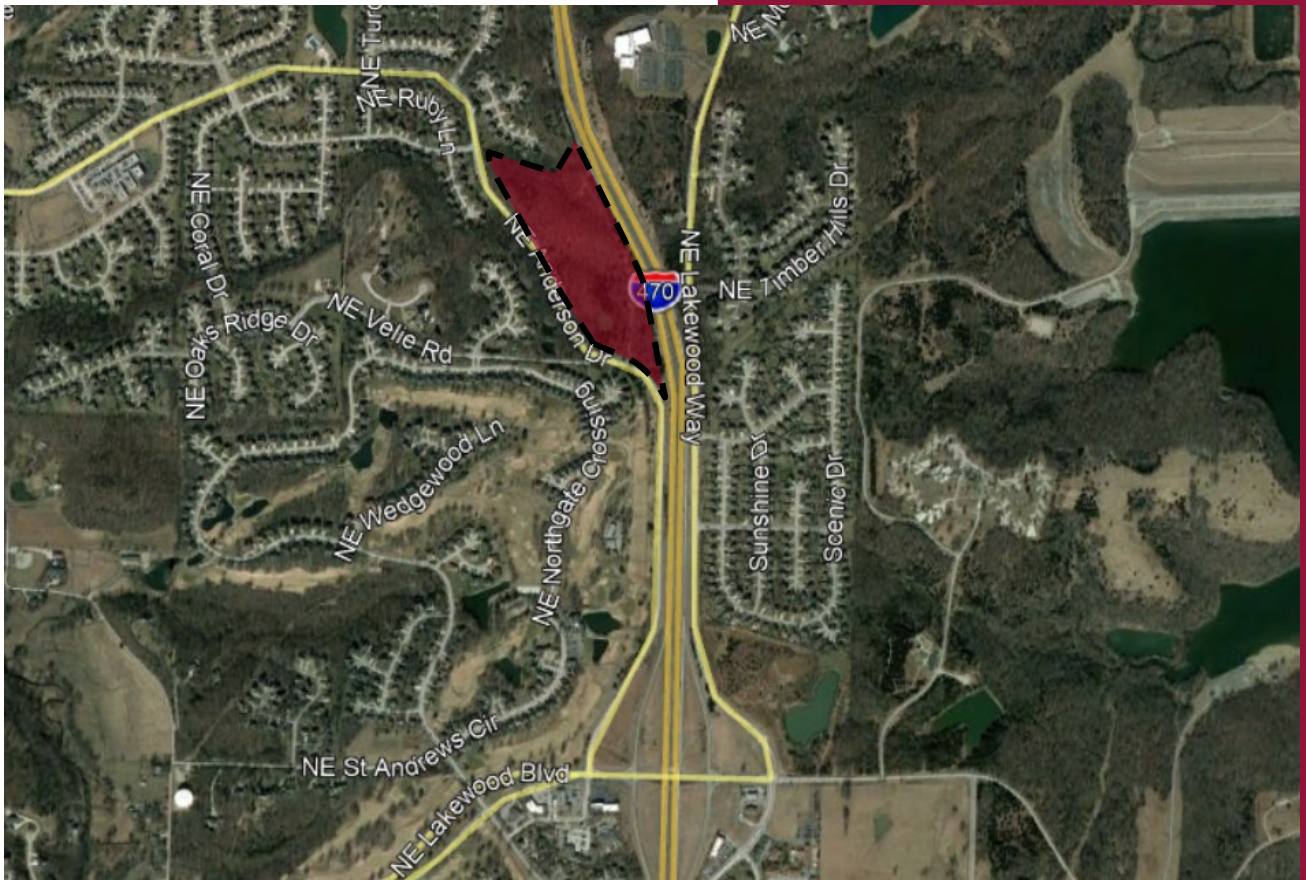


Lakewood Multifamily Traffic Impact Study

Anderson Drive and Velie Road
Lee's Summit, Missouri



Prepared for:
Engineering Solutions

Prepared by TranSystems
August 2021



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August 13, 2021

Mr. Matthew J. Schlicht
Engineering Solutions
50 SE 30th Street
Lee's Summit, MO 64082

**Re: Lakewood Multifamily Traffic Impact Study
Anderson Drive and Velie Road
Lee's Summit, Missouri**

Dear Mr. Schlicht:

In response to your request and authorization, TranSystems has completed an abbreviated traffic impact study for the proposed Lakewood Multifamily development to be generally located along the east side of Anderson Drive, north of Velie Road in Lee's Summit, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system.


Included in this study is a discussion of the anticipated impact of the proposed development on the adjacent street network and identified improvements to mitigate deficiencies for the following scenarios:

- ▶ Existing plus Development Conditions

We trust that the enclosed information proves beneficial to you and the City of Lee's Summit in this phase of the development process. We appreciate the opportunity to be of service to you and will be available to review this study at your convenience.

Sincerely,
TRANSYSTEMS

By: 
Jeffrey J. Wilke, PE, PTOE

By: 
Emma Martin, E.I.T.

EHM:JJW/em/PI01210244
Enclosure

Introduction

TranSystems has completed an abbreviated traffic impact study for the proposed Lakewood Multifamily development to be generally located along the east side of Anderson Drive, north of Velie Road in Lee's Summit, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system. The location of the development site relative to the major streets in the area is shown on **Figure A-1** in **Appendix A**.

This study also contains a description of the proposed development and the surrounding transportation infrastructure along with trip generation estimates, trip distribution estimates, and a summary of the findings.

Proposed Development Plan

The proposed development consists of a residential development. The site will have 36 duplex units and 52 single-family homes. Access to the site will be provided from two site driveways along Anderson Drive. The first site driveway (Site Drive A) will be located 380 feet north of Velie Road. The second driveway (Site Drive B) will be located approximately 980 feet north of Velie Road. The proposed development plan is included on **Figure A-2** in **Appendix A** for reference.

Surrounding Street Network and Land Uses

The development site is located on roughly 25 acres of undeveloped land. The proposed site is bounded by Anderson Drive to the west and I-470 to the east. The surrounding area is primarily single-family houses. There is a golf course to the southwest.

Adjacent to the development site, Anderson Drive is a 32-foot wide two-lane road classified by the City of Lee's Summit as a residential collector. North of Velie Road, there is curb and gutter and a sidewalk along the west side of the roadway. North of the site, there is sidewalk on both sides of the road. On the west side of Anderson Drive, the sidewalk continues south to Velie Road. The curb and gutter ends roughly 250 feet south of Velie Road, and the road narrows to 24 feet in width with turf shoulders and ditches. There are no sidewalks to the south of Velie Road. The posted speed limit is 35 mph adjacent to the development site, but increases to 45 mph to the south of the site. There are several horizontal curves on Anderson Drive, and a winding road warning signs with an advisory speed of 30 mph are posted for both directions of travel. According to the City of Lee's Summit 2018 Average Daily (ADT) Volume Map, Anderson Drive, just south of the Velie Road, has a two-way volume of 6,051 vehicles per day.

Analysis

The scope of analysis for the assessment of the proposed development's impact on the surrounding transportation system is based in large part on the recommended practices of the Institute of Transportation Engineers (ITE), as outlined in their [Traffic Engineering Handbook](#). ITE is a nationally-recognized organization of transportation professionals with members from both private and public sectors. The analysis of the proposed development's impact included development of trip generation and trip distribution estimates as well as a review of compliance with city development policies. Each of the analysis methodologies and findings are described in the subsequent sections.

Trip Generation

Trip generation estimates were prepared using the Institute of Transportation Engineer's Trip Generation, 10th Edition. **Table 1** shows the expected trips to be generated by the proposed development. The single-family detached homes land use was used for the trip generation for the entire site even though the site is comprised of 36 duplex units and 52 single-family homes. The 10th Edition does not include a separate land use for duplexes, so the single-family detached homes land use was used to provide a conservative trip generation estimate. Additional information related to trip generation is included in **Appendix B**.

Table 1 Trip Generation									
Land Use	Intensity	ITE Code	Average Weekday	A.M. Peak Hour			P.M. Peak Hour		
				Total	In	Out	Total	In	Out
Single-Family Detached Housing	88 units	210	925	68	17	51	90	57	33

The trip generation for the proposed development indicates a low level of development traffic. During the A.M. peak hour, a total of 68 trips are projected to enter and exit the site. This equates to roughly one vehicle per minute. During the P.M. peak hour, 90 trips are projected, which is less than two vehicles per minute.

Trip Distribution

The estimated trips generated by the proposed development were distributed onto the surrounding street network based on the trip distributions summarized in **Table 2**. These distributions are based on existing traffic patterns, the proximity to services, and engineering judgement.

Table 2 Trip Distribution	
Direction To/From	Percentage
North on Anderson Drive	25%
South on Anderson Drive	75%
Total	100%

Figure A-3 in **Appendix A** displays the proposed trips entering and exiting the site at the proposed driveways. According to the Lee's Summit Access Management Code, left- and right-turn lanes are not warranted at either of the site driveways.

Sight Distances

Intersection sight distance is provided at intersections to allow the drivers of stopped vehicles to depart from their approach and enter or cross the uncontrolled street. These distances are generous, allowing enough

distance for the stopped driver to complete their turning or crossing maneuver without requiring through traffic on the uncontrolled street to reduce their speed. Stopping sight distance is the minimum distance required to allow for a vehicle to stop before reaching a stationary object in its path. Sight distance and stopping sight distance evaluation criteria is provided in A Policy on Geometric Design of Highways and Streets (7th Edition), also referred to as the AASHTO Green Book published by the American Association of State Highway and Transportation Officials (AASHTO).

Sight distances were measured in the field at each proposed site driveway intersection and are provided in **Table 3**. Although there is a warning sign with an advisory speed of 30 mph adjacent to Site Drive A, the 35 mph speed limit was used to evaluate the recommended sight distances.

Table 3 Intersection Sight Distances			
Intersection	Direction Looking	Intersection Sight Distance, feet	
		Field Measured	Recommended
Anderson Drive & Site Drive A	North	>500	335
	South	200	390
Anderson Drive & Site Drive B	North	>500	335
	South	>500	390

The measurements in the table indicate that sight distances are adequate when looking to the north and south along Anderson Drive at Site Drive B. Sight distances are also adequate when looking to the north from Site Drive A. Just south of Site Drive A there is a horizontal curve. The existing trees and vegetation on the inside of the horizontal curve restrict sight lines looking to the south from Site Drive A. When Site Drive A is constructed, there should be no obstructions to the south of this driveway to ensure adequate sight lines are provided. No fences, trees, bushes, or any other obstructions should be located within the red shaded area shown in **Figure 1** on the following page.

Crash Data

Crash data was reviewed for the segment of Anderson Drive from Lakewood Boulevard to the development site. Crash information from the Missouri State Highway Patrol's online crash mapping tool was used. From January 1, 2018 to May 31, 2021 there have been only two crashed on this segment of Anderson Drive. One crash appeared to be an intersection related crash at Lakewood Boulevard and the other was a fixed object crash near the Velie Road intersection. Only two crashes during the 30-month period corresponds to a very low crash frequency.



Figure 1: Driver's Line of Sight Looking South from Site Drive A

Unimproved Road Policy

Lee's Summit has adopted an Unimproved Road Policy to guide development activity impacting roadways constructed to unimproved and/or interim standards. According to the policy, an unimproved road has a narrow width (less than 22 feet of pavement) consistent with a rural character. The interim standard is generally defined as a minimum of two 12-foot travel lanes with six-foot wide paved shoulders. Anderson Drive south of Velie Road is wider than 22 feet, but it does not have paved shoulders. Therefore, the segment of Anderson Drive south of the site is most similar to an unimproved road rather than an interim road.

According to the policy, no residential subdivisions are permitted on unimproved roads. Further, development may be permitted on interim standard roads with volumes less than 11,000 vehicles per day. With the addition of development traffic, the section of Anderson Drive south of the proposed development site will have a volume of less than 7,000 vehicles per day, which is well below the capacity of a two-lane roadway.

It is worth noting that the development site and site driveways are adjacent to the section of Anderson Drive that has been improved to urban standards. It is the 3,600-foot section of Anderson Drive from Velie Road to Lakewood Boulevard that is considered unimproved. Six-foot wide paved shoulders would need to be added to this nearly three-quarters of a mile long segment of roadway to meet the interim road standard. Given that the road has a very low crash frequency and is projected to operate well below the capacity

thresholds for a two-lane roadway, the benefits of shoulder widening are not likely to outweigh the substantial costs that would be incurred.

Sidewalks

Lee's Summit requires sidewalks to be constructed along the frontage of public streets adjacent to developments. As such, sidewalk should be constructed along the east side of Anderson Drive adjacent to the development site. The sidewalk should extend north to provide a continuous connection to the existing sidewalk at Emerald Drive.

Summary

TranSystems has completed an abbreviated traffic impact study for the proposed Lakewood Multifamily development to be generally located along the east side of Anderson Drive, north of Velie Road in Lee's Summit, Missouri. The purpose of this study was to assess the impact of the proposed development on the surrounding transportation system.

The proposed development is projected to generate 68 trips during the A.M. peak hour and 90 trips during the P.M. peak hour. This low level of trip generation equates to less than two vehicles per minute during the peak hours. Access will be provided from two site driveways along Anderson Drive. No turn lanes are required at either of the site driveways per the city's Access Management Code.

The south site driveway is located on the inside of a horizontal curve along Anderson Drive. **Figure 1** illustrates an area that should be kept clear of obstructions to provide adequate sight lines from the driveway.

Sidewalk should be constructed along the east side of Anderson Drive adjacent to the development site. The sidewalk should extend north to provide a continuous connection to the existing sidewalk at Emerald Drive.

The segment of Anderson Drive south of the site is most similar to an unimproved road. According to the city's Unimproved Roads Policy, no residential subdivisions are permitted on unimproved roads. Paved shoulders would be needed to meet the interim road standard along the 3,600-foot segment of Anderson Drive from Lakewood Boulevard to Velie Road. This segment is nearly three-quarters of a mile in length. Given that the road has a very low crash frequency and is projected to operate well below the capacity thresholds for a two-lane roadway, the benefits of shoulder widening are not likely to outweigh the substantial costs that would be incurred. As such, no roadway improvements are identified to mitigate the addition of development traffic.