

# MEMO



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<b>TO:</b>	Vincent Walker, Summit Homes
<b>FROM:</b>	Tom Fulton, Technical Leader Shannon Jeffries, PE, PTOE
<b>RE:</b>	Summit Homes Osage Residential Development
<b>DATE:</b>	September 12, 2019
<b>PROJECT #:</b>	019-2339

This memorandum provides a comparison of trip generation for the Summit Homes Osage residential development to a prior development plan located on the same site. The Osage development site is located in the southwest corner of Missouri Highway 150 (M-150) and Pryor Road. The land uses associated with the proposed development (site plan dated August 14, 2019) are a combination of single family, duplex, and four-unit townhome residential units. The site plan is provided in the **Appendix**.

A previous traffic study was conducted, and approved, for a residential development planned for the subject property. This memorandum references the approved traffic impact study for comparison purposes. The previous land use considered 160 single family residential units. This memorandum compares the number of trips expected to be generated by the proposed Osage development to trips generated under the prior development plan. Trip generation referenced from the approved traffic impact study is provided in the **Appendix**.

### Trip Generation

Trip generation was conducted for the proposed Osage development land uses. Trip generation for the proposed plan was conducted using the ITE *Trip Generation Manual* (10<sup>th</sup> Edition). The land uses that most resemble the proposed uses are *Single-Family Detached Housing (LU 210)* and *Multi-Family Housing (Low Rise) (LU 220)*.

**Table 1** illustrates the land use comparison between the prior development plan and proposed development. The prior development plan use is for 160 Single-Family Detached Housing units. The proposed site plan is for 21 Four-Unit Townhome Lots (84 units), 22 Twin Gallery Lots (duplexes, 44 units), and 32 Simplicity Lots (single family residential). The 84 townhome units were classified under multi-family housing (low-rise). The 32 single-family residential units were classified under single-family detached housing. In reviewing the ITE *Trip Generation Manual*, a specific land use is not provided for duplexes, which represent two-unit attached housing. Multi-family housing (LU 220) typically refers to housing developments with more than three units. In reviewing trip generation, the single-family detached housing land use is more



conservative in the number of trips generated when compared to the multi-family land use. Thus, the 44 duplex units have been classified as Single-Family Detached Housing for the purposes of this trip generation comparison.

**Table 1: Land Use Comparison**

Land Use	Prior Development Plan	Proposed Site Plan
Single-Family Detached Housing	160 Units	76 Units
Multi-Family Housing (Low Rise)	-	84 units

**Table 2** illustrates the prior development plan and proposed land use trip generation for daily, AM, and PM peak hour periods and compares the difference for each.

**Table 2: Daily and Peak Hour Trip Generation Comparison (All Trips)**

Daily Comparison				AM Peak Hour Comparison				PM Peak Hour Comparison			
Prior Site Plan				Prior Site Plan				Prior Site Plan			
	Enter	Exit	Total		Enter	Exit	Total		Enter	Exit	Total
<b>Total</b>	802	801	1,603	<b>Total</b>	30	89	119	<b>Total</b>	101	59	160
Proposed Site Plan				Proposed Site Plan				Proposed Site Plan			
	Enter	Exit	Total		Enter	Exit	Total		Enter	Exit	Total
<b>Total</b>	702	701	1,403	<b>Total</b>	25	75	100	<b>Total</b>	83	47	130
Difference				Difference				Difference			
<b>Total</b>	<b>-100</b>	<b>-100</b>	<b>-200</b>	<b>Total</b>	<b>-5</b>	<b>-14</b>	<b>-19</b>	<b>Total</b>	<b>-18</b>	<b>-12</b>	<b>-30</b>

Referencing **Table 2**, the proposed land use is expected to generate approximately 200 less trips during a typical weekday, 19 less AM peak hour trips, and 30 less PM peak hour trips when compared to the prior development plan land use. Detailed trip generation calculations are provided in the **Appendix**.

*Trip Distribution*

The trip distribution for the proposed land use is expected to be the same as the previously approved traffic impact study due to the similar residential uses. Due to the reduction in trip generation due to the change in proposed land use, it would be expected that trips to and from the development at the proposed access points would decrease. This may result in a slight improvement of expected operations at proposed access points when compared to the approved study. Trip distribution percentages from the previous study are provided in the **Appendix** for reference.



### Proposed Access

The Osage development proposed access points are similar to those presented in the approved traffic study. Throat distance of the access approaches are similar to the approved study. With the previous development, single family residential properties were expected to have a direct connection to the access approach to M-150. In reviewing the proposed site plan, access to the four-unit townhomes will be provided along roadways internal to the site and the throat of the approach to M-150 will not have direct residential access.

### Summary

The proposed residential development is expected to generate fewer trips when compared to the prior single-family development plan. The proposed development is expected to have similar or improved traffic operations when compared to the previous site. Access connections to M-150 and Pryor Road are similar to the prior development plan.

Recommendations regarding public roadway improvements presented in the approved traffic study, plus additional improvements requested by City staff, are expected to be completed with the proposed development plan.

We hope that we have provided adequate information for your request. If you have additional questions, please contact us at 913.381.1170.

# **APPENDIX**



### 4.1. Proposed Development Trip Generation and Distribution

To determine the impact of potential site traffic on the roadway network, expected trips associated with the proposed site were generated and applied to the study network. The Institute of Transportation Engineers (ITE) provides methods for estimating traffic volumes of common land uses in the Trip Generation Manual (10th Edition). The land use that most resembles that which is planned for this site is Land Use Code 210 (Single-Family Detached Housing).

Based on the ITE Trip Generation Manual, trip generation characteristics were developed for the proposed site. Trip generation characteristics expected for the site are shown in **Table 4**. Detailed ITE trip generation information can be found in **Appendix C**.

**Table 4. Proposed Development Trip Generation**

Land Use	Size	Average Weekday	AM Peak Hour			PM Peak Hour		
			Total	Enter	Exit	Total	Enter	Exit
Single-Family Detached Housing	160 DU	1,603	119	30	89	160	101	59

Trips were distributed based on the anticipated land use, discussions with City staff, as well as a review of existing traffic behavior within the study area. **Table 5** illustrates general trip distribution for the site.

**Table 5. Proposed Development Trip Distribution**

Route	Percent Distribution
Pryor Road (north)	15%
Pryor Road (south)	5%
MO Route 150 (west)	50%
MO Route 150 (east)	30%

The trip distribution for the proposed development is shown in **Figure 6**. Existing plus development volumes are illustrated in **Figure 7**.

**Trip Generation**

**Daily Trip Generation**

ITE Code/Page	Land Use	Size	Unit	Trip Gen. Avg. Rate/Eq.	Daily Trips	Trip Distribution		Daily Trips	
						Enter	Exit	Enter	Exit
210	Single-Family Detached Housing	76	Dwelling Units	Equation	808	50%	50%	404	404
220	Multi-family Housing (Low Rise)	84	Dwelling Units	Equation	595	50%	50%	298	297
<b>Total</b>		160			1,403			702	701

**AM Peak Hour Trip Generation**

ITE Code/Page	Land Use	Size	Unit	Trip Gen. Avg. Rate/Eq.	AM Trips	Trip Distribution		AM Trips	
						Enter	Exit	Enter	Exit
210	Single-Family Detached Housing	76	Dwelling Units	Equation	59	25%	75%	15	44
220	Multi-family Housing (Low Rise)	84	Dwelling Units	Equation	41	23%	77%	10	31
<b>Total</b>		160			100			25	75

**PM Peak Hour Trip Generation**

ITE Code/Page	Land Use	Size	Unit	Trip Gen. Avg. Rate/Eq.	PM Trips	Trip Distribution		PM Trips	
						Enter	Exit	Enter	Exit
210	Single-Family Detached Housing	76	Dwelling Units	Equation	79	63%	37%	50	29
220	Multi-family Housing (Low Rise)	84	Dwelling Units	Equation	51	63%	37%	33	18
<b>Total</b>		160			130			83	47

	Approved Site Plan	Proposed Site Plan	Difference
Daily Total Trips	1,603	1,403	-200
AM Peak Hour Total Trips	119	100	-19
PM Peak Hour Total Trips	160	130	-30