

Base Data and Assumptions

Miami Valley Land Use Demand Assessment

Before presenting the land use demand projection results, it is necessary to take a more detailed look at some of the base data that was used and some of the assumptions that were made in the course of the calculations. The sections that follow present examinations of the base data and assumptions at both the regional and county levels.

Residential Land Use

Tables 6 through 10 show the base data and assumptions for the residential projections. In order to project the residential land needed in 2040, single family housing units were divided into four density categories. All multi-family housing units were considered in the same category.

For single family housing units, the number of units was derived from the 2007 parcel database. The number of multi-family units, however, was not included in the parcel database and had to be obtained from the 2005-2007 American Community Survey 3-Year Estimates (ACS). For both single and multi-family housing units, the acreage was determined using the 2007 parcel database.

Vacancy rates were calculated based on data from the ACS and were held constant to 2040. The estimated household sizes were calculated based on population data from the ACS and the number of units from the 2007 parcel database. These were also held constant to 2040.

Table 6 shows that almost 82% of the housing units in the Region are single

Table 6. Regional Residential Land Use Data: 2007

	Housing Units	Acres	Vacancy Rate	Estimated Household Size
Single Family				
<1 Units Per Net Acre	36,116 (10.7%)	80,740	6.61%	2.65
1-2 Units Per Net Acre	86,769 (25.8%)	46,140	6.61%	2.66
3-5 Units Per Net Acre	92,659 (27.6%)	23,756	6.61%	2.58
6+ Units Per Net Acre	59,666 (17.7%)	8,344	6.61%	2.55
Subtotal Single Family	275,210 (81.9%)	158,979	6.61%	2.61
Multi-Family				
Total Multi-Family	61,026 (18.1%)	8,466	18.96%	2.81
Total Residential	336,236 (100%)	167,446	9.36%	2.64

Source: MVRPC; U.S. Census Bureau, 2008

Table 7. Greene County Residential Land Use Data: 2007

	Housing Units	Acres	Vacancy Rate	Estimated Household Size
Single Family				
<1 Units Per Net Acre	11,713 (18.4%)	23,148	5.83%	2.71
1-2 Units Per Net Acre	22,411 (35.1%)	11,916	5.83%	2.71
3-5 Units Per Net Acre	11,495 (18.0%)	2,680	5.83%	2.71
6+ Units Per Net Acre	4,097 (6.4%)	584	5.83%	2.71
Subtotal Single Family	49,716 (78.0%)	38,328	5.83%	2.71
Multi-Family				
Total Multi-Family	14,047 (22.0%)	1,445	13.21%	1.62
Total Residential	63,763 (100.0%)	39,772	7.48%	2.48

Source: MVRPC; U.S. Census Bureau, 2008

Table 8. Miami County Residential Land Use Data: 2007

	Housing Units	Acres	Vacancy Rate	Estimated Household Size
Single Family				
<1 Units Per Net Acre	13,675 (36.0%)	35,503	4.88%	2.61
1-2 Units Per Net Acre	11,142 (29.4%)	6,966	4.88%	2.61
3-5 Units Per Net Acre	6,213 (16.4%)	1,449	4.88%	2.61
6+ Units Per Net Acre	3,998 (10.5%)	576	4.88%	2.61
Subtotal Single Family	35,028 (92.3%)	44,493	4.88%	2.61
Multi-Family				
Total Multi-Family	2,925 (7.7%)	935	14.03%	5.31
Total Residential	37,953 (100.0%)	45,428	5.58%	2.79

Source: MVRPC; U.S. Census Bureau, 2008

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family. In terms of acreage, those single family housing units with more than one acre per unit (<1 Units per Net Acre) occupy the largest amount of land, while single family housing units with 6 units or more per acre occupy the smallest amount of land. Not surprisingly, vacancy rates for single family housing units are much lower than those for multi-family units. Household sizes for single family units are lower as well.

Employment-Related Land Use

The base data for the employment-based land use projections came mostly from the 2007 parcel database (Tables 11 through 15). For this projection, employment was categorized into one of two major classifications: Industrial or Commercial. Industrial employment includes the SIC categories for Manufacturing and Transportation, Communications, and Utilities (listed as 'Trans, Comm, Util' in the employment tables). Commercial employment includes Construction, FIRE, Public Service, Retail, Services, and Wholesale. Land use needs for Agriculture and Mining were not projected.

Square footage per employee was calculated using building square footage data obtained from the 2007 parcel database and the employment projections. Even though 2007 is the base year for this assessment, 2000 was the base year for the

Table 9. Montgomery County Residential Land Use Data: 2007

	Housing Units	Acres	Vacancy Rate	Estimated Household Size
Single Family				
<1 Units Per Net Acre	11,401 (4.8%)	21,853	7.87%	2.54
1-2 Units Per Net Acre	50,012 (21.0%)	24,795	7.87%	2.54
3-5 Units Per Net Acre	74,357 (31.3%)	18,411	7.87%	2.54
6+ Units Per Net Acre	60,667 (25.5%)	7,153	7.87%	2.54
Subtotal Single Family	196,437 (82.6%)	72,212	7.87%	2.54
Multi-Family				
Total Multi-Family	41,481 (17.4%)	5,891	21.60%	3.08
Total Residential	237,918 (100.0%)	78,103	10.43%	2.63

Source: MVRPC; U.S. Census Bureau, 2008

Table 10. Warren County* Residential Land Use Data: 2007

	Housing Units	Acres	Vacancy Rate	Estimated Household Size
Single Family				
<1 Units Per Net Acre	145 (1.5%)	236	4.47%	3.17
1-2 Units Per Net Acre	5,501 (42.7%)	2,463	4.47%	3.17
3-5 Units Per Net Acre	4,469 (34.7%)	1,216	4.47%	3.17
6+ Units Per Net Acre	207 (1.6%)	31	4.47%	3.17
Subtotal Single Family	10,322 (80.0%)	3,947	4.47%	3.17
Multi-Family				
Total Multi-Family	2,573 (20.0%)	196	13.45%	2.38
Total Residential	12,895 (100.0%)	4,142	6.24%	3.02

Source: MVRPC; U.S. Census Bureau, 2008

Note: *Warren County includes only the cities of Carlisle, Franklin, and Springboro

Table 11. Regional Employment-Related Land Use Data: 2007

	Facility Sq. Ft.	Sq. Ft. Per Employee (Lower Projection)	Sq. Ft. Per Employee (Upper Projection)	Acres	Vacancy Rate	FAR
Total Industrial	80,045,176	958.9	1,029.8	10,712	19.3%	0.172
Manufacturing	79,007,280	1,250.5	1,341.8	9,990	19.3%	0.182
Total Commercial	147,116,302	397.8	426.4	24,596	14.6%	0.137
Retail	56,877,180	676.1	723.7	6,527	12.7%	0.200
Office*	32,560,782	149.0	160.0	3,169	18.2%	0.236
Total	227,161,478	501.2	537.4	42,969	16.8%	0.148

Source: MVRPC; Gem Real Estate Group, 2007

Note: *Includes FIRE, Services, and Government SIC categories

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employment projections, and so the 2007 employment numbers had to be interpolated based on the 2000 and 2010 projections. For this reason, for all counties except Warren, there is a square footage per employee number for each end of the projection range.

The 2007 acreage data comes directly from the 2007 parcel database and the floor area ratios (FARs) were calculated using the square footage and acreage data. The vacancy rates, however, were adapted from the Gem Real Estate Group's 2007 market analyses for industrial, retail, and office development.

Overall, industrial development has a larger amount of square feet per employee than commercial development, and the vacancy rates are higher as well. The differences in the floor area ratios indicate that generally there is more building square footage per acre for retail and office development than for industrial development.

Table 12. Greene County Employment-Related Land Use Data: 2007

	Facility Sq. Ft.	Sq. Ft. Per Employee (Lower Projection)	Sq. Ft. Per Employee (Upper Projection)	Acres	Vacancy Rate	FAR
Total Industrial	5,572,936	996.5	1,041.4	876	22.0%	0.146
Manufacturing	5,416,045	1,246.3	1,302.4	615	22.0%	0.202
Total Commercial	20,618,669	379.1	396.2	3,770	10.2%	0.126
Retail	9,938,735	613.0	640.6	1,195	8.6%	0.191
Office*	4,210,685	128.4	134.2	484	16.6%	0.200
WPAFB	n/a	n/a	n/a	6,486	n/a	n/a
Total**	26,191,605	436.7	456.4	4,646	11.3%	0.129

Source: MVRPC; Gem Real Estate Group, 2007
Note: *Includes FIRE, Services, and Government SIC categories

Table 13. Miami County Employment-Related Land Use Data: 2007

	Facility Sq. Ft.	Sq. Ft. Per Employee (Lower Projection)	Sq. Ft. Per Employee (Upper Projection)	Acres	Vacancy Rate	FAR
Total Industrial	11,595,237	819.9	883.5	2,275	16.6%	0.117
Manufacturing	11,571,114	972.0	1,047.4	2,136	16.6%	0.124
Total Commercial	12,927,065	352.8	381.1	3,398	18.1%	0.087
Retail	6,326,337	653.5	704.2	893	14.1%	0.163
Office*	1,679,155	74.8	80.6	346	20.1%	0.111
Total	24,522,302	482.8	521.2	5,673	17.7%	0.099

Source: MVRPC; Gem Real Estate Group, 2007
Note: *Includes FIRE, Services, and Government SIC categories

Table 14. Montgomery County Employment-Related Land Use Data: 2007

	Facility Sq. Ft.	Sq. Ft. Per Employee (Lower Projection)	Sq. Ft. Per Employee (Upper Projection)	Acres	Vacancy Rate	FAR
Total Industrial	61,120,156	1,023.0	1,106.0	6,770	20.7%	0.207
Manufacturing	60,281,682	1,391.8	1,504.8	6,466	20.7%	0.214
Total Commercial	111,204,763	452.6	489.9	16,675	16.8%	0.153
Retail	39,584,302	718.0	776.3	4,173	14.9%	0.218
Office*	26,307,437	164.9	178.3	2,258	18.8%	0.267
WPAFB	n/a	n/a	n/a	1,175	n/a	n/a
Total**	172,324,919	564.2	610.5	24,620	18.3%	0.169

Source: MVRPC; Gem Real Estate Group, 2007
Note: *Includes FIRE, Services, and Government SIC categories

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Table 15. Warren County* Employment-Related Land Use Data: 2007

	Facility Sq. Ft.	Sq. Ft. Per Employee	Acres	Vacancy Rate	FAR
Total Industrial	1,756,847	440.0	791	2.1%	0.051
Manufacturing	1,738,439	480.5	773	2.1%	0.052
Total Commercial	2,365,805	270.2	753	5.7%	0.072
Retail	1,027,806	331.5	267	1.2%	0.088
Office**	363,505	96.5	80	11.4%	0.104
Total	4,122,652	323.4	1,544	3.7%	0.061

Source: MVRPC; Gem Real Estate Group, 2007

Note: *Warren County includes only the cities of Carlisle, Franklin, and Springboro

**Includes FIRE, Services, and Government SIC categories

Public Facility Land Use

In order to project land use needs for public facilities, it was necessary to determine the 24/7 functional population for each county (Table 16). This was calculated using the population and employment projections and journey-to-work data used in MVRPC's 2030 Long Range Transportation Plan.

The 2007 square footage and acreage for each of the public facility categories came mostly from the 2007 parcel database. In the case of libraries in Montgomery County, however, the library systems were contacted for the square footage data.

By far the largest portion of the land allocated to public facilities is classified as parks and open space. Outside of parks and open space, the most land-intensive uses are religious facilities and private golf courses.

Educational Land Use

Tables 17 and 18 present the base data and assumptions for primary and secondary schools and post-secondary schools in the Region, respectively. For all schools, the number of students was obtained from the National Center for Education Statistics and the acreage came from the 2007 parcel database. For primary and secondary schools, square footage data was obtained directly from the school districts. The Level of Service (LOS) facility space per student comes from the lower range given by the Ohio School Facilities Commission's *Ohio School Design Manual*.

In terms of primary and secondary schools, the largest number of students and facility square footage are found in the elementary schools. The largest acreage, however, occurs at the high school level.

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Table 16. Public Facility Land Use Data: 2007

2007 24/7 Functional Population	Region 700,083		Greene 129,007		Miami 82,504		Montgomery 460,167		Warren* 28,405	
	sq ft	acres	sq ft	acres	sq ft	acres	sq ft	acres	sq ft	acres
Public Safety Facilities										
Fire/EMS Facilities	674,108	127.8	140,524	21.4	45,579	23.5	460,438	78.6	27,567	4.3
Police Facilities	518,177	122.9	62,293	6.8	113,377	3.3	331,058	103.4	11,449	9.3
Jail and Detention Facilities	n/a	244.2	n/a	16.2	n/a	15.6	n/a	212.4	n/a	0.0
Government and Leisure Facilities										
Community Centers	1,582,037	210.1	317,989	35.3	176,558	34.7	1,073,844	132.1	13,646	7.9
Library Facilities	602,460	43.7	94,231	8.2	70,384	4.5	406,795	28.0	31,050	3.0
Recreation Centers	1,582,037	280.9	317,989	7.0	176,558	41.9	1,073,844	217.7	13,646	14.3
Major Community Facilities										
Convention Centers	200,000	3.7	0	0.0	0	0.0	200,000	3.7	0	0.0
Public Assembly Halls	409,239	6.1	0	0.0	0	0.0	409,239	6.1	0	0.0
Other Major Facilities	577,067	376.8	99,589	141.8	50,929	119.9	422,530	114.3	4,019	0.8
Parks and Open Space										
Parks	n/a	15,092.7	n/a	3,412.3	n/a	1,247.6	n/a	10,185.7	n/a	247.1
Public Golf Courses	n/a	4,122.5	n/a	526.3	n/a	1,002.1	n/a	2,286.4	n/a	307.6
Special Use	n/a	1,223.7	n/a	414.7	n/a	320.0	n/a	458.2	n/a	30.8
Conservancy/Greenbelt	n/a	16,601.0	n/a	5,116.3	n/a	3,005.9	n/a	8,369.0	n/a	109.9
Private Land-Extensive Land Uses										
Private Golf Courses	n/a	2,030.7	n/a	699.6	n/a	341.1	n/a	987.1	n/a	2.8
Cemeteries	n/a	1,982.9	n/a	370.3	n/a	360.5	n/a	1,245.2	n/a	6.9
Other Private Land-Related	n/a	768.1	n/a	354.6	n/a	138.5	n/a	275.0	n/a	0.0
Miscellaneous Support										
Public Works Equipment, Storage Yards	n/a	194.6	n/a	66.7	n/a	17.0	n/a	101.7	n/a	9.2
Publicly Owned Drainage Ponds	n/a	73.2	n/a	36.8	n/a	4.0	n/a	24.9	n/a	7.6
Sand, Gravel, Soil Storage Yards	n/a	110.3	n/a	9.4	n/a	0.0	n/a	96.7	n/a	4.2
Landfills	n/a	902.2	n/a	175.7	n/a	41.1	n/a	682.3	n/a	3.2
Other Public Land in Inventory	n/a	513.6	n/a	289.7	n/a	48.6	n/a	139.7	n/a	35.6
Religious										
Religious Facilities	n/a	3,464.4	n/a	1,041.7	n/a	562.7	n/a	1,765.3	n/a	94.7
Total	6,145,124	48,496.1	1,032,615	12,750.9	633,385	7,332.5	4,377,747	27,513.5	101,377	899.2

Source: MVRPC

Note: *Warren County includes only the cities of Carlisle, Franklin, and Springboro

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Table 17. Primary and Secondary School Data: 2007

	Region	Greene	Miami	Montgomery	Warren*
Public Primary & Secondary Schools					
<i>Grades K-5 (Elementary School)</i>					
Number of students	58,212	9,751	7,431	36,372	4,658
Facility square footage	6,854,499	794,465	966,918	4,447,412	645,704
Acreage	1,408	264	153	909	81
Average floor area ratio	0.108	0.069	0.145	0.112	0.111
LOS facility space per student (sq. ft.)	115.6				
<i>Grades 6-8 (Middle School)</i>					
Number of students	30,001	5,195	3,961	18,600	2,245
Facility square footage	4,501,305	578,505	605,483	2,946,285	371,033
Acreage	963	247	136	522	57
Average floor area ratio	0.107	0.054	0.102	0.130	0.151
LOS facility space per student (sq. ft.)	141.0				
<i>Grades 9-12 (High School)</i>					
Number of students	41,211	7,392	5,686	25,338	2,795
Facility square footage	6,420,978	851,218	880,666	4,175,088	514,005
Acreage	1,506	226	213	930	137
Average floor area ratio	0.098	0.087	0.095	0.103	0.086
LOS facility space per student (sq. ft.)	156.0				
Total Public Primary & Secondary School Acreage					
Acreage	3,877	737	503	2,361	275
Auxiliary Facilities					
Acreage	346	73	67	192	14
Private Primary & Secondary Schools					
Number of students	15,624	1,362	1,298	12,949	15
Acreage	400	69	41	289	1
Primary & Secondary Schools					
Total Acreage	4,622	880	611	2,842	289

Source: MVRPC; National Center for Education Statistics, 2007; Ohio School Facilities Commission, 2007
 Note: *Warren County includes only the cities of Carlisle, Franklin, and Springboro

Table 18. Post-Secondary School Data: 2007

	Region	Greene	Miami	Montgomery	Warren*
Public Post-secondary Education					
Number of students	42,771	20,096	3,658	19,017	0
Acreage	1,046	864	125	57	0
Private Post-secondary Education					
Number of students	22,307	5044	524	16072	667
Acreage	779	525	12	229	13
Post-secondary Education					
Total Acreage	1,825	1,389	137	286	13

Source: MVRPC; National Center for Education Statistics, 2007
 Note: *Warren County includes only the cities of Carlisle, Franklin, and Springboro

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Water and Wastewater Utilities

Data for water and wastewater utilities came from three sources. For water supply facilities, capacity and demand data were collected from the facilities themselves. For wastewater facilities, capacity and demand data were obtained through the Ohio Environmental Protection Agency. Facility acreage came from the 2007 parcel database.

In terms of water supply, regional demand in 2008 was less than half of regional capacity. The demand for wastewater treatment was much closer to the Region's capacity, but still almost 50 million gallons per day (mgd) below capacity.

Table 19. Water and Wastewater Utility Data: 2007

Region	Water Supply		Wastewater		Facility Acres, 2007
	Capacity, mgd*, 2008	Demand, mgd*, 2008	Capacity, mgd*, 2007	Demand, mgd*, 2007	
Region	238.04	101.93	182.87	132.95	2,201
Greene	33.61	14.80	33.19	23.47	484
Miami	19.93	7.89	13.95	10.26	377
Montgomery	172.50	74.95	127.23	93.01	1,055
Warren**	12.00	4.30	8.50	6.20	285

Source: MVRPC; Ohio Environmental Protection Agency, 2007

Note: *million gallons per day

**Warren County includes only the cities of Carlisle, Franklin, and Springboro