



Atlantic Development

Lake Mary Housing

Traffic Impact Statement

Zoning Group

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December 2, 2021

Mark Breen
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15957 North 81st Street #101
Scottsdale, Arizona 85260

c/o Ryan McCann, AICP
Urban Planner
Snell & Wilmer
One Arizona Center
400 East Van Buren Street, Suite 1900
Phoenix, Arizona 85004-2202



Expires 30 JUN 22

RE: TRAFFIC STATEMENT FOR LAKE MARY HOUSING NORTHWEST CORNER OF LAKE MARY ROAD AND FRONTIER ROAD – FLAGSTAFF, ARIZONA

Dear Mr. Breen:

Thank you for choosing CivTech Inc. to prepare this traffic statement for a new Multifamily Housing development (the "Project") located at the northwest corner of Lake Mary Road and Frontier Road in the City of Flagstaff, Arizona. The Project will be a new Multifamily Housing development consisting of approximately 202 dwelling units (DUs) total. The proposed Project is a mix of apartments (3 story building height) and townhomes (2 or 3 story building height) that all fall under the Institute of Transportation Engineers' (ITE) land use code of Multifamily Housing, with Multifamily Housing (Low-Rise) for buildings of two (2) stories or less and Multifamily Housing (Mid-Rise) for buildings of three (3) to 10 stories. A context map relating the subject property to the existing roadway network is presented in **Figure 1**.



Figure 1: Vicinity Map

PURPOSE OF TRAFFIC STATEMENT

A preliminary trip generation estimate for the Project indicated that the proposed 202 DUs are likely to generate approximately 81 trips per hour during the AM peak hour and approximately 99 trips per hour during the PM peak hour. The City of Flagstaff requires a Traffic Statement with the City of Flagstaff "Pre-Scope of Work Meeting Form" filled out for all projects, to be utilized as a guide during the traffic study scoping meeting. It is at this scoping meeting that the need for a Traffic Impact Analysis (TIA) will be determined. The City of Flagstaff typically requires a Traffic Impact

Analysis (TIA) Category 1 when there are greater than 99 and fewer than 501 site generated trips in the highest peak hour. The pre-scope of work meeting form has been included within **Attachment A**.

EXISTING CONDITIONS

EXISTING AND SURROUNDING LAND USE

The project site is currently undeveloped land, located within a small island of parcels surrounded by the Coconino National Forrest, in the City of Flagstaff, Arizona. Adjacent and west of the site are large lot residential homes, with a trailer park further west. To the northwest is a large industrial lot with a couple single family homes. On the north side of Lake Mary Road are single family homes.

SURROUNDING ROADWAY NETWORK AND INTERSECTIONS

Lake Mary Road is a curvilinear two (2) lane minor arterial roadway with one (1) lane of travel in each direction. Approximately 1,000-feet north of the intersection of Lake Mary Road and Frontier Road, the roadway widens to include a two-way left-turn lane (TWLTL). Approximately 2,200-feet north of the intersection of Lake Mary Road and J. W. Powell Boulevard, the roadway widens to consist of two (2) lanes of travel in each direction and a two-way left-turn lane (TWLTL). Beginning to the north at Beulah Boulevard, this section of Lake Mary Road curves southeasterly approximately 2.5 miles southeast of Interstate 17 (I-17), an Arizona Department of Transportation (ADOT) facility, until it reaches Frontier Road. Immediately south of Frontier Road, Lake Mary Road curves to the east for approximately 1.75 miles before curving to the southeast and then south and terminates at State Route 87 (SR-87). Within the vicinity of the development, Lake Mary Road has a posted speed limit of 45 mph.

Frontier Road is an east-west two (2) lane local roadway with one (1) lane of travel in each direction. Frontier Road begins at Lake Mary Road to the east and extends west for approximately ½-mile, where it turns south and becomes Forest Service Road 3E. The posted speed limit within vicinity to the site is 25 mph.

The intersection of **Lake Mary Road and Frontier Road**, is a three-way intersection with stop control on the eastbound approach. For the purpose of this analysis, Lake Mary Road's cardinal directions will be treated as a north-south roadway. The northbound approach consists of one (1) shared left-turn/through lane. The southbound approach consists of one (1) shared through/right-turn lane. The eastbound approach consists of one shared left-turn/right-turn lane. There is additionally a short loop of pavement on this intersection that allows for large vehicles to turn around.

PROPOSED DEVELOPMENT

The project consists of proposed multifamily housing development with 71 DUs of apartments and 131 DUs of townhomes. The townhomes would include 84 two-bedroom DUs (2-story) and 47 three-bedrooms DUs (3-story). A detailed site plan has been included as **Attachment B**.

SITE ACCESS

There are a total of two (2) accesses to the development, one (1) main full movement access along Lake Mary Road and one (1) secondary full movement access along Lake Mary Road.

SITE TRIP GENERATION, DISTRIBUTION, AND ASSIGNMENT

SITE TRIP GENERATION

The potential trip generation for the proposed development is typically estimated utilizing the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 10th Edition* and *Trip Generation Handbook, 3rd Edition*. The ITE *Trip Generation Manual* contains data collected by various transportation professionals for a wide range of different land uses. The data are summarized in the report and average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for the categorized land use. The report provides information for daily and peak hour trips. In the case of the proposed land uses, Multifamily Housing (Mid-Rise), which corresponds to Land Use Code (LUC) 221 respectively, both fitted curve and weighted averages are published for dwelling units in a general, urban/suburban setting. The results of the trip generation calculations are, therefore, detailed in **Table 1**.

Table 1 – Trip Generation

Land Use	ITE Code	ITE Land Use Name	Quantity Units	AM Distribution		PM Distribution	
				In	Out	In	Out
Townhomes	220	Multifamily Housing (Low-Rise)	84 DUs	23%	77%	63%	37%
Apartments & Townhomes	221	Multifamily Housing (Mid-Rise)	118 DUs	26%	74%	61%	39%

Land Use	ADT		AM Peak Hour			PM Peak Hour				
	Avg. Rate	Total	Avg. Rate	In	Out	Total	Avg. Rate	In	Out	Total
Townhomes	7.32	614	0.46	9	30	39	0.56	30	17	47
Apartments & Townhomes	5.44	642	0.36	11	31	42	0.44	32	20	52
Total "New" Trips		1,256		20	61	81		62	37	99

CALCULATIONS (Equations shown only where applicable)			
Land Use [Units]	Daily	AM Peak Hour	PM Peak Hour
Townhomes [84 DUs]	WA: T=7.32*X [7.32]	WA: T=0.46*X [0.46]	WA: T=0.56*X [0.56]
Apartments & Townhomes [118 DUs]	WA: T=5.44*X [5.44]	WA: T=0.36*X [0.36]	WA: T=0.44*X [0.44]

A review of the detailed trip generation presented in **Table 1** reveals that the proposed multifamily housing development could generate 1,256 trips over the course of a typical weekday, with 81 trips (20 in/61 out) during the AM peak hour and 99 trips (62 in/37 out) during the PM peak hour.

Trip Distribution and Assignment A single trip distribution pattern was assumed for the proposed development. It is expected that the proposed development will generate trips based on the commercial developments surrounding the site. Only 3% of site traffic are assumed to travel south on Lake Mary Road due to the limited number of developments there. The resulting trip distribution percentages for the study area are shown in **Table 2**.

Table 2 – Trip Distribution

Direction (To/From)	Percentage
North on Lake Mary Road	97%
South on Lake Mary Road	3%
Total	100%

Site Volumes By applying the percentages in **Table 2** to the entering and exiting site trips in **Table 1**, the AM and PM peak hour turning movements into and out from the site can be estimated. The total anticipated volume at the site driveway is illustrated in **Figure 2**.

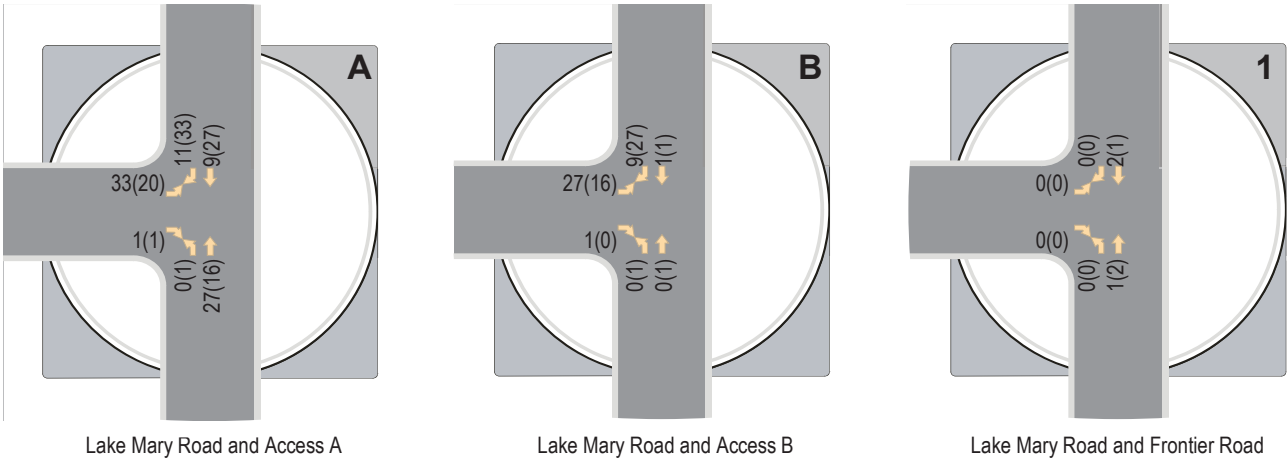


Figure 2: Site Volumes AM(PM)

Future Background Traffic CivTech completed a study for another development within a three-mile radius of this project and was directed by the City of Flagstaff to use a 1% annual growth rate for intersections south of Interstate 40, for that project. The study intersection of Lake Mary Road and Frontier Road falls within this category; therefore, projected 2022 non-site volumes were calculated with an expansion factor of 1.01. Background traffic calculations are located within **Attachment D**.

OTHER PRELIMINARY ASSUMPTIONS

Traffic Study Level - Based on the preliminary trip generation of 81 new trips in the AM peak hour and 99 new trips in the PM peak hour, it is assumed that a TIA Category 0 will be required.

Study Horizon Years - The development is expected to be completed by the end of 2022.

Pass-By or Internal Capture - As a single use, internal capture is not applicable. As an apartment and townhome complex, pass-by trips are also not applicable.

Future Roadway Network - The development proposed for the site will not require any new roadways, and will require two (2) new site driveways on Lake Mary Road.

Study Area Intersections - Based on the requirements of a TIA Category 0, it is assumed that study intersections would be set or waived by the City Engineer.

CONCLUSIONS

The following conclusions have been documented in this statement:

- A review of the detailed trip generation reveals that the proposed multifamily housing development could generate 1,256 trips over the course of a typical weekday, with 81 trips (20 in/61 out) during the AM peak hour and 99 trips (62 in/37 out) during the PM peak hour.
- It is expected that the proposed development will generate trips based on the commercial developments surrounding the site. Only 3% of site traffic are assumed to travel south on Lake Mary Road due to the limited number of developments to the south.
- Based on a previous project located south of I-17, the projected 2022 non-site volumes should be calculated with an expansion factor of 1.01.

Thank you for allowing CivTech to assist you on this project. Please contact me with any questions you may have on this statement.

Sincerely,

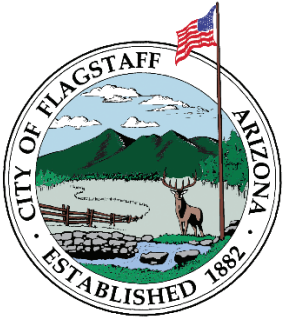
CivTech



Benjamin A. Good, P.E., PTOE
Project Manager/Senior Traffic Engineer

Attachments

- A - Pre-Scope pf Work Meeting Form
- B - Site Plan
- C - Trip Generation
- D - Background Growth Calculations



City of Flagstaff
 211 W. Aspen Ave.
 Flagstaff, AZ 86001

PRE-SCOPE OF WORK MEETING FORM

Information on the Project Traffic Impact Analysis Base Assumptions

The applicant is responsible for entering the relevant information and submitting the form to the City of Flagstaff and the locality no less than three (3) business days prior to the scheduled meeting. If a form is not received by this deadline, the scope of work meeting may be postponed.

Contact Information

Consultant Name:	CivTech Inc.
Telephone:	480-659-4250
E-Mail:	Bgood@civtech.com
Developer/Owner Name:	Atlantic Development / Noel Griemsmann, Representative
Telephone:	602.382.6824
Email:	ngriemsmann@swlaw.com

Project Information

Project Name:	Lake Mary Housing			
Project Location: (Attach regional and site specific location map)	Northwest corner of Lake Mary Road and Frontier Road in the City of Flagstaff, Arizona			
Project Description: Including type of application (rezoning, subdivision, site plan), acreage, business square ft., number of dwelling units, access location, etc. Attach additional sheet if necessary.	The proposed Project would develop approximately 12.9 net acres with approximately 71 dwelling units (DUs) of apartments (4 story building height) and approximately 131 DUs of townhomes (2-3 story building height). Access to the proposed development would be from two (2) new driveways on Lake Mary Road.			
Locality/County:	Coconino County			
Trip Generation (Attach calculation summary)	Residential <input checked="" type="checkbox"/>	Commercial <input type="checkbox"/>	Mixed Use <input type="checkbox"/>	Other <input type="checkbox"/>
Proposed Use:	Townhomes, Multifamily Housing (Low-Rise)			
Number of Units:	84 Dwelling Units (DU)			
ITE Code(s):	LUC 220			
Proposed Use:	Townhomes and Apartments, Multifamily Housing (Mid-Rise)			
Number of Units:	118 (47 + 71) Dwelling Units (DU)			
ITE Code(s):	LUC 221			
Proposed Use:	-			
Number of Units:	-			
ITE Code(s):	-			
Proposed Use:	-			
Number of Units:	-			
ITE Code(s):	-			

It is important for the applicant to provide sufficient information to the City of Flagstaff so questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Traffic Impact Analysis Assumptions					
Study Period:	Existing: 2021	Opening: 2022		Phase 1: -	
	Phase 2: -	Phase 3: -		Build-Out: 2022	
Study Area Boundaries: (Attach map)	North: Lake Mary Road		South: Frontier Road		
	East: Lake Mary Road		West: Frontier Road		
External Factors That Could Affect Project: (Planned road improvements, other nearby developments)	-				
Available Traffic Data: (Historical, forecasts)	-				
Trip Distribution: (Attach sketch)	Road Name: Lake Mary Road	N 97%	S 3%	E ____%	W ____%
	Road Name:	N ____%	S ____%	E ____%	W ____%
	Road Name:	N ____%	S ____%	E ____%	W ____%
	Road Name:	N ____%	S ____%	E ____%	W ____%
Annual Vehicle Trip Growth Rate:	1.0%				
Peak Period for Study: (Check all that apply)	<input checked="" type="checkbox"/> AM	<input type="checkbox"/> Midday	<input checked="" type="checkbox"/> PM	<input type="checkbox"/> SAT	
Study Intersections and/or Road Segments: (Attach additional sheets as necessary)	1. Lake Mary Road and Frontier Road		2. Lake Mary Road and Access A		
	3. Lake Mary Road and Access B		4. Click here to enter text.		
	5. Click here to enter text.		6. Click here to enter text.		
	7. Click here to enter text.		8. Click here to enter text.		
	9. Click here to enter text.		10. Click here to enter text.		
Trip Adjustment Factors: (Attach calculations and assumptions)	Internal allowance: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Pass-by allowance: <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
	Reduction: _____% of trips		Reduction: _____% of trips		
Software Methodology:	<input type="checkbox"/> Synchro <input type="checkbox"/> HCS (v.2010) <input type="checkbox"/> aaSIDRA <input type="checkbox"/> CORSIM <input type="checkbox"/> Other: _____				
Traffic Signal Proposed or Affected: (analysis software to be used, progression speed, cycle length)	Click here to enter text.				
Improvement(s) Assumed or to be Considered:	Click here to enter text.				
Relevant Traffic Studies Considered:	Click here to enter text.				
Plan Submission:	<input type="checkbox"/> Master Development Plan <input type="checkbox"/> Preliminary / Sketch Plan		<input type="checkbox"/> Generalized Development Plan <input type="checkbox"/> Other Plan Type (Final Site, Subd. Plan)		
Analysis Types:	<input type="checkbox"/> Queuing Analysis <input type="checkbox"/> Merge Analysis <input type="checkbox"/> TDM Measures <input type="checkbox"/> Other: _____	<input type="checkbox"/> Actuation / Coordination <input type="checkbox"/> Bike / Ped Accommodations <input type="checkbox"/> LOS Analysis <input type="checkbox"/> Other: _____	<input type="checkbox"/> Weaving Analysis <input type="checkbox"/> Intersection(s) <input type="checkbox"/> Delay Analysis <input type="checkbox"/> Other: _____		

It is important for the applicant to provide sufficient information to the City of Flagstaff so questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Notes on Assumptions

Click here to enter text.

SIGNED: _____ DATE: _____
Applicant or Consultant

PRINT NAME: _____
Applicant or Consultant

It is important for the applicant to provide sufficient information to the City of Flagstaff so questions regarding geographic scope, alternate methodology, or other issues can be answered at the scoping meeting.

Methodology Overview

This form facilitates trip generation estimation using data within the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 10th Edition and methodology described within ITE's Trip Generation Handbook, 3rd Edition. These references will be referred to as Manual and Handbook, respectively. The Manual contains data collected by various transportation professionals for a wide range of different land uses, with each land use category represented by a land use code (LUC). Average rates and equations have been established that correlate the relationship between an independent variable that describes the development size and generated trips for each categorized LUC in various settings and time periods. The Handbook indicates an established methodology for how to use data contained within the Manual when to use the fitted curve instead of the average rate and when to adjustments to the volume of trips are appropriate and how to do so. The methodology steps are represented visually in boxes in Figure 3.1. This worksheet applies calculations for each box if applicable.

Box 1 - Define Study Site Land Use Type&Site Characteristics.

Box 2 - Define Site Context | Box 3 - Define Analysis Objectives Trip Types&Time Period

The analyst is to pick an appropriate LUC(s) based on the subject's zoning/land use(s)/future land use(s). The size of the land use(s) is described in reference to an independent variable(s) specific to (each) the land use (example: 1,000 square feet of building area is relatively common). Context assessment is to "simply determine whether the study sites is in a multimodal setting" and "could have persons accessing the site by walking, bicycling, or riding transit." This assessment is used in Box 4. The Manual separates data into 4 setting categories - Rural, General Urban/Suburban, Dense Multi-Urban Use and Center City Core. This worksheet uses the following abbreviations, respectively: R, G, D, and C. The Manual does not have data for all settings of all land use codes. The "General Urban/Suburban" setting is used by default.

This tool will focus on vehicular trips for a 24-hour period on a typical weekday as well as its AM peak hour and PM peak hour. Other time period(s) may be of interest.

Land Use Types and Size

Proposed Use	Amount Units	ITE LUC	ITE Land Use Name
Townhomes	84 Dwelling Units	220	Multifamily Housing (Low-Rise)
Multifamily & Townhomes	118 Dwelling Units	221	Multifamily Housing (Mid-Rise)

Box 4 - Is Study Site Multimodal?

Per the Handbook, "if the objective is to establish a local trip generation rate for a particular land use or study site, the simplified approach (Box 9) may be acceptable but the Box 5 through 8 approach is required if the study site is located in an infill setting, contains a mix of uses on-site, or is near significant transit service."

Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Determine Equation)

Vehicular trips are estimated using rates/equations applicable to each LUC. When the appropriate graph has a fitted curve, the Handbook has a process (Figure 4.2) to determine when to use it versus using the weighted average rate or collecting local data. The methodology requires for engineering judgement in some circumstances and permits engineering judgement to override or make adjustments when appropriate to best project (example 1: study site is expected to operate differently than data in the applicable land use code - such as restaurant that is closed in the morning or in the evening; example 2: LUC data in a localized area fails to be represented by the typically selected fitted curve/weighted average rate - a small shop/LUC 820, AM peak hour is skewed by the high y-intercept).

Equation Type: Equation Used [Equated Rate] (Type Abbreviations: Weighted Average Rate ("WA"), Fitted Curve Type: Equation Used [Equated Rate])

Proposed Use	ADT	AM Peak Hour	PM Peak Hour	(not used)
Townhomes	WA: $T=X*7.32$ [7.32]	WA: $T=X*0.46$ [0.46]	WA: $T=X*0.56$ [0.56]	
Multifamily & Townhomes	WA: $T=X*5.44$ [5.44]	WA: $T=X*0.36$ [0.36]	WA: $T=X*0.44$ [0.44]	



Lake Mary Housing

Proposed

Trip Generation
December 2021

Box 5/Box 9 - Estimate Baseline Trips/Estimate Vehicular Trips (Apply Equations and In/Out Distributions)

Baseline Vehicular Trips

Proposed Use	ADT			AM Peak Hour			PM Peak Hour			(not used)		
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total
Townhomes	50%	307	307	614	23%	9	30	39	63%	30	17	47
Multifamily & Townhomes	50%	321	321	642	26%	11	31	42	61%	32	20	52
Totals		628	628	1,256		20	61	81		62	37	99

If vehicle trip reductions are not applied for internal capture and alternative mode, vehicle trips may be separated into vehicle trip subsets (pass-by trips, diverted trips, truck trips, new passenger vehicle trips) as part of Box 10. If vehicle trip reductions are to be applied, continue to Box 6.

External Vehicular Trips

Proposed Use	ADT			AM Peak Hour			PM Peak Hour			(not used)		
	% In	In	Out	Total	% In	In	Out	Total	% In	In	Out	Total
Townhomes		307	307	614		9	30	39		30	17	47
Multifamily & Townhomes		321	321	642		11	31	42		32	20	52
Totals		628	628	1,256		20	61	81		62	37	99

City intersections south of the I-40 ONLY

Growth Rate Used 1.0%
 Per-Year Multiplier 1.010

Year	Expansion Factor(s)	
2021	1.000	
2022	1.010	Opening
2023	1.020	
2024	1.030	
2025	1.041	
2026	1.051	
2027	1.062	
2028	1.072	
2029	1.083	
2030	1.094	
2031	1.105	
2032	1.116	
2033	1.127	
2034	1.138	
2035	1.149	
2036	1.161	
2037	1.173	
2038	1.184	
2039	1.196	
2040	1.208	
2041	1.220	
2042	1.232	
2043	1.245	
2044	1.257	
2045	1.270	
2046	1.282	
2047	1.295	
2048	1.308	
2049	1.321	
2050	1.335	
2051	1.348	
2052	1.361	
2053	1.375	