6-L-25-DP
TIS Version 1
4/25/2025

# LOVELL ROAD TOWNHOMES

## Transportation Impact Analysis

### Lovell Road (SR 131)

### Knoxville, TN

**A Transportation Impact Analysis for the Lovell Road Townhomes**

Submitted to

**Knoxville-Knox County Planning**

April 25, 2025
Ardurra Project No. 792.001

Submitted By:


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# Executive Summary

King Properties & Development, LLC is proposing a residential development. The Lovell Road Townhomes proposes 79 single-family attached residential lots. The project is located south of the intersection of Middlebrook Pike (SR 169) at Lovell Road (SR 131) and north of the Site One Landscape Supply Store in Knox County, Tennessee. Construction is proposed to take place this year and this study assumes full build out for the development will occur in 2028.

The Lovell Road Townhomes has a proposed single roadway connection to Lovell Road (SR 131).

The Lovell Road (SR 131) Widening project was identified in the "FY 2023-2026 Transportation Improvement Plan (TIP)" that was adopted by the Knoxville Regional TPO in October 2022. The project identifies the section of Lovell Road (SR 131) from Cedardale Lane to Middlebrook Pike or approximately 1.7 miles to be widened from the existing 2-lane road to 4-lanes including pedestrian and bicycle facilities. The Horizon Year is listed as 2030; however, the project is not listed in the current TDOT 10-year project plan and was not factored into the full buildout analysis for the Lovell Road Townhomes.

In order to maintain or provide an acceptable level-of-service for each of the intersections studied, some recommendations are presented.

**Lovell Road (SR 131) at Roadway Connection (Road "J")**
After the completion of the full buildout of the Lovell Road Townhomes the intersection of Lovell Road (SR 131) at roadway connection (Road "J") will operate as follows. The northwest approach (Road "J") will operate at a LOS D during the AM peak hour and a LOS E during the PM peak hour and the southwest approach (Lovell Road) will operate at a LOS A during both the AM and PM peak hours.

The result of the queue analysis is that the proposed geometry at the intersection of Lovell Road (SR 131) at the roadway connection (Road "J") is adequate and there are no recommended improvements.

At the intersection of Lovell Road (SR 131) at the proposed roadway connection (Road "J") neither a northbound right turn lane nor a southbound left turn lane are recommended per the TDOT Highway System Access Manual (HSAM) Volume 3: Geometric Design Criteria dated April 2021.

# 1 Introduction

## 1.1 Project Description

This report provides a summary of a transportation impact analysis that was performed for the Lovell Road Townhomes residential development. The Lovell Road Townhomes proposes 79 single-family attached units. The project is located south of the intersection of Lovell Road (SR 131) at Hibbert Road in Knox County, Tennessee. The location of the site is shown in Figure 1.

Construction is proposed to take place this year and this study assumes full build out for the subdivision will occur in 2028.

The Lovell Road Townhomes has a proposed single roadway connection (Road "J") to Lovell Road (SR 131) located approximately 235 feet south of Hibbert Road and approximately 100 feet north of the Gravel Drive and 290 feet north of Lovell Landing Lane / Site One Landscape Supply driveway connection.

Knox County Schools provides free bus transportation except for students that live in the Parent Responsibility Zone (PRZ). Students who live in the PRZ are not eligible for transportation services. The PRZ for Grades K-5 is "an area of one (1) mile from the school, by the shortest route" and the PRZ for Grades 6-12 is "an area of one and one-half (1 ½) miles from the school, by the shortest route". The distance measurements for transportation purposes shall include only publicly maintained roads.

The proposed Lovell Road Townhomes will be located within the Parent Responsibility Zone (PRZ) of Ball Camp Elementary School.

The proposed site layout is shown in Figure 2.

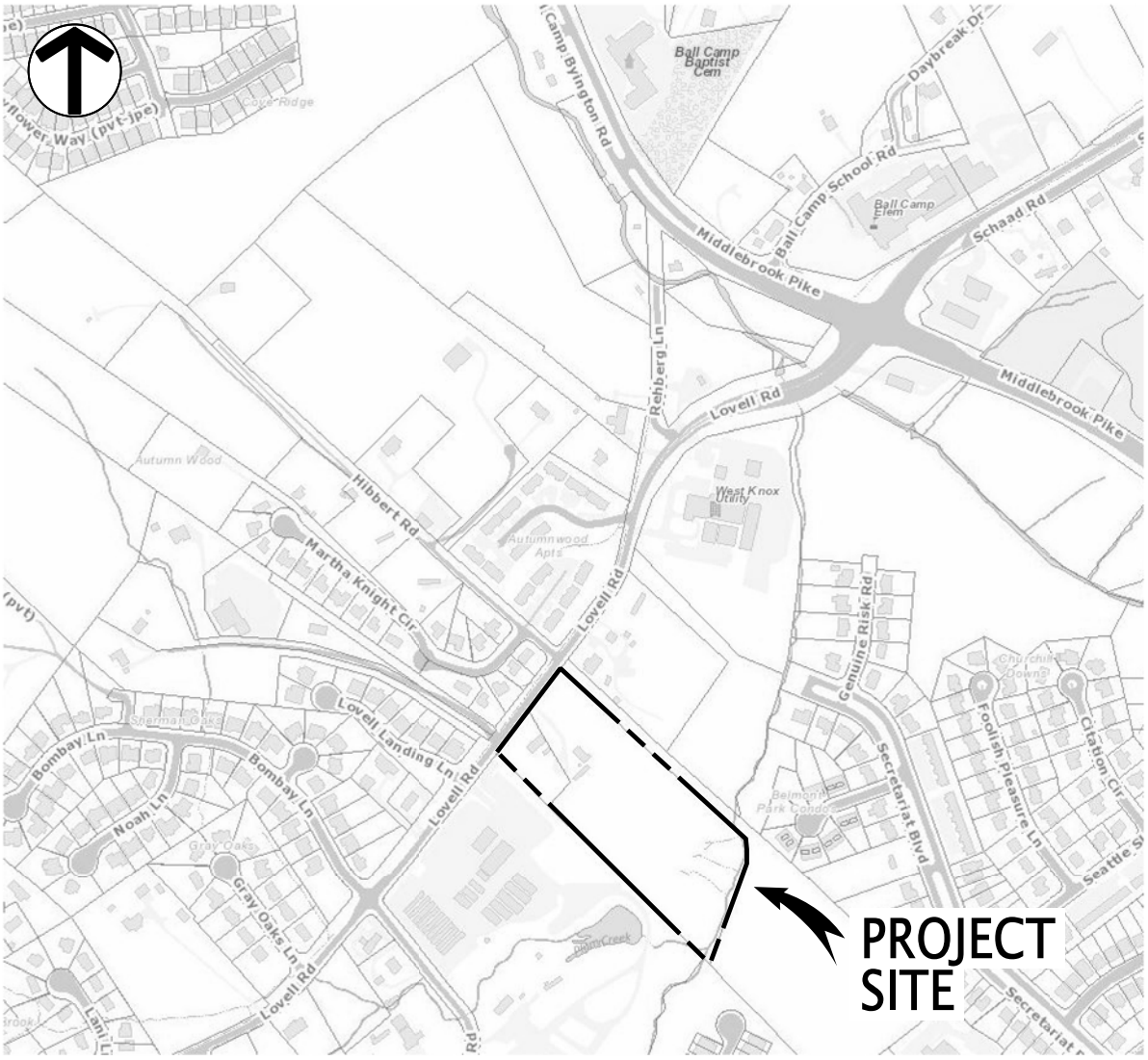



**Figure 1: Location Map**


**Figure 2: Site Plan**

## 1.2 Study Area

The purpose of this study is to evaluate the impacts to the traffic conditions caused by the proposed development. Hibbert Road and Lovell Landing Lane are considered north-south orientated roadways and Lovell Road (SR 131) is considered an east-west oriented roadway. The existing intersections and existing traffic control are summarized in Table 1.2-1 Study Area.

**Table 1.2-1**
**Lovell Road Townhomes**
**Study Area**

| Intersection | Existing Traffic Control |
|---|---|
| Lovell Road (SR 131) at Hibbert Road | Two-Way Stop-Controlled |
| Lovell Road (SR 131) at Lovell Landing Lane | Two-Way Stop-Controlled |

## 1.3 Existing Site Conditions

Roadway geometry and posted speed limits were obtained by field observations. The Knoxville-Knox County Planning "2018 Major Road Plan" was used to determine road classification. This information is summarized in Table 1.3-1 Existing Site Conditions.

**Table 1.3-1**
**Lovell Road Townhomes**
**Existing Site Conditions**

| Roadway | Speed Limit | Lanes | Road Width | Major Road Plan |
|---|---|---|---|---|
| Lovell Road (SR 131) | 35 mph | 2 | ~20 feet | Minor Arterial – 100ft ROW |
| Hibbert Road | 25 mph | 2 | ~19 feet | Local Street |
| Lovell Landing Lane | 25 mph | 2 | ~26 feet | Local Street |

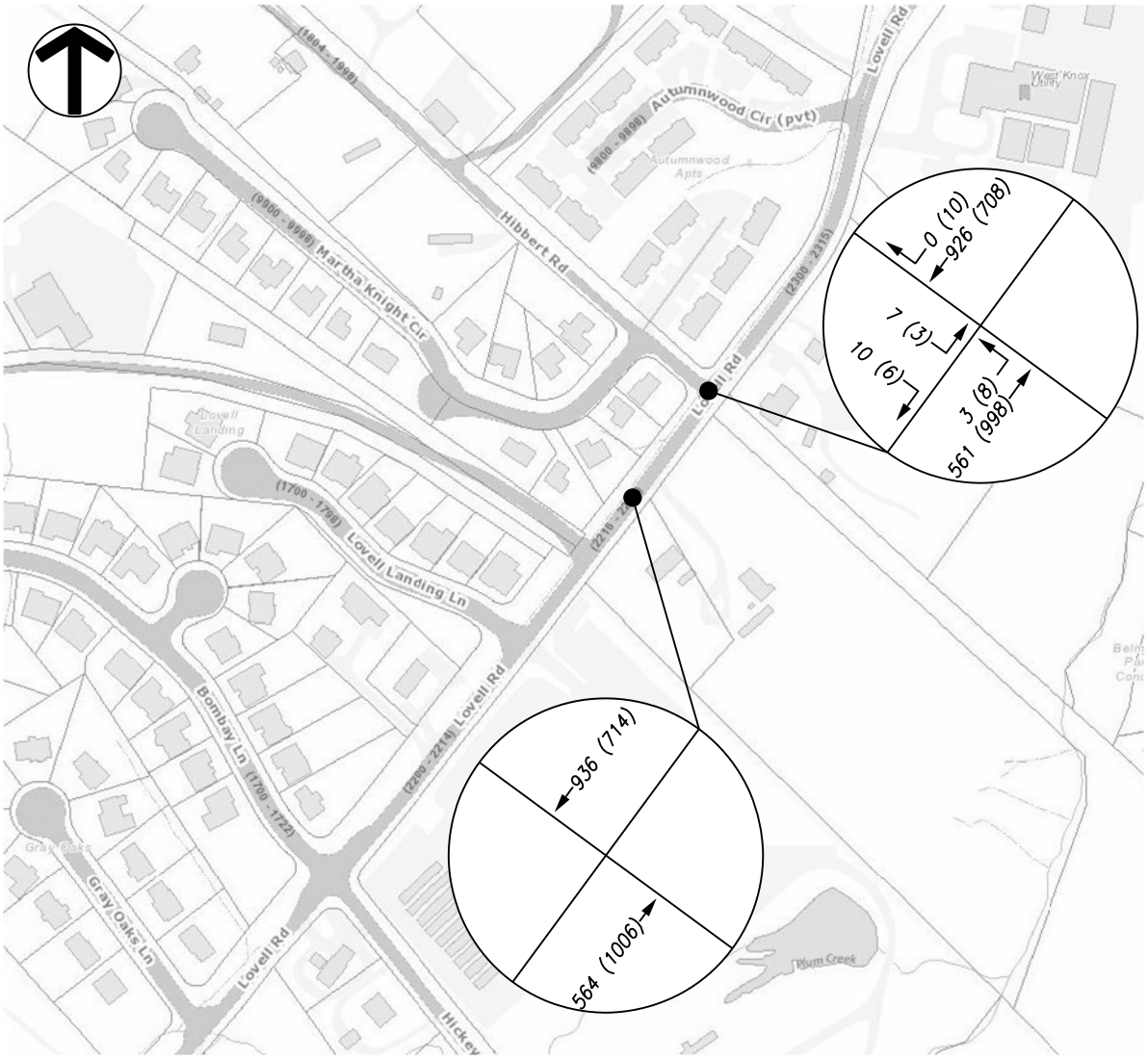
There are no sidewalks or bike infrastructure in the vicinity of the proposed development.

An aerial photo of the property roadway frontage along Lovell Road (SR 131) is included in Attachment 1.

# 2 Existing Traffic Volumes

Ardurra conducted a peak hour turning movement count at the two-way stop-controlled intersection of Lovell Road (SR 131) at Hibbert Road on Wednesday April 16, 2025. The AM peak hour occurred between 7:15 a.m. and 8:15 a.m. with an AM PHF of 0.93 and an hourly volume of 1,507 vehicles. The PM peak hour occurred between 4:30 p.m. and 5:30 p.m. with a PM PHF of 0.95 and an hourly volume of 1,733 vehicles.

The existing volumes including the AM and PM peak hour traffic volumes at the count locations are shown in Figure 3, and the count data collected is included in Attachment 2.




LEGEND:

← 5 (16) TURNING MOVEMENT VOLUME AM (PM)

**Figure 3: 2025 Existing Peak Hour Traffic**

# 3 Background Growth

The Tennessee Department of Transportation (TDOT) maintain a count station in the vicinity of the proposed development.

TDOT count station ID 47000085 is located on Lovell Road (SR 131) south of the intersection of Middlebrook Pike and the proposed development in Knoxville, TN The annual growth rate for this station over the last twenty years is approximately 1.41%. The 2024 ADT was 12,730 vehicles per day.

For the purpose of this study, an annual growth rate of 1.5% was assumed for traffic at the studied intersections until full occupancy is reached in 2028. Attachment 3 shows the trend line growth charts for the TDOT count stations.

Figure 4 demonstrates the projected background peak hour volumes at the studied intersections after applying the background growth rate to the existing conditions.

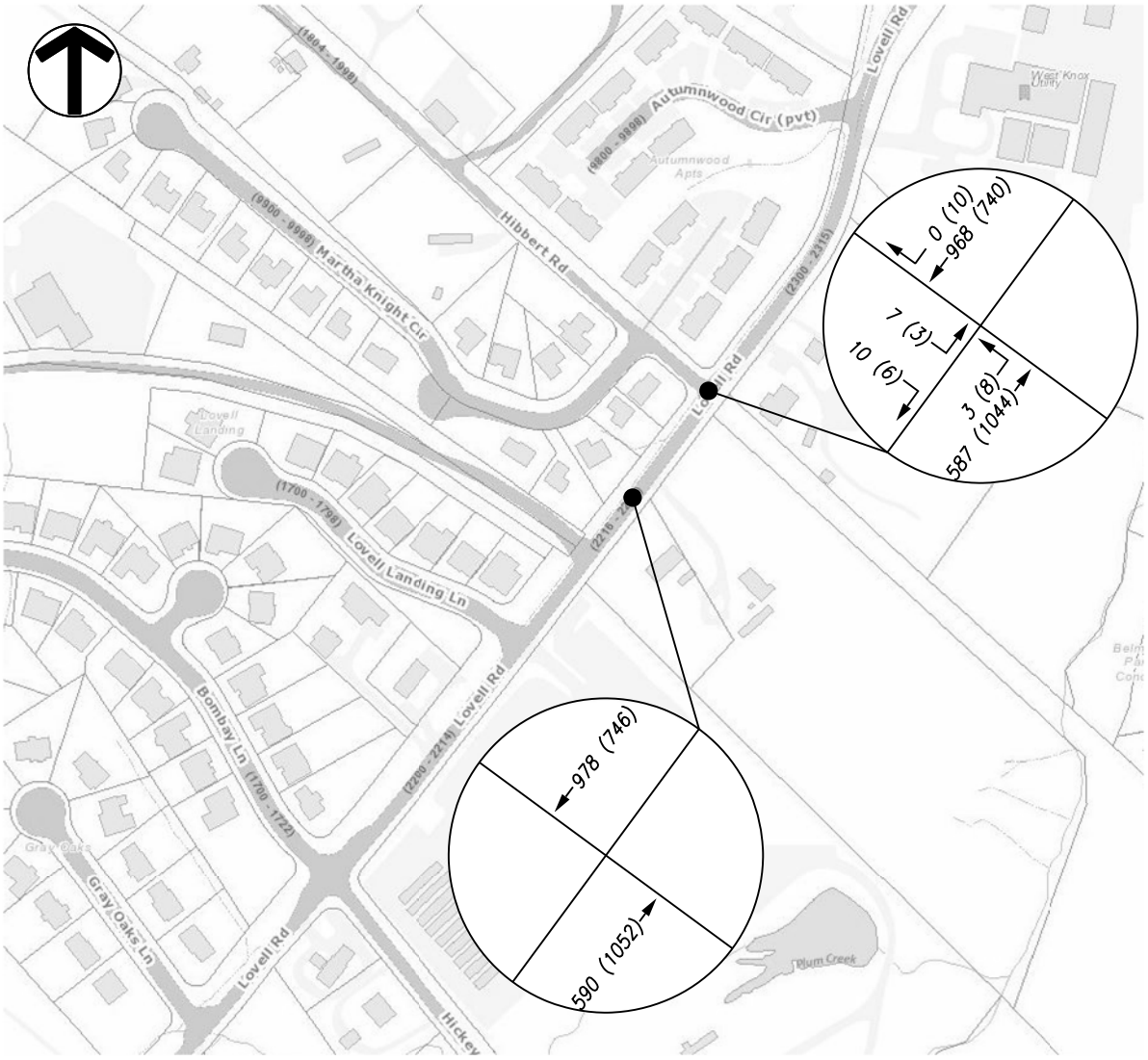



**Figure 4: 2028 Background Peak Hour Traffic**

### 3.1 Future Roadway Improvements

The Knoxville Regional Planning Organization compiles a Transportation Improvement Program (TIP) that identifies the region's long-range Metropolitan Transportation Plan "Mobility Plan 2045". The projects listed in the TIP are developed in cooperation with the Tennessee Department of Transportation (TDOT), regional public transportation providers, member jurisdictions and the public. The resulting document provides an overview of transportation investments in the region over a four-year period. All projects in the TIP must be consistent with, or selected from the current Metropolitan Transportation Plan and the TIP must be fiscally constrained based on estimated revenues.

The "FY 2023-2026 Transportation Improvement Plan (TIP)" was adopted by the Knoxville Regional TPO in October 2022.

Project ID: 09-637 Lovell Road Widening (SR 131) was included on the list of potential projects in Knox County. The project identifies the section of Lovell Road (SR 131) from Cedardale Lane to Middlebrook Pike or approximately 1.7 miles to be widened from the existing 2-lane road to 4-lanes including pedestrian and bicycle facilities. The Horizon Year is listed as 2030 with an estimated cost of $25,490,954.

The Lovell Road (SR 131) Road Widening project is not currently listed in the TDOT 10-year project plan; therefore, the project was not factored into the full buildout analysis for the Lovell Road Townhomes.

## 4 Trip Generation and Trip Distribution

Lovell Road Townhomes proposes 79 single-family attached residential lots. Single-Family Attached Housing or Land Use 215 was used to calculate site trips for the development using the fitted curve equations from the Trip Generation, 11th Edition, published by the Institute of Transportation Engineers.

The land use worksheets are included in Attachment 4. A trip generation summary is shown in Table 4-1.

**Table 4-1**
**Lovell Road Townhomes**
**Trip Generation Summary**

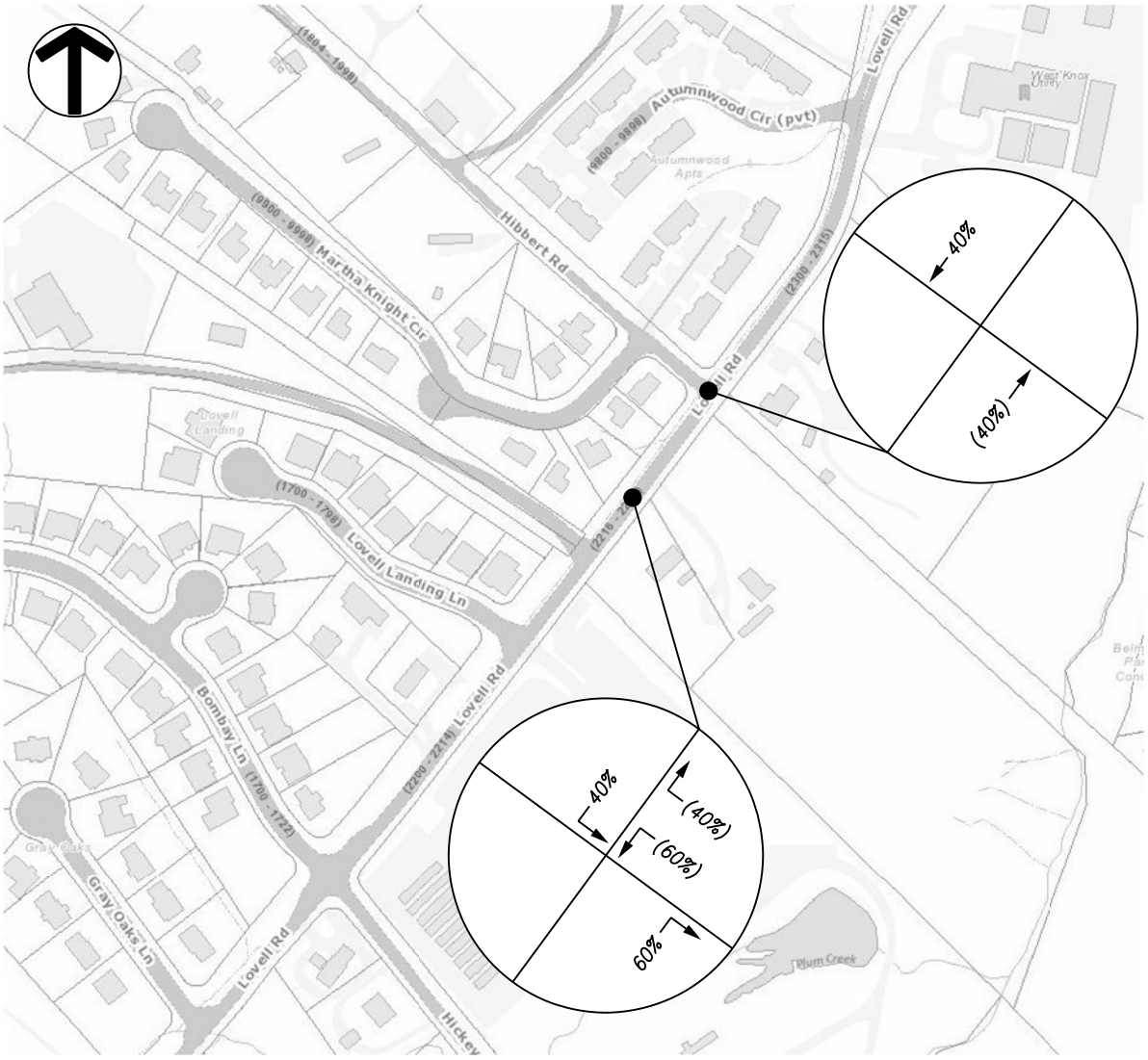
| Land Use | Density | Daily Trips | AM Peak Hour Enter | AM Peak Hour Exit | PM Peak Hour Enter | PM Peak Hour Exit |
|---|---|---|---|---|---|---|
| Single Family Attached Housing (LUC 215) | 79 Lots | 552 | 11 | 24 | 25 | 19 |

The total new trips generated by the Lovell Road Townhomes were estimated to be 552 daily trips. The estimated trips are 35 trips during the AM peak hour and 44 trips during the PM peak hour.

Lovell Road (SR 131) at the intersection with the proposed roadway connection has an existing trip distribution of 40% northbound and 60% southbound during the AM peak hour and 60% northbound and 40% southbound during the PM peak hour.

The directional distribution of the traffic generated by the Lovell Road Townhomes was determined using the existing traffic volumes in combination with the concept plan layout. The entering/exiting traffic was assumed to be 40% Lovell Road (SR 131) northbound to/from Middlebrook Pike (SR 169) and 60% Lovell Road (SR 131) southbound towards Pellissippi Parkway (SR 162).

Figure 5 and Figure 6 show the Lovell Road Townhomes peak hour trip distribution and subdivision peak hour site trips. Figure 7 shows the 2028 full buildout peak hour traffic including the background growth and the peak hour site trips Lovell Road Townhomes.




**LEGEND:**

← 50% (50%) TRIP DISTRIBUTION ENTERING (EXITING)

**Figure 5: Subdivision Peak Hour Trip Distribution**

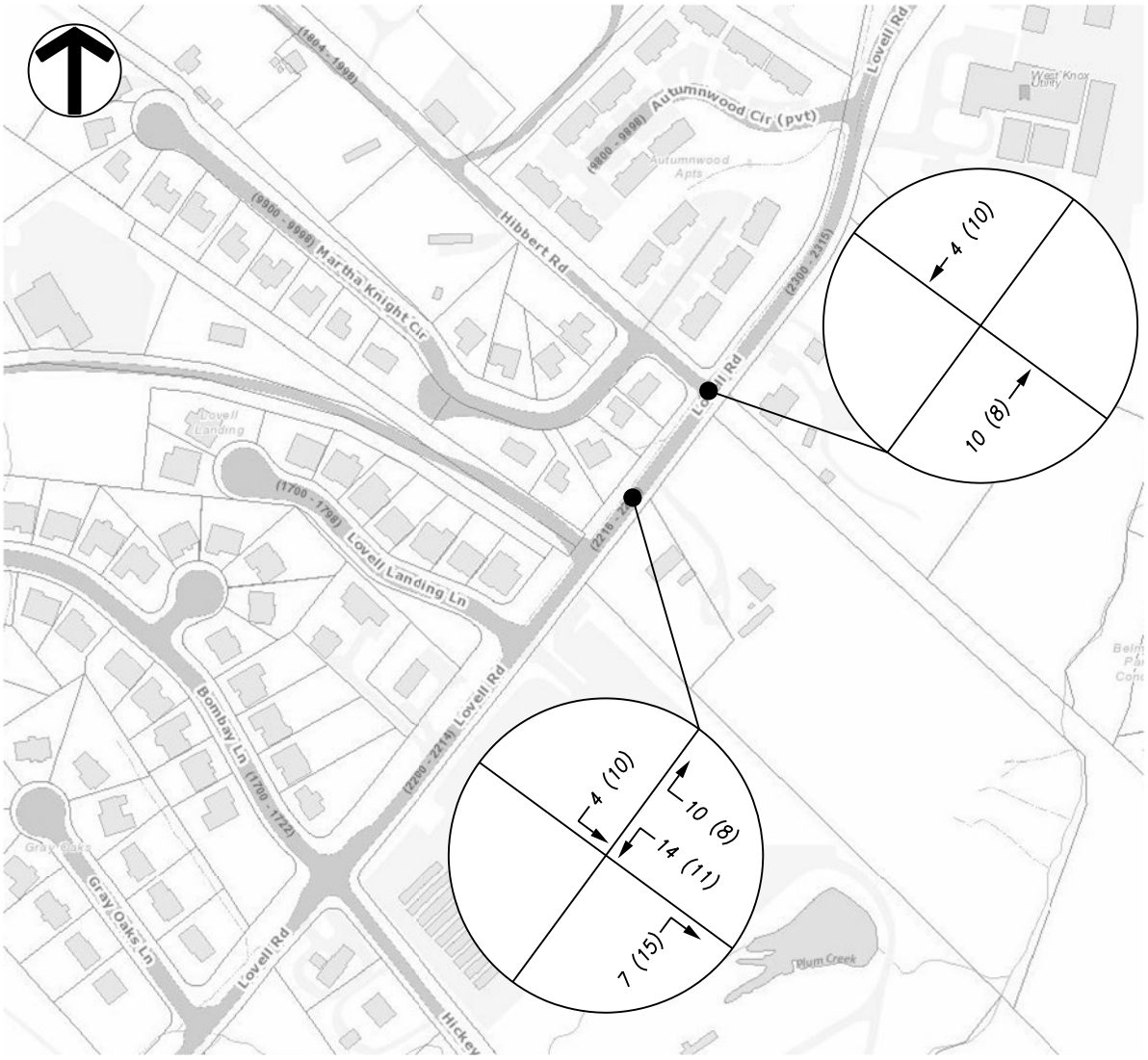



**Figure 6: Subdivision Peak Hour Site Trips**

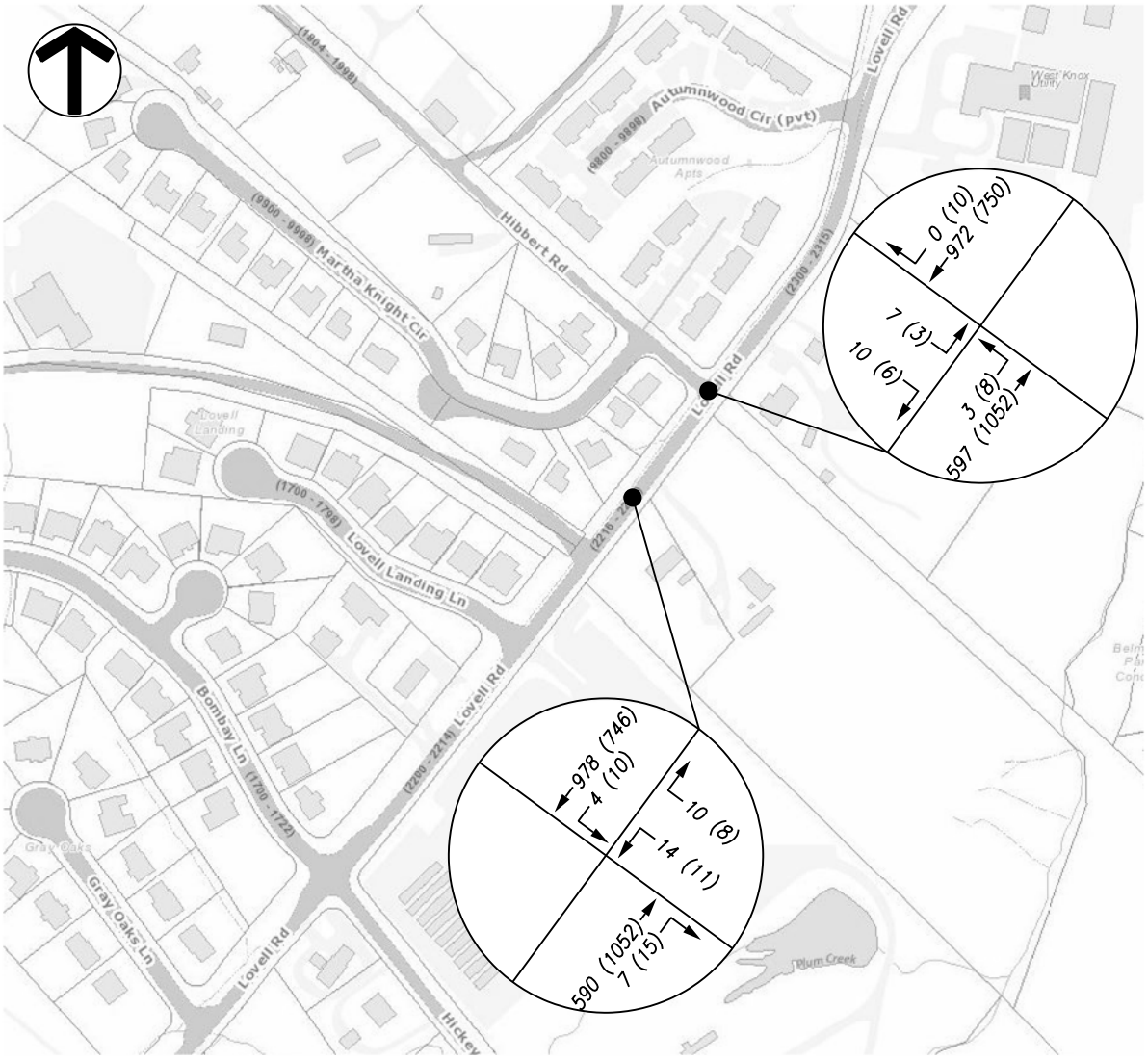



**Figure 7: 2028 Full Buildout Peak Hour Traffic**

# 5 Projected Capacity and Level of Service

Unsignalized intersection capacity analyses were performed using the Synchro 11 Software at the intersection of Lovell Road (SR 131) at the proposed roadway connection (Road "J") in order to evaluate the AM and PM peak hours for the full buildout conditions.

**Level of Service**

The results from the analyses are expressed with a term "level of service" (LOS), which is based on the amount of delay experienced at the intersection. The LOS index ranges from LOS A, indicating excellent traffic conditions with minimal delay, to LOS F indicating very congested conditions with excessive delay. LOS D generally is considered the minimum acceptable condition in urban areas. Table 5-1 shows the LOS index range for signalized and unsignalized intersections as defined by the Highway Capacity Manual (HCM).

**Table 5-1**
**Level of Service (LOS) Index**

| Level of Service | Signalized Intersection | Unsignalized Intersection |
|---|---|---|
| LOS A | ≤ 10 sec | ≤ 10 sec |
| LOS B | 10 – 20 sec | 10 – 15 sec |
| LOS C | 20 – 35 sec | 15 – 25 sec |
| LOS D | 35 – 55 sec | 25 – 35 sec |
| LOS E | 55 – 80 sec | 35 – 50 sec |
| LOS F | > 80 sec | > 50 sec |

The Synchro 11 worksheets are included in Attachments 5. Table 5-2 shows the results of the capacity analyses.

**Table 5-2**
**Level of Service (LOS) Summary**

| Intersection | Time Period | Year 2025 Existing (Delay/LOS) | Year 2028 Background (Delay/LOS) | Year 2028 Full Buildout (Delay/LOS) |
|---|---|---|---|---|
| **Lovell Road (SR 131) @ Roadway Connection (Road "J")** | **AM Peak** | | | |
| | NW Approach | | | 33.6 / D |
| | SW Approach | | | 0.1 / A |
| | **PM Peak** | | | |
| | NW Approach | | | 49.1 / E |
| | SW Approach | | | 0.5 / A |

# 6 Turn Lane Warrant Analysis

The intersection of Lovell Road (SR 131) at the proposed roadway connection (Road "J") was evaluated to determine if a northbound right turn lane or a southbound left turn lane are warranted. The TDOT Highway System Access Manual (HSAM) Volume 3: Geometric Design Criteria dated April 2021 was used to analyze the information. TDOT recommends that a turn lane be installed at an intersection when the turn lane warrants are met during both the AM and PM peak hours.

In order to evaluate a right turn lane warrant, the Major-Road Volume, (one direction), veh/h and Right-Turn Volume, veh/h were reference from Figure 7: 2028 Full Buildout Peak Hour Traffic. Per Figure 3-18: Right-Turn Warrant along Two-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control) the full buildout conditions at the intersection of Lovell Road (SR 131) at Roadway Connection (Road "J") will only warrant a right turn lane during the PM peak hour; therefore, a northbound right turn lane on Lovell Road (SR 131) is not recommended.

In order to evaluate a left turn lane warrant, the Major Highway Volume (veh/h/ln) and the Left-Turn Volume (veh/h) were referenced from Figure 7: 2028 Full Buildout Peak Hour Traffic. Per Figure 3-15: Left-Turn Lane Warrant for Urban and Suburban Arterials (Unsignalized) the full buildout conditions at the intersection of Lovell Road (SR 131) at Roadway Connection (Road "J") will only warrant a left turn lane during the PM peak hour; therefore, a southbound left turn lane on Lovell Road (SR 131) is not recommended.

The turn lane worksheets and TDOT Highway System Access Manual Figures are included in Attachment 6.

# 7 Conclusions and Recommendations

## 7.1 Lovell Road (SR 131) at Roadway Connection (Road "J")

The proposed intersection of Lovell Road (SR 131) at the roadway connection (Road "J") is three-legged two-way stop-controlled intersection with the stop sign located on northwest approach (Road "J").

After the completion of the full buildout of the Lovell Road Townhomes the intersection of Lovell Road (SR 131) at roadway connection (Road "J") will operate as follows. The northwest approach (Road "J") will operate at a LOS D during the AM peak hour and a LOS E during the PM peak hour and the southwest approach (Lovell Road) will operate at a LOS A during both the AM and PM peak hours.

**Queue Analysis**
The 95% queue length is defined as the queue length that has only a 5-percent probability of being exceeded during the analysis time period. The 95% queue length is typically used to determine the length of turning lanes in order to minimize the risk of blockage.

The roadway connection (Road "J") has a proposed storage length of 125 feet before the vehicle queue would block the intersection with Road "K". The unsignalized intersection capacity analysis shows the full buildout 95% queue length for Road "J" of 15 feet (one vehicle) during the AM peak hour and 17 feet (one vehicle) during the PM peak hour; therefore, the queue is not expected to block access to Road "K" or the residential driveways along Road "J".

**Turn Lane Warrant Analysis**
At the intersection of Lovell Road (SR 131) at the proposed roadway connection (Road "J") neither a northbound right turn lane nor a southbound left turn lane are recommended per the TDOT Highway System Access Manual (HSAM) Volume 3: Geometric Design Criteria dated April 2021.

**Intersection Spacing**
Lovell Road (SR 131) is classified as Minor Arterial per the Major Road Plan. The minimum intersection spacing required on an arterial road is 400 feet per the "Knoxville-Knox County Subdivision Regulations" amended through January 9, 2025. The proposed roadway connection "Road "J" is located approximately 235 feet south of Hibbert Road and approximately 100 feet north of the Gravel Drive

and 290 feet north of Lovell Landing Lane / Site One Landscape Supply driveway connection; therefore, the minimum separation on a Minor Arterial is not met.

The current roadway connection was determined after consulting with Knox County Engineering & Public Works and the Tennessee Department of Transportation after evaluating the site to determine the safest option for access to the development.

**Sight Distance**

Within Knox County the minimum sight distance at an intersection (in both directions along the major street) shall be ten (10) times the posted speed limit, but in no case shall it be less than 250 feet in accordance with the "Knoxville-Knox County Subdivision Regulations" amended through June 13, 2024.

The minimum recommended intersection sight distance along Lovell Road (SR 131) is 350 feet in both directions.

Attachment 7 includes pictures of the intersection sight distance at the intersection of Lovell Road (SR 131) at the proposed roadway connection (Road "J"). Removal and/or clearing of vegetation located within the site frontage is the responsibility of the property owner. The removal of vegetation should be sufficient to provide adequate intersection sight distance to the proposed roadway connection.

Ardurra recommends that the intersection sight distance be certified by a land surveyor prior to construction in order to verify that Lovell Road (SR 131) has adequate intersection sight distance at the proposed subdivision entrance to comply with Knox County Engineering and Public Works guidelines.

Ardurra recommends that the signs and pavement markings be installed in accordance with the standards provided in the *Manual on Uniform Traffic Control Devices* (MUTCD).

Any future improvements to the intersection or the various traffic management infrastructure, would need to be reviewed, coordinated, and approved by both Tennessee Department of Transportation and Knox County Engineering and Public Works.

# Attachment 1
# Aerial Photos


# Lovell Road (SR 131)

Printed: 4/16/2025 at 2:19:09 PM

0 25 50 100

ft

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

# Attachment 2
# Traffic Counts

**Project: 792.001 Lovell Road Townhomes**
**Intersection: Lovell Road (SR 131) at Hibbert Road**
**Date Conducted: Wednesday April 16, 2025**

| | Lovell Road (SR 131) Southbound | | | | Westbound | | | | Lovell Road (SR 131) Northbound | | | | Hibbert Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start | Left | Thru | Right | Total | Left | Thru | Right | Total | Left | Thru | Right | Total | Left | Thru | Right | Total | Int. Total |
| 7:00 AM | 0 | 160 | 1 | 161 | 0 | 0 | 0 | 0 | 0 | 97 | 0 | 97 | 2 | 0 | 2 | 4 | 262 |
| 7:15 AM | 0 | 240 | 0 | 240 | 0 | 0 | 0 | 0 | 1 | 141 | 0 | 142 | 4 | 0 | 3 | 7 | 389 |
| 7:30 AM | 0 | 239 | 0 | 239 | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 128 | 1 | 0 | 4 | 5 | 372 |
| 7:45 AM | 0 | 272 | 0 | 272 | 0 | 0 | 0 | 0 | 2 | 127 | 0 | 129 | 2 | 0 | 3 | 5 | 406 |
| Total | 0 | 911 | 1 | 912 | 0 | 0 | 0 | 0 | 3 | 493 | 0 | 496 | 9 | 0 | 12 | 21 | 1429 |
| 8:00 AM | 0 | 175 | 0 | 175 | 0 | 0 | 0 | 0 | 0 | 165 | 0 | 165 | 0 | 0 | 0 | 0 | 340 |
| 8:15 AM | 0 | 198 | 0 | 198 | 0 | 0 | 0 | 0 | 0 | 123 | 0 | 123 | 2 | 0 | 3 | 5 | 326 |
| 8:30 AM | 0 | 167 | 0 | 167 | 0 | 0 | 0 | 0 | 1 | 120 | 0 | 121 | 0 | 0 | 1 | 1 | 289 |
| 8:45 AM | 0 | 149 | 1 | 150 | 0 | 0 | 0 | 0 | 0 | 105 | 0 | 105 | 1 | 0 | 4 | 5 | 260 |
| Total | 0 | 689 | 1 | 690 | 0 | 0 | 0 | 0 | 1 | 513 | 0 | 514 | 3 | 0 | 8 | 11 | 1215 |
| 2:00 PM | 0 | 124 | 0 | 124 | 0 | 0 | 0 | 0 | 0 | 121 | 0 | 121 | 1 | 0 | 1 | 2 | 247 |
| 2:15 PM | 0 | 113 | 1 | 114 | 0 | 0 | 0 | 0 | 0 | 107 | 0 | 107 | 0 | 0 | 1 | 1 | 222 |
| 2:30 PM | 0 | 139 | 0 | 139 | 0 | 0 | 0 | 0 | 1 | 136 | 0 | 137 | 0 | 0 | 0 | 0 | 276 |
| 2:45 PM | 0 | 131 | 1 | 132 | 0 | 0 | 0 | 0 | 1 | 134 | 0 | 135 | 0 | 0 | 2 | 2 | 269 |
| Total | 0 | 507 | 2 | 509 | 0 | 0 | 0 | 0 | 2 | 498 | 0 | 500 | 1 | 0 | 4 | 5 | 1014 |
| 3:00 PM | 0 | 143 | 1 | 144 | 0 | 0 | 0 | 0 | 0 | 132 | 0 | 132 | 0 | 0 | 1 | 1 | 277 |
| 3:15 PM | 0 | 139 | 0 | 139 | 0 | 0 | 0 | 0 | 2 | 164 | 0 | 166 | 0 | 0 | 0 | 0 | 305 |
| 3:30 PM | 0 | 165 | 1 | 166 | 0 | 0 | 0 | 0 | 2 | 135 | 0 | 137 | 0 | 0 | 0 | 0 | 303 |
| 3:45 PM | 0 | 143 | 2 | 145 | 0 | 0 | 0 | 0 | 0 | 156 | 0 | 156 | 3 | 0 | 0 | 3 | 304 |
| Total | 0 | 590 | 4 | 594 | 0 | 0 | 0 | 0 | 4 | 587 | 0 | 591 | 3 | 0 | 1 | 4 | 1189 |
| 4:00 PM | 0 | 145 | 3 | 148 | 0 | 0 | 0 | 0 | 1 | 186 | 0 | 187 | 0 | 0 | 1 | 1 | 336 |
| 4:15 PM | 0 | 158 | 4 | 162 | 0 | 0 | 0 | 0 | 5 | 241 | 0 | 246 | 1 | 0 | 0 | 1 | 409 |
| 4:30 PM | 0 | 162 | 2 | 164 | 0 | 0 | 0 | 0 | 1 | 248 | 0 | 249 | 1 | 0 | 3 | 4 | 417 |
| 4:45 PM | 0 | 205 | 2 | 207 | 0 | 0 | 0 | 0 | 2 | 247 | 0 | 249 | 1 | 0 | 1 | 2 | 458 |
| Total | 0 | 670 | 11 | 681 | 0 | 0 | 0 | 0 | 9 | 922 | 0 | 931 | 3 | 0 | 5 | 8 | 1620 |
| 5:00 PM | 0 | 176 | 2 | 178 | 0 | 0 | 0 | 0 | 3 | 263 | 0 | 266 | 0 | 0 | 1 | 1 | 445 |
| 5:15 PM | 0 | 165 | 4 | 169 | 0 | 0 | 0 | 0 | 2 | 240 | 0 | 242 | 1 | 0 | 1 | 2 | 413 |
| 5:30 PM | 0 | 176 | 2 | 178 | 0 | 0 | 0 | 0 | 1 | 151 | 0 | 152 | 1 | 0 | 1 | 2 | 332 |
| 5:45 PM | 0 | 161 | 4 | 165 | 0 | 0 | 0 | 0 | 0 | 234 | 0 | 234 | 1 | 0 | 1 | 2 | 401 |
| Total | 0 | 678 | 12 | 690 | 0 | 0 | 0 | 0 | 6 | 888 | 0 | 894 | 3 | 0 | 4 | 7 | 1591 |
| Grand Total | 0 | 4045 | 31 | 4076 | 0 | 0 | 0 | 0 | 25 | 3901 | 0 | 3926 | 22 | 0 | 34 | 56 | 8058 |
| Approach % | 0.0 | 99.2 | 0.8 | | - | - | - | | 0.6 | 99.4 | 0.0 | | 39.3 | 0.0 | 60.7 | | |
| Total % | 0.0 | 50.2 | 0.4 | 50.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 48.4 | 0.0 | 48.7 | 0.3 | 0.0 | 0.4 | 0.7 | |

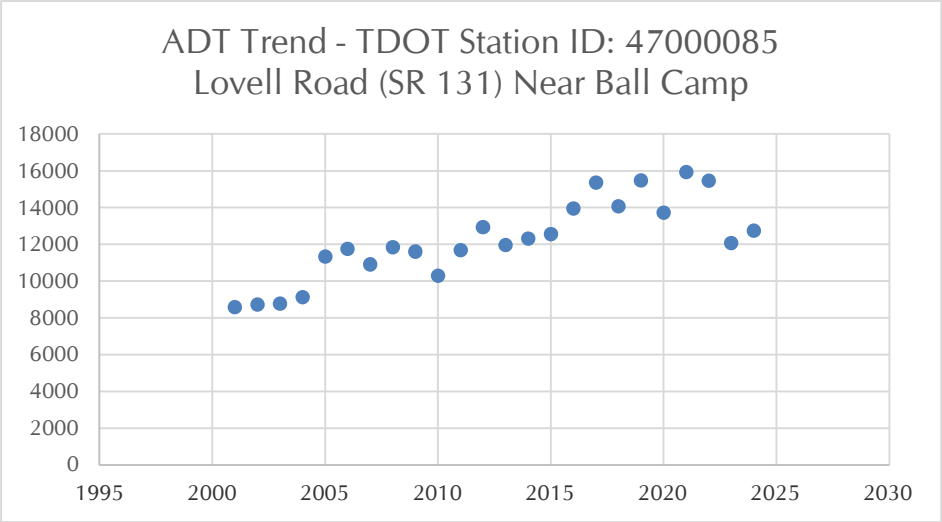
**Project: 792.001 Lovell Road Townhomes**
**Intersection: Lovell Road (SR 131) at Hibbert Road**
**Date Conducted: Wednesday April 16, 2025**

| | | |
|---|---|---|
| AM Peak Hour | 7:15 AM - 8:15 AM | 1507 |
| PM Peak Hour | 4:30 PM - 5:30 PM | 1733 |

| | Lovell Road (SR 131) Southbound | | | | Westbound | | | | Lovell Road (SR 131) Northbound | | | | Hibbert Road Eastbound | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start | Left | Thru | Right | Total | Left | Thru | Right | Total | Left | Thru | Right | Total | Left | Thru | Right | Total | Int. Total |
| Peak Hour Analysis from 7:00 AM to 9:00 AM | | | | | | | | | | | | | | | | | |
| AM Peak Hour begins at 7:15 AM | | | | | | | | | | | | | | | | | |
| 7:15 AM | 0 | 240 | 0 | 240 | 0 | 0 | 0 | 0 | 1 | 141 | 0 | 142 | **4** | 0 | 3 | 7 | 389 |
| 7:30 AM | 0 | 239 | 0 | 239 | 0 | 0 | 0 | 0 | 0 | 128 | 0 | 128 | 1 | 0 | **4** | 5 | 372 |
| 7:45 AM | 0 | **272** | 0 | 272 | 0 | 0 | 0 | 0 | **2** | 127 | 0 | 129 | 2 | 0 | 3 | 5 | **406** |
| 8:00 AM | 0 | 175 | 0 | 175 | 0 | 0 | 0 | 0 | 0 | **165** | 0 | 165 | 0 | 0 | 0 | 0 | 340 |
| Total Volume | 0 | 926 | 0 | 926 | 0 | 0 | 0 | 0 | 3 | 561 | 0 | 564 | 7 | 0 | 10 | 17 | 1507 |
| Future (1.5% over 3 yrs) | 0 | 968 | 0 | | 0 | 0 | 0 | | 3 | 587 | 0 | | 7 | 0 | 10 | | 1576 |
| PHF | - | 0.85 | - | | - | - | - | | 0.38 | 0.85 | - | | 0.44 | - | 0.63 | | 0.93 |
| Peak Hour Analysis from 2:00 PM to 6:00 PM | | | | | | | | | | | | | | | | | |
| PM Peak Hour begins at 4:30 PM | | | | | | | | | | | | | | | | | |
| 4:30 PM | 0 | 162 | 2 | 164 | 0 | 0 | 0 | 0 | 1 | 248 | 0 | 249 | **1** | 0 | **3** | 4 | 417 |
| 4:45 PM | 0 | **205** | 2 | 207 | 0 | 0 | 0 | 0 | 2 | 247 | 0 | 249 | 1 | 0 | 1 | 2 | **458** |
| 5:00 PM | 0 | 176 | 2 | 178 | 0 | 0 | 0 | 0 | **3** | **263** | 0 | 266 | 0 | 0 | 1 | 1 | 445 |
| 5:15 PM | 0 | 165 | **4** | 169 | 0 | 0 | 0 | 0 | 2 | 240 | 0 | 242 | 1 | 0 | 1 | 2 | 413 |
| Total Volume | 0 | 708 | 10 | 718 | 0 | 0 | 0 | 0 | 8 | 998 | 0 | 1006 | 3 | 0 | 6 | 9 | 1733 |
| Future (1.5% over 3 yrs) | 0 | 740 | 10 | | 0 | 0 | 0 | | 8 | 1044 | 0 | | 3 | 0 | 6 | | 1812 |
| PHF | - | 0.86 | 0.63 | | - | - | - | | 0.67 | 0.95 | - | | 0.75 | - | 0.50 | | 0.95 |

# Attachment 3
# ADT Trends

| Year | Adjusted Average Daily Traffic |
|---|---|
| 2001 | 8590 |
| 2002 | 8733 |
| 2003 | 8778 |
| 2004 | 9137 |
| 2005 | 11341 |
| 2006 | 11748 |
| 2007 | 10914 |
| 2008 | 11854 |
| 2009 | 11615 |
| 2010 | 10294 |
| 2011 | 11685 |
| 2012 | 12944 |
| 2013 | 11970 |
| 2014 | 12325 |
| 2015 | 12565 |
| 2016 | 13964 |
| 2017 | 15371 |
| 2018 | 14076 |
| 2019 | 15485 |
| 2020 | 13731 |
| 2021 | 15927 |
| 2022 | 15462 |
| 2023 | 12086 |
| 2024 | 12739 |




Most Recent Trend Line Growth

| Year | ADT |
|---|---|
| 2004 | 9137 |
| 2024 | 12739 |

**Annual Percent Growth** **1.41%**

# Attachment 4
# Trip Generation

**Project: Lovell Road Townhomes**
**Date Conducted: 4/21/2025**

**Single-Family Attached Housing (LUC 215)**
**79 Lots**

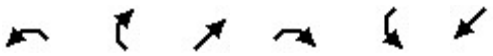
**Average Daily Traffic**
T = 7.62*(X) - 50.48
T = 7.62*(79) - 50.48
T = 552

**Peak Hour of Adjacent Street Traffic**
**One Hour Between 7 and 9 a.m.**
T = 0.52*(X) - 5.70
T = 0.52*(79) - 5.70
T = 35

**Peak Hour of Adjacent Street Traffic**
**One Hour Between 4 and 6 p.m.**
T = 0.60*(X) - 3.93
T = 0.60*(79) - 3.93
T = 44

| Time Period | Total Trips | Percent | | Number | |
|---|---|---|---|---|---|
| | | Enter | Exit | Enter | Exit |
| Weekday (24 hours) | 552 | 50% | 50% | 276 | 276 |
| AM Peak Hour | 35 | 31% | 69% | 11 | 24 |
| PM Peak Hour | 44 | 57% | 43% | 25 | 19 |

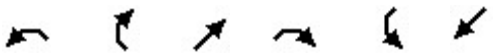
# Attachment 5
# Intersection Worksheets – Full Buildout AM/PM Peaks



| Movement | NWL | NWR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 14 | 10 | 590 | 7 | 4 | 978 |
| Future Volume (Veh/h) | 14 | 10 | 590 | 7 | 4 | 978 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 | 0.93 |
| Hourly flow rate (vph) | 15 | 11 | 634 | 8 | 4 | 1052 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1698 | 638 | | | 642 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1698 | 638 | | | 642 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 85 | 98 | | | 100 | |
| cM capacity (veh/h) | 101 | 477 | | | 943 | |

| Direction, Lane # | NW 1 | NE 1 | SW 1 |
|---|---|---|---|
| Volume Total | 26 | 642 | 1056 |
| Volume Left | 15 | 0 | 4 |
| Volume Right | 11 | 8 | 0 |
| cSH | 152 | 1700 | 943 |
| Volume to Capacity | 0.17 | 0.38 | 0.00 |
| Queue Length 95th (ft) | 15 | 0 | 0 |
| Control Delay (s) | 33.6 | 0.0 | 0.1 |
| Lane LOS | D | | A |
| Approach Delay (s) | 33.6 | 0.0 | 0.1 |
| Approach LOS | D | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.6 | | |
| Intersection Capacity Utilization | 64.7% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

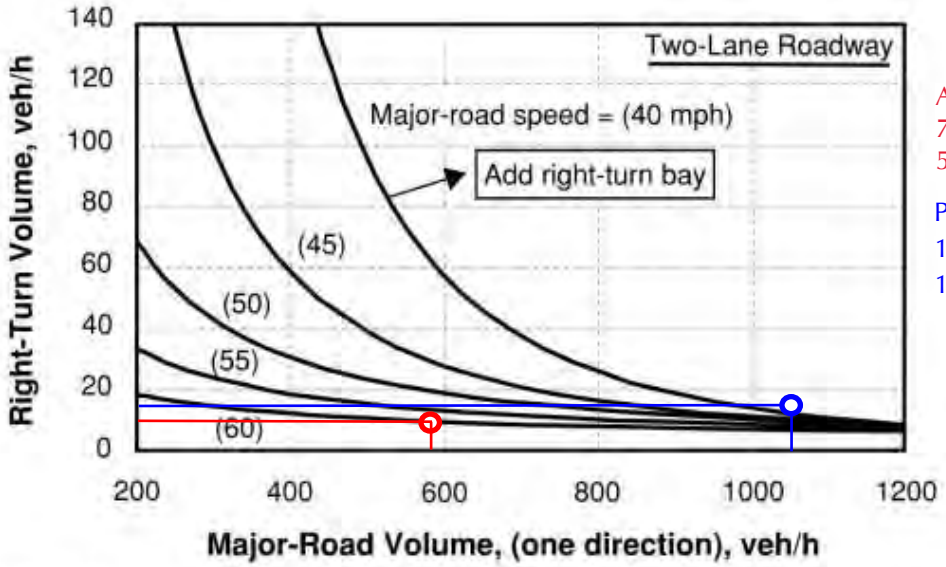


| Movement | NWL | NWR | NET | NER | SWL | SWT |
|---|---|---|---|---|---|---|
| Lane Configurations | | | | | | |
| Traffic Volume (veh/h) | 11 | 8 | 1052 | 15 | 10 | 746 |
| Future Volume (Veh/h) | 11 | 8 | 1052 | 15 | 10 | 746 |
| Sign Control | Stop | | Free | | | Free |
| Grade | 0% | | 0% | | | 0% |
| Peak Hour Factor | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 | 0.95 |
| Hourly flow rate (vph) | 12 | 8 | 1107 | 16 | 11 | 785 |
| Pedestrians | | | | | | |
| Lane Width (ft) | | | | | | |
| Walking Speed (ft/s) | | | | | | |
| Percent Blockage | | | | | | |
| Right turn flare (veh) | | | | | | |
| Median type | | | None | | | None |
| Median storage veh) | | | | | | |
| Upstream signal (ft) | | | | | | |
| pX, platoon unblocked | | | | | | |
| vC, conflicting volume | 1922 | 1115 | | | 1123 | |
| vC1, stage 1 conf vol | | | | | | |
| vC2, stage 2 conf vol | | | | | | |
| vCu, unblocked vol | 1922 | 1115 | | | 1123 | |
| tC, single (s) | 6.4 | 6.2 | | | 4.1 | |
| tC, 2 stage (s) | | | | | | |
| tF (s) | 3.5 | 3.3 | | | 2.2 | |
| p0 queue free % | 83 | 97 | | | 98 | |
| cM capacity (veh/h) | 72 | 253 | | | 622 | |

| Direction, Lane # | NW 1 | NE 1 | SW 1 |
|---|---|---|---|
| Volume Total | 20 | 1123 | 796 |
| Volume Left | 12 | 0 | 11 |
| Volume Right | 8 | 16 | 0 |
| cSH | 101 | 1700 | 622 |
| Volume to Capacity | 0.20 | 0.66 | 0.02 |
| Queue Length 95th (ft) | 17 | 0 | 1 |
| Control Delay (s) | 49.1 | 0.0 | 0.5 |
| Lane LOS | E | | A |
| Approach Delay (s) | 49.1 | 0.0 | 0.5 |
| Approach LOS | E | | |

| Intersection Summary | | | |
|---|---|---|---|
| Average Delay | 0.7 | | |
| Intersection Capacity Utilization | 66.3% | ICU Level of Service | C |
| Analysis Period (min) | 15 | | |

# Attachment 6
# Turn Lane Warrants




AM Peak
7 VPH Right Turn
590 VPH Major-Road

PM Peak
15 VPH Right Turn
1052 VPH Major-Road

Figure 3-18: Right-Turn Lane Warrant along Two-Lane Roadway (Unsignalized Intersection with Two-Way Stop-Control)[24]

AM Peak
4 vph Left Turn
784 veh/h/ln Major-Road

PM Peak
10 vph Left Turn
899 veh/h/ln Major-Road

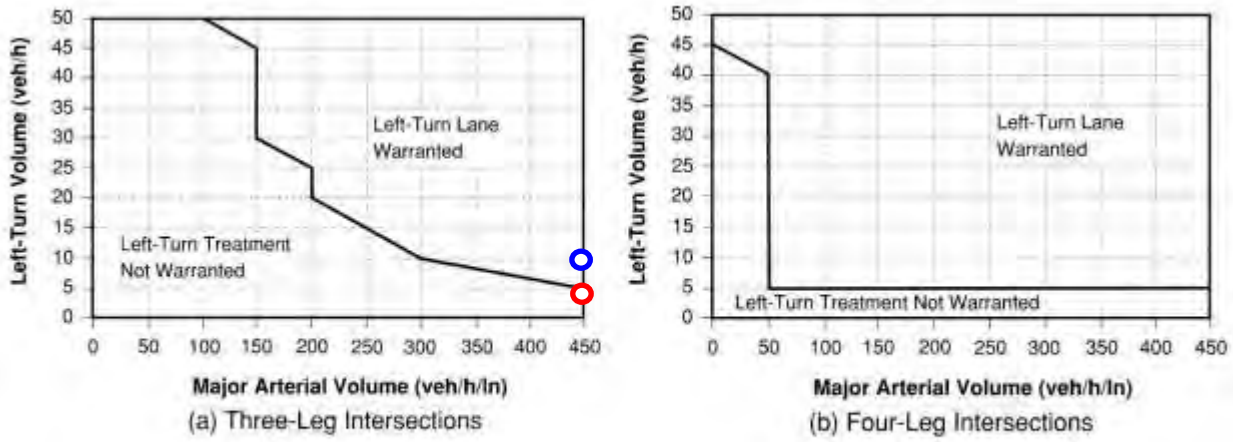



Figure 3-15: Left-Turn Lane Warrant for Urban and Suburban Arterials (Unsignalized)[20, 21]

# Attachment 7
# Sight Distance

**Lovell Road (SR 131) at Roadway – Looking Right (Northbound)**

**Lovell Road (SR 131) at Roadway – Looking Left (Southbound)**