would serve the city's need for a gathering space to hold festivals and accommodate the growing community interest in biking, walking, etc. with sufficient accessible and safe bikeways. Greenway links (along Hwy 31, Old Louisville Rd, and northern bank of Barren River) connect Kereiakes Park, Baker Hill, Weldon Peete and Beech Bend Park. The vitality of the area is improved by additional linkages with streetscape enhancements along College and State streets connecting Fountain Square with L& N Depot, Bland Park and Community Center.

11 http://www.bgdailynews.com/articles/2007/10/17/news/news2.prt

The U.S. Army Corps of Engineers (USACE), the City of Bowling Green, the Greenways Commission and Western Kentucky University are partnering to develop a whitewater course[12] on the Barren River at Mitch McConnell Park in downtown Bowling Green. The preliminary concepts show a series of pools stretching 1,200 feet downstream of the BGMU dam near the State Street Bridge. This park, being touted as the "birthplace of the Greenbelt," is connected to a countywide network of walking and biking pathways, trailheads and river access points.

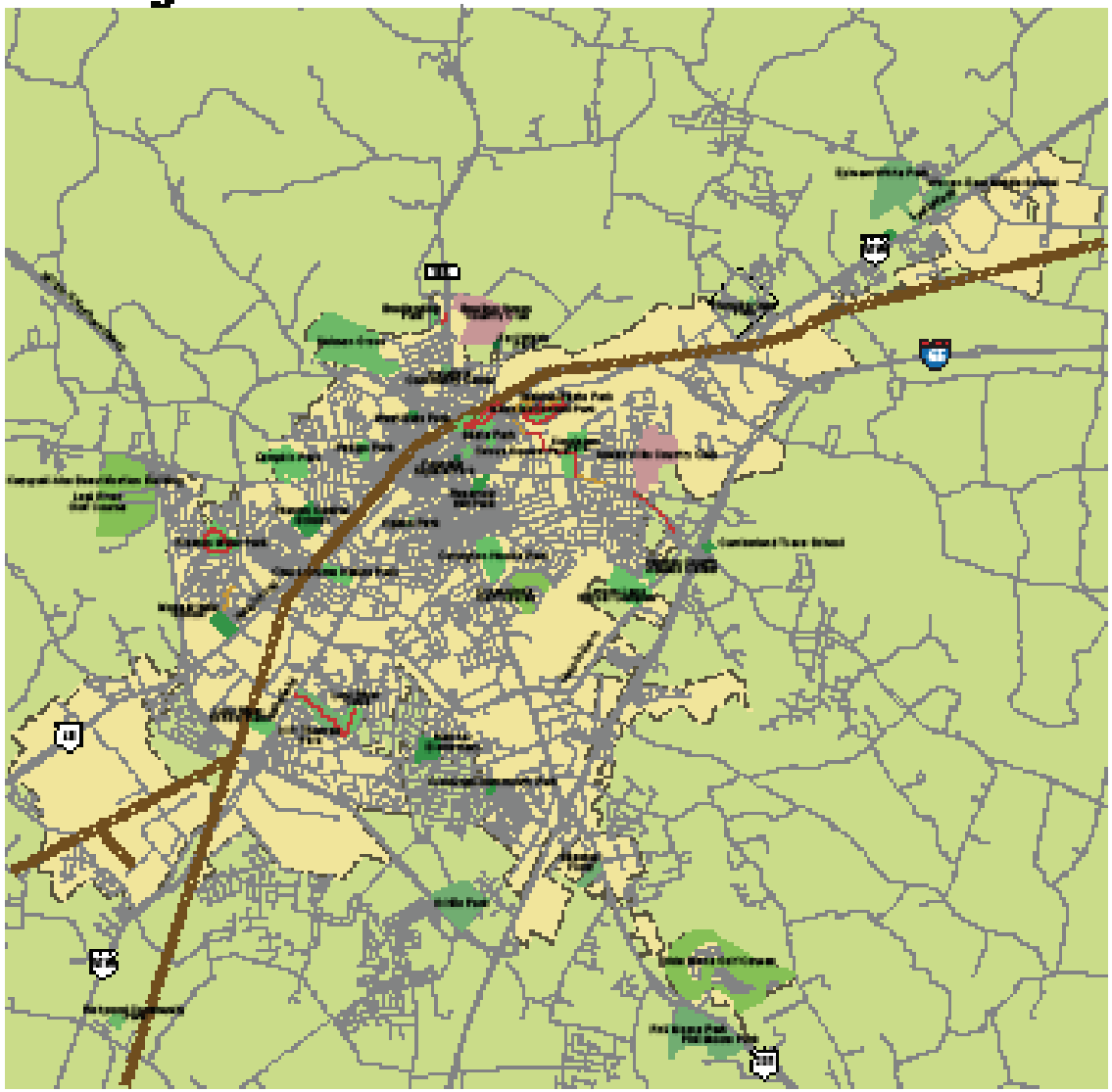
12 The Corps and its consultants (Recreation Engineering and Planning, and GEC, Inc.) presented preliminary concepts at a workshop on Thursday, Sept. 22, 2005.

# FIGURE 23a: PARKS AND RECREATION

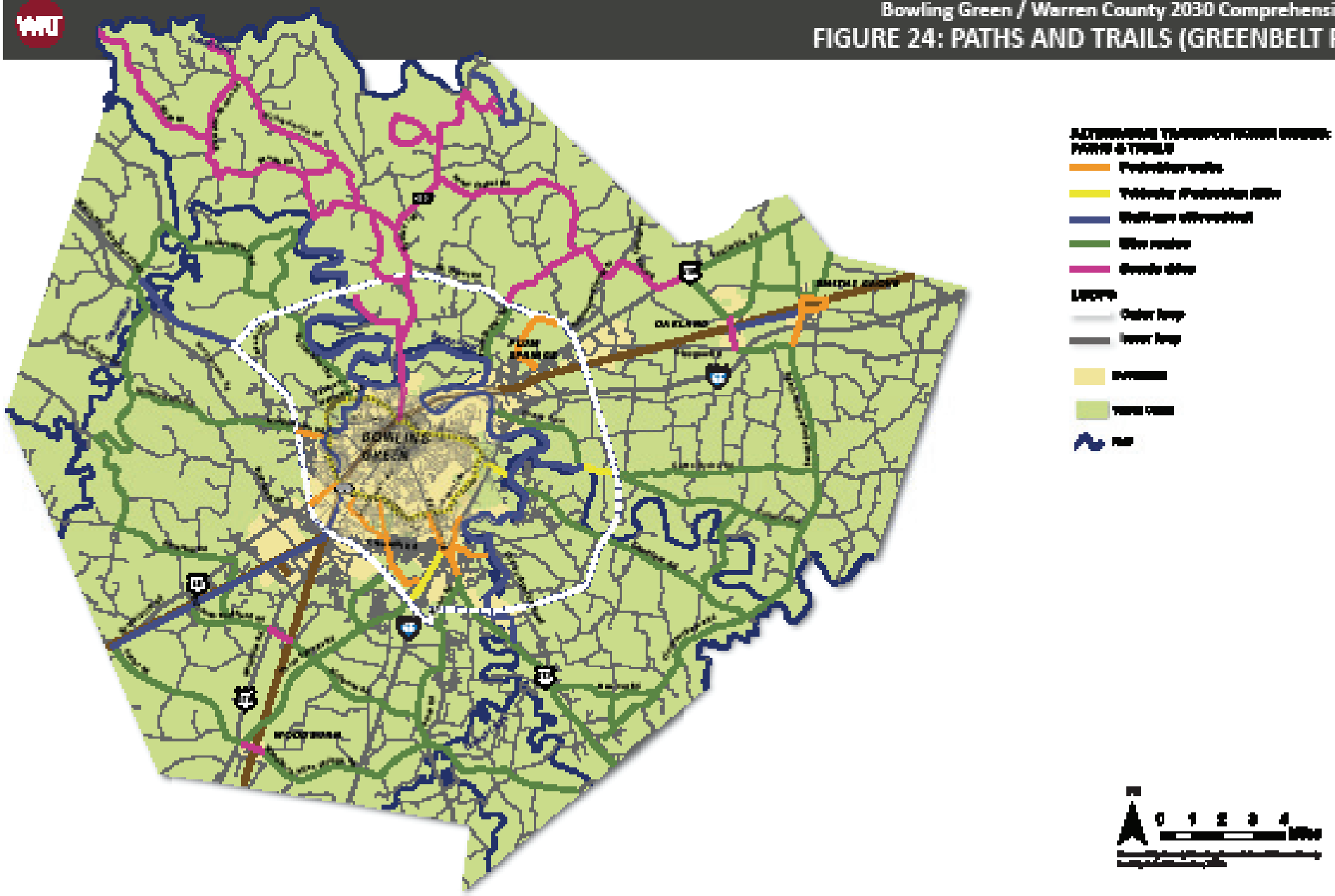


# FIGURE 23b: PARKS AND RECREATION

## Bowling Green



# FIGURE 24: PATHS AND TRAILS (GREENBELT PLAN)



## Economy

*Sources:*

- *southcentralky.com Website*
- *Western Kentucky University Website – http://www.wku.edu*
- *Warren County 1990 Comprehensive Plan*
- *2000 Census*
- *2007 Economic Census*
- *2005-2007 American Community Survey*
- *US Department of Labor, Bureau of Labor Statistics*

In recent years, Warren County has enjoyed a strong economy based on its many competitive advantages. First, the County has an advantageous location. Situated along the I-65 corridor, the County has easy access to the Nashville Metropolitan Area (less than an hour by car), the Louisville Metropolitan Area (approximately 2 hours by car) and other cities beyond. Thus, those seeking to locate businesses requiring easy access to larger markets or corporate headquarters with big city amenities nearby often look favorably on Bowling Green and Warren County.

Next, the presence of Western Kentucky University (WKU) is an enormous economic benefit. Not only does the University employ over 2,000 full- and part-time faculty and staff, but it also provides the community with premier educational opportunities; attracts talent from many places; participates in various local economic development initiatives (including its training, counseling and reference information programs at the Small Business Development Center, its businesses incubator and its Innovation and Commercialization Center); and enhances the County's quality of life through its beautiful campus as well as formal and informal cultural contributions.
The educational opportunities fostered by WKU, as well as the fact that many of the University's graduates remain in the community after college, contributes to Warren County having one of the highest levels of educational attainment in Kentucky. The Census Bureau's American Community Survey (ACS) for 2005-2007 reports that 85.4% of Warren County residents 25 years and older have completed at least a high school education, compared with 79.3% in Kentucky and 84% in the United States. Similarly, 28.4% in Warren County have at least a bachelor's degree, compared to only 19.7% in Kentucky and 27% in the nation. These high education levels provide a clear economic advantage, attracting companies that require a skilled workforce.

Warren County has also benefitted greatly from the foresight and boldness of earlier economic development initiatives. The development of the Kentucky Transpark and the South Central Kentucky Industrial Park has been instrumental in maintaining a healthy industrial base in the County, while other areas of the United States have suffered severe industrial decline. According to the Census 2005-2007 ACS, manufacturing accounted for 18.1% of employment of Warren County residents, compared to 14.9% for Kentucky and 11.5% for the entire country.

The factors cited above also contribute to Bowling Green's appeal as a regional hub for major medical institutions and cultural institutions alike. Warren County accounts for about 36% of the workforce employed in its labor market area, which includes Simpson, Logan, Butler, Edmonson, Barren, Allen, Hart, Todd and Sumner (TN) counties. The table below shows employment by major industry for 2006 in

both Warren County and the labor market area. While manufacturing has remained a strong component of the area's economy, between 1990 and 2006, Services, Wholesale and Retail Trade and Financial sectors have grown much faster than Manufacturing.

**Table 11: Employment by Major Industry by Place of Work, 2006**

| Industry | Warren County | | Labor Market Area | |
|---|---|---|---|---|
| | Employment | % | Employment | % |
| All Industries | 55,786 | 100 | 154,370 | 100 |
| Agriculture, Forestry, Fishing & Hunting | 70 | 0.1 | N/A | N/A |
| Mining | 220 | 0.4 | N/A | N/A |
| Construction | 2,718 | 4.9 | 7,532 | 4.9 |
| Manufacturing | 9,913 | 17.8 | 34,856 | 22.6 |
| Trade, Transportation, and Utilities | 11,736 | 21 | 30,439 | 19.7 |
| Information | 644 | 1.2 | 1,566 | 1 |
| Financial Activities | 2,334 | 4.2 | 6,038 | 3.9 |
| Services | 20,225 | 36.3 | 45,956 | 29.8 |
| Public Administration | 1,916 | 3.4 | 5,458 | 3.5 |
| Other | 44 | 0.1 | N/A | N/A |

Source: U.S. Department of Labor, Bureau of Labor Statistics. Available at The Kentucky Cabinet for Economic Development website.

In recent years, quality of life has been increasingly recognized for its importance to a locality's economic performance. This is due to such factors as the competition between regions to attract a skilled workforce that is increasingly mobile and the lifestyle choices of business owners and company executives who also can often choose among many competing locales to open a company headquarters, branch office or other operation. Here again, Bowling Green and Warren County compare favorably to many other regions. The community is rightly proud of its small town and rural charm coupled with big city amenities. Attractions such as the 4,500-seat Bowling Green Ballpark and the under-construction Southern Kentucky Performing Arts Center (SKyPAC) help to bolster the community's quality of life, already considered outstanding thanks to factors such as the County's scenic beauty and easy access to recreational opportunities, and the relatively low cost of living enjoyed by residents.

## Natural Resources

**Sources:**

- **"The Karst Landscape of Warren County" – Warren County (1990) Comprehensive Plan Technical Report**
- **Kentucky Geological Survey**
- **Barren River Area Development District (BRADD) Website - http://www.bradd.org**

The region's natural features have played a defining role in the development pattern of Warren County characterized by its three landform types: Chester Uplands in the northwest; the Escarpment running through the County from southwest to the northeast; and the Sinkhole Plain in the southern portion. **(See Figure 25: Geomorphology and Landscape Character).**

The Chester Upland is characterized by an extensive above ground stream network that, over time, has carved the terrain into a collection of hills and valleys. The dramatic topography is less conducive to development; consequently, scenic views overlooking pastureland and deciduous tree canopy are common. Averaging 700 feet in elevation, the Upland is separated from the remainder of the County by a long ridge, known as Dripping Springs Escarpment (also called the Chester Escarpment). The Escarpment, a collection of flat-topped mesas, towers several hundred feet above the topography to its south and is the most prominent topographic feature in the area. The southern portion of the County is comprised of undulating hills and flat agricultural land known as the Pennyroyal Sinkhole Plain.

By virtue of their topography, soil composition, and drainage qualities, the areas between Routes KY68 and I-65 southwest of Bowling Green and between Routes US31W and I-65 northeast of Bowling Green contain the largest contiguous areas of prime farmland. **(See Figure 26: Vegetation/Land Cover; Figure 27: Soil Suitability for Residential Development; Figure 28: Farming Suitability).** However, the same areas, for the same reasons (in addition to roadway access), are also deemed prime for future development. Concern over the conflict between these two land uses and the possible continuing loss of farmland to scattered residential development is genuine, as agriculture has been a part of the physical, cultural, and social landscape of the County for much of its history. The agricultural sector's strength, however, is not simply a function of setting aside land resources for farming, but, more significantly, of bolstering productivity and competitiveness in the market. This is true not only for Warren County, but for Kentucky as well. The total land area devoted in the state to agriculture has actually increased by about 1 percent between 1997 and 2007.

In Warren County, the percent of land devoted to farms has decreased by approximately 7 percent between 2002 and 2007. [13] The number of farms has decreased from nearly 1,600 in 2002 to slightly over 1,300 in 2007, although the average size of farms has increased. The County's market value of products sold has also increased by nearly 16 percent, with the average per farm

13 United States Department of Agriculture, The Census of Agriculture. 2007 Census Publications – State and County Profiles.
http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/County_Profiles/Tennessee/cp47177.pdf

increasing by 38 percent from $58,901 (2002) to $81,569 (2007). These figures ranked Warren County 2nd in the state for total value of agricultural products sold, and 1st for the value of crops, including nursery and greenhouse stock. The value of livestock, poultry, etc., ranks the County 26th in the state.

The Sinkhole Plain's extensive Karst geology and related underground stream network introduce a new set of factors that are not ideal for development. Specifically, these factors are: unpredictable grading and development costs; vulnerability to groundwater contamination; and, increased susceptibility to flooding and soil erosion. Unfortunately, this susceptibility to soil erosion includes the County's largest areas of prime agricultural land. The intermittent instability of the terrain, variable depths of bedrock and shallow water table lessen the predictability of grading and excavation costs and increase susceptibility to flooding in shallow sinkhole areas.

In addition to additional considerations for building practices, Karst topography also necessitates increased sensitivity toward groundwater. Over 60 percent of Warren County and most of Bowling Green drain into cave streams, most of which are located near to the water table and relatively close to the surface. In fact, many of the subsurface streams are simply sunken surface streams. The Kentucky Geological Survey characterizes approximately 4/5 of Warren County as having a "high" level of hydrosensitivity, meaning that because of its drainage characteristics, contaminants can easily penetrate, and move around in, the groundwater system. **(See Figure 29: Hydrosensitivity)**

The County groundwater system's varying vulnerability to contamination has been classified according to the D.R.A.S.T.I.C. Index. **(See Figure 30: Groundwater: Vulnerability to Contamination)** Initially developed by the National Water Well Association and the Environmental Protection Agency (EPA), the D.R.A.S.T.I.C. Index takes into account seven hydrologic factors that influence an area's proclivity toward water pollution: the depth of the water table, the speed with which rain reaches the water table, the composition of the aquifer, soil type at ground level, topography, the effectiveness of the soil between the surface and the water table at removing contaminants from percolating water, and the speed with which water moves once it reaches the aquifer. Sixty-three percent of land within Warren County falls into the "Extremely Vulnerable" category, which means that roughly 221,760 acres of land is highly unsuitable for landfills, concentrated septic tanks, industries and businesses that store or use large quantities of toxic and explosive materials, and underground storage tanks containing hazardous contaminants. Given the presence of shallow aquifers, groundwater quality is exceedingly sensitive to discharge from failing, on-site sewage disposal systems and other point sources of pollution. To avert a threat to public health, extra measures must be taken to treat and supply water and to provide public sewage treatment and collection to reduce the need for septic systems. Because public wastewater systems in sinkhole plains typically require more complicated infrastructure—more circuitously configured pipes and lift stations to overcome the topography, they are more expensive to build.

The Karst geology and soil composition in Warren County often result in competing and incompatible uses for the same land. Soil erosion in the County's largest areas of prime agricultural land has long been identified as a major problem. The majority of eroded soil ultimately ends up in the bottom of sinkhole plains. The sedimentation slows natural drainage and intensifies flooding problems during heavy rainstorms. If water movement slows to the point of causing ponding or

flooding on the surface, the weight of the standing water can lead to additional sinkhole collapse. In addition, soil erosion into the Karst aquifer leads to muddy water in water wells and springs. Prior analysis of water samples in Warren County has shown that, in addition to sedimentation, this "muddy water" also contains very high levels of dangerous bacteria such as fecal coliform and fecal streptococcus following heavy rainstorms. To further complicate matters, these same two locations have the largest contiguous areas of soil most suitable for urban development.

Extensive research was done on the County's natural resources as part of the planning process that produced the 1990 Comprehensive Plan. A series of technical reports made several policy recommendations to deal with the Karst terrain and related issues which were implemented in varying degrees through the Subdivision Regulations, and Phase II Stormwater requirements.

1. **Extend water lines throughout the County.** This has largely been achieved. Between 98 and 99 percent of the County is on public water.
2. **Host informational workshops for homeowners about water treatment techniques.**
3. **Require ponds or berms to be constructed to protect sinkhole drains from becoming clogged and increase water infiltration into and through the soil.**
4. **Implement Best Management Practices for the application of fertilizers, animal waste, and pesticides to reduce soil loss and direct recharge of storm water runoff.**
5. **Treat urban storm water runoff from commercial and industrial areas before it flows into the aquifer and/or store it in retention basins to be released slowly into the Bowling Green Municipal Utilities sewer system for treatment.**
6. **Use a watershed system approach to stormwater management, moving away from stormwater drainage wells and retention basins.** This has not been implemented. Retention Basins are permitted in the Subdivision Regulations.
7. **Construct sinkhole ponds in urban areas.** This has not been formally implemented.
8. **Extend sewers into the subdivisions close to Bowling Green to protect groundwater.** New developments are required to hook up to sewer, but existing developments on septic are not required to convert.
9. **Require future subdivisions with lot sizes less than three acres to have an acceptable sewage treatment plant, thereby limiting high density residential development dependent upon individual septic tank absorption fields.** This has not been formally implemented.
10. **Ban septic tank absorption fields within the sinkhole flood plain.**

Warren County falls within the Green River Basin. There are three major rivers and one significant creek in the region. Green River forms a portion of the northern boundary of the County; Barren River bisects the County from the northwest to the southeast; Gasper River flows into Barren River on the western side of the County; and Drakes Creek runs north from Simpson County into Barren River on the eastern side of Warren County. **(See Figure 31: Hydrology Network).**

These rivers are perceived to be recreational assets, part of the pastoral beauty in rural areas of the County, and an urban amenity (in the case of the Barren River), but there is also concern that they are being used for illegal dumping that affects not only their aesthetic beauty, but also water quality. These perceptions have been substantiated by a report to the Kentucky General Assembly, which found that while the water quality of most lakes, creeks, and streams in Warren County is sufficient to support aquatic habitat, recreational activities, fish consumption and

drinking water, a few bodies of water have been identified as having unsafe levels of pollution, namely West Fork Drakes Creek and portions of Barren River.[3] (Significantly, of the 10 species identified as endangered by the U. S. Fish and Wildlife Service, eight are aquatic – primarily species of mussel and fish).

In 2003, as part of its effort to reduce pollutants entering into the groundwater, Warren County began participating in the Kentucky Certified Clean County (KCCC) Program, a statewide effort to eradicate illegal dumpsites. Using transportation funding, Kentucky awarded Warren County just over $250,000 with the condition that it match at least 25 percent in cash or in-kind services. As of 2005, Warren County had cleaned up nearly all 120 identified locations with the assistance of its Road Department and laborers participating in the Warren County Regional Jail Class D Inmate Work Program. About twenty of the sites were located on rights-of-way, while the remainder sites were on private property.

In 2004, Bowling Green and Warren County began participating in a Federal Emergency Management Agency (FEMA) program to update Flood Insurance Rate Maps (FIRM), which are very influential on mortgage lending and insurance rates. Upon receiving a $366,000 grant from FEMA and becoming certified Cooperative Technical Partners (CTP), the City and County have been remapping the area, including as many historical records as possible but also restudying certain floodways, conducting survey reconnaissance, doing basemap projections, and working on hydrologic and hydraulic analyses in order to improve the data's accuracy. The analysis has identified over 30,000 acres of floodplain in Warren County and 248 miles, which equates to 8.65 percent of Warren County's 545 square miles and 472 and 582 buildings in Bowling Green's and Warren County's floodplains, respectively.

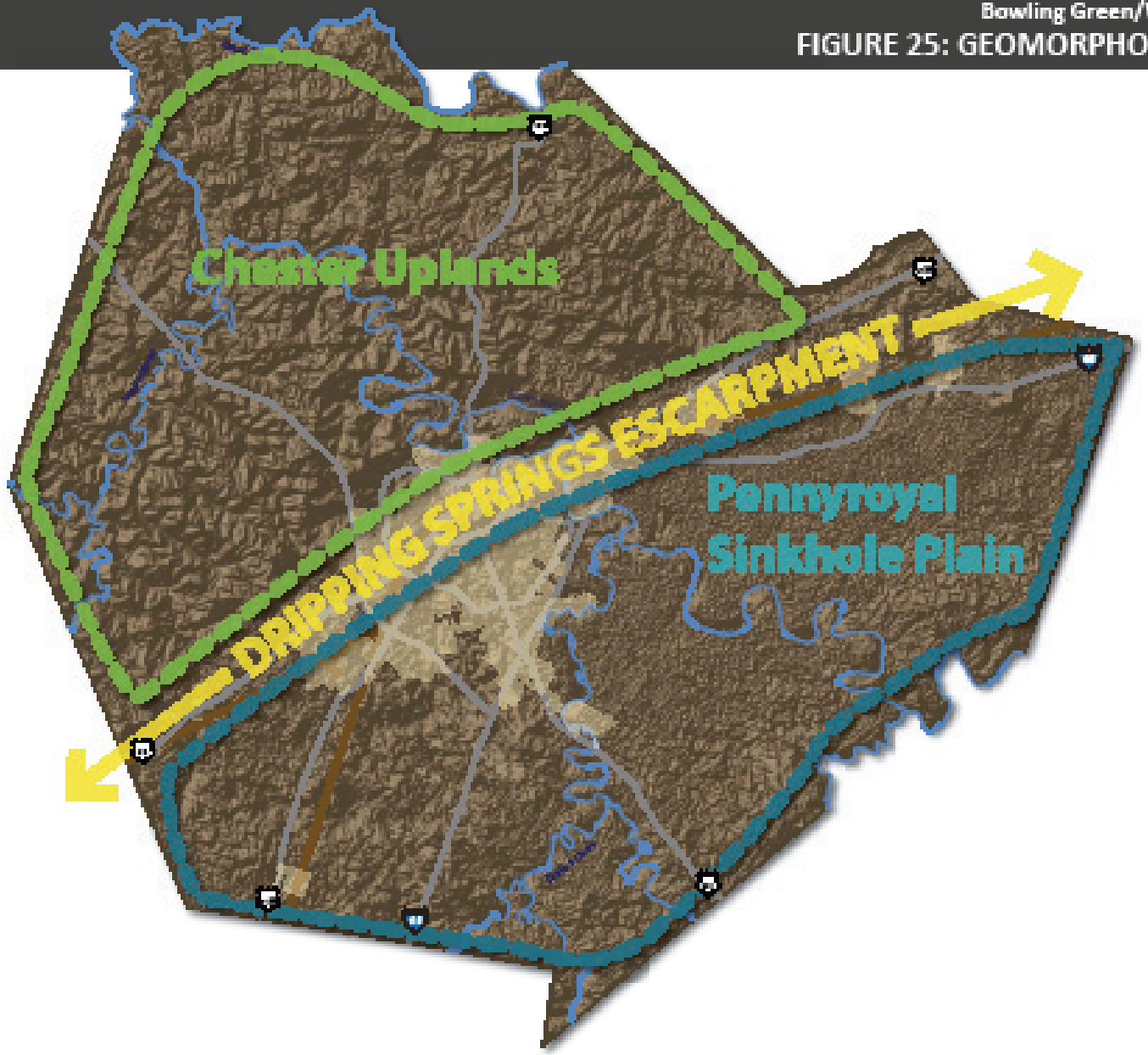
Warren County has a significant number of small wetlands—often one acre or smaller and permanently or semi-permanently flooded— scattered throughout the County. There is also a handful of larger wetlands, namely in the areas east of Bowling Green in the floodplain of the Barren River; near to Basil Griffin Park west of I-65 and north of Dewey Lake; and, south of Dewey Avenue.

Rainfall and climatic changes have become increasingly critical issues. In 2007, despite a rainy autumn, Warren County was nearly 20 percent short on rainfall for the year. A hot, dry summer coupled with a late season freeze resulted in the Barren River dropping to a 50-year low and farmers and nurseries losing significant portions of their crops. To ameliorate the situation, in late fall the U.S. Army Corps of Engineers released additional water from Barren River Lake. The City and County subsequently requested that the Corps study whether more water should be regularly kept in the lake to ease future droughts. Record low flows forced the Bowling Green Municipal Utility to lower its water intake and institute outdoor water use restrictions.

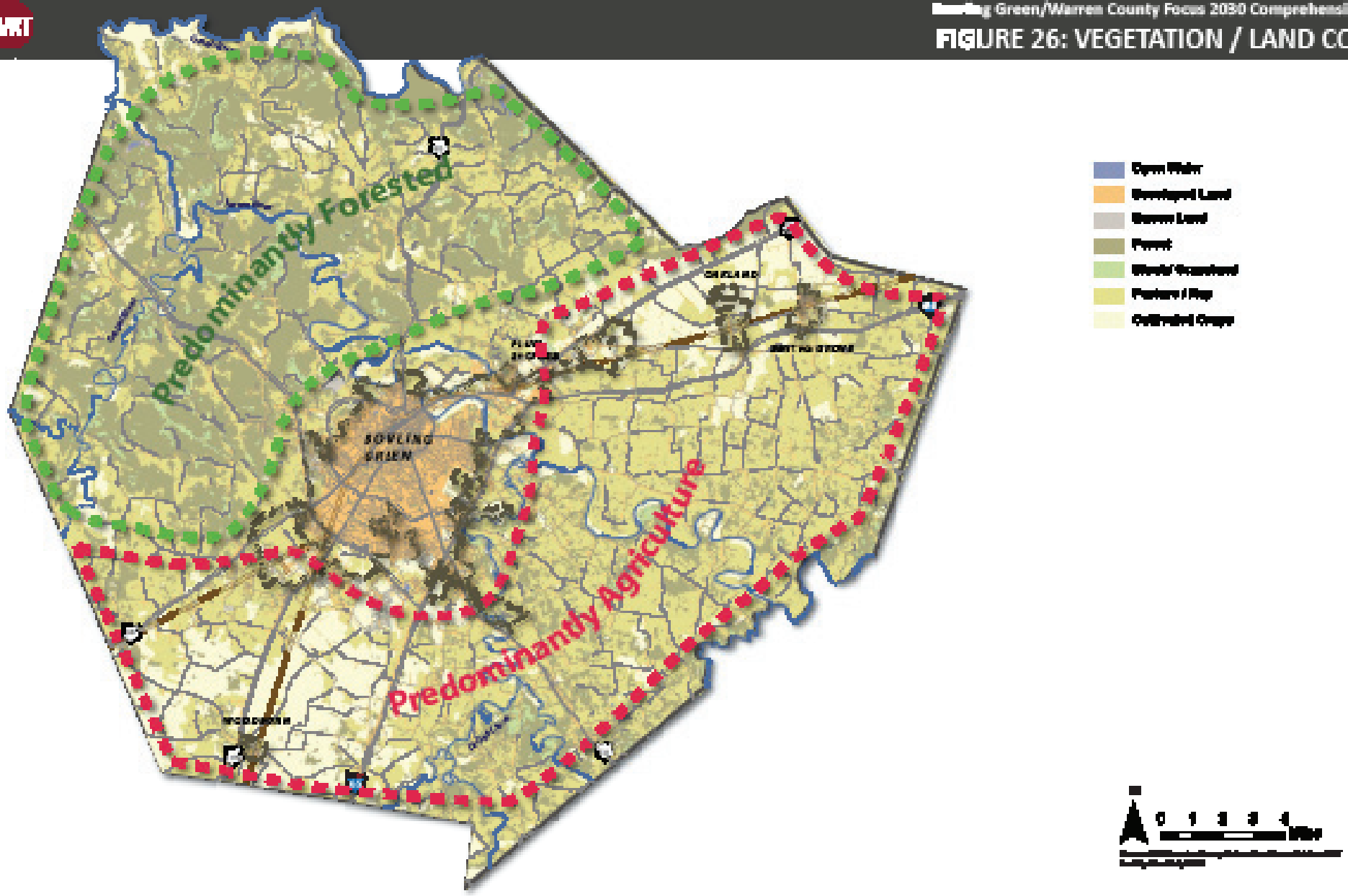
The wetlands habitat combined with varied topography and multiple "micro-climates" has led to notable ecological diversity. However, negative externalities from agriculture, mining, development and septic tanks —including polluted runoff, drainage and fill of wetlands and seepage— have altered much of the natural habitat in Warren County.

Nevertheless, there are four notable wildlife habitat preserves in the County, all with very limited public access: Woodburn Glade, a 20-acre property with several open, rocky, glades and six rare plants; Cheney Lake, a 169-acre transient water body located in Cheney Lake State Nature Preserve that acts as a pass through for migratory birds; McElroy Lake, another transient water body that is privately owned and not protected; and Sunset Barrens, a 100-acre remnant barren managed by The Nature Conservancy. Many of the ten federally-listed and 58 state-listed (Kentucky State Nature Preserves Commission) threatened or endangered species inhabit these areas in Warren County.

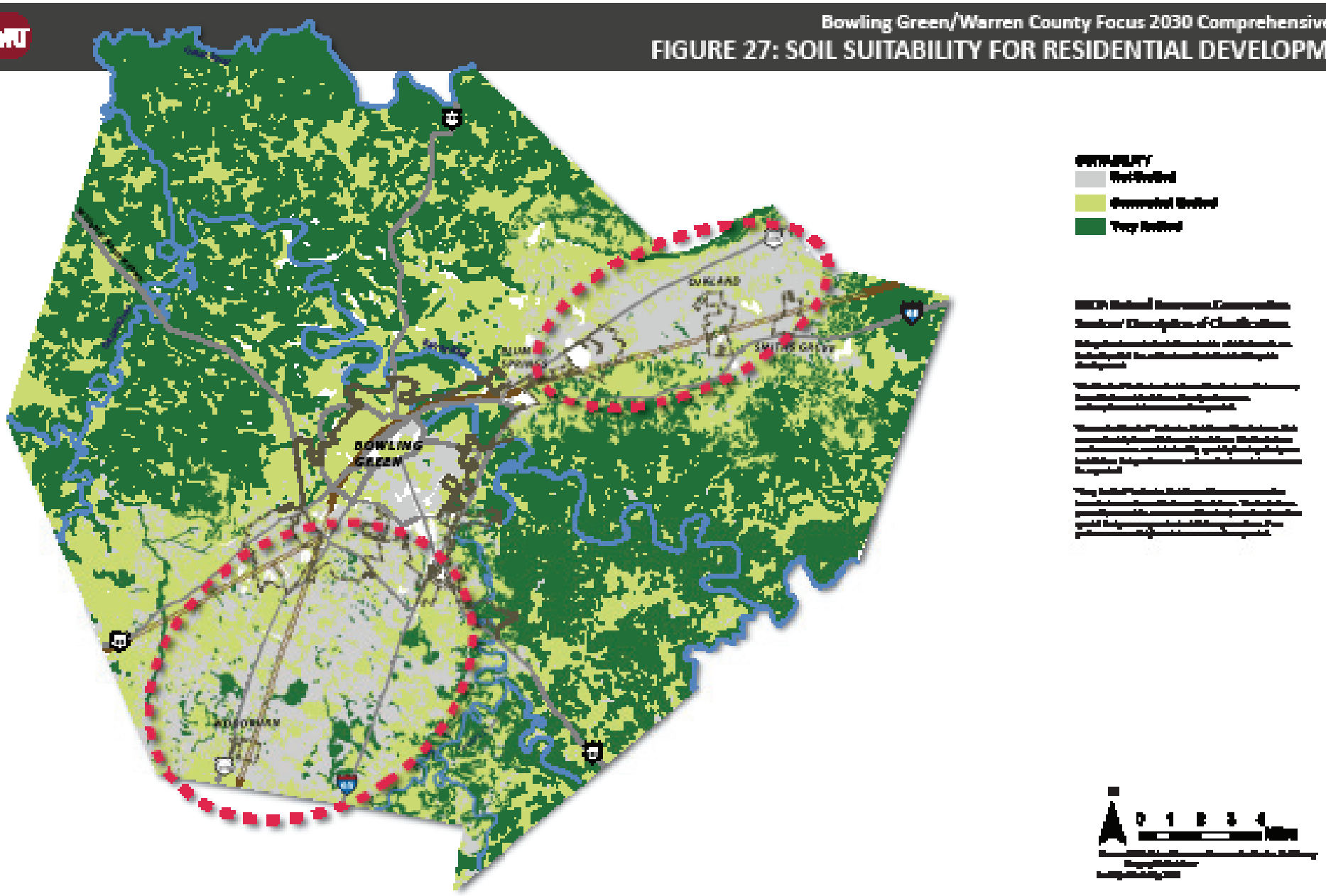
# FIGURE 25: GEOMORPHOLOGY AND LANDSCAPE CHARACTER



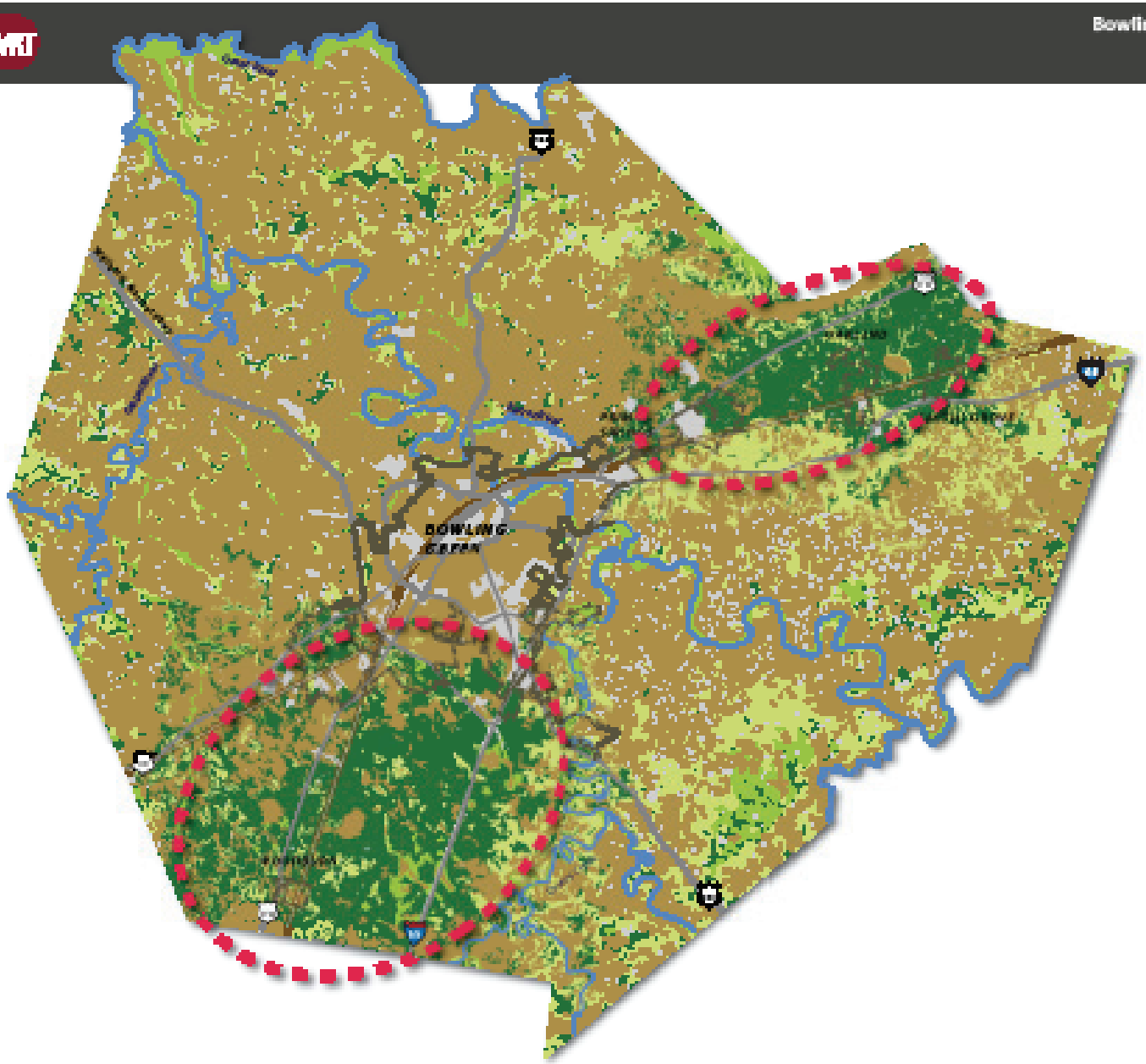
# FIGURE 26: VEGETATION / LAND COVER



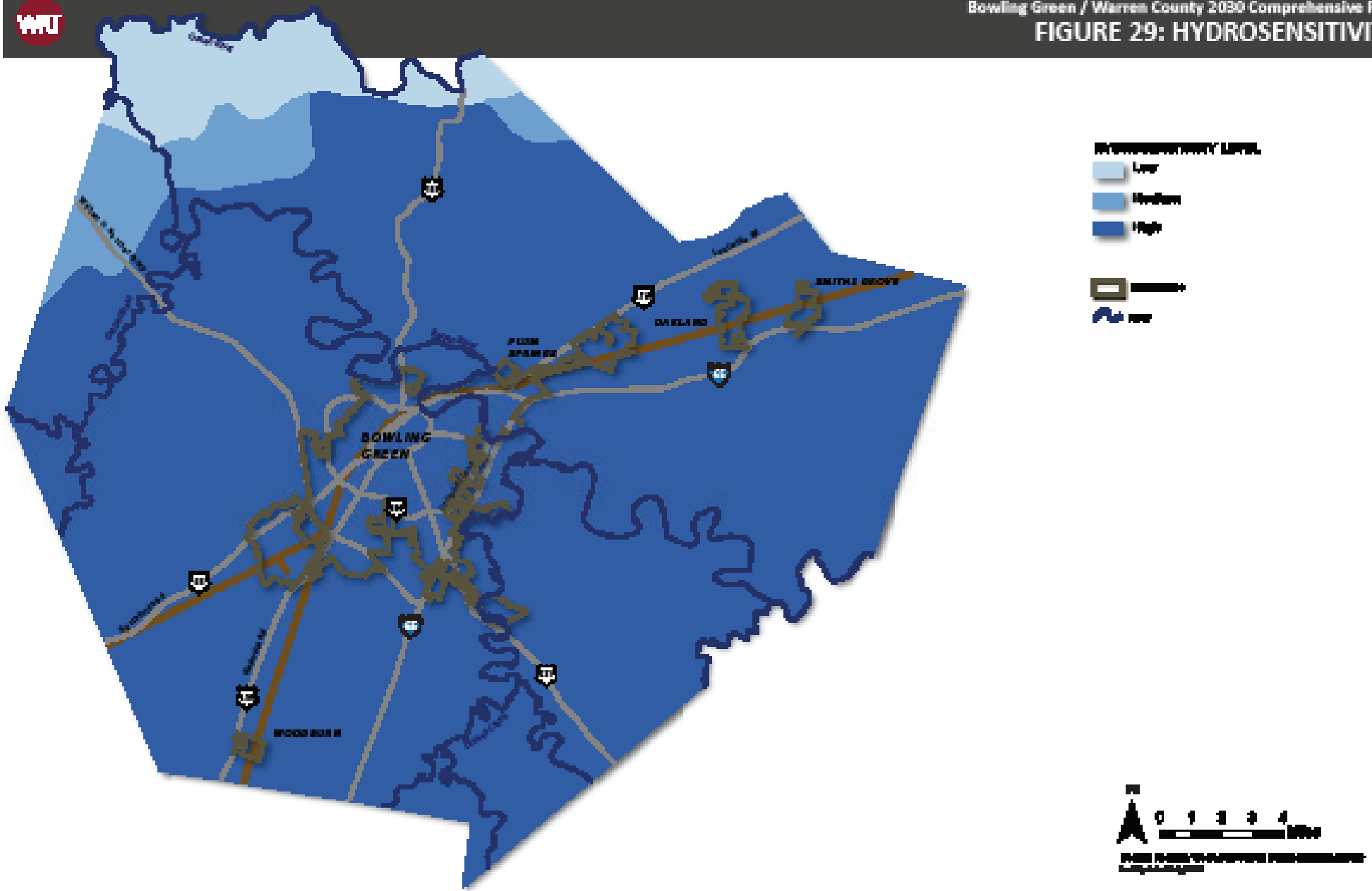
# FIGURE 27: SOIL SUITABILITY FOR RESIDENTIAL DEVELOPMENT



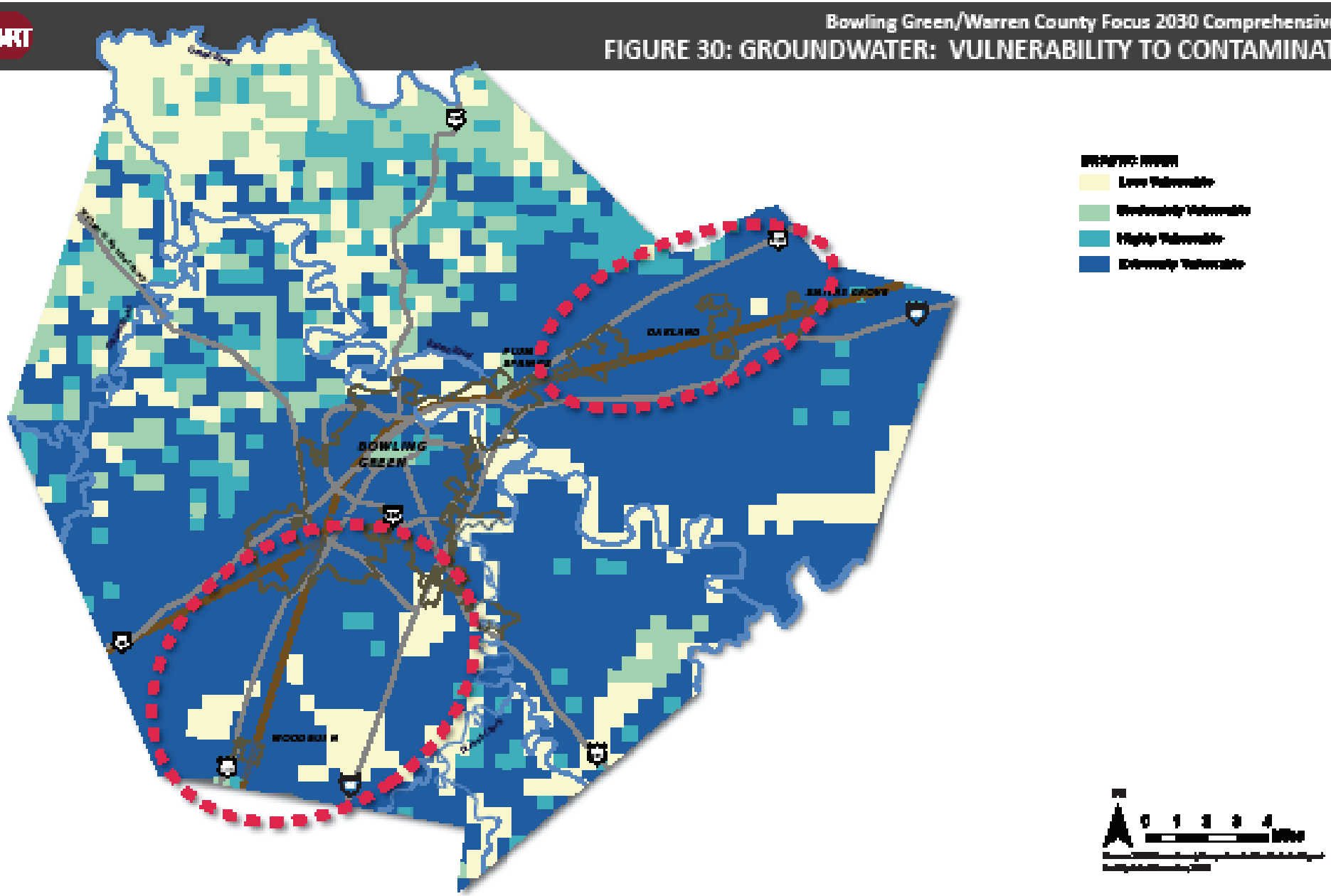
# FIGURE 28: FARMING SUITABILITY



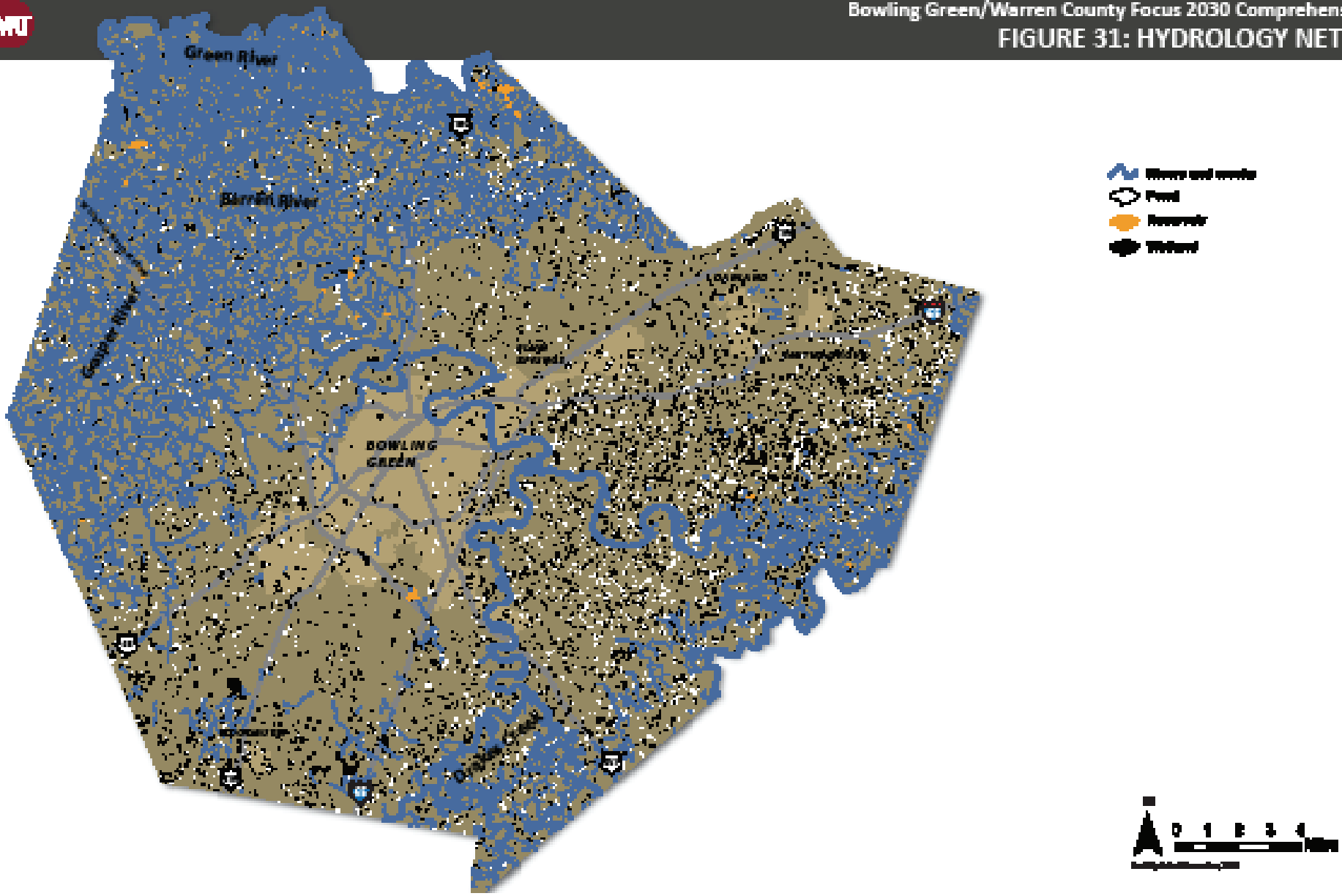
# FIGURE 29: HYDROSENSITIVITY



# FIGURE 30: GROUNDWATER: VULNERABILITY TO CONTAMINATION



# FIGURE 31: HYDROLOGY NETWORK



## Cultural Resources

**Sources:**

- **Historic Preservation Design Guidelines, Bowling Green, Kentucky 1993, Revised, June 2006**
- **Planning to Preserve: The 2004 State Historic Preservation Plan for the Commonwealth of Kentucky**
- **Bowling Green-Warren County Historic Preservation Board Website - http://www.warrenpc.org/historic_preservation/index.php**

Most of the historic resources of Warren County generally fall into two categories: first, historic structures or properties that have significance in terms of architectural character, as locations of important historical events or connection to important historical figures; and second, elements important to the historic rural and agricultural character of the County.

Warren County, and particularly Bowling Green, is recognized for having a number of architectural resources of historical significance. There are six districts in the City of Bowling Green designated on the National Register of Historic Places: St. Joseph's Historic District; Shake Rag Historic District; Upper East Main Historic District; Downtown Commercial Historic District; College Hill Historic District; and, Magnolia Historic District. In addition, there are two National Register historic districts in Warren County outside Bowling Green: Smiths Grove Historic District and Oakland-Freeport Historic District.

There are also 60 individual sites in Warren County on the National Register, and the National Trust for Historic Preservation honored Bowling Green in 2006 as one of a "Dozen Distinctive Destinations" in the country as a historic-themed tourist attraction. National Register district or individual property designation is a high honor and comes with some financial opportunities to encourage preservation. However, no special regulations apply, provided there is no involvement of Federal funds.

There are four locally-designated historic districts and nine individual properties with local historic designation in Bowling Green. The historic districts are: the Downtown Commercial Historic District; the Chestnut Dodd Historic District; the College Hill Historic District and the Upper East Main Historic District. The individual properties with local historic designation are:

- 422 15th Avenue;
- 1405 State Street;
- 1056 Elm Street;
- 641 10th Avenue E;
- 537 10th Avenue E;
- 522 Morris Alley;
- 3838 Belle Rive Circle;
- 3870 Belle Rive Circle; and,
- 1303 College Street.

The following descriptions of the four locally-designated historic districts appeared in the June 2006 Revision of the Bowling Green and Warren County Historic Preservation Board's "Historic Preservation Design Guidelines":

***Downtown Commercial Local Historic District:***
This district consists of a concentrated group of 19th and early 20th century commercial, governmental, and religious structures. It comprises the original center of Bowling Green; the original courthouse square; the principal buildings of the city, county, and federal governments; and a portion of the Downtown Commercial National Register District. The majority of buildings are the "two-part commercial block" type. The two-part commercial block is usually two to four stories characterized by a horizontal division into two distinct zones that reflect the different interior uses - for instance, retail on the main floor and offices or residential on the upper floors.

***Chestnut Dodd Local Historic District:***
The 700 block of Chestnut began developing c. 1895 with the majority of new buildings, additions and subdivision of lots taking place between 1901 and 1908. Its period of significance is from 1895 to 1920. During this period, it represented owner-occupied housing of the white middle-class with at least two early merchants. In the 1930s and 40s it served mostly as rental property. Current use is commercial and residential (multi-family rental).

Lon Dodd, for whom the district is named, owned three lots: 729, 725, and 719 Chestnut, along with rights to the fences and stones, in 1895 and likely built his home at 729 Chestnut soon after. Dodd, born in the Goshen vicinity of Warren County, lived in Bowling Green for 25 years and owned a grocery store at 10th and State Streets. Originally, he was a member of the firm of Dodd & Duncan on Main Street but sold out to open the store at 10th and State. Dodd was a featured Bowling Green citizen in *The Times-Journal and Warren County Courier, Twentieth anniversary Edition* in 1902. Dodd also served as a city council member, was a member of the Masonic order, and a member of State Street Methodist church. He is buried at Fairview Cemetery.

***College Hill Historic Local District:***
The spine of this residential district is State Street, a principal north-south arterial that connects the Downtown Commercial Historic District with the campus of Western Kentucky University. The district also includes portions of College and Chestnut Streets parallel with State Street. The area is a highly concentrated group of 19th and early 20th century residences and churches with architectural and historic significance. Styles, forms, and construction methods are freely mixed throughout the district with the majority of the structures having been built between 1840 and 1930.

***Upper East Main Local Historic District:***
This district is a highly concentrated group of late 19th and early 20th century residences constructed between 1870 and 1930 and located between the historic core of Bowling Green and Reservoir Hill. Both individually and as a district, the structures are eclectic.

The major architectural styles in the district include Italianate, Romanesque Revival, Queen Anne, Victorian Colonial, early 20th century Utilitarian, Craftsman, Georgian Revival and Bungalow. Two houses in the district were designed by the local architect, Creedmore Fleenor, who designed many structures in Bowling Green. The district is also listed on the National Register of Historic Places and includes one individually listed house.

In local historic districts and for locally-designated individual properties, special guidelines apply to exterior changes, new construction, demolition or structure relocations, and decisions are based on a set of design guidelines which are based on national standards.

Historic architectural styles surviving in Warren County in terms of residential structures include Federal style, Greek Revival, Italianate, Greek Revival, Gothic Revival, Romanesque, Second Empire, Queen Anne, Colonial Revival and Bungalow. In terms of commercial structures, mostly concentrated in downtown Bowling Green, the Italianate style predominates but Federal, Gothic, Venetian Gothic, Classical, Functional, International and Art Deco structures can also be found. In the latter part of the 20th century many of these buildings were deteriorating and sometimes covered with aluminum. However, beginning in approximately 1980, a downtown rejuvenation began under direction of the Landmark Association, which later became a prototype for the National Trust for Historic Preservation's Main Street program. While building materials were generally similar to those used elsewhere in Kentucky, an exception was the white limestone facings on many downtown commercial buildings. The stone was quarried in Warren County and known in trade circles as Bowling Green limestone.

*Additional notes:*

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*(Endnotes)*

1 This money came from The Clean Water State Revolving Fund (CWSRF), a 20-year loan program for planning, design and construction of wastewater infrastructure projects that collectively contribute toward the statewide goal of improving water quality. Final Intended Use Plan Including Priority Project List of the Clean Water State Revolving Fund for State Fiscal Year 2008. Commonwealth of Kentucky. October 2007. Prepared by the Environmental and Public Protection Cabinet and Kentucky Infrastructure Authority.

2 *Source:* TIF top story in '07 JIM GAINES, The Daily News, January 1, 2008

3 *Source*: p2-8 Wastewater Report, Kentucky 305(b) Report to Congress, 2002

4 Warren County On Its Way to Becoming Certified Clean County. CCPC Spring 2005 Newsletter.

5 FEMA Flood Maps Receive Facelift. CCPC Fall 2006 Newsletter.