

# Rolla Comprehensive Plan Update, 2005

## DEVELOPMENT TRENDS MEMORANDUM

01/10/2005

### Residential Development Trends

Housing consumes the largest share of land of all land uses and up until the 1990s its share had steadily grown. Unlike some land uses, such as many retail and manufacturing activities that have relatively rigid space requirements, housing needs can be accommodated along a wide variety of arrangements from single-family homes to high-rise apartments. Housing can often be sited in areas not suitable for large commercial or industrial uses due to terrain difficulties. This section examines residential development trends in Rolla relying on building permit records, U.S. Census data, commercial data vendors, and the Community Housing Assessment Team (CHAT) report dated April 10, 2002.

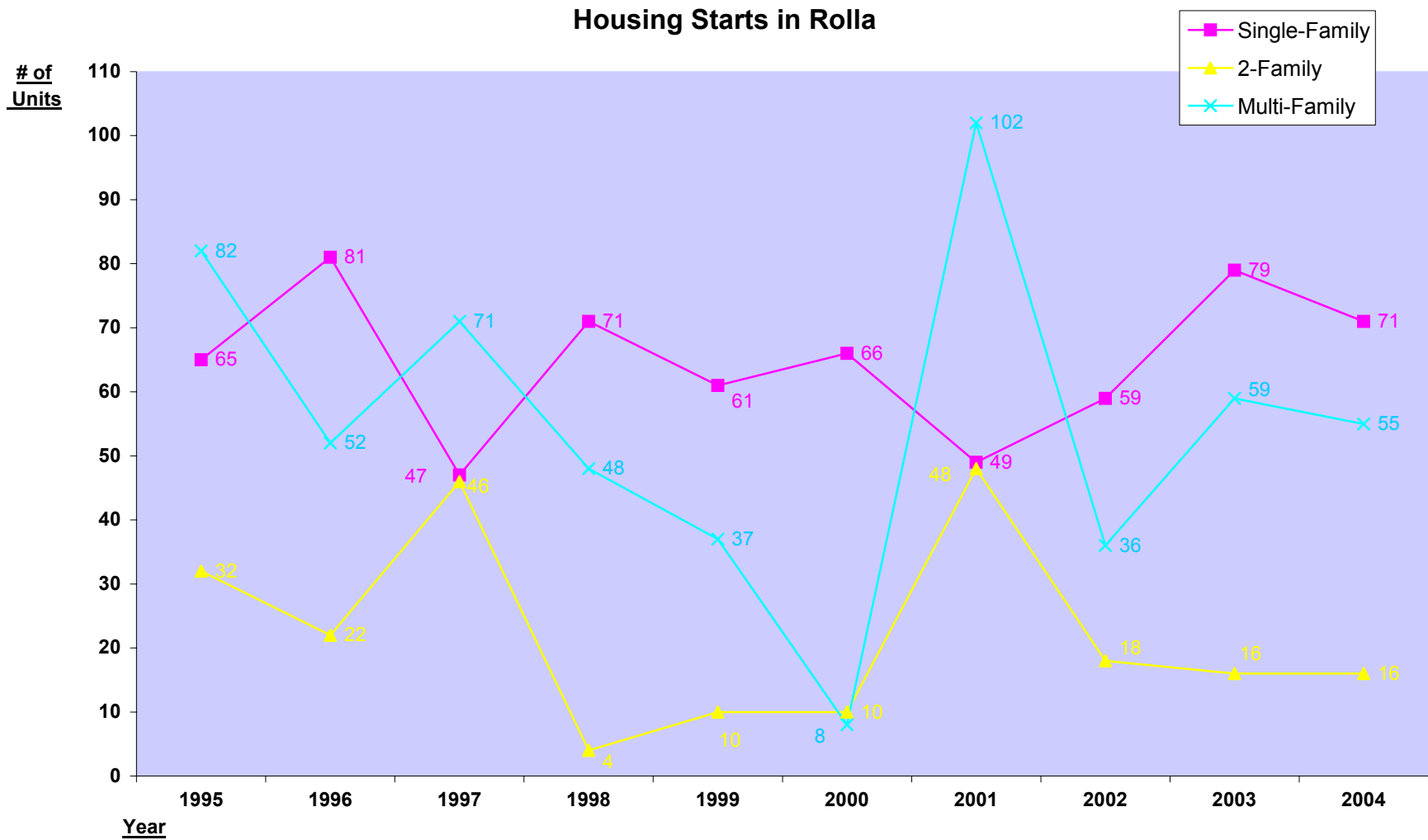
A review of residential building permit data in Rolla revealed some interesting trends (please refer to Table 1). Since 1995, housing development has consistently been strong, a reflection of the overall health of Rolla's economy and desirability as a community. Over this ten-year period a total of 1,421 new housing units have been developed in Rolla for an average of 142 units per year. Single-family structures comprised the largest component with an annual average of 65 units (46 % of the total), while multi-family housing accounted for an annual average of 55 units (39 %). Two-family or duplex development provided an average of 22 units (15 %). The average of 142 units multiplied by the current average household size (2.19 persons) yielded an annual population increase of 311. Factoring in a housing vacancy rate of 8.5 percent (based on current estimates), the actual population increase would be 285 persons – very close to Rolla's average annual population growth of 303 persons over the past several years. Annual housing construction levels varied, sometimes significantly, in response to normal market factors like interest rates, housing supply, and income growth.

**TABLE 1**  
**Housing Construction in Rolla, 1995-2004**

<u>Year</u>	<u>Single-Family</u> Units	<u>Two-Family</u> Bldgs./Units	<u>Multi-Family</u> Bldgs./Units
1995	65	16/32	12/82
1996	81	11/22	13/52
1997	47	23/46	16/71
1998	71	2/4	10/48
1999	61	5/10	10/37
2000	66	5/10	2/8
2001	49	24/48	19/102
2002	59	9/18	9/36
2003	79	8/16	12/59
2004	71	8/16	14/55
Total	649	111/222	117/550

Source: City of Rolla Community Development Department.

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**TABLE 2**  
**Average Housing Construction Cost in Rolla, 1995-2004**

<u>Year</u>	<u>Single-Family</u>	<u>Two-Family</u>	<u>Multi-Family</u>
	Est. Cost/Yr./Unit	Est. Cost/Yr./Unit	Est. Cost/Yr./Unit
1995	\$ 58,648	\$ 23,179	\$ 29,406
1996	\$ 70,062	\$ 47,227	\$ 37,645
1997	\$ 91,562	\$ 62,605	\$ 33,462
1998	\$ 96,579	\$ 49,936	\$ 43,943
1999	\$ 100,849	\$ 51,659	\$ 62,660
2000	\$ 107,418	\$ 49,134	\$ 57,151
2001	\$ 103,844	\$ 39,420	\$ 40,413
2002	\$ 115,294	\$ 73,684	\$ 36,469
2003	\$ 115,569	\$ 62,597	\$ 41,759
2004	\$ 136,629	\$ 89,176	\$ 70,171
10 Yr. Avg. / Unit	\$ 99,646	\$ 54,862	\$ 45,308

Source: City of Rolla Community Development Department.

The steady rise in housing construction cost is apparent from Table 2. These statistics generally do not reflect land or land preparation costs. The average unit cost for all types of housing was \$ 66,605. Increased construction costs make it more difficult for developers to supply new housing at costs within the affordability range of many Rolla households, therefore increasing the demand for rental units. The census statistics below indicate that the balance between owner and rental housing has been shifting over the past twenty years. This trend is expected to continue. The 2004 housing estimate was prepared by including the construction of 608 new units since 2000, reduced by demolitions/conversions of housing units (average of 9.4 units/year since 1990) to arrive at a total of 7,824 units. Vacancy rates have been declining in Rolla with a strong local demand for housing, despite continued high levels of construction (please refer to Table 3).

**TABLE 3**  
**Rolla Housing Units/Home Ownership Status**

	<u>1990 Census</u>	<u>2000 Census</u>	<u>2004 Estimate</u>
<b>Total Housing Units</b>	6,054	7,254	7,824
<b>Owner Occupied</b>	2,850 (47.1 %)	3,275 (45.1 %)	3,150 (44.0 %)
<b>Renter Occupied</b>	2,646 (43.7 %)	3,240 (44.7 %)	4,009 (45.6 %)
<b>Vacant Units</b>	559 (9.2 %)	749 (10.2 %)	665 (8.5 %)

Sources: U.S. Census and the City of Rolla Community Development Department.

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To test the accuracy of the 2004 housing estimate, consider the following: Rolla currently has an estimated 7,159 occupied housing units that, if multiplied by the average household size of 2.19, would yield a population of 15,678 persons in 2004. The housing data does not include group quarters such as dormitories, fraternities/ sororities, or nursing homes. Therefore, using the 2004 population estimate of 17,579, minus the non-group quarter population (15,678), the total estimated inhabitants of group quarters would be 1,921. In 2000 Rolla had 1,745 persons living in group quarters arrangements. The growth in group quarter residents could easily and reasonably be attributed to increased enrollment at UMR recorded over the past several years.

### Housing Projections and Residential Land Use

Future housing supply within Rolla will be determined by a number of factors including population growth, the expansion of UMR and other important institutions, market forces, and land use policies adopted by the City. Housing demand calculations for Rolla are based on a declining number of people per household, an increasing ratio of non-household residents to household residents, a stable vacancy rate, and an increasing annual loss due to demolition/conversion of Rolla's aging housing stock. The exponential population growth estimate was used.

**TABLE 4**  
**16 Year Housing Development Projection, 2005-2020**

	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>
<b>Rolla Population</b> (exponential estimate)	17,861	19,343	20,837	22,566
<b>Household Pop.</b>	15,896	17,215	18,128	19,181
<b>Group-Quarters Pop.</b>	1,965	2,128	2,709	3,385
<b>Average Population Per Household</b>	2.19	2.19	2.16	2.15
<b>Households</b>	7,258	7,861	8,393	8,921
<b>Projected Vacancy Rate</b>	8.5	8.5	8.5	8.4
<b>Housing Units Needed</b>	7,875	8,529	9,106	9,670
<b>Replacement Need</b>	50	60	100	100
<b>Cumulative Need</b>	671*	664	617	589

\* The cumulative need was calculated from the 2000 U.S. Census baseline year.  
Source: City of Rolla Community Development Department.

The cumulative need statistic identifies the number of new housing units needed in Rolla at the end of a five-year increment after considering changes in the household population, household size, vacancy rates, and the replacement of demolished housing structures.

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The next step in the land use projection process is to translate housing unit demand into future residential acreage projections. The average area for all types of housing was 14,569 square feet per unit. The square feet per unit varied with the type of zoning. As expected, single-family zoned subdivisions, with their broad streets and larger lots, consumed the most land per unit while multi-family development and Planned Unit Developments (PUDs) used the least amount of land per unit. Table 5 shows Rolla's development patterns from 1990 through September 2004.

**TABLE 5**  
**Rolla Residential Development Patterns, 1990-2004**

	<u><b>R-1 Single-Family</b></u>	<u><b>R-2 Two-Family</b></u>	<u><b>R-3 Multi-Family</b></u>	<u><b>PUD</b></u>
<b>Projects</b>	56 projects	4 projects	23 projects	12 projects
<b>Total Units</b>	950	55	608	735
<b>Total Acres</b>	486	16.7	203	79.6
<b>Units per Acre</b>	1.95	3.29	3.00	9.23
<b>Square Ft. per Unit</b>	22,284	13,226	14,544	4,717

Source: City of Rolla Community Development Department

Rolla's future residential land use need by acre was calculated assuming a proportional housing development pattern of 46 percent single-family units, 39 percent multi-family units, and 15 percent two-family units (based on the 1995 to 2004 construction trends). The cumulative housing needs statistic found in Table 4 for each five-year increment was then multiplied using the housing distribution percentages. Finally, the square foot per unit statistic found in Table 5 was used to project the estimated number of acres needed to meet housing demand during each five-year increment. The estimate of residential acres needed was then adjusted to reflect a subtraction of acres used for corollary land uses, such as street right-of-way, parkland, and storm water detention areas. The adjustment factor used was 26 percent, based on the 2004 land use percentages.

The gradual decline in the number of new housing units and the reduced demand for development acres is a direct result of the projected increase in group-quarters population. Group-quarters residents are not included as household population – the building block of housing demand. Additional group-quarters housing will undoubtedly be required in Rolla over the next fifteen years, probably in the form of new nursing home space and dormitories, but this land use need is not reflected here. Group-quarter facilities are counted as part of the institutional land use category.

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**TABLE 6  
Rolla Residential Land Use Projection, 2005-2020**

	<b><u>R-1 Single-Family</u></b>	<b><u>R-2 Two-Family</u></b>	<b><u>R-3 Multi-Family</u></b>	<b><u>Total</u></b>
<b>2005-2010</b>	115.4 acres	22.2 acres	104.0 acres	241.6
<b>2010-2015</b>	107.3 acres	20.7 acres	80.5 acres	208.5
<b>2015-2020</b>	102.9 acres	20.0 acres	76.8 acres	199.7
<b>Total</b>	325.6 acres	62.9 acres	261.3 acres	649.8

Source: City of Rolla Community Development Department.

Non-Residential Land Use Projection

The 1996-2004 land use study found that non-residential development consumed an annual average of 40.4 acres in Rolla. Non-residential development included commercial/office uses, manufacturing, public/institutional, public/private parkland (i.e. Ber Juan Park, The Audubon Nature and Art Center or Lions Club Park) and street right-of-way. Of the total non-residential acres used, commercial and manufacturing activities accounted for 12.3 acres on average per year.

The 1996-2004 land use study established, in addition to the annual land absorption ratios, population to acres developed ratios. The population to acres developed ratios represent a useful tool for projecting future land use needs. The following projections for future non-residential land use are based on the assumption that the ratio of population to acres developed will be maintained. A reduction or increase in the population to developed land ratio will alter the projected amount of land used by category.

**TABLE 7  
Non-Residential Land Use Projections, 2005-2020 (acres)**

	<b><u>2005-2010</u></b>	<b><u>2010-2015</u></b>	<b><u>2015-2020</u></b>	<b><u>Total</u></b>	<b><u>Avg./yr.</u></b>
<b>Commercial/Off.</b>	52.4	44.5	51.5	148.4	9.3
<b>Manufacturing</b>	17.0	14.4	16.6	48.0	3.0
<b>Public/Institutional</b>	67.4	57.0	66.0	190.4	11.9
<b>Parkland</b>	46.1	39.0	45.1	130.2	8.1
<b>Right-Of-Way</b>	115.3	97.6	113.0	325.9	20.4
<b>Total</b>	515.4	252.5	292.2	842.9	52.7

Source: City of Rolla Community Development Department.

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**TABLE 8**  
**Rolla Land Use Projections Summary, 2005-2020 (acres)**

	<u>2005-2010</u>	<u>2010-2015</u>	<u>2015-2020</u>	<u>Total</u>	<u>Avg./yr.</u>
<b>Residential</b>	241.6	208.5	199.7	649.8	40.6
<i>Single-Family</i>	115.4	107.3	102.9	325.6	20.4
<i>Two-Family</i>	22.2	20.7	20.0	62.9	3.9
<i>Multi-Family</i>	104.0	80.5	76.8	261.3	16.3
<b>Commercial/Off.</b>	52.4	44.5	51.5	148.4	9.3
<b>Manufacturing</b>	17.0	14.4	16.6	48.0	3.0
<b>Public/Institutional</b>	67.4	57.0	66.0	190.4	11.9
<b>Parkland</b>	46.1	39.0	45.1	130.2	8.1
<b>Right-Of-Way</b>	115.3	97.6	113.0	325.9	20.4
<b>Total</b>	539.8	461.0	491.9	1,492.7	93.0

Source: City of Rolla Community Development Department.

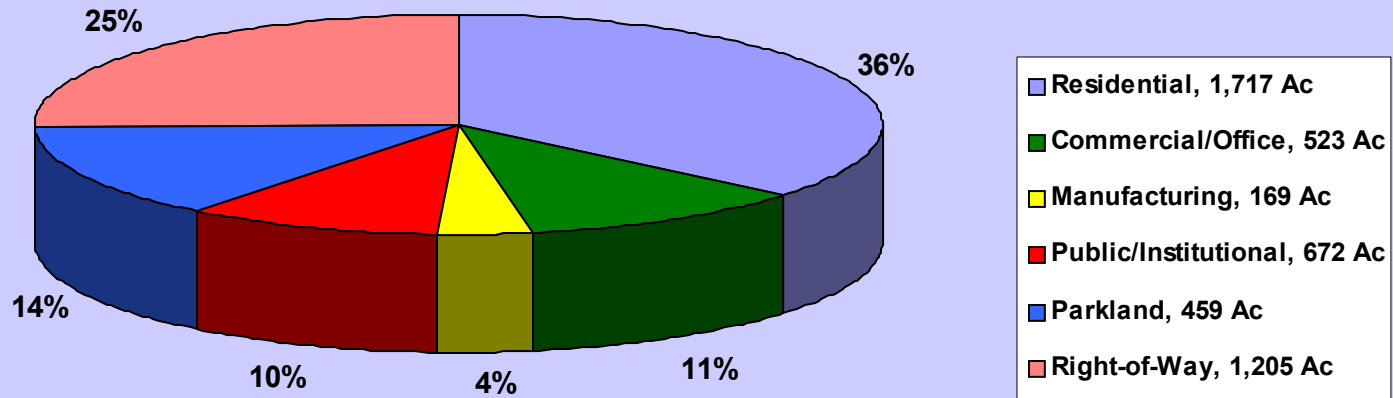
Rolla's developed area will increase by 1,492.7 acres by 2020, or 93 acres on average over sixteen years, if the population and housing projection rates occur as anticipated. Housing and transportation needs will consume the largest proportion of the newly developed parts of the City at 975.7 acres or almost 65.4 percent of the total increase in land use. Public and institutional uses that include all public property (except publicly-owned parkland) and private institutional uses such as churches, schools, nursing homes, and privately owned recreation areas will require a total of 190.4 additional acres. Commercial and industrial land needs will be satisfied over the next 15 years with an estimated 196.4 acres or 12.3 acres on average annually.

### Land Development Capacity

This section will answer the following questions:

1. *Does Rolla have enough land within its current City limits to accommodate growth projected over the next sixteen years?*
2. *If not, at what point during the sixteen-year planning horizon will the initiation of an involuntary annexation program become advisable. The annexation of additional land would become necessary to maintain an adequate supply of vacant land for development without distorting the local real estate market. (The market distortion would result from a shortage of available land for development).*

### Developed Land Use Acreage, 2004



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3. *How much additional land would Rolla need to annex to accommodate projected growth?*
4. *Although zoning classifications can be changed, are there any imbalances between the existing zoning of vacant parcels in Rolla and the projected land needs by land use category?*

The first and second questions can be answered by considering existing land development totals in Rolla and land development constraints. “Constrained” areas consist of land located in the 100-year flood plain, land identified for use as flood detention ponds, and land with severe slope or topography (35 percent grade or better). The following calculations were used to identify the amount of vacant land in Rolla found to be without significant development constraints (please refer to the attached development constraints map).

7,427	<b><u>Total acres in Rolla (2005)</u></b>
- 4,745	<b>Developed acres, including right-of-way</b>
2,682	
- 339	<b>Acres/100-year frequency flood plain</b>
2,343	
- 350	<b>Acres with excessive slope 35 % +</b>
1,993	
- 33	<b>Acres set-aside for flood retention ponds</b>
1,960	<b><u>Vacant acres</u></b>

Rolla had 1,960 acres of unconstrained vacant land available for development in 2005, based on the previous analysis. Of course, not all of the vacant, unconstrained land in Rolla will develop. Some owners will elect not to develop or sell their property for development over the next sixteen years - there are several examples of this in and around Rolla. It is assumed, for the benefit of the following analysis, that all of the unconstrained vacant land in Rolla will eventually be available for development during the planning period. It is also assumed that there will be no “large-scale” redevelopment of existing developed areas or annexations of vacant land (large-scale means forty or more acres).

Table 8 “Rolla Land Use Projections Summary, 2005-2020” forecasted that development within Rolla’s existing City limits will consume an estimated 1,492.7 acres for all use categories by 2020. Assuming 1,960 acres of vacant available land, Rolla would appear to have an adequate supply of land to accommodate projected growth over the next sixteen years within the existing City limits. Cities, however, consider annexation programs for a variety of reasons. One of the primary reasons for a growing community is to ensure an adequate balance is maintained between market demand and supply (availability) of land. A common land use planning guideline suggests that healthy real estate markets are maintained when there exists at least a 2 to 1 ratio between the supply and demand for development land. In other words, if over the course of sixteen years

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(2005-2020) Rolla development will consume 1,492.7 acres, there should be at least 2,985.4 acres (1,492.7 x 2) available for development during the planning horizon.

Using this methodology, Rolla’s civic leaders would need to initiate an involuntary annexation program involving a “significant” amount of land in the year 2013 to ensure that an adequate supply of development land is available by the target year 2015. It is assumed that it would take at least two years to accomplish an involuntary annexation program – although the required extension/upgrade of public infrastructure could take 5 years to complete.

*[The year 2015 was determined to be the target year using the following calculations: Multiply the 2005-2015 acres consumed 1,000.8 x 2 =2,001.6. Subtract the available acres in 2005, 1,960, from 2001.6 - yields a deficit of 41.6 acres in 2015.]*

The third question asked how much additional land should be annexed by 2015. There are potentially many variables or considerations that could influence the answer to this question. A review of the UGA (Urban Growth Area) map and the projected demand for development land, however, would suggest that at least 1,500 acres could be annexed in large tracts of land probably to the south and east.

The final question addressed the balance between the amounts of land currently zoned by district and projected land use demand by category. Table 9 indicates that, in most cases, there exists a balance between the projected demand by land use type and available vacant acres by zoning district. It should be noted that land zoned Rural Residential was not included in the total residential demand because it is considered a transitional or “holding” classification until re-zoned for other uses.

**TABLE 9**  
**Land Use Projections and Zoning of Vacant Land, 2005-2020**

	<u>Land Use Demand</u>	<u>Vacant Land by Zoning</u>	<u>Surplus/(Deficit)</u>
<b>Residential</b>	649.8 acres	1,350 acres	700.2 acres
<i>Rural-Res.</i>	-----	582	-----
<i>Single-Family</i>	325.6	670	344.4
<i>Two-Family</i>	62.9	18	(44.9)
<i>Multi-Family</i>	261.3	80	(181.3)
<b>Commercial</b>			
<b>/Office</b>	148.4	291	142.6
<b>Manufacturing</b>	48	261	213.0

Source: City of Rolla Community Development Department.

Only the R-2 (Two-Family District) and the R-3 (Multi-Family District) reflected an imbalance or deficit between projected land use demand and current zoning.