



Revised: 4/30/2020

April 28, 2020

Ms. Tarren Barrett  
Knoxville-Knox County Planning  
400 Main St, Suite 403  
Knoxville, TN 37902

Re: Traffic Letter for Thompson Meadows Subdivision

Dear Ms. Barrett:

Thompson Meadows Subdivision is located north of the intersection of E Emory Road (SR 131) at Thompson School Road in Corryton, Tennessee. The development will include an additional 193 single family lots and will connect to the existing Wheatmeadow Subdivision at Bill Keaton Road. Wheatmeadow Subdivision currently has 107 single family homes; therefore, the combined total of the two connected subdivisions will be 300 single family lots. Construction is proposed to take place this year and this analysis assumes full build out for the development will occur in 2023.

It has been standard practice for several years in Knox County to require at least two access points for any residential subdivision with 150 or more lots. This is based on national best practice to provide alternate access opportunities in the event that one access is blocked by a fallen tree, crash, or other. The existing Wheatmeadow Subdivision includes 107 lots with access via Wheatmeadow Road so if 43 or more lots in Thompson Meadows have access via Wheatmeadow Road, the second access will be required to be included in the evaluation.

The purpose of this traffic analysis is to evaluate the need for exclusive turn lanes at the existing intersection of Wheatmeadow Road at Thompson School Road and at the proposed intersection of Thompson School Road at the new roadway connection under three scenarios: existing volumes, background volumes at buildout year without Thompson Meadows Subdivision and future volumes including Thompson Meadows Subdivision. To simplify this analysis the worst-case condition assuming all traffic will enter and exit via the existing intersection of Wheatmeadow Road at Thompson School Road was tested first. If no turn lanes are required under this condition, then none will be required with two access points because the turning traffic volumes would decrease being split between the two access points.

Thompson School Road is a two-lane road at the intersection with Wheatmeadow Subdivision. Knoxville-Knox County Planning classifies Thompson School Road as a major collector with a 60 foot right-of-way in the vicinity of the proposed development. The speed limit on Thompson School Road is 30 mph. There are no existing sidewalks on Thompson School Road or in Wheatmeadow Subdivision. An aerial photo of the existing intersection is included in the attachments.

Knox County Engineering conducted a PM peak hour turning movement count at the intersection of Thompson School Road at Wheatmeadow Road on Thursday February 27, 2020 from 4:00 p.m. to 6:00 p.m. The PM peak hour at this intersection occurred between 4:45 p.m. and 5:45 p.m. The PM peak hour is considered the critical period for traffic entering the subdivision; therefore only the PM peak hour was needed for an adequate analysis of the exclusive turn lanes. Figure 1: Existing PM Peak Hour Traffic and the count data collected are included in the attachments.

The Knoxville Regional Transportation Planning Organization (TPO) maintains count stations in the vicinity of the proposed development. Knoxville TPO count station ID: 093M218 is located on Thompson School Road north of E Emory Road (SR 131) and was discontinued in 2016. The annual growth rate for this station between 2002 and 2016 is approximately 3.20% and the 2016 ADT was 3,040 vehicles per day. For the purpose of this study, an annual growth rate of 3.0% was assumed for traffic at the intersection of Wheatmeadow Road at Thompson School Road until full occupancy is reached in 2023. Figure 2: Background PM Peak Hour Traffic and the future count data for the PM peak hour is included in the attachments.

The trip generation was calculated using the fitted curve equations where provided from *Trip Generation, 10<sup>th</sup> Edition*, published by the Institute of Transportation Engineers. Single-Family Detached Housing (Land Use 210) was used to calculate the daily trips, AM and PM peak hour trips. The land use worksheets are included in the attachments. A trip generation summary is shown in Table 1 – Trip Generation Summary.

**Table 1 - Trip Generation Summary  
Thompson Meadows Subdivision**

Land Use	Density	Daily Trips	AM Peak Hour		PM Peak Hour	
			Enter	Exit	Enter	Exit
Single-Family Detached Housing (LUC 210)	193 Lots	1,904	36	107	120	71

The total number of new trips generated by the Thompson Meadows Subdivision will be 1,904 new daily trips, 143 trips during the AM peak hour and 191 trips during the PM peak hour.

Thompson School Road at the intersection with Wheatmeadow Road has an existing exiting trip distribution of 25% eastbound left turns and 75% eastbound right turns during the PM peak hour and an existing entering trip distribution of 90% northbound left turns and 10% southbound right turns during the PM peak hour. Figure 3: PM Peak Hour Site Traffic and Figure 4: Full Buildout PM Peak Hour Traffic are included in the attachments.

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The Knox County Department of Engineering and Public Works handbook, "Access Control and Driveway Design Policy," was used to determine if a right turn lane or left turn is warranted at the intersection of Wheatmeadow Road at Thompson School Road during the existing, background and future full buildout conditions. The turn lane worksheets and analysis are included in the attachments.

For the full buildout conditions during the PM peak hour there will be an estimated 144 northbound vehicles turning left onto Wheatmeadow Road and 16 southbound vehicles turning right onto Wheatmeadow Road. Due to the relatively low thru traffic (102 vehicles northbound and 47 vehicles southbound) the intersection does not meet a right or left turn lane warrant under this worst-case scenario; therefore no further analysis is needed.

I hope that this is helpful. Please contact me if you have any questions.

Thank you,

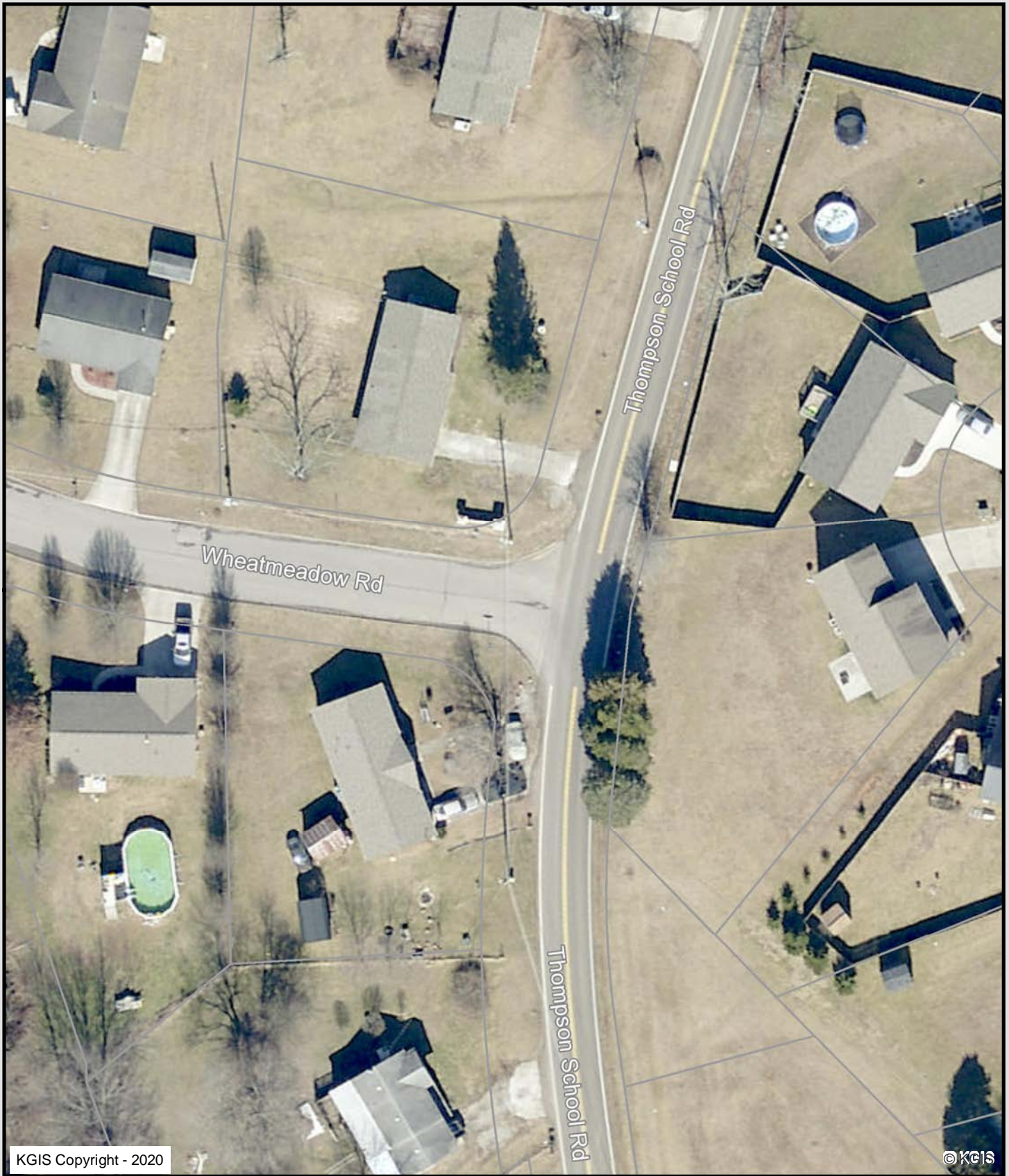


Addie Kirkham, P.E.

Enclosure: Attachments

## Attachments

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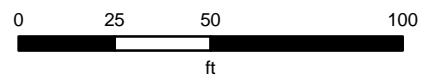


## Wheatmeadow Subdivision

**Knoxville - Knox County - KUB Geographic Information System**



Printed: 3/20/2020 at 3:36:26 PM



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**Project: Thompson Meadows Subdivision****Intersection: Thompson School Road at Wheatmeadow Road****Date Conducted: 2/27/2020**

	Wheatmeadow Road Eastbound			Thompson School Rd Northbound			Thompson School Rd Southbound			
Start	Left	Right	Total	Left	Thru	Total	Thru	Right	Total	Int. Total
4:00 PM	0	3	3	5	16	21	13	0	13	37
4:15 PM	2	4	6	5	15	20	8	1	9	35
4:30 PM	0	4	4	4	19	23	7	2	9	36
4:45 PM	1	4	5	5	25	30	8	2	10	45
Total	3	15	18	19	75	94	36	5	41	153
5:00 PM	1	4	5	12	21	33	10	2	12	50
5:15 PM	2	3	5	8	26	34	5	0	5	44
5:30 PM	1	3	4	8	21	29	20	0	20	53
5:45 PM	0	4	4	3	24	27	12	0	12	43
Total	4	14	18	31	92	123	47	2	49	190
Grand Total	7	29	36	50	167	217	83	7	90	343
Approach %	19.4	80.6		23.0	77.0		92.2	7.8		
Total %	2.0	8.5	10.5	14.6	48.7	63.3	24.2	2.0	26.2	

**Project: Thompson Meadows Subdivision**

**Intersection: Thompson School Road at Wheatmeadow Road**

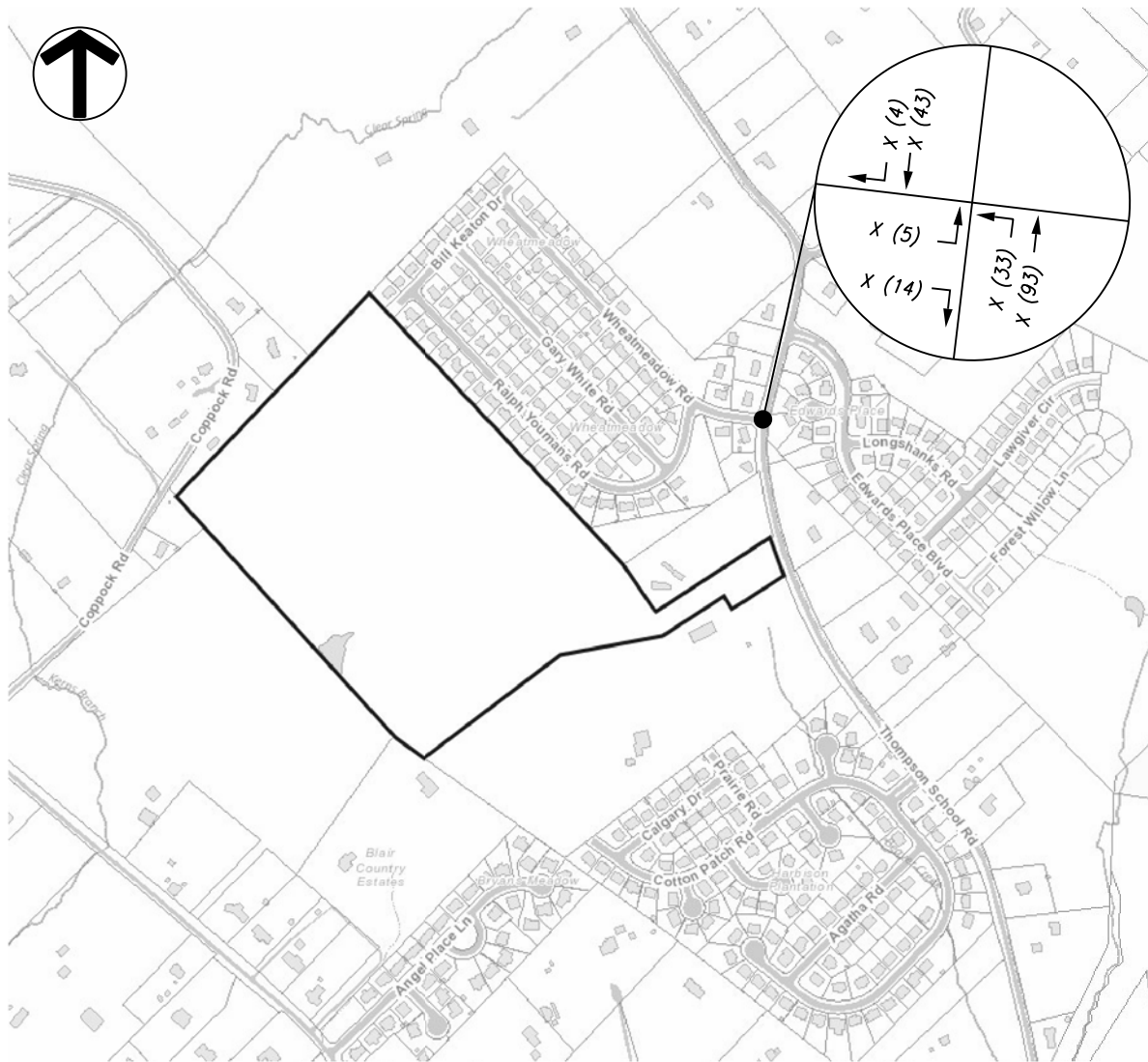
**Date Conducted: 2/27/2020**

PM Peak Hour	4:45 PM - 5:45 PM	192
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	Wheatmeadow Road Eastbound			Thompson School Rd Northbound			Thompson School Rd Southbound			
Start	Left	Right	Total	Left	Thru	Total	Thru	Right	Total	Int. Total
Peak Hour Analysis from 4:00 PM to 6:00 PM										
PM Peak Hour begins at 4:45 PM										
4:45 PM	1	<b>4</b>	5	5	25	30	8	<b>2</b>	10	45
5:00 PM	1	4	5	<b>12</b>	21	33	10	2	12	50
5:15 PM	<b>2</b>	3	5	8	<b>26</b>	34	5	0	5	44
5:30 PM	1	3	4	8	21	29	<b>20</b>	0	20	<b>53</b>
Total Volume	5	14	19	33	93	126	43	4	47	192
Future (3% over 3 yrs)	5	15		36	102		47	4		210
PHF	0.63	0.88		0.69	0.89		0.54	0.50		0.91



Thompson Meadows Subdivision  
Traffic Impact Letter  
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**LEGEND:**

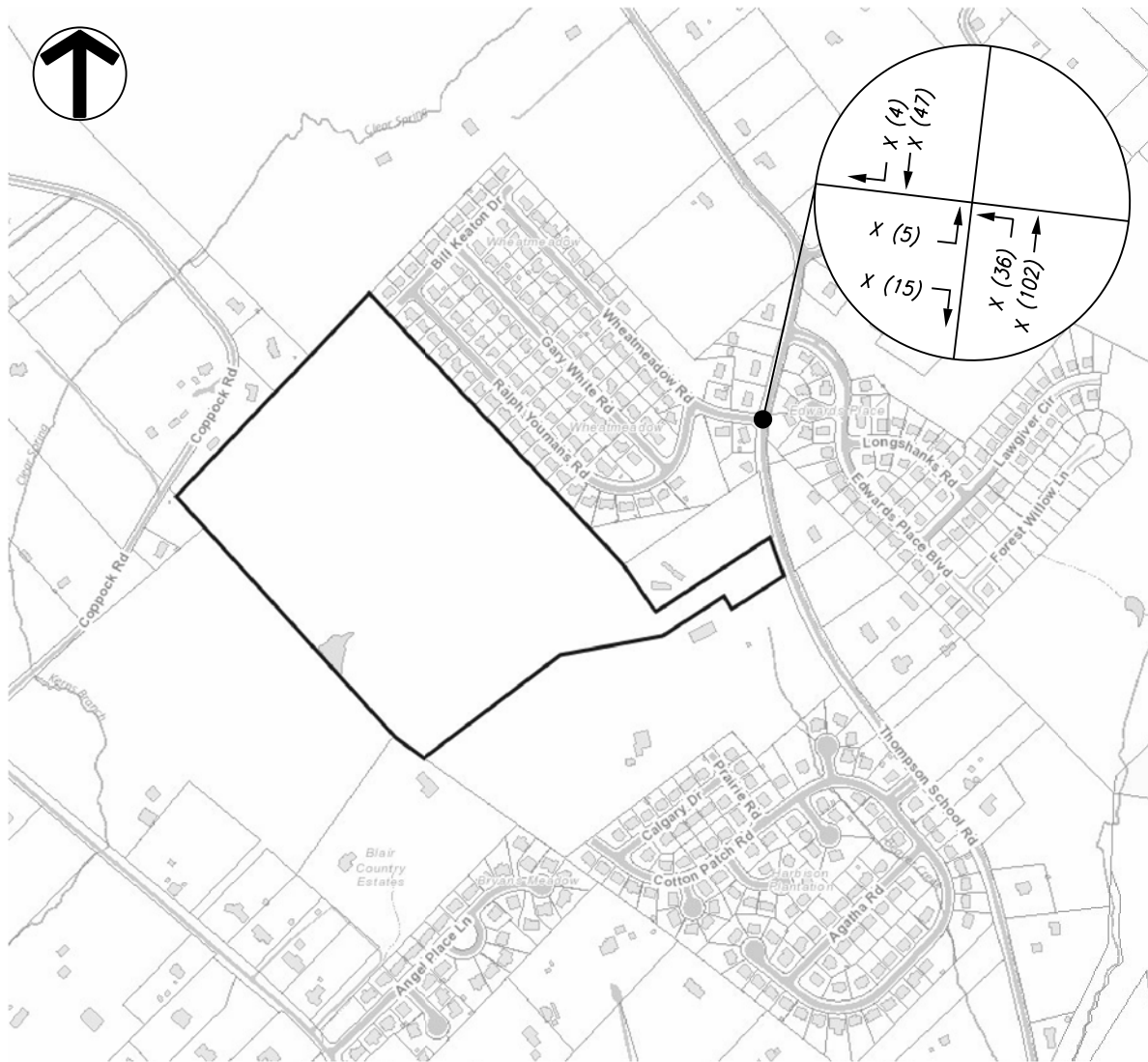
← X (23)

TURNING MOVEMENT VOLUME AM (PM)

Figure 1: Existing PM Peak Hour Traffic



Thompson Meadows Subdivision  
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**LEGEND:**

← X (23)

TURNING MOVEMENT VOLUME AM (PM)

Figure 2: Background PM Peak Hour Traffic

# Trip Generation

**Project: Thompson Meadows**

**Date Conducted: 3/16/2020**

**Single-Family Detached Housing (LUC 210)**

**193 Single Family Lots**

**Average Daily Traffic**

$$\ln(T) = 0.92\ln(X) + 2.71$$

$$\ln(T) = 0.92\ln(193) + 2.71$$

$$T = 1904$$

**Peak Hour of Adjacent Street Traffic**

**One Hour Between 7 and 9 a.m.**

$$T = 0.71(X) + 4.80$$

$$T = 0.71(193) + 4.80$$

$$T = 142$$

**Peak Hour of Adjacent Street Traffic**

**One Hour Between 4 and 6 p.m.**

$$\ln(T) = 0.96\ln(X) + 0.20$$

$$\ln(T) = 0.96\ln(193) + 0.20$$

$$T = 191$$

Time Period	Total Trips	Percent		Number	
		Enter	Exit	Enter	Exit
Weekday (24 hours)	1904	50%	50%	952	952
AM Peak Hour	142	25%	75%	36	107
PM Peak Hour	191	63%	37%	120	71

## Single-Family Detached Housing (210)

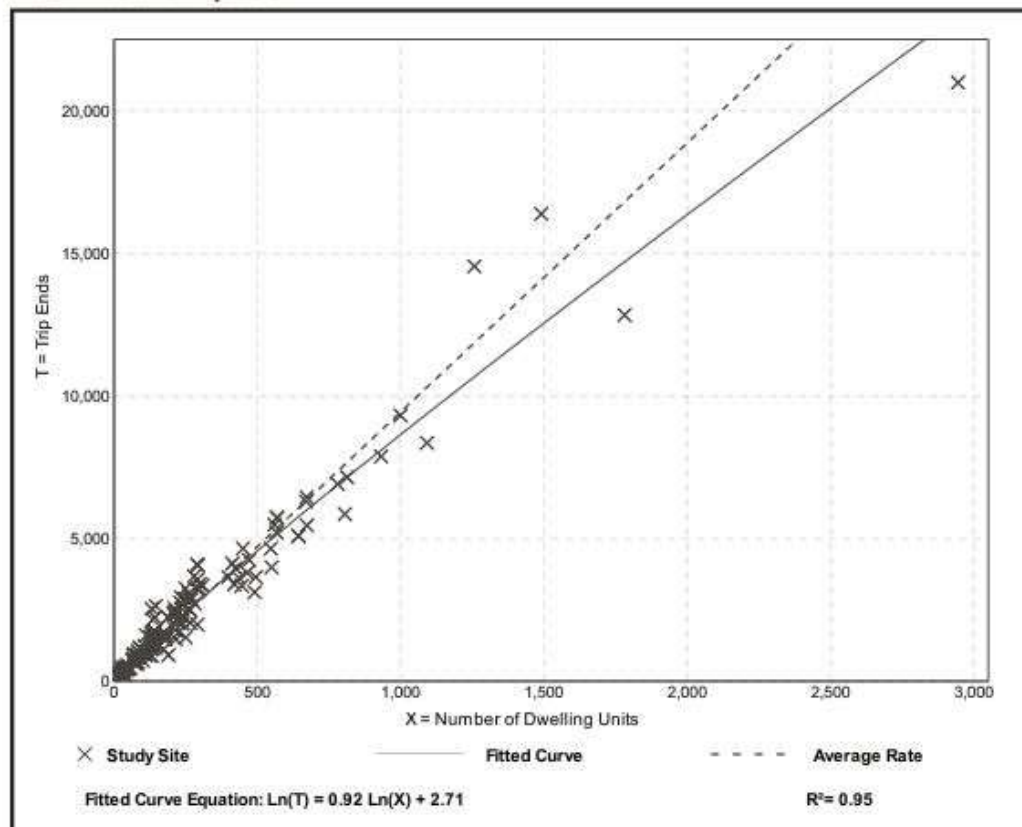
Vehicle Trip Ends vs: Dwelling Units  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 159  
Avg. Num. of Dwelling Units: 264  
Directional Distribution: 50% entering, 50% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
9.44	4.81 - 19.39	2.10

### Data Plot and Equation



## Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units

On a: Weekday,

Peak Hour of Adjacent Street Traffic,  
One Hour Between 7 and 9 a.m.

Setting/Location: General Urban/Suburban

Number of Studies: 173

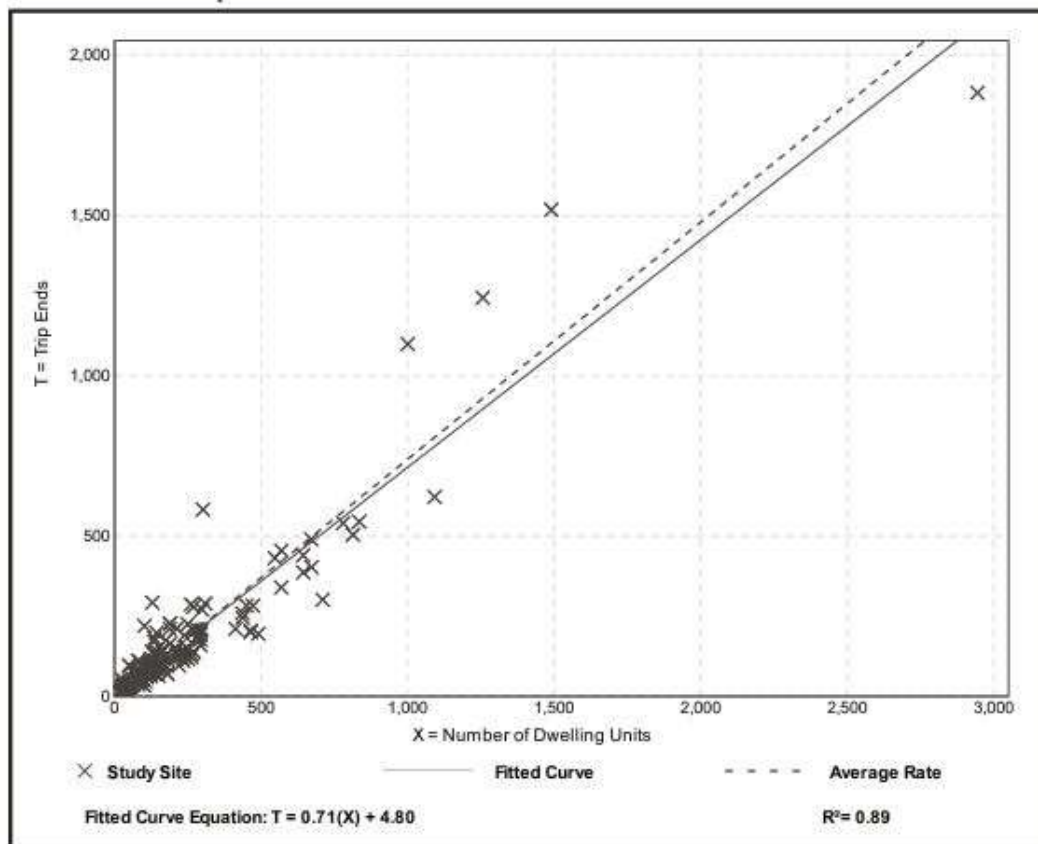
Avg. Num. of Dwelling Units: 219

Directional Distribution: 25% entering, 75% exiting

### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.74	0.33 - 2.27	0.27

### Data Plot and Equation



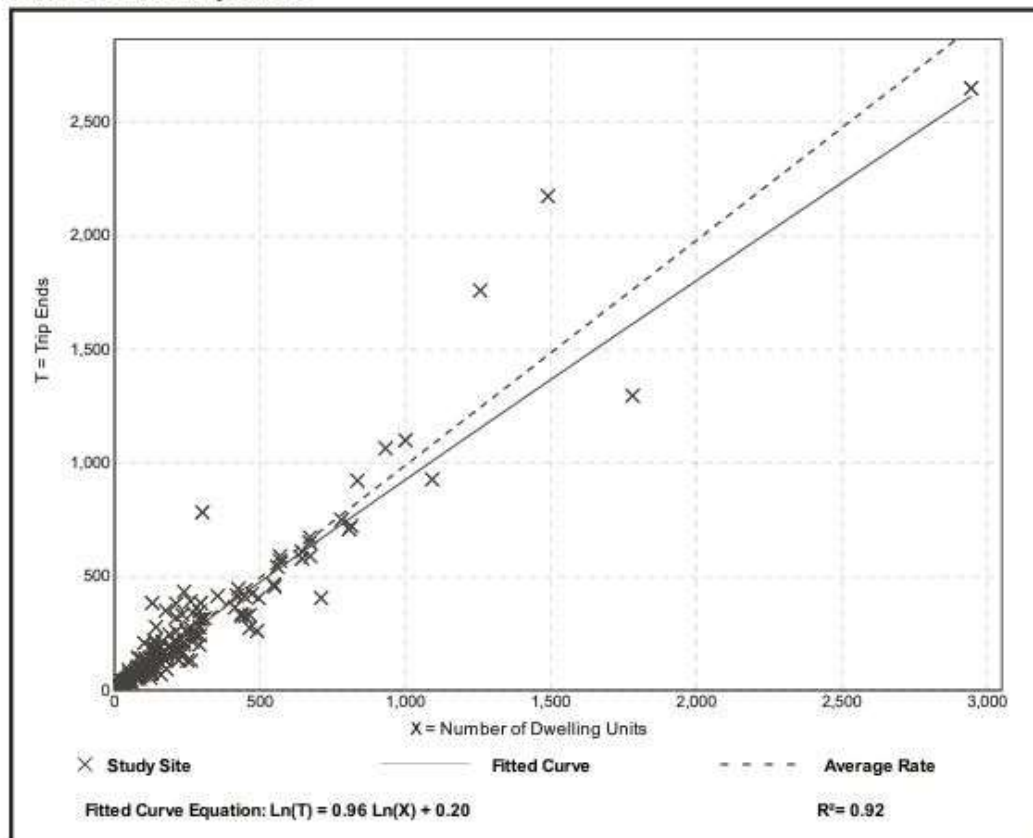
## Single-Family Detached Housing (210)

Vehicle Trip Ends vs: Dwelling Units  
 On a: Weekday,  
 Peak Hour of Adjacent Street Traffic,  
 One Hour Between 4 and 6 p.m.  
 Setting/Location: General Urban/Suburban  
 Number of Studies: 190  
 Avg. Num. of Dwelling Units: 242  
 Directional Distribution: 63% entering, 37% exiting

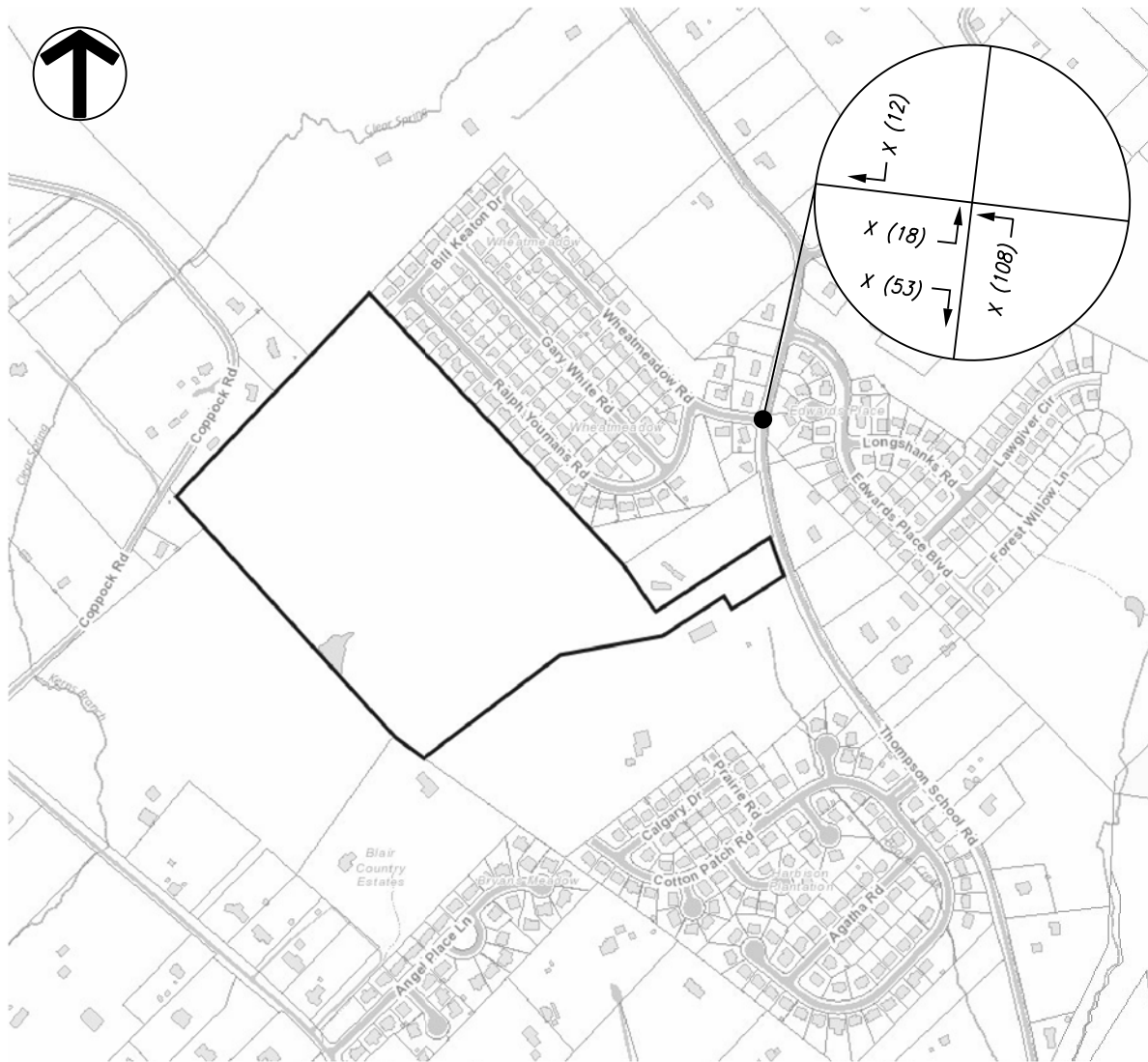
### Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.99	0.44 - 2.98	0.31

### Data Plot and Equation



Thompson Meadows Subdivision  
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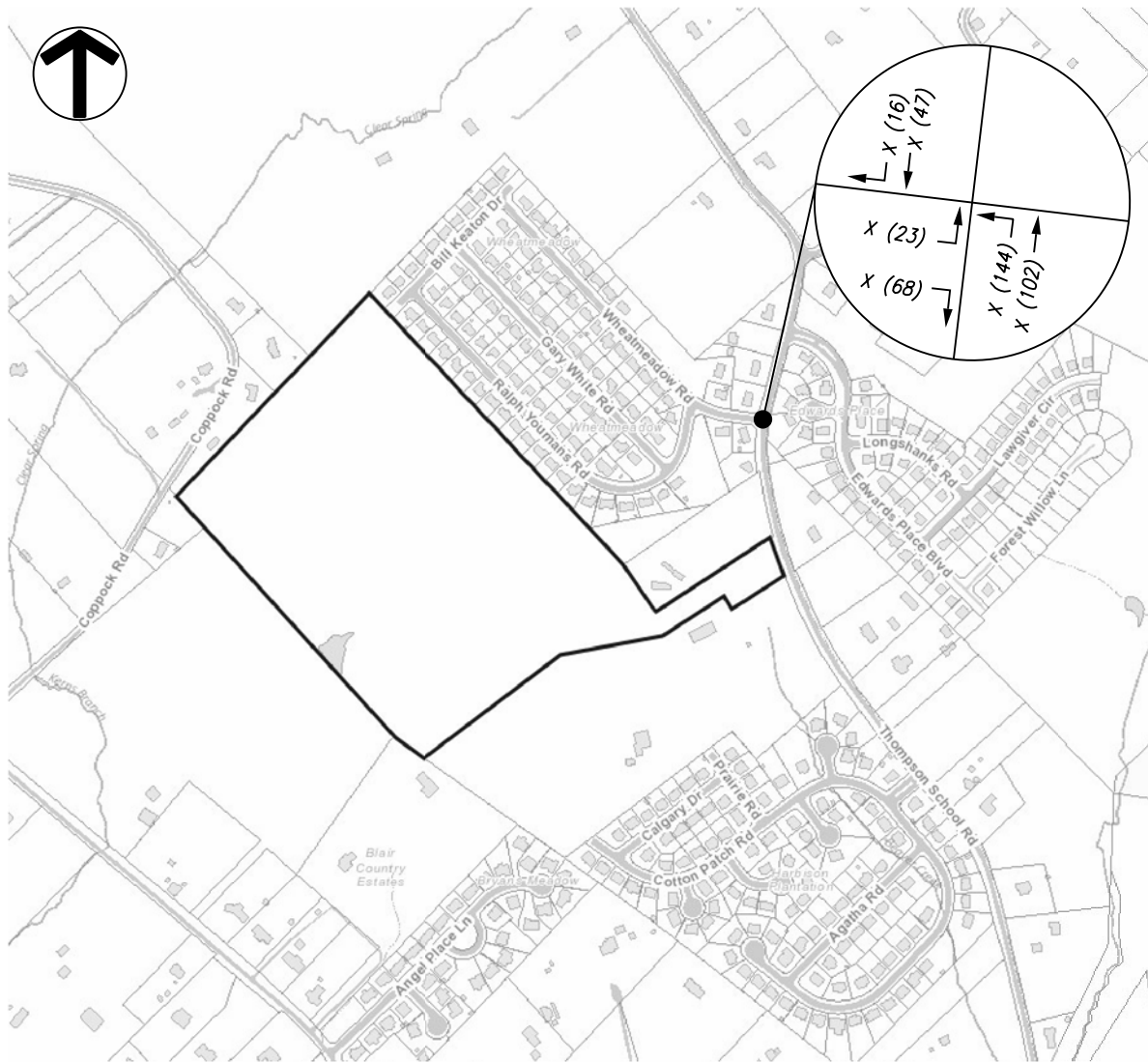
**LEGEND:**

← X (23)

TURNING MOVEMENT VOLUME AM (PM)

Figure 3: PM Peak Hour Site Traffic

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**LEGEND:**

← X (23)

TURNING MOVEMENT VOLUME AM (PM)

Figure 4: Full Buildout PM Peak Hour Traffic



**Project: Thompson Meadows Subdivision**

**Wheatmeadow Rd at Thompson School Rd**

**Wheatmeadow Rd  
at Thompson School Rd**

VOLUMES

LEFT TURN  
AM  
PM

Opposing	Thru	LT	LT MAX	Warrant Met
-	-	-	-	-
63	102	144	300	NO

**Wheatmeadow Rd  
at Thompson School Rd**

VOLUMES

RIGHT TURN  
AM  
PM

Thru	RT	RT MAX	Warrant Met
-	-	-	-
47	16	599	NO

TABLE 4A

LEFT-TURN LANE VOLUME THRESHOLDS  
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 35 MPH OR LESS

(If the left-turn volume exceeds the table value a left -turn lane is needed)

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	100 - 149	150 - 199	200 - 249	250 - 299	300 - 349	350 - 399
100 - 149 150 - 199	300 PM Peak - 144 LT 245	200	185 160	145 130	120 110	100 90
200 - 249 250 - 299	205 175	170 150	140 125	115 105	100 90	80 70
300 - 349 350 - 399	155 135	135 120	110 100	95 85	80 70	65 60
400 - 449 450 - 499	120 105	105 90	90 80	75 70	65 60	55 50
500 - 549 550 - 599	95 85	80 70	70 65	65 60	55 50	50 45
600 - 649 650 - 699	75 70	65 60	60 55	55 50	45 40	40 35
700 - 749 750 or More	65 60	55 50	50 45	45 40	35 35	30 30

OPPOSING VOLUME	THROUGH VOLUME PLUS RIGHT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 599	= / > 600
100 - 149 150 - 199	100 90	80 75	70 65	60 55	55 50	50 45
200 - 249 250 - 299	80 70	72 65	460 55	55 50	50 45	45 40
300 - 349 350 - 399	65 60	60 55	50 50	50 45	45 40	40 40
400 - 449 450 - 499	55 50	50 45	45 45	45 40	40 35	35 35
500 - 549 550 - 599	50 45	45 40	40 40	40 35	35 35	35 35
600 - 649 650 - 699	40 35	35 35	35 35	35 30	35 30	30 30
700 - 749 750 or More	30 30	30 30	30 30	30 30	30 30	30 30

\* Or through volume only if a right-turn lane exists.

TABLE 4B  
RIGHT-TURN LANE VOLUME THRESHOLDS  
FOR TWO-LANE ROADWAYS WITH A PREVAILING SPEED OF 35 MPH OR LESS

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	<100	100 - 199	200 - 249	250 - 299	300 - 349	350 - 399
Fewer Than 25 25 - 49 50 - 99	○ PM Peak - 16 RT					
100 - 149 150 - 199						
200 - 249 250 - 299						Yes
300 - 349 350 - 399				Yes	Yes Yes	Yes Yes
400 - 449 450 - 499			Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599		Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

RIGHT-TURN VOLUME	THROUGH VOLUME PLUS LEFT-TURN VOLUME *					
	350 - 399	400 - 449	450 - 499	500 - 549	550 - 600	+ / > 600
Fewer Than 25 25 - 49 50 - 99					Yes	Yes Yes
100 - 149 150 - 199			Yes	Yes Yes	Yes Yes	Yes Yes
200 - 249 250 - 299	Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
300 - 349 350 - 399	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
400 - 449 450 - 499	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
500 - 549 550 - 599	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes	Yes Yes
600 or More	Yes	Yes	Yes	Yes	Yes	Yes

\* Or through volume only if a left-turn lane exists.



**Date: April 28, 2020**

**Project Name: Thompson Meadows Subdivision**

**To: Knoxville-Knox County Planning**

**Subject: TIS Review for Thompson Meadows Subdivision (5-SA-20-C & 5-A-20-UR)**

Dear Knoxville-Knox County Planning staff,

The following comment response document is submitted to address comments dated April 23, 2020:

1. **Reviewer Comment:** The scope stipulated that 2 access points would be required for this subdivision. I ask that the engineer add a brief paragraph to make this clear as follows: It has been standard practice for several years in Knox County to require at least two access points for any residential subdivision with 150 or more lots. This is based on national best practice to provide alternate access opportunities in the event that one access is blocked by a fallen tree, crash, or other. The existing Wheatmeadow subdivision includes 107 lots with access via Wheatmeadow Road, so if 43 or more lots in Thompson Meadows have access via Wheatmeadow Road, the second access will be required to be included in the evaluation. Why was only the PM analyzed?

Response: Added the above statement to the traffic impact letter. Also added a statement as to why only the PM peak hour was analyzed to the first paragraph on the second page. "The PM peak hour is considered the critical period for traffic entering the subdivision; therefore only the PM peak hour was needed for an adequate analysis of the exclusive turn lanes."

2. **Reviewer Comment:** Please break down the total number lots between the two subdivisions, Wheatmeadow Subdivision lot count, and Thompson Meadows Subdivision lot count so it is clear.

Response: Added the following statement to the first paragraph. "Wheatmeadow Subdivision currently has 107 single family homes; therefore, the combined total of the two connected subdivisions will be 300 single family lots."

3. **Reviewer Comment:** Related to the above is the statement of the purpose for this analysis. I ask that the engineer clarify (2<sup>nd</sup> paragraph on page 1) that this evaluation is to ascertain if exclusive turn lanes are needed on Thompson School Road either at Wheatmeadow Road or at the second access under any scenario (existing, background or full buildout conditions). To simplify this analysis, we have agreed

that the first step is to test the worst-case condition with full buildout and all access via Wheatmeadow Road. If no turn lanes are required under this condition, then none will be required with two access points because the turning traffic volumes would decrease being split between the two access points.

Response: Revised the third paragraph to clarify the purpose of the analysis.

4. **Reviewer Comment:** The TIL includes a figure in the attachments showing full buildout traffic volumes. Please add figures showing existing and background volumes and the generated site traffic to facilitate checking, just as would be done in a typical TIA, and reference these in the letter as appropriate.

Response: Revised figures to include Figure 1: Existing PM Peak Hour Traffic, Figure 2: Background PM Peak Hour Traffic, Figure 3: PM Peak Hour Site Traffic and Figure 4: Full Buildout PM Peak Hour Traffic and referenced the additional figures in the traffic letter.

5. **Reviewer Comment:** Please include the worksheets from Trip Generation v. 10 in the attachments to facilitate checking.

Response: Added the land use worksheets from the Trip Generation 10<sup>th</sup> Edition to the attachments.

6. **Reviewer Comment:** In the 3<sup>rd</sup> paragraph on page 2, correct the direction of 25% and 75% traffic exiting Wheatmeadow Road from "northbound and southbound" to "eastbound".

Response: Revised "northbound and southbound" to "eastbound".

Sincerely,



Addie Kirkham, P.E.