



August 30, 2019

Mr. Jason Brandman
First Carbon Solutions
1350 Treat Boulevard, Suite 380
Walnut Creek, CA 94597

City of Santa Rosa

AUG 30 2019

Planning & Economic
Development Department

Focused Traffic Study for the Emerald Isle Senior Housing Project

Dear Mr. Brandman;

As requested, W-Trans has prepared a focused traffic analysis for the proposed Emerald Isle Senior Housing project to be located near Thomas Lake Harris Drive in the City of Santa Rosa. The traffic study was completed in accordance with the criteria established by the City of Santa Rosa and is consistent with standard traffic engineering techniques.

Project Description

The proposed project is a housing development consisting of 82 attached senior housing units, to be constructed on a currently vacant 12.5-acre site surrounded by the Fountaingrove Golf Course. With respect to the surrounding roadway network, the site is generally bounded by Thomas Lake Harris Drive on the west, east, and north. Fountaingrove Lake is located to the south. The project includes construction of seven apartment buildings as well as a recreation center, swimming pool, and sport court for use by residents, along with 210 total parking spaces. The project would be accessed via an eastward extension of a private street called Gullane Drive. A new sidewalk would be included along the extended roadway, connecting to an existing sidewalk at the current terminus of Gullane Drive. A copy of the project site plan on which the analysis was based is enclosed on Figure 1.

Study Area and Periods

The study area includes Thomas Lake Harris Drive near the project site, as well an evaluation of the following intersections:

1. Thomas Lake Harris Drive/Gullane Drive
2. Fountaingrove Parkway/Thomas Lake Harris Drive (West)

Operating conditions during the a.m. and p.m. peak periods were evaluated to capture the highest potential impacts for the proposed project as well as the highest volumes on the local transportation network. The morning peak period is from 7:00 to 9:00 a.m. and reflects conditions during the home to work or school commute, while the p.m. peak period occurs between 4:00 and 6:00 p.m. and typically reflects the highest level of congestion during the homeward bound commute.

Circulation Setting

Vehicular Circulation

Thomas Lake Harris Drive is an approximately 1.75-mile long collector street that forms a loop beginning and ending on Fountaingrove Parkway. The street passes through single- and multi-family residential neighborhoods and has a posted speed limit of 25 mph, conforming to the hillside topography with a series of horizontal and vertical curves. Thomas Lake Harris Drive is generally 40 feet wide with turn pockets at intersections, together with sidewalks and/or parallel multi-use paths on both sides of the street.

Fountaingrove Parkway/Thomas Lake Harris Drive (West) is a signalized tee-intersection with protected left-turn phasing on all approaches and a right-turn overlap on the Thomas Lake Harris Drive approach. Marked crosswalks are provided across the south and west legs.

Thomas Lake Harris Drive/Gullane Drive is an unsignalized driveway intersection with a left-turn pocket on the southbound Thomas Lake Harris Drive approach. The westbound Gullane Drive private street approach has a modified driveway configuration and is stop-controlled. There are no marked crosswalks at the intersection.

The current intersection lane configurations at the study intersections are shown on the enclosed Figure 2.

Bicycle Circulation

Bicycle facilities in Santa Rosa consist of Class I pathways, Class II bicycle lanes, and Class III bicycle routes along with support facilities such as bicycle parking, multi-modal transit access, and amenities such as showers, changing areas and storage facilities. Near the proposed project, there are existing Class I bicycle paths that run parallel to Fountaingrove Parkway.

Pedestrian Circulation

Sidewalks exist along the segment of Gullane Drive that would be extended into the project site, as well as along Thomas Lake Harris Drive in the surrounding vicinity. In general, pedestrian facilities are continuous and connective among neighborhoods in the Fountaingrove community.

Transit Operations

Santa Rosa CityBus is the primary transit provider in Santa Rosa. CityBus provides regularly-scheduled fixed-route service to residential neighborhoods, major activity centers, and transit hubs within the City. Fifteen fixed routes are operated with wheelchair accessible, low-floor buses, which can accommodate up to two bikes on racks attached to the front. CityBus routes are designed around a timed-transfer method where buses serving different routes arrive and depart at designated transfer locations at routine periodic intervals.

CityBus Route 10 includes a stop at Round Bard Boulevard/Unocal Place, approximately one mile from the project site. Paratransit, also known as dial-a-ride or door-to-door service, is also available for those who are unable to independently use the transit system due to a physical or mental disability. Individuals must be registered and certified as ADA eligible before using the service. CityBus currently contracts out paratransit service which provides curb-to-curb transportation for disabled riders within city limits. Service hours are Monday through Saturday from 6:00 a.m. to 8:00 p.m., and Sunday from 9:00 a.m. to 5:30 p.m. Ride reservations can be scheduled daily.

Collision History

The collision history for the section of Thomas Lake Harris Drive between its western terminus at Fountaingrove Parkway and Skyfarm Drive (0.30 miles east of the project site) was reviewed to determine any trends or patterns that may indicate a safety issue. Collision records were obtained from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is June 1, 2013 through May 31, 2018. During this five-year period, two reported collisions occurred along the study segment, though neither was near Gullane Drive. Both collisions involved solo drivers hitting fixed objects, with "improper turning" identified as the primary collision factor. One collision occurred approximately 400 feet west of Skyfarm Drive, and the other near the Terraces housing development. Based on the collision review there appears to be no clear pattern of safety concerns near the proposed project site.

There were four collisions reported directly at the intersection of Thomas Lake Harris Drive/Fountaingrove Parkway, though the collision data lacks sufficient detail to determine whether collisions occurred at the eastern or western end of Thomas Lake Harris Drive (the street intersects Fountaingrove Parkway at two locations). Conservatively assuming all four reported collisions occurred at the western study intersection, the calculated collision rate would be 0.12 collisions per million vehicles entering (c/mve), which is less than the Statewide Average of 0.27 c/mve for similar facilities. It should be noted that the intersection was signalized in late 2013, and that the frequency of reported collisions has dropped since that time.

Regulatory Framework

The City of Santa Rosa's adopted Level of Service (LOS) Standard is contained in *Santa Rosa General Plan 2035*. Standard TD-1 states that the City will maintain a Level of Service (LOS) D or better along all major corridors. Although the City's standard does not specify criteria for intersections, for the purposes of this study a minimum operation of LOS D for the overall operation of signalized intersections was applied, since intersections are typically where corridor capacity constraints occur; acceptable intersection operation typically translates to acceptable corridor operation.

Existing Traffic Conditions

Given the considerable effects of the 2017 Tubbs Fire on the Fountaingrove area including mass destruction of homes, traffic data collected *prior* to the fire has been used for the analysis as it more accurately reflects the typical travel patterns that will be encountered in the area again once rebuilding efforts have been completed. Turning movement counts were collected on March 15, 2016 at the Fountaingrove Parkway/Thomas Lake Harris Drive (West) intersection, and on August 25, 2016 at the Thomas Lake Harris Drive/Gullane Drive intersection. All counts were obtained while area schools were in session. Under these previously existing conditions, the study intersections operated acceptably at LOS A during the a.m. and p.m. peak hours. A summary of the level of service calculations is contained in Table 1. Enclosed is Figure 3 showing traffic volumes along with copies of the LOS calculations for all evaluated scenarios.

Table 1 – Existing Intersection Levels of Service

Study Intersection <i>Approach</i>	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Thomas Lake Harris Dr/Gullane Dr	0.5	A	0.2	A
<i>Westbound (Gullane Dr) Approach</i>	<i>9.1</i>	<i>A</i>	<i>9.0</i>	<i>A</i>
2. Fountaingrove Pkwy/Thomas Lake Harris Dr (West)	6.2	A	5.1	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Baseline Traffic Conditions

Baseline operating conditions were assessed to reflect the addition of traffic associated with known projects that may be constructed and/or become operational in the study area in the next two to three years. Relevant projects used in the Baseline scenario were selected based on the expected impact to the study area from the City's "Permit Santa Rosa" portal (<http://santarosa.civicsight.com>) and confirmed with City Staff in January 2019.

- **Canyon Oaks** – 96 apartment units on Thomas Lake Harris Drive, north of Emerald Isle site
- **Fir Ridge Workforce Housing** – 36 attached residential dwellings at 3700 Fir Ridge Drive
- **Fountaingrove Inn Condos** – 22 attached residential dwellings at 3586 Mendocino Avenue

- **Terrazzo at Fountaingrove** – 19 single-family detached residential dwellings at 1601 Fountaingrove Parkway
- **Skyfarm 3** – 30 single-family detached residential dwellings at 3925 Saint Andrews Drive
- **The Arbors** – 37 single-family detached residential dwellings at 3500 Lake Park Drive
- **Bicentennial Estates 2 and 3** – 14 single-family detached residential dwellings at 3450 Lake Park Drive
- **Round Barn Village** – 237 attached residential dwellings at 0 Round Barn Boulevard
- **Residence Inn** – 114-room hotel at 3558 Round Barn Circle

Trip distribution assumptions for the approved projects were based on the project trip distribution, as well as published traffic studies for specific projects, if available.

The anticipated traffic associated with these projects was added to the volumes analyzed in the “Existing Conditions” scenario to determine Baseline volumes. Under these conditions, the study intersections are expected to continue operating acceptably at LOS A during the a.m. and p.m. peak hours. The resulting operating conditions are summarized in Table 2.

Table 2 – Baseline Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Thomas Lake Harris Dr/Gullane Dr <i>Westbound (Gullane Dr) Approach</i>	0.3 9.5	A A	0.1 9.6	A A
2. Fountaingrove Pkwy/Thomas Lake Harris Dr (West)	8.1	A	6.5	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Future Traffic Conditions

Future traffic volumes representing year 2040 buildout of the City of Santa Rosa General Plan were obtained from the Sonoma County Transportation Authority’s SCTM\10 travel demand model. The model includes link-based volume projections for Fountaingrove Parkway and Thomas Lake Harris Drive. The “Furness” procedure was used to determine future turning movements at the Fountaingrove Parkway/Thomas Lake Harris Drive (West) intersection, while future volumes at the Thomas Lake Harris Drive/Gullane Drive intersection were developed by adding the model’s incremental growth on Thomas Lake Harris Drive to the intersection’s existing volumes.

Under future conditions, the study intersections are projected to continue operating acceptably at LOS A or B during the a.m. and p.m. peak hours. Future operating conditions are summarized in Table 3.

Table 3 – Future Intersection Levels of Service

Study Intersection Approach	AM Peak		PM Peak	
	Delay	LOS	Delay	LOS
1. Thomas Lake Harris Dr/Gullane Dr <i>Westbound (Gullane Dr) Approach</i>	0.2 10.8	A B	0.1 11.0	A B
2. Fountaingrove Pkwy/Thomas Lake Harris Dr (West)	14.9	B	10.5	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual*, 10th Edition, 2017, for “Senior Adult Housing - Attached” (Land Use #252). The proposed 82-units are expected to generate an average of 303 new trips daily, including 16 during the a.m. peak hour and 21 during the p.m. peak hour. The applied trip generation rates and estimates are shown in Table 4.

Table 4 – Trip Generation Summary

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
Senior Adult Housing - Attached (#252)	82 units	3.70	303	0.20	16	6	10	0.26	21	12	9

Trip Distribution

The pattern used to allocate new project trips to the street network was determined by reviewing existing turning movements at the study intersections, observations of neighborhood travel patterns, and knowledge of traffic patterns in the area and surrounding region. The applied trip distribution percentages are shown in Table 5.

Table 5 – Trip Distribution Assumptions

Route	Percent
Cross Creek Rd – via Thomas Lake Harris Dr northeast of project site	8%
Fountaingrove Pkwy E – via Thomas Lake Harris Dr south of project site	22%
Fountaingrove Pkwy W – via Thomas Lake Harris Dr south of project site	70%
TOTAL	100%

Traffic Operation with the Proposed Project

Existing plus Project Intersection Levels of Service

Completion and occupation of the proposed project would result in a less than significant increase in delay, with both study intersections continuing to operate at LOS A during the a.m. and p.m. peak hours upon adding project-generated trips to existing volumes. A summary of the level of service calculations is contained in Table 6.

Table 6 – Existing and Existing plus Project Peak Hour Intersection Levels of Service

Study Intersection <i>Approach</i>	Existing Conditions				Existing plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Thomas Lake Harris Dr/Gullane Dr <i>Westbound (Gullane Dr) Approach</i>	0.5	A	0.2	A	1.2	A	0.9	A
	9.1	A	9.0	A	9.2	A	9.1	A
2. Fountaingrove Pkwy/Thomas Lake Harris Dr (West)	6.2	A	5.1	A	6.6	A	5.4	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Baseline plus Project Intersection Levels of Service

Under Baseline plus Project conditions, the study intersections would also experience a less-than-significant increase in delay, with continued LOS A operation during the a.m. and p.m. peak hours. A summary of the level of service calculations is contained in Table 7.

Table 7 – Baseline and Baseline plus Project Peak Hour Intersection Levels of Service

Study Intersection <i>Approach</i>	Baseline Conditions				Baseline plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Thomas Lake Harris Dr/Gullane Dr <i>Westbound (Gullane Dr) Approach</i>	0.3	A	0.1	A	0.9	A	0.6	A
	9.5	A	9.6	A	9.7	A	9.6	A
2. Fountaingrove Pkwy/Thomas Lake Harris Dr (West)	8.1	A	6.5	A	8.5	A	6.8	A

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Future plus Project Intersection Levels of Service

Upon the addition of project-generated traffic to future volumes, the study intersections would continue to operate acceptably at LOS B or better during both peak hours, with less than significant increases in delay. A summary of the future level of service calculations is contained in Table 8.

Table 8 – Future and Future plus Project Peak Hour Intersection Levels of Service

Study Intersection <i>Approach</i>	Future Conditions				Future plus Project			
	AM Peak		PM Peak		AM Peak		PM Peak	
	Delay	LOS	Delay	LOS	Delay	LOS	Delay	LOS
1. Thomas Lake Harris Dr/Gullane Dr <i>Westbound (Gullane Dr) Approach</i>	0.2	A	0.1	A	0.5	A	0.3	A
	10.8	B	11.0	B	11.1	B	11.0	B
2. Fountaingrove Pkwy/Thomas Lake Harris Dr (West)	14.9	B	10.5	B	15.5	B	11.0	B

Notes: Delay is measured in average seconds per vehicle; LOS = Level of Service; results for minor approaches to two-way stop-controlled intersections are indicated in *italics*

Finding – The study intersections are expected to operate acceptably upon the addition of project trips to Existing, Baseline, and Future volumes, resulting in a less-than-significant impact on traffic operation.

Multimodal Circulation

Given the demographics of the project's residents and the surrounding land use context of the site, residents would primarily be expected to generate pedestrian and bicycle trips for recreational purposes. Some residents may also choose to use transit by walking to the nearest CityBus stop approximately one mile away.

Pedestrian Facilities

The project includes construction of a new sidewalk along the Gullane Drive extension to the project site, connecting to existing sidewalks on Gullane Drive and Thomas Lake Harris Drive. A network of onsite sidewalks would connect each of the apartment buildings to the central recreation center and leasing office, as well as to the sidewalk on Gullane Drive.

Bicycle Facilities

Bicyclists can access the regional bicycle network via Gullane Drive and Thomas Lake Harris Drive, which connects to the existing Class I bike trail along Fountaingrove Parkway.

Transit Facilities

Given the one-mile distance to the nearest CityBus stop and hilly terrain in the area, relatively few of the project's residents are likely to use fixed-route transit when traveling to and from the project site. For those residents and visitors who do choose to use transit, continuous pedestrian facilities exist between the project site and the transit stop. It is anticipated that most transit trips made by residents would be via existing paratransit services offered by CityBus.

Finding – The proposed project will effectively tie into the surrounding multimodal circulation network, making walking and bicycling viable means of travel for the facility's employees and visitors.

Finding – Continuous sidewalks exist between the project site and the nearest existing fixed-route transit stop. Project residents with limited mobility would qualify for door-to-door paratransit service operated by CityBus. The project's accessibility to transit facilities and services is therefore considered to be acceptable.

Site Access and Circulation

Access to the site would be provided via an eastward extension of Gullane Drive. Driveways and internal drive aisles use standard configurations that would be navigable by emergency response vehicles. The project also includes an emergency vehicle access (EVA) between the northern portion of the site and Thomas Lake Harris Drive, providing two points of access for emergency service providers.

The project driveway crosses a narrow portion of the Fountaingrove Golf Course and a paved golf cart/walking path. In tandem with construction of the driveway, the path would be realigned appropriately to cross the road perpendicularly.

Finding – Emergency access and on-site circulation are expected to function acceptably at the project site.

Sight Distance

At unsignalized intersections, a substantially clear line of sight should be maintained between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. Adequate time must be provided for the waiting vehicle to either cross, turn left, or turn right, without requiring the through traffic drivers to radically alter their speed.

Sight distance along Thomas Lake Harris Drive at Gullane Drive was evaluated based on sight distance criteria contained in the *Highway Design Manual* published by Caltrans. The recommended sight distances for minor street approaches that are either a private roadway (such as Gullane Drive) or a private driveway are based on stopping sight distance.

For the posted 25 mile per hour (mph) speed limit on Thomas Lake Harris Drive, the recommended stopping sight distance at a private street is 150 feet. Based on a review of the field conditions, the sight distance at Gullane Drive extends 250 feet to the north, which satisfies requirements for speeds of 35 mph. To the south of Gullane Drive, the available sight distance is approximately 200 feet, which satisfies requirements for speeds up to 30 mph.

Radar speed samples were obtained on the northbound and southbound approaches of Thomas Lake Harris Drive at Gullane Drive. Prevailing speeds were found to exceed the posted 25-mph speed limit in both directions of

travel. Based on the speed samples, the average surveyed speed for northbound vehicles was 30 mph, with a peak observed speed of 38 mph. In the southbound direction, the average surveyed speed was also 30 mph, with a peak observed speed of 40 mph.

Sufficient sight distance exists at Gullane Drive for drivers to adequately respond to the observed average speeds on Thomas Lake Harris Drive. Because some drivers were observed substantially exceeding the posted speed limit on Thomas Lake Harris Drive and driving at speeds more than 35 mph near the project site, however, it is recommended that a traffic calming measure be implemented to reduce speeds and reduce the potential for sight distance related safety issues to occur. Currently, the effective through traffic lane widths on Thomas Lake Harris Drive near the project site range from 13 to 18 feet. These lane widths could be narrowed to 10 to 12 feet by adding white edge lines on each side of the street. The narrowing of travel lanes is a proven traffic calming technique and would be expected to reduce vehicle speeds and can also help to improve sight distance by positioning drivers more toward the center of the roadway. The project applicants should be responsible for designing and implementing this restriping scheme for a distance of approximately 300 feet to the north and south of Gullane Drive, with design details to be reviewed and approved by the City of Santa Rosa Public Works Department.

Finding – Sight distance from Gullane Drive to the north and south at the Thomas Lake Harris intersection is adequate for observed average speeds. However, some drivers on Thomas Lake Harris Drive are exceeding the posted 25 mph posted speed limit, at speeds requiring a greater sight distance than is available at the Gullane Drive intersection.

Recommendation – In order to reduce speeds on Thomas Lake Harris Drive and ensure provision of adequate sight distance at Gullane Drive, the project applicants should be responsible for adding edge line striping on Thomas Lake Harris Drive for a distance of approximately 300 feet to the north and south of Gullane Drive; the striping dimensions shall be specified and approved by the City of Santa Rosa Public Works Department.

Conclusions

- The project is expected to generate an average of 303 new daily vehicle trips, including 16 trips during the a.m. peak hour and 21 trips during the p.m. peak hour.
- No reported collisions have occurred near the Thomas Lake Harris/Gullane Drive intersection in the past five years, and the intersection at Fountaingrove Parkway/Thomas Lake Harris drive has a collision rate that is less than the statewide average.
- The study intersections currently operate acceptably during the a.m. and p.m. peak hours and are projected to continue operating acceptably under Baseline and Future conditions.
- Upon the addition of project-generated traffic to Existing, Baseline, and Future traffic volumes, the study intersections would be expected to continue operating acceptably at LOS B or better.
- The addition of sidewalks along the extension of Gullane Drive would effectively link the project site to the surrounding pedestrian network.
- The project would effectively tie into the regional bicycle circulation network.
- The project's accessibility to transit facilities and services would be acceptable.
- Emergency access and on-site circulation would be expected to function acceptably at the project site.

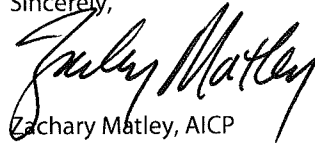
- Sight distance along Thomas Lake Harris Drive at Gullane Drive is adequate for drivers approaching at the posted 25 mph speed limit, as well as speeds up to 35 mph in the southbound direction and 30 mph in the northbound direction. However, some drivers on Thomas Lake Harris Drive are substantially exceeding the posted speed limit, resulting in the need for greater sight distance than exists at the Gullane Drive intersection.

Recommendation

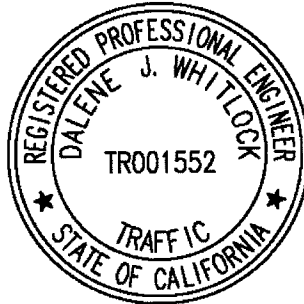
- To reduce speeds on Thomas Lake Harris Drive and ensure provision of adequate sight distance at Gullane Drive, the project applicants should be responsible for adding edge line striping on Thomas Lake Harris Drive for a distance of approximately 300 feet to the north and south of Gullane Drive; the striping dimensions shall be specified and approved by the City of Santa Rosa Public Works Department.

Thank you for giving W-Trans the opportunity to provide these services. Please call if you have any questions.

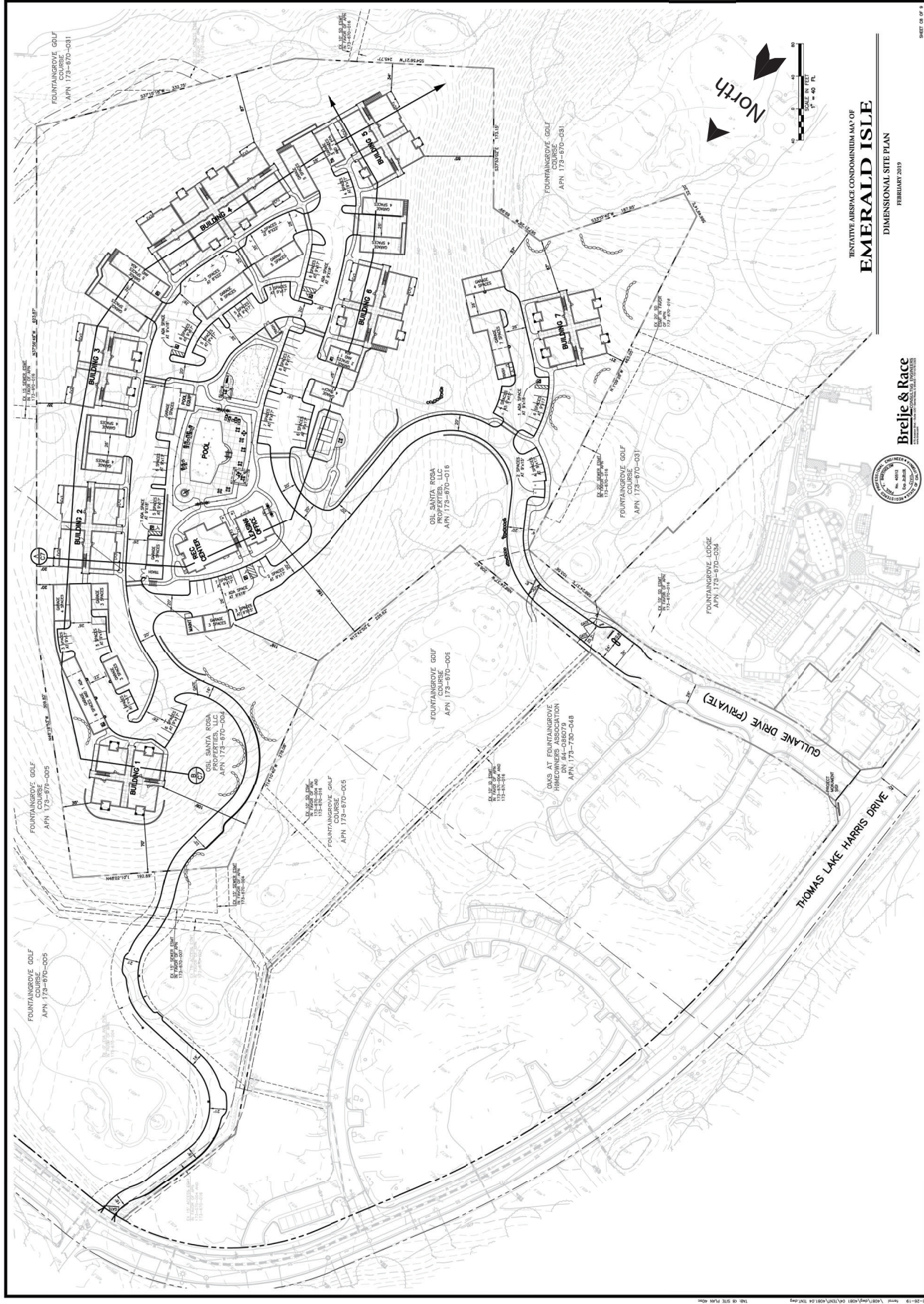
Sincerely,


Zachary Matley, AICP
Principal

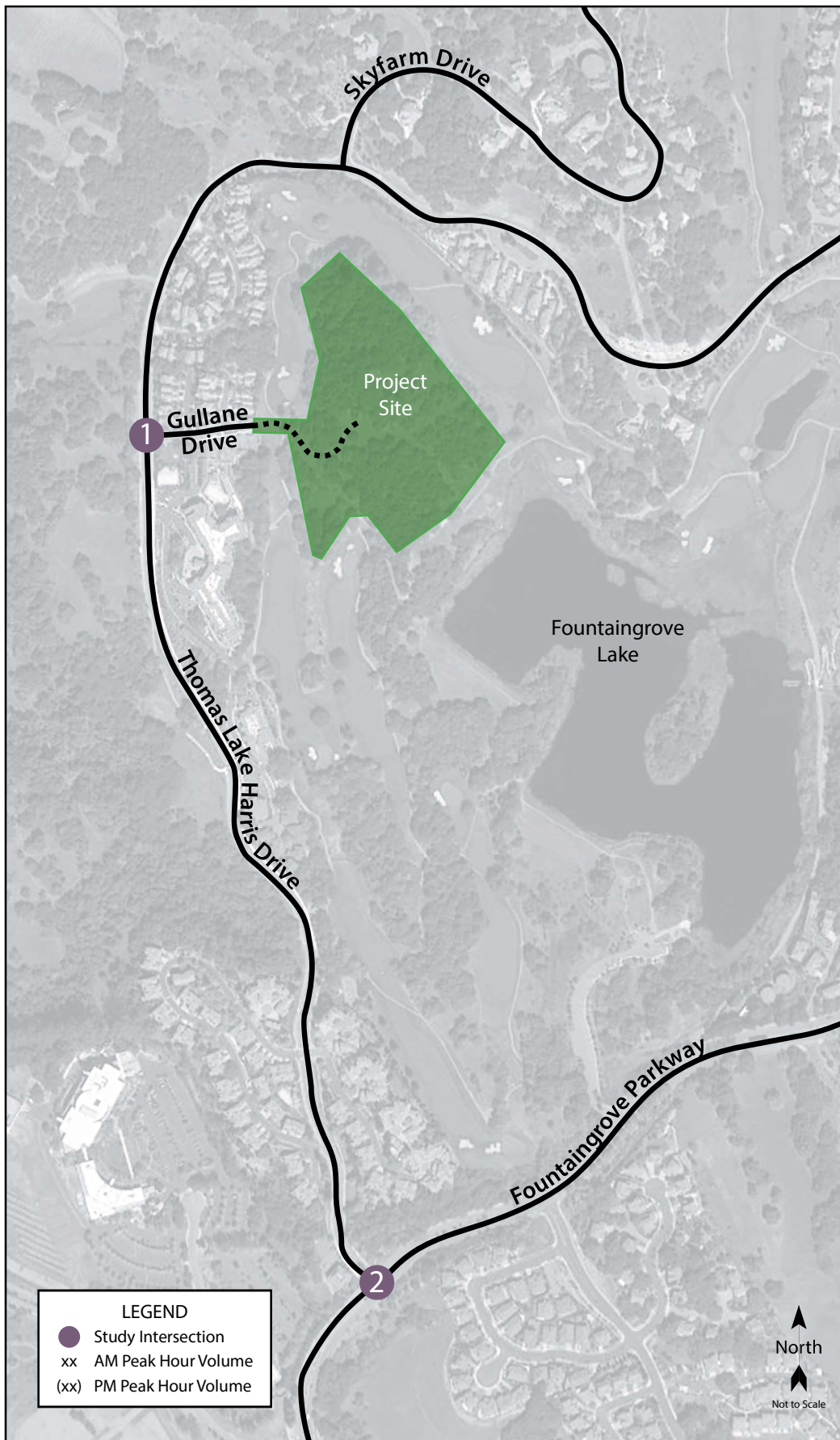
JZM/SRO399.L5



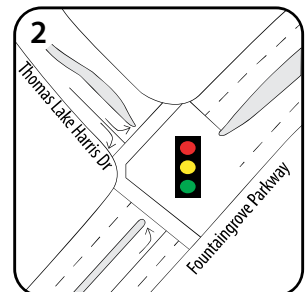
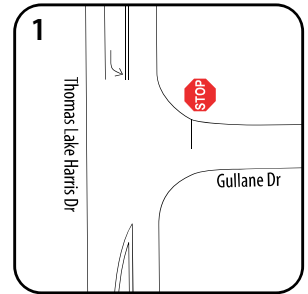
Enclosures: Figure 1 – Site Plan
Figure 2 – Existing Volumes and Lane Configurations
Figure 3 – Baseline, Future, and Project Traffic Volumes
Intersection Collision Rate Calculation
Level of Service Calculations



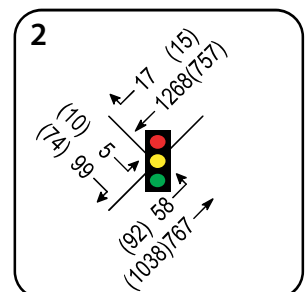
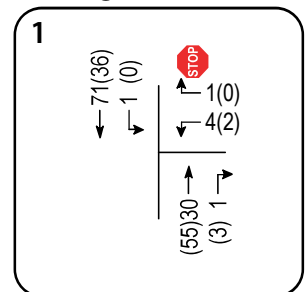
Focused Traffic Study for the Emerald Isle Senior Housing Project
Figure 1 – Site Plan



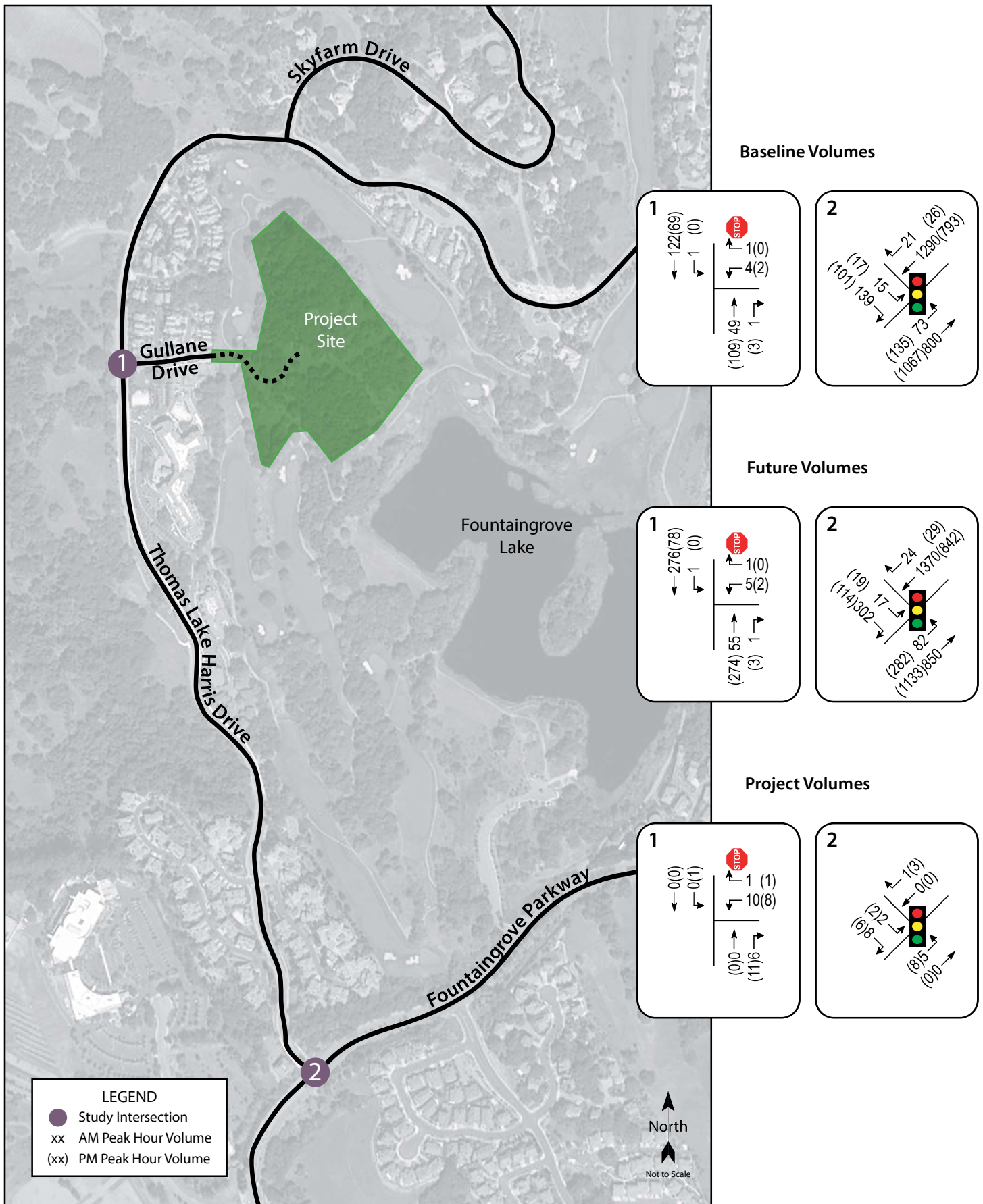
Existing Lane Configurations



Existing Traffic Volumes



Focused Traffic Study for the Emerald Isle Senior Housing Project
Figure 2 – Existing Lane Configurations and Traffic Volumes



Focused Traffic Study for the Emerald Isle Senior Housing Project
Figure 3 – Baseline, Future, and Project Traffic Volumes

Intersection Collision Rate Calculations

Emerald Isle Senior Housing

Intersection # 1: Fountaingrove Parkway & Thomas Lake Harris Drive

Date of Count: Sunday, September 18, 2016

Number of Collisions: 4

Number of Injuries: 3

Number of Fatalities: 0

ADT: 18600

Start Date: June 1, 2013

End Date: May 31, 2018

Number of Years: 5

Intersection Type: Tee

Control Type: Signals

Area: Suburban

$$\text{collision rate} = \frac{\text{Number of Collisions} \times 1 \text{ Million}}{\text{ADT} \times 365 \text{ Days per Year} \times \text{Number of Years}}$$

$$\text{collision rate} = \frac{4}{18,600} \times \frac{1,000,000}{365 \times 5}$$

	Collision Rate	Fatality Rate	Injury Rate
Study Intersection	0.12 c/mve	0.0%	75.0%
Statewide Average*	0.27 c/mve	0.6%	37.3%

ADT = average daily total vehicles entering intersection

c/mve = collisions per million vehicles entering intersection

* 2013 Collision Data on California State Highways, Caltrans

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection												
Int Delay, s/veh		0.5										
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Lane Configurations	W	W	P		P	↑						
Traffic Vol, veh/h	4	1	30	1	1	71						
Future Vol, veh/h	4	1	30	1	1	71						
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	-	-	-	50	-						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	79	79	79	79	79	79						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	5	1	38	1	1	90						
Major/Minor	Minor1	Major1	Major2									
Conflicting Flow All	131	39	0	0	39	0						
Stage 1	39	-	-	-	-	-						
Stage 2	92	-	-	-	-	-						
Critical Hwy	642	622	-	-	412	-						
Critical Hwy Stg 1	542	-	-	-	-	-						
Critical Hwy Stg 2	542	-	-	-	-	-						
Follow-up Hwy	3,518	3,318	-	-	2,218	-						
Pot Cap-1 Maneuver	863	1033	-	-	1571	-						
Stage 1	983	-	-	-	-	-						
Stage 2	932	-	-	-	-	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	862	1033	-	-	1571	-						
Mov Cap-2 Maneuver	862	-	-	-	-	-						
Stage 1	982	-	-	-	-	-						
Stage 2	932	-	-	-	-	-						
Approach	WB	NB	SB									
HCM Control Delay, s	9.1	0	0.1									
HCM LOS	A											
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	892	1571	-							
HCM Lane V/C Ratio	-	-	0.007	0.001	-							
HCM Control Delay (s)	-	-	9.1	7.3	-							
HCM Lane LOS	-	-	A	A	-							
HCM 95th %ile Q(veh)	-	-	0	0	-							

AM Peak Hour - Existing Conditions

Emerald Isle Senior Housing Traffic Impact Study

W-Trans

Page 1

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		 					
Traffic Volume (veh/h)	58	767	1268	17	5	99	
Future Volume (veh/h)	58	767	1268	17	5	99	
Number	5	2	6	16	7	14	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A, pbT)	1.00			0.97	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	66	872	1441	19	6	112	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap. veh/h	93	2668	2510	33	155	224	
Arrive On Green	0.05	0.79	0.67	0.67	0.09	0.09	
Sat Flow, veh/h	1703	3487	3815	49	1774	1583	
Grp Volume(v), veh/h	66	872	713	747	6	112	
Grp Sat Flow(s), veh/h/ln	1703	1699	1840	1927	1774	1583	
Q Serve(Q, s), s	2.4	4.7	12.9	12.9	0.2	4.1	
Cycle Q Clear(g, c), s	2.4	4.7	12.9	12.9	0.2	4.1	
Prop In Lane	1.00			0.03	1.00	1.00	
Lane Grp Cap(c), veh/h	93	2668	1242	1301	155	224	
V/C Ratio(X)	0.71	0.33	0.57	0.57	0.04	0.50	
Avail Cap(c, a), veh/h	394	3407	1317	1379	823	821	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	29.2	1.9	5.4	5.4	26.2	24.9	
Incr Delay (d2), s/veh	3.7	0.1	0.5	0.5	0.0	0.6	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%), veh/ln	1.2	2.1	6.5	6.8	0.1	3.6	
LnGrp Delay(d), s/veh	32.9	2.0	6.0	5.9	26.3	25.5	
LnGrp LOS	C	A	A	A	C	C	
Approach Vol, veh/h		938	1460		118		
Approach Delay, s/veh		4.2	5.9		25.5		
Approach LOS		A	A		C		
Timer	1	2	3	4	5	6	7 8
Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		53.8		9.0	6.9	46.8	
Change Period (Y+Rc), s		4.5		3.5	3.5	4.5	
Max Green Setting (Gmax), s		62.9		29.1	14.5	44.9	
Max Q Clear Time (g, c+H), s		6.7		6.1	4.4	14.9	
Green Ext Time (p, c), s		29.1		0.2	0.0	27.4	
Intersection Summary							
HCM 2010 Ctrl Delay	6.2						
HCM 2010 LOS	A						

AM Peak Hour - Existing Conditions

Emerald Isle Senior Housing Traffic Impact Study

W-Trans

Page 2

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection												
Int Delay, s/veh		0.2										
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Lane Configurations	W	W	W	W	W	W						
Traffic Vol, veh/h	2	0	55	3	0	36						
Future Vol, veh/h	2	0	55	3	0	36						
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	-	-	-	50	-						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	89	89	89	89	89	89						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	2	0	62	3	0	40						
Major/Minor	Minor1	Major1	Major2									
Conflicting Flow All	104	64	0	0	65	0						
Stage 1	64	-	-	-	-	-						
Stage 2	40	-	-	-	-	-						
Critical Hwy	642	622	-	-	412	-						
Critical Hwy Stg 1	542	-	-	-	-	-						
Critical Hwy Stg 2	542	-	-	-	-	-						
Follow-up Hwy	3518	3318	-	-	2218	-						
Pot Cap-1 Maneuver	894	1000	-	-	1537	-						
Stage 1	959	-	-	-	-	-						
Stage 2	982	-	-	-	-	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	894	1000	-	-	1537	-						
Mov Cap-2 Maneuver	894	-	-	-	-	-						
Stage 1	959	-	-	-	-	-						
Stage 2	982	-	-	-	-	-						
Approach	WB	NB	SB									
HCM Control Delay, s	9	0	0									
HCM LOS	A											
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	894	1537	-							
HCM Lane V/C Ratio	-	-	0.003	-	-							
HCM Control Delay (s)	-	-	9	0	-							
HCM Lane LOS	-	-	A	A	-							
HCM 95th %tile Q(veh)	-	-	0	0	-							

PM Peak Hour - Existing Conditions
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 1

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

Movement	EBL	EBT	WBT	WBR	SBL	SBT	
Lane Configurations	↰	↗	↗		↰	↗	↰
Traffic Volume (veh/h)	92	1038	757	15	10	74	
Future Volume (veh/h)	92	1038	757	15	10	74	
Number	5	2	6	16	7	14	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/hln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	99	1116	814	16	11	80	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap. veh/h	126	2699	2434	48	118	223	
Arrive On Green	0.07	0.79	0.66	0.66	0.07	0.07	
Sat Flow, veh/h	1703	3487	3787	73	1774	1583	
Grp Volume(v), veh/h	99	1116	406	424	11	80	
Grp Sat Flow(s),veh/hln	1703	1699	1840	1922	1774	1583	
Q Serve(g, s), s	3.3	5.8	5.5	5.5	0.3	2.6	
Cycle Q Clear(g, c), s	3.3	5.8	5.5	5.5	0.3	2.6	
Prop In Lane	1.00			0.04	1.00	1.00	
Lane Grp Cap(c), veh/h	126	2699	1214	1268	118	223	
V/C Ratio(X)	0.79	0.41	0.33	0.33	0.09	0.36	
Avail Cap(c, a), veh/h	429	3713	1436	1499	897	918	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	26.2	1.8	4.3	4.3	25.2	22.4	
Incr Delay (d2), s/veh	4.0	0.1	0.2	0.2	0.1	0.4	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.7	2.7	2.8	2.9	0.2	2.4	
LnGrp Delay(d),s/veh	30.3	1.9	4.4	4.4	25.4	22.8	
LnGrp LOS	C	A	A	A	C	C	
Approach Vol, veh/h		1215	830		91		
Approach Delay, s/veh		4.2	4.4		23.1		
Approach LOS		A	A		C		
Timer	1	2	3	4	5	6	7 8
Assigned Phs		2		4	5	6	
Phs Duration (G+Y+Rc), s		50.2		7.3	7.8	42.5	
Change Period (Y+Rc), s		4.5		3.5	3.5	4.5	
Max Green Setting (Gmax), s		62.9		29.1	14.5	44.9	
Max Q Clear Time (g_c+H), s		7.8		4.6	5.3	7.5	
Green Ext Time (p_c), s		37.9		0.1	0.1	21.1	
Intersection Summary							
HCM 2010 Ctrl Delay	5.1						
HCM 2010 LOS	A						

PM Peak Hour - Existing Conditions
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 2

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection		1.2									
Int Delay, s/veh											
Movement	WBL	WBR	NBT	NBR	SBL	SBT					
Lane Configurations	W	W	P		P	↑					
Traffic Vol, veh/h	14	2	30	7	1	71					
Future Vol, veh/h	14	2	30	7	1	71					
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	-	-	-	50	-					
Veh in Median Storage, #	0	-	0	-	-	0					
Grade, %	0	-	0	-	-	0					
Peak Hour Factor	79	79	79	79	79	79					
Heavy Vehicles, %	2	2	2	2	2	2					
Mvmt Flow	18	3	38	9	1	90					
Major/Minor	Minor1	Major1	Major2								
Conflicting Flow All	135	43	0	0	47	0					
Stage 1	43	-	-	-	-	-					
Stage 2	92	-	-	-	-	-					
Critical Hwy	642	622	-	-	412	-					
Critical Hwy Stg 1	542	-	-	-	-	-					
Critical Hwy Stg 2	542	-	-	-	-	-					
Follow-up Hwy	3.518	3.318	-	-	2.218	-					
Pot Cap-1 Maneuver	859	1027	-	-	1560	-					
Stage 1	979	-	-	-	-	-					
Stage 2	932	-	-	-	-	-					
Platoon blocked, %	-	-	-	-	-	-					
Mov Cap-1 Maneuver	858	1027	-	-	1560	-					
Mov Cap-2 Maneuver	858	-	-	-	-	-					
Stage 1	978	-	-	-	-	-					
Stage 2	932	-	-	-	-	-					
Approach	WB	NB	SB								
HCM Control Delay, s	9.2	0	0.1								
HCM LOS	A										
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT						
Capacity (veh/h)	-	-	876	1560	-						
HCM Lane V/C Ratio	-	-	0.023	0.001	-						
HCM Control Delay (s)	-	-	9.2	7.3	-						
HCM Lane LOS	-	-	A	A	-						
HCM 95th %ile Q(veh)	-	-	0.1	0	-						

AM Peak Hour - Existing plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 1

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

							
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		 	 				
Traffic Volume (veh/h)	63	767	1268	18	7	107	
Future Volume (veh/h)	63	767	1268	18	7	107	
Number	5	2	6	16	7	14	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	72	872	1441	20	8	122	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap. veh/h	96	2648	2480	34	168	240	
Arrive On Green	0.06	0.78	0.67	0.67	0.09	0.09	
Sat Flow, veh/h	1703	3487	3812	52	1774	1583	
Grp Volume(v), veh/h	72	872	713	748	8	122	
Grp Sat Flow(s), veh/h/ln	1703	1699	1840	1927	1774	1583	
Q Serve(g, s), s	2.6	4.8	13.4	13.4	0.3	4.5	
Cycle Q Clear(g, c), s	2.6	4.8	13.4	13.4	0.3	4.5	
Prop In Lane	1.00			0.03	1.00	1.00	
Lane Grp Cap(c), veh/h	96	2648	1229	1286	168	240	
V/C Ratio(X)	0.75	0.33	0.58	0.58	0.05	0.51	
Avail Cap(c, a), veh/h	389	3363	1300	1361	812	815	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	29.5	2.1	5.7	5.7	26.2	24.8	
Incr Delay (d2), s/veh	4.3	0.1	0.6	0.6	0.0	0.6	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%), veh/ln	1.4	2.2	6.7	7.3	0.1	4.0	
LnGrp Delay(d),s/veh	33.8	2.2	6.3	6.3	26.2	25.4	
LnGrp LOS	C	A	A	A	C	C	
Approach Vol, veh/h	944			130			
Approach Delay, s/veh	4.6			6.3			
Approach LOS	A			A			
Timer	1	2	3	4	5	6	7 8
Assigned Phs	2						
Phs Duration (G+Y+Rc), s	54.0						
Change Period (Y+Rc), s	4.5						
Max Green Setting (Gmax), s	62.9						
Max Q Clear Time (g_c+H), s	6.8						
Green Ext Time (p_c), s	29.0						
Intersection Summary							
HCM 2010 Ctrl Delay	6.6						
HCM 2010 LOS	A						

AM Peak Hour - Existing plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 2

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection												
Int Delay, s/veh		0.9										
Movement		WBL	WBR	NBT	NBR	SBL	SBT					
Lane Configurations		W	W	W	W	W	W					
Traffic Vol, veh/h		10	1	55	14	1	36					
Future Vol, veh/h		10	1	55	14	1	36					
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	-	-	-	50	-					
Veh in Median Storage, #		0	-	0	-	-	0					
Grade, %		0	-	0	-	-	0					
Peak Hour Factor		89	89	89	89	89	89					
Heavy Vehicles, %		2	2	2	2	2	2					
Mvmt Flow		11	1	62	16	1	40					
Major/Minor		Minor1	Major1		Major2							
Conflicting Flow All		112	70	0	0	78	0					
Stage 1		70	-	-	-	-	-					
Stage 2		42	-	-	-	-	-					
Critical Hwy		642	622	-	-	412	-					
Critical Hwy Stg 1		542	-	-	-	-	-					
Critical Hwy Stg 2		542	-	-	-	-	-					
Follow-up Hwy		3,518	3,318	-	-	2,218	-					
Pot Cap-1 Maneuver		885	993	-	-	1520	-					
Stage 1		953	-	-	-	-	-					
Stage 2		980	-	-	-	-	-					
Platoon blocked, %		-	-	-	-	-	-					
Mov Cap-1 Maneuver		884	993	-	-	1520	-					
Mov Cap-2 Maneuver		884	-	-	-	-	-					
Stage 1		952	-	-	-	-	-					
Stage 2		980	-	-	-	-	-					
Approach		WB	NB		SB							
HCM Control Delay, s		9.1	0		0.2							
HCM LOS		A										
Minor Lane/Major Mvmt		NBT		NBR		WBLn1	SBL	SBT				
Capacity (veh/h)		-		-		893	1520	-				
HCM Lane V/C Ratio		-		-		0.014	0.001	-				
HCM Control Delay (s)		-		-		9.1	7.4	-				
HCM Lane LOS		-		-		A	A	-				
HCM 95th %ile Q(veh)		-		-		0	0	-				

PM Peak Hour - Existing plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 1

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

							
Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	100	1038	757	18	12	80	
Future Volume (veh/h)	100	1038	757	18	12	80	
Number	5	2	6	16	7	14	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A, pbT)	1.00			0.97	1.00	1.00	
Parking Bus, Adj		1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	108	1116	814	19	13	86	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap. veh/h	138	2693	2392	56	122	237	
Arrive On Green	0.08	0.79	0.65	0.65	0.07	0.07	
Sat Flow, veh/h	1703	3487	3771	86	1774	1583	
Grp Volume(v), veh/h	108	1116	408	425	13	86	
Grp Sat Flow(s), veh/h/ln	1703	1699	1840	1919	1774	1583	
Q Serve(g, s), s	3.6	5.9	5.7	5.7	0.4	2.8	
Cycle Q Clear(g, c), s	3.6	5.9	5.7	5.7	0.4	2.8	
Prop In Lane	1.00			0.04	1.00	1.00	
Lane Grp Cap(c), veh/h	138	2693	1198	1250	122	237	
V/C Ratio(X)	0.79	0.41	0.34	0.34	0.11	0.36	
Avail Cap(c, a), veh/h	428	3701	1431	1493	894	926	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	26.0	1.9	4.5	4.5	25.2	22.1	
Incr Delay (d2), s/veh	3.7	0.1	0.2	0.2	0.1	0.3	
Initial Q Delay(d3), s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%), veh/ln	1.8	2.7	2.9	3.0	0.2	2.6	
LnGrp Delay(d), s/veh	29.7	2.0	4.7	4.7	25.4	22.4	
LnGrp LOS	C	A	A	A	C	C	
Approach Vol, veh/h	1224			833			99
Approach Delay, s/veh	4.4			4.7			22.8
Approach LOS	A			A			C
Timer	1	2	3	4	5	6	7 8
Assigned Phs	2						
Phs Duration (G+Y+Rc), s	50.3						
Change Period (Y+Rc), s	4.5						
Max Green Setting (Gmax), s	62.9						
Max Q Clear Time (g_c+I1), s	7.9						
Green Ext Time (p_c), s	37.9						
Intersection Summary							
HCM 2010 Ctrl Delay	5.4						
HCM 2010 LOS	A						

PM Peak Hour - Existing plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 2

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection												
Int Delay, s/veh		0.3										
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Lane Configurations	W	W	W	W	W	W						
Traffic Vol, veh/h	4	1	49	1	1	122						
Future Vol, veh/h	4	1	49	1	1	122						
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	-	-	-	50	-						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	79	79	79	79	79	79						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	5	1	62	1	1	154						
Major/Minor	Minor1	Major1	Major2									
Conflicting Flow All	219	63	0	0	63	0						
Stage 1	63	-	-	-	-	-						
Stage 2	156	-	-	-	-	-						
Critical Hwy	642	622	-	-	412	-						
Critical Hwy Stg 1	542	-	-	-	-	-						
Critical Hwy Stg 2	542	-	-	-	-	-						
Follow-up Hwy	3518	3318	-	-	2218	-						
Pot Cap-1 Maneuver	769	1002	-	-	1540	-						
Stage 1	960	-	-	-	-	-						
Stage 2	872	-	-	-	-	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	768	1002	-	-	1540	-						
Mov Cap-2 Maneuver	768	-	-	-	-	-						
Stage 1	959	-	-	-	-	-						
Stage 2	872	-	-	-	-	-						
Approach	WB	NB	SB									
HCM Control Delay, s	9.5	0	0.1									
HCM LOS	A											
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	806	1540	-							
HCM Lane V/C Ratio	-	-	0.008	0.001	-							
HCM Control Delay (s)	-	-	9.5	7.3	-							
HCM Lane LOS	-	-	A	A	-							
HCM 95th %tile Q(veh)	-	-	0	0	-							

AM Peak Hour - Baseline Conditions
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 1

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

									
Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR		
Lane Configurations		 	 		 	 	 		
Traffic Volume (veh/h)	73	800	1290	21	15	139			
Future Volume (veh/h)	73	800	1290	21	15	139			
Number	5	2	6	16	7	14			
Initial Q (Ob), veh	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00				0.97	1.00	1.00		
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/hln	1788	1788	1937	1976	1863	1863			
Adj Flow Rate, veh/h	83	909	1466	24	17	158			
Adj No. of Lanes	1	2	2	0	1	1			
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88			
Percent Heavy Veh, %	2	2	2	2	2	2			
Cap, veh/h	105	2581	2390	39	213	288			
Arrive On Green	0.06	0.76	0.65	0.65	0.12	0.12			
Sat Flow, veh/h	1703	3487	3801	61	1774	1583			
Grp Volume(v), veh/h	83	909	728	762	17	158			
Grp Sat Flow(s),veh/hln	1703	1699	1840	1925	1774	1583			
Q Serve(g, s), s	3.2	5.8	15.4	15.5	0.6	6.0			
Cycle Q Clear(g, c), s	3.2	5.8	15.4	15.5	0.6	6.0			
Prop In Lane	1.00			0.03	1.00	1.00			
Lane Grp Cap(c), veh/h	105	2581	1187	1242	213	288			
V/C Ratio(X)	0.79	0.35	0.61	0.61	0.08	0.55			
Avail Cap(c, a), veh/h	371	3214	1243	1299	776	791			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	30.8	2.6	6.9	6.9	26.0	24.7			
Incr Delay (d2), s/veh	4.8	0.1	0.8	0.8	0.1	0.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	1.6	2.7	8.0	8.3	0.3	5.3			
LnGrp Delay(d),s/veh	35.6	2.7	7.8	7.7	26.1	25.3			
LnGrp LOS	D	A	A	A	C	C			
Approach Vol, veh/h		992	1490		175				
Approach Delay, s/veh		5.5	7.7		25.4				
Approach LOS		A	A		C				
Timer	1	2	3	4	5	6	7	8	
Assigned Phs		2		4	5	6			
Phs Duration (G+Y+Rc), s		55.0		11.5	7.6	47.4			
Change Period (Y+Rc), s		4.5		3.5	3.5	4.5			
Max Green Setting (Gmax), s		62.9		29.1	14.5	44.9			
Max Q Clear Time (g_c+H), s		7.8		8.0	5.2	17.5			
Green Ext Time (p_c), s		30.2		0.3	0.1	25.4			
Intersection Summary									
HCM 2010 Ctrl Delay			8.1						
HCM 2010 LOS			A						

AM Peak Hour - Baseline Conditions
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 2

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection													
0.1													
Movement	WBL	WBR	NBT	NBR	SBL	SBT							
Lane Configurations	W		P		P	↑							
Traffic Vol, veh/h	2	0	109	3	0	69							
Future Vol, veh/h	2	0	109	3	0	69							
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	-	-	-	50	-							
Veh in Median Storage, #	0	-	0	-	-	0							
Grade, %	0	-	0	-	-	0							
Peak Hour Factor	89	89	89	89	89	89							
Heavy Vehicles, %	2	2	2	2	2	2							
Mvmt Flow	2	0	122	3	0	78							
Major/Minor	Minor1	Major1		Major2									
Conflicting Flow All	202	124	0	0	125	0							
Stage 1	124	-	-	-	-	-							
Stage 2	78	-	-	-	-	-							
Critical Hwy	642	622	-	-	412	-							
Critical Hwy Stg 1	542	-	-	-	-	-							
Critical Hwy Stg 2	542	-	-	-	-	-							
Follow-up Hwy	3518	3318	-	-	2218	-							
Pot Cap-1 Maneuver	787	927	-	-	1462	-							
Stage 1	902	-	-	-	-	-							
Stage 2	945	-	-	-	-	-							
Platoon blocked, %	-	-	-	-	-	-							
Mov Cap-1 Maneuver	787	927	-	-	1462	-							
Mov Cap-2 Maneuver	787	-	-	-	-	-							
Stage 1	902	-	-	-	-	-							
Stage 2	945	-	-	-	-	-							
Approach	WB	NB	SB										
HCM Control Delay, s	9.6	0	0										
HCM LOS	A												
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT								
Capacity (veh/h)	-	-	787	1462	-								
HCM Lane V/C Ratio	-	-	0.003	-	-								
HCM Control Delay (s)	-	-	9.6	0	-								
HCM Lane LOS	-	-	A	A	-								
HCM 95th %tile Q(veh)	-	-	0	0	-								

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

							
Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	135	1067	793	26	17	101	101
Future Volume (veh/h)	135	1067	793	26	17	101	101
Number	5	2	6	16	7	14	
Initial Q (Ob.) veh	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00	
Parking Bus. Adj		1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	145	1147	853	28	18	109	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh. %	2	2	2	2	2	2	
Cap. veh/h	183	2659	2243	74	150	304	
Arrive On Green	0.11	0.78	0.62	0.62	0.08	0.08	
Sat Flow, veh/h	1703	3487	3730	119	1774	1583	
Grp Volume(v), veh/h	145	1147	432	449	18	109	
Grp Sat Flow(s),veh/h/ln	1703	1699	1840	1912	1774	1583	
Q Serve(g. s), s	5.0	6.7	7.1	7.1	0.6	3.6	
Cycle Q Clear(g. c), s	5.0	6.7	7.1	7.1	0.6	3.6	
Prop In Lane	1.00			0.06	1.00	1.00	
Lane Grp Cap(c), veh/h	183	2659	1136	1180	150	304	
V/C Ratio(X)	0.79	0.43	0.38	0.38	0.12	0.36	
Avail Cap(c.a), veh/h	410	3544	1370	1424	856	934	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	26.3	2.1	5.8	5.8	25.5	21.1	
Incr Delay (d2), s/veh	2.9	0.1	0.2	0.2	0.1	0.3	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%)\veh/ln	2.5	3.1	3.5	3.7	0.3	3.3	
LnGrp Delay(d),s/veh	29.2	2.3	6.0	6.0	25.7	21.4	
LnGrp LOS	C	A	A	A	C	C	
Approach Vol, veh/h	1292 881 127						
Approach Delay, s/veh	5.3 6.0 22.0						
Approach LOS	A A C						
Timer	1	2	3	4	5	6	7 8
Assigned Phs	2 4 4 5 6						
Phs Duration (G+Y+Rc), s	51.7 8.6 10.0 41.7						
Change Period (Y+Rc), s	4.5 3.5 3.5 4.5						
Max Green Setting (Gmax), s	62.9 29.1 14.5 44.9						
Max Q Clear Time (g_c+H), s	8.7 5.6 7.0 9.1						
Green Ext Time (p_c), s	38.5 0.2 0.1 21.9						
Intersection Summary							
HCM 2010 Ctrl Delay	6.5						
HCM 2010 LOS	A						

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection													
Int Delay, s/veh		0.9											
Movement	WBL	WBR	NBT	NBR	SBL	SBT							
Lane Configurations	W	W	A			↑							
Traffic Vol, veh/h	14	2	49	7	1	122							
Future Vol, veh/h	14	2	49	7	1	122							
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	-	-	-	50	-							
Veh in Median Storage, #	0	-	0	-	-	0							
Grade, %	0	-	0	-	-	0							
Peak Hour Factor	79	79	79	79	79	79							
Heavy Vehicles, %	2	2	2	2	2	2							
Mvmt Flow	18	3	62	9	1	154							
Major/Minor	Minor1	Major1		Major2									
Conflicting Flow All	223	67	0	0	71	0							
Stage 1	67	-	-	-	-	-							
Stage 2	156	-	-	-	-	-							
Critical Hwy	642	6.22	-	-	4.12	-							
Critical Hwy Stg 1	542	-	-	-	-	-							
Critical Hwy Stg 2	542	-	-	-	-	-							
Follow-up Hwy	3518	3318	-	-	2218	-							
Pot Cap-1 Maneuver	765	997	-	-	1529	-							
Stage 1	956	-	-	-	-	-							
Stage 2	872	-	-	-	-	-							
Platoon blocked, %	-	-	-	-	-	-							
Mov Cap-1 Maneuver	764	997	-	-	1529	-							
Mov Cap-2 Maneuver	764	-	-	-	-	-							
Stage 1	955	-	-	-	-	-							
Stage 2	872	-	-	-	-	-							
Approach	WB	NB	SB										
HCM Control Delay, s	9.7	0	0.1										
HCM LOS	A												
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT								
Capacity (veh/h)	-	-	787	1529	-								
HCM Lane V/C Ratio	-	-	0.026	0.001	-								
HCM Control Delay (s)	-	-	9.7	7.4	-								
HCM Lane LOS	-	-	A	A	-								
HCM 95th %tile Q(veh)	-	-	0.1	0	-								

AM Peak Hour - Baseline plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 1

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

							
Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR
Lane Configurations							
Traffic Volume (veh/h)	78	800	1290	22	17	147	
Future Volume (veh/h)	78	800	1290	22	17	147	
Number	5	2	6	16	7	14	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00				0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/hln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	89	909	1466	25	19	167	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap, veh/h	113	2569	2360	40	222	304	
Arrive On Green	0.07	0.76	0.64	0.64	0.13	0.13	
Sat Flow, veh/h	1703	3487	3798	63	1774	1583	
Grp Volume(v), veh/h	89	909	728	763	19	167	
Grp Sat Flow(s),veh/hln	1703	1699	1840	1924	1774	1583	
Q Serve(g, s), s	3.5	6.0	16.0	16.0	0.6	6.4	
Cycle Q Clear(g, c), s	3.5	6.0	16.0	16.0	0.6	6.4	
Prop In Lane	1.00				0.03	1.00	1.00
Lane Grp Cap(c), veh/h	113	2569	1173	1227	222	304	
V/C Ratio(X)	0.79	0.35	0.62	0.62	0.09	0.55	
Avail Cap(c, a), veh/h	366	3170	1226	1281	766	789	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	31.0	2.7	7.3	7.3	26.1	24.6	
Incr Delay (d2), s/veh	4.5	0.1	0.9	0.9	0.1	0.6	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	1.8	2.8	8.2	8.6	0.3	5.7	
LnGrp Delay(d),s/veh	35.5	2.8	8.2	8.2	26.1	25.2	
LnGrp LOS	D	A	A	A	C	C	
Approach Vol, veh/h	998 1491 186						
Approach Delay, s/veh	5.7 8.2 25.3						
Approach LOS	A A C						
Timer	1	2	3	4	5	6	7 8
Assigned Phs	2 4 5 6						
Phs Duration (G+Y+Rc), s	55.5 11.9 8.0 47.5						
Change Period (Y+Rc), s	4.5 3.5 3.5 4.5						
Max Green Setting (Gmax), s	62.9 29.1 14.5 44.9						
Max Q Clear Time (g_c+H), s	8.0 8.4 5.5 18.0						
Green Ext Time (p_c), s	30.2 0.3 0.1 24.9						
Intersection Summary							
HCM 2010 Ctrl Delay	8.5						
HCM 2010 LOS	A						

AM Peak Hour - Baseline plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 2

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection													
Int Delay, s/veh		0.6											
Movement	WBL	WBR	NBT	NBR	SBL	SBT							
Lane Configurations	W	W	W	W	W	W							
Traffic Vol, veh/h	10	1	109	14	1	69							
Future Vol, veh/h	10	1	109	14	1	69							
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	-	-	-	50	-							
Veh in Median Storage, #	0	-	0	-	-	0							
Grade, %	0	-	0	-	-	0							
Peak Hour Factor	89	89	89	89	89	89							
Heavy Vehicles, %	2	2	2	2	2	2							
Mvmt Flow	11	1	122	16	1	78							
Major/Minor	Minor1	Major1	Major2										
Conflicting Flow All	210	130	0	0	138	0							
Stage 1	130	-	-	-	-	-							
Stage 2	80	-	-	-	-	-							
Critical Hwy	642	622	-	-	412	-							
Critical Hwy Stg 1	542	-	-	-	-	-							
Critical Hwy Stg 2	542	-	-	-	-	-							
Follow-up Hwy	3518	3318	-	-	2218	-							
Pot Cap-1 Maneuver	778	920	-	-	1446	-							
Stage 1	896	-	-	-	-	-							
Stage 2	943	-	-	-	-	-							
Platoon blocked, %	-	-	-	-	-	-							
Mov Cap-1 Maneuver	777	920	-	-	1446	-							
Mov Cap-2 Maneuver	777	-	-	-	-	-							
Stage 1	895	-	-	-	-	-							
Stage 2	943	-	-	-	-	-							
Approach	WB	NB	SB										
HCM Control Delay, s	9.6	0	0.1										
HCM LOS	A												
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT								
Capacity (veh/h)	-	-	788	1446	-								
HCM Lane V/C Ratio	-	-	0.016	0.001	-								
HCM Control Delay (s)	-	-	9.6	7.5	-								
HCM Lane LOS	-	-	A	A	-								
HCM 95th %tile Q(veh)	-	-	0	0	-								

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

						
Movement	EBL	EBT	WBT	WBR	SBL	SBT
Lane Configurations		 	 			
Traffic Volume (veh/h)	143	1067	793	29	19	107
Future Volume (veh/h)	143	1067	793	29	19	107
Number	5	2	6	16	7	14
Initial Q (Ob), veh	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00
Adj Sat Flow, veh/hln	1788	1788	1937	1976	1863	1863
Adj Flow Rate, veh/h	154	1147	853	31	20	115
Adj No. of Lanes	1	2	2	0	1	1
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	2	2	2	2	2	2
Cap, veh/h	194	2648	2200	80	157	320
Arrive On Green	0.11	0.78	0.61	0.61	0.09	0.09
Sat Flow, veh/h	1703	3487	3715	132	1774	1583
Grp Volume(v), veh/h	154	1147	434	450	20	115
Grp Sat Flow(s),veh/hln	1703	1699	1840	1910	1774	1583
Q Serve(g, s), s	5.3	6.8	7.3	7.3	0.6	3.8
Cycle Q Clear(g, c), s	5.3	6.8	7.3	7.3	0.6	3.8
Prop In Lane	1.00			0.07	1.00	1.00
Lane Grp Cap(c), veh/h	194	2648	1119	1161	157	320
V/C Ratio(X)	0.80	0.43	0.39	0.39	0.13	0.36
Avail Cap(c, a), veh/h	407	3524	1363	1414	851	940
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	26.2	2.2	6.1	6.1	25.5	20.8
Incr Delay (d2), s/veh	2.8	0.1	0.2	0.2	0.1	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.7	3.1	3.7	3.8	0.3	3.5
LnGrp Delay(d),s/veh	29.0	2.3	6.3	6.3	25.6	21.1
LnGrp LOS	C	A	A	A	C	C
Approach Vol, veh/h	1301			884	135	
Approach Delay, s/veh	5.5			6.3	21.7	
Approach LOS	A			A	C	
Timer	1	2	3	4	5	6
					7	8
Assigned Phs	2					
Phs Duration (G+Y+Rc), s	51.8					
Change Period (Y+Rc), s	4.5					
Max Green Setting (Gmax), s	62.9					
Max Q Clear Time (g_c+H), s	8.8					
Green Ext Time (p_c), s	38.5					
	0.2					
	0.1					
	21.9					
Intersection Summary						
HCM 2010 Ctrl Delay	6.8					
HCM 2010 LOS	A					

Intersection		0.2									
Movement	WBL	WBR	NBT	NBR	SBL	SBT					
Lane Configurations	W	W	W	W	W	W					
Traffic Vol, veh/h	5	1	55	1	1	276					
Future Vol, veh/h	5	1	55	1	1	276					
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	-	-	-	50	-					
Veh in Median Storage, #	0	-	0	-	-	0					
Grade, %	0	-	0	-	-	0					
Peak Hour Factor	79	79	79	79	79	79					
Heavy Vehicles, %	2	2	2	2	2	2					
Mvmt Flow	6	1	70	1	1	349					
Major/Minor	Minor1	Major1	Major2								
Conflicting Flow All	422	71	0	0	71	0					
Stage 1	71	-	-	-	-	-					
Stage 2	351	-	-	-	-	-					
Critical Hwy	642	622	-	-	412	-					
Critical Hwy Stg 1	542	-	-	-	-	-					
Critical Hwy Stg 2	542	-	-	-	-	-					
Follow-up Hwy	3518	3318	-	-	2218	-					
Pot Cap-1 Maneuver	588	991	-	-	1529	-					
Stage 1	952	-	-	-	-	-					
Stage 2	713	-	-	-	-	-					
Platoon blocked, %	-	-	-	-	-	-					
Mov Cap-1 Maneuver	587	991	-	-	1529	-					
Mov Cap-2 Maneuver	587	-	-	-	-	-					
Stage 1	951	-	-	-	-	-					
Stage 2	713	-	-	-	-	-					
Approach	WB	NB	SB								
HCM Control Delay, s	10.8	0	0								
HCM LOS	B										
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT						
Capacity (veh/h)	-	-	630	1529	-						
HCM Lane V/C Ratio	-	-	0.012	0.001	-						
HCM Control Delay (s)	-	-	10.8	7.4	-						
HCM Lane LOS	-	-	B	A	-						
HCM 95th %tile Q(veh)	-	-	0	0	-						

	↖	→	←	↗	↘	↙	↕
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	↖	↗↗	↗↗		↖	↖	
Traffic Volume (veh/h)	82	850	1370	24	17	302	
Future Volume (veh/h)	82	850	1370	24	17	302	
Number	5	2	6	16	7	14	
Initial Q (Ob), veh	0	0	0	0	0	0	
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/h/ln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	93	966	1557	27	19	343	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap. veh/h	118	2284	2067	36	402	469	
Arrive On Green	0.07	0.67	0.56	0.56	0.23	0.23	
Sat Flow, veh/h	1703	3487	3797	64	1774	1583	
Grp Volume(v), veh/h	93	966	773	811	19	343	
Grp Sat Flow(s),veh/h/ln	1703	1699	1840	1924	1774	1583	
Q Serve(g, s), s	4.3	10.3	25.3	25.5	0.7	15.4	
Cycle Q Clear(g, c), s	4.3	10.3	25.3	25.5	0.7	15.4	
Prop In Lane	1.00			0.03	1.00	1.00	
Lane Grp Cap(c), veh/h	118	2284	1028	1075	402	469	
V/C Ratio(X)	0.79	0.42	0.75	0.75	0.05	0.73	
Avail Cap(c, a), veh/h	312	2699	1043	1091	652	692	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	36.3	5.9	13.3	13.3	23.9	25.0	
Incr Delay (d2), s/veh	4.3	0.1	3.1	3.0	0.0	0.8	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%),veh/ln	2.1	4.7	13.6	14.2	0.3	12.9	
LnGrp Delay(d),s/veh	40.6	6.1	16.4	16.3	23.9	25.9	
LnGrp LOS	D	A	B	B	C	C	
Approach Vol, veh/h	1059			362			
Approach Delay, s/veh	9.1			16.4			
Approach LOS	A			B			
Timer	1	2	3	4	5	6	7 8
Assigned Phs	2			4			5 6
Phs Duration (G+Y+Rc), s	57.7			21.5			9.0 48.7
Change Period (Y+Rc), s	4.5			3.5			3.5 4.5
Max Green Setting (Gmax), s	62.9			29.1			14.5 44.9
Max Q Clear Time (g_c+H), s	12.3			17.4			6.3 27.5
Green Ext Time (p_c), s	30.8			0.6			0.1 16.8
Intersection Summary							
HCM 2010 Ctrl Delay	14.9						
HCM 2010 LOS	B						

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection						
Int Delay, s/veh		0.1				
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Vol, veh/h	2	0	274	3	0	78
Future Vol, veh/h	2	0	274	3	0	78
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	-	-	-	50	-
Veh in Median Storage, #	0	-	0	-	-	0
Grade, %	0	-	0	-	-	0
Peak Hour Factor	89	89	89	89	89	89
Heavy Vehicles, %	2	2	2	2	2	2
Mvmt Flow	2	0	308	3	0	88
Major/Minor	Minor1	Major1	Major2			
Conflicting Flow All	398	310	0	0	311	0
Stage 1	310	-	-	-	-	-
Stage 2	88	-	-	-	-	-
Critical Hdwy	642	622	-	-	412	-
Critical Hdwy Stg 1	542	-	-	-	-	-
Critical Hdwy Stg 2	542	-	-	-	-	-
Follow-up Hdwy	3,518	3,318	-	-	2,218	-
Pot Cap-1 Maneuver	607	730	-	-	1249	-
Stage 1	744	-	-	-	-	-
Stage 2	935	-	-	-	-	-
Platoon blocked, %	-	-	-	-	-	-
Mov Cap-1 Maneuver	607	730	-	-	1249	-
Mov Cap-2 Maneuver	607	-	-	-	-	-
Stage 1	744	-	-	-	-	-
Stage 2	935	-	-	-	-	-
Approach	WB	NB	SB			
HCM Control Delay, s	11	0	0			
HCM LOS	B					
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT	
Capacity (veh/h)	-	-	607	1249	-	
HCM Lane V/C Ratio	-	-	0.004	-	-	
HCM Control Delay (s)	-	-	11	0	-	
HCM Lane LOS	-	-	B	A	-	
HCM 95th %tile Q(veh)	-	-	0	0	-	

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

Movement	EBL	EBT	WBT	WBR	SBL	SBT	
Lane Configurations	↰	↗↗	↗↗		↰	↰	↰
Traffic Volume (veh/h)	282	1133	842	29	19	114	
Future Volume (veh/h)	282	1133	842	29	19	114	
Number	5	2	6	16	7	14	
Initial Q (Qb), veh	0	0	0	0	0	0	
Ped-Bike Adj(A, pBt)	1.00			0.97	1.00	1.00	
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	
Adj Sat Flow, veh/hln	1788	1788	1937	1976	1863	1863	
Adj Flow Rate, veh/h	303	1218	905	31	20	123	
Adj No. of Lanes	1	2	2	0	1	1	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	
Percent Heavy Veh, %	2	2	2	2	2	2	
Cap. veh/h	347	2677	1920	66	154	461	
Arrive On Green	0.20	0.79	0.53	0.53	0.09	0.09	
Sat Flow, veh/h	1703	3487	3724	124	1774	1583	
Grp Volume(v), veh/h	303	1218	459	477	20	123	
Grp Sat Flow(s),veh/hln	1703	1699	1840	1911	1774	1583	
Q Serve(g, s), s	11.0	7.6	10.0	10.0	0.7	3.8	
Cycle Q Clear(g, c), s	11.0	7.6	10.0	10.0	0.7	3.8	
Prop In Lane	1.00			0.07	1.00	1.00	
Lane Grp Cap(c), veh/h	347	2677	974	1012	154	461	
V/C Ratio(X)	0.87	0.45	0.47	0.47	0.13	0.27	
Avail Cap(c, a), veh/h	386	3340	1292	1341	807	1043	
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay (d), s/veh	24.7	2.2	9.4	9.4	27.0	17.4	
Incr Delay (d2), s/veh	16.6	0.1	0.4	0.3	0.1	0.1	
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	
%ile BackOfQ(50%) veh/ln	6.7	3.4	5.1	5.3	0.3	3.7	
LnGrp Delay(d),s/veh	41.3	2.4	9.8	9.8	27.1	17.6	
LnGrp LOS	D	A	A	A	C	B	
Approach Vol, veh/h	1521			936			
Approach Delay, s/veh	10.1			9.8			
Approach LOS	B			A			
Timer	1	2	3	4	5	6	7 8
Assigned Phs	2			4 5			6
Phs Duration (G+Y+Rc), s	54.9			9.1			16.5 38.4
Change Period (Y+Rc), s	4.5			3.5			3.5 4.5
Max Green Setting (Gmax), s	62.9			29.1			14.5 44.9
Max Q Clear Time (g_c+H), s	9.6			5.8			13.0 12.0
Green Ext Time (p_c), s	40.2			0.2			0.1 21.9
Intersection Summary							
HCM 2010 Ctrl Delay	10.5						
HCM 2010 LOS	B						

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection												
Int Delay, s/veh		0.5										
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Lane Configurations	W	W	T	T	T	T						
Traffic Vol, veh/h	15	2	55	7	1	276						
Future Vol, veh/h	15	2	55	7	1	276						
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	-	-	-	50	-						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	79	79	79	79	79	79						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	19	3	70	9	1	349						
Major/Minor	Minor1	Major1		Major2								
Conflicting Flow All	426	75	0	0	79	0						
Stage 1	75	-	-	-	-	-						
Stage 2	351	-	-	-	-	-						
Critical Hwy	642	622	-	-	412	-						
Critical Hwy Stg 1	542	-	-	-	-	-						
Critical Hwy Stg 2	542	-	-	-	-	-						
Follow-up Hwy	3518	3318	-	-	2218	-						
Pot Cap-1 Maneuver	585	986	-	-	1519	-						
Stage 1	948	-	-	-	-	-						
Stage 2	713	-	-	-	-	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	584	986	-	-	1519	-						
Mov Cap-2 Maneuver	584	-	-	-	-	-						
Stage 1	947	-	-	-	-	-						
Stage 2	713	-	-	-	-	-						
Approach	WB	NB		SB								
HCM Control Delay, s	11.1	0		0								
HCM LOS	B											
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	613	1519	-							
HCM Lane V/C Ratio	-	-	0.035	0.001	-							
HCM Control Delay (s)	-	-	11.1	7.4	-							
HCM Lane LOS	-	-	B	A	-							
HCM 95th %ile Q(veh)	-	-	0.1	0	-							

AM Peak Hour - Future plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 1

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

								
Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR	
Lane Configurations								
Traffic Volume (veh/h)	87	850	1370	25	19	310		
Future Volume (veh/h)	87	850	1370	25	19	310		
Number	5	2	6	16	7	14		
Initial Q (Ob.) veh	0	0	0	0	0	0		
Ped-Bike Adj(A_pbT)	1.00			0.97	1.00	1.00		
Parking Bus. Adj	1.00	1.00	1.00	1.00	1.00	1.00		
Adj Sat Flow, veh/h/in	1788	1788	1937	1976	1863	1863		
Adj Flow Rate, veh/h	99	966	1557	28	22	352		
Adj No. of Lanes	1	2	2	0	1	1		
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88		
Percent Heavy Veh. %	2	2	2	2	2	2		
Cap. veh/h	126	2275	2041	37	409	482		
Arrive On Green	0.07	0.67	0.55	0.55	0.23	0.23		
Sat Flow, veh/h	1703	3487	3794	66	1774	1583		
Grp Volume(v), veh/h	99	966	774	811	22	352		
Grp Sat Flow(s),veh/h/in	1703	1699	1840	1923	1774	1583		
Q Serve(Q_s), s	4.6	10.5	26.1	26.2	0.8	15.9		
Cycle Q Clear(g_c), s	4.6	10.5	26.1	26.2	0.8	15.9		
Prop In Lane	1.00			0.03	1.00	1.00		
Lane Grp Cap(c), veh/h	126	2275	1016	1062	409	482		
V/C Ratio(X)	0.79	0.42	0.76	0.76	0.05	0.73		
Avail Cap(c_a), veh/h	308	2665	1030	1077	644	691		
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00		
Upstream Filter(i)	1.00	1.00	1.00	1.00	1.00	1.00		
Uniform Delay (d), s/veh	36.5	6.1	13.9	13.9	24.0	24.9		
Incr Delay (d2), s/veh	4.1	0.1	3.3	3.3	0.0	1.0		
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0		
%ile BackOfQ(50%) veh/in	2.3	4.9	14.1	14.7	0.4	13.4		
LnGrp Delay(d),s/veh	40.6	6.2	17.2	17.2	24.0	25.9		
LnGrp LOS	D	A	B	B	C	C		
Approach Vol, veh/h	1065			1585			374	
Approach Delay, s/veh	9.4			17.2			25.8	
Approach LOS	A			B			C	
Timer	1	2	3	4	5	6	7	8
Assigned Phs	2			4			5 6	
Phs Duration (G+Y+Rc), s	58.2			22.0			9.4 48.8	
Change Period (Y+Rc), s	4.5			3.5			3.5 4.5	
Max Green Setting (Gmax), s	62.9			29.1			14.5 44.9	
Max Q Clear Time (g_c+H), s	12.5			17.9			6.6 28.2	
Green Ext Time (p_c), s	30.7			0.6			0.1 16.1	
Intersection Summary								
HCM 2010 Ctrl Delay	15.5							
HCM 2010 LOS	B							

AM Peak Hour - Future plus Project
Emerald Isle Senior Housing Traffic Impact Study

W-Trans
Page 2

HCM 2010 TWSC

1: Thomas Lake Harris Drive & Gullane Dr.

01/02/2019

Intersection												
Int Delay, s/veh		0.3										
Movement	WBL	WBR	NBT	NBR	SBL	SBT						
Lane Configurations	W	W	P	P	S	↑						
Traffic Vol, veh/h	10	1	274	14	1	78						
Future Vol, veh/h	10	1	274	14	1	78						
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	-	-	-	50	-						
Veh in Median Storage, #	0	-	0	-	-	0						
Grade, %	0	-	0	-	-	0						
Peak Hour Factor	89	89	89	89	89	89						
Heavy Vehicles, %	2	2	2	2	2	2						
Mvmt Flow	11	1	308	16	1	88						
Major/Minor	Minor1	Major1	Major2									
Conflicting Flow All	406	316	0	0	324	0						
Stage 1	316	-	-	-	-	-						
Stage 2	90	-	-	-	-	-						
Critical Hwy	642	622	-	-	412	-						
Critical Hwy Stg 1	542	-	-	-	-	-						
Critical Hwy Stg 2	542	-	-	-	-	-						
Follow-up Hwy	3518	3318	-	-	2218	-						
Pot Cap-1 Maneuver	601	724	-	-	1236	-						
Stage 1	739	-	-	-	-	-						
Stage 2	934	-	-	-	-	-						
Platoon blocked, %	-	-	-	-	-	-						
Mov Cap-1 Maneuver	600	724	-	-	1236	-						
Mov Cap-2 Maneuver	600	-	-	-	-	-						
Stage 1	738	-	-	-	-	-						
Stage 2	934	-	-	-	-	-						
Approach	WB	NB	SB									
HCM Control Delay, s	11	0	0.1									
HCM LOS	B											
Minor Lane/Major Mvmt	NBT	NBR	WBLn1	SBL	SBT							
Capacity (veh/h)	-	-	609	1236	-							
HCM Lane V/C Ratio	-	-	0.02	0.001	-							
HCM Control Delay (s)	-	-	11	7.9	-							
HCM Lane LOS	-	-	B	A	-							
HCM 95th %ile Q(veh)	-	-	0.1	0	-							

HCM 2010 Signalized Intersection Summary

2: Fountaingrove Parkway & Thomas Lake Harris Drive (W)

01/02/2019

									
Movement	EBL	EBT	WBT	WBR	SBL	SBT	SBR		
Lane Configurations									
Traffic Volume (veh/h)	290	1133	842	32	21	120			
Future Volume (veh/h)	290	1133	842	32	21	120			
Number	5	2	6	16	7	14			
Initial Q (Ob), veh	0	0	0	0	0	0			
Ped-Bike Adj(A, pbT)	1.00			0.97	1.00	1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00			
Adj Sat Flow, veh/hln	1788	1788	1937	1976	1863	1863			
Adj Flow Rate, veh/h	312	1218	905	34	23	129			
Adj No. of Lanes	1	2	2	0	1	1			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	2	2	2	2	2	2			
Cap, veh/h	355	2673	1895	71	160	473			
Arrive On Green	0.21	0.79	0.52	0.52	0.09	0.09			
Sat Flow, veh/h	1703	3487	3710	136	1774	1583			
Grp Volume(v), veh/h	312	1218	461	478	23	129			
Grp Sat Flow(s),veh/hln	1703	1699	1840	1909	1774	1583			
Q Serve(g, s), s	11.5	7.8	10.3	10.3	0.8	4.0			
Cycle Q Clear(g, c), s	11.5	7.8	10.3	10.3	0.8	4.0			
Prop In Lane	1.00			0.07	1.00	1.00			
Lane Grp Cap(c), veh/h	355	2673	965	1001	160	473			
V/C Ratio(X)	0.88	0.46	0.48	0.48	0.14	0.27			
Avail Cap(c, a), veh/h	380	3286	1271	1318	794	1038			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00			
Uniform Delay (d), s/veh	24.9	2.3	9.8	9.8	27.3	17.4			
Incr Delay (d2), s/veh	18.5	0.1	0.4	0.4	0.2	0.1			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(50%),veh/ln	7.2	3.6	5.3	5.5	0.4	0.0			
LnGrp Delay(d),s/veh	43.4	2.4	10.2	10.2	27.4	17.5			
LnGrp LOS	D	A	B	B	C	B			
Approach Vol, veh/h	1530			939			152		
Approach Delay, s/veh	10.8			10.2			19.0		
Approach LOS	B			B			B		
Timer	1	2	3	4	5	6	7	8	
Assigned Phs	2			4			5		
Phs Duration (G+Y+Rc), s	55.7			9.4			17.1		
Change Period (Y+Rc), s	4.5			3.5			3.5		
Max Green Setting (Gmax), s	62.9			29.1			14.5		
Max Q Clear Time (g_c+H), s	9.8			6.0			13.5		
Green Ext Time (p_c), s	40.1			0.2			0.1		
Intersection Summary									
HCM 2010 Ctrl Delay	11.0								
HCM 2010 LOS	B								

THIS PAGE INTENTIONALLY LEFT BLANK