

Methodology

Miami Valley Land Use Demand Assessment

The projections presented in this report were calculated in two stages. First, population and employment projections were developed for the Region. Second, these two sets of projections were used to calculate land use needs for the Region. For both the socio-economic and the land use demand projections, the year 2040 was the planning horizon year.

Population and Employment Projections

The population projections to 2030 were taken directly from the Ohio Department of Development's (ODOD) population projections for Greene, Miami, and Montgomery counties. These projections were then extended to 2040 in order to meet the horizon year. For Warren County, since only the cities of Carlisle, Franklin, and Springboro are included in the planning boundaries, an average percentage of the population in these three cities in comparison to the county was developed based on historic population data. This percentage was then applied to the ODOD county-level population projections in order to calculate the future population for those three cities to 2030. This projection was then extended to 2040.

Two different employment projections were developed, one high and one low, in order to provide a forecasted employment range. Both are based on data gathered from ODOD, the Ohio Department of Jobs and Family Services (ODJFS), and data purchased from Woods & Poole. The projections were, for Greene, Miami, and Montgomery counties, made at the county level. County employment totals were calculated first, and then these totals were broken down into ten Standard Industrial Classification (SIC) categories based on data purchased from Woods & Poole.

The only exception to this method is the Warren County employment projection. Projections for the cities of Carlisle, Franklin, and Springboro to 2030 were provided by the Ohio, Kentucky, Indiana Regional Council of Governments (OKI). MVRPC staff then extended these forecasts to 2040. Because of this, there is only one projection for Warren County.

The lower level projection is the projection that has been used in MVRPC's 2030 Long Range Transportation Plan, although for this assessment it was extended to 2040 and a new division among SIC categories, based on data from Woods & Poole, was applied.

The upper level projection was calculated in two stages. First, a short term projection to 2010 was calculated using both adjusted historical data from the Quarterly Census of Employment and Wages and the ODJFS 2014 employment projection (including the 2004 employment number on which it is based). Second, using this same data, a linear projection to 2040 was calculated and the 2020 and 2030 numbers were placed on a line that extended from the 2010 projection to the 2040 projection. The total employment projections by county were divided into SIC categories using the same method used for the lower level projections.

Land Use Demand Projections

The land use demand projections were calculated at the county level and then aggregated to the regional level based on the 2040 population and employment projections and the assumption that development in the Region would continue at the same densities and intensities that were represented in 2007. The method follows, with some modifications, the method outlined in Arthur C. Nelson's *Planner's*

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Estimating Guide: Projecting Land-Use and Facility Needs. A base year of 2007 was used for most of the calculations, although in some cases 2007 data was not available and data from other years (most often 2008, 2006, or 2000) had to be substituted.

Nelson's approach divides the projections into five different categories, all of which are discussed in more detail below:

- Residential
- Employment
- Public Facilities
- Education
- Water and Wastewater Utilities

Data were obtained from a variety of different sources. The primary sources were the county Auditors' parcel-level data. Other sources include:

- U.S. Census Bureau
- Ohio Department of Development
- Ohio Department of Jobs and Family Services
- Ohio EPA, Division of Surface Water
- National Center for Education Statistics
- A variety of local sources, including water facilities superintendents and school districts

Residential Land Use – For this category, projections were calculated separately for single and multi-family housing units. For single family housing units, the projections were based on data from the 2007 parcel database. For multi-family housing units, 2007 American Community Survey (ACS) data from the Census Bureau was used to supplement the 2007 parcel data. For both types of housing units, data from the ACS were used in order to divide the 2007 population number among the housing types. All 2007 densities were held constant to 2040.

In order to calculate the residential land use needs, the first step was to inventory the existing residential land use using the 2007 parcel database. Second, numbers of occupied units and residents were estimated using both information from the 2007 parcel database and the ACS. Third, residential acreage was determined using the 2007 parcel database. Fourth, the projected number of residential units needed for 2040 was calculated based on the 2040 population projections and the calculated persons per household, held constant from 2007. Fifth, future residential land use needs were determined based on the projected number of housing units needed and average densities held constant from 2007.

Employment-Related Land Use – Because two employment projections were calculated, two land use projections for land related to employment were calculated as well. The 2007 parcel database was the primary source of data for the projection of this category.

As with the residential land use needs projection, the first step was to inventory existing employment-based land use from the 2007 parcel database. Second, gross square footage per employee and floor area ratios (FARs) were then calculated for 2007 by SIC category. These ratios were applied to the 2040 employment projections in order to calculate the land use needs for this category.

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For Greene and Montgomery counties, the employment-related land use projections had to be adjusted so that land for Wright Patterson Air Force Base (WPAFB) was not projected along with everything else. In order to accomplish this, neither land nor employment for 2007 and 2040 for WPAFB were included in the projections. The acreage was added back into both counties' total developed acreage for 2007 and the total acreage needed for 2040 after the projections were calculated.

Public Facility Land Use – Future land use demands for basic services — fire/emergency medical services and police facilities — were based on population projections and current levels of service. Land for all other public facilities, including jails, leisure facilities, major community facilities, parks and open space, miscellaneous support, and religious facilities, were not projected. These facilities are regarded as non-basic services that exist at the will of the public.

For the projections of both fire/emergency medical services and police facilities, the acreages for each type of facility were obtained from the 2007 parcel database and then divided by the 24/7 functional population for 2007. This ratio was then applied to the projected 24/7 functional population for 2040 in order to calculate the future acreage needed for these types of facilities.

Educational Land Use – Only the acreage needed for public primary and secondary schools was projected to 2040. The 2007 acreage for private primary and secondary schools, public and private post-secondary schools, and for auxiliary facilities were all held constant to 2040.

Future land use projections for public primary and secondary schools were based on enrollment projections, which were based largely on population projections. Levels of service for school facility space were taken from the Ohio School Facilities Commission's (OSFC) standards for school design.

The method for the educational land use demand projections is based on school planning guidelines from the OSFC. The floor area ratio (FAR) was calculated for each school category, i.e., elementary (kindergarten through 5th grade), middle (grades 6 through 8), and high (grades 9 through 12), for each county and for the Region as a whole. Not all schools in the Region fit neatly into these categories. Therefore, for some schools, estimates had to be calculated based the percentage divisions between grades from the 2007 enrollment numbers. The following standards were then applied in order to estimate future facility space needs:

- For elementary schools, the OSFC allocates 115.6-125 square feet per student (115.6 was used)
- For middle schools, the standard is 141-151 square feet per student (141 was used)
- For high schools, the standard is 156-180 square feet student (156 was used)

The facility space needed, along with the FAR, was used to determine the total land needed in 2040. Note that this calculation assumes each school is currently at full capacity.

Water and Wastewater Utility Land Use – Data regarding water and wastewater utilities' capacities and demands was acquired from local water facility operators and from the Ohio EPA, respectively. Capacities for water and wastewater at the county level were determined to be sufficient for future demand; therefore additional land for these types of facilities was not allocated in projections for 2040. However, local needs may differ from those projected at the county or regional level, and so future expansions may be necessary to meet local demands.