

APPENDIX H:
TRANSPORTATION DATA



Transportation Impact Study

Hembree Lane Oaks Subdivision

Town of Windsor, California

September 13, 2022



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EXECUTIVE SUMMARY

This report summarizes the results of the Transportation Impact Study (TIS) conducted for the proposed residential development located on the south side of Cornell Street in the Town of Windsor. The proposed project would construct 24 single family homes on a site currently unoccupied. Access to the project site would be provided by driveways on Cornell Street, and on extensions of Country Meadow Way to Cornell Street and Meadowlark Way to a hammerhead turnaround. Extensions of Cornell Street, Country Meadow Way and Meadowlark Way would be completed by the completion of the residential development.

The following report summarizes the vehicle miles traveled (VMT) and traffic impacts on the surrounding transportation system by the proposed project. The analysis of VMT impacts by the proposed project is based on recent changes to statewide CEQA guidelines, and relevant advice contained in the Town of Windsor's draft Vehicle Miles Traveled Policy, dated February 2022. To evaluate the effects on the transportation infrastructure due to the addition of traffic from the proposed project, an LOS analysis was conducted to determine consistency with Town of Windsor and SCTA guidelines and standards.

Vehicle Miles Traveled

The analysis of VMT impacts meets the requirements stipulated by recent changes to statewide CEQA guidelines, and incorporates information contained in the Town of Windsor's Draft Vehicle Miles Traveled Policy, dated February 2022.

The Sonoma County Transportation Authority travel demand model (SCTA Model) was obtained and the project's Travel Analysis Zone (TAZ) was identified as TAZ #866. Per the Sonoma County Transportation Authority (SCTA) VMT Screening Map, dated February 2022, the project site is located in a low-VMT residential zone. Thus, the project is screened out from VMT analysis due to its location and small size (24 units). The proposed project is expected to have a **less-than-significant** VMT impact.

Project Trip Generation

TJKM developed estimated project trip generation for the proposed project based on published trip generation rates from the ITE publication *Trip Generation (11th Edition)*. TJKM used published trip rates for the ITE land use Single Family Detached Housing (ITE Code 210) for this project and evaluated a project size of 24 homes. The proposed project is expected to generate 226 total daily trips, including 17 a.m. peak hour trips (four in, 13 out) and 23 p.m. peak hour trips (14 in, nine out).

Existing Conditions

Under this scenario, both study intersections operate within applicable jurisdictional standards during both peak hours.

Existing plus Project Conditions

Under this scenario, both study intersections operate within applicable jurisdictional standards during both peak hours. The project **would be consistent** with level of service standards set forth under the Town of Windsor 2040 General Plan.

Site Access and On-Site Circulation

TJKM concluded that the site plan will operate acceptably and provide adequate connections to existing streets and circulation in the area. The project proposes sidewalks will on both sides Cornell Street along the project frontage. The proposed sidewalks facilitate pedestrian traffic between Hembree Lane and Robbins Park. Additionally, the project proposes a pedestrian pathway to facilitate access between single family homes on Meadowlark Way and Cornell Street Site access and circulation for vehicles, pedestrians, and bicycles are considered **adequate**.

Due to conflicts with the existing bus stop at Hembree Lane and Cornell Street, Sonoma County Transit has requested the project provide a no-parking zone, an eight by six feet concrete pad, and a bus shelter with electricity access for lighting. As this is a condition of project approval, TJKM recommends the project provide the transit amenities detailed above.

Parking

The proposed project would construct garages and private driveways for each single-family residence along existing streets and future extensions of Cornell Street, Country Meadow Way and Meadowlark Way. The new streets would also accommodate on-street parking. The proposed parking supply would therefore be more than **adequate** under Town of Windsor and ITE Parking Generation Manual requirements and would not produce any parking impacts on surrounding parcels or roadways.

1.0 INTRODUCTION

This report summarizes the results of the Transportation Impact Study (TIS) conducted for the proposed residential development located at the southeast quadrant of the Hembree Lane and Cornell Street intersection in the Town of Windsor, California. The proposed project would construct 24 single family homes on a currently unoccupied site. Single family homes exist adjacent to the project site. Access to the project site would be provided by driveways on Cornell Street, and on extensions of Country Meadow Lane and Meadow Park Way.

This chapter discusses the TIS purpose, project study area, and analysis scenarios. **Figure 1** shows the study area and project site location. **Figure 2** shows the project site plan, dated June 04, 2021.

1.1 STUDY PURPOSE

The purpose of this report is to provide summaries of changes in vehicle miles traveled (VMT) and traffic impacts on the surrounding transportation system with the proposed project. The VMT analysis is based on the methodology adopted by the Sonoma County Transportation Authority (SCTA). To evaluate the effects on the transportation infrastructure due to the addition of traffic from the proposed project, an LOS analysis was conducted to determine consistency with the Town of Windsor General Plan and Complete Street Design Guidelines and SCTA guidelines and standards.

1.2 STUDY INTERSECTIONS

TJKM evaluated traffic conditions at two study intersections during the a.m. and p.m. peak hours for a typical weekday. The study intersections were selected based on TJKM's working knowledge of the area with input and approval from the Town of Windsor. Peak hour vehicle, pedestrian and bicycle turning movement counts (TMCs) were collected on Tuesday, May 17, 2022 for a.m. (7:00-9:00 a.m.) and p.m. (4:00-6:00 p.m.) peak periods. The study intersections and associated traffic controls are as follows:

1. Cornell Street & Hembree Lane (Two-Way Stop)
2. Old Redwood Highway & Billington Lane (One-Way Stop)

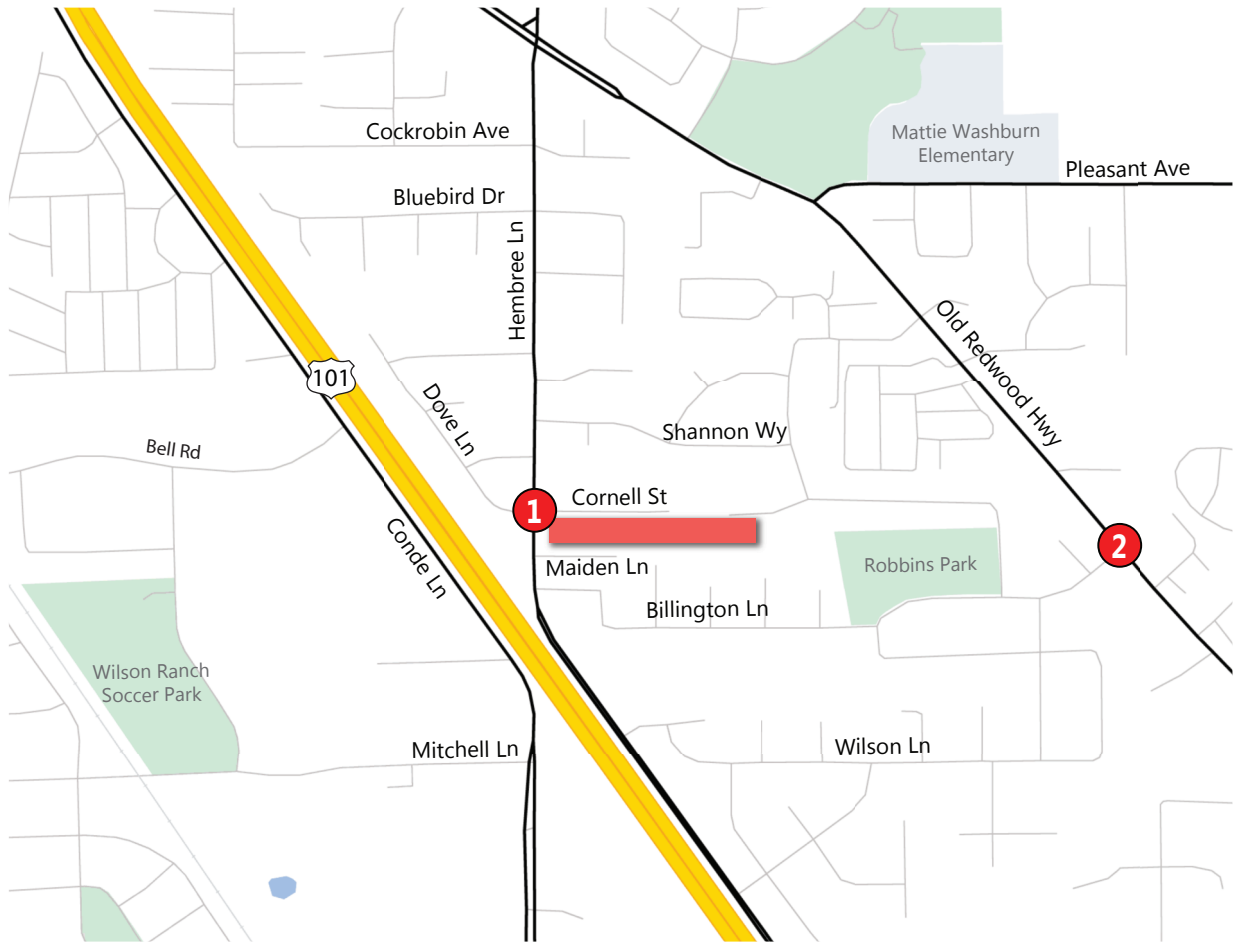
Appendix A contains the collected traffic count data at the study intersections.

1.3 STUDY SCENARIOS

The roadway operations analysis addresses the following six traffic scenarios:

- **Existing Conditions** – This scenario evaluates the study intersections based on adjusted existing traffic volumes, lane geometry and traffic controls.
- **Existing plus Project Conditions** – This scenario is identical to Existing Conditions, but with the addition of traffic from the proposed project.

Figure 1: Vicinity Map

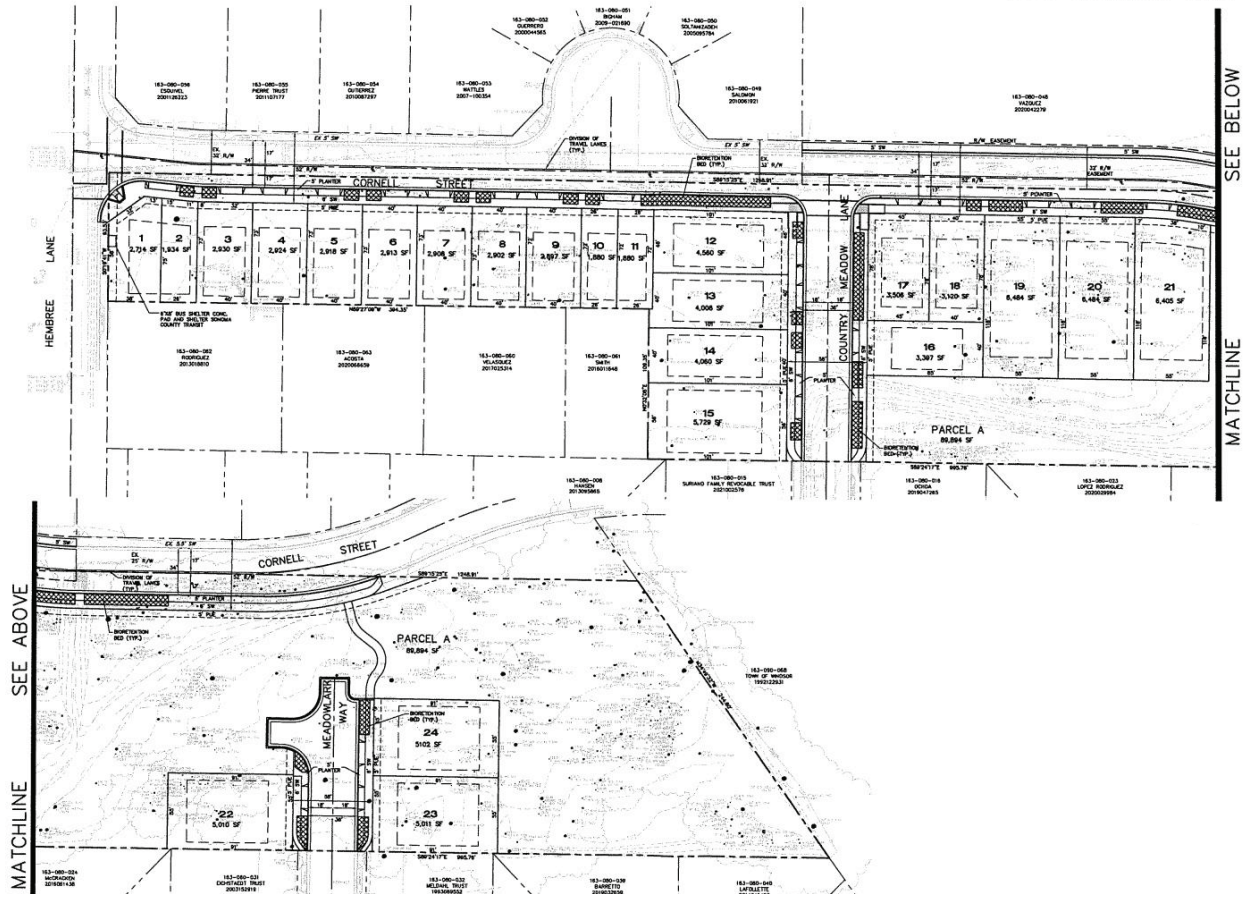


LEGEND

- Project Site
- ⊗ Study Intersection



Figure 2: Site Plan



2.0 STUDY METHODOLOGY

Traffic impacts related to the proposed project were evaluated for both compliance with applicable regulatory documents and environmental significance as defined in the California Environmental Quality Act (CEQA). The CEQA analysis was conducted in accordance with the *Technical Advisory on Evaluating Transportation Impacts in CEQA* published by the Governor’s Office of Planning and Research (OPR) and the Town of Windsor Draft Vehicle Miles Traveled (VMT) Policy Guidelines. As of July 1, 2020, intersection level of service (LOS) can no longer be used to determine significant CEQA impacts. However, an LOS analysis was conducted to determine consistency with the Town of Windsor General Plan.

2.1 VEHICLE MILES TRAVELED

The VMT analysis options described in the Town of Windsor Draft Vehicle Miles Traveled (VMT) Policy Guidelines are primarily tailored towards single-use developments, such as residential projects. Below are recommendations, methodology and criteria for specific land uses:

- For residential projects, VMT impacts are considered potentially significant if a residential project is expected to generate VMT per Capita (i.e., VMT per resident) at a rate that exceeds 85 percent of a regional average. For office projects, VMT impacts are considered potentially significant if an office project is expected to generate VMT per Employee at a rate that exceeds 85 percent of a regional average.
- For the Town of Windsor, the Sonoma County average VMT per capita is the regional average used; hence the VMT Significance Threshold is 14.05. **Table 1** shows the VMT Significance thresholds from the Town of Windsor guidelines.

Table 1: VMT Thresholds for the Town of Windsor

Numeric Performance-Based VMT Significance Thresholds – Fall 2021			
Project Type	VMT Performance Metric	Countywide Average	Town of Windsor Significance Threshold
Residential	Home-Based VMT per Capita	16.53	14.05
Office/Employment	Home-Based Commute VMT per Employee	12.53	10.65
Industrial	Home-Based Commute VMT per Employee	12.53	12.53

Note: Data is reflective of SCTA travel demand model as of Fall 2021

Screening Criteria and Methodology

The Sonoma County Transportation Authority travel demand model (SCTA Model) was obtained and the project’s Travel Analysis Zone (TAZ) was identified as TAZ #866. This study evaluates project-related VMT as outlined in the Town of Windsor’s Draft Vehicle Miles Traveled policy, dated February 2022.

The Governor’s Office of Planning and Research (OPR) *Technical Advisory* (December 2018) provides guidance to analysts and local jurisdictions for implementing VMT as a metric for determining the transportation impact for land use projects. The OPR guidelines state that for analysis purposes, “VMT”

refers to automobile VMT, specifically passenger vehicles and light trucks. Heavy truck traffic is typically excluded.

2.2 LEVEL OF SERVICE ANALYSIS METHODOLOGY

Although Level of Service (LOS) is no longer relevant to CEQA, LOS can be used to determine conformity with an adopted general plan or congestion management program. LOS is a qualitative measure that describes operational conditions as they relate to the traffic stream and perceptions by motorists and passengers. The LOS generally describes these conditions in terms of such factors as speed and travel time, delays, freedom to maneuver, traffic interruptions, comfort, convenience, and safety. The operational LOS are given letter designations from A to F, with A representing the best operating conditions (free-flow) and F the worst (severely congested flow with high delays). Intersections generally are the capacity-controlling locations with respect to traffic operations on arterial and collector streets in urban areas.

Unsignalized Intersections

The study intersections under stop control (unsignalized) were analyzed using the 6th Edition HCM Operations Methodology for unsignalized intersections described in Chapter 20 (HCM 6th Ed.). LOS ratings for stop-sign controlled intersections are based on the average control delay expressed in seconds per vehicle. At the side street, one-way or two-way stop controlled intersections, the control delay is calculated for each movement, not for the intersection as a whole. For approaches composed of a single lane, the control delay is computed as the average of all movements in that lane. The weighted average delay for the entire intersections is presented for all-way stop controlled intersections. The average control delay for unsignalized intersections was calculated using Synchro 10 analysis software and was correlated to a LOS designation as shown in **Table 2**.

Table 2: Unsignalized Intersection Delay and LOS Definitions

Level of Service	Description	Average Control Delay
A	Little or no traffic delay	≤ 10
B	Short Traffic delays	> 10 – 15
C	Average traffic delays	> 15 – 25
D	Long traffic delays	> 25 – 35
E	Very long traffic delays	> 35 – 50
F	Extreme traffic delays	> 50

Source: Highway Capacity Manual 6th Ed., Chapter 20 (Transportation Research Board, 2010)
Average Control Delay per Vehicle in seconds

2.3 LEVEL OF SERVICE STANDARDS

Although level of service is no longer used for identifying impacts under CEQA, level of service analysis is still used for determining consistency with adopted agency plans and standards. Where standards refer to significant environmental impacts, this analysis instead identifies these as significant inconsistencies with adopted plans.

Town of Windsor Standards

As per the Town of Windsor 2040 General Plan, adopted April 2018, level of service (LOS) standards of LOS D or better are required for both signalized and all-way stop-controlled intersections, during the weekday morning and evening peak periods. At side-street stop-controlled intersections, the Town requires that LOS is determined for both controlled movements and the overall intersection. The General Plan allows LOS E or F at controlled movements if:

- LOS C or better is projected overall;
- Projected volumes are less than or equal to 30 vehicles per hour at single-lane approaches, or less than or equal to 30 vehicles per hour per lane at multi-lane approaches;

The General Plan does not require level of service standards at minor intersections consisting of local streets only.

Impacts are considered insignificant if:

- The intersection operates at LOS D or better with the addition of project-generated traffic and delay increases by five seconds or less;
- The intersection operates at LOS E or F without the addition of project-generated traffic.

In this study, both study intersections are side-street stop-controlled, thus LOS is determined for both controlled movements and the overall intersection. Intersections that do not comply with the LOS standards above would be considered inconsistent with the Town of Windsor General Plan.

3.0 EXISTING CONDITIONS

This section describes existing conditions in the immediate project site vicinity, including roadway facilities, bicycle and pedestrian facilities, and available transit service. In addition, existing traffic volumes and operations are presented for the study intersections, including the results of LOS calculations.

3.1 EXISTING SETTING AND ROADWAY SYSTEM

Relevant roadways in the project vicinity are discussed below and shown in **Figure 3**:

U.S. 101 is the largest regional freeway in the area, providing north-south access throughout Sonoma County and to the adjacent counties of Marin (south) and Mendocino (north). To the north of Old Redwood Highway, US 101 provides two travel lanes in each direction, and to the south of Old Redwood Highway it provides three lanes in each direction (one of which is a high occupancy vehicle (HOV) lane). Access points in the Town of Windsor are provided via interchanges at Arata Lane to the north, Old Redwood Highway to the north, and Shiloh Road to the south of the project site. The posted speed limit is 65 miles per hour (mph).

Old Redwood Highway is a two- to four-lane, north-south highway, which extends between Healdsburg in the north, and Santa Rosa to the south. Old Redwood Highway generally runs parallel to US 101. Class II bike lanes and sidewalks exist on both sides of the highway, however, significant gaps are observed. Within the Town of Windsor, the highway mainly provides access to residential streets and retail land uses. The posted speed limit ranges between 30 and 40 mph.

Hembree Lane is a two-lane, north-south, crosstown roadway which extends between Arata Lane in the north, to Shiloh Road in the south. The roadway provides Class II bike lanes in both directions for the entire length of the roadway. Continuous sidewalks exist on the east side of the roadway for the entire length of the segment, while significant gaps exist on the west side. Hembree Lane mainly provides access to residential neighborhoods, and one retail center. The posted speed limit ranges between 35 and 40 mph.

Cornell Street is a two-lane, undivided local roadway that provides direct access to the project site. Cornell Street has one vehicle lane in each direction and has unsignalized intersections. The roadway provides access to single family homes and a neighborhood park. Currently, an approximately 340 foot gap exists on Cornell Street, between Hembree Lane and Shira Street. The portion of the missing roadway would need to be constructed, and the portion of Cornell Street west of Robbins Park needs to be widened to accommodate new traffic. On-street parking is currently permitted on the north side of the roadway, west of Robbins Park, and on both sides of the roadway, east of Shira Street. There is no posted speed limit, thus a speed limit of 25 mph is assumed for the project.

Billington Lane is a two-lane, east-west, undivided local roadway, which extends between Hembree Lane in the west and Old Redwood Highway to the east. Billington Lane has one vehicle lane in each direction, and includes unsignalized intersections. Continuous sidewalks exist on the north side of the roadway for the entire length of the segment. Sidewalks exist on the south side of the road, but multiple gaps are

observed. One mid-block pedestrian crossing is provided along Billington Lane. The roadway provides access to single family homes and a neighborhood park and has a posted speed limit of 25 mph.

Shiloh Road is a two- to four-lane crosstown street, which extends between Windsor Road in the west and Faught Road to the east. Class II bike lanes exist on both sides of the roadway, between Windsor Road and Old Redwood Highway. Shiloh Road provides sidewalks on both sides of the roadway, however significant gaps exist. Adjacent land uses include single- and multi-family residential, commercial, retail, recreation, and cemetery uses, and open space. The posted speed limit ranges between 40 and 45 mph.

Maiden Lane is a two-lane residential street, which extends for approximately 340 feet east of Hembree Lane. Maiden Lane provides access to single family homes on the north side of the roadway. The roadway is located south of the Hembree Lane and Cornell Street intersection. There are no pedestrian or bicycle facilities along Maiden Lane. Maiden Lane does not have a posted speed limit.

3.2 EXISTING PEDESTRIAN FACILITIES

Walkability is defined as the ability to travel easily and safely between various origins and destinations without having to rely on automobiles or other motorized travel. The ideal “walkable” community includes wide sidewalks, a mix of land uses such as residential, employment, and shopping opportunities, a limited number of conflict points with vehicle traffic, and easy access to transit facilities and services. Pedestrian facilities consist of crosswalks, sidewalks, pedestrian signals, and off-street paths, which provide safe and convenient routes for pedestrians to access the destinations such as institutions, businesses, public transportation, and recreation facilities.

In the project study area, sidewalks are provided on both sides of Hembree Lane, north of Billington Lane, and on the east side of Hembree Lane, south of Billington Lane. Cornell Street provides sidewalks on the north side only, east of Hembree Lane, and on both sides west of Billington Lane. A continuous sidewalk exists on the north side of Billington Lane, while significant gaps are observed on the south side. Old Redwood Highway provides sidewalks on both sides, however significant gaps are observed. The study intersection of Hembree Lane and Cornell Street provides a ladder style crosswalk across the south leg of Hembree Lane and curb ramps at all four corners. The study intersection of Old Redwood Highway and Billington Lane does not provide marked crosswalks, however, curb ramps exist at the northwest and southwest corners of the intersection. Billington Lane also provides a mid-block crosswalk, located east of the project site.

As per the site plan (**Figure 2**), the project proposes to provide a continuous sidewalk along the south side of Cornell Street, including the portion to be extended to the east. Additionally, the project will provide sidewalks on both sides of the extended portions of Country Meadow Lane and Meadowlark Way, which will conform to the existing sidewalks on both roadways.

The Town of Windsor Class I Trails Study, adopted November 2018, proposes the Robbins Park Connector trail, which would connect Hembree Lane with Robbins Park. Hembree Lane is located to the west of the project site and Robbins Park is located to the east. The proposed trail runs through the project site, however, the project proposes to provide sidewalks with curb ramps on both sides of Cornell Street along

the project frontage. The proposed sidewalks fulfill the pedestrian connection between Hembree Lane and Robbins Park.

3.3 EXISTING BICYCLE FACILITIES

Bicycle paths, lanes and routes are typical examples of bicycle transportation facilities, which are defined by the Sonoma County Transportation Authority (SCTA) as being in one of the following three classes:

- Class I Bike Path – a completely separated right-of-way facility for the exclusive use of bicyclists and pedestrians with cross-flow of vehicular traffic minimized.
- Class II Bike Lane – a striped lane designated for one-way bike traffic on a street or highway.
- Class III Bike Route – a route designated by signs or pavement markings and shared between bicyclists, pedestrians and motorists.

Within the project vicinity, Class II bicycle lanes run along both sides of Hembree Lane and Old Redwood Highway. There are no bicycle facilities proposed as part of the project.

As described under Section 3.2 above, the Town of Windsor Class I Trails Study, adopted November 2018, proposes the Robbins Park Connector trail, which would facilitate bicycle traffic between Hembree Lane with Robbins Park. The SCTA Countywide Bicycle and Pedestrian Master Plan (2014) proposes a Class III bike route along Shannon Way, Cornell Street, and Billington Lane, connecting Hembree Lane to the proposed Jensen Trail, located on the east side of the Town. The proposed project conflicts with the proposed Robbins Park Connector Trail.

3.4 EXISTING TRANSIT FACILITIES

Sonoma County Transit (SCT) provides local transit service in Windsor via Route 66, the Windsor Shuttle. The Shuttle operates on weekdays between the hours of 7:15 am and 5:08 pm on weekdays and 9:35 am and 3:27 pm on Saturday. The route terminus is the Windsor Depot (Windsor Road and Windsor River Road) in the Town Green area. The route serves the Shiloh Center (Walmart) Raley's Shopping and north and South Windsor. The Windsor Shuttle is free for all riders under Sonoma County Transit's "Fare-Free" program. The Windsor Shuttle's "Fare-Free" program is subsidized by the Town of Windsor.

In addition to local service, Sonoma County Transit's Route 60 provides intercity service that connects Windsor with Healdsburg and Cloverdale to the north, and downtown Santa Rosa to the south. In downtown Santa Rosa (Third Street Transit Mall), transfers to other Sonoma County Transit Routes, local Santa Rosa City Bus services and regional services provided by Golden Gate Transit can be made. Route 60 operates on a daily schedule. Fares on Route 60 are zone-based and vary between \$1.50 & \$3.00 for adults, \$1.25 to \$2.75 youth and \$0.75 to \$1.50 for seniors. Sonoma County Paratransit provides paratransit services, in accordance with the Americans with Disabilities Act, during the same hours and days as Sonoma County Transit's fixed-route service. In Windsor, local and intercity paratransit services are provided.

The nearest bus stop is located at the southeast corner of the Hembree Lane and Cornell Street intersection, within the project site, and is served by SCT Route 66. Additionally a bus stop exists south of the Old Redwood Highway and Billington Lane intersection, approximately 0.7 miles east of the project

site, and is served by SCT Route 60. **Figure 3** illustrates the existing pedestrian, bicycle and transit facilities in the project study area. **Table 3** summarizes existing transit services in the project vicinity.

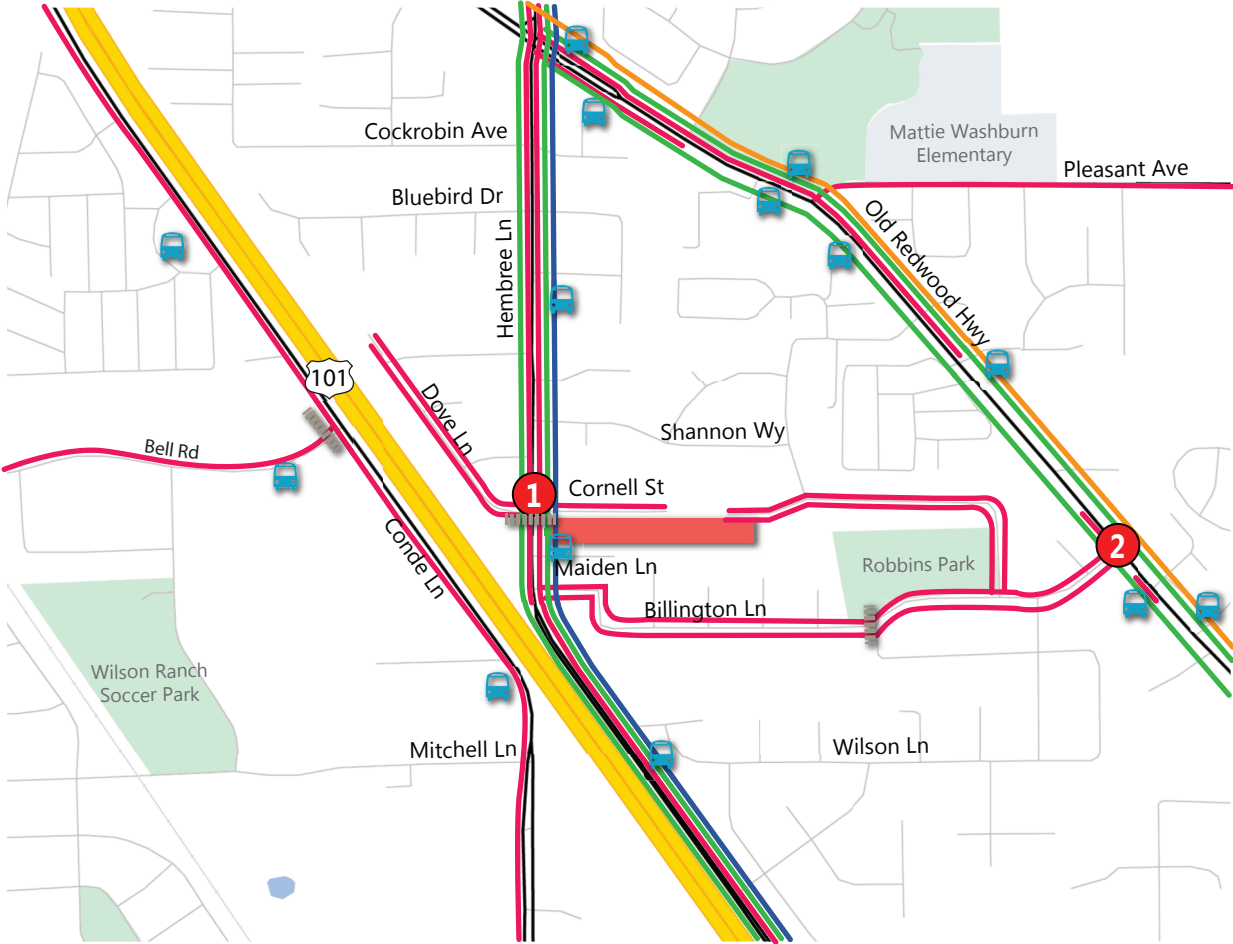
Table 3: Existing Transit Services

Route #	From	To	Weekdays		Weekend	
			Operating Hours	Headway (minutes)	Operating Hours	Headway (minutes)
60	Cloverdale City Hall/Plaza	Route 44/48	9:00 a.m.- 9:32 p.m.	60-120	6:45 a.m. - 9:38 p.m.	35-125
66	Windsor Depot	Shiloh Center	8:35 a.m. – 11:02 a.m.	55	7:15 a.m. – 5:08 p.m.	42-45

Source: Sonoma County Transit website (sctransit.com)

There are no future-planned transit improvements in the immediate project vicinity, however, the project conflicts with the current transit stop at the southeast quadrant of Hembree Lane and Cornell Street. The bus stop currently includes signage only.

Figure 3: Existing Pedestrian, Bicycle, and Transit Facilities



LEGEND

- Project Site
- X Study Intersection
- Sidewalk
- Marked Crosswalk
- Class II Bike Lane
- SCT Bus Route 66
- SCT Bus Route 60
- Bus Stop



3.5 INTERSECTION LEVEL OF SERVICE ANALYSIS – EXISTING CONDITIONS

This scenario evaluates the study intersections based on existing traffic volumes, and existing lane geometry and traffic controls. The peak hour factors calculated from the existing turning movement counts were used for the study intersections for the Existing Conditions analysis. **Figure 4** illustrates the existing lane geometries and traffic controls at the study intersections. **Figure 5** illustrates the Existing Conditions peak hour turning movement counts at the study intersections. The results of the LOS analysis using Synchro 11 software and the HCM 6th Edition methodology.

Table 4 summarizes the intersection operations under Existing Conditions. Under this scenario, both study intersections operate within applicable jurisdictional standards during both peak hours. **Appendix B** contains the detailed LOS calculation sheets for Existing Conditions.

Table 4: Intersection Level of Service Analysis – Existing Conditions

ID	Intersection	Control ¹	Peak Hour ²	Existing Conditions			
				Controlled Delay ³	Controlled LOS ⁴	Overall Delay ⁵	Overall LOS ⁶
1	Hembree Lane & Cornell Street	TWSC	AM	13.5	B	1.5	A
			PM	12.3	B	0.9	A
2	Old Redwood Highway & Billington Lane	One-Way Stop	AM	16.2	C	1.9	A
			PM	15.7	C	1.4	A

Notes:

¹TWSC – Two-way stop-controlled intersection

²AM – morning peak hour, PM – evening peak hour

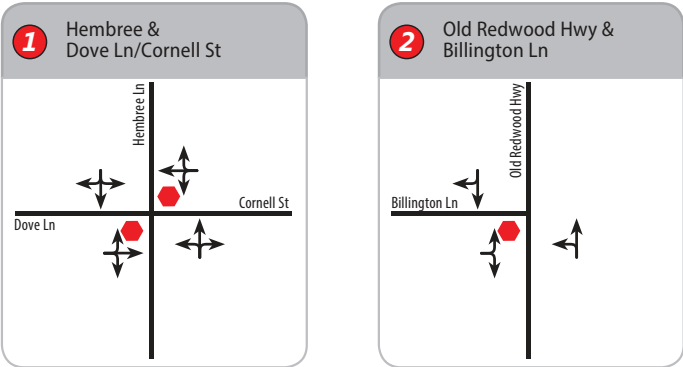
³Whole intersection weighted average control delay expressed in seconds per vehicle.

⁴LOS – Level of Service; LOS reported for whole intersection delay.

⁵Total control delay for the worst, controlled movement is presented for side-street stop-controlled intersections.

⁶LOS – Level of Service; LOS reported for worst, controlled movement.

Figure 4: Existing Conditions Lane Geometry and Traffic Controls



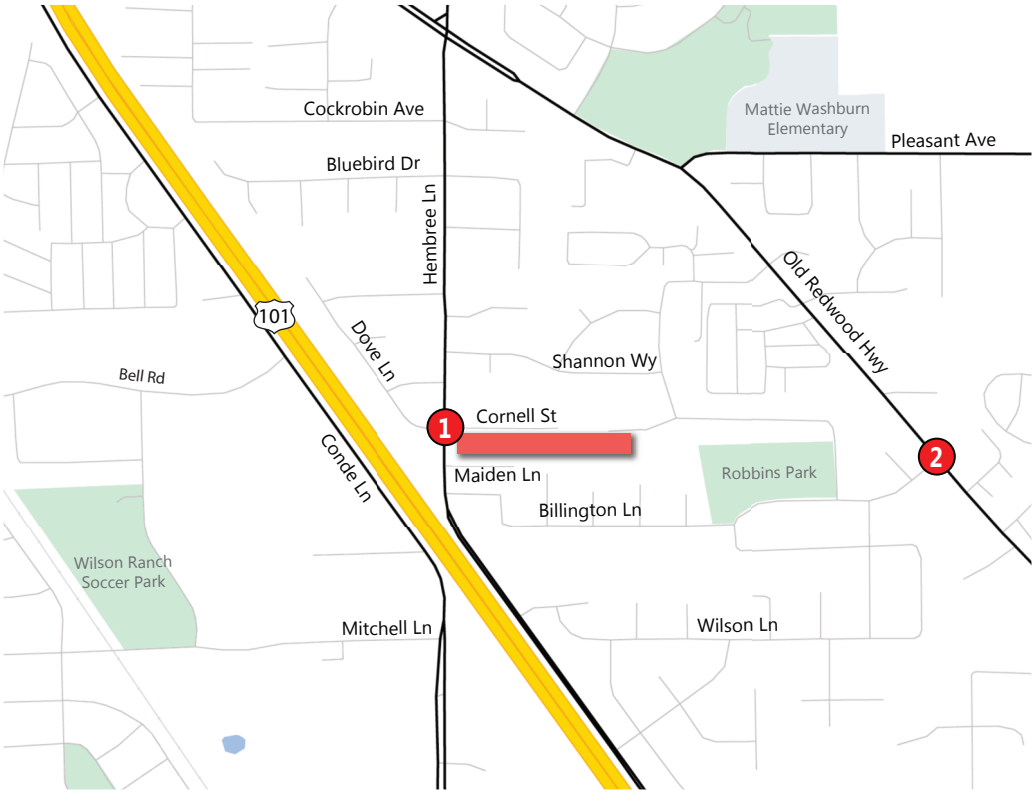
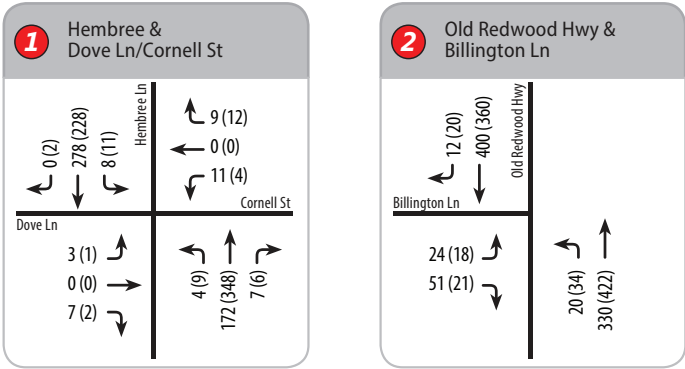
The map shows the study area with Hembree Lane highlighted in yellow. Key features include: Hembree Lane running north-south; Old Redwood Hwy running north-south to the east; Cornell St running east-west, crossing Hembree Lane; Billington Ln running east-west, crossing Old Redwood Hwy; and other streets including Cockrobin Ave, Bluebird Dr, Dove Ln, Shannon Wy, Maiden Ln, Billington Ln, Wilson Ln, Mitchell Ln, Bell Rd, and Conde Ln. Landmarks such as Wilson Ranch Soccer Park and Robbings Park are also shown. Two red circles with numbers 1 and 2 mark the study intersections at Cornell St and Billington Ln, respectively.

LEGEND

- Project Site
- Stop Sign
- Study Intersection



Figure 5: Existing Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ⊗ Study Intersection
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes



4.0 EXISTING PLUS PROJECT CONDITIONS

This analysis scenario presents the impacts of the proposed project at the study intersections and surrounding roadway system. This scenario is identical to Existing Conditions, but with the addition of traffic from the proposed project. The proposed project would construct 24 single family homes on a site that is currently undeveloped, located on the south side of Cornell Street.

4.1 PROJECT TRIP GENERATION

TJKM developed estimated project trip generation for the proposed project based on published trip generation rates from the ITE publication *Trip Generation (11th Edition)*. TJKM used published trip rates for the ITE land use Single Family Detached Housing (ITE Code 210) for this project. The proposed project is expected to generate 226 total daily trips, including 17 a.m. peak hour trips (4 in, 13 out) and 23 p.m. peak hour trips (14 in, 9 out).

Table 5 shows the trips expected to be generated by the proposed project.

Table 5: Project Trip Generation

Land Use	Size	Daily		AM Peak				PM Peak					
		Rate	Trips	Rate	In:Out	In	Out	Total	Rate	In:Out	In	Out	Total
Single-Family Detached Housing (210)	24 DU	9.43	226	0.70	26:74	4	13	17	0.94	63:37	14	9	23
Total			226			4	13	17			14	9	23

Notes:

1. *Trip Generation, 11th Edition*, Institute of Transportation Engineers (ITE), 2021
2. DU: dwelling unit

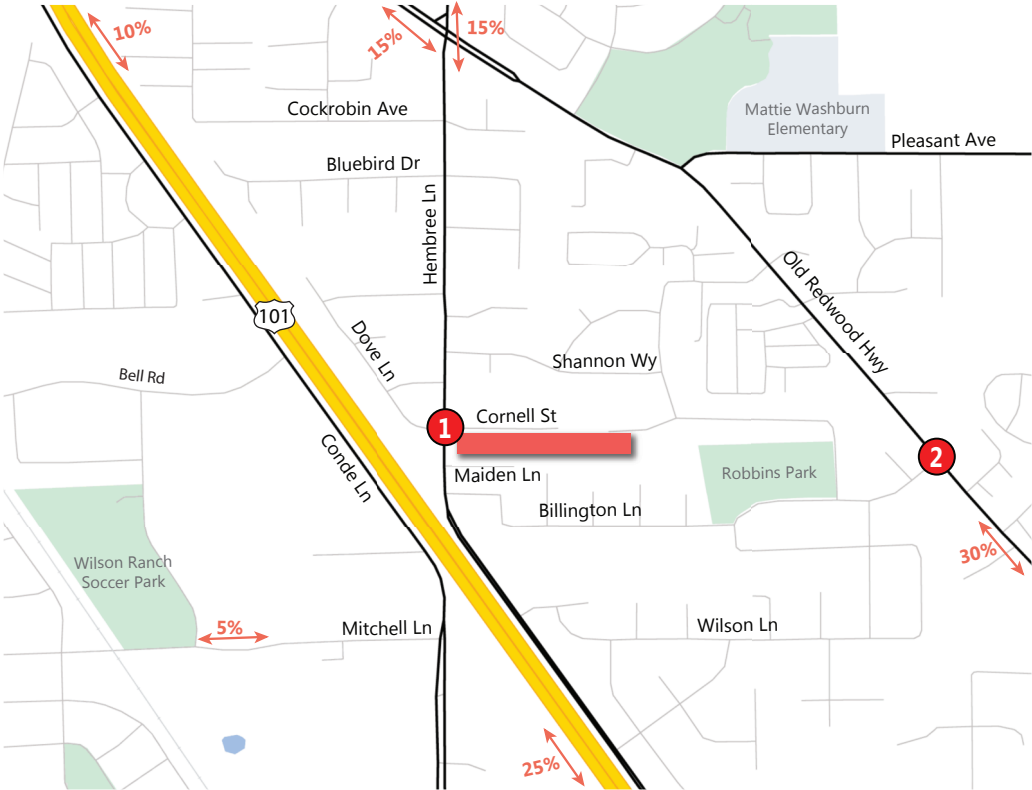
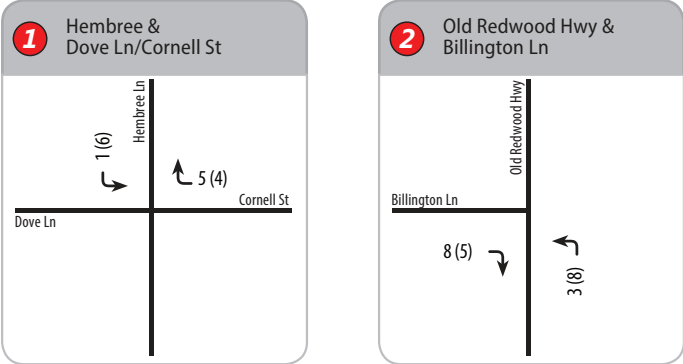
4.2 PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

Trip distribution is a process that determines in what proportion vehicles would be expected to travel between the project site and various destinations outside the project study area. Assignment determines the various routes that vehicles would take from the project site to each destination using the calculated trip distribution. Trip distribution assumptions for the proposed development project were developed based on the existing travel patterns and TJKM’s knowledge of the study area. The distribution assumptions for the proposed project are as follows:

- 40 percent to/from Hembree Lane to the south (15 percent via Windsor Road, 15 percent via Hembree lane, 10 percent via U.S. 101)
- 60 percent to/from Old Redwood Highway to the north (25 percent via U.S. 101, 20 percent via Old Redwood Highway, total 10 percent via Shiloh Road, 5 percent via Mitchell Lane)

Figure 6 illustrates the trip distribution and trip assignment at the study intersections. The project trips were then added to traffic volumes under Existing Conditions to generate Existing plus Project Conditions traffic volumes.

Figure 6: Trip Distribution and Assignment



LEGEND

- Project Site
- ⊗ Study Intersection
- ↔ XX% Trip Distribution
- XX AM Peak Hour Trips
- (XX) PM Peak Hour Trips



4.3 INTERSECTION LEVEL OF SERVICE ANALYSIS – EXISTING PLUS PROJECT CONDITIONS

This scenario evaluates the study intersections based on existing lane geometry and traffic controls, and existing traffic counts with the addition of project generated traffic. The peak hour factors calculated from the existing turning movement counts were used for the study intersections for the Existing plus Project Conditions analysis. **Figure 7** illustrates the Existing plus Project Conditions peak hour turning movement counts at the study intersections.

The intersection LOS analysis results for Existing plus Project Conditions are summarized in **Table 6**. The results for Existing Conditions are shown for comparison purposes. Under this scenario, both study intersections would continue to operate within applicable jurisdictional standards during both peak hours. **Appendix C** contains the detailed LOS calculation sheets for Existing Conditions.

Table 6: Intersection Level of Service Analysis – Existing plus Project Conditions

ID	Intersection	Control ¹	Peak Hour ²	Existing Conditions				Existing plus Project Conditions			
				Controlled Delay ³	Controlled LOS ⁴	Overall Delay ⁵	Overall LOS ⁶	Controlled Delay ³	Controlled LOS ⁴	Overall Delay ⁵	Overall LOS ⁶
1	Hembree Lane & Cornell Street	TWSC	AM	13.5	B	1.5	A	13.1	B	1.6	A
			PM	12.3	B	0.9	A	11.9	B	1.1	A
2	Old Redwood Highway & Billington Lane	One-Way Stop	AM	16.2	C	1.9	A	15.8	C	1.6	A
			PM	15.7	C	1.4	A	16.4	C	2.2	A

Notes:

¹TWSC – Two-way stop-controlled intersection

²AM – morning peak hour, PM – evening peak hour

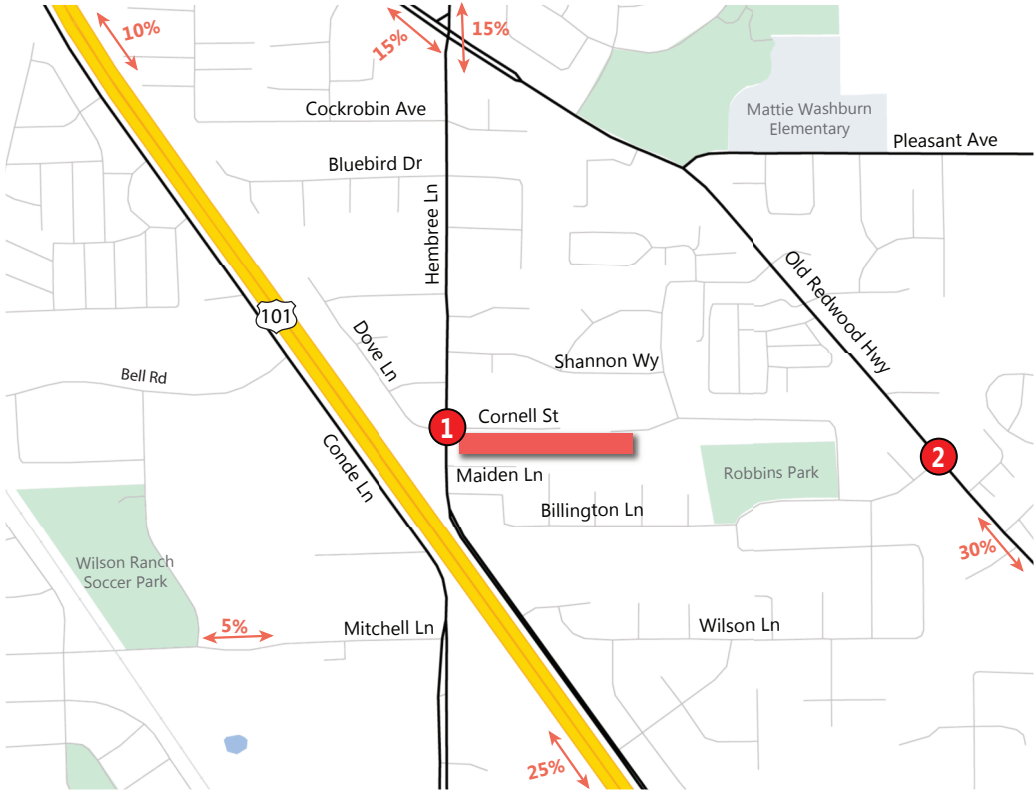
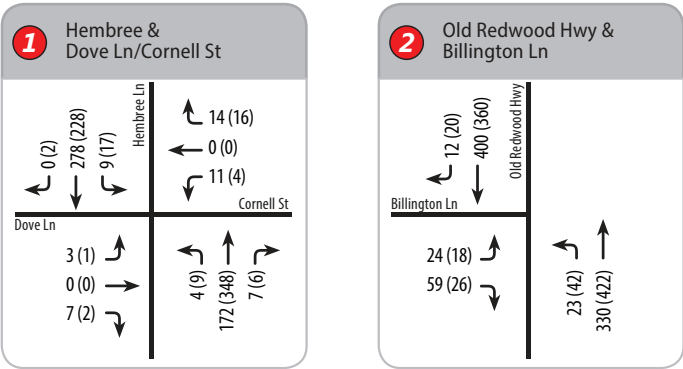
³Whole intersection weighted average control delay expressed in seconds per vehicle.

⁴LOS – Level of Service; LOS reported for whole intersection delay.

⁵Total control delay for the worst, controlled movement is presented for side-street stop-controlled intersections.

⁶LOS – Level of Service; LOS reported for worst, controlled movement.

Figure 7: Existing plus Project Conditions Peak Hour Traffic Volumes



LEGEND

- Project Site
- ⊗ Study Intersection
- ↔ XX% Trip Distribution
- XX AM Peak Hour Volumes
- (XX) PM Peak Hour Volumes



5.0 VEHICLE MILES TRAVELED ANALYSIS

This section provides an analysis of potential impacts due to vehicle miles traveled (VMT) attributable to the project. The analysis of VMT impacts described below meets the requirements stipulated by recent changes to statewide CEQA guidelines, and incorporate relevant advice contained in the Town of Windsor’s Draft Vehicle Miles Traveled Policy, dated February 2022.

TJKM conducted a VMT (Vehicle Miles Traveled) analysis for the proposed single family housing project located on the south side of Cornell Street in the Town of Windsor. The project is located on an undeveloped parcel and consists of 24 single family housing units. **Figure 8** shows the project location.

Figure 8: Project Location Map



5.1 VEHICLE MILES TRAVELED (VMT) FORECASTING AND ANALYSIS

The Sonoma County Transportation Authority travel demand model (SCTA Model) was obtained and the project’s Travel Analysis Zone (TAZ) was identified as TAZ #866. The project consists of 24 single family dwelling units. Per the Sonoma County Transportation Authority (SCTA) VMT Screening Map, dated February 2022, the project site is located in a low-VMT residential zone. Thus, the project is screened out from VMT analysis due to its location and small size (24 units).

6.0 ADDITIONAL ANALYSIS

The following sections provide additional analyses of other transportation issues associated with the project site, including:

- Site access
- On-site circulation
- Parking analysis

The analyses in these sections are based on professional judgment in accordance with the standards and methods employed by traffic engineers. Although operational issues are not considered CEQA impacts, they do describe traffic conditions that are relevant to describing the project environment.

6.1 SITE ACCESS AND ON-SITE CIRCULATION

This section analyzes site access and internal circulation for vehicles, pedestrians and bicycles based on the site plan presented in **Figure 2** (dated June 4, 2021). TJKM reviewed internal and external access for the project site for vehicles, pedestrians, and bicycles.

Vehicle Access

Site access to the single family homes would be provided via private driveways on Cornell Street, Country Meadow Lane and Meadowlark Way. Based on the evaluation, the driveways are expected to be adequate for passenger vehicles accessing the site. Because the project generates few peak hour or daily trips and because traffic is scattered over several routes, the quality of traffic flow in the neighborhood should not be reduced.

TJKM also examined the project site plan (**Figure 2**) in order to evaluate the adequacy of on-site circulation for vehicles, garbage trucks, and emergency vehicles. On-site circulation will be facilitated by the existing roadways and proposed extensions of Cornell Street, and Country Meadow Lane. The Country Meadow Lane extension would create a three-legged T-intersection along Cornell Street. The new proposed hammerhead turn around on Meadowlark would eliminate the dead end and facilitate circulation. The turning radii at proposed intersections appear to be adequate for the garbage and delivery trucks. Garbage collection will occur along the frontage of each residential lot. Residents would need to wheel out garbage bins along their residence for pick-up. The trash bins should be removed immediately after garbage pickup as to not inhibit access to the roadway and on-street parking. Emergency vehicles can access the project via the existing roadways and proposed extensions of Cornell Street and Country Meadow Lane. Emergency vehicle access would improve as the emergency vehicles would use the proposed roadway extension to enter and exit the project site, rather than having to perform U-turn movements. Overall, the proposed on-site vehicle circulation is adequate and should not result in any significant operational issues on Town streets.

Pedestrian Access

Pedestrian access to the project site is provided via existing sidewalks along both sides of Hembree Lane and the north side of Cornell Street. Direct pedestrian access to the single family residences will be provided via proposed sidewalks on both sides Cornell Street along the project frontage, and on both sides of Country Meadow Lane and Meadowlark Way. Additionally, a pedestrian pathway is proposed between Cornell Street and Meadowlark Way. The sidewalks and path are proposed as part of the project (see **Figure 2**). The site plan also shows an updated ADA curb ramp at the intersection of Hembree Lane and Cornell Street, with crosswalks at the east and south legs. Moorpark Avenue through a single concrete walkway. In the project vicinity, all signalized intersections are equipped with countdown pedestrian signal heads. Turner Avenue/Moorpark Avenue intersection has crosswalks on south and east legs. The project site has adequate accessibility via Central Way and Moorpark Avenue. There are continuous sidewalks present on Moorpark Avenue along both sides within the project vicinity except between Turner Drive and Central Way, where a paved sidewalk is available only on the south of Moorpark Avenue. All the bus stops are accessible to and from the project site via existing and proposed sidewalks and crosswalks within the vicinity of the project site. The Town of Windsor Class I Trails Study, adopted November 2018, proposes the Robbins Park Connector trail, which is a Class I path that connects Hembree Lane with Robbins Park.

An impact on pedestrian access occurs if the proposed project disrupts existing pedestrian facilities; or conflicts or creates inconsistencies with adopted pedestrian network plans, guidelines, and policies. facilities; or conflicts or creates inconsistencies with adopted bicycle system plans, guidelines, and policies. The Robbins Park Connector trail runs through the project site, however, the project proposes continuous sidewalks on both sides of Cornell Street along the project frontage. Thus, the proposed improvements by the project should comply with the Town of Windsor requirements and conform to existing and proposed existing facilities.

Bicycle Access

Bicycle access to the project site is provided via existing Class II bike lanes on both sides of Hembree Lane. The Sonoma County Transportation Authority (SCTA) Countywide Pedestrian and Bicycle Master Plan (2014), proposes a Class III bike route along Cornell Street, between Shira Street and Billington Lane. The Town of Windsor Class I Trails Study, adopted November 2018, proposes the Robbins Park Connector trail, which is a Class I path that connects Hembree Lane with Robbins Park.

An impact on bicycle access occurs if the proposed project disrupts existing bicycle facilities; or conflicts or creates inconsistencies with adopted bicycle system plans, guidelines, and policies. The Robbins Park Connector trail runs through the project site. The proposed project is consistent with the recommendations needed for the proposed Robbins Park Connector Trail.

Transit Access

The nearest bus stop is located at the southeast quadrant of the Hembree Lane and Cornell Street intersection. The project conflicts with this bus stop, which currently includes signage for the transit stop and prohibiting parking. Thus, Sonoma County Transit has requested the project provide a no-parking

zone, an eight by six feet concrete pad, and a bus shelter with electricity access for lighting. As this is a condition of project approval, TJKM recommends the project provide the transit amenities detailed above.

6.2 PARKING ANALYSIS

Based on the site plan presented in **Figure 2** (dated June 4, 2021), each residence will have a private driveway and garage. The Town of Windsor Zoning Ordinance, Chapter 27.30, does not provide parking supply regulations. The Institute of Transportation Engineers (ITE) Parking Generation Manual, 4th Edition, observes an average of 1.83 parking spaces per dwelling unit for single-family detached housing (ITE Code 210) land uses. Hence, the project would require 44 parking spaces to meet ITE standards. Based on the site plan, each residence will provide at least one uncovered driveway space, and one covered garage space, for a total of 48 parking spaces. Additional parking is provided via on-street parking along the project frontages. Thus, the proposed number of vehicle parking spaces is adequate.

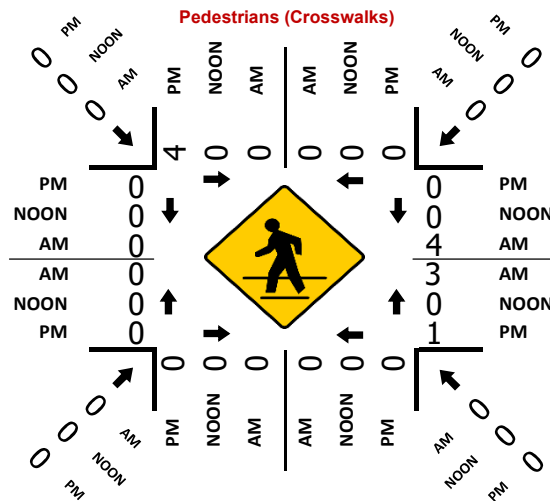
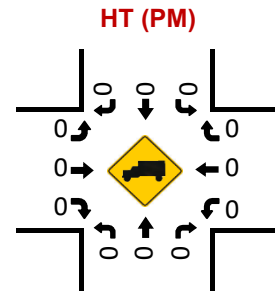
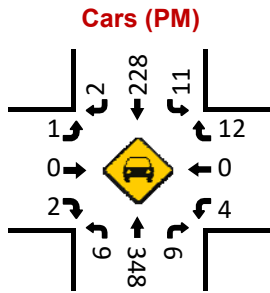
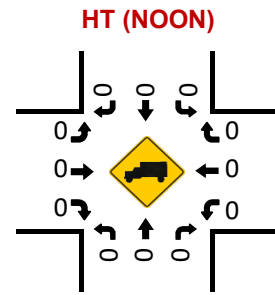
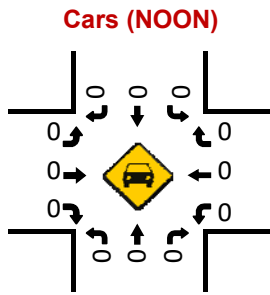
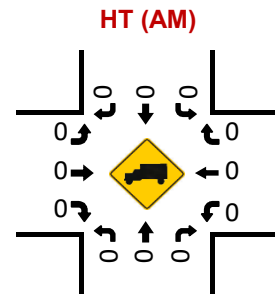
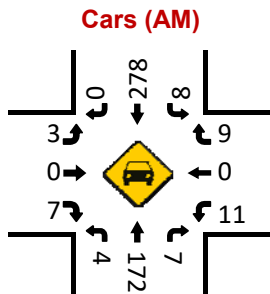
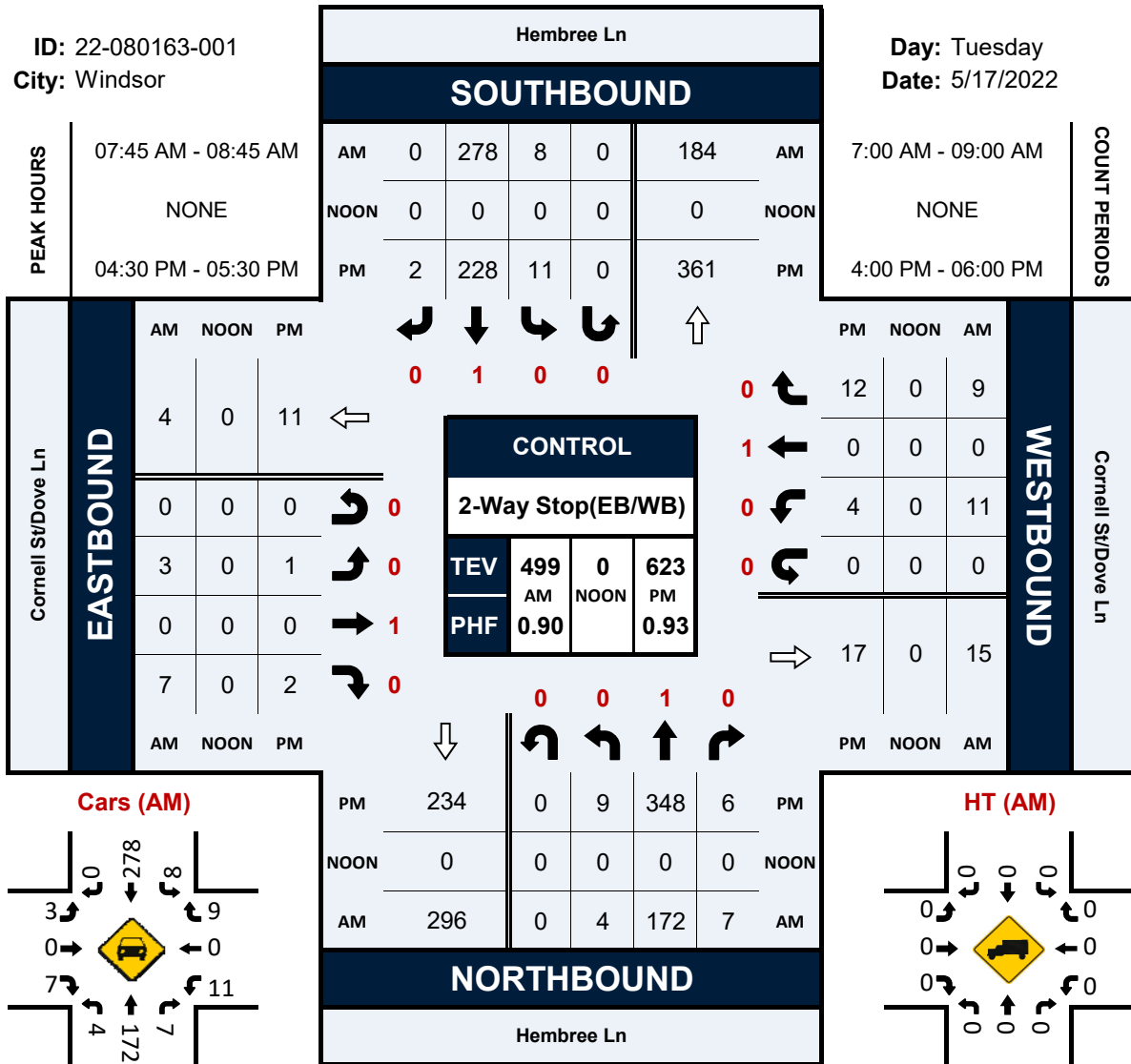
Appendix A – Existing Turning Movement Counts

Hembree Ln & Cornell St/Dove Ln

Peak Hour Turning Movement Count

ID: 22-080163-001
City: Windsor

Day: Tuesday
Date: 5/17/2022

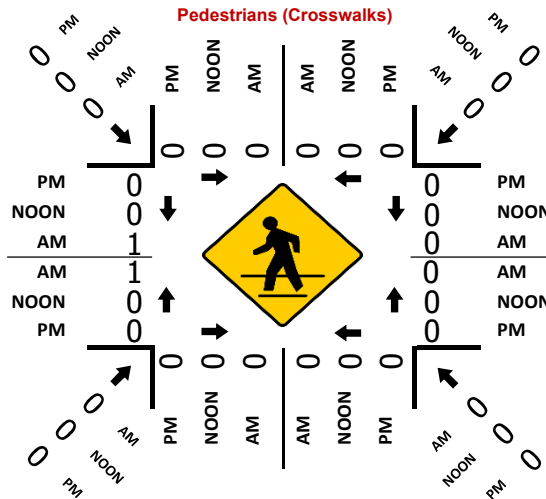
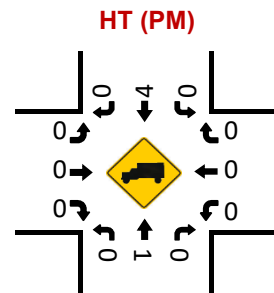
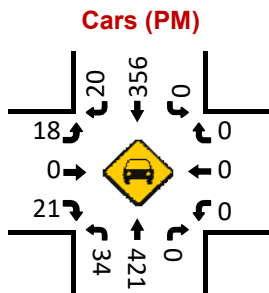
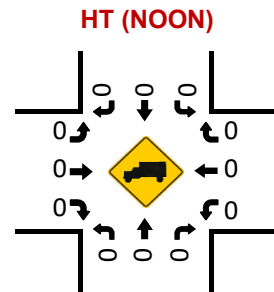
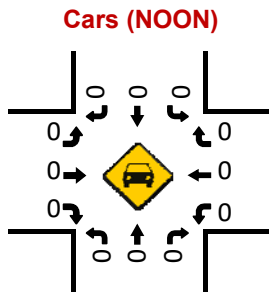
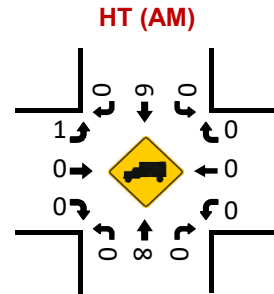
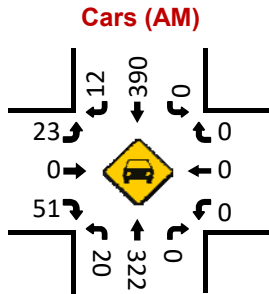
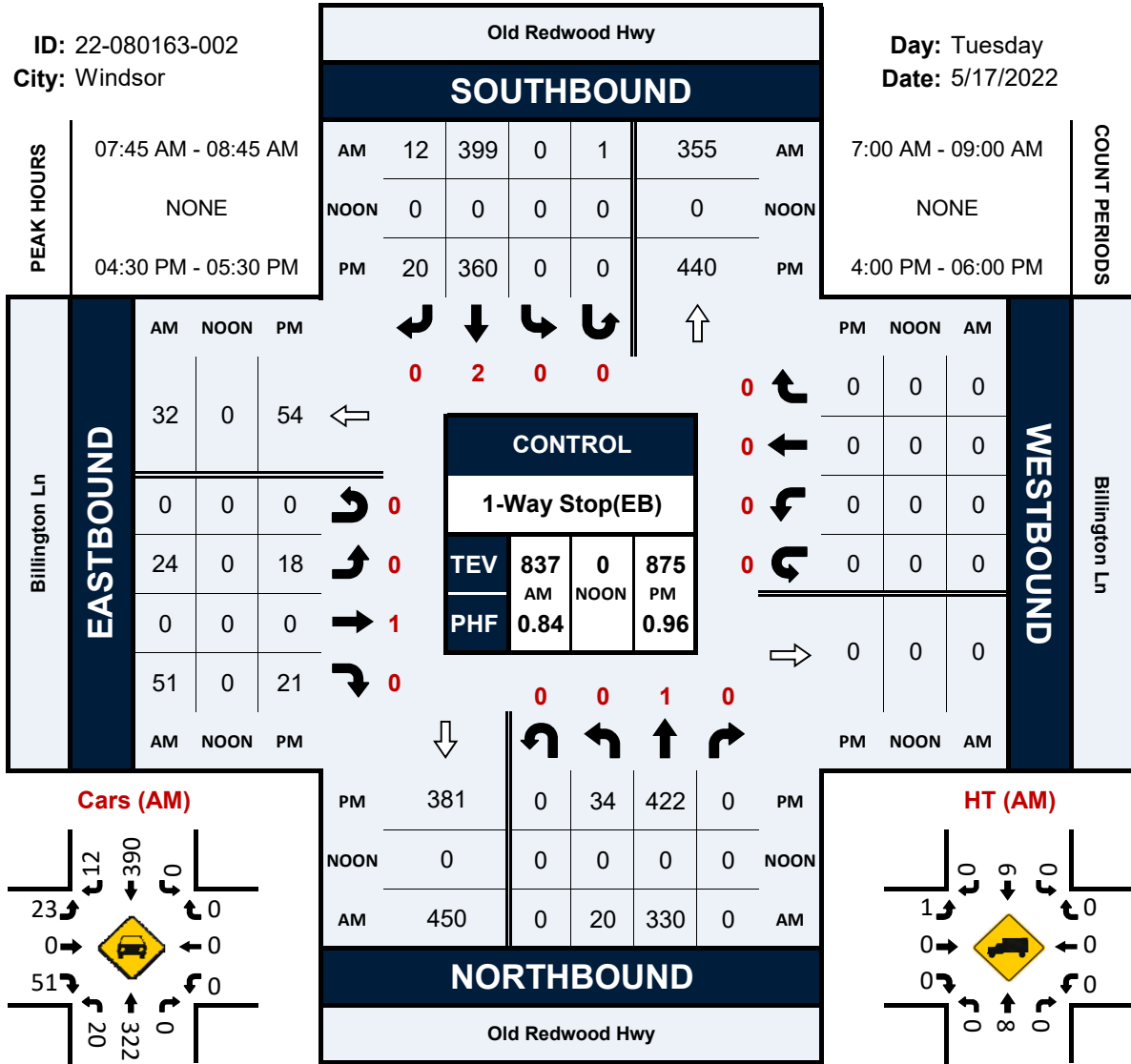


Old Redwood Hwy & Billington Ln

Peak Hour Turning Movement Count

ID: 22-080163-002
City: Windsor

Day: Tuesday
Date: 5/17/2022



**Appendix B – Existing Conditions Intersections Level of Service
Worksheets**

HCM 6th TWSC
 1: Hembree Lane & Dove Lane/Cornell Street

Existing Conditions
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	1.5											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	7	11	0	9	4	172	7	8	278	0
Future Vol, veh/h	3	0	7	11	0	9	4	172	7	8	278	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	25	58	39	25	75	50	84	44	50	80	25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	12	28	0	12	8	205	16	16	348	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	615	617	348	615	609	213	348	0	0	221	0	0
Stage 1	380	380	-	229	229	-	-	-	-	-	-	-
Stage 2	235	237	-	386	380	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	403	405	695	403	410	827	1211	-	-	1348	-	-
Stage 1	642	614	-	774	715	-	-	-	-	-	-	-
Stage 2	768	709	-	637	614	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	390	396	695	389	401	827	1211	-	-	1348	-	-
Mov Cap-2 Maneuver	390	396	-	389	401	-	-	-	-	-	-	-
Stage 1	637	605	-	768	709	-	-	-	-	-	-	-
Stage 2	751	703	-	617	605	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12		13.5		0.3		0.3	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1211	-	-	531	462	1348	-	-
HCM Lane V/C Ratio	0.007	-	-	0.038	0.087	0.012	-	-
HCM Control Delay (s)	8	0	-	12	13.5	7.7	0	-
HCM Lane LOS	A	A	-	B	B	A	A	-
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-	-

HCM 6th TWSC
2: Old Redwood Highway & Billington Lane

Existing Conditions
Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	1.9					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	51	20	330	400	12
Future Vol, veh/h	24	51	20	330	400	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	64	62	75	84	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	80	32	440	476	16

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	988	484	492	0	-	0
Stage 1	484	-	-	-	-	-
Stage 2	504	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	274	583	1071	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	607	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	263	583	1071	-	-	-
Mov Cap-2 Maneuver	263	-	-	-	-	-
Stage 1	595	-	-	-	-	-
Stage 2	607	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.2	0.6	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1071	-	432	-	-
HCM Lane V/C Ratio	0.03	-	0.259	-	-
HCM Control Delay (s)	8.5	0	16.2	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1	-	-

HCM 6th TWSC
1: Hembree Lane & Dove Lane/Cornell Street

Existing Conditions
Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	0.9											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	2	4	0	12	9	348	6	11	228	2
Future Vol, veh/h	1	0	2	4	0	12	9	348	6	11	228	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	50	25	75	75	96	75	69	89	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	8	8	0	16	12	363	8	16	256	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	689	685	258	685	683	367	260	0	0	371	0	0
Stage 1	290	290	-	391	391	-	-	-	-	-	-	-
Stage 2	399	395	-	294	292	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	360	371	781	362	372	678	1304	-	-	1188	-	-
Stage 1	718	672	-	633	607	-	-	-	-	-	-	-
Stage 2	627	605	-	714	671	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	344	361	781	351	362	678	1304	-	-	1188	-	-
Mov Cap-2 Maneuver	344	361	-	351	362	-	-	-	-	-	-	-
Stage 1	709	661	-	625	600	-	-	-	-	-	-	-
Stage 2	605	598	-	695	660	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.7		12.3		0.2		0.5	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1304	-	-	549	517	1188	-
HCM Lane V/C Ratio	0.009	-	-	0.022	0.046	0.013	-
HCM Control Delay (s)	7.8	0	-	11.7	12.3	8.1	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	0.1	0	-

HCM 6th TWSC
2: Old Redwood Highway & Billington Lane

Existing Conditions
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	1.4					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	18	21	34	422	360	20
Future Vol, veh/h	18	21	34	422	360	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	64	66	71	93	94	62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	32	48	454	383	32

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	949	399	415	0	-	0
Stage 1	399	-	-	-	-	-
Stage 2	550	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	289	651	1144	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	578	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	273	651	1144	-	-	-
Mov Cap-2 Maneuver	273	-	-	-	-	-
Stage 1	640	-	-	-	-	-
Stage 2	578	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.7	0.8	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1144	-	395	-	-
HCM Lane V/C Ratio	0.042	-	0.152	-	-
HCM Control Delay (s)	8.3	0	15.7	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.5	-	-

**Appendix C – Existing plus Project Conditions Intersections
Level of Service Worksheets**

HCM 6th TWSC
 1: Hembree Lane & Dove Lane/Cornell Street

Existing Plus Project Conditions
 Timing Plan: AM Peak

Intersection												
Int Delay, s/veh	1.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	3	0	7	11	0	14	4	172	7	9	278	0
Future Vol, veh/h	3	0	7	11	0	14	4	172	7	9	278	0
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	38	25	58	39	25	75	50	84	44	50	80	25
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	8	0	12	28	0	19	8	205	16	18	348	0

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	623	621	348	619	613	213	348	0	0	221	0	0
Stage 1	384	384	-	229	229	-	-	-	-	-	-	-
Stage 2	239	237	-	390	384	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	398	403	695	401	408	827	1211	-	-	1348	-	-
Stage 1	639	611	-	774	715	-	-	-	-	-	-	-
Stage 2	764	709	-	634	611	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	382	393	695	387	398	827	1211	-	-	1348	-	-
Mov Cap-2 Maneuver	382	393	-	387	398	-	-	-	-	-	-	-
Stage 1	634	601	-	768	709	-	-	-	-	-	-	-
Stage 2	741	703	-	612	601	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	12.1		13.1		0.3		0.4	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1211	-	-	525	491	1348	-
HCM Lane V/C Ratio	0.007	-	-	0.038	0.095	0.013	-
HCM Control Delay (s)	8	0	-	12.1	13.1	7.7	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	0.3	0	-

HCM 6th TWSC
2: Old Redwood Highway & Billington Lane

Existing Plus Project Conditions
Timing Plan: AM Peak

Intersection						
Int Delay, s/veh	2.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	24	59	23	330	400	12
Future Vol, veh/h	24	59	23	330	400	12
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	75	64	62	75	84	75
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	32	92	37	440	476	16

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	998	484	492	0	-	0
Stage 1	484	-	-	-	-	-
Stage 2	514	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	270	583	1071	-	-	-
Stage 1	620	-	-	-	-	-
Stage 2	600	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	258	583	1071	-	-	-
Mov Cap-2 Maneuver	258	-	-	-	-	-
Stage 1	591	-	-	-	-	-
Stage 2	600	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	16.4	0.7	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1071	-	440	-	-
HCM Lane V/C Ratio	0.035	-	0.282	-	-
HCM Control Delay (s)	8.5	0	16.4	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.1	-	1.1	-	-

HCM 6th TWSC
 1: Hembree Lane & Dove Lane/Cornell Street

Existing Plus Project Conditions
 Timing Plan: PM Peak

Intersection												
Int Delay, s/veh	1.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Vol, veh/h	1	0	2	4	0	16	9	348	6	17	228	2
Future Vol, veh/h	1	0	2	4	0	16	9	348	6	17	228	2
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	25	25	25	50	25	75	75	96	75	69	89	50
Heavy Vehicles, %	2	2	2	2	2	2	2	2	2	2	2	2
Mvmt Flow	4	0	8	8	0	21	12	363	8	25	256	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	710	703	258	703	701	367	260	0	0	371	0	0
Stage 1	308	308	-	391	391	-	-	-	-	-	-	-
Stage 2	402	395	-	312	310	-	-	-	-	-	-	-
Critical Hdwy	7.12	6.52	6.22	7.12	6.52	6.22	4.12	-	-	4.12	-	-
Critical Hdwy Stg 1	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.12	5.52	-	6.12	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.518	4.018	3.318	3.518	4.018	3.318	2.218	-	-	2.218	-	-
Pot Cap-1 Maneuver	348	362	781	352	363	678	1304	-	-	1188	-	-
Stage 1	702	660	-	633	607	-	-	-	-	-	-	-
Stage 2	625	605	-	699	659	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	327	349	781	339	350	678	1304	-	-	1188	-	-
Mov Cap-2 Maneuver	327	349	-	339	350	-	-	-	-	-	-	-
Stage 1	694	644	-	625	600	-	-	-	-	-	-	-
Stage 2	598	598	-	675	643	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	11.9		12.1		0.2		0.7	
HCM LOS	B		B					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1304	-	-	534	533	1188	-
HCM Lane V/C Ratio	0.009	-	-	0.022	0.055	0.021	-
HCM Control Delay (s)	7.8	0	-	11.9	12.1	8.1	0
HCM Lane LOS	A	A	-	B	B	A	A
HCM 95th %tile Q(veh)	0	-	-	0.1	0.2	0.1	-

HCM 6th TWSC
2: Old Redwood Highway & Billington Lane

Existing Plus Project Conditions
Timing Plan: PM Peak

Intersection						
Int Delay, s/veh	1.6					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	T			T		T
Traffic Vol, veh/h	18	26	42	422	360	20
Future Vol, veh/h	18	26	42	422	360	20
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	64	66	71	93	94	62
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	28	39	59	454	383	32

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	971	399	415	0	-	0
Stage 1	399	-	-	-	-	-
Stage 2	572	-	-	-	-	-
Critical Hdwy	6.42	6.22	4.12	-	-	-
Critical Hdwy Stg 1	5.42	-	-	-	-	-
Critical Hdwy Stg 2	5.42	-	-	-	-	-
Follow-up Hdwy	3.518	3.318	2.218	-	-	-
Pot Cap-1 Maneuver	280	651	1144	-	-	-
Stage 1	678	-	-	-	-	-
Stage 2	565	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	261	651	1144	-	-	-
Mov Cap-2 Maneuver	261	-	-	-	-	-
Stage 1	631	-	-	-	-	-
Stage 2	565	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	15.8	1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1144	-	401	-	-
HCM Lane V/C Ratio	0.052	-	0.168	-	-
HCM Control Delay (s)	8.3	0	15.8	-	-
HCM Lane LOS	A	A	C	-	-
HCM 95th %tile Q(veh)	0.2	-	0.6	-	-



September 27, 2022

Kim Voge, Planner III
Community Development Department
Town of Windsor
Email: kvoge@townofwindsor.com

Subject: Request for ADT volumes for Hembree Lane Oaks

Dear Kim:

Per your request on behalf of PlaceWorks request for ADTs for the noise analysis, I'm pleased to provide the estimated ADT volumes for the study segments related to the Hembree Lane Oaks residential project.

Hembree Lane Oaks Subdivision - Estimated ADTs				
Segment Location	Existing	Existing + Project	Cumulative*	Cumulative + Project
Hembree Lane (n/o Cornell St)	5380	5538	7834	7993
Cornell Street (e/o Hembree Ln)	340	498	495	653
Billington Lane (w/o Old Redwood Hwy)	1000	1068	1456	1524
Old Redwood Hwy (s/o Billington Ln)	8190	8258	11926	11994
*Growth Factor for Cumulative 2040 compounded	2.11			

I'm also attaching an Excel file per your request. If you have any questions, please don't hesitate to get in touch.

Thank you,

Anna Vickroy, PE, TE
Senior Transportation Engineer