

TRAFFIC IMPACT STUDY UPDATE

Black Bear Ridge Resort,
North of Harmony Road between Highway 37 and
Homan Road
City of Belleville, ON

March 2025

Prepared For
Black Bear Limited
Partnership



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March 14, 2025

Mr. Alex Sharpe
Black Bear Limited Partnership

Re: Black Bear Ridge Resort, North of Harmony Road between Highway 37 and Homan Road, Belleville, ON, Traffic Impact Study Update

Dear Mr. Sharpe,

TRANS-PLAN is pleased to submit this Traffic Impact Study for the proposed redevelopment of the Black Bear Ridge Golf Course located north of Harmony Road between Highway 37 and Homan Road in the City of Belleville, Ontario, as part of the Official Plan Amendment (OPA) submission.

The study includes traffic counts, trip generation estimates, and intersection capacity and queue analysis for existing, future background, and future total traffic conditions of Phase 1 and the full build-out of Phase 2 and 3. Findings show that the development will significantly impact traffic on Harmony Road, contributing to high traffic volumes on Highway 37 and worsening congestion on Ashley Street, which is already near capacity.

To maintain acceptable traffic conditions in 2046 (ten years after Phase 1 build-out), the study recommends the following:

- Providing two dedicated lanes on the east leg of Ashley Street at Highway 62: one for left turns and one for shared left/right turn and extending the two lanes from Highway 62 to Harmony Road.
- Adding a left-turn lane at the east leg of Harmony Road and Ashley Street, and the north leg of Harmony Road at Black Bear Ridge Site Access.
- Providing a two-lane with left and right turn at the existing Black Bear Ridge Site Access is recommended.
- Modifying the eastbound lane at Harmony Road and Highway 37 to include shared left and through lanes, along with a dedicated right-turn lane.
- Widening Ashley Street to two lanes (one left-turn and one right-turn lane) to address existing and future traffic concerns.
- Adding a left-turn lane at the east leg of Highway 37 and Cannifton Road/Blessington Road, and at the east and west leg of Highway 37 at Tank Farm Road/Casey Road.
- Optimizing signal timing at Highway 37 and Cannifton Road/Blessington Road, to better accommodate northbound and southbound traffic.



To maintain acceptable traffic conditions in 2056 (completion of all Phases), the study recommends the following:

- Adding two dedicated left-turn lanes and a shared left/right turn lane on the east leg of Highway 62 at Ashley Street and extending signal times for northbound and southbound traffic.
- Signalizing the intersection of Ashley Street and Harmony Road, adding a dedicated left-turn lane and converting the southbound lane to two lanes (one for left turns, one for shared through/left turns).
- Signalizing the intersection of Harmony Road and River Road North and adding left-turn lanes for the eastbound and westbound directions.
- Signalizing the intersection of Harmony Road and Homan Road and adding a left-turn lane for eastbound traffic and a right-turn lane for westbound traffic.
- Signalizing the intersection of Harmony Road and Black Bear Ridge Site Access and providing a two-lane with left and right turn at the existing Black Bear Ridge Site Access is recommended.
- Signalizing the intersection of Harmony Road and proposed Site Access 2 and adding a left-turn lane for eastbound traffic.
- Signalizing the intersection of Harmony Road and Harmony Public School, adding a left-turn lane for eastbound traffic, a dedicated left-turn lane for westbound traffic, and converting the eastbound lane to two lanes (one for through and one for shared through/right turns). Adding a "School Zone Maximum Speed" sign.
- Signalizing the intersection of Harmony Road and proposed Site Access 3 and adding a dedicated right-turn lane for westbound traffic.
- Converting eastbound and westbound lanes of Highway 37 at Harmony Road into shared through/right and dedicated left-turn lanes. Reconfiguration of northbound lanes with left-turn, left/through, and through/right lanes. Optimizing the signal timing to give more time for northbound and southbound traffic.
- Converting northbound and southbound left-turn lanes of Highway 37 and Cannifton Road/Blessington Road to left/through lanes, reconfiguring eastbound and westbound lanes with left-turn, left/through, and through/right turn lanes and optimizing the signal timing.
- Converting northbound and southbound left-turn lanes of Highway 37 and Tank Farm Road/Casey Road to left/through lanes and reconfiguring eastbound and westbound lanes with left-turn, left/through, and through/right turn lanes.

These changes are expected to alleviate congestion and improve overall traffic flow.



Sincerely,

A handwritten signature in blue ink, appearing to read 'Anil Seegobin'.

Anil Seegobin, P.Eng.
Partner, Engineer

Trans-Plan Transportation Inc.
Transportation Consultants



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Transmittal Letter

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1. INTRODUCTION

Trans-Plan has been retained by Black Bear Limited Partnership to complete an update to the Traffic Impact Study (TIS), dated August 2024, for the proposed redevelopment of the Black Bear Ridge Golf Course located north of Harmony Road between Highway 37 and Homan Road in the City of Belleville, Ontario. This study includes the following tasks:

- Review and assessment of the existing road network
- Assessment of boundary roadway operations under future background conditions, including a review of traffic growth, area developments, and proposed transportation improvements in the study area
- Assessment of the impact of site-generated traffic on the study area intersections under future background and total traffic conditions
- Discussion of roadway and intersection improvements, as required, to accommodate the proposed development
- Confirm the updated TIS to all requirements detailed in MTO's TIS Guidelines (dated March 2023)

2. RESPONSE TO COMMENTS

A Traffic Impact was completed by Trans-Plan in August 2024. This traffic impact study has been updated based on the comments received from the City of Belleville, requiring additional attachments, clarifications, and justifications to the previous submission. This traffic impact study update aims to address the following comments received from the City of Belleville,

- Peer Review Services, Black Bear Ridge Development by Greer Galloway, dated October 2024
- City of Belleville Preliminary Comments, dated January 2025

The comments received and our responses, based on the updated TIS report, are as follows:

Peer Review Services by Greer Galloway, dated October 2024

City Comment D1: *"The comments provided are based on what Greer Galloway (GG) believes is a reasonable scope of work given the size of the proposed development and likely impact on the surrounding road system. It is likely that some comments relate to items outside of the scope of work stated in the terms of reference. Despite this, GG believes the comments are justified and should be addressed."*

TRANS-PLAN Response:

Acknowledged.

City Comment D2: *"We recommend the TIS speak directly to traffic associated with existing significant source/destination points along Harmony Road, including the Township of Thurlow Community Centre, and in particular Harmony School. It is felt likely that the interaction of traffic with the school will be a significant point of concern and warrants particular attention – both as it relates to vehicle traffic volumes but also pedestrian / cycling traffic to and from the proposed development. For instance, is a left turn lane warranted during peak school pick up / drop off periods; will anticipated pedestrian / cycling traffic changes warrant a pedestrian crossover / sidewalk connections to / from the school?"*

TRANS-PLAN Response:

Acknowledged. Trans-plan analyzed during peak hours if any of the lanes will be warranted, to assess the impact of the site development on Harmony School. Trans-Plan also surveyed the traffic counts of Harmony Road at the Harmony School intersection to conduct a left turn warrant. The analysis of the results is reflected in the Traffic Impact Study Update of Phase 1 as part of the requirement in the Official Plan Amendment (OPA) submission.

City Comment D3: *“It is noted that the study is based on a Master Concept Plan which is not yet finalized. A final report or amending letter confirming what if any impact the finalized plan has on the findings of this study should be provided when appropriate to do so.”*

TRANS-PLAN Response:

Acknowledged. Trans-Plan will initially analyze two scenarios, Phase 1 of the site development and the full build-out of all phases. The Master Concept Plan is still in progress and may be subject to changes. Traffic Addendum Letters will be issued in the event of major changes that significantly affect the original results and findings.

City Comment D4: *“Homan Road appears to be posted as a 40km/h road in Google Streetview. Confirm the correct posted speed limit.”*

TRANS-PLAN Response:

Acknowledged. The revisions have been made in the report. Trans-Plan incorporated these changes throughout the Traffic Impact Study Update.

City Comment D5: *“Was the current traffic signal timing provided confirmed during the site visit? Our concern is that the timing may be quite old and may have changed over time.”*

TRANS-PLAN Response:

Trans-Plan requested an updated Signal Timing Plan (STP) for the MTO's signalized intersections. The STP for the intersections of Highway 37/Harmony Road, Highway 37/Tank Farm Road/Casey Road, and Highway 62/Ashley Street are from September 09, 2019. The STP for the Highway 37/Cannifton Road/Blessington intersection is from December 05, 2023. These updates are included in the revised Traffic Impact Study Update.

City Comment D6: *“Traffic counts were taken in May. Comment should be provided on whether applying a seasonal adjustment factor should be applied.”*

TRANS-PLAN Response:

Acknowledged. The TMC data collected were recorded across different seasons. Based on the Weekly Automatic Traffic Recorder (ATR) data, the summer season recorded the highest Average Daily Traffic (ADT). As a result, all other seasonal data will be adjusted to make the values more accurate and

conservative. The calculations are discussed in Section 5.3 of the TIS Update and results are tabulated in Table 2.

City Comment D7: *“Did the City or MTO have traffic count data available to add to the information available for this study? If so, it is recommended it be referenced to confirm the single day traffic count is representative of typical traffic volumes. For instance, below is an excerpt from the MTO Traffic Volumes 1988-2021 document available online suggesting the following traffic conditions on Highway 37 at Wiser Road (immediately south of Harmony Road) in 2021:*

Year	Highway	Location Description	Dist (KM)	Pattern Type	AADT	SADT	SWADT	WADT	Truck AADT	Total Collisions	Total CR	Trucks Collisions	Truck CR
2021	37			UC	10,300	10,300	10,500	9,900	1,050	4	0.3	0	0.0
1988	37	WISER RD (E)	7.0	CR	5,200	6,650	6,250	4,300	570	55	4.2	11	0.8
1989	37			CR	5,300	6,800	6,300	4,450	580	44	3.3	7	0.5
1990	37			CR	5,400	6,700	6,200	4,850	590	43	3.1	10	0.7
1991	37			CR	5,400	6,650	6,200	4,850	590	56	4.1	9	0.7
1992	37			IR	5,900	7,250	6,500	5,000	650	23	1.5	4	0.3
1993	37			IR	5,950	7,300	6,150	4,850	650	23	1.5	1	0.1
1994	37			IR	5,950	7,350	6,550	5,000	650	22	1.5	4	0.3
1995	37			IR	6,100	7,500	6,700	5,200	490	18	1.2	2	0.1
1996	37			IR	6,200	7,700	6,900	5,300	500	17	1.1	1	0.1
1997	37			IR	6,300	7,900	7,050	5,350	500	12	0.8	2	0.1
1998	37			IR	6,450	8,000	7,200	5,400	520	13	0.8	0	0.0
1999	37			IR	6,450	8,000	7,150	5,400	520	18	1.1	2	0.1
2000	37			C	6,600	7,450	7,450	5,950	530	11	0.7	1	0.1
2001	37			C	6,550	7,400	7,400	5,900	520	13	0.8	1	0.1
2002	37			C	6,750	7,550	7,600	6,050	340	13	0.8	1	0.1
2003	37			C	6,850	7,650	7,700	6,200	550	16	0.9	0	0.0
2004	37			C	6,900	7,750	7,800	6,200	550	9	0.5	2	0.1
2005	37			C	7,000	7,800	7,850	6,300	560	7	0.4	1	0.1
2006	37			C	7,050	7,850	7,900	6,350	560	5	0.3	0	0.0
2007	37			C	7,150	7,950	8,050	6,400	570	14	0.8	0	0.0
2008	37			C	7,200	7,950	7,850	6,450	580	7	0.4	0	0.0
2009	37			C	7,300	8,050	8,100	6,550	580	7	0.4	0	0.0
2010	37			C	7,300	8,050	8,100	6,550	580	11	0.6	0	0.0
2011	37			C	7,450	8,200	8,300	6,700	600	11	0.6	2	0.1
2012	37			C	7,200	7,950	7,750	6,500	580	11	0.6	2	0.1
2013	37			CTR	7,650	9,300	9,600	6,500	660	10	0.5	0	0.0
2014	37			CTR	7,650	9,350	9,400	6,500	660	6	0.3	1	0.1
2015	37			CTR	7,750	9,450	9,550	6,600	670	14	0.7	1	0.1
2016	37			CTR	7,800	9,500	9,600	6,650	670	7	0.4	1	0.1
2017	37			CTR	7,900	10,600	10,500	6,450	680	7	0.3	1	0.0
2018	37			CTR	7,950	10,600	10,600	6,450	680	20	1.0	2	0.1
2019	37			CTR	8,050	10,700	10,700	6,550	690	5	0.2	1	0.0
2021	37			CTR	8,200	10,700	10,600	6,700	740	8	0.4	0	0.0

- Highway 37 is a mixture of commuter, tourist and recreational traffic.
- Average annual daily traffic was 8,200 vehicles.
- Summer average daily traffic was 10,700 vehicles.
- Winter average daily traffic was 6,700 vehicles.
- Average traffic has consistently increased from 5,200 vehicles in 1988.

This information, or other available traffic count records may not change the conclusions of the study but would serve to build confidence in the traffic count data set and reduce questions / concerns that may be raised as the development approval process moves along.

TRANS-PLAN Response:

Acknowledged. Trans-Plan utilized the set of Weekly Automatic Traffic Recorder (ATR) data provided by the MTO.

City Comment D8: “Comment should be provided on whether the traffic count data accounts for school related traffic – pick up / drop off / buses – and community centre traffic.”

TRANS-PLAN Response:

Acknowledged. Trans-Plan conducted additional Traffic Movement Counts (TMC) at the Harmony Road/Harmony Public School intersection to evaluate the impact of school traffic on Harmony Road volumes. It is also confirmed that student arrival and departure times align with peak hours, from 8:30-9:30 am and 4:00-5:00 pm.

City Comment D9: “Were the approval, construction, phasing and full build out timelines considered when determining the horizon timeframes?”

TRANS-PLAN Response:

As per the developer’s confirmation, the full build-out of Phase 1 is projected to take 10 years. Since the commencement of the redevelopment will start in 2026, it is anticipated that Phase 1 will be completed by 2036. Consequently, the future horizon years to be considered for analysis of Phase 1 will be set at 5 and 10 years after build-out, which is in 2041 and 2046 respectively. Aside from Phase 1, the anticipated impact of all phases, such as Phase 2 and Phase 3 in 2056, will also be studied. The Traffic Impact Study Update incorporated these changes.

City Comment D10: “When is full build out anticipated?”

TRANS-PLAN Response:

As part of the discussion, the Phase 1 build-out will take 10 years, followed by an additional 10 years for Phase 2, and another 10 years for Phase 3. Therefore, the total timeline for the entire site development is anticipated to be 30 years. Construction of Phase 1 is scheduled to begin in 2026, with full build-out expected by 2036.

City Comment D11: “For a development of this scale, was examining phase milestones considered to help stage any improvement recommendations? For instance, a stage that reflects the draft plan document submitted for reference (not the figure by the same name in the study appendix) showing 559 residential units.

We believe a horizon milestone that aligns with Phase 1 (for which we understand the current draft plan approval is being requested) at a minimum is important to include. Consideration of additional milestones by warrant investigation given the scale and horizon of full buildout and occupancy.”

TRANS-PLAN Response:

Trans-Plan assessed the impacts of Phase 1 in 2046, and the full build-out of all phases in 2056.

City Comment D12: “Despite there likely being historical traffic count data available, the report suggests a 2% annual growth rate has been agreed to. We have no comment on this but note that based on the

MTO traffic records above an annual growth rate of 1.35% over the last 33 years is estimated suggesting the 2.0% assumption is reasonable.”

TRANS-PLAN Response:

Trans-Plan used a background growth rate of 2.0% which is normally considered conservative. Trans-Plan could also have reviewed MTO historical traffic data to determine if the growth rate is appropriate for Highway 37 and Harmony Road. However, it is acknowledged that recent historical traffic data has been affected by COVID-19 restrictions which could affect this analysis. For the purpose of the study, the 2.0% growth rate is considered acceptable.

City Comment D13: “It is understood there are significant changes planned for the Highway 401 interchange with Highway 37 located 6km to the south. This may not affect traffic volumes or be sufficiently far way that it is not felt to be relevant but is noted for reference and might be raised by the MTO in their review.”

TRANS-PLAN Response:

Acknowledged. This specific road improvement has been removed from the study.

City Comment D14: “Noted traffic generating land uses include:

- 762 Single Family Units (LUC 210)
- 153 Semi-Detached Units (LUC 215)
- 610 Townhouse Units (LUC 215)
- 610 Low Rise Units (LUC 220)
- 457 Stacked Townhouse (LUC 220)
- 457 Apartment (LUC 220)
- 79.22 ha Golf Course (LUC 430)
- 7.1 ha / 500 Room Resort Accommodations (LUC 330)

The following land uses are noted in an earlier section of the study, but no traffic allocated.

- Parks and Open Space
- Resort and Entertainment
- Event Space
- Stormwater Management Facilities
- Right of Way
- Environmental Protection Areas

Will the ‘Resort and Entertainment’ and ‘Event Space’ be traffic generating land uses?”

TRANS-PLAN Response:

The potential land uses were considered in the study. The ‘Parks and Open Space’, ‘Resort and Entertainment’, and ‘Event Space’ categories are already encompassed within the Golf course and Resort to consider the trips that will be generated.

City Comment D15: *“The ITE trip generation provides for ‘General Urban/Suburban’ settings by default but there are also ‘Dense Multi-Use Urban’ settings available. Comment should be provided on the choice of the setting criteria and whether the proposed development is consistent with that setting or if some manner of adjustment is justified, in particular as it relates to the lack of public transit or other transportation supports that may otherwise reduce trip generation estimates.”*

TRANS-PLAN Response:

Acknowledged. Trans-Plan has used the General Urban/Suburban setting as the default, as the area does not meet the criteria for a Dense Multi-Use Urban setting. The following factors were considered:

- **Transit Service:** There is no existing transit service or bus stop near the site. All routes for Belleville Transit are located south of the Macdonald-Cartier Freeway, about 11 km and an 11-minute drive from the site.
- **Active Transportation:** As per the City of Belleville's website, the only active transportation route in the vicinity is the Trans Canada Trail, situated to the west of the site. Additionally, the Transportation Master Plan indicates no proposed road or active transportation improvements within the study area within the horizon years that were considered in the study. Therefore, it can be reasonably assumed that the majority of future trips will be generated by automobile drivers.

Additionally, ‘General Urban/Suburban’ generates more trips than Dense Multi-Use Urban setting due to the absence/lack of public transportation. Thus, it generates more Single-Occupancy Vehicle (SOV) trips, which is a more conservative approach.

City Comment D16: *“Existing site traffic is largely local traffic. While some traffic relates to the golf course, we expect a great deal of the local traffic is related to the school, existing residences and traffic to / from Belleville via the community of Foxboro.”*

Will there be a significant portion of new development traffic that would be considered ‘non-local’ and warrant a modification of the trip distribution, specifically a heavier weighting in the direction of Highway 37?”

TRANS-PLAN Response:

We anticipate that the majority of the traffic will be local, but since the site development will include Resort and Entertainment along with the Golf course, non-local traffic will be considered. While there will be additional non-local traffic due to the resort, it is important to note that the golf course is already established. As such, golfers are therefore probably among the new resort patrons. As a result, the impact on traffic is expected to be minimal. Thus, in Trans-plan’s opinion, a warrant in modifying the trip distribution is not necessary.

City Comment D17: *“Some manner of commentary on the origin / destination of the development traffic should be provided to justify the assumption that it will continue to follow existing local traffic patterns.”*

For example, looking at Figure 8 – Site Traffic Assignment it appears the following is projected for pm peak hour (blue font):

- To/From Highway 37:
 - o 519 vehicles from #37 (247 right turn; 272 through at the BBR entrance).
 - o 406 vehicles to #37 (203 from BBR; 203 from Homan Road)
 - To/From Foxboro:
 - o 717 vehicles from Foxboro (223 left turn; 494 through at Homan Road).
 - o 431 vehicles to Foxboro (228 from BBR; 203 from Homan Road)
 - If this is correct, there is more traffic coming from the Foxboro direction and justification should be provided why intersections to the west were not considered in that direction.
 - Homan Road has 203 exiting trips turning left towards Highway 37. These trips are not represented as through trips at the BBR intersection. The same is true for the reverse with exiting right turn vehicles from the BBR intersection. Update the figure and confirm these trips allowed for in the modelling.
- We believe the reference should be to Figure 8. Review figure references throughout.”

TRANS-PLAN Response:

Acknowledged. Trans-Plan conducted a new set of Traffic Movement Count (TMC) surveys on November 28, 2024, for weekday AM and PM peak hours, and on November 30, 2023, for Saturday peak hours at the intersection of Harmony Road and the existing Black Bear Ridge site access. The survey findings indicated higher traffic volumes heading towards Highway 37, while traffic towards Foxboro was comparatively lower. Based on this, we can conclude that the site distribution is expected to show a higher volume of traffic heading east and a lower volume heading west. Intersections to the west towards Foxboro are also included in the TIS update. The table below shows the traffic data results of the survey.

Traffic Movement Counts along Harmony Road using TMC of Harmony Road at existing Black Bear Ridge site access:

TRAFFIC MOVEMENT COUNTS		
Date	Eastbound	Westbound
May 11, 2023, Weekday AM Peak Hour	118	75
May 11, 2023, Weekday PM Peak Hour	80	71
May 13, 2023, Saturday Peak Hour	50	39

City Comment D18: “To support the recommended Highway 37 signal timing changes there should be commentary describing the changes and a model confirming revised timing will in fact provide the necessary improvements.”

TRANS-PLAN Response:

Acknowledged. The recommendations will be revised due to major adjustments in traffic volume distribution and the addition of new site entrances to address previous comments. If the performance of the Harmony Road at the Highway 37 intersection is consistent with the previous analysis, a commentary, and a recommendation confirming the need to revise the timing will be included in the updated Traffic Impact Study.

City Comment D19: *“To support recommended intersection geometry changes, there should be revised models confirming the changes will in fact provide the necessary improvements.”*

TRANS-PLAN Response:

Acknowledged. The same approach will be applied to the city comment D18. If the performance of the intersections remains the same, recommended intersection geometry changes will be modeled and will be included in the updated Traffic Impact Study.

City Comment D20: *“Homan road improvements ‘might’ be required? How is this need, or lack of, to be determined? What improvements are being referenced – minimum lane width, structural construction, other?”*

TRANS-PLAN Response:

Acknowledged. The same approach will be adopted from the city comment D18. Should Homan Road exhibit a poor level of service, road improvement details and recommendations will be included in the updated Traffic Impact Study.

City Comment D21: *“Comment should be provided on the suitability of the early phase(s) of the development operation with only the single entrance onto Harmony Road. While we are not aware of a single universally accepted threshold for requiring 2 entrances to a development, it appears that the development plan will be limited to a single entrance until well into the development plans. Is this felt to be acceptable – not only from a volume LOS perspective but from emergency access perspective?”*

TRANS-PLAN Response:

Acknowledged. As discussed with the client, three site accesses will be available during Phase 1, the total number of accesses proposed will be 5 (public non-emergency accesses) with additional accesses to Homan Road and Harmony Road in later phases. Following NFPA 1141, which requires a minimum of three access routes for site developments with over 600 households, the three site accesses meet the required standards. Please refer to Appendix E for the proposed site accesses and the NFPA 1141.

City Comment D22: *“While difficult to quantify, it is expected that there will be significant feedback from the public regarding general safety along Harmony Road, beyond that which a level of service / delay based investigation can provide. Some commentary should be proactively provided to speak to possible safety concerns associated with the existing road cross section; increased traffic volumes; pedestrian and cycling traffic including where measure could be taken to manage risk. While this list below is not exhaustive, the following may be considered as resources to aid in speaking to ‘safety’ along the roadway:*

- The Transportation Association of Canada (TAC) Geometric Design Guide for Canadian Roads and it's MTO Design Supplement, left turn lane volume warrants, 9.17.2.1.

- TAC Sight line requirements and the ability to meet these requirements.

- Ontario Traffic Manual Book 15 – Pedestrian Crossing Treatments.”

TRANS-PLAN Response:

Acknowledged. Trans-Plan will coordinate with the owner to incorporate additional scope for general safety along Harmony Road. As part of Trans-Plan's initial actions, our team conducted a sightline survey of the existing main entrance to the site. The analysis of this data, along with other safety considerations for site access, will be addressed in the TIS update.

City Comment D23: “We recommend it be required that upon a pre-determined development / occupancy threshold the traffic study be updated for any changes in background traffic, actual site trip generation rates measured from new counts specific to the occupied portion of the development, changes in the development plans, etc.?”

TRANS-PLAN Response:

Separate TIS for other phases of the development will be prepared once the details and schedule for these phases have been finalized.

City Comment E3: “The Ministry has concerns with the contents of the Traffic Study as the report assumes the origins of inbound traffic trips (and conversely, destinations of outbound trips) are going to be evenly split between the north leg of Hwy 37 versus the south leg. As the total population of the Tweed-Madoc area to the north is about 10,000, yet the population of Belleville and Quinte West to the south is about 100,000. The Ministry would expect that traffic assignment would follow these population trends.

Northbound left turn from Hwy 37 is the “weakest link” and is very sensitive to additional traffic assignment to that south leg. Additional highway improvements maybe warranted at Hwy 37 and Harmony Rd, i.e., a dual left turn, (if that turns out to be what is required), this will be very challenging as it will require a full intersection rebuild and likely additional property expropriation.”

TRANS-PLAN Response:

Acknowledged. Trans-Plan revised the trip distribution since the survey data has been fully collected and updated. All relevant factors, including the population of surrounding areas and various land uses, will be considered during the revision process.

City of Belleville Preliminary Comments, dated January 2025

City Comment J1: “Intersections analysed were not per the TOR. Only Homan, Entrance, and Hwy 37 were analyzed. None to the east of Homan were examined.”

TRANS-PLAN Response:

The intersections listed in Trans-Plan's Terms of Reference for the study area are as follows:

- Highway 62 at Ashley Street
- Harmony Road at Ashley Street
- Harmony Road at River Road
- Proposed Site Access (or New Municipal Road) on the north end of Homan Road
- Harmony Road at Homan Road
- Harmony Road at Plumpton Road
- Existing Golf Course Access on Harmony Road
- Proposed Site Access (or New Municipal Road) with a cul-de-sac on Harmony Road
- Highway 37 at Harmony Road

A new list of three site accesses will be considered in Phase 1, as discussed with the client and as part of the recommendations of the City and Peer Reviewer, which are the Existing Golf Course Access on Harmony Road, and two other proposed site accesses to the east of the existing one. A total number of 5 accesses (public non-emergency accesses) will be proposed with additional accesses to Homan Road and Harmony Road in later phases. An updated Traffic Impact Study will be submitted once the timing and schedule of these phases are final.

City Comment J2: “Potential trip generators were not accounted for, and further it looks like the Resort Hotel trips were not included in the overall trip counts. Were they modelled?”

TRANS-PLAN Response:

Resort Hotel Trips were included in overall traffic counts as reflected in Table 3 – Site Trip Generation of the previous report.

3. CORRESPONDENCE

Before commencing this study, Transportation and Planning staff at the City of Belleville and the Ministry of Transportation Ontario were provided with our study terms of reference for their approval and/or comments. Detailed comments are provided in Appendix A.

4. SITE CONTEXT AND PROPOSED DEVELOPMENT

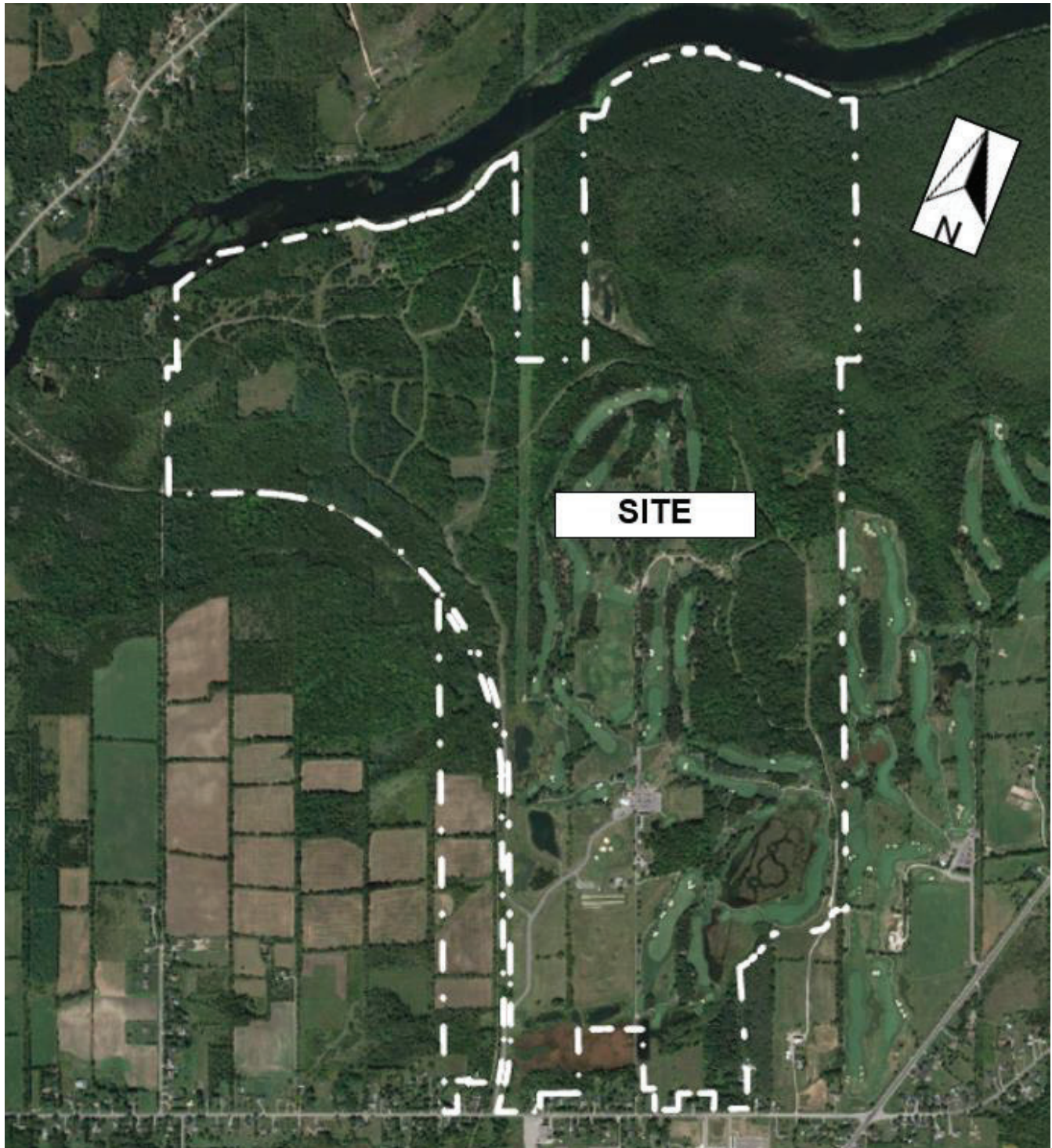
The site, as shown in Figure 1 is located north of Harmony Road between Highway 37 and Homan Road in the City of Belleville. The proposed site plan is shown in Figure 2.

The subject is an existing golf course to be redeveloped into a full, four-season resort containing commercial entertainment and recreational amenities, to be completed by surrounding residential and mixed-use developments. Based on the Master Concept Plan, which is understood as still being finalized,

but envisioned comprising the following land uses:

- Single-family detached housing (with approximately 762 dwelling units and an average area of 1,500-2,500 sq. ft/unit)
- Single-family attached housing (Semi-detached Houses and Townhouses with approximately 153 and 610 dwelling units, respectively, and an average area of 1,500-1,800 sq. ft/unit)
- Multifamily Housing – Low Rise (Condominiums with approximately 610 dwelling units and an average area of 1,200-1,500 sq. ft/unit; Stacked Townhouses and Apartments with approximately 1,524 dwelling units each and an average area of 650-90 sq. ft/unit.
- Golf Course (79.22 ha)
- Resort Accommodations (7.1 ha)
- Stormwater management facilities (2.64 ha)
- Right-of-ways (23.55 ha), and
- Environmental protection areas (107.87 ha)

Figure 1 – Site Location



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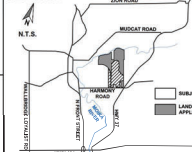
- LEGEND**
- SINGLE DETACHED
 - TOWNHOUSES
 - MIXED USE
 - GOLF RESORT ACCOMMODATIONS
 - RIVER RESORT
 - GOLF COURSE
 - GOLF COURSE RELATED
 - PARKS AND OPEN SPACE
 - NATURAL HERITAGE SYSTEM
 - STORMWATER MANAGEMENT POND
 - UTILITY
 - SPECIAL POLICY AREAS OVERLAY
 - EXISTING FLOOD PLAIN OVERLAY
 - SUBJECT SITE BOUNDARY

TITLE:
CONCEPTUAL MASTER PLAN

LEGAL DESCRIPTION:

Part of Lots 8, 9, 10 and 11, Concession 9,
Part of Lots 7, 8, 9, 10 and 11, Concession 8,
Township of Huron,
Now in the City of Huron,
County of Hastings

KEY PLAN:



SURVEYOR'S CERTIFICATE:

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATE AND CORRECTLY SHOWN IN ACCORDANCE WITH A PLAN OF SURVEY PREPARED BY:

SURVEYOR:
WATSON LAND SURVEYORS, OLS

OWNER'S CERTIFICATE:

I HEREBY AUTHORIZE THE BOLDEN GROUP LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBMISSION TO THE CITY OF HURON.

DATE:
JULY 30, 2024

REQUIRED INFORMATION:

AS REQUIRED UNDER SECTION 51(1) OF THE PLANNING ACT R.S.O. 1990.

- (1) SEE PLAN
- (2) SEE PLAN
- (3) SEE KEY MAP
- (4) SEE SCHEDULE OF LAND USE
- (5) SEE PLAN
- (6) SEE PLAN
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REVISIONS

No.	Description	Date	By
1	REVISED PER 1ST SUBMISSION COMMENTS	12/18/2024	MP
2			
3			

PROJECT No.: 22506
DATE: JUL 30, 2024
SCALE: 1:5000
DRAFTED BY: EC
CHECKED BY: MP
DRAWING No.: **CMP-01**

BIGLIERI GROUP

2472 Kingston Road, Toronto
27 King Street West, Suite 1000, New York
(416) 492-2855
biglieri@biglieri.com

5. EXISTING CONDITIONS

5.1 Road Network

The roadways located in the study area are described as follows:

Highway 37 is a major collector road under the Ministry of Transportation Ontario's (MTO) jurisdiction. It generally runs in a north-south direction with two travel lanes, with one lane in each direction and an exclusive left turn lane for both northbound and southbound movement. The posted speed limit along Highway 37 is 80km/h in the vicinity of the development.

Highway 62 is a major collector road under the jurisdiction of the MTO. It runs predominantly in a north-south direction with four travel lanes, two in each direction, along with a dedicated southbound left-turn lane and a channelized right turn onto Ashley Street. The posted speed limit in the vicinity of the development is 80 km/h.

Harmony Road is a minor collector road under the jurisdiction of the City of Belleville, running east-west with two travel lanes (one in each direction). The posted speed limit is 40 km/h starting at the Highway 37 intersection, where the community safety zone is located, and it extends a few meters past the Black Bear Ridge entrance. Beyond the entrance to the Black Bear Ridge development, the speed limit increases to 60 km/h.

Ashley Street is a minor collector road that runs in a north-south direction with two travel lanes (one in each direction). The road falls under the jurisdiction of the City of Belleville. The road has two travel lanes, with one lane in each direction. In the study area, Ashley Street intersects Harmony Road at an unsignalized intersection. Also, Ashley Street intersects Highway 62 from a west approach. Parking is strictly prohibited along this road, and the posted speed limit near the study area is 40 km/h.

River Road North is designated as a minor collector road and falls under the jurisdiction of the City of Belleville. The road primarily runs north-south and has two travel lanes, with one lane in each direction. In the study area, River Road North intersects Harmony Road at an unsignalized intersection with a posted speed limit near the study area of 40 km/h.

Homan Road is a local road also under the jurisdiction of the City of Belleville, running north-south with two travel lanes (one in each direction). In the study area, the road intersects Harmony Road at an unsignalized intersection with a posted speed limit of 40km/h in the vicinity of the development.

Plumpton Road is a local road also under the jurisdiction of the City of Belleville, running north-south with two travel lanes (one in each direction). The posted speed limit is 50km/h in the vicinity of the development.

Cannifton Road is a minor collector road under the jurisdiction of the City of Belleville, running east-west with two travel lanes (one in each direction). The posted speed limit is 50 km/h in the vicinity of the development.

Blessington Road is a minor collector road across Cannifton Road under the jurisdiction of the City of Belleville, running east-west with two travel lanes (one in each direction). The posted speed limit is 80 km/h in the vicinity of the development.

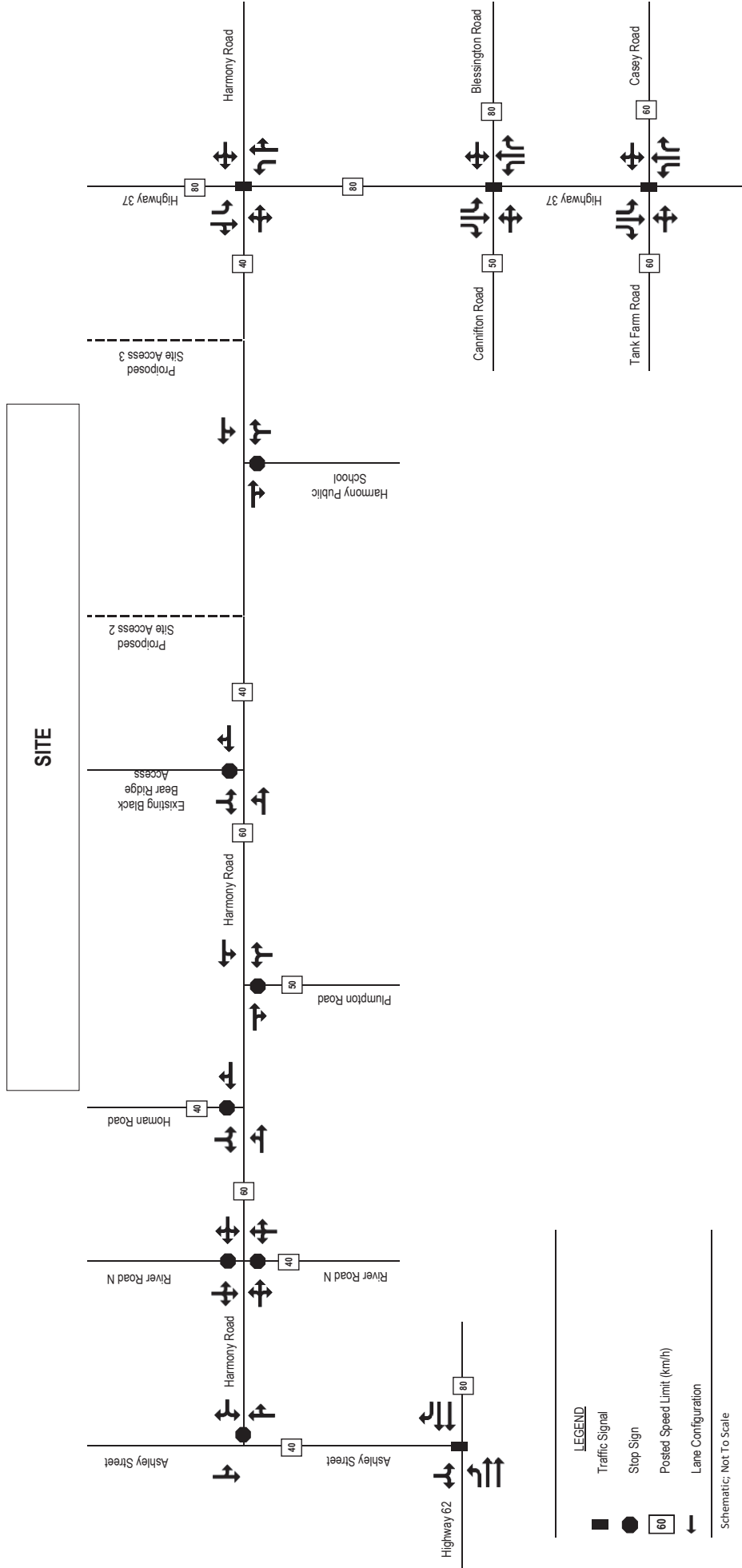
Tank Farm Road is a minor collector road under the jurisdiction of the City of Belleville, running east-west with two travel lanes (one in each direction). Parking is strictly prohibited along this road, and the posted

speed limit near the study area is 60 km/h.

Casey Road is a minor collector road across Tank Farm Road under the jurisdiction of the City of Belleville, running east-west with two travel lanes (one in each direction). The posted speed limit is 60 km/h in the vicinity of the development.

Signalized intersections exist at Highway 62 and Ashley Street and Highway 37 with Harmony Road, Cannifton Road/Blessington Road, and Tank Farm Road/Casey Road. The roadway characteristics for the existing study area are shown in Figure 3.

Figure 3: Existing Roadway Characteristics



5.2 Traffic Counts

To determine existing operating conditions in the study area, Trans-Plan conducted intersection turning movement counts (TMCs) along with a site visit and traffic observations. The TMC of the highways and its Signal Timing Plans (STP) for all signalized intersections under the study were provided by the Ministry of Transportation Ontario. Other intersections' TMCs were collected, analyzed, and interpreted by SMATS Traffic Solutions. The TMCs by Trans-Plan were conducted on Thursday, November 29, 2024, and Saturday, November 31, 2024. The count hours and peak hours obtained for each intersection are summarized in Table 1. The existing traffic volumes for the weekday AM and PM peak hours are shown in Figure 6. Detailed TMC data and current signal timing plans are provided in Appendix B.

Table 1 – Intersection Turning Movement Count Details

Intersection	Source	Count Date	Count Hours	Peak Hours
Highway 37 and Harmony Road	Trans-Plan	Thursday, November 28, 2024	7:00am - 9:30am 4:00pm - 6:30pm	7:15am - 8:15am 4:15pm - 5:15pm
		Saturday, November 30, 2024	10:00am - 4:00pm	3:00pm - 4:00pm
Harmony Road and Homan Road		Thursday, November 28, 2024	7:00am - 9:30am 4:00pm - 6:30pm	8:30am – 9:30am 4:00pm - 5:00pm
Harmony Road and Homan Road		Saturday, November 30, 2024	10:00am - 4:00pm	3:00pm - 4:00pm
Harmony Road and Black Bear Ridge Access		Thursday, November 28, 2024	7:00am - 9:30am 4:00pm - 6:30pm	8:30am – 9:30am 4:00pm - 5:00pm
		Saturday, November 30, 2024	10:00am - 4:00pm	3:00pm - 4:00pm
Harmony Road and Harmony Public School		Thursday, November 28, 2024	7:00am - 9:30am 4:00pm - 6:30pm	8:30am – 9:30am 4:00pm - 5:00pm
		Saturday, November 30, 2024	10:00am - 4:00pm	3:00pm - 4:00pm
Highway 62 and Ashley Street		Tuesday, May 10, 2022	7:00am - 6:00pm	7:30am – 8:30am 4:15pm - 5:15pm
Highway 37 and Cannifton Road North/Blessington Road		Tuesday, September 24, 2024	7:00am - 6:00pm	7:30am – 8:30am 4:30pm - 5:30pm
Highway 37 and Tank Farm Road/Casey Road		Tuesday, September 24, 2024	7:00am - 6:00pm	7:30am – 8:30am 4:30pm - 5:30pm
Harmony Road and Plumpton Road	SMATS Traffic Solutions	Weekday of Summer	7:00am - 9:30am 4:00pm - 6:30pm	8:00am – 9:00am 4:15pm - 5:15pm
		Saturday of Summer	10:00am - 4:00pm	2:30pm - 3:30pm

Harmony Road and River Road North		Weekday of Summer	7:00am - 9:30am 4:00pm - 6:30pm	7:30am – 8:30am 2:45pm – 3:45pm
		Saturday of Summer	10:00am - 4:00pm	2:15pm - 3:15pm
Harmony Road and Ashley Street		Weekday of Summer	7:00am - 9:30am 4:00pm - 6:30pm	7:30am – 8:30am 2:45pm – 3:45pm
		Saturday of Summer	10:00am - 4:00pm	11:30pm - 12:30pm

Per MTO correspondence, no recent recorded Saturday TMC counts for the intersections under their jurisdiction existed. To address this, Trans-Plan used the Traffic Engineering System (TES) Automatic Traffic Recorder (ATR), or Average Daily Traffic (ADT) data provided by MTO to establish the relationship between TMC output on Tuesday and Saturday during the Summer season.

The weekly ATR data along Highway 37 (between Black Diamond Road and Wiser Road East) was recorded from July 22-29, 2022. On Tuesday of that week, 913 vehicle trips were recorded during the PM peak hour, while Saturday recorded 708 vehicle trips during the Mid-day peak hour, the highest compared to the AM and PM data. This resulted in a ratio factor of 0.78.

As a result, all PM peak hour TMC data for intersections without Saturday TMC data along Highway 37 will be multiplied by 0.78 to estimate the Saturday TMC count. The same methodology was applied to the intersection of Highway 62 and Ashley Street, where the ratio factor was calculated to be 0.88.

5.3 Seasonal Factor Calculation

The TMC data collected were recorded across different seasons. Based on the Weekly Automatic Traffic Recorder (ATR) data, the summer season recorded the highest Average Daily Traffic (ADT). As a result, all other seasonal data will be adjusted to make the values more accurate and conservative. The calculated seasonal factors for each season are summarized in Table 2.

Table 2 – Seasonal Factor Data

Year	Location	Season	ADT	AADT	Seasonal Factor with respect to AADT	Source	Seasonal factor with respect to Summer (Highest ADT)
2022	Hwy 37 (bet. Black Diamond Rd. and Wiser Rd. E)	Spring	8,263	8,032	102.88%	MTO	1.24
2022		Summer	10,284	10,971	93.74%	MTO	1.00
2022		Fall	9,448	9,321	101.36%	MTO	1.09

To adjust the Spring and Fall ADT values to match the Summer ADT, it is necessary to determine the factors that can be multiplied by the Spring and Fall ADT values. This adjustment will be made using the Seasonal

Factor relative to AADT. The Seasonal Factor shows how much the ADT deviates from the presumed Average Annual Daily Traffic (AADT). The goal is to adjust the Spring and Fall ADTs to reflect the traffic volume that would be expected in the Summer.

To calculate this adjustment, the inverse of the ratio between each season's AADT and the Summer AADT will be used.

Formula:

$$\text{Adjustment Factor} = \frac{\text{Summer ADT}}{\text{Seasonal ADT (Spring or Fall)}}$$

1. For Spring:

Given:

- Spring ADT = 8,263
- Summer ADT = 10,284

To convert Spring to Summer, the factor is:

$$\text{Adjustment Factor for Spring} = \frac{10,284}{8,263}$$

So, the Spring ADT should be multiplied by 1.24 to adjust it to Summer-equivalent traffic.

2. For Fall:

Given:

- Fall ADT = 9,448
- Summer ADT = 10,284

To convert Fall to Summer, the factor is:

$$\text{Adjustment Factor for Spring} = \frac{10,284}{9,448}$$

So, the Fall ADT should be multiplied by 1.087 to adjust it to Summer-equivalent traffic.

After converting all the TMCs to summer, the TMCs collected in 2022 and 2024 were adjusted to 2025 values to reflect projected existing traffic conditions.

5.4 Transit Service

Based on the review of the transit services in the City of Belleville, there is no direct transit service near the study area.

Figure 4: Future Roadway Characteristics (Phase 1)

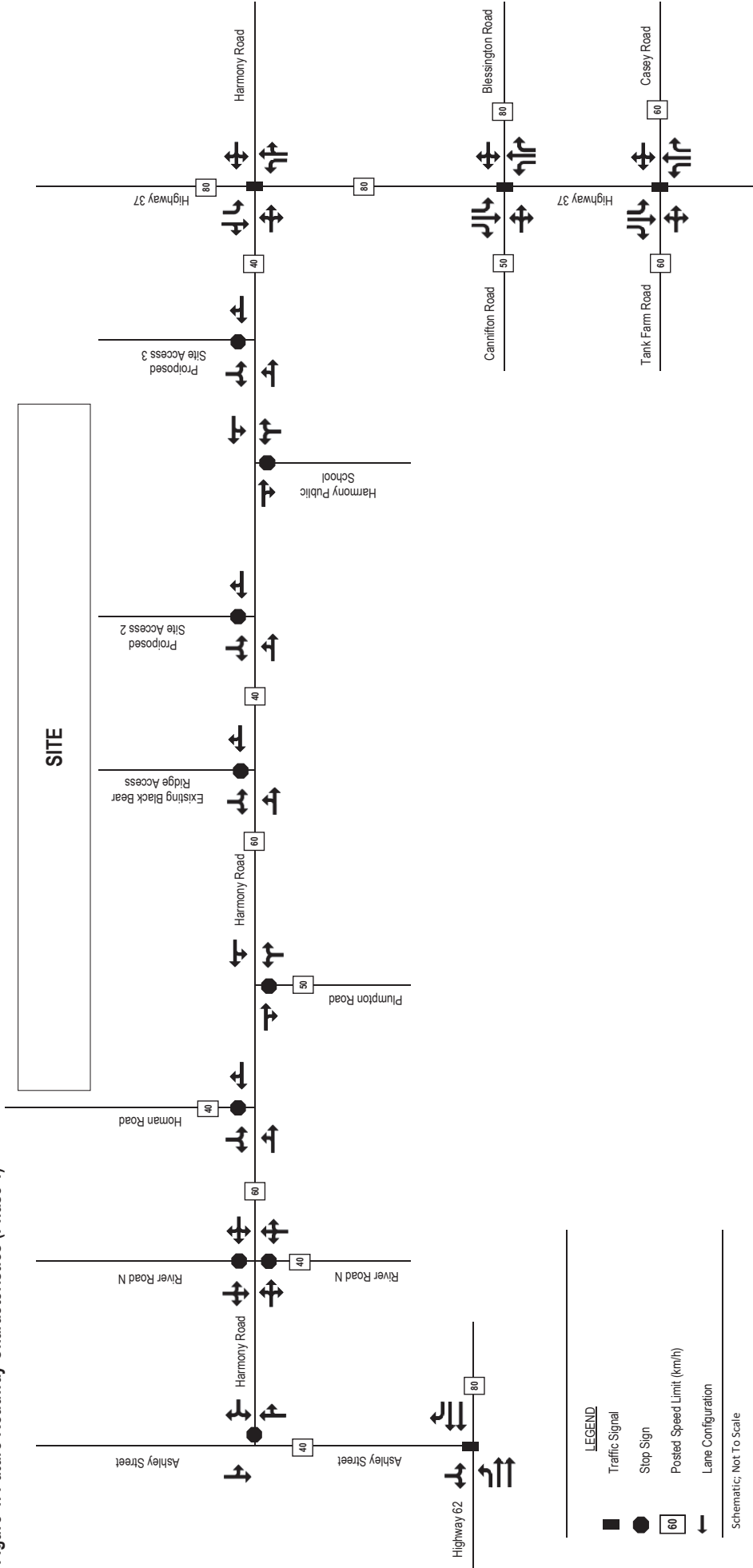


Figure 5: Future Roadway Characteristics (Phase 2 and 3)

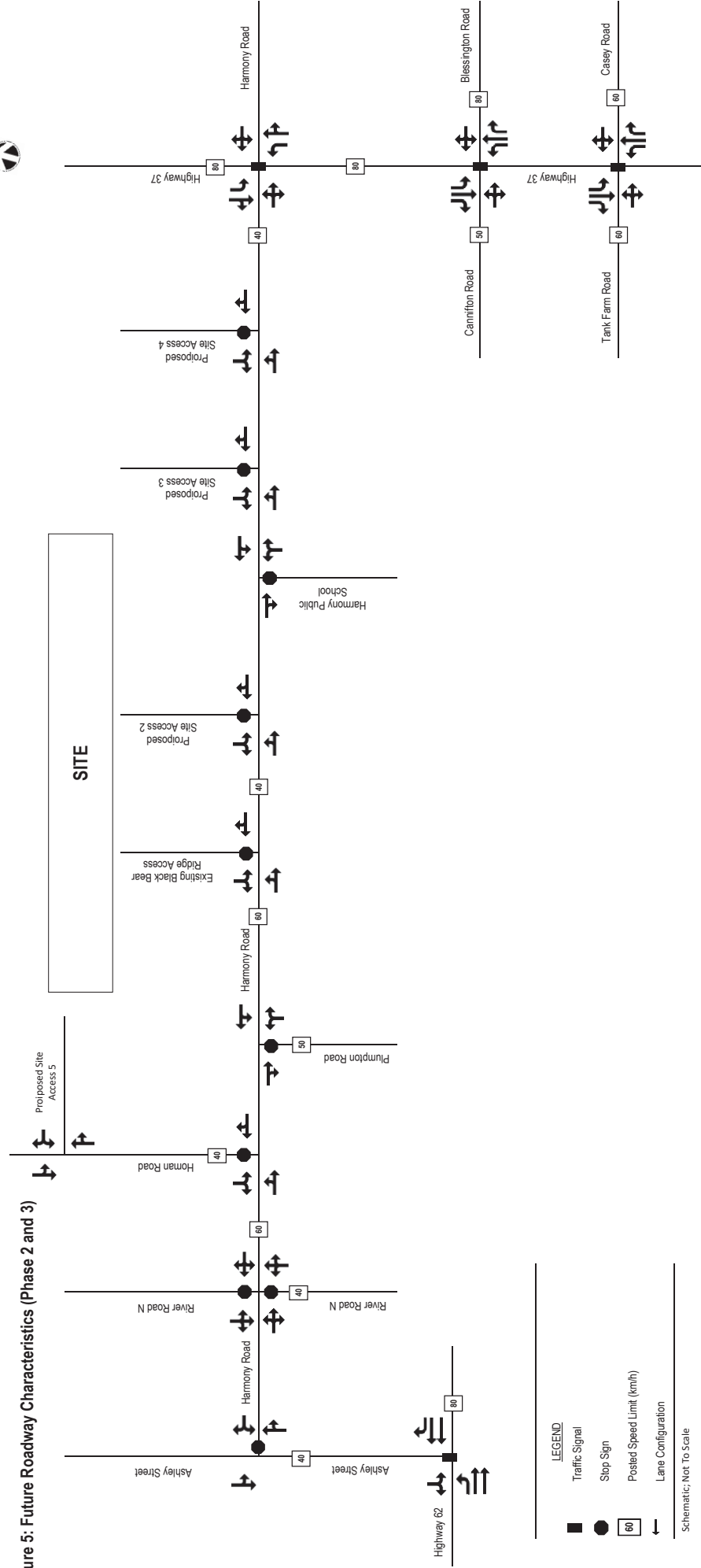
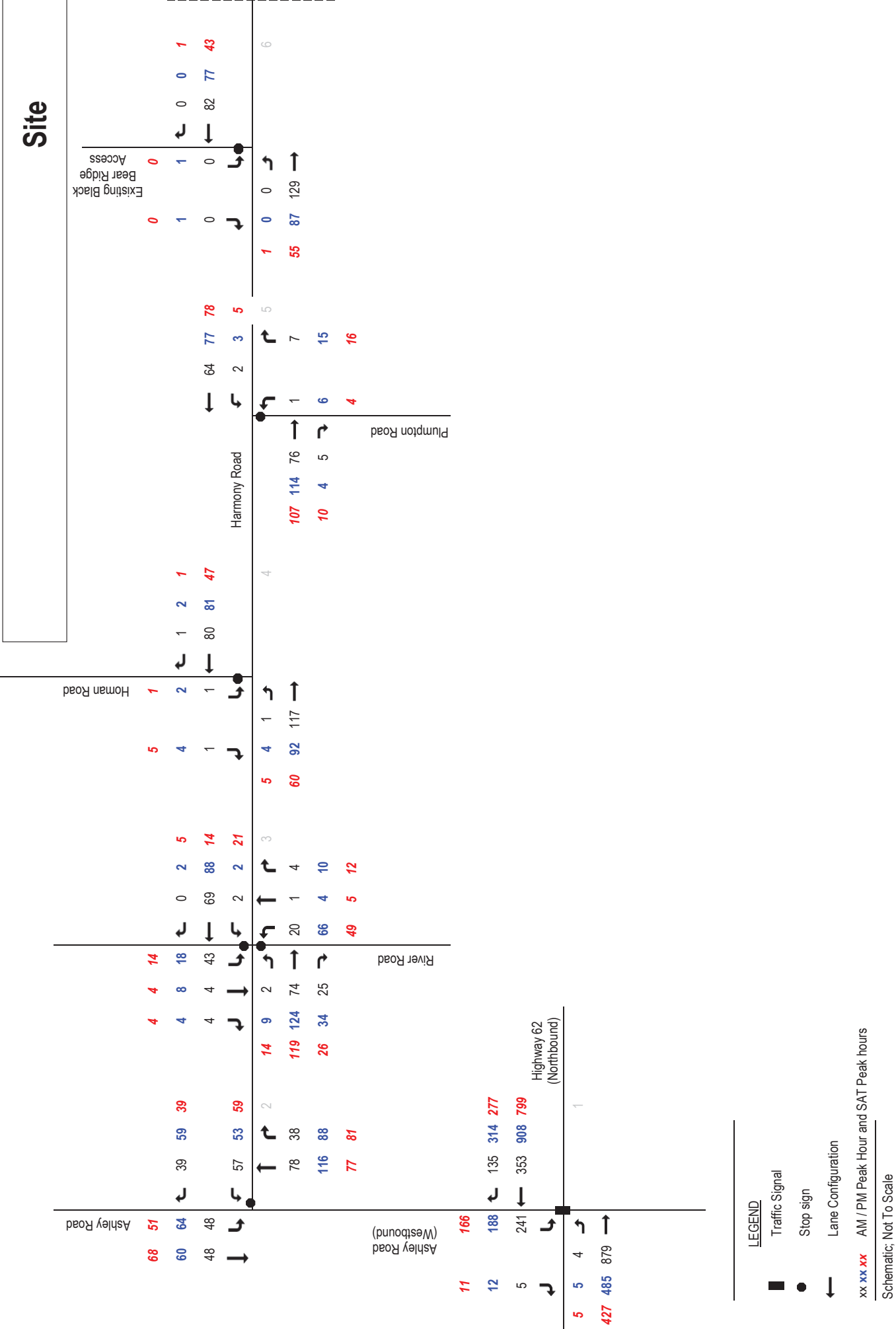


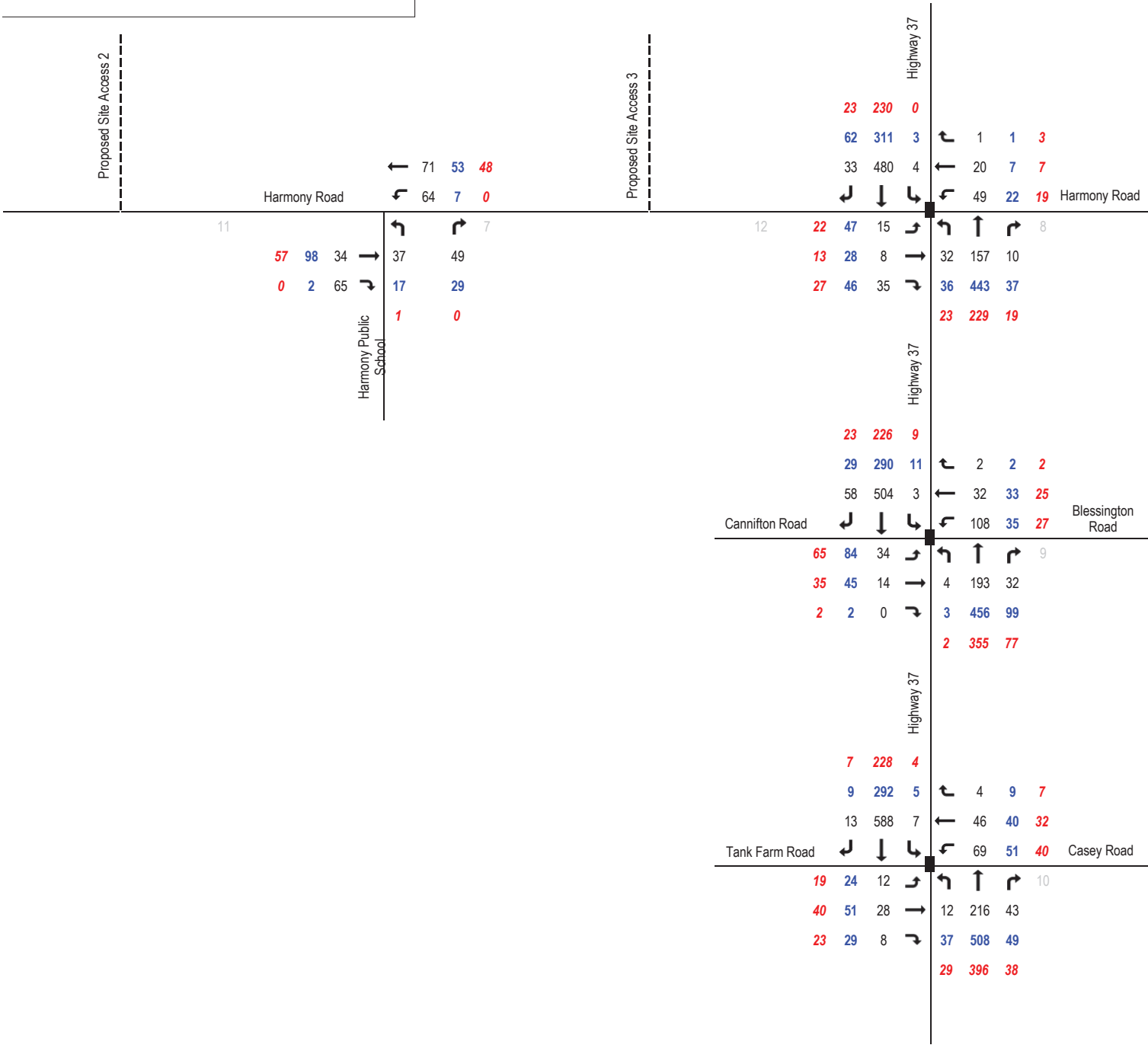
Figure 6: Existing Traffic Volumes, Weekday AM / PM / Saturday Peak Hours



TRAFFIC IMPACT STUDY

Black Bear Ridge Resort

Belleville, ON



6. FUTURE BACKGROUND CONDITIONS

Future background traffic volumes were determined based on a review of planned developments, road improvements, and traffic volume growth in the study area. This section also reviews planned roadway improvements.

6.1 Horizon Years

An analysis of future conditions was completed at build-out, five years after build-out, and ten years after build-out. The study horizon years are detailed as follows:

- Existing conditions: 2025
- Phase 1: 2026–2036
- Five years after Phase 1 build-out: 2041
- Ten years after Phase 1 build-out: 2046
- Completion of all Phases: 2056

6.2 Background Traffic Growth

A conservative 2 percent per annum growth rate for the planning horizon years was applied to the study area roadways as identified via correspondence from City staff and the MTO.

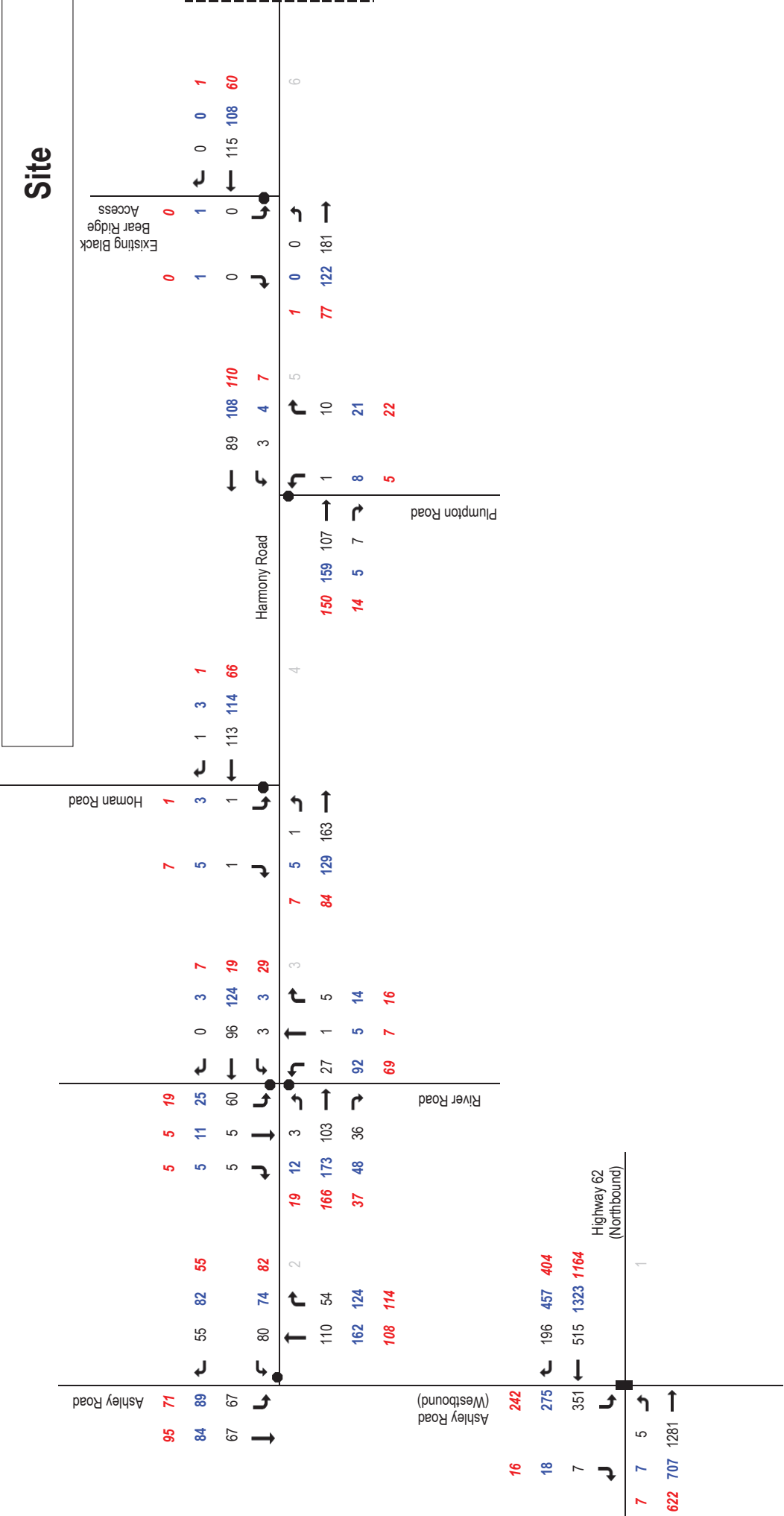
6.3 Planned Background Developments

According to the development application map on the City of Belleville’s official website, there is currently no ongoing development within the vicinity of the site.

6.4 Planned Roadway Improvements

Based on the City of Belleville Transportation Master Plan and construction projects on the City of Belleville’s official website, there is currently no ongoing or planned development within the vicinity of the site. The future background traffic volumes for the 2041 and 2046 horizon years for the weekday AM and PM peak hours are shown in Figure 7 and Figure 8, respectively.

Figure 7: Future Background 2041 Traffic Volumes, Weekday AM / PM / Saturday Peak Hours



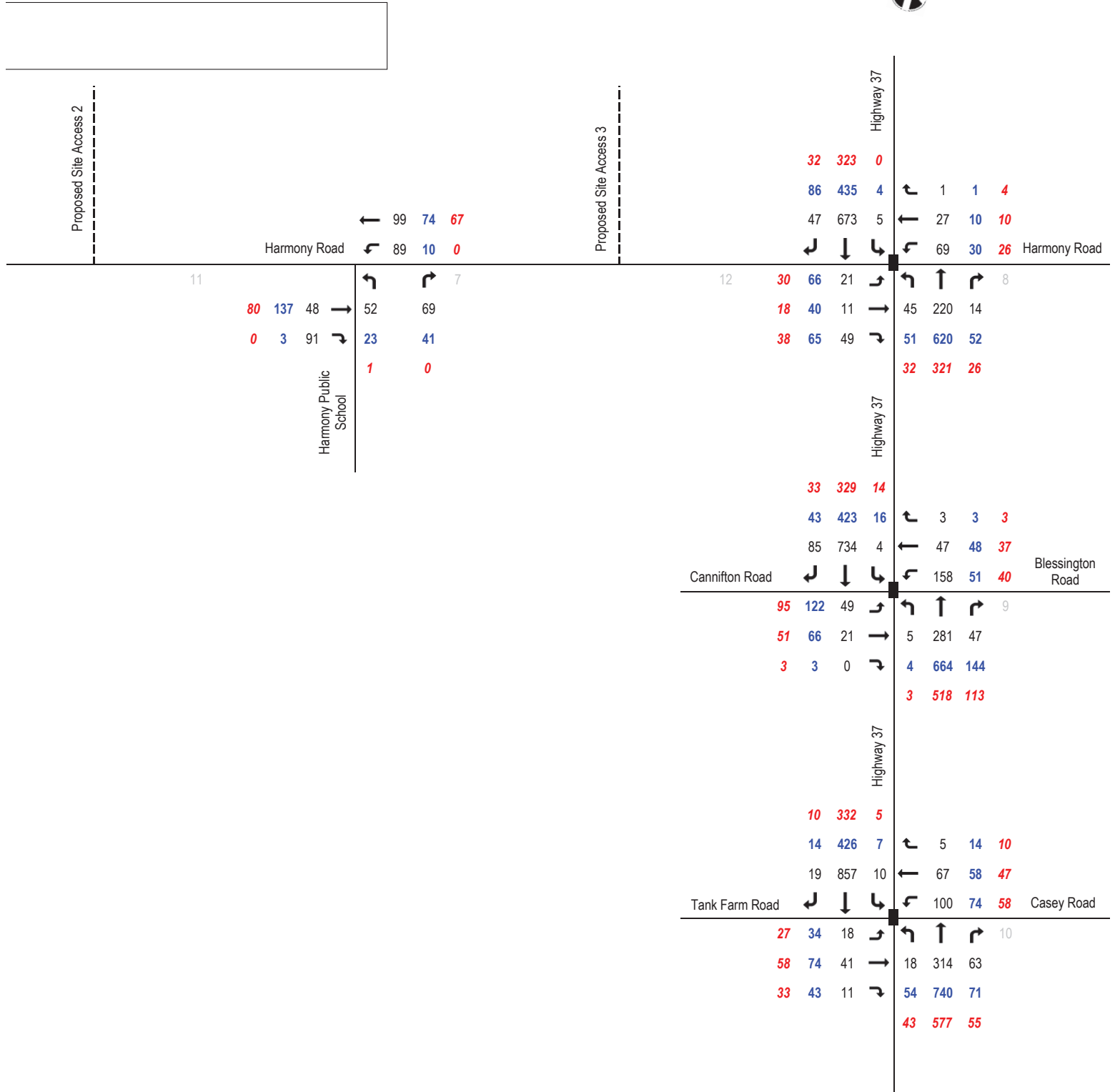
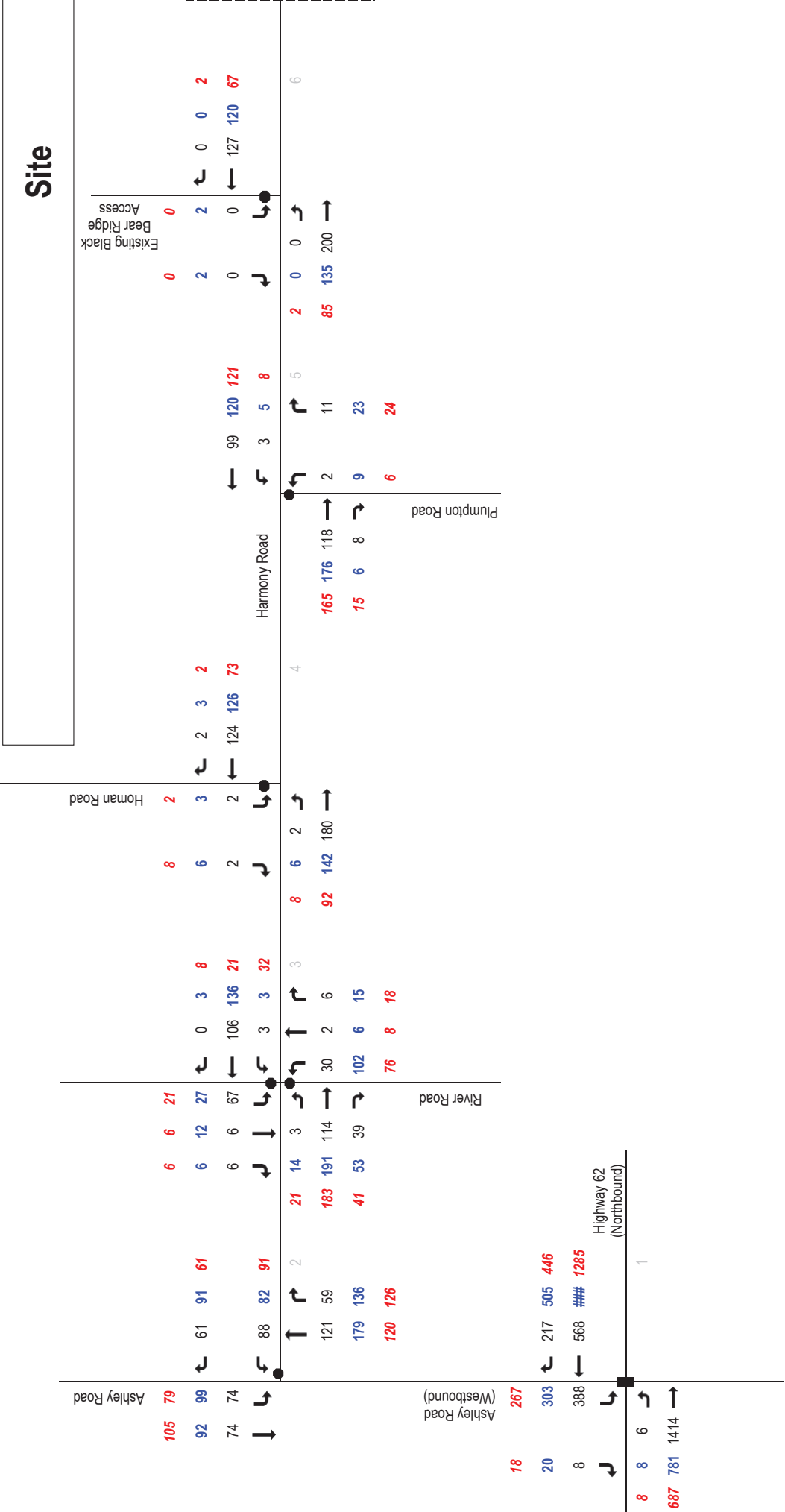


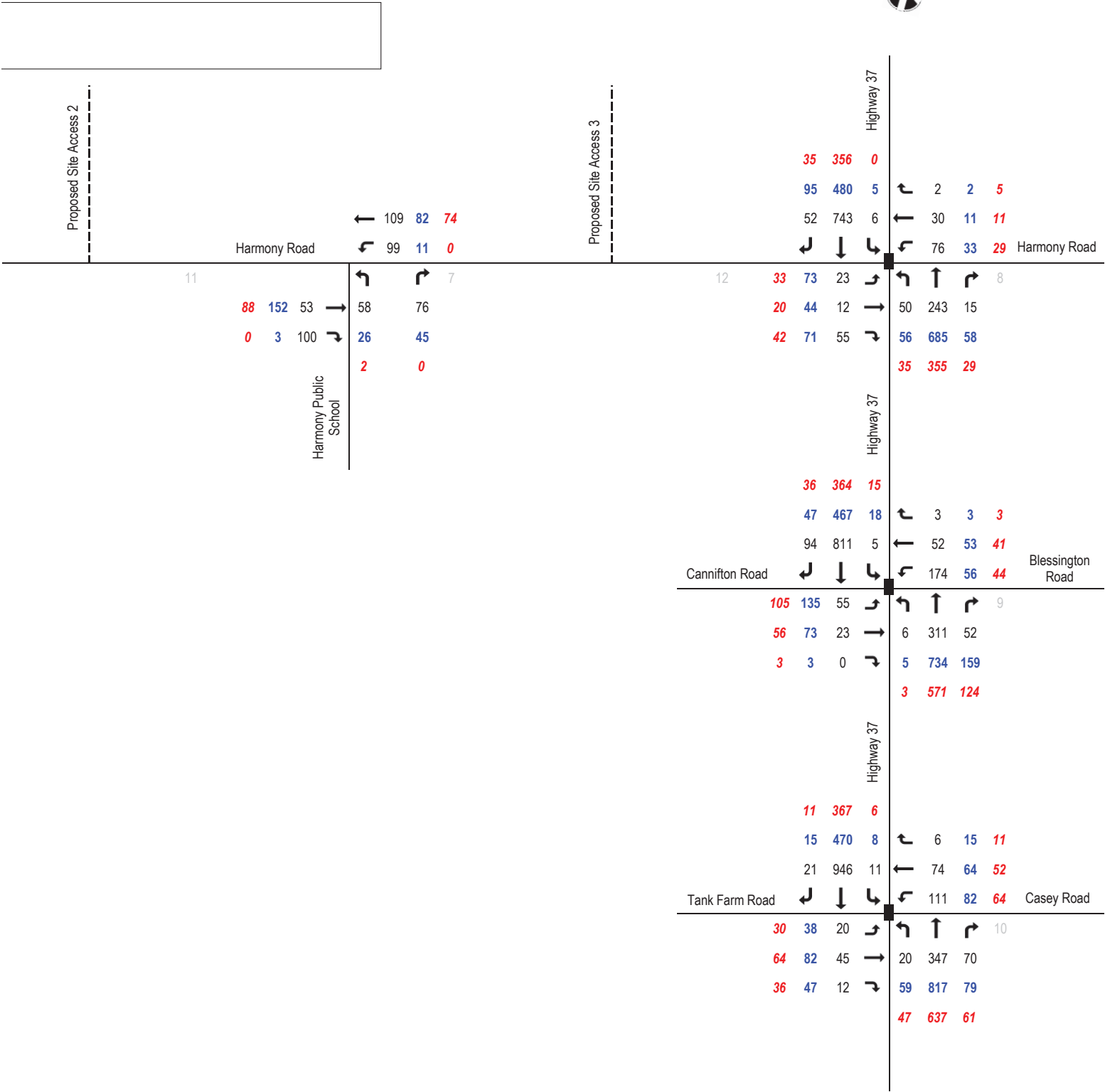
Figure 8: Future Background 2046 Traffic Volumes, Weekday AM / PM / Saturday Peak Hours



TRAFFIC IMPACT STUDY

Black Bear Ridge Resort

Belleville, ON



7. SITE TRAFFIC

7.1 Auto Trip Generation

Site trips for the proposed development were generated using the Institute of Transportation Engineers (ITE) Trip Generation manuals, 11th Edition. The ITE Land Use Code (LUC) Single-Family Detached Housing (LUC 210), Single-Family Attached Housing (LUC 215), Multifamily Housing - Low Rise (LUC 220), Resort Hotel (LUC 330), and Golf Course (LUC 430) were utilized for determining suitable trip rates. The site trip generation for Phase 1 of the subject site is shown in Table 3 and Table 4. While the site trip generation for consolidated Phase 2 and 3 of the subject sites is shown in Table 5 and Table 6.

Table 3 – Phase 1 Site Trip Generation (Residential)

Land Use (Non-Residential)	Dwelling Units		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Single-Family Detached Housing (LUC 210)	265	Distr.	25%	75%	100%	63%	37%	100%	54%	46%	100%
		Eqn	$\ln(X) = 0.91\ln(X) + 0.12$			$\ln(X) = 0.94\ln(X) + 0.27$			$T = 0.86(X) + 9.72$		
		Rate	0.17	0.51	0.68	0.59	0.35	0.94	0.48	0.42	0.30
		Trips	45	136	181	156	92	248	128	110	238
Single-Family Attached Housing (LUC 215) - Semis	38	Distr.	25%	75%	100%	59%	41%	100%	48%	52%	100%
		Eqn	$T = 0.52(X) - 5.70$			$T = 0.60(X) - 3.93$			$\ln(X) = 0.82\ln(X) + 0.43$		
		Rate	0.11	0.26	0.37	0.29	0.21	0.50	0.39	0.39	0.79
		Trips	4	10	14	11	8	19	15	15	30
Multifamily Housing - Low Rise (LUC 220) Condo & Stacked Townhouses	250	Distr.	24%	76%	100%	63%	37%	100%	63%	37%	100%
		Eqn	$T = 0.31(X) + 22.85$			$(T) = 0.43(X) + 20.55$			$(T) = 0.43(X) + 20.55$		
		Rate	0.10	0.30	0.40	0.32	0.19	0.51	0.32	0.19	0.51
		Trips	24	76	100	81	47	128	81	47	128
Multifamily Housing - Low Rise (LUC 220) Apartments	256	Distr.	24%	76%	100%	63%	37%	100%	63%	37%	100%
		Eqn	$T = 0.31(X) + 22.85$			$(T) = 0.43(X) + 20.55$			$(T) = 0.43(X) + 20.55$		
		Rate	0.10	0.30	0.40	0.32	0.19	0.51	0.32	0.19	0.51
		Trips	25	77	102	82	49	131	82	49	131
Total Trips			98	299	397	330	196	526	306	221	527

Table 4 – Phase 1 Site Trip Generation (Non-Residential)

Land Use (Non-Residential)	Rooms for hotel / Acres for Golf Course		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Resort Hotel (LUC 330)	500	Distr.	72%	28%	100%	43%	57%	100%	43%	57%	100%
		Eqn	T = 0.38(X) – 28.58			T = 0.52(X) – 55.42			T = 0.52(X) – 55.42		
		Rate	0.23	0.09	0.32	0.18	0.23	0.41	0.18	0.23	0.41
		Trips	116	45	161	88	117	205	88	117	205
Golf Course (LUC 430)	195.76	Distr.	74%	26%	100%	34%	66%	100%	34%	66%	100%
		Rate	0.14	0.05	0.19	0.10	0.18	0.28	0.10	0.18	0.28
		Trips	28	9	37	19	36	55	19	36	55
Total Trips			144	54	198	107	153	260	107	153	260

In Phase 1, the subject site is expected to generate approximately 595, 786, and 787 two-way trips in the weekday AM, weekday PM, and Saturday peak hours, respectively.

Table 5 – Phase 2 and 3 Site Trip Generation (Residential)

Land Use (Non-Residential)	Dwelling Units		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Single-Family Detached Housing (LUC 210)	498	Distr.	25%	75%	100%	63%	75%	100%	54%	46%	100%
		Eqn	$\ln(X) = 0.91\ln(X) + 0.12$			$\ln(X) = 0.94\ln(X) + 0.27$			$T = 0.86(X) + 9.72$		
		Rate	0.16	0.48	0.64	0.57	0.33	0.90	0.47	0.41	0.88
		Trips	80	241	321	283	166	449	236	202	438
Single-Family Attached Housing (LUC 215) - Semis	153	Distr.	25%	75%	100%	59%	41%	100%	48%	52%	100%
		Eqn	$T = 0.52(X) - 5.70$			$T = 0.60(X) - 3.93$			$\ln(X) = 0.82\ln(X) + 0.43$		
		Rate	0.12	0.36	0.48	0.34	0.24	0.58	0.31	0.31	0.62
		Trips	19	55	74	52	36	88	47	48	95
Single-Family Attached Housing (LUC 215) - Townhouse	572	Distr.	25%	75%	100%	59%	41%	100%	48%	52%	100%
		Eqn	$T = 0.52(X) - 5.70$			$T = 0.60(X) - 3.93$			$\ln(X) = 0.82\ln(X) + 0.43$		
		Rate	0.13	0.38	0.51	0.35	0.24	0.59	0.24	0.25	0.49
		Trips	73	218	292	200	139	339	135	145	280
Multifamily Housing - Low Rise (LUC 220) - Condo & Stacked Townhouses	818	Distr.	24%	76%	100%	63%	37%	100%	63%	37%	100%
		Eqn	$T = 0.31(X) + 22.85$			$(T) = 0.43(X) + 20.55$			$(T) = 0.43(X) + 20.55$		
		Rate	0.08	0.26	0.34	0.29	0.17	0.45	0.29	0.17	0.45
		Trips	66	210	276	234	138	372	234	138	372
Multifamily Housing - Low Rise (LUC 220) - Apartments	202	Distr.	24%	76%	100%	63%	37%	100%	63%	37%	100%
		Eqn	$T = 0.31(X) + 22.85$			$(T) = 0.43(X) + 20.55$			$(T) = 0.43(X) + 20.55$		
		Rate	0.10	0.32	0.42	0.33	0.20	0.53	0.33	0.20	0.53
		Trips	20	65	85	67	40	107	67	40	107
Total Trips			338	1,040	1,378	1,127	689	1,816	986	766	1,752

Table 6 – Phase 2 and 3 Site Trip Generation (Non-Residential)

Land Use (Non-Residential)	Rooms for hotel		Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Resort Hotel (LUC 330)	229	Distr.	72%	28%	100%	43%	57%	100%	43%	57%	100%
		Eqn	$T = 0.38(X) - 28.58$			$T = 0.52(X) - 55.42$			$T = 0.52(X) - 55.42$		
		Rate	0.18	0.07	0.25	0.12	0.16	0.28	0.12	0.16	0.28
		Trips	42	16	58	28	36	64	28	36	64
Total Trips			42	16	58	28	36	64	28	36	64

In completion of all phases, the subject site is expected to generate an additional 1,106, 1,419, and 1,356 two-way trips in the weekday AM, weekday PM, and Saturday peak hours, respectively.

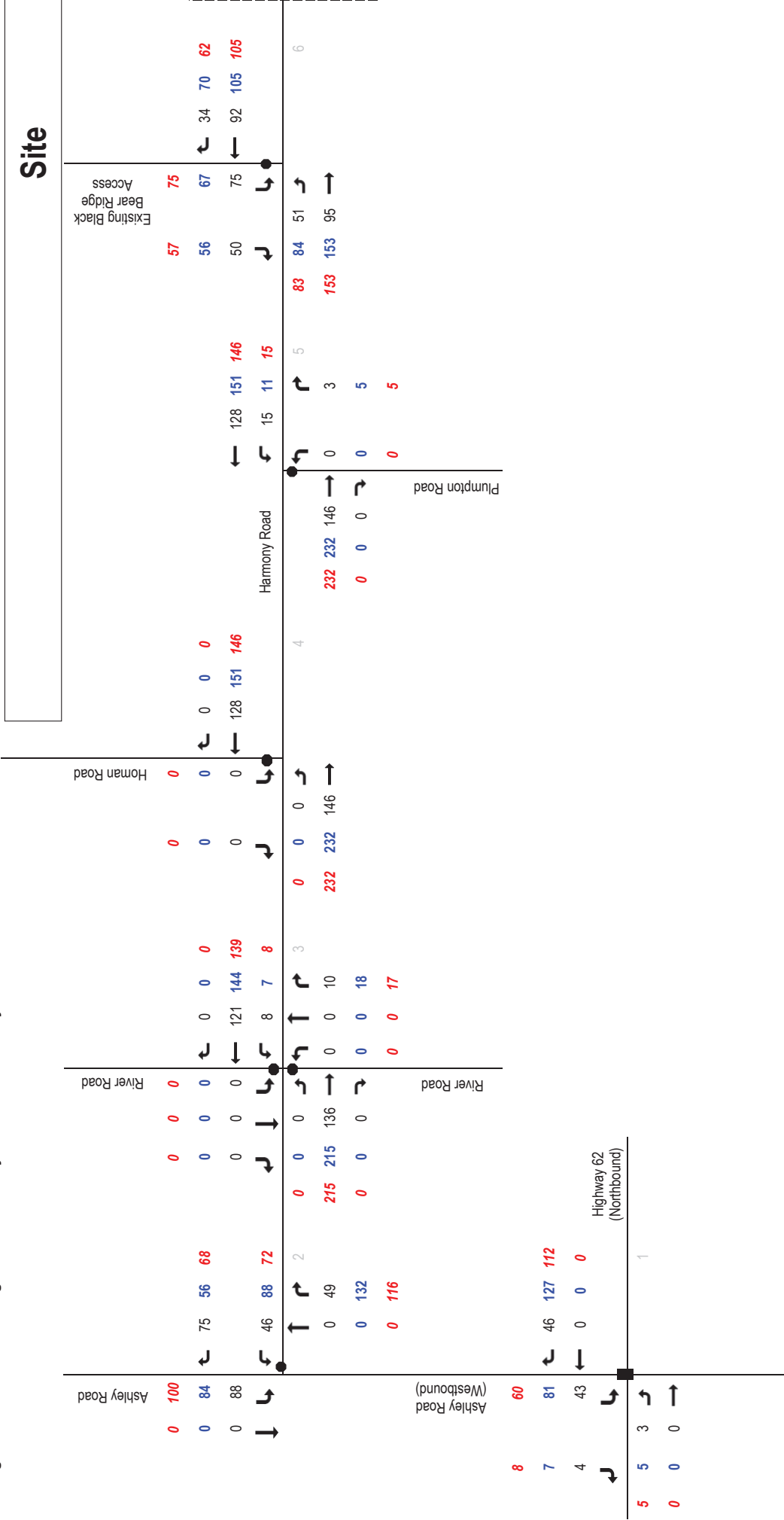
7.2 Trip Distribution and Assignment

The site trips for the proposed development were distributed to/from the subject site and boundary roadways based on the existing traffic patterns of the study area roadways. The site traffic assignment for the weekday AM and PM peak hours is shown in Figure 9.

8. FUTURE TOTAL TRAFFIC CONDITIONS

Site traffic volumes were added to the future background traffic volumes to obtain future total traffic volumes. Future total traffic volumes for weekday AM, PM, and Saturday peak hours for the years 2041, 2046, and 2056 are provided in Figure 10, Figure 11, and Figure 12 respectively.

Figure 9: Site Traffic Assignment, Weekday AM / PM / Saturday Peak Hours



LEGEND

- Traffic Signal
- Stop sign
- Lane Configuration

xx xx xx AM / PM Peak Hour and SAT Peak hours

Schematic; Not To Scale

TRAFFIC IMPACT STUDY

Black Bear Ridge Resort

Belleville, ON

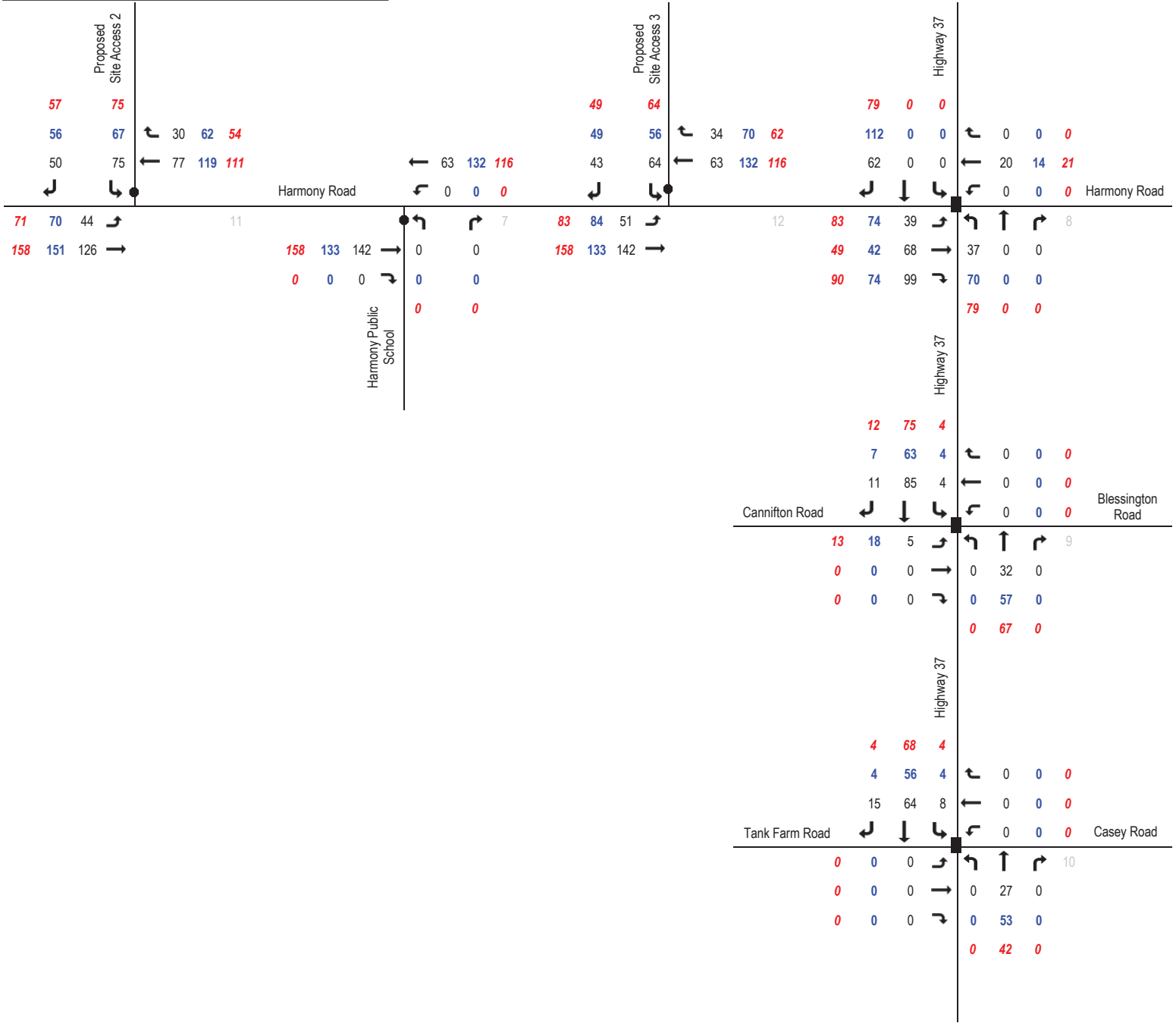
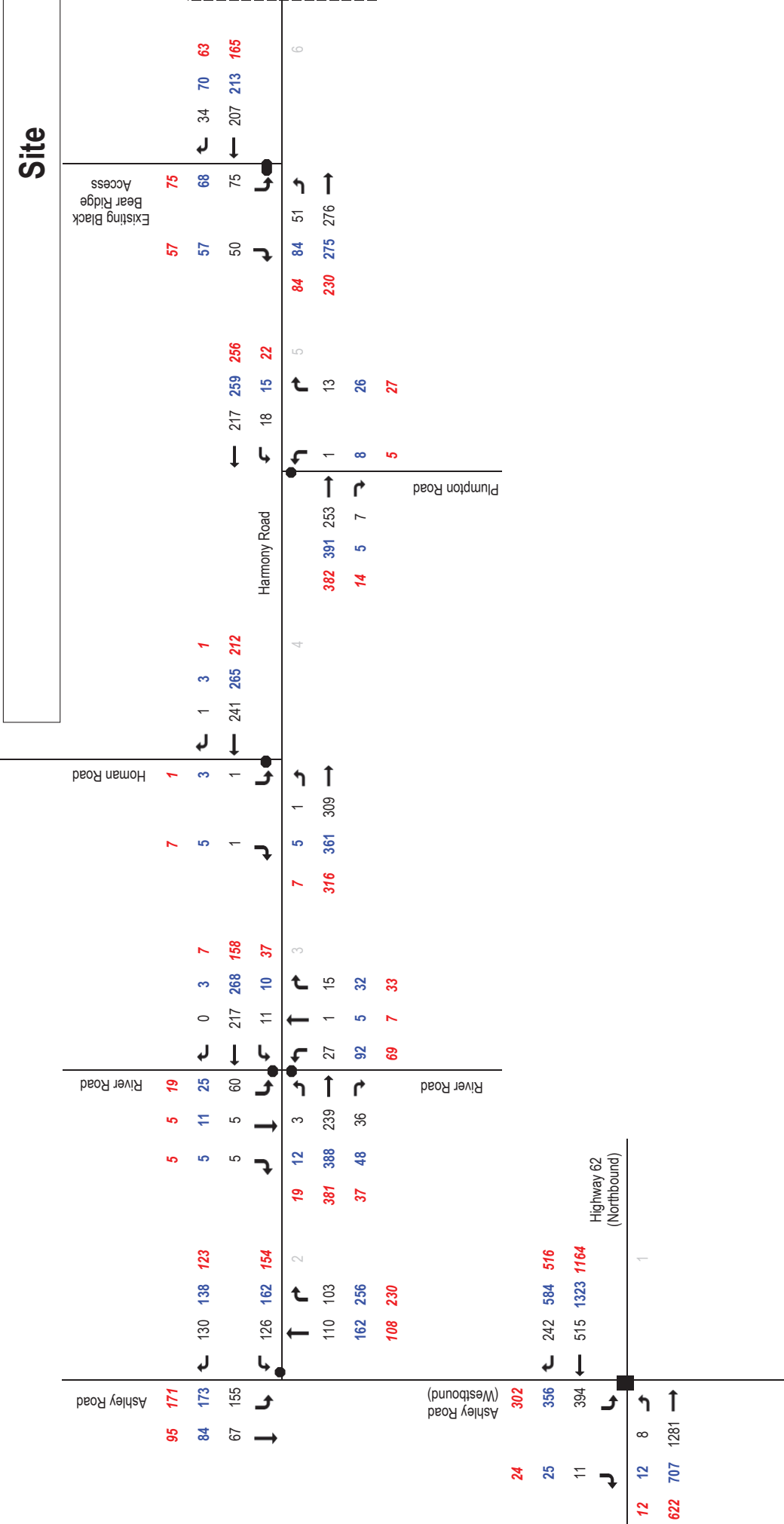


Figure 10: Future Total 2041 Traffic Volumes, Weekday AM / PM / Saturday Peak Hours



TRAFFIC IMPACT STUDY

Black Bear Ridge Resort

Belleville, ON

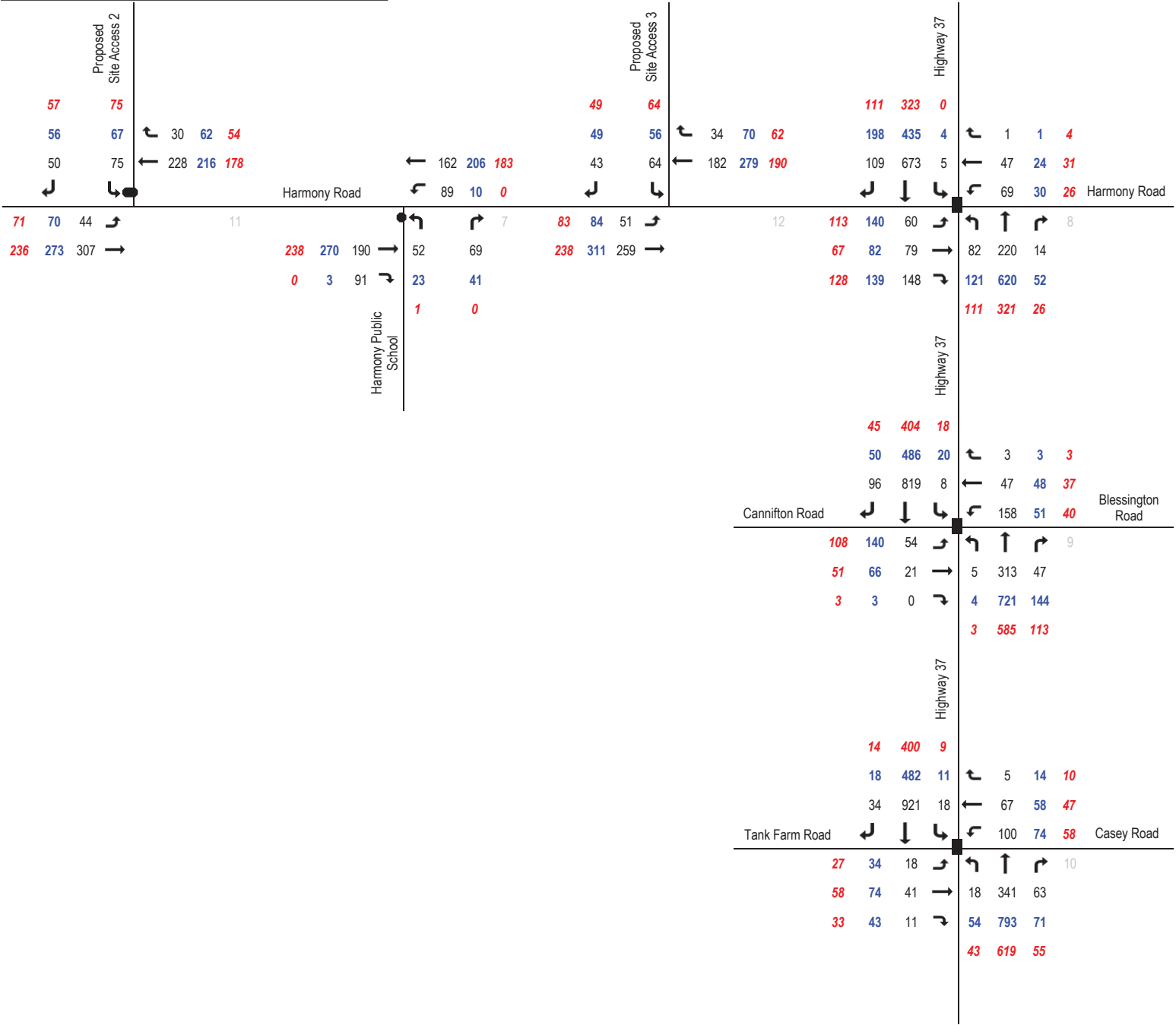
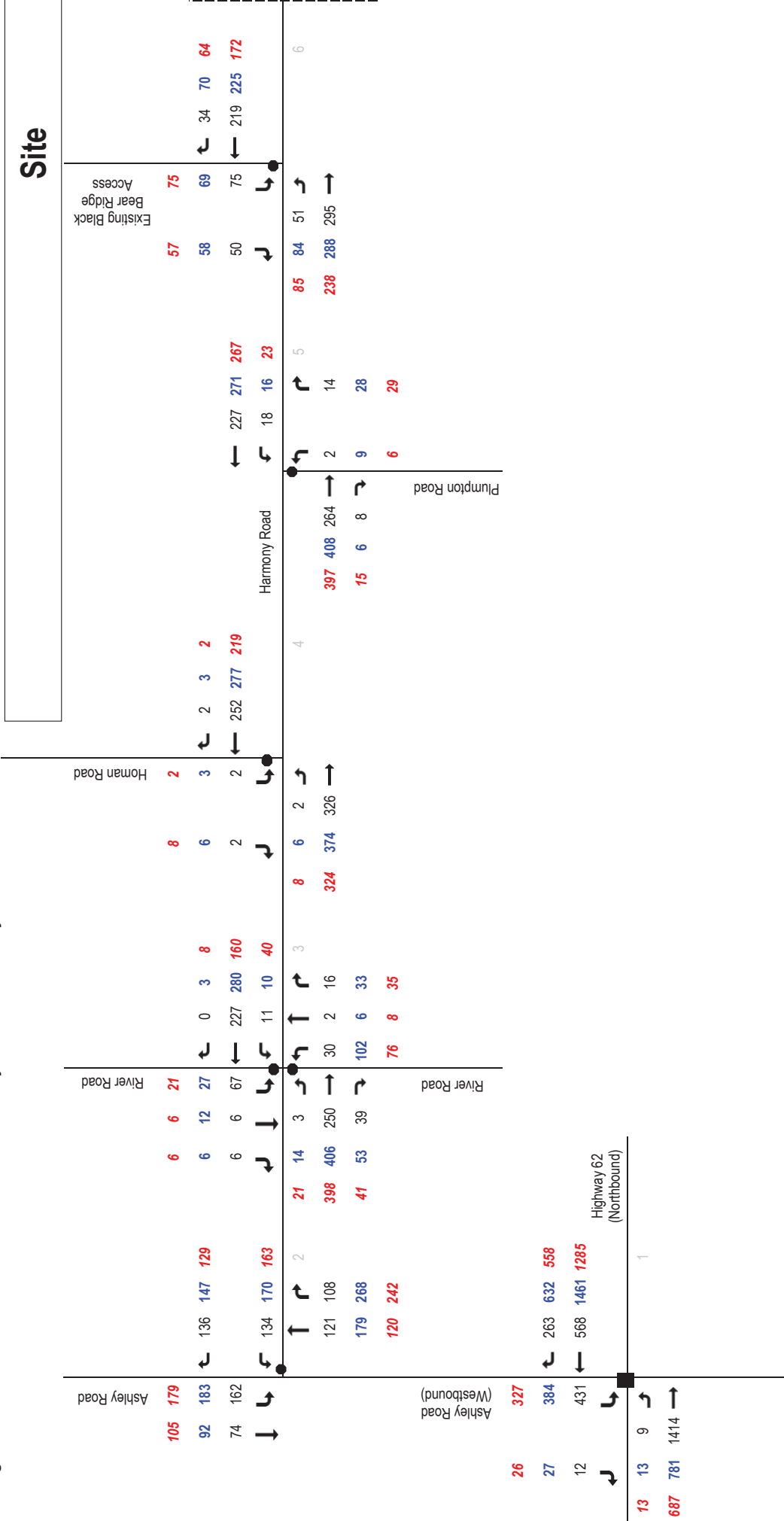


Figure 11: Future Total 2046 Traffic Volumes, Weekday AM / PM / Saturday Peak Hours



LEGEND

- Traffic Signal
- Stop sign
- Lane Configuration

xx xx xx AM / PM Peak Hour and SAT Peak hours

Schematic; Not To Scale

TRAFFIC IMPACT STUDY

Black Bear Ridge Resort

Belleville, ON

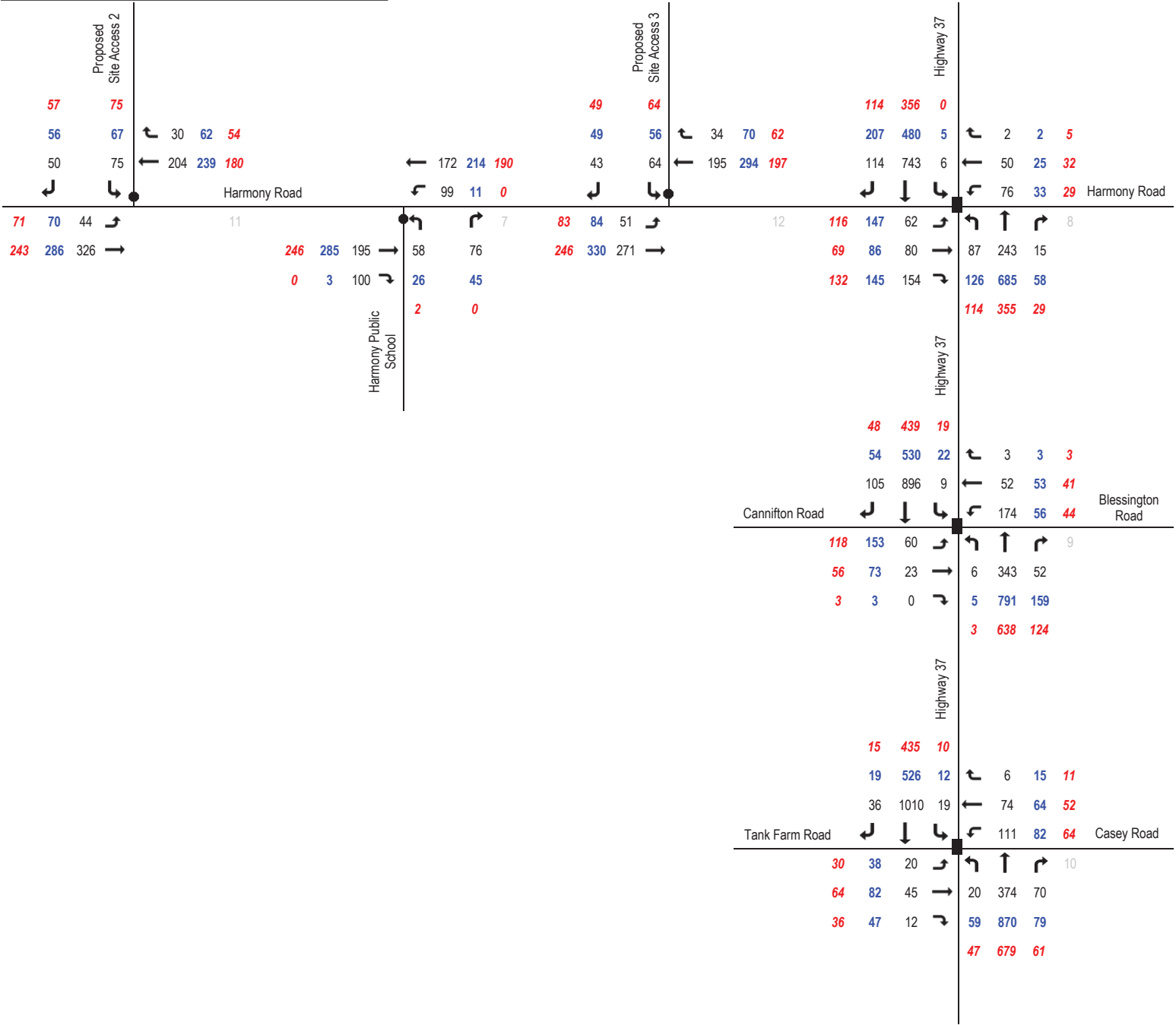
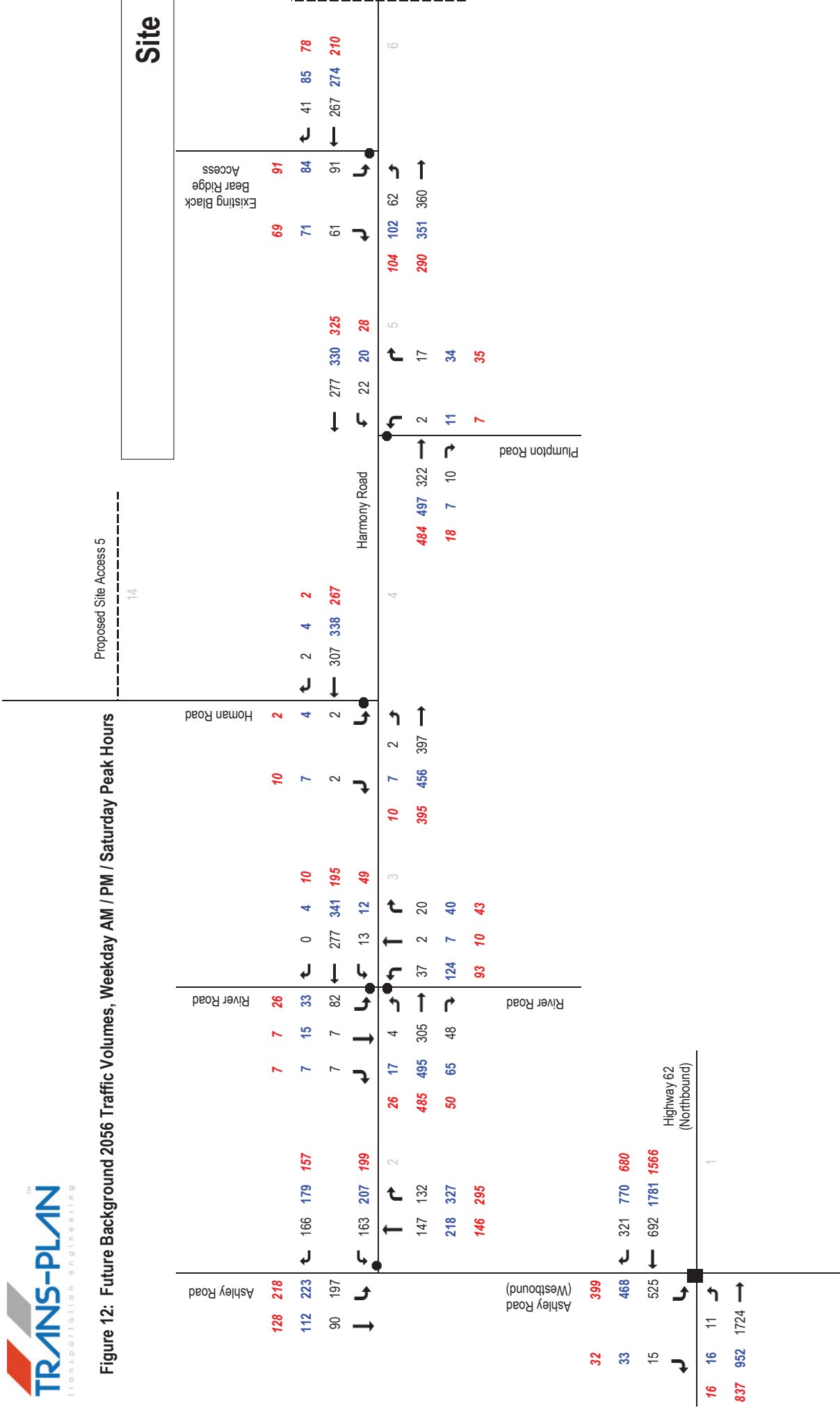


Figure 12: Future Background 2056 Traffic Volumes, Weekday AM / PM / Saturday Peak Hours



LEGEND

Traffic Signal

Stop sign

Lane Configuration

xx xx xx AM / PM Peak Hour and SAT Peak hours

TRAFFIC IMPACT STUDY

Black Bear Ridge Resort

Belleville, ON

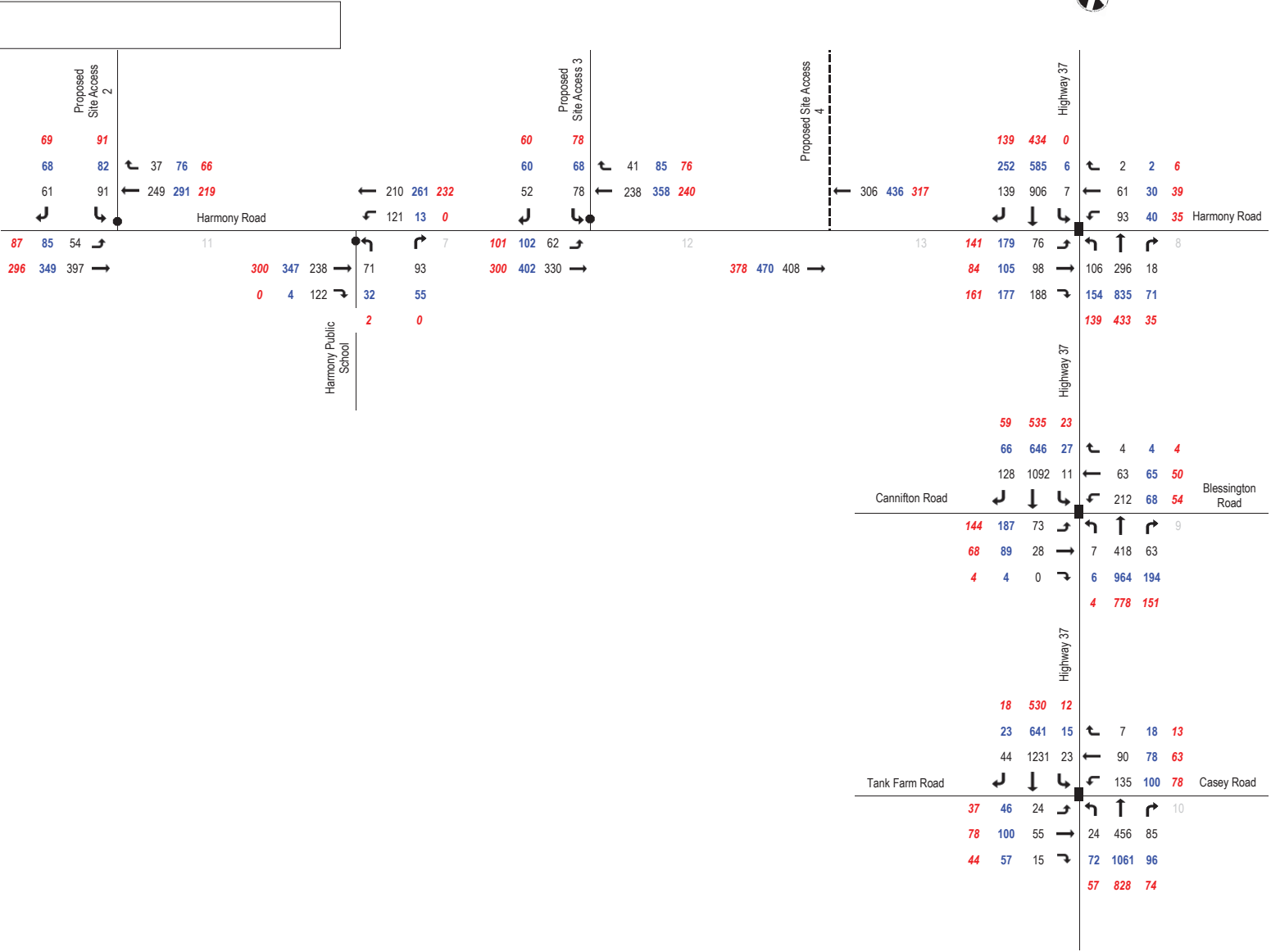
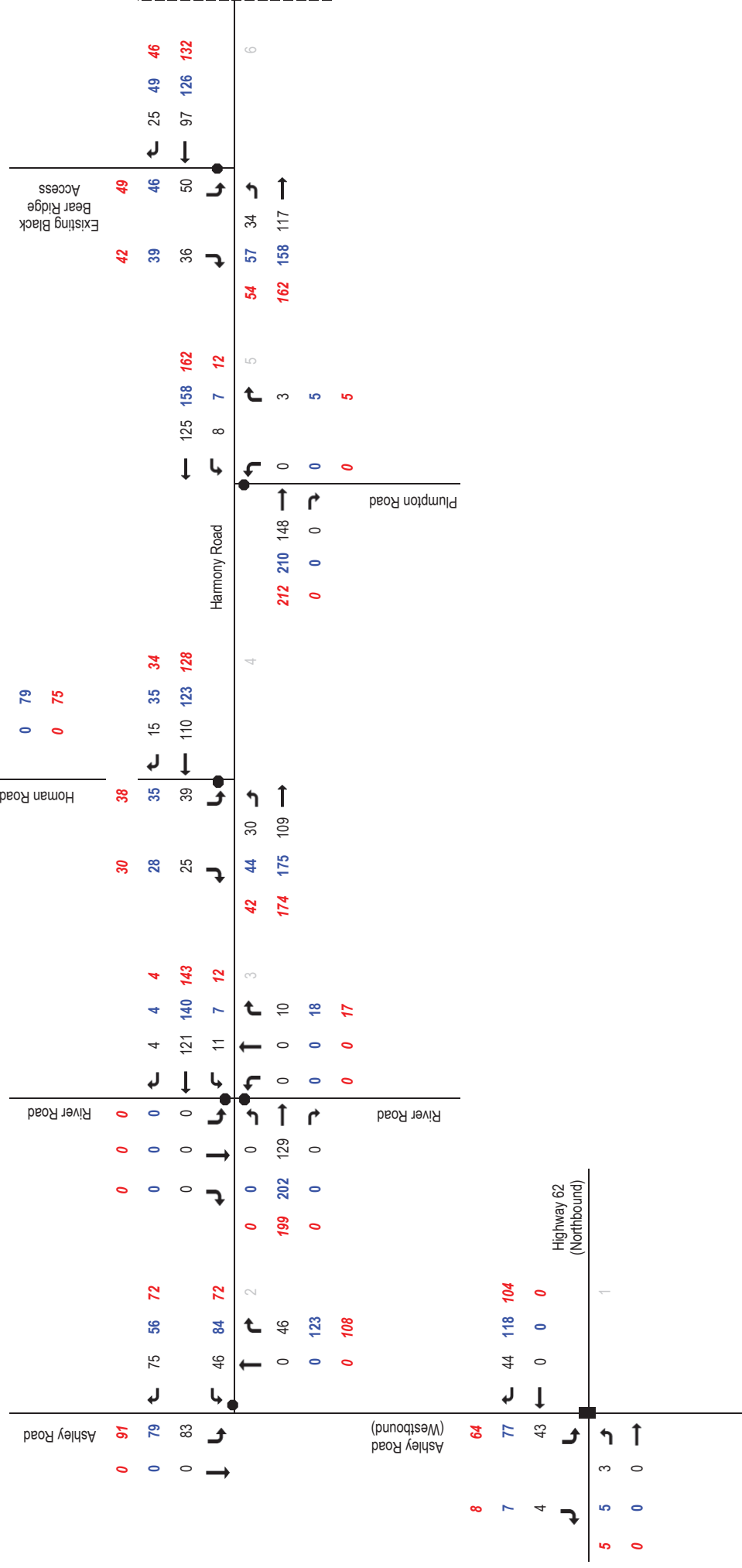


Figure 13: Phase 2 and 3 Site Traffic Assignment, Weekday AM / PM / Saturday

Peak Hours



LEGEND

- | | |
|---|--------------------|
|  | Traffic Signal |
|  | Stop sign |
|  | Lane Configuration |

xx xx xx AM / PM Peak Hour and SAT Peak hours

TRAFFIC IMPACT STUDY

Black Bear Ridge Resort

Belleville, ON

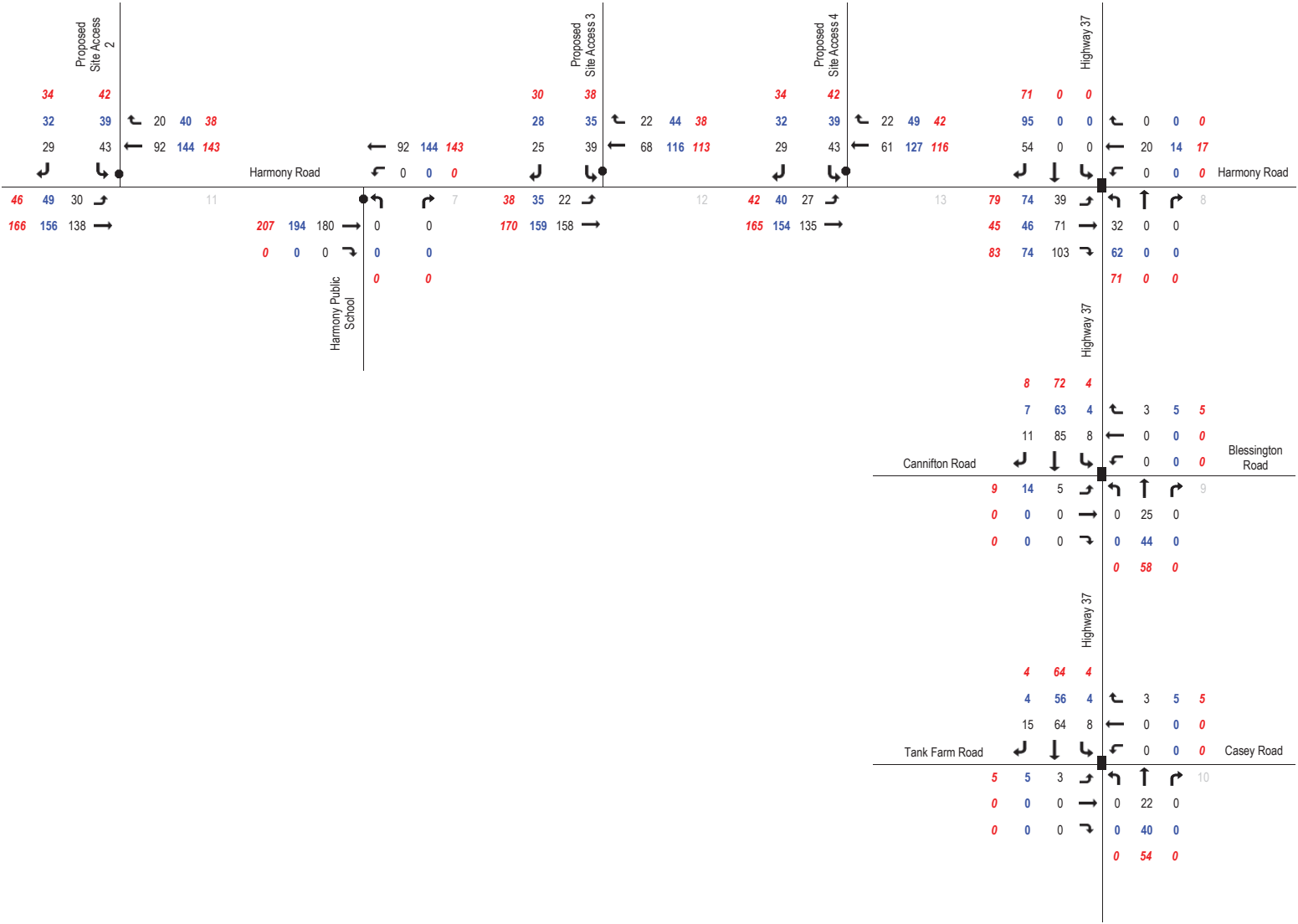
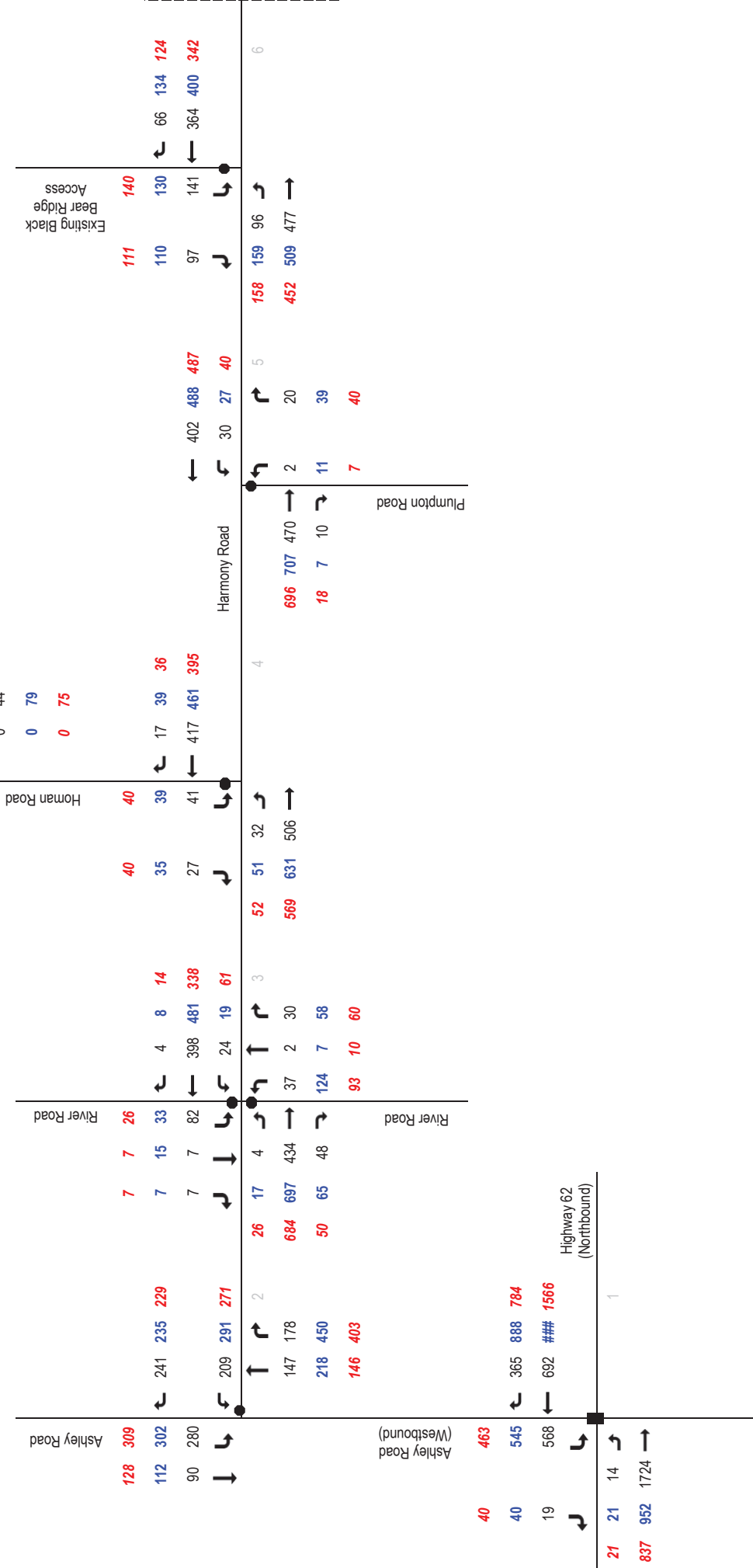
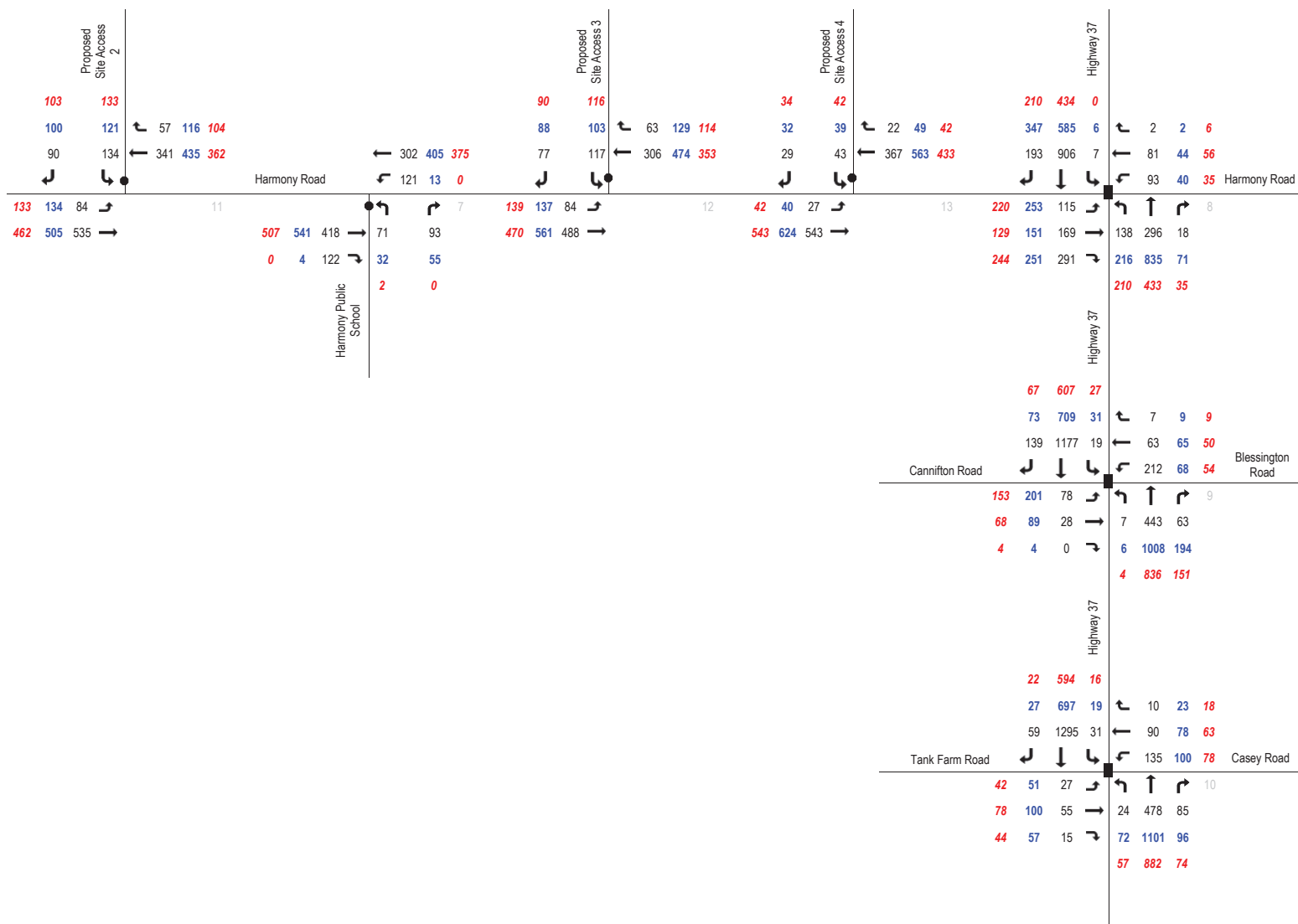


Figure 14: Future Total 2056 Traffic Volumes, Weekday AM / PM / Saturday Peak Hours

Site



Belleville, ON



9. CAPACITY AND QUEUEING ANALYSIS

A capacity analysis was performed for the study area intersections using Synchro 11 analysis software. The capacity analysis results for the weekday AM, weekday PM, and Saturday peak hours for the horizon years 2041, 2046, and 2056 are shown in Table 7 and Table 9, respectively. The adjusted capacity analysis results for the weekday AM, weekday PM, and Saturday peak hours for the horizon years 2046 and 2056 are shown in Table 8 and Table 10 respectively.

A vehicle queue analysis was performed for the turn lanes of the study area intersections using SimTraffic analysis software, version 11.0. The 95th percentile vehicle queue results for existing and the 2041, 2046, and 2056 horizon years for the weekday AM, PM, and Saturday Peak hours are shown in Table 11, Table 12, and Table 13.

Capacity and queue analysis sheets, and Level of Service (LOS) definitions are provided in Appendix C and Appendix D, respectively.

Capacity and Queueing Thresholds:

The MTO Traffic Impact Study Guidelines state that movements with a v/c ratio greater than 0.85 are deemed critical at signalized intersections. Generally, at unsignalized intersections, a LOS of D or better is considered acceptable for individual movements.

Queues are acceptable when they are contained within their available queue storage length, for analysis purposes, the 95th percentile queues were reviewed.

The results of the capacity and queue analysis are discussed in this section for each intersection.

CAPACITY and QUEUEING ANALYSIS RESULTS for Phase 1:

Highway 62 and Ashley Street

In existing traffic conditions, the intersection will operate within acceptable capacity during weekday AM, PM, and Saturday peak hours, with volume-to-capacity (v/c) ratios of 0.67, 0.58, and 0.49, respectively. However, the westbound left/right turn movement experiences an LOS F, with a v/c ratio of 1.03, indicating that the turn lane is operating at overcapacity even without the contribution of the site traffic.

Under 2041 future background conditions, the intersection is expected to operate at LOS D with an overall v/c ratio of 0.92 during the weekday AM peak hour. In 2046 future background conditions and both 2041 and 2046 future total conditions, the intersection is anticipated to operate at LOS E, with the overall v/c ratio exceeding 1.0. During the weekday PM peak hour and Saturday peak hours under 2041 and 2046 future background and total conditions, the intersection is projected to operate at LOS B to C, with v/c ratios ranging from 0.67 to 0.91, which are considered acceptable when below 0.85 and nearing capacity between 0.85 and 1.0. Under 2046 future total conditions, the westbound lane is anticipated to perform at overcapacity with a v/c ratio that exceeds 1.0 during the weekday AM, PM, and Saturday peak hours.

To ensure acceptable traffic conditions, it is recommended to consider having two dedicated lanes, one for left turn only and one for shared left and right turn along Ashley Street from Highway 62 to Harmony Road.

The 95th percentile queues for the northbound right turn and southbound left turn are expected to be contained within their available storage lengths under all traffic conditions.

Harmony Road and Ashley Street

The northbound through/right and southbound left/through movements are expected to operate acceptably under all conditions. Additionally, the westbound left/right turn movement is expected to operate acceptably under existing and future background conditions. Still, it is projected to operate at LOS E and F under 2041 and 2046 future total conditions.

To maintain acceptable traffic conditions, it is recommended to add a left turn lane that separates it from the right turn.

Harmony Road and River Street North

All northbound, eastbound, southbound, and westbound left/through/right turn movements are expected to operate acceptably, achieving an LOS of D or better under all conditions.

Harmony Road and Homan Road

The eastbound through/left, westbound through/right, and southbound left/right turn movements are expected to operate acceptably under all conditions in 2041 and 2046, with an LOS ranging from A to C.

Harmony Road and Plumpton Road

The eastbound through/right, westbound left/through, and northbound left/right movements are expected to operate acceptably under all conditions in 2041 and 2046, with an LOS ranging from A to B.

Harmony Road and Existing Black Bear Ridge Access

The eastbound left/through and westbound through/right movements are expected to operate acceptably under all conditions, with an LOS of A. Additionally, the southbound left/right turn movements are projected to operate acceptably in 2041 and 2046 under AM and Saturday peak hours, with an LOS of C. However, during the PM peak hours, they are expected to experience an LOS of E.

To reduce traffic queues for the north leg's left/right turns, it is recommended to warrant a left turn lane.

Harmony Road and Proposed Site Access 2

The eastbound left/through, westbound through/right, and southbound left/right turn movements are expected to operate acceptably under 2041 and 2046 future total conditions with an LOS ranging from A to C.

Harmony Road and Harmony Public School

The eastbound through/right, westbound left/through, and northbound left/right movements are expected to operate acceptably under all conditions in 2041 and 2046, with an LOS ranging from A to B, except during the AM peak hours of 2041 and 2046, where the LOS is projected to be F. However, this may not be a significant concern, as the combined volume from the two school entrances is accounted for as a single entrance in the study. In reality, the traffic flow will be distributed across both entrances. To improve traffic flow going in and out of the school, it is recommended to install a "School Zone Maximum Speed" sign.

Harmony Road and Proposed Site Access 3

The eastbound through/left, westbound through/right, and southbound left/right movements are expected to operate acceptably under all conditions in 2041 and 2046, with an LOS ranging from A to C.

Highway 37 and Harmony Road

In existing traffic conditions, the intersection operates within acceptable capacity during weekday AM, PM, and Saturday peak hours, with volume-to-capacity (v/c) ratios of 0.50, 0.45, and 0.24 respectively. In 2041 and 2046 future total conditions, the intersection is anticipated to operate at LOS C and D, with the overall v/c ratio ranging from 0.66 to 0.97. The eastbound left/through/right turn movements during PM and Saturday peak hours under 2041 and 2046 operate at LOS of F with v/c ratios exceeding 1.0, same goes with the northbound left and westbound left/through/right during PM peak hours under 2046 with LOS of F and E, respectively.

To manage the traffic concerns, it is recommended to convert the eastbound lane to include shared left and through, and a dedicated right lane.

Under all traffic conditions, the 95th percentile queues for the northbound and southbound left and right turns are expected to remain within the available storage lengths.

Highway 37 and Cannifton Road/Blessington Road

In existing traffic conditions, the intersection operates within acceptable capacity during weekday AM, PM, and Saturday peak hours, with volume-to-capacity (v/c) ratios of 0.63, 0.45, and 0.24, respectively. In 2041 and 2046, future background conditions, the intersection operates within acceptable capacity while AM peak hour operates at almost overcapacity due to the performance of lanes westbound left/through/right and southbound through movement with v/c ratios of more than 0.84 implying that the mentioned lanes are operating at almost overcapacity even without the contribution of the site traffic. In 2041 and 2046, the future total conditions of AM, PM, and Saturday Peak hours, the intersection is anticipated to operate at LOS C and D. The westbound lane operates at LOS E and F, while southbound through operates at LOS of C and D during the AM peak hours under background and future total traffic conditions.

It is recommended for a left turn lane to be warranted on the east leg. Moreover, it is also suggested to improve the signal timing by providing more time for northbound and southbound traffic.

The 95th percentile queues for the northbound and southbound left turn are expected to remain within the available storage lengths under all traffic conditions.

Highway 37 and Tank Farm Road/Casey Road

The intersection operates within acceptable capacity during weekday AM, PM, and Saturday peak hours, with volume-to-capacity (v/c) ratios not higher than 0.75 except for the AM peak hours in 2041 and 2046 future background and total conditions with v/c ratios at near capacity and overcapacity. Westbound left/through/right and Southbound through display high v/c ratios in 2041 and 2046 future background and total conditions. The intersection operates at LOS D or better during the AM, PM, and Saturday peak hours under both background and future total traffic conditions. This indicates ongoing traffic issues even without additional site traffic.

Trans-Plan recommends adding a left turn lane on both the east and the west leg.

The 95th percentile queues for the northbound and southbound left and right turns are expected to remain within the available storage lengths under all traffic conditions.

CAPACITY and QUEUEING ANALYSIS RESULTS for Phases 2 and 3:

The result of the future total traffic conditions in 2046 is used as the basis of the existing traffic conditions for Phase 2 and 3 (full build-out).

Highway 62 and Ashley Street

In existing traffic conditions, the intersection is anticipated to experience overcapacity during weekday AM peak hours and close to capacity during PM and Saturday peak hours, with volume-to-capacity (v/c) ratios of 1.06, 0.91, and 0.80, respectively. All individual movements operate acceptably, except for the westbound left/right turns, which experience poor performance (LOS F) during peak hours with v/c ratios of 1.74, 1.25, and 1.05. This contributes to congestion.

By 2056 future total conditions, the intersection is projected to operate between LOS D and F, with v/c ratios ranging from 0.97 to 1.45. The westbound left/right turn, along with the northbound through and northbound right turn during the PM peak, will also have LOS F, with v/c ratios exceeding 1.0.

To improve traffic flow, it is recommended to add two dedicated left-turn lanes and a shared left/right turn lane on Ashley Street. Extending signal times for northbound and southbound traffic also helps alleviate congestion. The southbound left-turn queue will generally stay within storage limits, except the northbound right turn lane.

Harmony Road and Ashley Street

The northbound through/right and southbound left/through movements are expected to operate acceptably under all conditions. However, the westbound left/right turn movement is projected to operate at LOS F in the 2056 future total conditions.

To maintain acceptable traffic flow, Trans-Plan recommends signalizing the intersection and adding a dedicated left-turn lane separated from the right-turn lane. Additionally, the southbound lane should be converted into two lanes: one for left turns and another for shared through and left turns.

Harmony Road and River Street North

The eastbound, and westbound left/through/right turn movements are expected to operate acceptably, achieving an LOS of A under all conditions. While the northbound left/through/right and southbound left/through/right movements are expected to operate poorly under the 2056 future total traffic conditions with recorded LOS of D to F.

It is recommended to signalize the intersection and provide left-turn lanes for eastbound and westbound lanes to achieve an acceptable level of service.

Harmony Road and Homan Road

The eastbound left/through, and westbound through/right movements are expected to operate acceptably, with an LOS of A under all conditions. While the southbound left/right movements are

expected to operate poorly under the 2056 future total traffic conditions with recorded LOS of F and recorded delays of not less than 134 seconds.

It is recommended to signalize the intersection and provide a left-turn lane for eastbound and a right turn lane for westbound lane to achieve an acceptable level of service.

Harmony Road and Plumpton Road

The eastbound through/right, westbound left/through, and northbound left/right movements are expected to operate acceptably under all conditions in 2056, with an LOS ranging from A to C.

Harmony Road and Existing Black Bear Ridge Access

The eastbound left/through and westbound through/right movements are expected to operate acceptably, with an LOS of A under all conditions. However, the southbound left/right movements are projected to operate poorly under the 2056 future total traffic conditions, with LOS ranging from D to F.

In addition to signalizing the intersection, Trans-Plan recommends adding a dedicated left-turn lane for eastbound traffic and a right-turn lane for westbound traffic to reduce traffic queues for the north leg's left/right turns.

Harmony Road and Proposed Site Access 2

The eastbound left/through and westbound through/right movements are expected to operate acceptably, with an LOS of A under all conditions. However, the southbound left/right movements are projected to operate poorly under the 2056 future total traffic conditions, with an LOS of F.

Trans-Plan recommends signalizing the intersection and adding a dedicated left-turn lane for eastbound traffic to achieve an acceptable level of service.

Harmony Road and Harmony Public School

The eastbound through/right and westbound left/through movements are expected to operate acceptably under all conditions in 2056, with an LOS of A. However, the northbound left/right movements are projected to operate at LOS E or F under future background and total traffic conditions.

To address traffic concerns, Trans-Plan recommends signalizing the intersection, adding a dedicated left-turn lane for westbound traffic, and converting the eastbound lane into two lanes: one for through traffic and another for shared through and right turns. Additionally, as suggested for 2046, the installation of a "School Zone Maximum Speed" sign is still recommended.

Harmony Road and Proposed Site Access 3

The eastbound left/through and westbound through/right movements are expected to operate acceptably, with an LOS of A under all conditions. However, the southbound left/right movements are projected to operate poorly under the 2056 future total traffic conditions, with an LOS of E or F.

Trans-Plan recommends signalizing the intersection and adding a dedicated right-turn lane for westbound traffic to achieve an acceptable level of service.

Harmony Road and Proposed Site Access 4

The eastbound through/left, westbound through/right, and southbound left/right turn movements are expected to operate acceptably under all conditions in 2056, with an LOS ranging from A to D.

Highway 37 and Harmony Road

In 2056 total traffic conditions, the intersection is projected to be overcapacity during weekday AM, PM, and Saturday peak hours, with volume-to-capacity (v/c) ratios of 1.93, 2.84, and 1.24, respectively. The eastbound left/through/right turn movements during AM, PM, and Saturday peak hours, along with the westbound left/through/right during AM peak, the northbound through/right during PM peak, and northbound left and southbound through/right during AM and PM peak hours, are expected to operate at LOS F with v/c ratios exceeding 1.0.

To address these traffic concerns, it is recommended to convert the eastbound and westbound lanes to include a shared through and right turn lane, as well as a dedicated left-turn lane. For the northbound lane, the existing configuration should be revised to include one left-turn lane, one left/through lane, and one through/right lane. Additionally, signal timing should be optimized by increasing the signal duration for all lanes, as traffic volumes are expected to rise significantly.

The 95th percentile queues for northbound and southbound left and right turns are expected to exceed available storage lengths under all future total traffic conditions, except for the southbound left turn during the Saturday peak hour.

Highway 37 and Cannifton Road/Blessington Road

In 2056 future total traffic conditions, the intersection operates at overcapacity during AM and PM peak hours, with volume-to-capacity (v/c) ratios of 1.34 and 1.35, respectively, while operating within acceptable capacity during Saturday peak hours (v/c ratio of 0.84). During the AM peak hour, the westbound left/through/right and southbound through movements are projected to operate at LOS F, with v/c ratios exceeding 1.0. Similarly, the eastbound left/through/right and northbound through movements are expected to operate at LOS F during the PM peak hour.

To address these issues, it is recommended to convert the northbound and southbound left-turn lanes into left/through lanes. Additionally, the eastbound and westbound lanes should be reconfigured to include one left-turn lane, one left/through lane, and one through/right turn lane. Signal timing should also be optimized by increasing the signal duration for all lanes, given the anticipated rise in traffic volumes.

The 95th percentile queues for the northbound left, northbound right, southbound left, and southbound right turns are expected to remain within available storage lengths under all traffic conditions, except for the northbound left and northbound right during the PM peak hour.

Highway 37 and Tank Farm Road/Casey Road

In 2056 future total traffic conditions, the intersection operates at overcapacity during AM and PM peak hours, with volume-to-capacity (v/c) ratios of 1.32 and 1.26, respectively, while operating within acceptable capacity during Saturday peak hours (v/c ratio of 0.87). During the AM peak hour, the westbound left/through/right and southbound through movements are projected to operate at LOS F,

with v/c ratios exceeding 1.0. Similarly, the eastbound left/through/right, westbound left/through/right and northbound through movements are expected to operate at LOS F during the PM peak hour. While during Saturday Peak hour, the eastbound left/through/right and westbound left/through/right lane performs at an LOS of F with v/c ratios of 0.99 and 1.52, respectively.

To alleviate traffic concerns, it is recommended to convert the northbound and southbound left-turn lanes into left/through lanes. Additionally, the eastbound and westbound lanes should be reconfigured to include one left-turn lane, one left/through lane, and one through/right turn lane.

The 95th percentile queues for the northbound left, northbound right, southbound left, and southbound right turns are expected to remain within available storage lengths under all traffic conditions, except for the northbound left and northbound right during the PM peak hour and southbound right during AM peak hour.

Homan Road and Proposed Site Access 5

The southbound through/left, northbound through/right, and westbound left/right turn movements are expected to operate acceptably under all conditions in 2056, with an LOS of A.

Table 7 - 2041 and 2046 Capacity Analysis Results

Intersection	Existing Traffic Conditions 2025									2041 Background Traffic Conditions								
Movement	AM Peak Hour			PM Peak Hour			SAT Peak Hour			AM Peak Hour			PM Peak Hour			SAT Peak Hour		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Highway 62 & Ashley Street	0.67	22	C	0.58	13	B	0.49	13	B	0.92	46	D	0.76	17	B	0.67	15	B
Westbound Left/Right	1.03	91	F	0.64	38	D	0.57	36	D	1.41	235	F	0.89	58	E	0.78	46	D
Northbound Through	0.23	10	A	0.52	12	B	0.45	12	B	0.32	10	B	0.71	15	B	0.62	14	B
Northbound Right	0.11	9	A	0.25	10	A	0.20	10	A	0.16	9	A	0.40	12	B	0.33	11	B
Southbound Left	0.17	42	D	0.17	42	D	0.20	43	D	0.20	43	D	0.27	44	D	0.27	44	D
Southbound Through	0.49	9	A	0.50	9	A	0.24	7	A	0.67	11	B	0.38	8	A	0.33	7	A
Harmony Road & Ashley Street																		
Westbound Left/Right		11	B		11	B		11	B		12	B		14	B		11	B
Northbound Through/Right		0	A		0	A		0	A		0	A		0	A		0	A
Southbound Left/Through		4	A		4	A		4	A		4	A		5	A		4	A
Harmony Road & River Road North																		
Eastbound Left/Through/Right		0	A		1	A		1	A		0	A		1	A		1	A
Westbound Left/Through/Right		0	A		0	A		4	A		0	A		0	A		4	A
Northbound Left/Through/Right		10	A		12	B		11	B		11	A		14	B		11	B
Southbound Left/Through/Right		11	B		11	B		11	B		12	B		12	B		11	B
Harmony Road & Homan Road																		
Eastbound Left/Through		0	A		0	A		1	A		0	A		0	A		1	A
Westbound Through/Right		0	A		0	A		0	A		0	A		0	A		0	A
Southbound Left/Right		10	B		10	A		9	A		11	B		10	B		9	A
Harmony Road & Plumpton Road																		
Eastbound Through/Right		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Left/Through		0	A		0	A		1	A		0	A		0	A		1	A
Northbound Left/Right		9	A		9	A		9	A		9	A		10	A		9	A
Harmony Road & Existing Black Bear Ridge Resort Site Access																		
Eastbound Left/Through		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Through/Right		0	A		0	A		0	A		0	A		0	A		0	A
Southbound Left/Right		0	A		9	A		0	A		0	A		10	A		0	A
Harmony Road & Harmony Public School																		
Eastbound Through/Right		0	A		0	A		0	A		0	A		0	A		0	A
Westbound Left/Through		4	A		1	A		0	A		4	A		1	A		0	A
Northbound Left/Right		14	B		10	A		9	A		23	C		10	B		9	A
Harmony Road & Highway 37	0.50	11	B	0.45	10	B	0.24	10	A	0.69	14	B	0.63	14	B	0.24	10	A
Eastbound Left/Through/Right	0.17	30	C	0.56	35	C	0.34	33	C	0.20	29	C	0.61	34	C	0.34	33	C
Westbound Left/Through/Right	0.58	36	D	0.21	30	C	0.23	32	C	0.69	41	D	0.24	29	C	0.23	32	C
Northbound Left	0.09	4	A	0.06	4	A	0.03	4	A	0.19	6	A	0.12	6	A	0.03	4	A
Northbound Through/ Right	0.20	5	A	0.43	7	A	0.21	4	A	0.28	6	A	0.63	11	B	0.21	4	A
Southbound Left	0.01	4	A	0.01	4	A	0.00	0	A	0.01	5	A	0.01	5	A	0.00	0	A
Southbound Through/ Right	0.49	7	A	0.35	6	A	0.22	5	A	0.69	11	B	0.51	9	A	0.22	5	A
Highway 37 & Cannifton Road/Blessington Road	0.63	16	B	0.49	12	B	0.40	11	B	0.87	26	C	0.67	15	B	0.39	11	B
Eastbound Left/Through/Right	0.29	28	C	0.62	35	C	0.63	38	D	0.36	27	C	0.76	41	D	0.63	38	D
Westbound Left/Through/Right	0.78	45	D	0.38	30	C	0.37	31	C	0.96	74	E	0.48	29	C	0.37	31	C
Northbound Left	0.02	6	A	0.00	5	A	0.00	4	A	0.04	7	A	0.01	6	A	0.00	4	A
Northbound Through	0.25	8	A	0.45	9	A	0.34	6	A	0.36	10	A	0.65	13	B	0.34	6	A
Northbound Right	0.03	6	A	0.07	6	A	0.06	4	A	0.05	7	A	0.10	6	A	0.06	4	A
Southbound Left	0.01	6	A	0.03	5	A	0.02	4	A	0.01	7	A	0.06	6	A	0.02	4	A
Southbound Through	0.58	11	B	0.30	7	A	0.22	5	A	0.84	21	C	0.43	9	A	0.22	5	A
Southbound Right	0.05	6	A	0.02	5	A	0.02	4	A	0.07	7	A	0.03	6	A	0.02	4	A
Highway 37 & Tank Farm Road/Casey Road	0.64	12	B	0.52	15	B	0.39	13	B	0.88	20	C	0.75	39	D	0.39	13	B
Eastbound Left/Through/Right	0.27	30	C	0.58	33	C	0.54	34	C	0.40	30	C	0.86	59	E	0.54	34	C
Westbound Left/Through/Right	0.71	43	D	0.83	54	D	0.76	49	D	0.92	73	E	1.36	225	F	0.76	49	D
Northbound Left	0.04	4	A	0.09	4	A	0.06	3	A	0.14	5	A	0.14	5	A	0.06	3	A
Northbound Through	0.24	5	A	0.45	6	A	0.34	5	A	0.33	5	A	0.62	8	A	0.34	5	A
Northbound Right	0.04	4	A	0.04	4	A	0.03	3	A	0.05	4	A	0.05	4	A	0.03	3	A
Southbound Left	0.01	4	A	0.01	4	A	0.01	3	A	0.02	4	A	0.02	4	A	0.01	3	A
Southbound Through	0.63	9	A	0.31	6	A	0.23	4	A	0.87	18	B	0.43	7	A	0.23	4	A
Southbound Right	0.01	4	A	0.01	4	A	0.01	3	A	0.01	4	A	0.01	4	A	0.01	3	A
Harmony Road & Proposed Black Bear Ridge Resort Site Access 2																		
Eastbound Left/Through																		
Westbound Through/Right																		
Southbound Left/Right																		
Harmony Road & Proposed Black Bear Ridge Resort Site Access 3																		
Eastbound Left/Through																		
Westbound Through/Right																		
Southbound Left/Right																		

2046 Background Traffic Conditions									2041 Total Traffic Conditions									2046 Total Traffic Conditions								
AM Peak Hour			PM Peak Hour			SAT Peak Hour			AM Peak Hour			PM Peak Hour			Sat Peak Hour			AM Peak Hour			PM Peak Hour			Sat Peak Hour		
V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
1.02	57	E	0.84	20	C	0.74	17	B	0.97	63	E	0.84	28	C	0.73	20	B	1.06	74	E	0.91	33	C	0.80	23	C
1.56	300	F	0.98	76	E	0.86	55	D	1.59	313	F	1.16	131	F	0.99	78	E	1.74	379	F	1.25	166	F	1.07	101	F
0.36	11	B	0.78	17	B	0.69	15	B	0.32	10	B	0.71	16	B	0.62	14	B	0.36	11	B	0.78	18	B	0.69	15	B
0.17	10	A	0.46	13	B	0.38	12	B	0.19	10	A	0.51	13	B	0.43	12	B	0.21	10	A	0.57	15	B	0.48	13	B
0.23	44	D	0.30	45	D	0.30	45	D	0.30	45	D	0.44	49	D	0.44	49	D	0.33	46	D	0.47	50	D	0.47	50	D
0.71	13	B	0.42	8	A	0.37	8	A	0.67	11	B	0.38	8	A	0.33	7	A	0.74	13	B	0.42	8	A	0.37	8	A
	13	B		15	B		11	B		20	C		47	E		39	E		23	C		72	F		55	F
	0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	4	A		5	A		4	A		6	A		7	A		6	A		6	A		7	A		6	A
	0	A		1	A		1	A		0	A		0	A		1	A		0	A		0	A		1	A
	0	A		0	A		4	A		1	A		0	A		2	A		0	A		0	A		2	A
	11	B		15	B		11	B		14	B		28	D		26	D		14	B		35	D		31	D
	12	B		13	B		11	B		18	C		20	C		22	C		20	C		21	C		25	C
	0	A		0	A		1	A		0	A		0	A		0	A		0	A		0	A		0	A
	0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	11	B		10	B		9	A		15	B		14	B		11	B		16	C		14	C		11	B
	0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	0	A		0	A		1	A		1	A		1	A		1	A		1	A		1	A		1	A
	9	A		10	A		9	A		10	B		13	B		12	B		11	B		13	B		13	B
	0	A		0	A		0	A		2	A		6	A		3	A		2	A		3	A		3	A
	0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	0	A		10	B		0	A		21	C		36	E		22	C		23	C		41	E		23	C
	0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	5	A		1	A		0	A		4	A		0	A		0	A		4	A		1	A		0	A
	33	D		11	B		9	A		95	F		12	B		13	B		168	F		13	B		14	B
0.75	17	B	0.70	15	B	0.38	11	B	0.84	26	C	0.80	30	C	0.66	42	D	0.97	36	D	0.87	34	C	0.70	44	D
0.19	28	C	0.65	35	C	0.53	33	C	0.81	43	D	1.01	81	F	1.11	111	F	0.83	45	D	1.07	96	F	1.15	123	F
0.60	34	C	0.26	28	C	0.32	31	C	0.80	49	D	0.23	25	C	0.25	25	C	0.86	58	E	0.25	25	C	0.28	25	C
0.30	10	B	0.15	7	A	0.06	4	A	0.61	25	C	0.44	15	B	0.26	10	B	1.02	107	F	0.53	18	B	0.28	11	B
0.33	8	A	0.71	14	B	0.32	6	A	0.32	9	A	0.71	17	B	0.34	10	B	0.35	10	A	0.78	20	B	0.38	11	B
0.01	5	A	0.02	6	A	0.00	0	A	0.01	7	A	0.02	8	A	0.00	0	A	0.01	7	A	0.03	8	A	0.00	0	A
0.80	17	B	0.57	11	B	0.35	6	A	0.84	22	C	0.71	17	B	0.46	12	B	0.93	31	C	0.77	20	B	0.50	13	B
0.95	33	C	0.75	17	B	0.57	14	B	0.94	29	C	0.73	17	B	0.58	13	B	1.03	43	D	0.81	20	B	0.64	14	B
0.40	27	C	0.82	46	D	0.68	36	D	0.39	27	C	0.81	45	D	0.68	37	D	0.43	28	C	0.87	53	D	0.72	39	D
1.04	93	F	0.52	29	C	0.43	29	C	0.94	68	E	0.47	29	C	0.40	29	C	1.04	94	F	0.50	29	C	0.43	29	C
0.09	9	A	0.01	6	A	0.00	6	A	0.08	9	A	0.01	6	A	0.01	6	A	0.09	10	A	0.01	6	A	0.01	6	A
0.39	10	A	0.72	15	B	0.54	10	B	0.40	10	A	0.71	14	B	0.56	10	B	0.43	10	B	0.79	18	B	0.61	11	B
0.05	7	A	0.11	7	A	0.09	6	A	0.05	7	A	0.10	7	A	0.08	6	A	0.05	7	A	0.11	7	A	0.09	6	A
0.01	7	A	0.08	7	A	0.04	6	A	0.02	7	A	0.08	7	A	0.05	6	A	0.02	7	A	0.12	8	A	0.06	6	A
0.93	29	C	0.48	10	B	0.36	8	A	0.93	30	C	0.50	10	B	0.40	8	A	1.02	49	D	0.55	12	B	0.44	9	A
0.07	7	A	0.03	6	A	0.03	6	A	0.08	7	A	0.04	6	A	0.03	6	A	0.08	7	A	0.04	7	A	0.04	6	A
0.97	29	C	0.75	39	D	0.63	23	C	0.93	23	C	0.79	38	D	0.59	17	B	1.03	38	D	0.88	53	D	0.66	22	C
0.44	30	C	0.86	59	E	0.72	41	D	0.40	30	C	0.86	59	E	0.64	35	D	0.44	30	C	0.98	88	F	0.72	41	D
1.01	95	F	1.36	225	F	1.06	114	F	0.92	73	E	1.36	225	F	0.92	74	E	1.01	95	F	1.60	327	F	1.06	114	F
0.26	7	A	0.14	5	A	0.11	4	A	0.20	6	A	0.16	5	A	0.11	4	A	0.26	7	A	0.19	5	A	0.13	5	A
0.37	6	A	0.62	8	A	0.54	7	A	0.36	5	A	0.67	9	A	0.52	7	A	0.40	6	A	0.73	10	B	0.57	7	A
0.06	4	A	0.05	4	A	0.04	4	A	0.05	4	A	0.05	4	A	0.04	4	A	0.06	4	A	0.06	4	A	0.04	4	A
0.02	4	A	0.02	4	A	0.02	4	A	0.04	4	A	0.04	4	A	0.02	4	A	0.04	4	A	0.05	4	A	0.03	4	A
0.97	30	C	0.43	7	A	0.37	6	A	0.93	24	C	0.49	7	A	0.41	6	A	1.03	47	D	0.54	8	A	0.44	7	A
0.02	4	A	0.01	4	A	0.01	4	A	0.03	4	A	0.02	4	A	0.01	4	A	0.03	4	A	0.02	4	A	0.02	4	A

Table 8 - 2046 Capacity Analysis Results

Intersection Movement	2046 Background Traffic Conditions						2046 Total Traffic Conditions						2046 Total Traffic Conditions (Adjusted)					
	AM Peak Hour			PM Peak Hour			SAT Peak Hour			AM Peak Hour			PM Peak Hour			AM Peak Hour		
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS
Highway 62 & Ashley Street	1.02	57	E	0.84	20	C	0.74	17	B	0.91	33	C	0.80	23	C	0.84	18	B
	1.56	300	F	0.98	76	E	0.86	55	D	1.74	379	F	1.25	166	F	0.90	50	D
	0.36	11	B	0.78	17	B	0.69	15	B	0.36	11	B	0.69	15	B	0.36	11	B
	0.17	10	A	0.46	13	B	0.38	12	B	0.21	10	A	0.57	15	B	0.21	10	A
	0.23	44	D	0.30	45	D	0.30	45	D	0.33	46	D	0.47	50	D	0.33	46	D
Southbound Left	0.71	13	B	0.42	8	A	0.37	8	A	0.74	13	B	0.42	8	A	0.74	13	B
Southbound Through																		
Harmony Road & Ashley Street	13	13	B	15	15	B	11	11	B									
	13	13	B	15	15	B	11	11	B	23	C	F	72	F	F	0	A	
	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A
	4	4	A	5	5	A	4	4	A	6	6	A	7	7	A	6	6	A
Harmony Road & River Road North	0	0	A	1	1	A	1	1	A	0	0	A	0	0	A	0	0	A
	0	0	A	0	0	A	4	4	A	0	0	A	0	0	A	0	0	A
	11	11	B	15	15	B	11	11	B	14	14	B	35	35	D	14	14	B
	12	12	B	13	13	B	11	11	B	20	20	C	21	21	C	20	20	C
Harmony Road & Homan Road	0	0	A	0	0	A	1	1	A	0	0	A	0	0	A	0	0	A
	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A
	11	11	B	10	10	B	9	9	A	16	16	C	14	14	C	16	16	C
Harmony Road & Plumpton Road	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A
	0	0	A	0	0	A	1	1	A	1	1	A	1	1	A	1	1	A
	9	9	A	10	10	A	9	9	A	11	11	B	13	13	B	11	11	B
Harmony Road & Existing Black Bear Ridge Resort Site Access	0	0	A	0	0	A	0	0	A	2	2	A	3	3	A			
	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A			
	0	0	A	10	10	B	0	0	A	23	23	C	41	41	E	20	20	C
Harmony Road & Harmony Public School	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A	0	0	A
	5	5	A	1	1	A	0	0	A	4	4	A	1	1	A	4	4	A
	13	13	B	15	15	B	11	11	B							63	63	F
	13	13	B	15	15	B	11	11	B							16	16	C
	33	33	D	11	11	B	9	9	A	168	168	F	13	13	B	14	14	B
Harmony Road & Highway 37	0.75	17	B	0.70	15	B	0.38	11	B	0.97	36	D	0.87	34	C	0.85	25	C
	0	0	A	0	0	A	0	0	A							0.56	30	C
	0	0	A	0	0	A	0	0	A							0.16	26	C
	0.19	28	C	0.65	35	C	0.53	33	C	0.83	45	D	1.07	96	F	0.69	37	D
	0.60	34	C	0.26	28	C	0.32	31	C	0.86	58	E	0.25	25	C	0.81	50	D
	0.30	10	B	0.15	7	A	0.06	4	A	1.02	107	F	0.53	18	B	0.81	15	B
	0.33	8	A	0.71	14	B	0.32	6	A	0.35	10	A	0.78	20	B	0.34	8	A
	0.01	5	A	0.02	6	A	0.00	0	A	0.01	7	A	0.03	8	A	0.01	6	A
	0.80	17	B	0.57	11	B	0.35	6	A	0.93	31	C	0.77	20	B	0.90	25	C
Harmony Road & Highway 37	0.58	19	B	0.83	45	D	0.12	25	C	0.77	21	C	0.80	43	D	0.58	19	B
	0.30	26	C	0.30	26	C	0.30	26	C	0.30	26	C	0.30	26	C	0.30	26	C
	0.27	10	A	0.27	10	A	0.27	10	A	0.27	10	A	0.27	10	A	0.27	10	A
	0.37	10	A	0.37	10	A	0.37	10	A	0.37	10	A	0.37	10	A	0.37	10	A
	0.00	0	A	0.00	0	A	0.00	0	A	0.00	0	A	0.00	0	A	0.00	0	A
Southbound Through/ Right	0.49	11	B	0.74	17	B	0.49	11	B	0.74	17	B	0.49	11	B	0.74	17	B

Table 9 - 2056 Capacity Analysis Re

Intersection Movement	Existing Traffic Conditions 2046						2056 Background Traffic Conditions						2056 Total Traffic Conditions														
	AM Peak Hour			PM Peak Hour			SAT Peak Hour			AM Peak Hour			PM Peak Hour			Sat Peak Hour											
	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS	V/C	Delay	LOS									
Highway 62 & Ashley Street Westbound Left/Right Northbound Through Northbound Right Southbound Left Southbound Through	1.06	74	E	0.91	33	C	0.80	23	C	1.30	107	F	1.35	105	F	0.97	37	D	1.35	127	F	1.45	148	F	1.05	53	D
	1.74	379	F	1.25	166	F	1.07	101	F	2.12	549	F	1.96	475	F	1.31	190	F	2.31	632	F	2.27	613	F	1.51	277	F
	0.36	11	B	0.78	18	B	0.69	15	B	0.43	11	B	1.12	80	E	0.84	20	B	0.43	11	B	1.17	102	F	0.88	23	C
	0.21	10	A	0.57	15	B	0.48	13	B	0.26	10	B	0.89	31	C	0.63	16	B	0.29	11	B	1.06	69	E	0.74	21	C
	0.33	46	D	0.47	50	D	0.47	50	D	0.41	48	D	0.56	58	E	0.53	54	D	0.50	51	D	0.35	41	D	0.35	41	D
0.74	13	B	0.42	8	A	0.37	8	A	0.90	19	B	0.50	9	A	0.45	8	A	0.90	19	B	0.50	9	A	0.45	8	A	
Harmony Road & Ashley Street Westbound Left/Right Northbound Through/Right Southbound Left/Through	23		C		72	F		55	F		58	F		410	F		242	F		353	F		Err	F		Err	F
	0		A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	6		A		7	A		6	A		4	A		8	A		7	A		8	A		11	B		9	A
Harmony Road & River Road North Eastbound Left/Through/Right Westbound Left/Through/Right Northbound Left/Through/Right Southbound Left/Through/Right	0		A		0	A		1	A		0	A		1	A		1	A		0	A		1	A		1	A
	0		A		0	A		2	A		1	A		0	A		2	A		1	A		1	A		3	A
	14		B		35	D		31	D		18	C		215	F		88	F		29	D		908	F		544	F
	20		C		21	C		25	C		33	D		52	F		46	E		134	F		320	F		314	F
Harmony Road & Homan Road Eastbound Left/Through Westbound Through/Right Southbound Left/Right	0		A		0	A		0	A		0	A		0	A		0	A		1	A		3	A		2	A
	0		A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	16		C		14	C		11	B		18	C		21	C		12	B		117	F		322	F		65	F
Harmony Road & Plumpton Road Eastbound Through/Right Westbound Left/Through Northbound Left/Right	0		A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	1		A		1	A		1	A		1	A		1	A		1	A		1	A		1	A		2	A
	11		B		13	B		13	B		11	A		16	C		15	B		14	B		25	C		23	C
Harmony Road & Existing Black Bear Ridge Resort Site Access Eastbound Left/Through Westbound Through/Right Southbound Left/Right																											
	2		A		3	A		3	A		2	A		4	A		4	A		4	A		8	A		7	A
	0		A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
23		C		41	E		23	C		41	E		65	F		43	E		486	F		Err	F		935	F	
Harmony Road & Harmony Public School Eastbound Through/Right Westbound Left/Through Northbound Left/Right																											
	0		A		0	A		0	A		0	A		0	A		0	A		0	A		0	A		0	A
	4		A		1	A		0	A		5	A		1	A		0	A		6	A		1	A		0	A
168		F		13	B		14	B		507	F		57	F		16	C		Err	F		370	F		28	D	
Harmony Road & Highway 37 Eastbound Left/Through/Right Westbound Left/Through/Right Northbound Left Northbound Through/ Right Southbound Left Southbound Through/ Right	0.97	36	D	0.87	34	C	0.70	44	D	1.42	97	F	1.76	143	F	0.86	77	E	1.93	205	F	2.84	268	F	1.24	220	F
	0.83	45	D	1.07	96	F	1.15	123	F	0.96	67	E	1.37	214	F	1.41	231	F	1.62	324	F	1.96	474	F	2.22	588	F
	0.86	58	E	0.25	25	C	0.28	25	C	1.05	108	F	0.40	27	C	0.37	26	C	1.57	317	F	0.46	28	C	0.42	27	C
	1.02	107	F	0.53	18	B	0.28	11	B	1.60	336	F	1.93	471	F	0.44	14	B	2.08	543	F	3.26	1064	F	0.82	37	D
	0.35	10	A	0.78	20	B	0.38	11	B	0.44	12	B	1.28	152	F	0.47	12	B	0.44	12	B	1.28	152	F	0.47	12	B
0.01	7	A	0.03	8	A	0.00	0	A	0.02	8	A	0.10	11	B	0.00	0	A	0.02	8	A	0.10	11	B	0.00	0	A	
0.93	31	C	0.77	20	B	0.50	13	B	1.17	107	F	0.96	37	D	0.61	15	B	1.24	136	F	1.08	71	E	0.70	17	B	
Highway 37 & Cannifton Road/Blessington Road Eastbound Left/Through/Right Westbound Left/Through/Right Northbound Left Northbound Through Northbound Right Southbound Left Southbound Through Southbound Right	1.03	43	D	0.81	20	B	0.64	14	B	1.26	100	F	1.28	93	F	0.78	18	B	1.34	123	F	1.35	109	F	0.84	20	C
	0.43	28	C	0.87	53	D	0.72	39	D	0.51	29	C	1.45	254	F	0.83	48	D	0.54	29	C	1.56	300	F	0.86	51	D
	1.04	94	F	0.50	29	C	0.43	29	C	1.30	189	F	0.60	31	C	0.49	29	C	1.32	199	F	0.61	31	C	0.49	29	C
	0.09	10	A	0.01	6	A	0.01	6	A	0.11	10	A	0.04	7	A	0.01	6	A	0.11	10	A	0.05	7	A	0.01	6	A
	0.43	10	B	0.79	18	B	0.61	11	B	0.53	12	B	1.22	124	F	0.77	17	B	0.56	12	B	1.27	148	F	0.83	20	B
	0.05	7	A	0.11	7	A	0.09	6	A	0.06	7	A	0.19	8	A	0.11	7	A	0.06	7	A	0.19	8	A	0.11	7	A
	0.02	7	A	0.12	8	A	0.06	6	A	0.03	7	A	0.35	19	B	0.12	8	A	0.05	7	A	0.41	22	C	0.19	10	A
	1.02	49	D	0.55	12	B	0.44	9	A	1.25	135	F	0.74	16	B	0.55	11	B	1.34	177	F	0.81	19	B	0.63	13	B
0.08	7	A	0.04	7	A	0.04	6	A	0.11	7	A	0.05	7	A	0.04	6	A	0.04	6	A	0.12	7	A	0.06	7	A	

Highway 37 & Tank Farm Road/Casey Road	1.03	38	D	0.88	53	D	0.66	22	C	1.26	95	D	1.22	83	F	0.83	45	D	1.32	111	F	1.26	93	F	0.87	48	D
	0.44	30	C	0.98	88	F	0.72	41	D	0.55	32	C	1.21	159	F	0.92	72	E	0.58	33	C	1.26	180	F	0.99	91	F
	1.01	95	F	1.60	327	F	1.06	114	F	1.27	184	F	1.66	360	F	1.47	274	F	1.29	194	F	1.68	368	F	1.52	295	F
	0.26	7	A	0.19	5	A	0.13	5	A	0.31	8	A	0.27	6	A	0.18	5	A	0.31	8	A	0.31	6	A	0.21	5	A
	0.40	6	A	0.73	10	B	0.57	7	A	0.49	6	A	1.13	81	F	0.70	9	A	0.51	7	A	1.17	99	F	0.74	11	B
	0.06	4	A	0.06	4	A	0.04	4	A	0.07	4	A	0.08	4	A	0.05	4	A	0.07	4	A	0.08	4	A	0.05	4	A
	0.04	4	A	0.05	4	A	0.03	4	A	0.06	4	A	0.17	8	A	0.05	4	A	0.08	4	A	0.22	10	A	0.08	5	A
	1.03	47	D	0.54	8	A	0.44	7	A	1.26	135	F	0.66	10	A	0.54	8	A	1.32	163	F	0.71	11	B	0.60	9	A
	0.03	4	A	0.02	4	A	0.02	4	A	0.03	4	A	0.02	4	A	0.02	4	A	0.05	4	A	0.02	4	A	0.02	4	A
Harmony Road & Proposed Black Bear Ridge Resort Site Access 2		1	A	2	2	A	2	2	A		1	A		2	A		2	A		2	A		4	A		3	A
		0	A	0	0	A	0	0	A		0	A		0	A		0	A		0	A		0	A		0	A
	15	15	B	16	16	C		15	B		19	C		21	C	18	18	C	71	71	F	165	165	F	117	117	F
Harmony Road & Proposed Black Bear Ridge Resort Site Access 3																											
	2	2	A	1	1	A	3	3	A		2	A		2	A		3	A		2	A		4	A		4	A
	0	0	A	0	0	A	0	0	A		0	A		0	A		0	A		0	A		0	A		0	A
	14	B	18	18	C		15	B		17	C		26	D		19	19	C	40	40	E	174	174	F	88	88	F
Harmony Road & Proposed Black Bear Ridge Resort Site Access 4																											
Harmony Road & Proposed Black Bear Ridge Resort Site Access 5																											

[illegible]

Highway 37 & Cannifton Road/Blessington Road	1.34	123	F	1.35	109	F	0.84	20	C	0.76	15	B	0.73	14	B	0.59	12	B		
										0.27	20	C	0.61	26	C	0.49	23	C		
										0.20	20	B	0.52	22	C	0.42	21	C		
	0.54	29	C	1.56	300	F	0.86	51	D											
										0.58	25	C	0.28	20	C	0.23	20	C		
										0.44	21	C	0.22	19	B	0.18	20	B		
	1.32	199	F	0.61	31	C	0.49	29	C											
	0.11	10	A	0.05	7	A	0.01	6	A											
	0.56	12	B	1.27	148	F	0.83	20	B											
										0.36	9	A	0.79	15	B	0.63	11	B		
	0.06	7	A	0.19	8	A	0.11	7	A	0.06	7	A	0.19	8	A	0.14	7	A		
	0.05	7	A	0.41	22	C	0.19	10	A											
	1.34	177	F	0.81	19	B	0.63	13	B											
										0.84	17	B	0.58	11	B	0.47	9	A		
0.12	7	A	0.06	7	A	0.05	7	A	0.11	7	A	0.06	7	A	0.05	6	A			
Highway 37 & Tank Farm Road/Casey Road	1.32	111	F	1.26	93	F	0.87	48	D	0.77	12	B	0.81	16	B	0.61	10	A		
										0.22	23	C	0.32	21	C	0.33	24	C		
										0.19	22	C	0.29	20	C	0.29	23	C		
	0.58	33	C	1.26	180	F	0.99	91	F											
										0.53	26	C	0.39	22	C	0.38	24	C		
										0.45	24	C	0.28	20	C	0.28	23	C		
	1.29	194	F	1.68	368	F	1.52	295	F											
	0.31	8	A	0.31	6	A	0.21	5	A											
	0.51	7	A	1.17	99	F	0.74	11	B											
										0.37	5	A	0.93	21	C	0.67	8	A		
	0.07	4	A	0.08	4	A	0.05	4	A	0.07	4	A	0.08	5	A	0.06	4	A		
	0.08	4	A	0.22	10	A	0.08	5	A											
	1.32	163	F	0.71	11	B	0.60	9	A											
										0.83	12	B	0.51	8	A	0.39	6	A		
0.05	4	A	0.02	4	A	0.02	4	A	0.05	4	A	0.02	5	A	0.02	4	A			
Harmony Road & Proposed Black Bear Ridge Resort Site Access 2										0.54	15	B	0.56	17	B	0.50	14	B		
	2		A	4		A	3		A											
										0.34	10	B	0.80	34	C	0.67	19	B		
										0.83	20	C	0.70	14	B	0.70	15	B		
	0		A	0		A	0		A	0.61	13	B	0.76	16	B	0.69	15	B		
Harmony Road & Proposed Black Bear Ridge Resort Site Access 3	71		F	165		F	117		F	0.27	9	A	0.31	11	B	0.32	10	B		
										0.40	12	B	0.54	15	B	0.48	12	B		
	2		A	4		A	4		A											
										0.64	13	B	0.81	18	B	0.72	15	B		
	0		A	0		A	0		A											
										0.54	12	B	0.67	14	B	0.56	12	B		
Harmony Road & Proposed Black Bear Ridge Resort Site Access 4	0.04		9	A	0.09		9	A	0.08		9	A	0.08		9	A	0.08		9	A
	40		E	174		F	88		F	0.22	8	A	0.26	11	B	0.27	9	A		
	1		A	1		A	1		A	1		A	1		A	1		A		
	0		A	0		A	0		A	0		A	0		A	0		A		
	20		C	33		D	23		C	20		C	36		E	23		C		
Harmony Road & Proposed Black Bear Ridge Resort Site Access 5																				
	9		A	9		A	9		A	9		A	9		A	9		A		
	0		A	0		A	0		A	0		A	0		A	0		A		
	0		A	0		A	0		A	0		A	0		A	0		A		



Intersection										
Movement	Available Storage Length [Taper] (m)	Existing Traffic Conditions (2025)			Background Traffic Conditions (2041)			Total Traffic Conditions (2041)		
		Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Peak Hour
Highway 62 & Ashley Street										
Westbound Left/Right		109	60	51	280	121	77	283	247	113
Northbound Right	38.5 [81.5]	15	10	37	19	14	14	18	18	14
Southbound Left	30.5 [225]	5	6	14	6	7	7	9	13	10
Harmony Road & Ashley Street										
Westbound Left/Right		16	15	12	19	25	13	41	43	45
Northbound Right		16	15	12	19	25	13	3	4	4
Southbound Left		9	11	10	10	16	10	24	30	29
Harmony Road & River Road North										
Eastbound Left/Right		0	3	0	0	0	4	4	13	5
Westbound Left/Right		0	0	7	0	0	4	4	9	10
Northbound Left/Right		12	16	15	15	22	14	16	25	21
Southbound Left/Right		15	15	13	15	12	13	17	16	14
Harmony Road & Homan Road										
Eastbound Left		0	0	0		0	0	8	0	9
Westbound Right		0	0	0	3	0	0	5	2	0
Southbound Left/Right		0	9	8	8	11	8	7	7	11
Harmony Road & Plumpton Road										
Eastbound Right		0	0	0	0	0	4	0	0	0
Westbound Left		0	3	0	0	0	0	8	6	12
Northbound Left/Right		8	12	12	10	13	12	10	14	16
Harmony Road & Existing Black Bear Ridge Resort Site Access										
Eastbound Left/Right		0	7	0	0	0	0	16	24	25
Westbound Right		0	0	0	0	0	0	0	0	0
Southbound Left/Right		0	0	0	0	0	0	25	17	18
Harmony Road & Harmony Public School										
Eastbound Right		0	0	0	0	0	0	0	0	0
Westbound Left		10	3	0	24	4	0	22	0	0
Northbound Left/Right		22	13	3	26	17	3	27	15	0
Harmony Road & Highway 37										
Eastbound Left/Right		12	32	18	19	26	21	57	77	75
Westbound Left/Right		27	17	12	39	13	13	43	23	18
Northbound Left	79.5 [78]	10	8	5	16	10	6	33	24	25
Northbound Right		17	41	29	33	50	26	35	71	37
Southbound Left	82 [148]	1	2	0	1	2	0	4	1	0
Southbound Right		40	32	15	63	34	17	96	69	47
Highway 37 & Cannifton Road/Blessington Road										
Eastbound Left/Right		18	35	29	28	44	36	31	51	46
Westbound Left/Right		52	25	23	47	30	25	60	30	31
Northbound Left	82 [131]	2	3	2	2	3	0	5	2	3
Northbound Right	85 [68]	6	8	10	10	12	8	7	13	10
Southbound Left	75[108]	2	4	6	3	6	6	6	14	7
Southbound Right	79 [80]	11	4	4	11	3	4	12	9	6
Highway 37 & Tank Farm Road/Casey Road										
Eastbound Left/Right		19	35	23	24	40	26	24	37	35
Westbound Left/Right		40	30	29	45	40	38	55	54	44
Northbound Left	66 [160]	6	16	14	6	24	13	6	15	18
Northbound Right	70 [97]	4	2	3	2	5	2	4	7	4
Southbound Left	68 [114]	3	4	0	5	7	1	11	8	8
Southbound Right	70 [166]	3	6	4	5	0	1	8	2	6
Harmony Road & Proposed Black Bear Ridge Resort Site Access 2										
Eastbound Left								17	14	20
Westbound Right								0	0	0
Southbound Left/Right								22	17	21
Harmony Road & Proposed Black Bear Ridge Resort Site Access 3										
Eastbound Left								22	25	18
Westbound Right								0	2	0
Southbound Left/Right								19	18	20

Table 13 - 2056 Queueing Analysis

Intersection										
Movement	Available Storage Length [Taper] (m)	Existing Traffic Conditions (2025)			Total Traffic Conditions (2046)			Total Traffic Conditions (2056)		
		Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Peak Hour	Weekday AM Peak Hour	Weekday PM Peak Hour	Saturday Peak Hour
Highway 62 & Ashley Street										
Westbound Left/Right		109	60	51	278	303	316	300	295	329
Northbound Right	38.5 [81.5]	15	10	37	17	19	16	17	158	46
Southbound Left	30.5 [225]	5	6	14	11	10	11	11	11	16
Harmony Road & Ashley Street										
Westbound Left/Right		16	15	12	28	91	42	94	515	516
Northbound Right		16	15	12	0	5	2	5	18	13
Southbound Left		9	11	10	16	30	30	30	76	64
Harmony Road & River Road North										
Eastbound Left/Right		0	3	0	0	4	7	5	3	2
Westbound Left/Right		0	0	7	7	4	16	19	1153	771
Northbound Left/Right		12	16	15	14	26	22	19	221	275
Southbound Left/Right		15	15	13	18	19	16	25	169	41
Harmony Road & Homan Road										
Eastbound Left		0	0	0	0	13	4	15	26	20
Westbound Right		0	0	0	7	2	0	4	50	2
Southbound Left/Right		0	9	8	11	13	8	28	131	25
Harmony Road & Plumpton Road										
Eastbound Right		0	0	0	0	0	4	0	9	0
Westbound Left		0	3	0	3	5	14	20	317	36
Northbound Left/Right		8	12	12	11	13	13	13	15	18
Harmony Road & Existing Black Bear Ridge Resort Site Access										
Eastbound Left/Right		0	7	0	19	27	16	34	42	65
Westbound Right		0	0	0	0	0	0	0	0	3
Southbound Left/Right		0	0	0	18	24	22	36	54	90
Harmony Road & Harmony Public School										
Eastbound Right		0	0	0	6	0	0	128	104	57
Westbound Left		10	3	0	26	7	0	31	3	0
Northbound Left/Right		22	13	3	37	17	7	214	218	4
Harmony Road & Highway 37										
Eastbound Left/Right		12	32	18	63	104	62	111	111	111
Westbound Left/Right		27	17	12	39	19	24	51	36	36
Northbound Left	79.5 [78]	10	8	5	45	43	27	182	158	115
Northbound Right		17	41	29	49	73	38	1061	2970	103
Southbound Left	82 [148]	1	2	0	4	2	0	87	87	0
Southbound Right		40	32	15	112	85	36	1022	807	62
Highway 37 & Cannifton Road/Blessington Road										
Eastbound Left/Right		18	35	29	33	67	48	40	576	60
Westbound Left/Right		52	25	23	61	39	26	84	41	38
Northbound Left	82 [131]	2	3	2	13	2	2	3	87	4
Northbound Right	85 [68]	6	8	10	8	13	10	9	216	12
Southbound Left	75[108]	2	4	6	6	11	7	9	12	18
Southbound Right	79 [80]	11	4	4	9	10	12	79	6	6
Highway 37 & Tank Farm Road/Casey Road										
Eastbound Left/Right		19	35	23	29	55	42	32	201	57
Westbound Left/Right		40	30	29	47	52	51	95	362	68
Northbound Left	66 [160]	6	16	14	6	26	17	10	155	34
Northbound Right	70 [97]	4	2	3	2	7	4	2	194	2
Southbound Left	68 [114]	3	4	0	8	10	9	59	9	10
Southbound Right	70 [166]	3	6	4	57	9	6	118	5	8
Harmony Road & Proposed Black Bear Ridge Resort Site Access 2										
Eastbound Left					15	28	18	59	149	49
Westbound Right					0	2	2	0	0	0
Southbound Left/Right					24	21	24	91	186	51
Harmony Road & Proposed Black Bear Ridge Resort Site Access 3										
Eastbound Left					16	26	17	36	65	85
Westbound Right					0	0	0	0	0	4
Southbound Left/Right					19	23	20	138	145	188
Harmony Road & Proposed Black Bear Ridge Resort Site Access 4										
Eastbound Left								264	264	289
Westbound Right								25	28	0
Southbound Left/Right								21	26	316
Homan Road & Proposed Black Bear Ridge Resort Site Access 5										
Westbound Left/Right								15	13	14
Northbound Right								16	17	15



Figure 15: Adjusted Future Roadway Characteristics (2046)

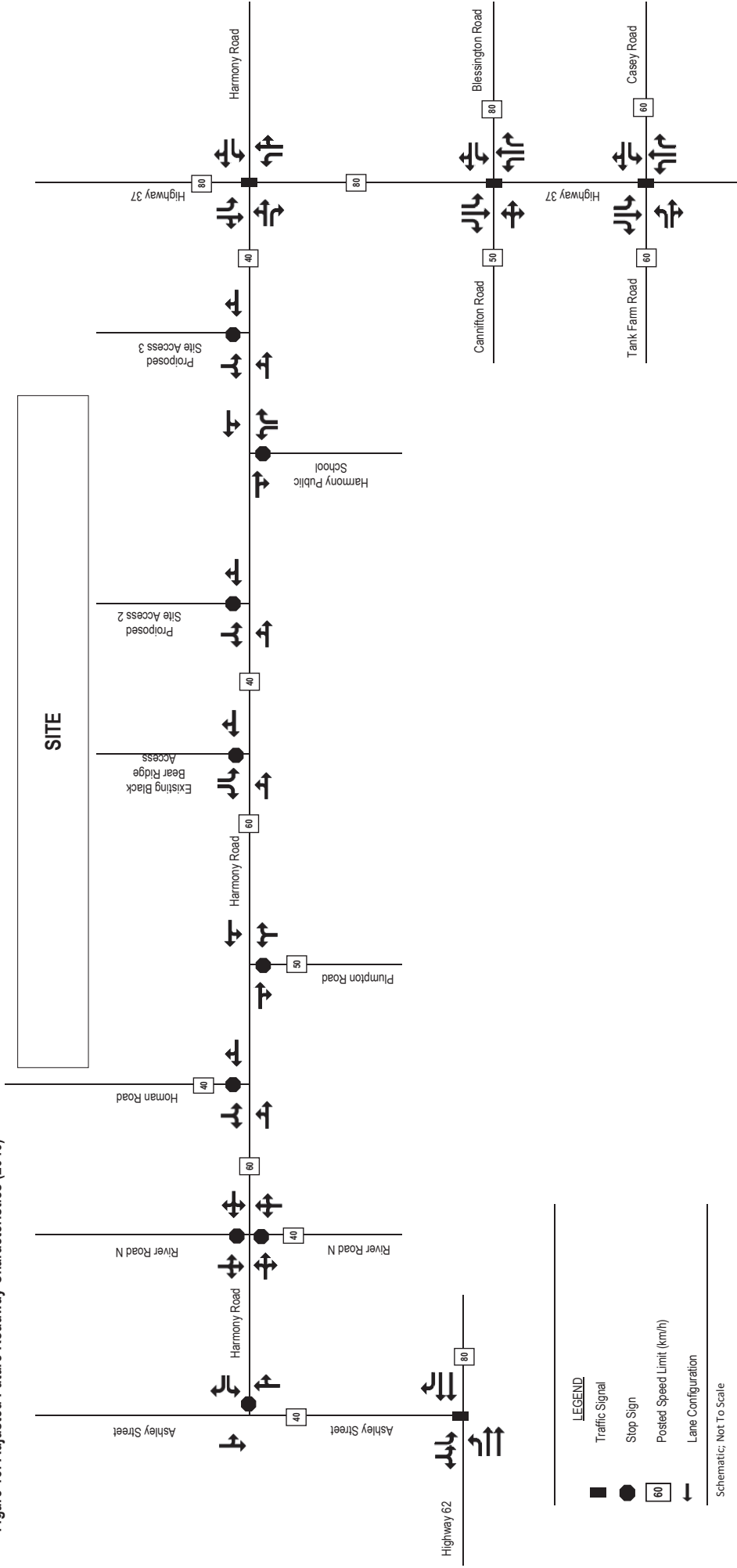
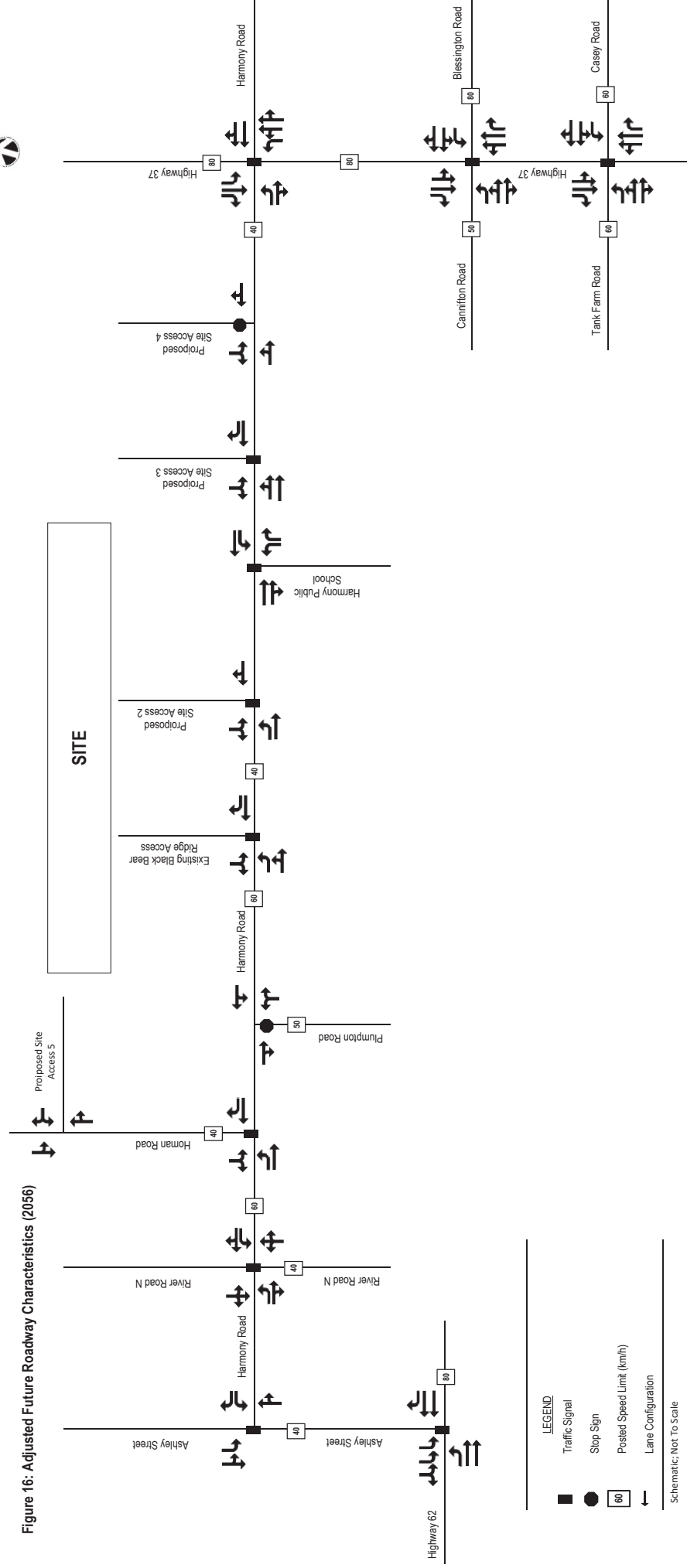


Figure 16: Adjusted Future Roadway Characteristics (2056)



10. LEFT TURN LANE WARRANT ANALYSIS

A left turn warrant was completed for the future 2046 horizon years and was reviewed for the selected intersections that resulted in a poor level of service. The MTO Geometric Design Standard warrants were analyzed based on the design speed according to the posted speed limits for study area roadways.

The traffic volumes used for the analysis were the weekday AM, weekday PM, and Saturday peak hours under future 2046 total traffic conditions. The analysis for the 2046 horizon periods for the various legs of the study intersections is provided in Appendix E and shown in the tables below.

10.1 ASHLEY STREET AND HIGHWAY 62

Table 14 – Left Turn Warrant Justification, East Leg of Ashley Street and Highway 62

Criteria	AM Peak Hour Traffic Volumes	PM Peak Hour Traffic Volumes	Saturday Peak Hour Traffic Volumes
Westbound Left Turn (WBLT) Traffic Volumes	431	384	327
Advancing Traffic Volumes (Westbound)	443	411	353
% Left Turns in Advancing Traffic Volumes (WB)	97%	93%	93%
Opposing Traffic Volumes (Eastbound)	0	0	0
Warrant at 50km/h design speed justified?	No	No	No

Source: MTO Geometric Design Appendix E

The overall analysis indicates that a westbound left turn lane is not warranted at the intersection of Highway 62 and Ashley Street for the horizon year 2046. However, the Synchro results show that the lane is projected to operate at overcapacity in weekday AM, weekday PM, and Saturday peak hours. To address traffic issues on the east leg, it is recommended to provide separate lanes for right and left turns from Highway 62 to Harmony Road.

10.2 HARMONY ROAD AT ASHLEY STREET

Table 15 – Left Turn Warrant Justification, East Leg of Harmony Road and Ashley Street

Criteria	AM Peak Hour Traffic Volumes	PM Peak Hour Traffic Volumes	Saturday Peak Hour Traffic Volumes
Westbound Left Turn (WBLT) Traffic Volumes	134	170	163
Advancing Traffic Volumes (Westbound)	270	317	292
% Left Turns in Advancing Traffic Volumes (WB)	50%	54%	56%
Opposing Traffic Volumes (Eastbound)	0	0	0
Warrant at 70km/h design speed justified?	No	No	No

Source: MTO Geometric Design Appendix E

The overall analysis indicates that a westbound left turn lane is not warranted at the intersection of Harmony Road and Ashley Street for the horizon year 2046. However, the Synchro results show that the lane is projected to operate at overcapacity during weekday PM, and Saturday peak hours. To address traffic issues on the east leg, it is recommended that a left turn lane be warranted.

10.3 HARMONY ROAD AT EXISTING BLACK BEAR RIDGE SITE ACCESS

Table 16 – Left Turn Warrant Justification, North Leg of Harmony Road and Existing Black Bear Ridge Access

Criteria	AM Peak Hour Traffic Volumes	PM Peak Hour Traffic Volumes	Saturday Peak Hour Traffic Volumes
Southbound Left Turn (SBLT) Traffic Volumes	75	69	75
Advancing Traffic Volumes (Southbound)	125	127	132
% Left Turns in Advancing Traffic Volumes (SB)	60%	54%	57%
Opposing Traffic Volumes (Northbound)	0	0	0
Warrant at 50km/h design speed justified?	No	No	No

Source: MTO Geometric Design Appendix E

The overall analysis indicates that the southbound left turn lane is not warranted at the intersection of Harmony Road and the existing Black Bear Ridge Site Access for the horizon year 2046. However, the Synchro results for the southbound lane show that the lane is projected to operate at a poor level of service with 41-second delay. To address traffic issues on the east leg, it is recommended that a left turn lane be warranted.

10.4 HARMONY ROAD AT HARMONY PUBLIC SCHOOL

Table 17 – Left Turn Warrant Justification, South Leg of Harmony Road and Harmony Public School

Criteria	AM Peak Hour Traffic Volumes	PM Peak Hour Traffic Volumes	Saturday Peak Hour Traffic Volumes
Northbound Left Turn (NBLT) Traffic Volumes	58	26	2
Advancing Traffic Volumes (Northbound)	134	71	2
% Left Turns in Advancing Traffic Volumes (NB)	43%	37%	100%
Opposing Traffic Volumes (Southbound)	0	0	0
Warrant at 50km/h design speed justified?	No	No	No

Source: MTO Geometric Design Appendix E

The analysis indicates that a northbound left turn lane is not warranted at the proposed site access intersection on Harmony Road near Harmony Public School. However, Synchro results show that the lane will operate poorly, with a delay of 168 seconds during the AM peak hour. A left turn lane is recommended for the south leg to address traffic concerns, though this may not be a major issue since the school's other entrance already has separate left and right turn lanes. The study uses a consolidated traffic volume from a single site entrance for reference.

11. SIGHT DISTANCE ANALYSIS

11.1 Methodology

The available sight lines at Black Bear Ridge Resort were reviewed to assess vehicle safety on the existing driveway. Harmony Road at Site Access 1 is generally level without significant vertical and horizontal

curvature. There are no notable existing trees/vegetation in the City's right-of-way which may obstruct the driver's sight lines.

Given that the posted speed limit on Harmony is 40km/h, a design speed of 50km/h is appropriate to determine the minimum sight lines from the site access approach. As per the Transportation Association of Canada (TAC) Guideline for Canadian Roads 2017, the minimum stopping sight distance (SSD) requirement for a 50km/h design speed is 65m. SSD is generally the accepted metric for evaluating sight lines from a private driveway approach.

11.2 Field Measurements

Based on Trans-Plan's measurements taken on December 01, 2024, the following sight line distances are available from the Site Access 1 driveway location, based on a driver eye height of 1.08m and an object height of 0.6m (as specified by Chapter 2 of TAC 2017):

- The measurement is taken from 3.0m back from the edge of the road:
 - Approx. 240m looking left (east)
 - Approx. 300m looking right (west)

The above measurements are shown in Table 18.

The measurement taken from 3.0m back from the edge of the road represents the driver's perspective when approaching the road before the vehicle encroaches onto the road.

Photographs taken by Trans-Plan showing the approximate driver perspective from the site access 1 approach to Harmony Road are provided in Appendix F.

11.3 Sightline Review

As per the City of Belleville's comments, a sight distance review for the site access was conducted through actual field measurements for the site access onto Harmony Road. The measurements were compared to the minimum requirements outlined in Table 9.9.4 (Case B1) & Table 9.9.6 (Case B2-3), TAC Guidelines. Harmony Road has a posted speed limit of 40km/h. A comparison of the minimum sight distance requirements to the available sight distance is provided in Table 18. Source information is provided in Appendix F.

Table 18 – Sight Line Analysis, Harmony Road at Site Access 1. (3m behind the edge of the road)

No.	Location	Sight Line Direction	Available Sight Distance (m)	Criteria	Required Sight Distance (m)	Requirement Met?
1	Black Bear Ridge Resort, Belleville, ON	Looking East	240m	SSD	65	Yes
				ISD	95	Yes
		Looking West	>300m	SSD	65	Yes
				ISD	105	Yes

Source: Table 2.5.2, 9.9.4, and 9.9.6 from TAC 2017 for sight distance requirements

The available sight distance for the existing site access meets TAC's required stopping sight distance (SSD) of 65m, and minimum intersection sight distance (ISD) of 95m (for left turns) and 105m (for right turns) from 3.0m back from the edge of the road. Thus, the available sight distance is expected to be sufficient.

11.4 Sightline Analysis Conclusion

The measurements indicate that the minimum SSD and minimum ISD requirements are generally met.

12. SIGNAL WARRANT ANALYSIS

Based on OTM Guidelines, Book 12, Traffic Signals, a signal warrant analysis was completed for the intersections with poor Level of Service (LOS), due to the expected increase in delays observed in Section 9. The signal warrant analysis reviews the intersection under the 2056 future total conditions. Eight-hour traffic volumes (7:30 am-10:30 am and 2:00 pm – 6:00 pm) were estimated based on the conducted traffic counts.

To estimate the future traffic volumes, a percentage of each off-peak hour was calculated to the peak hour using the existing turning movement count volumes provided in Appendix G. Since the turning movement counts are only provided for 4 hours, the missing data were estimated by assuming that the peak hour volumes would decrease by 5 percent on the shoulder hours.

The traffic volume percentage used in the analysis for each off-peak hour, in comparison to the weekday AM and PM peak hour volumes, and the detailed summary of signal warrant analysis results are shown in the tables below:

Intersection: Ashley Street at Harmony Road

Table 19 - Weekday Hourly Volumes, Ashley Street at Harmony Road

	AM Peak							PM Peak
Hour Ending	7:30	8:30	9:30	10:30	14:00	16:00	17:00	18:00
2056 Future Traffic Volumes	1,145	1,018	959	903	1,607	1,697	1,790	1,815
Percent Peak Hour	100%	89%	84%	79%	89%	94%	99%	100%

Table 20 – Signal Warrant Justification, Ashley Street at Harmony Road

Traffic Signal Warrant	2056 Total Conditions		
	Required	Satisfied	Warrant Met?
1 – Minimum Vehicular Volume	100%	100%	Yes
2 – Delay to Cross Traffic	100%	100%	Yes
3 - Combination (1 & 2)	80%	100%	Yes
4 – 4-Hr Volume	100%	100%	Yes
Overall Result			Yes

Intersection: River Road North and Harmony Road

Table 21 - Weekday Hourly Volumes, River Road North and Harmony Road

	AM Peak						PM Peak	
Hour Ending	7:30	8:30	9:30	10:30	14:00	16:00	17:00	18:00
2056 Future Traffic Volumes	1,077	1,045	991	936	1,381	1,456	1,531	1,475
Percent Peak Hour	100%	97%	92%	87%	90%	95%	100%	96%

Table 22 – Signal Warrant Justification, River Road North and Harmony Road

Traffic Signal Warrant	2056 Total Conditions		
	Required	Satisfied	Warrant Met?
1 – Minimum Vehicular Volume	100%	100%	Yes
2 – Delay to Cross Traffic	100%	100%	Yes
3 - Combination (1 & 2)	80%	100%	Yes
4 – 4-Hr Volume	100%	75%	No
Overall Result			Yes

Intersection: Homan Road and Harmony Road

Table 23 - Weekday Hourly Volumes, Homan Road and Harmony Road

		AM Peak					PM Peak	
Hour Ending	7:30	8:30	9:30	10:30	14:00	16:00	17:00	18:00
2056 Future Traffic Volumes	701	1,040	988	939	1,113	1,197	1,256	809
Percent Peak Hour	67%	100%	95%	90%	90%	95%	100%	64%

Table 24 – Signal Warrant Justification, Homan Road and Harmony Road

Traffic Signal Warrant	2056 Total Conditions		
	Required	Satisfied	Warrant Met?
1 – Minimum Vehicular Volume (A.Total Volume, B.Crossing Volume)	100%	A. 100 B. 35%	No
2 – Delay to Cross Traffic	100%	A. 100	No

(A.Main Road, B.Crossing Road)		B. 35%	
3 - Combination (1 &2) (A.Justification 1, B.Justification 2)	80%	A. 100 B. 35%	No
4 – 4-Hr Volume	100%	72%	No
Overall Result			No

Intersection: Existing Black Bear Ridge Site Access and Harmony Road

Table 25 - Weekday Hourly Volumes, Existing Black Bear Ridge Site Access and Harmony Road

		AM Peak					PM Peak	
Hour Ending	7:30	8:30	9:30	10:30	14:00	16:00	17:00	18:00
2056 Future Traffic Volumes	750	1,241	1,179	1,120	1,300	1,373	1,442	936
Percent Peak Hour	60%	100%	95%	90%	90%	95%	100%	65%

Table 26 – Signal Warrant Justification, Existing Black Bear Ridge Site Access and Harmony Road

Traffic Signal Warrant	2056 Total Conditions		
	Required	Satisfied	Warrant Met?
1 – Minimum Vehicular Volume (A.Total Volume, B.Crossing Volume)	100%	A. 100 B. 96%	No
2 – Delay to Cross Traffic (A.Main Road, B.Crossing Road)	100%	A. 100 B. 100%	Yes
3 - Combination (1 &2) (A.Justification 1, B.Justification 2)	80%	A. 96 B. 100%	Yes
4 – 4-Hr Volume	100%	100%	Yes
Overall Result			Yes

Intersection: Proposed Site Access 2 and Harmony Road

Table 27 - Weekday Hourly Volumes, Proposed Site Access 2 and Harmony Road

		AM Peak					PM Peak	
Hour Ending	7:30	8:30	9:30	10:30	14:00	16:00	17:00	18:00
2056 Future Traffic Volumes	741	1,227	1,166	1,107	1,283	1,354	1,423	923
Percent Peak Hour	60%	100%	95%	90%	90%	95%	100%	65%

Table 28 – Signal Warrant Justification, Proposed Site Access 2 and Harmony Road

Traffic Signal Warrant	2056 Total Conditions		
	Required	Satisfied	Warrant Met?
1 – Minimum Vehicular Volume (A.Total Volume, B.Crossing Volume)	100%	A. 100 B. 94%	No
2 – Delay to Cross Traffic (A.Main Road, B.Crossing Road)	100%	A. 100 B. 100%	Yes
3 - Combination (1 &2) (A.Justification 1, B.Justification 2)	80%	A. 94 B. 100%	Yes
4 – 4-Hr Volume	100%	100%	Yes
Overall Result			Yes

Intersection: Harmony Public School and Harmony Road

Table 29 - Weekday Hourly Volumes, Harmony Public School and Harmony Road

		AM Peak					PM Peak	
Hour Ending	7:30	8:30	9:30	10:30	14:00	16:00	17:00	18:00
2056 Future Traffic Volumes	971	1,127	888	843	947	998	1,050	638
Percent Peak Hour	52%	100%	95%	90%	90%	95%	100%	61%

Table 30 – Signal Warrant Justification, Harmony Public School and Harmony Road

Traffic Signal Warrant	2056 Total Conditions		
	Required	Satisfied	Warrant Met?
1 – Minimum Vehicular Volume (A.Total Volume, B.Crossing Volume)	100%	A. 100 B. 59%	No
2 – Delay to Cross Traffic (A.Main Road, B.Crossing Road)	100%	A. 100 B. 75%	No
3 - Combination (1 &2) (A.Justification 1, B.Justification 2)	80%	A. 59 B. 75%	No
4 – 4-Hr Volume	100%	25%	No
Overall Result			No

Intersection: Proposed Site Access 3 and Harmony Road

Table 31 - Weekday Hourly Volumes, Proposed Site Access 3 and Harmony Road

		AM Peak					PM Peak	
Hour Ending	7:30	8:30	9:30	10:30	14:00	16:00	17:00	18:00
2056 Future Traffic Volumes	971	1,157	888	843	1,041	1,097	1,154	795
Percent Peak Hour	63%	100%	95%	90%	90%	95%	100%	69%

Table 32 – Signal Warrant Justification, Proposed Site Access 3 and Harmony Road

Traffic Signal Warrant	2056 Total Conditions		
	Required	Satisfied	Warrant Met?
1 – Minimum Vehicular Volume (A.Total Volume, B.Crossing Volume)	100%	C. 100 D. 92%	No
2 – Delay to Cross Traffic (A.Main Road, B.Crossing Road)	100%	C. 100 D. 100%	Yes
3 - Combination (1 &2) (A.Justification 1, B.Justification 2)	80%	C. 92 D. 100%	Yes
4 – 4-Hr Volume	100%	100%	Yes
Overall Result			Yes

Based on OTM guidelines, the results indicate that a traffic signal is warranted at the Harmony Road intersecting with Ashley Street, River Road North, existing Black Bear Ridge Site Access, Proposed Site Access 2 and 3 on a weekday for future 2056 conditions. While a traffic signal is not warranted at the Harmony Road intersecting with Homan Road and Harmony Public School, signalizing the intersection will ease the traffic going in and out of the site accesses.

13. CONCLUSION AND RECOMMENDATIONS

This Traffic Impact Study for the proposed redevelopment of the Black Bear Ridge Golf Course located north of Harmony Road between Highway 37 and Homan Road in the City of Belleville, is summarized as follows:

- The subject is an existing golf course which is to be redeveloped into a full, four seasons resort containing commercial entertainment and recreational amenities, to be completed by surrounding residential and mixed-use developments.
- Site traffic for the development was based on rates provided in the ITE Trip Generation manual. In Phase 1, the subject site is expected to generate approximately 595, 786, and 787 two-way trips in the weekday AM, weekday PM, and Saturday peak hours, respectively. Moreover, in Phases 2 and 3, the subject site is expected to generate approximately 1,106, 1,419, and 1,356 two-way trips in the weekday AM, weekday PM, and Saturday peak hours, respectively.
- The available sight distance for the existing site access meets TAC's required stopping sight distance (SSD) of 65m, and minimum intersection sight distance (ISD) of 95m (for left turns) and 105m (for right turns) from 3.0m back from the edge of the road. Thus, the available sight distance is expected to be sufficient.

Ten years after Phase 1 build-out: 2046 Results

- Ashley Street at Highway 62 (East Leg) operates at LOS E with an overall v/c ratio exceeding 1.0 in 2046 future background conditions and both 2041 and 2046 future total conditions, indicating ongoing traffic issues even without additional site traffic. Trans-Plan recommends having two dedicated lanes, one for left turn only and one for shared left and right turn along Ashley Street from Highway 62 to Harmony Road.
- Ashley Street at Harmony Road (East Leg) operates at LOS E of F under 2041 and 2046 future total conditions. Trans-Plan recommends adding a left turn lane that separates it from the right turn.
- The southbound left/right turn movements of Harmony Road and Existing Black Bear Ridge Access are projected to operate acceptably in 2041 and 2046 under AM and Saturday peak hours, with an LOS of C. However, during the PM peak hours, they are expected to experience a LOS of E. To reduce traffic queues for the existing Black Bear Ridge Site Access, a two-lane with left and right turn is recommended.
- Harmony Road at Highway 37 operates nearly at capacity with LOS C or D during the AM, PM, and Saturday peak hours under future total traffic conditions (2041 and 2046). The eastbound left/through/right turn movements during PM and Saturday peak hours under 2041 and 2046 operate at LOS of F with v/c ratios exceeding 1.0, same goes with the northbound left and westbound left/through/right during PM peak hours under 2046 with LOS of F and E, respectively. Trans-Plan

recommends designing the eastbound lane to include shared left and through, as well as a dedicated right turn lane.

- In the future background conditions at the Highway 37 and Cannifton Road/Blessington Road intersection, the intersection generally operates within acceptable capacity, but during the AM peak hour, it nearly reaches overcapacity due to the westbound left/through/right and southbound through movements, with v/c ratios exceeding 0.84. This indicates near-critical capacity even without the site traffic. In 2041 and 2046, during AM, PM, and Saturday peak hours, the intersection is expected to operate at LOS C and D. The westbound lane will operate at LOS E and F, while the southbound through movement will have a LOS of C and D during AM peak hours under both background and future traffic conditions. A left turn lane is recommended for the east leg, and signal timing adjustments by allocating more time for northbound and southbound traffic.
- Tank Farm Road/Casey Road at Highway 37 operates at LOS E or F during the AM, PM, and Saturday peak hours under both background and future total traffic conditions (2041 and 2046) for the East Leg, and at LOS D or E during the PM and Saturday peak hours for the West Leg in the 2041 and 2046 horizon years. This indicates ongoing traffic issues even without additional site traffic. Trans-Plan recommends adding a left turn lane on both legs and improving signal timing to provide more time for northbound and southbound traffic.

Completion of Phase 2 and Phase 3: 2056 Results

- In 2056 future total conditions, the intersection Highway 62 at Ashley Street is projected to operate between LOS D and F, with v/c ratios ranging from 0.97 to 1.45. The westbound left/right turn, along with the northbound through and northbound right turn during the PM peak, will also have LOS F, with v/c ratios exceeding 1.0. Trans-Plan recommends adding two dedicated left-turn lanes and a shared left/right turn lane on Ashley Street. Extending signal times for northbound and southbound traffic also helps alleviate congestion.
- The northbound through/right and southbound left/through movements of Ashley Street at Harmony Road are expected to operate acceptably under all conditions. However, the westbound left/right turn movement is projected to operate at LOS F in 2056. To improve traffic flow, Trans-Plan recommends adding a dedicated left-turn lane and converting the southbound lane into two lanes: one for left turns and another for shared through/left turns, assuming the intersection is signalized.
- At the Harmony Road and River Street North intersection, the northbound and southbound left/through/right movements are projected to operate poorly in 2056, with LOS ranging from D to F. Trans-Plan recommends signalizing the intersection and adding left-turn lanes for the eastbound and westbound directions.
- The southbound left/right movements of Harmony Road and Homan Road intersection are projected to operate poorly in 2056, with an LOS of F and delays of at least 134 seconds. Trans-Plan recommends signalizing the intersection and adding a left-turn lane for the eastbound direction and a right-turn lane for the westbound direction.
- The southbound left/right movements of Harmony Road and Black Bear Ridge Site Access intersection are projected to operate poorly in 2056, with an LOS of D to F. Trans-Plan recommends signalizing the

intersection and adding a left-turn lane for the eastbound direction and a right-turn lane for the westbound direction.

- The southbound left/right movements of Harmony Road and Proposed Site Access 2 intersection are projected to operate poorly in 2056, with an LOS of F. Trans-Plan recommends signalizing the intersection and adding a left-turn lane for the eastbound traffic to achieve an acceptable level of service.
- The northbound left/right movements of Harmony Road and Harmony Public School intersection are projected to operate poorly in 2056, with an LOS of E to F. Trans-Plan recommends signalizing the intersection and adding a left-turn lane for the eastbound traffic to achieve an acceptable level of service. adding a dedicated left-turn lane for westbound traffic and converting the eastbound lane into two lanes: one for through traffic and another for shared through and right turns. Additionally, the installation of a “School Zone Maximum Speed” sign is also recommended.
- The southbound left/right movements of Harmony Road and Proposed Site Access 3 intersection are projected to operate poorly in 2056, with an LOS of E or F. Trans-Plan recommends signalizing the intersection and adding a dedicated right-turn lane for westbound traffic to achieve an acceptable level of service.
- In 2056, the Highway 37 and Harmony Road intersection is projected to be overcapacity during peak hours, with v/c ratios exceeding 1.0 for multiple movements. To improve traffic flow, it is recommended to convert the eastbound and westbound lanes into shared through/right and dedicated left-turn lanes. The northbound lane should be reconfigured to include one left-turn lane, one left/through lane, and one through/right lane. Signal timing should also be optimized by giving more time to the northbound and southbound to accommodate higher traffic volumes.
- In 2056 of Highway 37 and Cannifton Road/Blessington Road, the intersection operates at overcapacity during AM and PM peak hours (v/c ratios of 1.34 and 1.35), but within capacity during Saturday peak hours (v/c ratio of 0.84). During the AM peak, the westbound left/through/right and southbound through movements, and during the PM peak, the eastbound left/through/right and northbound through movements are expected to operate at LOS F with v/c ratios over 1.0. To improve flow, it is recommended to convert the northbound and southbound left-turn lanes to left/through lanes and reconfigure the eastbound and westbound lanes with a left-turn lane, left/through lane, and through/right turn lane. Signal timing should also be optimized to accommodate higher traffic volumes.
- In 2056, the Highway 37 and Tank Farm Road/Casey Road intersection operates at overcapacity during AM and PM peak hours (v/c ratios of 1.32 and 1.26), but within capacity during Saturday peak hours (v/c ratio of 0.87). During AM peak, the westbound left/through/right and southbound through movements are expected to operate at LOS F, while during PM peak, the eastbound left/through/right, westbound left/through/right, and northbound through movements will also operate at LOS F. During Saturday peak, the eastbound and westbound left/through/right lanes will have LOS F with v/c ratios of 0.99 and 1.52, respectively. To improve traffic flow, it is recommended to convert the northbound and southbound left-turn lanes to left/through lanes and reconfigure the eastbound and westbound lanes with a left-turn lane, left/through lane, and through/right turn lane.

Respectfully submitted,



Anil Seegobin, P.Eng.
Partner, Engineer

Trans-Plan Transportation Inc.
Transportation Consultants

APPENDICES

Appendix A – Correspondence with the City of Belleville and Ministry of Transportation (Ontario)

Appendix B – Turning Movement Counts and Signal Timing Plans

Appendix C – Capacity and Queueing Analysis Sheets

Appendix D – Level of Service Definitions

Appendix E – Left Turn Lane Warrant Analysis Graph

Appendix F – Sightline Survey Results

Appendix G – Signal Warrant Analysis



APPENDIX A

Correspondence with the City of Belleville and
Ministry of Transportation (Ontario)

Preliminary Comments

Traffic Impact Study (TIS)

TransPlan's Response of Dec. 20, 2024

The following represents preliminary comments from the City and its Peer Reviewer, Greer Galloway, on the written response from TransPlan dated December 20, 2024 re: BBR Traffic Impact Study (TIS), Aug. 2024:

A. City of Belleville

1. Comment J1: The City is concerned that only three (3) intersections are being analyzed, and that the intersections towards Ashley Street and Hwy 62 are not being analyzed. The ToR that was provided to the City in October of 2023 included nine intersections (please see below). This includes all signalized and unsignalized intersections towards Hwy 62 and Foxboro. The City is still expecting that they be assessed, as it is imperative that we understand the impacts of the development on all other intersections, including those in the Hwy 62 direction particularly given there is more traffic coming from the Foxboro area.

City Comment J1: *"Intersections analysed were not per the TOR. Only Homan, Entrance, and Hwy 37 were analyzed. None to the east of Homan were examined."*

TRANS-PLAN Response:

The intersections listed in Trans-Plan's Terms of Reference for the study area are as follows:

- Harmony Road at Homan Road
- Harmony Road at Existing Site Access
- Harmony Road at Highway 37

Three site accesses will be considered in Phase 1, as discussed with the client and as part of the recommendations of the City and Peer Reviewer. A total number of 5 accesses (public non-emergency accesses) will be proposed with additional accesses to Homan Road and Harmony Road in later phases. An updated Traffic Impact Study will be submitted to support these changes.

TransPlan ToR

4. Confirm the necessary study area intersections with City and MTO staff and obtain intersection traffic counts. Based on our experience and the concept plan provided, the study area intersections / driveways to be assessed include:
 - Highway 62 at Ashley Street
 - Harmony Road at Ashley Street
 - Harmony Road at River Road
 - Proposed Site Access (or New Municipal Road) on the north end of Homan Road
 - Harmony Road at Homan Road
 - Harmony Road at Plumpton Road
 - Existing Golf Course Access on Harmony Road
 - Proposed Site Access (or New Municipal Road) with Cul-de-Sac on Harmony Road
 - Highway 37 at Harmony Road

Preliminary Comments

Traffic Impact Study (TIS)

TransPlan's Response of Dec. 20, 2024

2. Comment D3: It is unclear whether full build out of the Secondary (Master) Plan is being assessed or just Phase 1 only. It is the City's view that nothing provided or discussed to date should have limited or suggested to limit the analysis to only the Phase 1 of development. The Secondary (Master) Plan traffic impact will need to consider the full build out of the Secondary Plan area (3,049 units + golf & resort uses). The Phase 1 draft plan traffic impact will need to consider the full build out of the draft plan area.
3. Comment K2: Fire & Emergency Services is reviewing the revised road configuration with respect to NFPA and fire access, and comments will be provided separately.

B. Greer Galloway

1. Comment D3: The comments provided were not intended to suggest the overall development plan should be ignored, rather acknowledge the results of the study would be subject to change as the development plan changed. We agree that a greater focus on the first phase is warranted but not to the exclusion of future phases and full build out - it is important for all parties to have an idea of what the future may hold as well as the near future.
2. Comment D17: Confirmation is required that all intersections to the west (towards Foxboro) are being considered in this TIS.

Re: Recent Single Day Traffic Count/Average Annual Daily Traffic and Signal Timing Plan of Harmony Road at Highway 37

From Kim Amande <Kim.Amande@trans-plan.com>

Date Fri 17/01/2025 21:30

To Taylor, George (MTO) <George.Taylor2@ontario.ca>

Cc Posthumus, Allison (MTO) <Allison.Posthumus@ontario.ca>

Hi George,

Thank you for your comments and the attached documents. We will ensure they are incorporated into the new TIS.

Best regards,

Kim Amande

Traffic Analyst

[TRANS-PLAN](#) | [VIEWS AI](#)

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From: Taylor, George (MTO) <George.Taylor2@ontario.ca>

Sent: 17 January 2025 01:24

To: Kim Amande <Kim.Amande@trans-plan.com>

Cc: Posthumus, Allison (MTO) <Allison.Posthumus@ontario.ca>

Subject: FW: Recent Single Day Traffic Count/Average Annual Daily Traffic and Signal Timing Plan of Harmony Road at Highway 37

Hi Kim,

Please see below for the Ministry's comments regarding the updated terms of reference for the 'Black Bear Ridge Resort' traffic impact study.

MTO Comments to the Updated Terms of Reference Submission (Dated December 17, 2024)

Introduction

- Please add a note confirming that the updated TIS shall conform to all requirements detailed in MTO's TIS Guidelines (dated March 2023).

Required Studies

- No comments or concerns.

Data Requests

- Information regarding nearby planned background developments will need to be obtained from MTO Corridor staff, as well as from the City of Belleville.
- A 2% annual traffic growth rate is acceptable. Please note that this growth rate shall be compounded annually (rather than computed linearly).
- Information regarding planned active transportation/roadway infrastructure improvements within the study area will need to be obtained from MTO Corridor staff, as well as from the City of Belleville.
- Information regarding any planned transit improvements in the area will need to be obtained from the City of Belleville.

Study Context

- Given that the master concept plan (which I'm currently unable to open) is not finalized yet, please note that any significant updates to this site plan shall require an updated TIS submission in the future.

Traffic Impact Study

- Please ensure that the following intersections are also added to the study area and analyzed for current and future traffic operations:
 - Hwy 37 at Cannifton Rd N/Blessington Rd
 - Hwy 37 at Tank Farm Rd/Casey Rd
 - Hwy 62 at Ashley St
- Various turning movement counts and signal timing plans have been attached.
- Nearby weekly ATR counts for Hwy 37 and Hwy 62 are also attached for your reference.
- The existing condition analysis year should be revised to 2025.
- While the MTO has no issues with the proposed horizon years of 2041 and 2046 (5-years and 10-years beyond full buildout of phase 1), please note that any other work beyond phase 1 of the development (e.g., phase 2, phase 3, etc.) will require updated TIS submissions in the future.

Sightline Review

- If significant modifications are expected at any of the MTO-owned intersections located within the study area, then additional sight distance reviews will be required. If that's the case, then please refer to the "MTO Design Supplement for TAC Geometric Design Guide" (dated October 2023), which can be found on our MTO Technical Publications website.
 - <https://www.library.mto.gov.on.ca/SydneyPLUS/TechPubs/Portal/tp/tdViews.aspx?lang=en-US>

Additional Comments

- If significant modifications are expected at any of the MTO-owned intersections within the study area, then a conceptual intersection design(s) will need to be included in the next TIS submission.
- In order to help assist with preparations for the next TIS submission, please see below for more details regarding our earlier comments and concerns from the previously submitted TIS (dated August 2024).

Summary of MTO's Comments (dated November 8, 2024) from the Previous TIS Submission (dated August 2024)

- The Consultant shall review our attached "MTO TIS Guidelines" (dated March 2023) and conform to all submission requirements.

- No executive summary was provided at the beginning of the report. According to our guidelines, this is an MTO requirement.
- A study horizon of 5 and 10 years beyond present day (2024) was used in the TIS submission. This is incorrect, as our guidelines state that the study horizon years shall include the opening date (full build-out) of the site, 5 years beyond full build-out of the site, and 10 years beyond full build-out of the site.
 - Given that full build-out of the subject site is not possible in 2024, please revise all three study horizon years in the TIS (based on a realistic full build-out date of the subject site).
- As you can see in the attached “Conceptual Master Plan”, no site plan statistics (i.e., number of dwelling units, size of golf course, number of hotel rooms, etc.) were provided in the TIS submission. This missing information is very important, as it will allow the ministry to verify what is planned for the proposed development (which is needed to estimate the site-generated trips). Is there an updated site plan available (with an engineer’s stamp of approval) that the Consultant could provide us in the next submission?
- Please provide more details regarding all the trip distribution assumptions. As per our TIS guidelines, all the trip distribution percentages must be presented in tabular form.
 - Note: The ministry does not agree with the trip distribution as currently proposed. The urban areas of Belleville (located south of the subject site) are likely the origin/destination of the vast majority of the site-generated vehicle trips. Most of the population centres, employment areas, amenities (e.g., shopping, civic services such as libraries, arenas/sports complexes, etc.), and the Hwy 401 corridor all lie to the south of this site.
 - In addition, since the subject site is located between two provincial highways (Hwy 37 and Hwy 62), the ministry feels that it’s reasonable to assume that some site-generated traffic will also utilize the intersection of Highway 62 at Ashley Street. As a result, this intersection should also be included in the TIS analysis (see attached for our most recent turning movement count, as well as the current signal timing plan).
- As detailed in the attached “MTO Comments on TIS Terms of Reference” (dated June 21, 2023), the ministry previously stated that the Sunday peak hour was also to be analyzed. This was omitted from the TIS submission and therefore will need to be updated.
- In Appendix B (Capacity Analysis Reports), the existing signal timing plans (see attached) were not inputted correctly into Synchro. As a result, all the intersection capacity analysis summaries (for Hwy 37 at Harmony Rd) are inaccurate and therefore are not representative of the theoretical intersection operating conditions. Therefore, the Consultant will need to re-run their Synchro analysis (for all scenarios) and update all applicable tables throughout the TIS. Some of the notable errors in Synchro are as follows:
 - The “Recall Mode” is set to “Max” for phase 2 and phase 6, which is incorrect for a fully-actuated intersection. Please review and update.
 - Normally the “Recall Mode” is set to “Min” for the main road (with no recall for the side road approaches).
 - The “Total Split” (maximum green + amber interval + all-red interval) was inputted incorrectly for all four phases. Please review and update.
 - A “Base Saturation Flow Rate” (BSFR) of 1900 was used, which seems a bit high for this area. The ministry recommends reducing this value to 1750.
 - Note: For the “BSFR”, a value of 1900 is typically only used in urban areas with a population greater than 250,000.
- In Appendix B (Capacity Analysis Reports), please double check that all lane configurations were inputted correctly into Synchro. For example, at the intersection of Highway 37 and Harmony Road (during the existing weekday a.m. peak hour), the eastbound lane configuration was incorrectly inputted as a “through/right” lane. The lane

configuration for this approach should have been inputted as a “through/left” lane with a “channelized right” lane.

- Therefore, the Consultant will need to re-run their Synchro analysis (for all scenarios) and update all applicable tables throughout the TIS.
- The report conclusion states that “minor signal timing adjustments” are recommended to enhance traffic flow at the intersection of Highway 37 and Harmony Road. Due to the anticipated number of new site-generated traffic volumes in the area, “minor signal timing adjustments” will not be enough to reduce the expected “total future” delays in all three horizon years. Major intersection and/or roadway improvements are likely required in the area. Please note that the ministry does not optimize signal timings to favour intersecting sideroads, at the expense of provincial highway traffic.

Feel free to contact me if you have any questions.

Thanks.

George Taylor
Senior Project Manager – Area West
Corridor Management Section | East Operations
Ministry of Transportation
1355 John Counter Boulevard
Postal Bag 4000
Kingston, ON K7L 5A3
Mobile (613)483-5307
George.Taylor2@Ontario.ca

From: Kim Amande <Kim.Amande@trans-plan.com>

Sent: Tuesday, December 17, 2024 7:00 AM

To: Taylor, George (MTO) <George.Taylor2@ontario.ca>

Cc: Dei Pe <Dei.Pe@trans-plan.com>; Traffic Engineering Team <Traffic.Team@trans-plan.com>; Cole, Robert (MTO) <Robert.Cole@ontario.ca>

Subject: Re: Recent Single Day Traffic Count/Average Annual Daily Traffic and Signal Timing Plan of Harmony Road at Highway 37

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.
Hi Taylor,

We have not received yet a response regarding the recent Single Day Traffic Count/Average Annual Daily Traffic and Signal Timing Plan of Harmony Road at Highway 37.

Also, I am reaching out to inquire whether you are the appropriate contact at the MTO to submit and review the Terms of Reference of the proposed redevelopment of the same project Black Bear Ridge Golf Course located north of Harmony Road between Highway 37 and Homan Road in the City of Belleville. I am traffic analyst at Trans-Plan and we have been retained to prepare a Transportation Study in support of the redevelopment.

Attached is a Terms of Reference (TOR) letter containing our proposed scope of work and study methodology. Please feel free to review and let us know if any TOR comments can be provided at this time. As well, for your reference, please find the preliminary master plan for phase 1 of the proposed development attached.

If there is any other information that I can provide regarding this study, please let me know.
Thank you for your time.

Kind regards,

Kim Amande
Traffic Analyst
[TRANS-PLAN | VIEWS AI](#)
Transportation Engineering
Toll Free:+1 (877) 668-8784 (TPTI)
Office/Fax:+1 (647) 931-7383
Email: kim.amande@trans-plan.com

Head office: 67 Mowat Ave, Suite 331, Toronto, ON, M6K 3E3 CANADA



From: Taylor, George (MTO) <George.Taylor2@ontario.ca>
Sent: 11 December 2024 01:13
To: Kim Amande <Kim.Amande@trans-plan.com>
Cc: Dei Pe <Dei.Pe@trans-plan.com>; Traffic Engineering Team <Traffic.Team@trans-plan.com>; Cole, Robert (MTO) <Robert.Cole@ontario.ca>
Subject: RE: Recent Single Day Traffic Count/Average Annual Daily Traffic and Signal Timing Plan of Harmony Road at Highway 37

Good morning, Kim,

I have forwarded your request to the MTO Area Planner for response.

Can you advise if a Terms of Reference has been submitted for this proposal. The Ministry's guidelines are very specific regarding Traffic Studies. I have attached a copy of the Ministry's guidelines, please review.

Terms of Reference

Prior to the submittal of a Traffic Impact Study or Traffic brief to the Ministry by MTO a RAQS qualified transportation consultants the Ministry will require the submittal of a Terms of Reference as detailed in Part 3 of the MTO Traffic Impact Study Guidelines 2023.

While municipalities may develop and apply their own policies and technical guidelines for developments impacting highways under their jurisdiction, MTO's TIS guidelines shall apply to all developments undertaken within MTO's corridor permit control area and shall be used to prepare and submit TIS in support of permits from MTO. Where separate studies are submitted to each road authority, the inputs and outputs of the analyses are expected to be in agreement and consistent with each other.

The pre-TIS briefing package shall include the following:

- (a) A site plan that must include the following details:
 - Plan title
 - Name of the applicant
 - Scale

- North point
 - Highway number
 - Lot and concession numbers and the limits of the property
 - Location of existing and proposed buildings, structures
 - Proposed parking area layout with the maximum number of vehicles to be accommodated at one time,
 - Elevation of the area adjoining the highway and the proposed drainage system for the development,
 - Location of existing and proposed entrances
 - Location and names of adjacent roads
 - Clearly defined study area/limit
 - Growth rate suggestion
- (b) Development details, including:
- Type of development (i.e., residential, commercial, industrial, etc.)
 - Projected size of development (i.e., number of units, gross floor area (GFA), etc.)
 - Stages or phasing schemes of the development
- (c) Traffic information:
- Expected peak hour number and percentages of vehicles entering and leaving the property from each direction,
 - Times of the peak hour(s)
 - Number of days per week and the specific days of the week that the development is expected to be open to the public,
- (d) Any previous Traffic Impact Studies

Regards,

George Taylor
 Senior Project Manager – Area West
 Corridor Management Section | East Operations
 Ministry of Transportation
 1355 John Counter Boulevard
 Postal Bag 4000
 Kingston, ON K7L 5A3
 Mobile (613)483-5307
George.Taylor2@Ontario.ca

From: Kim Amande <Kim.Amande@trans-plan.com>

Sent: Tuesday, December 10, 2024 12:59 AM

To: Taylor, George (MTO) <George.Taylor2@ontario.ca>; Corridor East (MTO) <CorridorEast@ontario.ca>

Cc: Dei Pe <Dei.Pe@trans-plan.com>; Traffic Engineering Team <Traffic.Team@trans-plan.com>

Subject: Recent Single Day Traffic Count/Average Annual Daily Traffic and Signal Timing Plan of Harmony Road at Highway 37

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Hi George,

Good day,

I hope you are the right person in the MTO to request traffic data for an intersection.

We are the transportation consultant retained to conduct a Traffic Impact Study Update for a redevelopment of Blackbear Ridge located at North of Harmony Road between Highway 37 and Homan Road, City of Belleville, ON. We would like to purchase the most recent Single Day Traffic Count/Average Annual Daily Traffic and Signal Timing Plan (STP) for the intersection below, if available:

1. Harmony Road at Highway 37

Requestor: Christopher Waugh
General Manager
TRANS-PLAN
Mobile: (416) 464-7255
Email: christopher.waugh@trans-plan.com

Please find attached the site location and markups for a clear representation of the requests. I would appreciate your assistance in reviewing them and look forward to your feedback.

Thank you for your time and support.

Best regards,

Kim Amande
Traffic Analyst
[TRANS-PLAN](#) | [VIEWS AI](#)
Transportation Engineering
Toll Free: +1 (877) 668-8784 (TPTI)
Office/Fax: +1 (647) 931-7383
Email: kim.amande@trans-plan.com

Head office: 67 Mowat Ave, Suite 331, Toronto, ON, M6K 3E3 CANADA



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APPENDIX B

Turning Movement Counts and Signal Timing Plans



Ministry of Transportation

TES - Traffic Engineering System

Turning Movement 15 Minute Report

Description: HWY 62 @ ASHLEY ST

Region EAST

Hwy #: HWY 62

LHRS_Offset: 33690_0453

Count Period. 5/10/2022 7:00:00 AM

Count Start 5/10/2022 12:00:00 AM

5/10/2022 6:00:00 PM

Date:

Int. Type:

Start Time	North						South						East						West						Total								
	Cars			Trucks			Ped			Cars			Trucks			Ped			Cars			Trucks				Long Trucks			Ped				
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT		
07:00	2	121	0	0	4	0	0	3	0	0	0	0	8	0	0	49	20	0	8	0	0	3	0	0	19	0	0	0	0	0	0	0	229
07:15	0	162	0	0	5	0	0	3	0	0	0	0	4	0	0	60	19	0	4	0	0	3	1	0	32	0	0	0	0	0	0	0	293
07:30	1	199	0	0	2	0	0	4	0	0	0	0	4	2	0	4	18	0	4	2	0	4	1	0	41	0	2	0	0	0	0	0	331
07:45	0	188	0	0	1	0	0	4	0	0	0	0	4	3	0	65	21	0	4	3	0	4	3	0	50	0	0	0	0	0	0	0	347
08:00	1	148	0	0	3	0	0	3	0	0	0	0	5	2	0	67	26	0	5	2	0	8	1	0	58	0	0	0	0	0	0	0	323
08:15	1	155	0	0	0	0	0	2	0	0	0	0	2	2	0	69	27	0	2	2	0	5	3	0	36	0	1	0	0	0	0	0	303
08:30	0	140	0	0	2	0	1	3	0	0	0	0	3	1	0	71	29	0	3	1	0	5	1	0	33	0	0	3	0	0	0	0	294
08:45	0	128	0	0	1	0	0	4	0	0	0	0	1	2	0	57	26	0	1	2	0	4	1	0	22	0	0	0	0	0	0	0	247
11:00	1	80	0	0	0	0	0	2	0	0	0	0	2	0	0	75	31	0	2	0	0	3	0	0	35	0	1	0	0	0	0	0	230
11:15	1	107	0	0	0	0	0	2	0	0	0	0	4	3	0	79	33	0	4	3	0	3	1	0	33	0	1	0	0	0	0	0	268
11:30	2	76	0	0	1	0	0	1	0	0	0	0	0	1	0	59	34	0	0	1	0	3	0	0	31	0	1	0	0	0	0	0	210
11:45	2	91	0	0	4	0	0	6	0	0	0	0	3	1	0	73	41	0	3	1	0	4	0	0	25	0	2	0	0	0	0	0	253
12:00	1	81	0	0	7	0	0	2	0	0	0	0	4	0	0	82	45	0	4	0	0	2	1	0	33	0	3	2	0	0	0	0	263
12:15	4	80	0	0	2	0	0	2	0	0	0	0	1	0	0	68	37	0	1	0	0	3	0	0	28	0	4	0	0	0	0	0	229
12:30	2	84	0	0	3	0	0	1	0	0	0	0	0	2	0	65	41	0	0	2	0	1	1	0	41	0	2	0	0	0	0	0	243
12:45	3	99	0	0	5	0	0	5	0	0	0	0	5	2	0	88	40	0	5	2	0	1	0	0	32	0	2	0	0	0	0	0	282
13:00	2	76	0	0	3	0	0	1	0	0	0	0	1	1	0	83	18	0	1	1	0	5	2	0	35	0	3	2	0	1	1	0	234
13:15	3	104	0	0	6	0	0	4	0	0	0	0	4	0	0	80	35	0	4	0	0	4	0	0	33	0	0	0	0	0	0	0	273
13:30	4	80	0	0	4	0	0	2	0	0	0	0	3	1	0	81	27	0	3	1	0	0	0	0	33	0	1	2	0	0	0	0	238
13:45	1	97	0	0	2	0	0	3	0	0	0	0	4	0	0	81	38	0	4	0	0	6	1	0	35	0	2	1	0	0	0	0	272
15:00	0	83	0	0	2	0	0	1	0	0	0	0	1	2	0	104	37	0	1	2	0	10	3	0	25	0	2	1	0	0	0	0	271

Start Time	North										South										East										West										Total
	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped	Cars			Trucks			Long Trucks			Ped											
	LT	TH	RT	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT	LT	TH	RT		LT	TH	RT	LT	TH	RT	LT	TH	RT												
15:15	1	69	0	0	3	0	0	3	0	0	0	138	51	0	1	1	0	3	5	0	33	0	3	0	0	2	0	1	0	0	0	0	0	314							
15:30	0	73	0	0	3	0	0	2	0	0	0	136	68	0	1	0	0	2	2	0	33	0	2	1	0	0	0	0	0	0	0	0	0	323							
15:45	3	68	0	0	2	0	0	3	0	0	0	131	57	0	0	1	0	7	0	0	44	0	3	1	0	0	3	0	1	0	0	0	0	324							
16:00	1	73	0	0	7	0	1	5	0	0	0	135	53	0	3	1	0	3	2	0	44	0	1	0	0	0	5	0	1	0	0	0	0	335							
16:15	1	104	0	0	5	0	0	4	0	0	0	162	69	0	1	1	0	2	4	0	35	0	2	2	0	0	1	0	0	0	0	0	0	393							
16:30	0	89	0	0	5	0	0	3	0	0	0	182	59	0	1	0	0	2	0	0	39	0	2	1	0	0	2	0	0	0	0	0	0	385							
16:45	2	85	0	0	3	0	0	4	0	0	0	195	61	0	2	0	0	0	1	0	35	0	4	1	0	0	1	0	0	0	0	0	0	394							
17:00	1	84	0	0	3	0	0	2	0	0	0	182	57	0	2	1	0	1	0	0	33	0	2	2	0	0	0	0	0	0	0	0	0	370							
17:15	1	87	0	0	2	0	0	1	0	0	0	190	48	0	0	0	0	1	1	0	30	0	2	0	0	0	0	0	0	0	0	0	0	363							
17:30	1	89	0	0	1	0	0	0	0	0	0	114	52	0	1	0	0	2	1	0	29	0	1	1	0	0	0	0	0	0	0	0	0	292							
17:45	2	83	0	0	2	0	0	3	0	0	0	110	34	0	3	0	0	0	2	0	35	0	1	0	0	0	0	0	0	0	0	0	0	276							



TES - Traffic Engineering System
Turning Movement Total Count and Peak Summary Report

Description: HWY 62 @ ASHLEY ST
Region: EAST
LHRS_Offset: 33690_0453
Count Date: Tuesday, 10 May, 2022

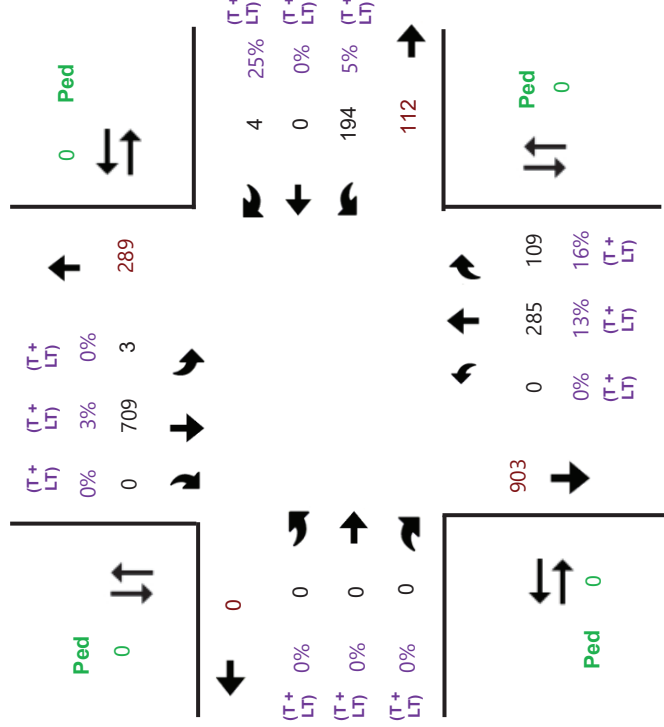
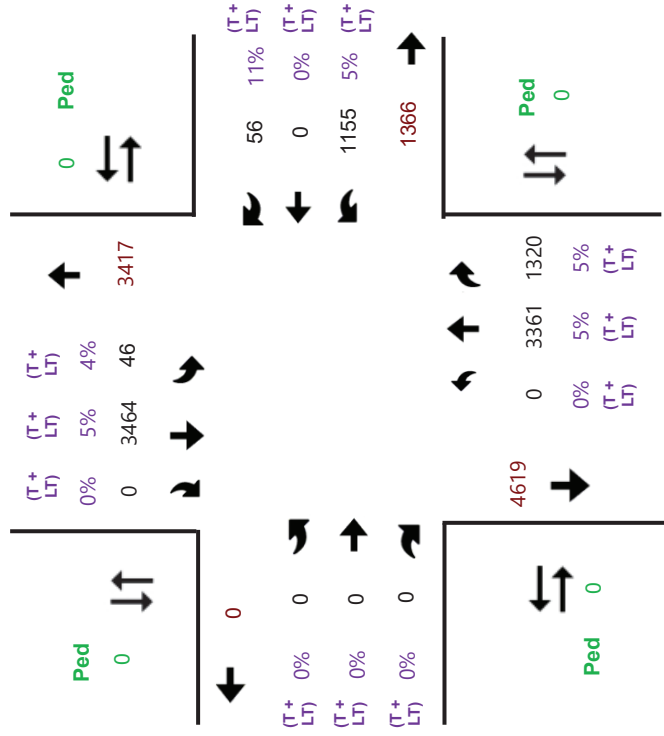
Hwy #: HWY 62
Int. Type:

Full Study

Tue, 10 May, 2022 07:00 AM - 06:00 PM

AM Period

Tue, 10 May, 2022 07:30 AM - 08:30 AM





TES - Traffic Engineering System
Turning Movement Total Count and Peak Summary Report

Description: HWY 62 @ ASHLEY ST
Region: EAST
LHRS_Offset: 33690_0453
Count Date: Tuesday, 10 May, 2022

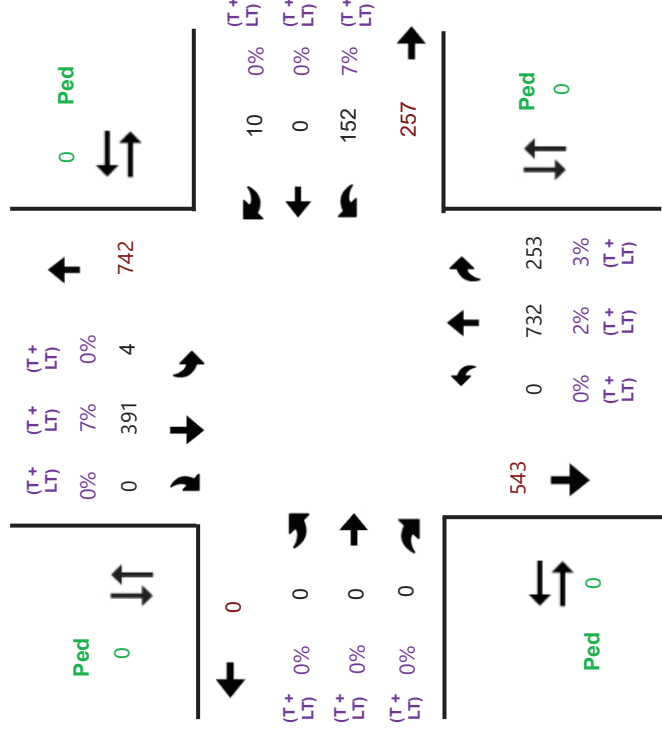
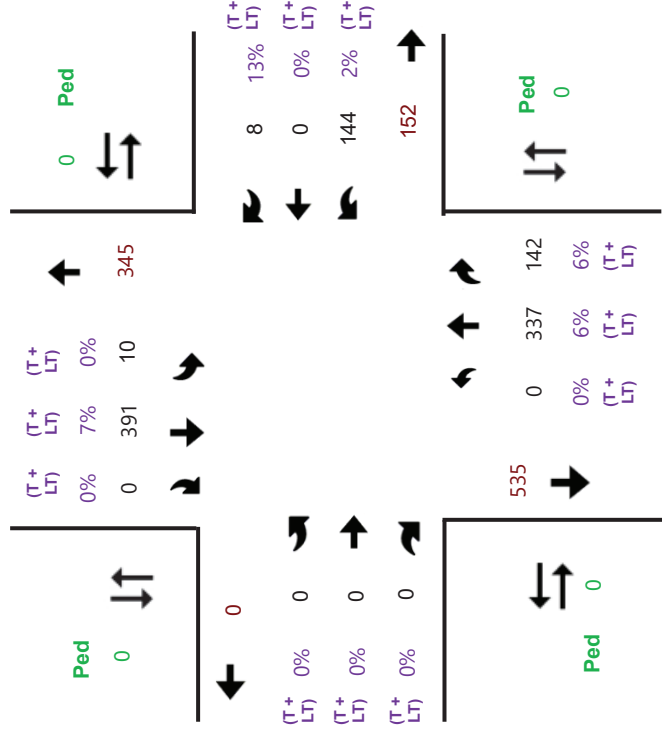
Hwy #: HWY 62
Int. Type:

MD Period

Tue, 10 May, 2022 12:30 PM - 01:30 PM

PM Period

Tue, 10 May, 2022 04:15 PM - 05:15 PM



INTERSECTION: R4 Hwy 62 at Ashley Street

Group Assignment: NONE

Field Master Assignment: NONE

System Reference Number: 218

N/S Street Name: Highway 62

E/W Street Name: Ashley Street

Last Database Change: 9/9/2019 1:42:11 PM

Change Record				
Change	By	Date	Change	By

Notes:

Manual Plan
0 = Automatic
1-9 = Plan 1-9

14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Drop Number	1	<C/O+0+0>
Zone Number	1	<C/O+0+1>
Area Number	4	<C/O+0+2>
Area Address	147	<C/O+0+3>

QuicNet Channel :8054:10:151:192 (QuicNet)

Manual Plan		<C/O+A+1>
Manual Offset		<C/O+B+1>

Manual Selection

Red Revert	5.0	<F/1+0+F>
All Red Start	5.0	<F/1+C+0>

Start / Revert Times

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Exclusive Ped Phase

(Outputs specified in Assignable
Outputs at E/127+A+E & F)

Phase										
Column Numbers ---->	1	2	3	4	5	6	7	8		
Phase Names ---->										
Ped Walk	0	17	0	0	0	0	0	12		
Ped FDW	0	8	0	0	0	0	0	5		
Min Green	7	20	0	0	0	20	0	10		
Type 3 Disconnect	0	0	0	0	0	0	0	0		
Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Veh Extension	3.0	4.5	0.0	0.0	0.0	4.5	0.0	3.0		
Max Gap	3.0	4.5	0.0	0.0	0.0	4.5	0.0	3.0		
Min Gap	3.0	4.5	0.0	0.0	0.0	4.5	0.0	3.0		
Max Limit	15	40	0	0	0	40	0	20		
Max Limit 2	0	0	0	0	0	0	0	0		
Adv. / Delay Walk	0	0	0	0	0	0	0	0		
Sequence To	0	0	0	0	0	0	0	0		
Cond Serv Check	0	0	0	0	0	0	0	0		
Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Yellow Change	3.0	5.9	0.0	0.0	0.0	5.9	0.0	4.5		
Red Clear	2.0	1.3	0.0	0.0	0.0	1.3	0.0	1.1		

Phase Timing - Bank 1

Alternate Timing <C+0+F=1>

9	A	B	C	D
Phase 1	0	0	0	0.0
Phase 2	0	0	0	0.0
Phase 3	0	0	0	0.0
Phase 4	0	0	0	0.0
Phase 5	0	0	0	0.0
Phase 6	0	0	0	0.0
Phase 7	0	0	0	0.0
Phase 8	0	0	0	0.0
Max Initial				
Alternate Walk				
Alternate FDW				
Alternate Initial				
Alternate Extension				

E	RR-1 Delay	RR-1 Clear	EV-A Delay	EV-A Clear	EV-B Delay	EV-B Clear	EV-C Delay	EV-C Clear	EV-D Delay	EV-D Clear	RR-2 Delay	RR-2 Clear	Vlew EV Delay	Vlew EV Clear	Vlew RR Delay	Vlew RR Clear
0	0	0	0	0	0	0	0	0	0	0	0	0	---	---	---	---

Preempt Timing

F	Permit	Red Lock	Yellow Lock	Min Recall	Ped Recall	View Set Peds	Rest In Walk	Red Rest	Dual Entry	Max Recall	Soft Recall	Max 2	Cond. Service	Man Cntrl Calls	Yellow Start	First Phases
12				2	6	---			2	6					2	6

Phase Functions <C+0+F=1>



Intersection: Ashley Street at Harmony Road
Municipality: Belleville, Ontario
Count Date: A typical weekday (Tues to Thurs) in Summer 2024

approach	East (westbound)		North (southbound)		South (northbound)	
movement_type	L	R	L	T	R	T
time_set_name						
07:00 - 07:15	13	5	4	12	4	5
07:15 - 07:30	11	9	4	18	6	10
07:30 - 07:45	6	15	9	24	10	10
07:45 - 08:00	13	11	9	18	11	11
08:00 - 08:15	20	7	7	20	11	13
08:15 - 08:30	18	6	9	16	16	14
08:30 - 08:45	15	5	7	16	17	10
08:45 - 09:00	16	7	6	17	12	13
09:00 - 09:15	9	6	7	13	13	11
09:15 - 09:30	17	8	7	11	14	13
16:00 - 16:15	14	16	11	10	19	27
16:15 - 16:30	15	13	13	11	20	25
16:30 - 16:45	11	13	16	19	17	26
16:45 - 17:00	14	15	14	16	20	29
17:00 - 17:15	13	13	17	19	22	31
17:15 - 17:30	13	19	14	15	20	33
17:30 - 17:45	13	12	15	14	26	23
17:45 - 18:00	10	9	12	16	19	12
18:00 - 18:15	13	9	12	11	21	16
18:15 - 18:30	11	7	13	12	18	15



Intersection: Ashley Street at Harmony Road
Municipality: Belleville, Ontario
Count Date: A typical Saturday in Summer 2024

approach	East (westbound)		North (southbound)		South (northbound)	
movement_type	L	R	L	T	R	T
time_set_name						
10:00 - 10:15	13	7	10	12	18	13
10:15 - 10:30	12	9	14	12	12	14
10:30 - 10:45	13	6	13	18	14	14
10:45 - 11:00	6	15	11	9	17	13
11:00 - 11:15	18	8	16	10	10	17
11:15 - 11:30	18	10	13	15	23	11
11:30 - 11:45	18	10	14	11	23	21
11:45 - 12:00	13	8	7	23	17	20
12:00 - 12:15	15	9	13	14	24	19
12:15 - 12:30	13	12	17	20	17	17
12:30 - 12:45	14	10	15	14	20	13
12:45 - 13:00	9	12	9	10	20	21
13:00 - 13:15	10	12	13	18	22	19
13:15 - 13:30	12	12	8	17	20	18
13:30 - 13:45	17	14	12	12	26	23
13:45 - 14:00	8	10	15	8	20	15
14:00 - 14:15	11	10	9	11	15	14
14:15 - 14:30	12	13	10	6	26	18
14:30 - 14:45	14	10	13	9	20	17
14:45 - 15:00	14	10	11	8	19	12
15:00 - 15:15	18	11	10	7	21	20
15:15 - 15:30	18	11	14	14	21	13
15:30 - 15:45	15	14	10	8	13	12
15:45 - 16:00	19	15	12	8	19	17



Intersection: River Road at Harmony Road
Municipality: Belleville, Ontario
Count Date: A typical weekday (Tues to Thurs) in Summer 2024

approach	East (westbound)			North (southbound)			South (northbound)			West (eastbound)		
movement_type	L	R	T	L	R	T	L	R	T	L	R	T
time_set_name												
07:00 - 07:15	2	0	16	2	0	0	1	0	0	0	2	7
07:15 - 07:30	1	0	16	10	2	0	6	0	0	0	3	8
07:30 - 07:45	1	0	16	11	2	0	1	1	0	0	7	16
07:45 - 08:00	0	0	17	21	2	2	3	1	1	1	4	21
08:00 - 08:15	1	0	19	5	0	1	8	1	0	0	7	15
08:15 - 08:30	0	0	17	6	0	1	8	1	0	1	7	22
08:30 - 08:45	2	0	16	3	1	3	5	1	0	0	4	20
08:45 - 09:00	1	1	19	8	0	0	5	1	0	0	7	17
09:00 - 09:15	1	0	10	4	3	0	8	1	0	2	4	17
09:15 - 09:30	0	0	22	3	3	5	5	0	1	1	6	20
16:00 - 16:15	1	2	23	3	1	1	21	5	0	3	9	23
16:15 - 16:30	1	0	22	5	2	2	11	6	2	2	9	27
16:30 - 16:45	1	1	18	0	1	1	13	5	1	10	10	29
16:45 - 17:00	1	0	22	3	1	1	14	2	1	3	7	30
17:00 - 17:15	0	2	22	4	1	2	14	4	0	1	12	33
17:15 - 17:30	0	0	22	6	1	2	23	3	2	3	6	30
17:30 - 17:45	1	0	22	5	1	3	15	1	1	2	9	31
17:45 - 18:00	3	0	16	1	1	1	6	1	0	1	8	24
18:00 - 18:15	0	0	17	3	0	1	6	1	1	1	10	27
18:15 - 18:30	1	0	15	5	1	1	7	3	0	0	4	29



Intersection: River Road at Harmony Road
Municipality: Belleville, Ontario
Count Date: A typical Saturday in Summer 2024

approach	East (westbound)			North (southbound)			South (northbound)			West (eastbound)		
movement_type	L	R	T	L	R	T	L	R	T	L	R	T
time_set_name												
10:00 - 10:15	0	0	14	5	2	0	10	4	0	2	8	21
10:15 - 10:30	0	0	15	2	0	0	19	0	0	2	13	21
10:30 - 10:45	0	0	17	2	2	0	8	4	0	2	8	21
10:45 - 11:00	5	0	18	5	0	0	23	2	0	0	12	21
11:00 - 11:15	0	0	18	7	0	0	6	0	2	2	10	23
11:15 - 11:30	0	0	25	0	0	0	12	0	0	2	10	28
11:30 - 11:45	3	0	25	0	0	10	8	4	2	0	3	29
11:45 - 12:00	3	0	18	2	0	2	13	2	0	0	3	22
12:00 - 12:15	0	0	20	5	0	0	4	2	0	0	12	30
12:15 - 12:30	2	2	19	5	5	5	10	4	0	0	17	26
12:30 - 12:45	7	2	20	5	0	2	10	2	0	0	7	26
12:45 - 13:00	0	0	19	2	5	0	10	2	0	5	3	21
13:00 - 13:15	2	0	18	2	2	2	17	4	0	5	17	26
13:15 - 13:30	2	0	19	2	0	2	13	4	0	2	10	21
13:30 - 13:45	2	0	21	0	0	0	17	2	0	0	7	37
13:45 - 14:00	2	0	18	0	5	0	6	6	0	2	10	28
14:00 - 14:15	2	2	15	7	2	0	13	2	0	0	8	22
14:15 - 14:30	2	0	20	2	2	0	8	8	0	2	8	29
14:30 - 14:45	5	0	17	10	2	2	12	0	0	5	8	33
14:45 - 15:00	2	0	18	2	0	2	21	2	0	2	7	28
15:00 - 15:15	0	0	29	0	0	0	8	2	5	5	3	29
15:15 - 15:30	0	0	23	10	2	0	4	6	2	0	2	31
15:30 - 15:45	0	0	23	19	2	0	10	0	0	2	8	20
15:45 - 16:00	2	0	25	7	0	0	13	2	0	0	10	23



Turning Movement Count Diagram

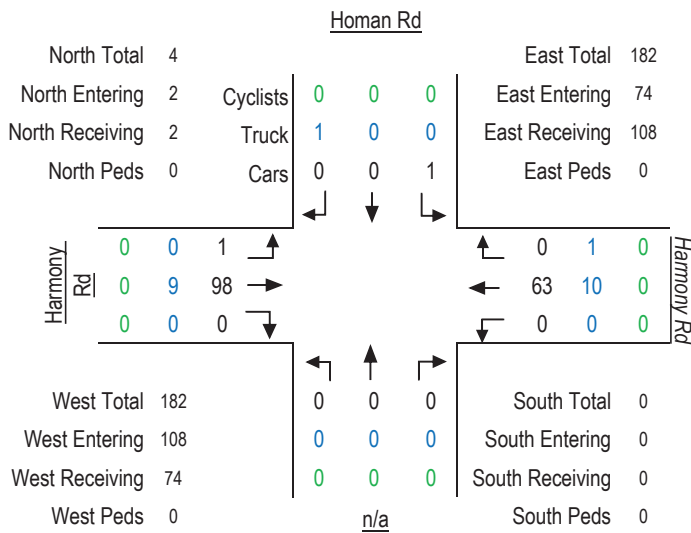
Intersection: Harmony Road and Homan Road

Municipality: Belleville, Ontario

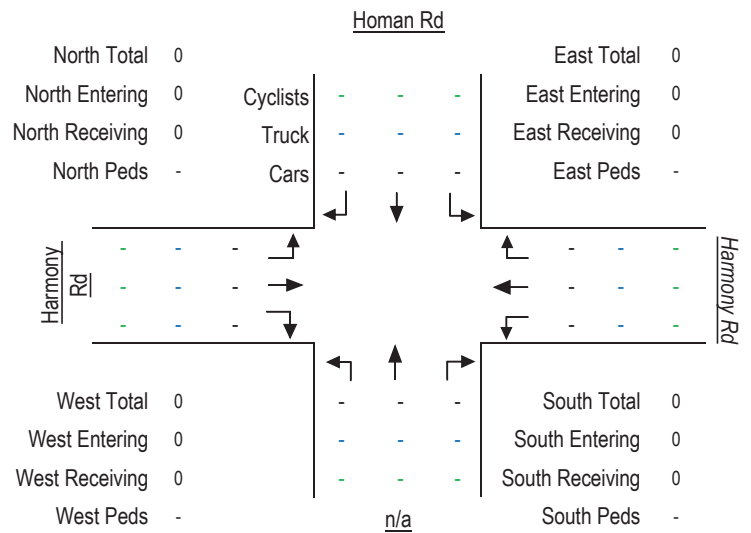
Intersection ID:

Date: Thursday, November 28, 2024

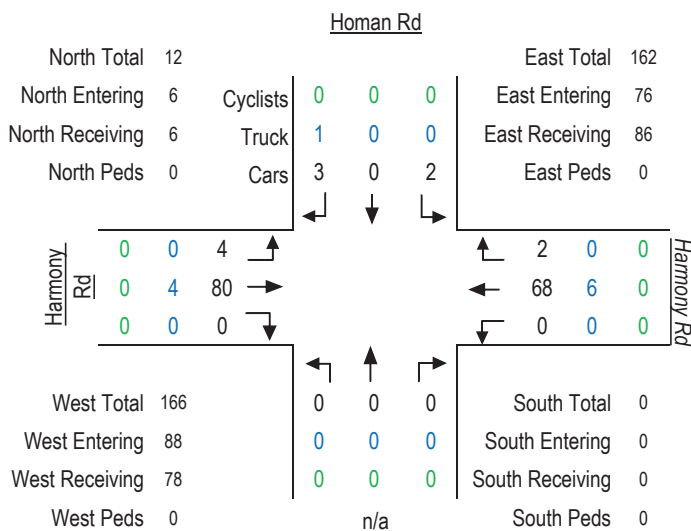
AM Peak Hour: 8:30 to 9:30



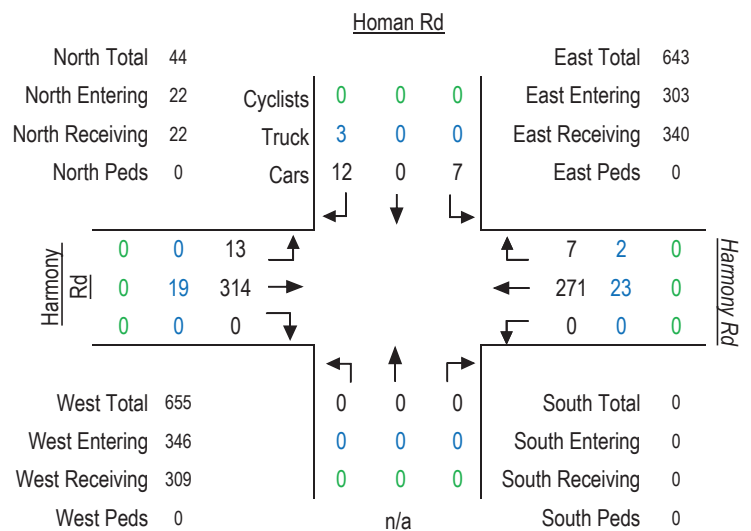
MD Peak Hour: - to -



PM Peak Hour: 16:00 to 17:00



Total 8-Hour Count



Intersection: Harmony Road and Homan Road
Municipality: Belleville, Ontario
Count Date: Thursday, November 28, 2024
Weather and Temperature: AM: Overcast, a few snow flakes, TP
Survivor:

AM	NORTH APPROACH Hornan Rd									EAST APPROACH Harmony Rd									SOUTH APPROACH n/a									Total	WEST APPROACH Harmony Rd									Total	Grand Total
	CAR			TRUCKS			CYCLISTS			Peds	CAR			TRUCKS			CYCLISTS			Peds	CAR			TRUCKS			CYCLISTS			Peds									
	L	T	R	L	T	R	L	T	R		L	T	R	L	T	R	L	T	R		L	T	R	L	T	R	L		T		R	L	T	R					
7:00	1		1	0		0	0	2				8	0		1	0						0	0	0	9							0	0	0	0	7	18		
7:15	1		1	0		0	0	2				8	0		1	0									9									0	10	21			
7:30	1		3	0		0	4					13	0		1	1								15									0	8	27				
7:45	0		0	0		0	0	1				19	0		2	0								21									0	15	37				
8:00	0		0	0		0	0	0				16	0		1	0								17									0	14	31				
8:15	0		0	0		0	0	0				18	0		0	0								18									0	11	29				
8:30	1		0	0		0	0	1				18	0		0	0								18									0	27	46				
8:45	0		0	0		0	0	0				7	0		1	0								8									0	28	36				
9:00	0		0	0		0	0	0				10	0		1	1								12									0	18	31				
9:15	0		0	0		0	0	0				28	0		8	0								36									0	35	71				
PM																																							
16:00			1	0		1	0		2			30	0		0	0								30									0	3	19	24	56		
16:15	1		1	0		0	0	2				16	2		1	0								19									0	0	1	18	39		
16:30	0		1	0		0	0	1				10	0		4	0								14									0	1	30	32	47		
16:45	1		0	0		0	0	0				12	0		1	0								13									0	0	14	28			
17:00	1		0	0		0	0	1				12	1		1	0								14									0	0	27	42			
17:15	0		2	0		0	0	2				9	1		0	0								10									0	1	14	15	27		
17:30	0		0	0		0	0	0				11	1		0	0								12									0	0	8	20			
17:45	0		0	0		0	0	0				10	1		0	0								11									0	0	9	20			
18:00	0		0	0		0	0	0				10	0		0	0								10									0	5	10	16	26		
18:15	0		2	0		0	0	2				6	1		0	0								7									0	0	10	10	19		

Intersection Location:

Weather and Temperature:
Survivor:

[illegible]



Intersection: Plumpton at Harmony Road
Municipality: Belleville, Ontario
Count Date: A typical weekday (Tues to Thurs) in Summer 2024

approach	East (westbound)		South (northbound)		West (eastbound)	
movement_type	L	T	L	R	R	T
time_set_name						
07:00 - 07:15	0	7	2	0	2	7
07:15 - 07:30	0	11	1	0	0	9
07:30 - 07:45	2	16	0	1	2	16
07:45 - 08:00	2	15	0	0	0	20
08:00 - 08:15	2	17	0	1	1	16
08:15 - 08:30	0	15	1	2	2	23
08:30 - 08:45	0	14	0	1	1	18
08:45 - 09:00	0	18	0	3	1	19
09:00 - 09:15	0	9	0	2	1	17
09:15 - 09:30	2	19	1	3	0	19
16:00 - 16:15	0	22	2	3	1	21
16:15 - 16:30	1	18	2	3	2	26
16:30 - 16:45	1	18	1	3	0	29
16:45 - 17:00	1	22	1	6	2	29
17:00 - 17:15	0	19	2	3	0	30
17:15 - 17:30	0	18	1	1	0	27
17:30 - 17:45	1	18	1	2	1	26
17:45 - 18:00	0	15	0	1	1	21
18:00 - 18:15	0	15	1	3	1	23
18:15 - 18:30	1	14	1	3	1	27



Intersection: Plumpton at Harmony Road
Municipality: Belleville, Ontario
Count Date: A typical Saturday in Summer 2024

approach	East (westbound)		South (northbound)		West (eastbound)	
movement_type	L	T	L	R	R	T
time_set_name						
10:00 - 10:15	0	14	0	4	0	21
10:15 - 10:30	0	17	2	0	0	19
10:30 - 10:45	0	13	0	2	0	24
10:45 - 11:00	0	20	2	0	0	21
11:00 - 11:15	2	14	0	0	0	20
11:15 - 11:30	0	21	0	2	0	25
11:30 - 11:45	0	23	0	2	0	29
11:45 - 12:00	3	18	2	2	2	22
12:00 - 12:15	0	19	0	0	0	28
12:15 - 12:30	0	18	0	2	0	29
12:30 - 12:45	0	20	0	4	3	25
12:45 - 13:00	0	18	0	0	0	24
13:00 - 13:15	0	18	4	0	0	28
13:15 - 13:30	2	19	4	0	2	18
13:30 - 13:45	2	19	0	2	0	33
13:45 - 14:00	2	15	2	4	0	31
14:00 - 14:15	5	16	0	2	0	24
14:15 - 14:30	0	16	4	6	2	28
14:30 - 14:45	0	15	0	6	3	29
14:45 - 15:00	5	17	0	0	2	26
15:00 - 15:15	0	28	2	2	2	24
15:15 - 15:30	0	18	2	8	3	28
15:30 - 15:45	0	19	0	0	2	17
15:45 - 16:00	0	26	2	0	0	22

Intersection: Harmony Road and Black Bear Ridge Golf Club Access
Municipality: Belleville, Ontario
Count Date: Thursday, November 28, 2024
Weather and Temperature: AM: Overcast, a few snow flakes, 0 to 1 degrees. PM: Overcast, dry, 4 to 3 degrees.
Surveyor: TP

[illegible]

Intersection Location: Harmony Road and Black Bear Ridge Golf Club Access
Municipality: Belleville, Ontario
Count Date: Saturday, November 30, 2024
Weather and Temperature: Mainly overcast, dry, 1 degree.
Surveyor: TP

Intersection Location:
Municipality:
Count Date:
Weather and Temperature:
Surveyor:

[illegible]



Turning Movement Count Diagram

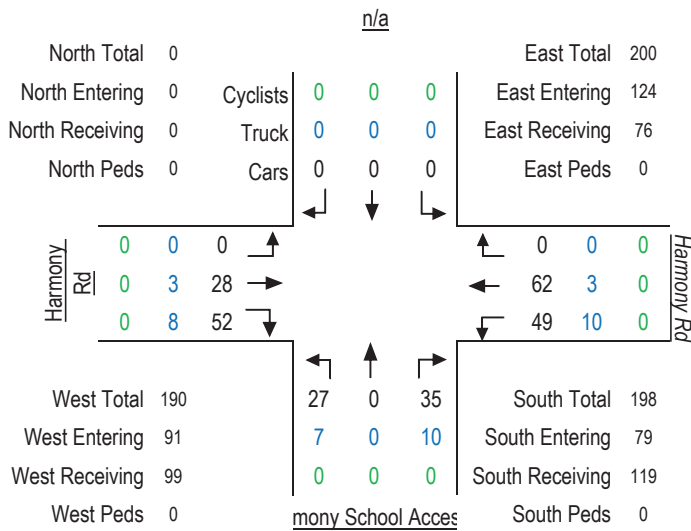
Intersection: Harmony Road and Harmony School Accesses

Municipality: Belleville, Ontario

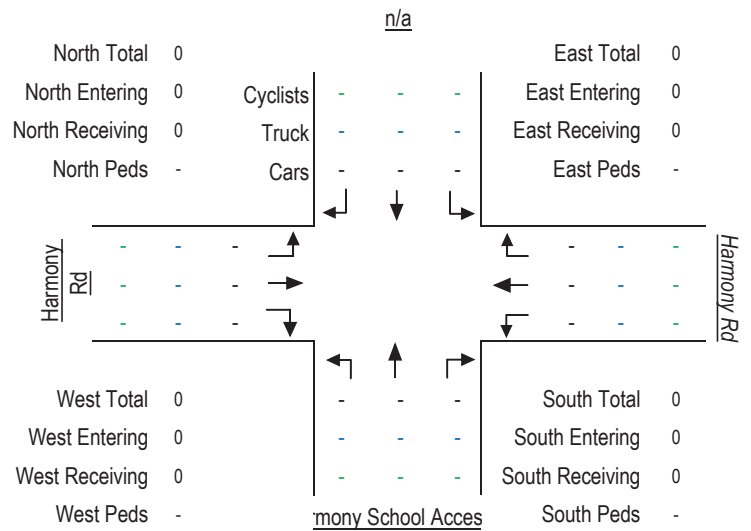
Intersection ID:

Date: Thursday, November 28, 2024

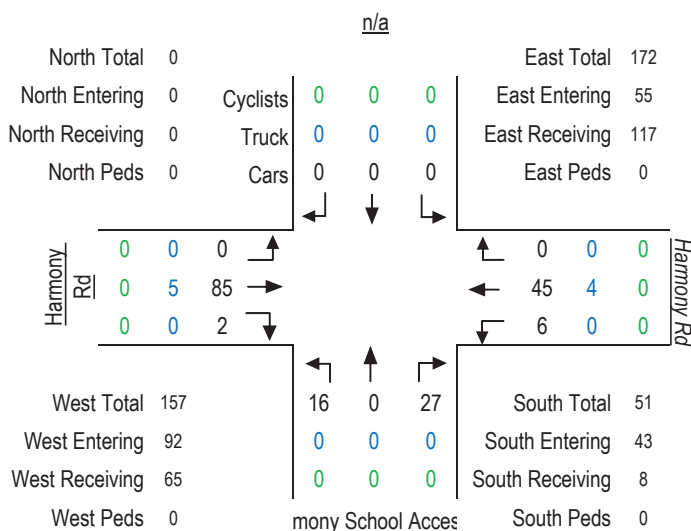
AM Peak Hour: 8:30 to 9:30



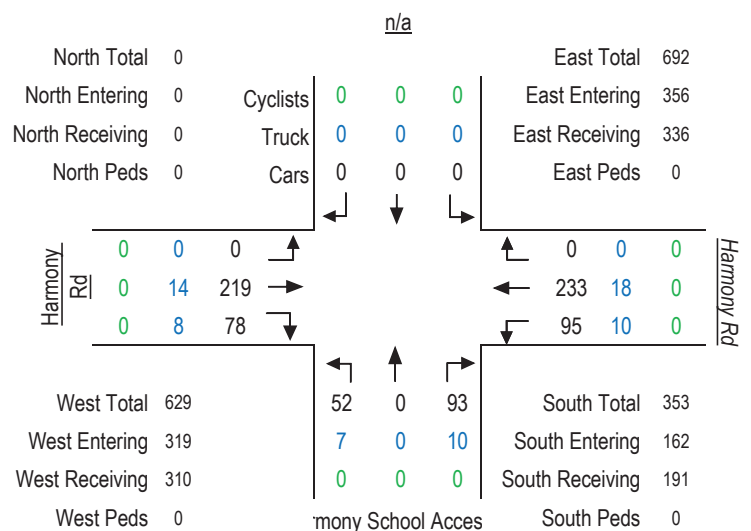
MD Peak Hour: - to -



PM Peak Hour: 16:00 to 17:00



Total 8-Hour Count



Intersection: Harmony Road and Harmony School Accesses
 Municipality: Belleville, Ontario
 Count Date: Thursday, November 28, 2024
 Weather and Temperature: AM: Overcast, a few snow flakes, 0 to 1 degrees
 Surveyor: TP

Harmony Road and Harmony School Accesses
Belleville, Ontario
Thursday, November 28, 2024
AM: Overcast, a few snow flakes, 0 to 1 degrees. PM: Overcast, dry, 4 to 3 degrees.
TP

AM	NORTH APPROACH n/a												EAST APPROACH Harmony Rd										SOUTH APPROACH Harmony School Accesses										Total	WEST APPROACH Harmony Rd										Total	Grand Total
	CAR			TRUCKS			CYCLISTS			Peds	CAR			TRUCKS			CYCLISTS			Peds	CAR			TRUCKS			CYCLISTS			Peds															
	L	T	R	L	T	R	L	T	R		L	T	R	L	T	R	L	T	R		L	T	R	L	T	R	L	T	R		L	T		R											
7:00				0	0	2	5				0	1	0	0	0	8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	7	15												
7:15				0	0	2	8				0	1	0	0	0	11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	11	23												
7:30				0	0	4	11				0	3	0	0	0	18	1	5	0	0	0	0	0	0	0	0	0	0	0	0	8	32													
7:45				0	0	4	16				0	3	0	0	0	23	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	16	44												
8:00				0	0	7	17				0	1	0	0	0	25	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	13	43												
8:15				0	0	12	12				0	1	0	0	0	25	1	0	0	0	0	0	0	0	0	0	0	0	0	0	7	34	51												
8:30				0	0	6	25				0	0	0	0	0	31	2	2	0	0	0	0	0	0	0	0	0	0	0	0	0	16	51												
8:45				0	0	12	21				0	0	0	0	0	33	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	18	56												
9:00				0	0	12	6				1	1	0	0	0	40	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	15	40												
9:15				0	0	19	10				9	2	0	0	0	20	22	26	7	10	0	0	0	0	0	0	0	0	0	0	0	42	147												
PM																																													
16:00				0	0	2	13				0	0	0	0	0	15	11	14	0	0	0	0	0	0	0	0	0	0	0	0	0	23	63												
16:15				0	0	0	12				0	1	0	0	0	13	1	4	0	0	0	0	0	0	0	0	0	0	0	0	0	23	41												
16:30				0	0	4	11				0	3	0	0	0	18	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	23	48												
16:45				0	0	0	9				0	0	0	0	0	9	2	4	0	0	0	0	0	0	0	0	0	0	0	0	0	23	38												
17:00				0	0	2	16				0	1	0	0	0	19	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	24	45												
17:15				0	0	1	7				0	0	0	0	0	8	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	28											
17:30				0	0	1	10				0	0	0	0	0	11	2	5	0	0	0	0	0	0	0	0	0	0	0	0	0	7	25												
17:45				0	0	0	7				0	0	0	0	0	7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10	17												
18:00				0	0	0	12				0	0	0	0	0	12	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	22												
18:15				0	0	5	5				0	0	0	0	0	10	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	9	25												



Turning Movement Count Diagram

Intersection: Harmony Road and Harmony School Accesses

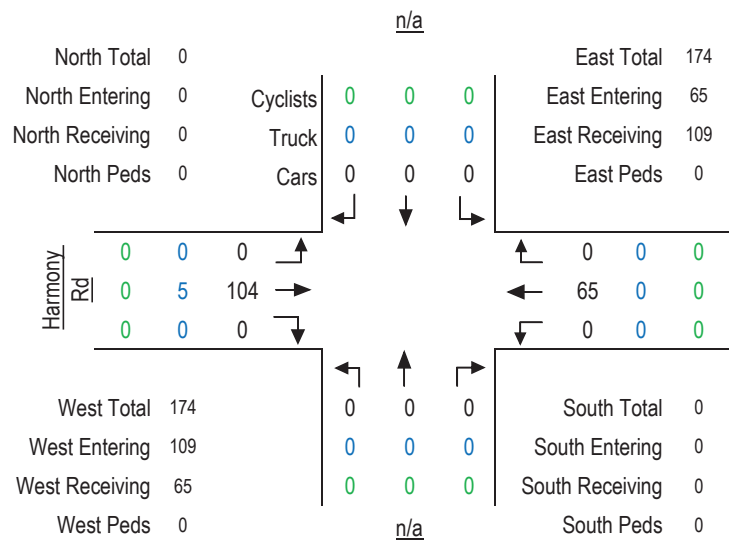
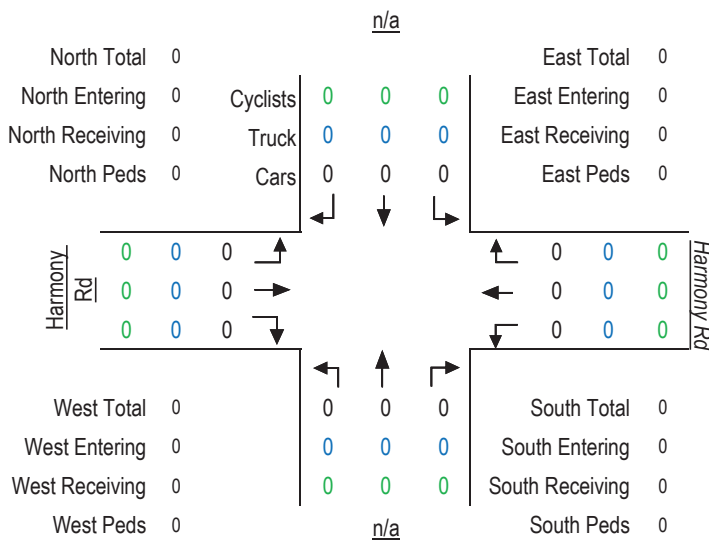
Intersection ID:

Municipality: Belleville, Ontario

Date: Saturday, November 30, 2024

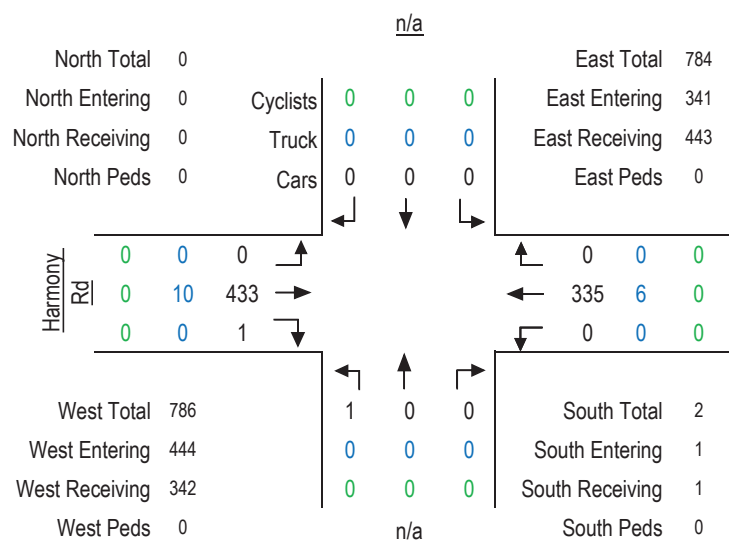
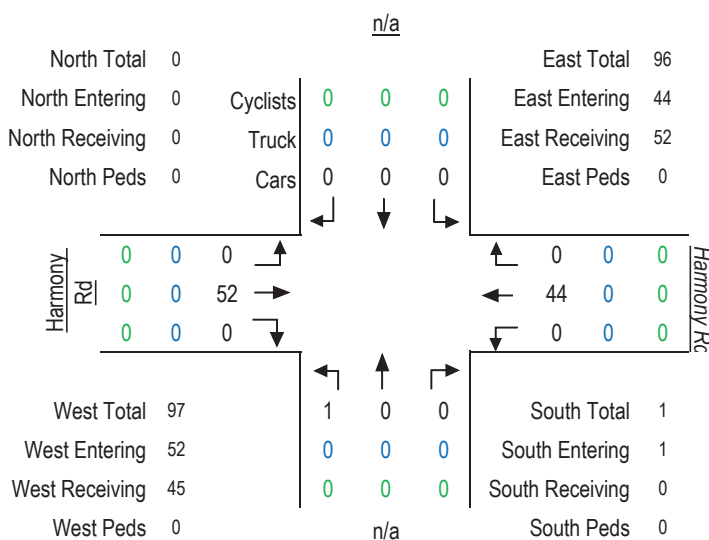
AM Peak Hour: 0:00 to 0:00

MD Peak Hour: 12:30 to 13:30



PM Peak Hour: 15:00 to 16:00

Total 12-Hour Count



Intersection Location:

Weather and
Survivor:

[illegible]



Turning Movement Count Diagram

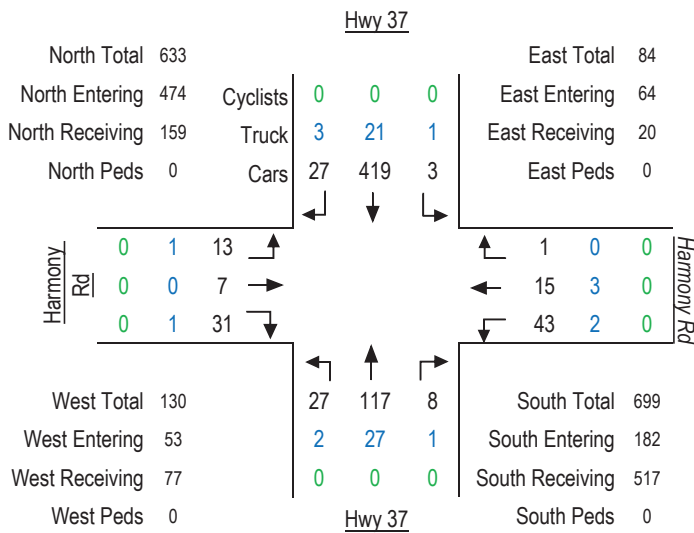
Intersection: Harmony Road and Highway 37

Municipality: Belleville, Ontario

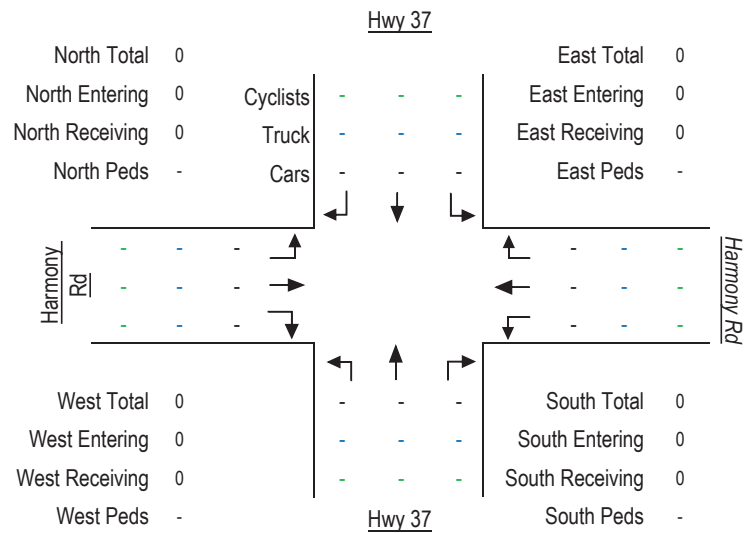
Intersection ID:

Date: Thursday, November 28, 2024

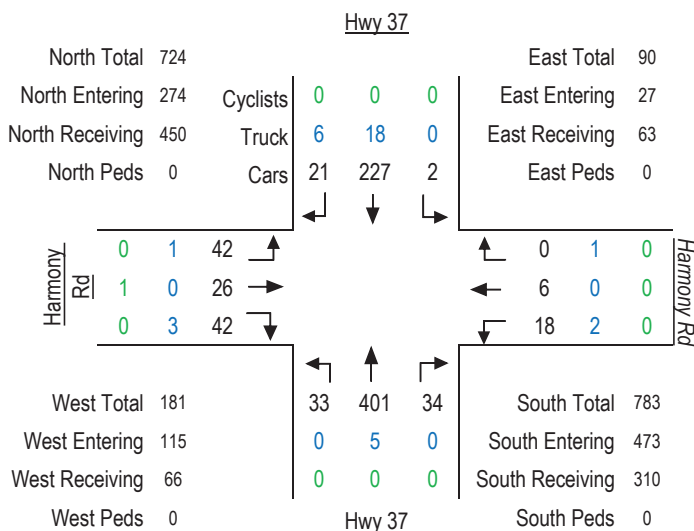
AM Peak Hour: 7:15 to 8:15



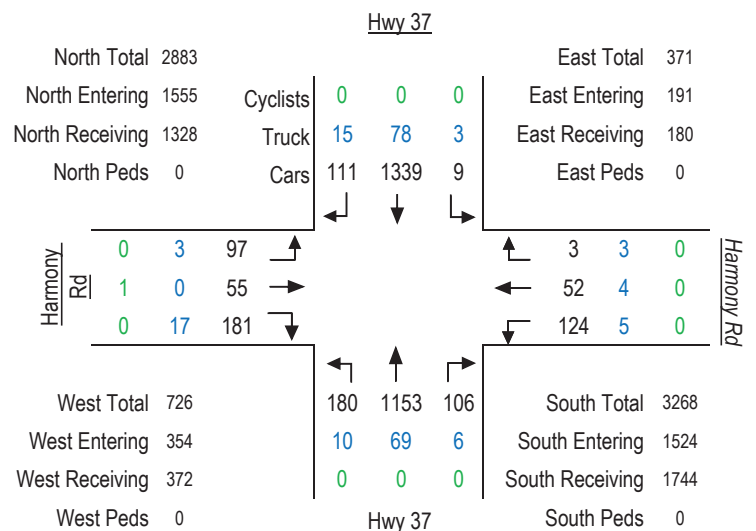
MD Peak Hour: - to -



PM Peak Hour: 16:15 to 17:15



Total 8-Hour Count



Intersection: Harmony Road and Highway 37
Municipality: Belleville, Ontario
Count Date: Thursday, November 28, 2024
Weather and Temperature: AM: Overcast, a few snow flakes, 0 to 1 degrees. PM: Overcast, dry, 4 to 3 degrees.
Surveyor: TP

AM	NORTH APPROACH												EAST APPROACH												SOUTH APPROACH												WEST APPROACH												Grand Total
	Hwy 37						Harmony Rd						Hwy 37						Total						Hwy 37						Total																		
	CAR			TRUCKS			CYCLISTS			Peds			CAR			TRUCKS			CYCLISTS			Peds			CAR			TRUCKS			CYCLISTS			Peds															
	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R	L	T	R																
7:00	0	53	4	1	4	1	0	0	0	63	5	2	0	1	0	0	0	8	1	31	1	0	7	1	0	0	0	41	0	1	2	0	0	0	5														
7:15	0	101	4	0	6	1	0	0	0	112	8	3	0	2	0	0	0	13	3	29	3	0	11	0	0	0	0	46	4	0	6	0	0	10															
7:30	1	109	8	0	7	1	0	0	0	126	8	4	1	0	1	0	0	14	5	25	0	2	4	0	0	0	36	1	1	9	1	0	0	13															
7:45	1	117	9	1	6	1	0	0	0	135	17	4	0	0	1	0	0	22	7	26	1	0	7	1	0	0	42	5	3	7	0	0	0	15															
8:00	1	92	6	2	0	0	0	0	0	101	10	4	0	0	1	0	0	0	15	12	37	4	0	5	0	0	58	3	3	9	0	0	0	15															
8:15	0	82	7	0	3	0	0	0	0	92	7	3	0	0	1	0	0	11	14	26	3	1	10	2	0	0	56	0	0	5	0	0	0	5															
8:30	1	78	11	1	3	0	0	0	0	94	13	5	0	0	1	0	0	19	15	30	3	0	3	1	0	0	52	0	1	12	0	0	0	13															
8:45	0	78	9	0	4	0	0	0	0	91	5	5	1	0	0	0	0	11	20	45	3	0	5	0	0	0	73	0	0	7	0	0	0	8															
9:00	0	51	9	0	3	2	0	0	0	65	4	0	0	0	1	0	0	5	11	27	3	0	4	0	0	0	45	1	3	4	0	0	0	9															
9:15	0	63	6	0	3	3	0	0	0	75	7	3	0	0	0	0	0	10	20	28	2	7	4	0	0	0	61	10	3	27	0	0	8	48															
PM																																																	
16:00	1	57	4	0	6	0	0	0	0	68	1	4	1	0	0	0	0	6	8	96	6	0	1	0	0	0	111	10	1	23	0	0	1	35															
16:15	1	60	6	0	2	1	0	0	0	70	3	1	0	1	0	0	0	6	7	94	5	0	1	0	0	0	107	10	8	10	0	0	0	29															
16:30	0	60	3	0	6	4	0	0	0	73	5	2	0	1	0	0	0	10	8	83	8	0	1	0	0	0	102	11	3	11	0	0	0	28															
16:45	1	51	2	0	6	0	0	0	0	60	5	1	0	0	0	0	0	6	8	112	11	0	1	0	0	0	132	5	9	12	0	0	0	26															
17:00	0	56	10	0	4	1	0	0	0	71	5	2	0	0	0	0	0	7	8	112	10	0	2	0	0	0	132	16	6	9	1	0	0	32															
17:15	1	51	2	0	4	0	0	0	0	58	6	1	0	0	0	0	0	10	7	8	98	14	0	1	0	0	121	6	5	9	0	0	0	20															
17:30	0	49	2	0	1	0	0	0	0	52	6	4	0	0	0	0	0	10	7	72	8	0	0	0	0	0	87	4	1	5	0	0	0	10															
17:45	1	32	2	0	3	0	0	0	0	38	6	2	0	0	0	0	0	8	5	82	6	0	1	1	0	0	95	5	5	2	0	0	0	12															
18:00	0	57	4	0	1	0	0	0	0	62	2	1	0	0	0	0	0	3	5	46	11	0	1	0	0	0	63	1	2	4	1	0	0	8															
18:15	0	42	3	0	4	0	0	0	0	49	1	1	0	0	0	0	0	2	6	54	4	0	0	0	0	0	64	5	0	8	0	0	0	13															



Turning Movement Count Diagram

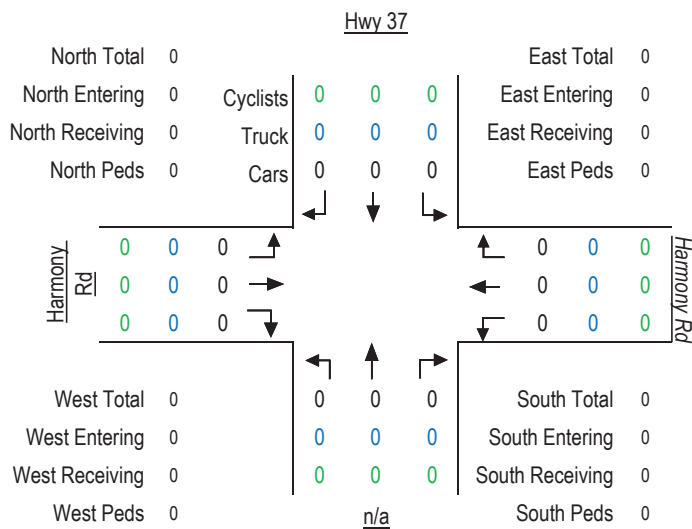
Intersection: Harmony Road and Highway 37

Municipality: Belleville, Ontario

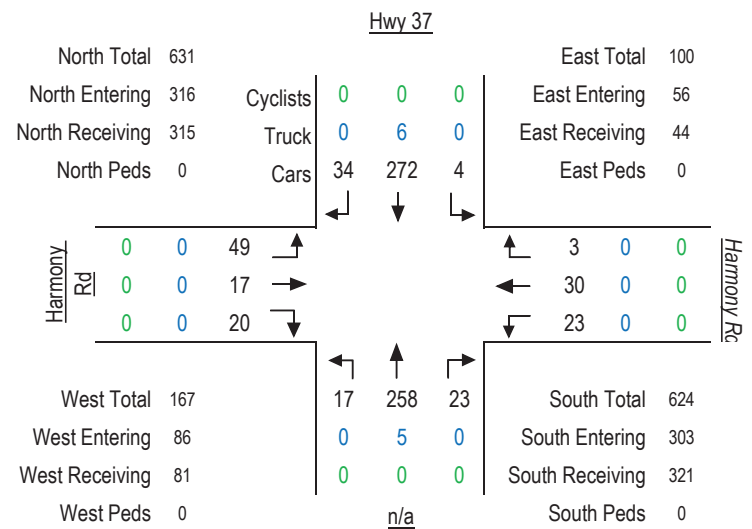
Intersection ID:

Date: Saturday, November 30, 2024

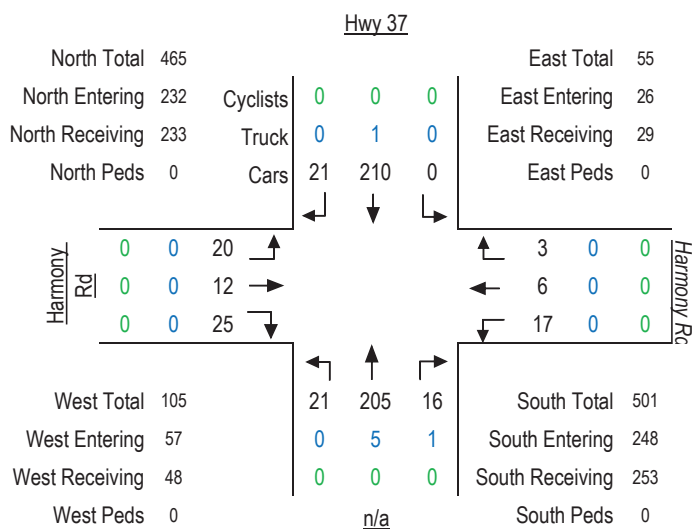
AM Peak Hour: 0:00 to 0:00



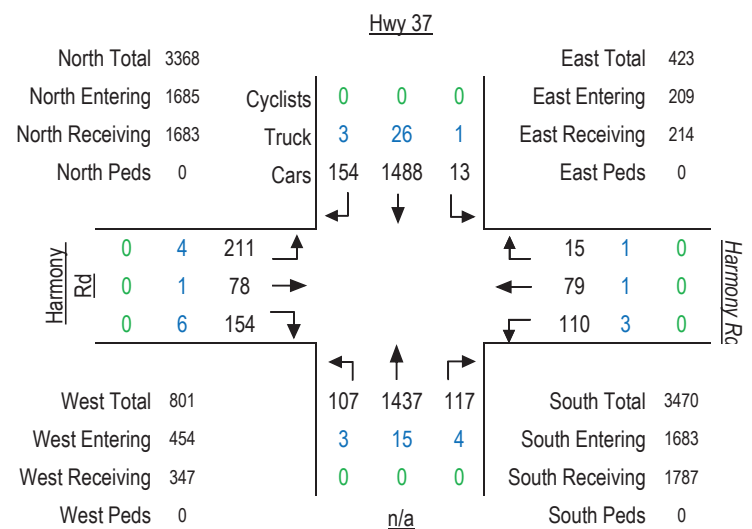
MD Peak Hour: 11:45 to 12:45



PM Peak Hour: 15:00 to 16:00



Total 12-Hour Count



Intersection Location: Harmony Road and Highway 37
Municipality: Belleville, Ontario
Count Date: Saturday, November 30, 2024
Weather and Temperature: Mainly overcast, dry, 1 degree.
Survivor: TP

Intersection Location:
Municipality:
Count Date:
Weather and Temperature:
Survivor:

[illegible]

INTERSECTION: R4 Hwy 37 @ Harmony Rd

N/S Street Name: Hwy 37

E/W Street Name: Harmony Rd

Group Assignment: NONE

Field Master Assignment: NONE

System Reference Number: 50

[illegible]

Notes:

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Drop Number	1	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	4	<C/0+0+2>
Area Address	152	<C/0+0+3>
QuicNet Channel	8053:10.151.192	

Manual Plan	
Manual Offset	

Manual Plan	<C/0+A+1>
Manual Offset	<C/0+B+1>

Red Revert	5.0	$<F/1+0+F>$
All Red Start	5.0	$<F/1+C+0>$

Exclusive Walk	0	$\langle F/1+0+0 \rangle$
Exclusive FDW	0	$\langle F/1+0+1 \rangle$
All Red Clear	0.0	$\langle F/1+0+2 \rangle$

Exclusive Ped Phase
(Outputs specified in Assignable
Outputs at E/127+A+E & F)

Row	Column Numbers -->								Phase							
	Phase Names -->															
0	Ped Walk	0	12	0	10	0	12	0	10							
1	Ped FDW	0	5	0	5	0	5	0	5							
2	Min Green	0	20	0	10	0	20	0	10							
3	Type 3 Disconnect	0	0	0	0	0	0	0	0							
4	Added per Vehicle	0.0	1.9	0.0	0.0	0.0	1.9	0.0	0.0							
5	Veh Extension	0.0	4.5	0.0	3.0	0.0	4.5	0.0	3.0							
6	Max Gap	0.0	4.5	0.0	3.0	0.0	4.5	0.0	3.0							
7	Min Gap	0.0	4.5	0.0	3.0	0.0	4.5	0.0	3.0							
8	Max Limit	0	55	0	20	0	55	0	20							
9	Max Limit 2	0	0	0	0	0	0	0	0							
A	Adv. / Delay Walk	0	0	0	0	0	0	0	0							
B	Sequence To	0	0	0	0	0	0	0	0							
C	Cond Serv Check	0	0	0	0	0	0	0	0							
D	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0							
E	Yellow Change	0.0	5.9	0.0	5.0	0.0	5.9	0.0	5.0							
F	Red Clear	0.0	1.7	0.0	2.0	0.0	1.7	0.0	2.0							

	9	A	B	C	D
Phase 1	0	0	0	0	0.0
Phase 2	34	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	34	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

E	
RR-1 Delay	0
RR-1 Clear	0
EV-A Delay	0
EV-A Clear	0
EV-B Delay	0
EV-B Clear	0
EV-C Delay	0
EV-C Clear	0
EV-D Delay	0
EV-D Clear	0
RR-2 Delay	0
RR-2 Clear	0
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

F		Row
Permit	<u> 2 </u> <u> 4 </u> <u> 6 </u> <u> 8 </u>	0
Red Lock	<u> </u>	1
Yellow Lock	<u> </u>	2
Min Recall	<u> 2 </u> <u> 6 </u> <u> </u>	3
Pad Recall	<u> </u>	4
<i>View Set Pads</i>	<u> - - - - </u>	5
Rest In Walk	<u> </u>	6
Red Rest	<u> </u>	7
Dual Entry	<u> 2 </u> <u> 4 </u> <u> 6 </u> <u> 8 </u>	8
Max Recall	<u> </u>	9
Soft Recall	<u> </u>	A
Max 2	<u> </u>	B
Cond. Service	<u> </u>	C
Man Cntrl Calls	<u> </u>	D
Yellow Start	<u> 2 </u> <u> 6 </u> <u> </u>	E
First Phases	<u> </u> <u> 4 </u> <u> 8 </u>	F

[illegible]



Ministry of Transportation

TES - Traffic Engineering System

Turning Movement 15 Minute Report

Description:	HWY 37 @ CANNIFTON RD N_BLESSINGTON RD			
Region	EAST	Hwy #:	HWY 37	
LHRS_Offset:	28540_0328	Count Period:	9/24/2024 7:00:00 AM	
Count Start	9/24/2024 12:00:00 AM	Date:	9/24/2024 6:00:00 PM	
Int. Type:	Cross			

Start Time	North									South									East									West									Total
	Cars			Trucks			Long Trucks			Ped			Cars			Trucks			Long Trucks			Ped			Cars			Trucks			Long Trucks			Ped			
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
07:00	0	76	6	0	2	0	0	4	1	0	0	31	6	0	1	0	0	3	2	0	10	5	0	0	0	0	0	4	2	0	0	0	0	153			
07:15	0	97	14	0	3	1	0	2	1	0	0	22	1	0	1	0	0	5	2	0	17	9	0	0	0	0	0	8	2	0	0	0	0	185			
07:30	0	134	16	0	3	0	0	7	0	0	0	33	3	0	1	0	0	3	1	0	22	6	0	2	2	0	3	0	10	1	0	0	0	247			
07:45	2	124	12	0	0	1	0	6	0	0	2	36	5	0	1	1	0	8	3	0	30	10	1	0	0	0	1	1	0	9	6	0	0	260			
08:00	0	91	14	0	0	1	0	4	0	0	1	36	4	1	3	0	0	4	1	0	23	2	0	0	0	0	0	6	2	0	1	0	0	195			
08:15	1	93	9	0	0	0	0	0	0	0	0	41	9	0	2	0	0	9	2	0	16	8	0	2	0	0	0	4	3	0	0	0	0	200			
08:30	0	78	10	1	2	0	0	0	0	0	1	55	5	0	0	0	0	4	0	0	14	2	1	0	0	0	0	1	4	2	3	0	1	185			
08:45	0	74	11	0	2	0	0	1	0	0	0	45	3	0	1	0	0	3	0	0	11	6	0	0	0	0	2	0	4	4	0	0	0	177			
11:00	1	38	5	0	1	0	0	0	0	0	1	44	7	0	4	1	0	2	2	0	3	2	0	0	0	0	0	6	2	0	0	0	0	119			
11:15	0	61	8	0	2	0	0	0	0	0	1	44	6	0	1	0	0	1	0	0	17	6	0	1	0	0	1	0	6	3	0	0	0	158			
11:30	3	52	11	0	2	0	0	1	0	0	1	51	5	0	2	0	0	3	0	0	8	4	1	1	0	0	0	7	4	0	0	0	0	157			
11:45	2	54	6	0	0	0	0	8	0	0	3	53	7	0	1	0	0	1	1	0	11	6	1	1	0	0	1	0	6	3	0	0	0	166			
12:00	0	83	11	0	0	0	0	0	0	0	1	60	8	0	1	0	0	2	1	0	5	3	0	0	0	0	0	12	3	1	1	0	0	192			
12:15	0	62	7	0	3	0	0	1	0	0	0	53	8	0	1	1	0	4	0	0	7	2	1	0	0	0	1	0	13	9	0	0	0	173			
12:30	0	68	6	0	2	0	0	1	0	0	1	51	2	0	3	0	0	0	0	0	14	6	0	0	0	0	0	10	6	0	1	0	0	171			
12:45	0	53	10	0	1	0	0	3	0	0	1	41	8	0	2	0	0	2	0	0	7	3	1	1	0	0	0	10	2	0	1	0	0	146			
13:00	1	54	8	0	2	0	0	1	0	0	2	62	12	0	0	0	0	2	1	0	3	6	0	0	0	0	0	10	7	1	0	1	0	173			
13:15	1	52	7	0	2	0	0	2	0	0	3	44	6	0	1	1	0	0	0	0	13	5	1	0	0	1	0	3	9	3	0	0	0	154			
13:30	0	51	5	0	1	0	0	1	0	0	1	57	13	0	3	0	0	5	0	0	13	7	0	0	0	0	0	6	6	1	0	0	0	170			
13:45	0	61	15	0	3	0	0	2	0	0	0	47	9	0	0	0	0	1	1	0	5	5	1	0	1	0	1	8	2	0	2	0	0	164			
15:00	2	66	11	0	1	0	0	5	0	0	2	79	18	0	4	0	0	9	2	0	3	4	0	1	0	0	0	16	11	1	0	0	0	235			

Start Time	North										South										East										West										Total		
	Cars					Trucks					Long Trucks					Ped					Cars					Trucks					Long Trucks					Ped							
	LT			TH		RT		LT			TH		RT		LT			TH		RT		LT			TH		RT		LT			TH		RT		LT			TH			RT	
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT				
15:15	0	54	6	0	1	0	0	5	0	0	5	74	14	0	2	0	0	6	0	0	8	7	1	0	0	0	0	0	0	0	13	8	0	0	1	0	0	0	0	206			
15:30	1	50	4	0	2	0	0	3	0	0	0	92	20	0	1	0	0	5	1	0	6	6	1	1	1	0	0	1	0	21	10	0	0	0	0	0	0	0	226				
15:45	2	53	8	0	1	0	1	2	4	0	4	74	12	0	1	0	0	2	1	0	4	2	0	0	0	0	0	0	0	13	9	0	0	0	0	0	0	0	193				
16:00	0	74	9	0	3	0	0	9	0	0	2	104	17	0	0	0	0	1	3	0	7	7	0	0	1	0	1	1	0	14	11	1	0	0	0	0	2	0	267				
16:15	1	58	7	0	1	1	0	2	1	0	1	89	16	0	2	0	0	4	0	0	2	2	1	0	0	0	1	0	0	15	14	1	0	0	0	2	0	0	221				
16:30	2	61	6	0	1	0	0	8	2	0	1	79	25	0	1	0	0	1	0	0	11	6	2	0	0	0	0	2	0	18	13	0	0	2	0	0	0	0	241				
16:45	3	58	8	0	5	0	0	1	0	0	0	107	18	0	0	0	0	2	0	0	6	4	0	0	0	0	1	0	0	21	8	0	0	1	0	0	0	0	243				
17:00	3	72	3	0	2	0	0	3	0	0	0	114	25	0	1	1	0	1	0	10	8	0	0	0	0	0	0	0	0	23	7	1	1	0	0	0	0	0	276				
17:15	2	53	8	0	2	0	0	0	0	0	2	112	22	0	0	0	0	0	0	4	10	0	0	0	0	0	0	0	0	14	9	1	0	0	0	0	0	0	239				
17:30	1	46	3	0	2	0	0	2	0	0	3	89	15	1	0	0	0	2	0	10	6	1	0	0	0	0	0	0	0	16	14	1	0	0	0	0	0	0	212				
17:45	0	54	2	0	1	1	0	5	0	0	0	55	18	0	0	0	0	1	0	6	5	0	0	1	0	0	0	0	0	9	9	0	0	0	0	0	0	0	167				



TES - Traffic Engineering System
Turning Movement Total Count and Peak Summary Report

Description: HWY 37 @ CANNIFTON RD N_BLESSINGTON RD
Region: EAST **Hwy #:** HWY 37
LHRS_Offset: 28540_0328 **Int. Type:** Cross
Count Date: Tuesday, 24 September, 2024

Full Study		Tue, 24 Sep, 2024 07:00 AM - 06:00 PM		AM Period		Tue, 24 Sep, 2024 07:30 AM - 08:30 AM		
		506		86		2		
		357		31		29		
		211		13		99		
		19		0		45		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
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7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
2663		2113		373		177		
7%		7%		7%		18%		
(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
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(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
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(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
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(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
(T+ L) 3%		(T+ L) 6%		(T+ L) 7%		(T+ L) 4%		
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0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
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Ped 0		Ped 0		Ped 0		Ped 0		
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(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
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(T+ L) 7%		(T+ L) 7%		(T+ L) 25%		(T+ L) 28%		
0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
5% 280		6% 2297		7% 30		4% 53		
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0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
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0		0		0		0		
Ped 0		Ped 0		Ped 0		Ped 0		
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2663		2113		373		177		
7%		7%		7%		18%</		



TES - Traffic Engineering System
Turning Movement Total Count and Peak Summary Report

Description: HWY 37 @ CANNIFTON RD N_BLESSINGTON RD
Region: EAST **Hwy #:** HWY 37
LHRS_Offset: 28540_0328 **Int. Type:** Cross
Count Date: Tuesday, 24 September, 2024

MD Period		Tue, 24 Sep, 2024 11:45 AM - 12:45 PM		PM Period		Tue, 24 Sep, 2024 04:30 PM - 05:30 PM	

INTERSECTION: R4 Hwy 37 @ Blessington Rd

N/S Street Name: Hwy 37

E/W Street Name: **Blessington Rd**

Group Assignment: NONE

Field Master Assignment: NONE

System Reference Number: 49

[illegible]

Notes:

Manual Plan

0 = Automatic

1-9 = Plan 1-9

14 = Free

15 = Flash

Manual Offset

0 = Automatic

1 = Offset A

2 = Offset B

3 = Offset C

Drop Number	1	<C/0+0+0>
Zone Number	1	<C/0+0+1>
Area Number	4	<C/0+0+2>
Area Address	151	<C/0+0+3>

QuicNet Channel 8052:10.151.191 (QuicNet Channel 8052:10.151.191)

Manual Plan	
Manual Offset	

Communication Addresses

Red Revert	5.0	<F/1+0+F>
All Red Start	5.0	<F/1+C+0>

Start / Revert Times

Exclusive Walk	0	$<F/1+0+0>$
Exclusive FDW	0	$<F/1+0+1>$
All Red Clear	0.0	$<F/1+0+2>$

Exclusive Ped Phase

Outputs specified in Assignable

Outputs at E/127+A+E & F)

Row	Column Numbers 1-7						
	1	2	3	4	5	6	7
0	Phase Names 0-7						
1	Ped Walk	0	13	0	13	0	13
2	Ped FDW	0	5	0	5	0	5
3	Min Green	0	20	0	10	0	10
4	Type 3 Disconnect	0	0	0	0	0	0
5	Added per Vehicle	0.0	1.9	0.0	0.0	0.0	1.9
6	Veh Extension	0.0	4.5	0.0	3.0	0.0	4.5
7	Max Gap	0.0	4.5	0.0	3.0	0.0	4.5
8	Min Gap	0.0	4.5	0.0	3.0	0.0	4.5
9	Max Limit	0	50	0	25	0	50
A	Max Limit 2	0	0	0	0	0	0
B	Adv. / Delay Walk	0	0	0	0	0	0
C	Sequence To	0	0	0	0	0	0
D	Cond Serv Check	0	0	0	0	0	0
E	Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0
F	Yellow Change	0.0	5.9	0.0	5.4	0.0	5.9
	Red Clear	0.0	1.7	0.0	1.6	0.0	1.7

Phase Timing - Bank 1

	9	A	B	C	D
	---	---	---	---	---
Phase 1	0	0	0	0	0.0
Phase 2	35	0	0	0	0.0
Phase 3	0	0	0	0	0.0
Phase 4	0	0	0	0	0.0
Phase 5	0	0	0	0	0.0
Phase 6	35	0	0	0	0.0
Phase 7	0	0	0	0	0.0
Phase 8	0	0	0	0	0.0
Max Initial					
Alternate Walk					
Alternate FDW					
Alternate Initial					
Alternate Extension					

Alternate Timing

RR-1 Delay	0
RR-1 Clear	0
EV-A Delay	0
EV-A Clear	0
EV-B Delay	0
EV-B Clear	0
EV-C Delay	0
EV-C Clear	0
EV-D Delay	0
EV-D Clear	0
RR-2 Delay	0
RR-2 Clear	0
View EV Delay	---
View EV Clear	---
View RR Delay	---
View RR Clear	---

Preempt Timing

Permit	<u>2</u> <u>4</u> <u>6</u> <u>8</u>
Red Lock	_____
Yellow Lock	_____
Min Recall	<u>2</u> <u>6</u>
Ped Recall	_____
<i>View Set Peds</i>	- - - - -
Rest In Walk	_____
Red Rest	_____
Dual Entry	<u>2</u> <u>4</u> <u>6</u> <u>8</u>
Max Recall	_____
Soft Recall	_____
Max 2	_____
Cond. Service	_____
Man Cntrl Calls	_____
Yellow Start	<u>2</u> <u>6</u>
First Phases	<u>4</u> <u>8</u>

Phase Functions $C+0+F=1$



Ministry of Transportation

TES - Traffic Engineering System
Turning Movement 15 Minute Report

Description:
Region
LHRS_Offset:
Count Start
Date:
Int. Type:

HWY 37 @ CASEY RD_TANK FARM RD
EAST
28540_0249
9/24/2024 12:00:00 AM

Cross

Hwy #:
Count Period.

HWY 37
9/24/2024 7:00:00 AM
9/24/2024 6:00:00 PM

Start Time	North									South									East									West									Total			
	Cars			Trucks			Ped			Cars			Trucks			Ped			Cars			Trucks			Ped			Cars			Trucks			Ped						
	LT		RT	LT		TH	RT	LT		TH	RT	LT		TH	RT	LT		TH	RT	LT		TH	RT	LT		TH	RT	LT		TH	RT	LT		TH	RT					
07:00	0	87	1	0	0	0	0	4	0	0	3	33	5	0	1	0	0	5	0	0	7	7	1	0	0	0	4	0	0	2	4	2	0	0	0	1	0	0	167	
07:15	1	112	1	0	5	0	1	1	0	0	2	24	3	0	1	0	0	6	3	0	9	7	0	0	0	0	1	1	0	0	1	4	0	0	0	1	3	0	187	
07:30	0	152	5	0	3	0	0	10	0	0	1	31	6	0	0	0	0	5	1	0	9	12	0	0	0	1	4	2	0	0	4	5	0	0	1	0	1	0	254	
07:45	3	145	4	0	0	0	0	7	0	0	3	36	10	0	1	0	1	10	2	0	13	8	2	2	0	0	5	0	0	3	4	0	1	0	0	0	0	0	260	
08:00	1	113	0	0	2	0	0	3	1	0	1	40	4	1	4	2	1	5	0	0	15	10	0	2	0	0	1	1	0	2	8	4	0	0	0	1	0	0	222	
08:15	2	102	2	0	2	0	0	0	0	0	3	53	11	0	2	1	0	11	2	0	11	9	1	0	0	0	1	0	0	1	6	0	0	2	0	0	0	0	222	
08:30	2	96	4	0	1	1	0	0	0	0	3	51	7	0	0	0	0	4	2	0	12	7	1	0	0	0	4	1	0	4	3	3	0	0	0	0	1	0	207	
08:45	0	88	4	0	3	0	0	3	0	0	2	47	7	0	0	1	2	3	1	0	16	4	1	1	0	1	1	0	0	1	6	3	0	1	0	0	1	0	198	
11:00	1	37	2	0	1	0	0	0	0	0	3	50	8	0	5	0	1	4	0	0	6	8	0	0	1	0	1	0	0	2	5	2	0	0	0	1	0	0	138	
11:15	1	66	3	0	2	1	0	1	0	0	5	49	7	0	2	1	0	1	2	0	8	8	0	0	0	0	1	1	0	2	7	3	0	0	0	1	1	0	173	
11:30	0	66	1	0	1	0	0	1	0	0	1	53	4	0	0	0	1	3	0	0	11	5	2	1	0	0	1	1	0	6	12	4	1	0	0	0	0	0	175	
11:45	3	62	3	0	2	0	0	9	0	0	1	57	7	0	1	2	0	2	3	0	8	4	1	0	0	0	2	1	0	2	14	1	0	1	0	0	0	0	187	
12:00	4	80	2	0	0	0	0	0	0	0	1	64	11	0	1	1	0	3	1	0	9	8	2	1	1	0	2	0	0	5	8	1	0	1	0	0	1	1	0	208
12:15	1	70	1	1	2	0	0	2	0	0	4	58	12	0	2	1	1	4	1	0	6	15	0	0	0	0	1	1	0	2	10	2	0	0	0	0	1	1	0	199
12:30	2	77	1	1	1	0	0	1	0	0	2	47	11	0	3	3	0	0	3	0	11	7	2	1	0	0	1	1	0	7	7	3	0	0	1	0	0	1	0	194
12:45	2	49	8	0	1	1	0	3	0	0	2	43	10	1	2	1	1	2	2	0	5	1	3	2	0	0	3	0	0	3	10	1	0	1	0	0	0	0	157	
13:00	2	60	2	0	1	0	0	1	0	0	1	71	10	1	0	0	0	3	1	0	6	9	2	0	0	0	3	0	0	5	7	3	0	0	1	0	0	2	0	191
13:15	1	59	4	0	3	0	0	2	0	0	3	45	13	0	1	0	2	1	2	0	13	5	2	0	0	1	0	0	0	5	5	5	0	1	2	0	0	0	175	
13:30	2	64	1	0	1	0	0	1	0	0	4	66	7	1	3	0	0	4	2	0	6	10	1	1	0	0	1	3	0	4	4	0	0	0	0	1	0	0	187	
13:45	3	57	3	0	2	2	0	2	0	0	3	45	6	0	0	3	1	2	1	0	6	6	2	1	0	0	0	1	0	7	11	3	0	0	0	0	1	0	168	
15:00	0	47	1	0	4	0	0	0	5	1	4	70	9	0	1	2	0	8	2	0	10	8	4	0	1	1	0	1	0	6	11	4	1	0	0	1	0	0	202	

Start Time	North												South												East												West												Total
	Cars				Trucks				Long Trucks				Ped				Cars				Trucks				Long Trucks				Ped				Cars				Trucks				Long Trucks				Ped				
	LT		RT		LT		TH		RT		LT		TH		RT		LT		TH		RT		LT		TH		RT		LT		TH		RT		LT		TH		RT		LT		TH		RT				
15:15	1	62	0	0	1	0	0	5	1	0	6	94	11	0	1	1	0	6	0	0	6	3	1	0	0	3	3	0	0	5	7	5	0	0	0	0	2	1	0	231									
15:30	1	44	2	1	0	0	1	2	0	0	1	79	9	0	1	0	1	6	4	0	7	7	0	0	0	0	0	0	0	4	13	6	0	0	0	0	0	0	189										
15:45	0	66	5	0	0	0	2	1	0	0	4	96	12	1	0	2	1	2	2	0	10	8	2	2	0	0	2	1	0	8	5	5	0	0	0	0	3	0	0	240									
16:00	3	68	2	1	2	0	1	7	0	0	2	112	19	2	0	1	0	3	1	0	8	9	2	0	1	0	1	2	1	0	5	9	2	1	1	0	0	0	0	266									
16:15	0	62	1	0	2	0	0	5	0	0	3	109	9	2	0	1	0	3	0	0	3	6	2	1	0	0	1	2	0	5	5	2	0	1	0	0	1	2	0	228									
16:30	1	57	0	0	0	0	0	8	0	0	3	108	10	8	1	0	0	2	1	0	13	7	4	0	0	0	1	0	0	6	10	6	0	0	0	0	0	0	246										
16:45	0	65	3	0	3	2	0	3	0	0	6	109	8	4	0	0	0	1	2	0	11	4	0	1	0	0	0	0	5	8	4	0	0	0	1	0	0	0	240										
17:00	3	73	2	0	2	0	0	3	0	0	6	125	6	3	1	0	0	2	0	0	16	17	2	0	0	1	0	0	5	18	9	0	0	0	0	0	0	0	294										
17:15	1	49	0	0	2	0	0	3	1	0	3	115	16	1	1	0	0	1	2	0	5	8	1	1	0	0	0	0	5	9	8	0	0	0	2	0	0	234											
17:30	1	68	2	0	0	0	0	1	0	0	2	98	5	1	0	0	1	1	2	0	6	9	2	0	0	0	0	0	8	6	2	0	0	1	0	0	0	216											
17:45	0	68	1	0	2	0	0	1	0	0	0	68	6	1	2	0	0	2	0	0	4	7	0	0	0	0	1	0	3	4	2	0	0	0	0	0	0	172											



TES - Traffic Engineering System
Turning Movement Total Count and Peak Summary Report

Description: HWY 37 @ CASEY RD_TANK FARM RD
Region: EAST
Int. Type: Cross
LHRS_Offset: 28540_0249
Hwy #: HWY 37
Count Date: Tuesday, 24 September, 2024

Full Study		Tue, 24 Sep, 2024 07:00 AM - 06:00 PM		AM Period		Tue, 24 Sep, 2024 07:30 AM - 08:30 AM	

Tuesday, 24 September, 2024

MD Period

PM Period

Tue, 24 Sep, 2024 11:45 AM - 12:45 PM

Tue, 24 Sep, 2024 04:30 PM - 05:30 PM

The figure displays four diagrams of a four-way intersection, showing traffic flow and counts for two periods: MD Period (Morning Drive, 11:45 AM - 12:45 PM) and PM Period (Afternoon Drive, 04:30 PM - 05:30 PM). Each diagram includes vehicle counts, pedestrian counts, and percentage of traffic for various movements.

MD Period Diagrams:

- Top Left:** Shows traffic flow from the top and bottom. Pedestrian count is 0. Vehicle counts: 7 (left), 306 (through), 12 (right). Percentage of traffic: 0% (left), 6% (through), 17% (right).
- Top Right:** Shows traffic flow from the top and bottom. Pedestrian count is 0. Vehicle counts: 5 (left), 38 (through), 42 (right). Percentage of traffic: 0% (left), 11% (through), 19% (right).
- Bottom Left:** Shows traffic flow from the left and right. Pedestrian count is 0. Vehicle counts: 16 (left), 43 (through), 12 (right). Percentage of traffic: 0% (left), 9% (through), 42% (right).
- Bottom Right:** Shows traffic flow from the left and right. Pedestrian count is 0. Vehicle counts: 9 (left), 242 (through), 56 (right). Percentage of traffic: 11% (left), 7% (through), 27% (right).

PM Period Diagrams:

- Top Left:** Shows traffic flow from the top and bottom. Pedestrian count is 0. Vehicle counts: 8 (left), 268 (through), 5 (right). Percentage of traffic: 38% (left), 9% (through), 0% (right).
- Top Right:** Shows traffic flow from the top and bottom. Pedestrian count is 0. Vehicle counts: 34 (left), 466 (through), 45 (right). Percentage of traffic: 47% (left), 2% (through), 11% (right).
- Bottom Left:** Shows traffic flow from the left and right. Pedestrian count is 0. Vehicle counts: 22 (left), 47 (through), 27 (right). Percentage of traffic: 5% (left), 4% (through), 0% (right).
- Bottom Right:** Shows traffic flow from the left and right. Pedestrian count is 0. Vehicle counts: 342 (left), 466 (through), 45 (right). Percentage of traffic: 47% (left), 2% (through), 11% (right).

INTERSECTION: R4 Hwy 37 @ Casey Rd

Group Assignment: **NONE**

Field Master Assignment: **NONE**

System Reference Number: **9**

N/S Street Name: **Hwy 37**

E/W Street Name: **Casey Rd**

Last Database Change: **9/9/2019 1:41:17 PM**

Change Record					
Change	By	Date	Change	By	Date

Notes:

Manual Plan
0 = Automatic
1-9 = Plan 1-9
14 = Free
15 = Flash

Manual Offset
0 = Automatic
1 = Offset A
2 = Offset B
3 = Offset C

Drop Number	1	<C/O+0+0>
Zone Number	1	<C/O+0+1>
Area Number	4	<C/O+0+2>
Area Address	148	<C/O+0+3>
QuicNet Channel	18052:10.151.192	(QuicNet)

Communication Addresses

Manual Plan	
Manual Offset	

Manual Selection

Red Revert	5.0	<F/1+0+F>
All Red Start	5.0	<F/1+C+0>

Start / Revert Times

Exclusive Walk	0	<F/1+0+0>
Exclusive FDW	0	<F/1+0+1>
All Red Clear	0.0	<F/1+0+2>

Exclusive Ped Phase

(Outputs specified in Assignable Outputs at E/127+A+E & F)

Phase									
Column Numbers ---->	1	2	3	4	5	6	7	8	
Phase Names ---->	1	2	3	4	5	6	7	8	
Ped Walk	0	0	0	0	0	0	0	0	0
Ped FDW	0	0	0	0	0	0	0	0	0
Min Green	0	20	0	10	0	20	0	10	0
Type 3 Disconnect	0	0	0	0	0	0	0	0	0
Added per Vehicle	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Veh Extension	0.0	4.8	0.0	3.0	0.0	4.8	0.0	3.0	0.0
Max Gap	0.0	4.8	0.0	3.0	0.0	4.8	0.0	3.0	0.0
Min Gap	0.0	4.8	0.0	3.0	0.0	4.8	0.0	3.0	0.0
Max Limit	0	55	0	15	0	55	0	15	0
Max Limit 2	0	0	0	0	0	0	0	0	0
Adv. / Delay Walk	0	0	0	0	0	0	0	0	0
Sequence To	0	0	0	0	0	0	0	0	0
Cond Serv Check	0	0	0	0	0	0	0	0	0
Reduce Every	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Yellow Change	0.0	5.9	0.0	4.5	0.0	5.9	0.0	4.5	0.0
Red Clear	0.0	1.2	0.0	1.8	0.0	1.2	0.0	1.8	0.0

Phase Timing - Bank 1

<C+0+F=1>

9	A	B	C	D
Phase 1	0	0	0	0.0
Phase 2	0	0	0	0.0
Phase 3	0	0	0	0.0
Phase 4	0	0	0	0.0
Phase 5	0	0	0	0.0
Phase 6	0	0	0	0.0
Phase 7	0	0	0	0.0
Phase 8	0	0	0	0.0
Max Initial				
Alternate Walk				
Alternate FDW				
Alternate Initial				
Alternate Extension				

Alternate Timing

<C+0+F=1>

E	RR-1 Delay	RR-1 Clear	EV-A Delay	EV-A Clear	EV-B Delay	EV-B Clear	EV-C Delay	EV-C Clear	EV-D Delay	EV-D Clear	RR-2 Delay	RR-2 Clear	V/ev EV Delay	V/ev EV Clear	V/ev RR Delay	V/ev RR Clear
0	0	0	0	0	0	0	0	0	0	0	0	0	---	---	---	---

Preempt Timing

F	Permit	Red Lock	Yellow Lock	Min Recall	Ped Recall	V/ev Set Peds	Rest In Walk	Red Rest	Dual Entry	Max Recall	Soft Recall	Max 2	Cond. Service	Man Cntrl Calls	Yellow Start	First Phases
2 4 6 8				2 6					2 4 6 8						2 6	4 8

Phase Functions

<C+0+F=1>

Hwy: **37** TS: **15** Start: **28540.0058** End: **28540.0439**
 Btwn.: **BLACK DIAMOND RD** and: **WISER RD**
 Regn: **ER** Pattern: **UC** PDCS: **74** Factor: **0.97**
 ICS: **15** LHRs: **28540** Locn: **1.000 KM N OF HWY 401-M/C FRWY IC**
 Dir: **Combined** Lanes: **2** Speed: **80 km/h** Dates: **16-Mar-2022 to 23-Mar-2022**

Summary

	03/16	03/17	03/18	03/19	03/20	03/21	03/22	03/23
Part of Day	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed
AM		3,540	3,444	2,148	1,842	3,689	3,702	3,647
PM	5,035	5,683	5,869	4,385	4,541	5,084	5,230	
24-hour Total	5,035	9,223	9,313	6,533	6,383	8,773	8,932	3,647
Noon - Noon		8,575	9,127	8,017	6,227	8,230	8,786	8,877

Peak Hour	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed
AM		547	511	296	163	656	677	655
Mid-Day	475	638	691	563	625	544	537	526
PM	759	835	758	513	557	736	803	

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV	% Trucks	AADTT
8,263	8,841	8,032	8,051	8,156	7,739	692	4.1%	330

Dir. Split	Highest Dir.	Trk Dir. Split	Trk Highest Dir.
52%	SB	50%	NB

Data collection note:

Note / Comment:

Note: This data was collected during the COVID - 19 pandemic.
 This report may not be representative of typical volumes and patterns.

Provincial Stay at Home orders were in effect:

1. March 17, 2020 - Gradual re-opening beginning May 4, 2020
2. December 26, 2020 - February 10, 2021
3. April 8, 2021 - June 2, 2021

The level of restrictions fluctuated through-out the pandemic at a regional level.
 If needed, please check local restrictions for more accurate information

Hwy: **62** TS: **65** Start: **33690.0000** End: **33690.0453**
 Btwn.: **HWY 401** and: **ASHLEY ST**
 Regn: **ER** Pattern: **UC** PDCS: **74** Factor: **0.99**
 ICS: **70** LHRS: **33690** Locn: **6.200 KM N OF HWY 401-M/C FRWY IC**
 Dir: **Combined** Lanes: **2** Speed: **80 km/h** Dates: **14-Oct-2022 to 21-Oct-2022**

Summary

	10/14	10/15	10/16	10/17	10/18	10/19	10/20	10/21
Part of Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		3,466	2,635	4,474	4,762	4,595	4,691	4,845
PM	7,927	6,312	5,741	6,528	6,646	6,862	6,980	
24-hour Total	7,927	9,778	8,376	11,002	11,408	11,457	11,671	4,845
Noon - Noon		11,393	8,947	10,215	11,290	11,241	11,553	11,825

Peak Hour	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		461	278	795	842	817	818	834
Mid-Day	797	840	817	706	720	766	735	722
PM	1,062	725	764	971	977	1,084	1,049	

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV	% Trucks	AADTT
10,923	11,477	10,777	10,803	10,944	10,384	928	4.7%	509

Dir. Split	Highest Dir.	Trk Dir. Split	Trk Highest Dir.
51%	SB	51%	NB

Data collection note:

Note / Comment:

Hwy: **62** TS: **65** Start: **33690.0000** End: **33690.0453**
 Btwn.: **HWY 401** and: **ASHLEY ST**
 Regn: **ER** Pattern: **UC** PDCS: **74** Factor: **0.97**
 ICS: **70** LHRs: **33690** Locn: **6.200 KM N OF HWY 401-M/C FRWY IC**
 Dir: **Combined** Lanes: **2** Speed: **80 km/h** Dates: **17-Mar-2022 to 24-Mar-2022**

Summary

	03/17	03/18	03/19	03/20	03/21	03/22	03/23	03/24
Part of Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu
AM		3,815	2,716	2,064	3,938	4,034	3,778	4,007
PM	6,007	6,312	5,088	4,510	5,490	5,967	5,332	
24-hour Total	6,007	10,127	7,804	6,574	9,428	10,001	9,110	4,007
Noon - Noon		9,822	9,028	7,152	8,448	9,524	9,745	9,339

Peak Hour	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu
AM		581	335	228	694	744	731	725
Mid-Day	670	732	717	628	621	625	567	626
PM	800	829	599	580	786	884	807	

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV	% Trucks	AADTT
9,008	9,608	8,756	8,777	8,891	8,437	754	5.5%	479

Dir. Split	Highest Dir.	Trk Dir. Split	Trk Highest Dir.
51%	SB	50%	SB

Data collection note:

Note / Comment:

Note: This data was collected during the COVID - 19 pandemic.
This report may not be representative of typical volumes and patterns.

Provincial Stay at Home orders were in effect:

1. March 17, 2020 - Gradual re-opening beginning May 4, 2020
2. December 26, 2020 - February 10, 2021
3. April 8, 2021 - June 2, 2021

The level of restrictions fluctuated through-out the pandemic at a regional level.
If needed, please check local restrictions for more accurate information

Hwy: **37** TS: **15** Start: **28540.0058** End: **28540.0439**
 Btwn.: **BLACK DIAMOND RD** and: **WISER RD**
 Regn: **ER** Pattern: **UC** PDCS: **74** Factor: **0.99**
 ICS: **15** LHRS: **28540** Locn: **1.000 KM N OF HWY 401-M/C FRWY IC**
 Dir: **Combined** Lanes: **2** Speed: **80 km/h** Dates: **14-Oct-2022 to 21-Oct-2022**

Summary

	10/14	10/15	10/16	10/17	10/18	10/19	10/20	10/21
Part of Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		2,886	2,456	3,876	4,068	4,057	3,982	4,173
PM	6,986	5,065	5,674	5,626	5,611	5,755	5,918	
24-hour Total	6,986	7,951	8,130	9,502	9,679	9,812	9,900	4,173
Noon - Noon		9,872	7,521	9,550	9,694	9,668	9,737	10,091

Peak Hour	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		388	265	667	744	726	689	685
Mid-Day	738	646	791	591	580	544	628	689
PM	995	632	746	848	850	878	833	

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV	% Trucks	AADTT
9,448	9,798	9,321	9,344	9,465	8,981	803	4.0%	373

Dir. Split	Highest Dir.	Trk Dir. Split	Trk Highest Dir.
52%	SB	52%	SB

Data collection note:

Note / Comment:

Hwy: **37** TS: **15** Start: **28540.0058** End: **28540.0439**
 Btwn.: **BLACK DIAMOND RD** and: **WISER RD**
 Regn: **ER** Pattern: **UC** PDCS: **74** Factor: **1.07**
 ICS: **15** LHRS: **28540** Locn: **1.000 KM N OF HWY 401-M/C FRWY IC**
 Dir: **Combined** Lanes: **2** Speed: **80 km/h** Dates: **22-Jul-2022 to 29-Jul-2022**

Summary

	07/22	07/23	07/24	07/25	07/26	07/27	07/28	07/29
Part of Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		3,015	2,462	4,069	4,217	4,154	4,253	4,402
PM	7,500	5,308	5,798	6,515	6,596	6,739	6,958	
24-hour Total	7,500	8,323	8,260	10,584	10,813	10,893	11,211	4,402
Noon - Noon		10,515	7,770	9,867	10,732	10,750	10,992	11,360

Peak Hour	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		368	253	630	678	669	665	644
Mid-Day	878	708	837	715	689	708	699	787
PM	910	572	672	857	913	856	962	

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV	% Trucks	AADTT
10,284	10,958	10,971	10,998	11,141	10,571	945	4.1%	450

Dir. Split	Highest Dir.	Trk Dir. Split	Trk Highest Dir.
52%	SB	51%	SB

Data collection note:

Note / Comment:

Hwy: **62** TS: **65** Start: **33690.0000** End: **33690.0453**
 Btwn.: **HWY 401** and: **ASHLEY ST**
 Regn: **ER** Pattern: **UC** PDCS: **74** Factor: **1.07**
 ICS: **70** LHRS: **33690** Locn: **6.200 KM N OF HWY 401-M/C FRWY IC**
 Dir: **Combined** Lanes: **2** Speed: **80 km/h** Dates: **22-Jul-2022 to 29-Jul-2022**

Summary

	07/22	07/23	07/24	07/25	07/26	07/27	07/28	07/29
Part of Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		3,516	2,746	4,626	4,679	4,914	4,762	4,849
PM	7,802	6,296	5,881	6,929	7,063	7,528	7,239	
24-hour Total	7,802	9,812	8,627	11,555	11,742	12,442	12,001	4,849
Noon - Noon		11,318	9,042	10,507	11,608	11,977	12,290	12,088

Peak Hour	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri
AM		471	301	759	804	838	784	735
Mid-Day	886	846	824	791	769	800	852	891
PM	976	684	702	925	958	1,025	896	

ADT	AWD	AADT	SADT	SAWDT	WADT	DHV	% Trucks	AADTT
11,261	11,991	12,013	12,042	12,199	11,575	1,034	5.3%	631

Dir. Split	Highest Dir.	Trk Dir. Split	Trk Highest Dir.
51%	SB	50%	SB

Data collection note:

Note / Comment:



APPENDIX C

Capacity Analysis and Queueing Reports

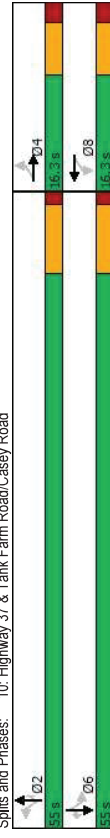


EXISTING CONDITIONS

(2025)

Timings	<Existing 2025> AM Peak Hour 02-12-2025
10: Highway 37 & Tank Farm Road/Casey Road	

Comprehensive Traffic Signal Performance Analysis - Q3 2023													
Signal Control & Timing Parameters													
Lane Group		EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SGR	Directional Flow	
Lane Configurations		13	30	73	49	13	229	46	7	624	14	↔ ↗ ↘	
Traffic Volume (vph)		13	30	73	49	13	229	46	7	624	14	↔ ↗ ↘	
Future Volume (vph)		Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	↔ ↗ ↘	
Turn Type		Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	↔ ↗ ↘	
Protected Phases		4	4	8	8	2	2	2	2	6	6	↔ ↗ ↘	
Permitted Phases		4	4	8	8	2	2	2	2	6	6	↔ ↗ ↘	
Detector Phase		4	4	8	8	2	2	2	2	6	6	↔ ↗ ↘	
Switch Phase													
Minimum Initial (s)		10.0	10.0	10.0	16.3	20.1	20.1	20.0	20.0	20.0	20.0	↔ ↗ ↘	
Minimum Split (s)		16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1	↔ ↗ ↘	
Total Split (s)		16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0	↔ ↗ ↘	
Total Split (%)		22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%	↔ ↗ ↘	
Yellow Time (s)		4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9	↔ ↗ ↘	
All-Red Time (s)		1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2	↔ ↗ ↘	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	↔ ↗ ↘	
Total Lost Time (s)		6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1	↔ ↗ ↘	
Lead-Lag Optimize?													
Recall Mode		None	None	None	None	None	None	None	None	None	None	↔ ↗ ↘	
Act Effct Green (s)		10.1	10.1	10.1	50.8	50.8	50.8	50.8	50.8	50.8	50.8	↔ ↗ ↘	
Actuated g/C Ratio		0.14	0.14	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	↔ ↗ ↘	
v/c Ratio		0.31	0.31	0.72	0.72	0.04	0.24	0.06	0.01	0.63	0.02	↔ ↗ ↘	
Control Delay		27.9	27.9	52.1	52.1	4.4	5.1	1.4	4.0	9.5	0.2	↔ ↗ ↘	
Queue Delay		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	↔ ↗ ↘	
Total Delay		27.9	27.9	52.1	52.1	4.4	5.1	1.4	4.0	9.5	0.2	↔ ↗ ↘	
LOS		C	C	D	D	A	A	A	A	A	A	↔ ↗ ↘	
Approach Delay		27.9	27.9	52.1	52.1	4.5	4.5	9.2	9.2	9.2	9.2	↔ ↗ ↘	
Approach LOS		C	C	D	D	A	A	A	A	A	A	↔ ↗ ↘	
Intersection Summary													
Cycle Length: 71.3		↔ ↗ ↘											
Actuated Cycle Length: 74.3		↔ ↗ ↘											
Natural Cycle: 60		↔ ↗ ↘											
Control Type: Semi Act-Uncoord		↔ ↗ ↘											
Maximum v/c Ratio: 0.72		↔ ↗ ↘											
Intersection Signal Delay: 13.2		↔ ↗ ↘											
Intersection Capacity Utilization: 58.8%		↔ ↗ ↘											
Analysis Period (min): 15		↔ ↗ ↘											



HCM Signalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔			↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	13	30	8	73	49	4	13	229	46	7	824	14
Future Volume (vph)	13	30	8	73	49	4	13	229	46	7	824	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.3			6.3		7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00				1.00		1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.98				1.00		1.00	1.00	0.85	1.00	0.85	1.00
Ft Protected		0.99			0.97		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1800				1753		1770	1863	1588	1770	1776	1593
Ft Permitted		0.89			0.78		0.30	1.00	1.00	0.57	1.00	1.00
Satd. Flow (perm)	1622				1410		562	1863	1568	1070	1776	1583
Peak-hour factor, PHF	0.73	0.73	0.73	0.91	0.91	0.91	0.75	0.75	0.75	0.82	0.82	0.82
Adj. Flow (vph)	18	41	11	80	54	4	17	305	61	9	761	17
RTOR Reduction (vph)	0	10	0	2	0	0	0	0	19	0	0	5
Lane Group Flow (vph)	0	60	0	0	136	0	17	305	42	9	761	12
Heavy Vehicles (%)	2%	2%	2%	7%	2%	2%	2%	2%	3%	2%	7%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G(s)	10.1				10.1		50.8	50.8	50.8	50.8	50.8	50.8
Effective Green, g(s)	10.1				10.1		50.8	50.8	50.8	50.8	50.8	50.8
Actuated g/C Ratio	0.14				0.14		0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	6.3				6.3		7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0				3.0		4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	220				191		384	1273	1072	731	1214	1082
v/s Ratio Prot								0.16			c0.43	
v/s Ratio Perm	0.04				c0.10		0.03		0.03	0.01		0.01
v/c Ratio	0.27				0.71		0.04	0.24	0.04	0.01	0.63	0.01
Uniform Delay, d1	28.8				30.7		3.8	4.4	3.8	3.7	6.5	3.7
Progression Factor	1.00				1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7				11.9		0.1	0.2	0.0	0.0	2.5	0.0
Delay (s)	29.5				42.6		3.9	4.6	3.8	3.8	9.0	3.8
Level of Service	C				D		A	A	A	A	A	A
Approach Delay (s)	29.5				42.6			4.5			8.8	
Approach LOS	C				D			A			A	

Intersection Summary			
HCM 2000 Control Delay	12.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	74.3	Sum of lost time (s)	13.4
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Intersection: 1: Highway 62 & Ashley Street												
Movement	WB	NB	NB	SB	SB	SB	SB	T				
Directions Served	LR		T		R	L	T					
Maximum Queue (m)	128.0	33.9	22.7	19.1	8.8	46.4	42.2					
Average Queue (m)	63.8	14.4	6.4	7.5	0.8	25.9	20.5					
95th Queue (m)	109.0	25.1	18.4	14.6	4.7	41.8	36.8					
Link Distance (m)	460.8	539.5	539.5			617.0	617.0					
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)					38.0	30.5						
Storage Blk Time (%)							3					
Queuing Penalty (veh)							0					

Intersection: 2: Ashley Street & Harmony Road												
Movement	WB	SB										
Directions Served	LR	LT										
Maximum Queue (m)	15.0	16.6										
Average Queue (m)	9.5	1.8										
95th Queue (m)	16.1	8.6										
Link Distance (m)	510.9	376.6										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 3: River Road & Harmony Road												
Movement	NB	SB										
Directions Served	LTR	LTR										
Maximum Queue (m)	9.1	16.3										
Average Queue (m)	4.2	8.0										
95th Queue (m)	11.5	14.8										
Link Distance (m)	215.8	332.3										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 4: Harmony Road & Homan Road												
Movement												
Directions Served												
Maximum Queue (m)												
Average Queue (m)												
95th Queue (m)												
Link Distance (m)												
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 5: Plumpton & Harmony Road												
Movement	NB	LR										
Directions Served												
Maximum Queue (m)		9.2										
Average Queue (m)		2.0										
95th Queue (m)		8.1										
Link Distance (m)		551.1										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access												
Movement												
Directions Served												
Maximum Queue (m)												
Average Queue (m)												
95th Queue (m)												
Link Distance (m)												
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 7: Harmony Public School & Harmony Road											
Movement	EB	WB	NB	NB	WB	EB	WB	NB	NB	WB	EB
Directions Served	LTR	LTR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	23.0	23.7			23.0	23.7			23.0	23.7	
Average Queue (m)	2.0	13.3			2.0	13.3			2.0	13.3	
95th Queue (m)	10.2	22.2			10.2	22.2			10.2	22.2	
Link Distance (m)	463.5	212.1			463.5	212.1			463.5	212.1	
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)											
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 8: Harmony Road & Highway 37

Movement	EB	WB	NB	NB	WB	EB	WB	NB	NB	WB	EB
Directions Served	LTR	LTR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	15.8	44.9	13.2	21.7	3.6	51.3					
Average Queue (m)	4.2	11.6	3.6	6.2	0.1	19.2					
95th Queue (m)	12.3	27.1	10.0	17.4	1.2	40.0					
Link Distance (m)	463.5	263.1		2731.5		954.7					
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)					79.5	82.0					
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

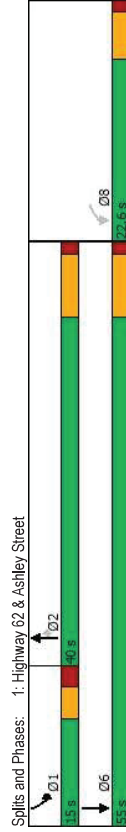
Movement	EB	WB	NB	NB	WB	EB	WB	NB	NB	WB	EB
Directions Served	LTR	LTR	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	21.0	60.5	5.4	49.8	13.3	6.2	44.1	23.5			
Average Queue (m)	9.4	27.7	0.3	12.4	1.5	0.2	21.6	3.0			
95th Queue (m)	18.2	52.3	2.4	34.4	6.4	2.0	41.4	10.6			
Link Distance (m)	437.7	564.0		780.7		2731.5					
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)					82.0	85.0	75.0	79.0			
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road											
Movement	EB	WB	NB	NB	WB	EB	WB	NB	NB	WB	EB
Directions Served	LTR	LTR	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	26.6	46.8	10.5	24.9	11.8	7.5	97.6	6.0			
Average Queue (m)	8.6	22.2	2.0	7.3	0.5	0.4	25.3	0.5			
95th Queue (m)	18.7	40.3	6.1	18.3	4.0	2.8	61.4	3.3			
Link Distance (m)	593.4	692.0		405.0		780.7					
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)				66.0	70.0	68.0		70.0			
Storage Blk Time (%)								0			
Queuing Penalty (veh)								0			

Network Summary

Network wide Queuing Penalty: 0

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	200	964	333	4	933
Future Volume (vph)	200	964	333	4	933
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Eff Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	0.62	0.49	0.34	0.03	0.52
Control Delay	35.0	11.2	3.1	32.8	9.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	35.0	11.2	3.1	32.8	9.5
LOS	D	B	A	C	A
Approach Delay	35.0	9.1			9.6
Approach LOS	D	A			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 70					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.62					
Intersection Signal Delay: 11.5					Intersection LOS: B
Intersection Capacity Utilization 49.2%					ICU Level of Service A
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	200	13	964	333	4	933
Future Volume (vph)	200	13	964	333	4	933
Initial Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	0.95
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687	3539	1568	1770	3374	3374
Flt Permitted	0.96	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1687	3539	1568	1770	3374	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	215	14	1015	351	5	1072
RTOR Reduction (vph)	3	0	0	135	0	0
Lane Group Flow (vph)	226	0	1015	216	5	1072
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0	45.4	45.4	1.4	1.4	51.8
Effective Green, g (s)	17.0	45.4	45.4	1.4	1.4	51.8
Actuated g/C Ratio	0.21	0.56	0.56	0.02	0.02	0.63
Clearance Time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5	4.5
Lane Grp Cap (vph)	351	1969	872	30	2141	
v/s Ratio Prot		0.29		0.00	0.32	
v/s Ratio Perm	0.13		0.14			
v/c Ratio	0.64	0.52	0.25	0.17	0.50	
Uniform Delay, d1	29.5	11.3	9.3	39.5	8.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.8	1.0	0.7	2.6	0.8	
Delay (s)	38.3	12.2	10.0	42.1	8.8	
Level of Service	D	B	A	D	A	
Approach Delay (s)	38.3	11.7		9.0		
Approach LOS	D	B		A		
Intersection Summary						
HCM 2000 Control Delay	12.9				HCM 2000 Level of Service B	
HCM 2000 Volume to Capacity ratio	0.58					
Actuated Cycle Length (s)	81.6				Sum of lost time (s) 17.8	
Intersection Capacity Utilization	49.2%				ICU Level of Service A	
Analysis Period (min)	15					
Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
2. Ashley Street & Harmony Road

<Existing 2025> PM Peak Hour
02-12-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	54	60	118	90	65	61
Future Volume (Veh/h)	54	60	118	90	65	61
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.96	0.96	0.86	0.86
Hourly flow rate (vph)	61	68	123	94	76	71
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	393	170				217
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	393	170				217
IC single (s)	6.4	6.2				4.1
IC 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	89	92				94
cM capacity (veh/h)	577	874				1353
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	129	217	147			
Volume Left	61	0	76			
Volume Right	68	94	0			
cSH	703	1700	1353			
Volume to Capacity	0.18	0.13	0.06			
Queue Length 95th (m)	5.3	0.0	1.4			
Control Delay (s)	11.3	0.0	4.3			
Lane LOS	B	A	A			
Approach Delay (s)	11.3	0.0	4.3			
Approach LOS	B					
Intersection Summary						
Average Delay			4.2			
Intersection Capacity Utilization			35.2%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
3. River Road & Harmony Road

<Existing 2025> PM Peak Hour
02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4				4
Traffic Volume (veh/h)	9	126	35	2	90	2	67	4	10	18	8	4
Future Volume (Veh/h)	9	126	35	2	90	2	67	4	10	18	8	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.71	0.71	0.71	0.83	0.83	0.83
Hourly flow rate (vph)	10	138	38	2	94	2	94	6	14	22	10	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	96			176			286	277	157	293	295	95
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	96			176			286	277	157	293	295	95
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			86	99	98	97	98	99
cM capacity (veh/h)	1498			1400			650	626	889	640	611	962
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	186	98	114	37								
Volume Left	10	2	94	22								
Volume Right	38	2	14	5								
cSH	1498	1400	671	662								
Volume to Capacity	0.01	0.00	0.17	0.06								
Queue Length 95th (m)	0.2	0.0	4.9	1.4								
Control Delay (s)	0.5	0.2	11.5	10.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.5	0.2	11.5	10.8								
Approach LOS	B											
Intersection Summary												
Average Delay				4.1								
Intersection Capacity Utilization				26.3%						ICU Level of Service	A	
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations	4	94	83	2	2	4
Traffic Volume (veh/h)	4	94	83	2	2	4
Future Volume (Veh/h)	4	94	83	2	2	4
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.69	0.69	0.63	0.63	0.75	0.75
Hourly flow rate (vph)	6	136	132	3	3	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	135			282	134	
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	135			282	134	
IC, single (s)	4.1			6.4	6.5	
IC, 2 stage (s)						
IF (s)	2.2			3.5	3.5	
p0 queue free %	100			100	99	
cM capacity (veh/h)	1449			706	858	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	142	135	8			
Volume Left	6	0	3			
Volume Right	0	3	5			
cSH	1449	1700	794			
Volume to Capacity	0.00	0.08	0.01			
Queue Length 95th (m)	0.1	0.0	0.2			
Control Delay (s)	0.3	0.0	9.6			
Lane LOS	A	A	A			
Approach Delay (s)	0.3	0.0	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			18.2%			A
Analysis Period (min)			15			

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	4	3	79	6	15
Traffic Volume (veh/h)	116	4	3	79	6	15
Future Volume (Veh/h)	116	4	3	79	6	15
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.95	0.95	0.87	0.75	0.75	
Hourly flow rate (vph)	122	4	3	91	8	20
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked			126	221	124	
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol			126	221	124	
IC, single (s)			4.1	6.4	6.2	
IC, 2 stage (s)						
IF (s)			2.2	3.5	3.3	
p0 queue free %			100	99	98	
cM capacity (veh/h)			1460	766	927	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	126	94	28			
Volume Left	0	3	8			
Volume Right	4	0	20			
cSH	1700	1460	874			
Volume to Capacity	0.07	0.00	0.03			
Queue Length 95th (m)	0.0	0.0	0.8			
Control Delay (s)	0.0	0.3	9.3			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.3	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			1.1			
Intersection Capacity Utilization			16.6%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Existing 2025> PM Peak Hour
02-12-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	1	
Traffic Volume (veh/h)	0	89	79	0	1	1
Future Volume (Veh/h)	0	89	79	0	1	1
Sign Control		Free	Free	Stop		
Grade		0%	0%	0%		
Peak Hour Factor	0.80	0.80	0.61	0.50	0.50	
Hourly flow rate (vph)	0	111	130	0	2	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	130			241	130	
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	130			241	130	
IC, single (s)	4.1			6.4	6.2	
IC, 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	100	
cM capacity (veh/h)	1455			747	920	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	111	130	4			
Volume Left	0	0	2			
Volume Right	0	0	2			
cSH	1455	1700	825			
Volume to Capacity	0.00	0.08	0.00			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	9.4			
Lane LOS			A			
Approach Delay (s)	0.0	0.0	9.4			
Approach LOS			A			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			14.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Existing 2025> PM Peak Hour
02-12-2025

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	1	1	4	1	1	
Traffic Volume (veh/h)	100	2	7	54	17	30
Future Volume (Veh/h)	100	2	7	54	17	30
Sign Control	Free	Free	Free	Stop		
Grade	0%	0%	0%	0%		
Peak Hour Factor	1.00	1.00	0.76	0.43	0.43	
Hourly flow rate (vph)	100	2	9	71	40	70
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked			102	190	101	
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol			102	190	101	
IC, single (s)			4.1	6.4	6.2	
IC, 2 stage (s)						
IF (s)			2.2	3.5	3.3	
p0 queue free %			99	95	93	
cM capacity (veh/h)			1490	794	954	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	102	80	110			
Volume Left	0	9	40			
Volume Right	2	0	70			
cSH	1700	1490	889			
Volume to Capacity	0.06	0.01	0.12			
Queue Length 95th (m)	0.0	0.1	3.4			
Control Delay (s)	0.0	0.9	9.6			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.9	9.6			
Approach LOS		A	A			
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			18.7%		ICU Level of Service	A
Analysis Period (min)			15			

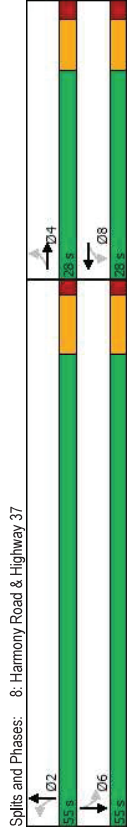
Timings
8: Harmony Road & Highway 37

HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37

<Existing 2025> PM Peak Hour
02-12-2025

<Existing 2025> PM Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	8	8	2	2	6	6
Traffic Volume (vph)	48	29	22	7	37	452	3	317
Future Volume (vph)	48	29	22	7	37	452	3	317
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	4	4	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	11.6	11.6	52.7	52.7	52.7	52.7	52.7	52.7
Actuated g/C Ratio	0.16	0.16	0.72	0.72	0.72	0.72	0.72	0.72
v/c Ratio	0.52	0.52	0.17	0.06	0.41	0.01	0.33	0.33
Control Delay	28.5	28.5	28.3	5.7	7.4	5.7	6.6	6.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.5	28.5	28.3	5.7	7.4	5.7	6.6	6.6
LOS	C	C	C	A	A	A	A	A
Approach Delay	28.5	28.5	28.3	7.3	6.5	6.5	6.5	6.5
Approach LOS	C	C	C	A	A	A	A	A
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 73.7								
Natural Cycle: 35								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.52								
Intersection Signal Delay: 10.2								
Intersection Capacity Utilization 51.2%								
Analysis Period (min) 15								

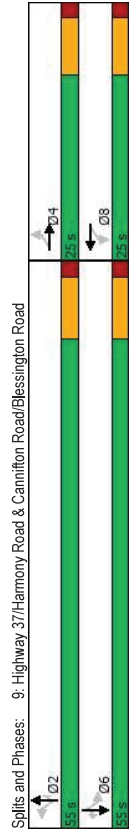


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	48	29	47	22	7	1	37	452	38	3	317	63
Future Volume (vph)	48	29	47	22	7	1	37	452	38	3	317	63
Total Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702	1702
Flt Permitted	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Satd. Flow (perm)	1489	1489	1489	1489	1489	1489	1489	1489	1489	1489	1489	1489
Peak-hour factor, PHF	0.90	0.90	0.90	0.84	0.84	0.84	0.90	0.90	0.90	0.94	0.94	0.94
Adj. Flow (vph)	53	32	52	26	8	1	41	502	42	3	337	67
RTOR Reduction (vph)	0	31	0	0	1	0	0	3	0	0	6	0
Lane Group Flow (vph)	0	106	0	0	34	0	41	541	0	3	398	0
Heavy Vehicles (%)	2%	2%	7%	10%	2%	100%	2%	2%	2%	2%	7%	22%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	9.5	9.5	9.5	9.5	9.5	9.5	51.1	51.1	51.1	51.1	51.1	51.1
Effective Green, g (s)	9.5	9.5	9.5	9.5	9.5	9.5	51.1	51.1	51.1	51.1	51.1	51.1
Actuated g/C Ratio	0.13	0.13	0.13	0.13	0.13	0.13	0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	188	188	188	160	160	160	663	1250	551	1149	1149	1149
v/s Ratio Prot	c0.07	c0.07	c0.07	0.03	0.03	0.04	c0.29	c0.29	c0.29	0.01	0.23	0.23
v/s Ratio Perm	0.56	0.56	0.56	0.21	0.21	0.06	0.43	0.43	0.43	0.01	0.35	0.35
Uniform Delay, d1	30.9	30.9	30.9	29.5	29.5	4.0	5.5	5.5	5.5	3.9	5.0	5.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	3.8	3.8	0.7	0.7	0.2	1.1	1.1	1.1	0.0	0.8	0.8
Delay (s)	34.7	34.7	34.7	30.2	30.2	4.2	6.6	6.6	6.6	3.9	5.9	5.9
Level of Service	C	C	C	C	C	A	A	A	A	A	A	A
Approach Delay (s)	34.7	34.7	34.7	30.2	30.2	6.4	6.4	6.4	6.4	5.9	5.9	5.9
Approach LOS	C	C	C	C	C	A	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	10.3	10.3	10.3	HCM 2000 Level of Service	B	B	B	B	B	B	B	B
HCM 2000 Volume to Capacity ratio	0.45	0.45	0.45	Sum of lost time (s)	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	75.2	75.2	75.2	ICU Level of Service	A	A	A	A	A	A	A	A
Intersection Capacity Utilization	51.2%	51.2%	51.2%	Analysis Period (min)	15	15	15	15	15	15	15	15
Analysis Period (min)	15	15	15	c. Critical Lane Group								

Timings
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

HCM Signalized Intersection Capacity Analysis
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	89	48	37	35	3	484	105	12	308	31
Traffic Volume (vph)	89	48	37	35	3	484	105	12	308	31
Future Volume (vph)	89	48	37	35	3	484	105	12	308	31
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	13.9	13.9	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3
Actuated g/C Ratio	0.18	0.18	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
v/c Ratio	0.62	0.39	0.00	0.45	0.11	0.03	0.30	0.03	0.30	0.03
Control Delay	40.5	31.4	6.3	9.4	1.7	6.7	7.9	1.1	6.7	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.5	31.4	6.3	9.4	1.7	6.7	7.9	1.1	6.7	7.9
LOS	D	C	A	A	A	A	A	A	A	A
Approach Delay	40.5	31.4	6.3	9.4	8.0	7.2				
Approach LOS	D	C	A	A	A	A				
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 78.8										
Natural Cycle: 60										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.62										
Intersection Signal Delay: 13.4										
Intersection Capacity Utilization 60.2%										
Analysis Period (min) 15										



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	89	48	2	37	35	2	3	484	105	12	308	31
Traffic Volume (vph)	89	48	2	37	35	2	3	484	105	12	308	31
Future Volume (vph)	89	48	2	37	35	2	3	484	105	12	308	31
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Satd. Flow (prot)	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754	1754
Flt Permitted	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Satd. Flow (perm)	1392	1392	1392	1392	1392	1392	1392	1392	1392	1392	1392	1392
Peak-hour factor, PHF	0.91	0.91	0.91	0.76	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	98	53	2	49	46	3	3	538	117	13	338	34
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	42	0	0	12
Lane Group Flow (vph)	0	152	0	0	96	0	3	538	75	13	338	22
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	13.9	13.9	13.9	13.9	13.9	13.9	50.3	50.3	50.3	50.3	50.3	50.3
Effective Green, g (s)	13.9	13.9	13.9	13.9	13.9	13.9	50.3	50.3	50.3	50.3	50.3	50.3
Actuated g/C Ratio	0.18	0.18	0.18	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	245	245	245	252	252	252	662	1189	1010	501	1122	963
v/s Ratio Prot	c0.11	c0.11	c0.11	0.07	0.07	0.07	0.00	0.05	0.02	0.03	0.19	0.01
v/s Ratio Perm	0.62	0.62	0.62	0.38	0.38	0.38	0.00	0.45	0.07	0.03	0.30	0.02
Uniform Delay, d1	30.0	30.0	30.0	28.7	28.7	28.7	5.2	7.2	5.4	5.2	6.4	5.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.8	4.8	4.8	1.0	1.0	1.0	0.0	1.2	0.1	0.1	0.7	0.0
Delay (s)	34.8	34.8	34.8	29.6	29.6	29.6	5.2	8.5	5.6	5.3	7.1	5.3
Level of Service	C	C	C	C	C	C	A	A	A	A	A	A
Approach Delay (s)	34.8	34.8	34.8	29.6	29.6	29.6	8.0	6.9	6.9	6.9	6.9	6.9
Approach LOS	C	C	C	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	12.4	12.4	12.4	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	B	B	B	B	B	B
HCM 2000 Volume to Capacity ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Actuated Cycle Length (s)	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8	78.8
Intersection Capacity Utilization	60.2%	60.2%	60.2%	60.2%	60.2%	60.2%	60.2%	60.2%	60.2%	60.2%	60.2%	60.2%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group												

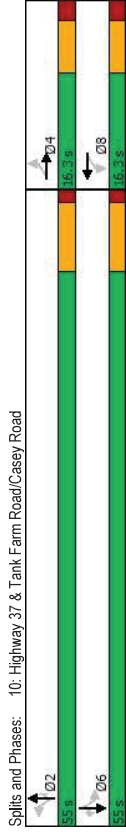
Timings

10: Highway 37 & Tank Farm Road/Casey Road

<Existing 2025> PM Peak Hour

02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	25	54	54	42	39	539	52	5	310	10
Future Volume (vph)	25	54	54	42	39	539	52	5	310	10
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3
Actuated g/C Ratio	0.14	0.14	0.87	0.87	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.62	0.83	0.09	0.45	0.06	0.01	0.31	0.01	0.01	0.01
Control Delay	37.2	64.4	4.6	6.9	1.4	4.0	5.7	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	64.4	4.6	6.9	1.4	4.0	5.7	0.0	0.0	0.0
LOS	D	E	A	A	A	A	A	A	A	A
Approach Delay	37.2	64.4	6.3							
Approach LOS	D	E	A							
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.7										
Natural Cycle: 50										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.83										
Intersection Signal Delay: 16.5										
Intersection Capacity Utilization 58.8%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis

10: Highway 37 & Tank Farm Road/Casey Road

<Existing 2025> PM Peak Hour

02-12-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	25	54	54	42	39	539	52	5	310	10
Future Volume (vph)	25	54	54	42	39	539	52	5	310	10
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3				7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96				0.99	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.99				0.98			1.00	0.95	1.00
Satd. Flow (prot)	1744				1751			1770	1743	1170
Flt Permitted	0.88				0.78			1.00	0.42	1.00
Satd. Flow (perm)	1556				1395			1455	1777	1170
Peak-hour factor, PHF	0.75	0.75	0.75	0.64	0.64	0.95	0.95	0.95	0.84	0.84
Adj. Flow (vph)	33	72	41	84	16	41	567	55	6	369
RTOR Reduction (vph)	0	20	0	0	5	0	0	18	0	0
Lane Group Flow (vph)	0	126	0	0	161	0	41	567	37	6
Heavy Vehicles (%)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	48.3	48.3	48.3	48.3	48.3	48.3
Effective Green, g (s)	10.0	10.0	10.0	10.0	48.3	48.3	48.3	48.3	48.3	48.3
Actuated g/C Ratio	0.14	0.14	0.09	0.45	0.06	0.01	0.31	0.01	0.01	0.01
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	217		194		471	1254	980	523	1174	788
v/s Ratio Prot										
v/s Ratio Perm	0.08		c0.12		0.06		0.03	0.01		0.01
v/c Ratio	0.58		0.83		0.09		0.04	0.01		0.01
Uniform Delay, d1	28.9		30.0		4.1		5.5	3.8		4.8
Progression Factor	1.00		1.00		1.00		1.00	1.00		1.00
Incremental Delay, d2	3.9		24.3		0.2		0.5	0.0		0.7
Delay (s)	32.8		54.4		4.2		6.0	3.9		5.5
Level of Service	C		D		A		A	A		A
Approach Delay (s)	32.8		54.4		5.7		5.5	5.5		5.5
Approach LOS	C		D		A		A	A		A
Intersection Summary										
HCM 2000 Control Delay			14.5		HCM 2000 Level of Service		B			
HCM 2000 Volume to Capacity ratio			0.52							
Actuated Cycle Length (s)			71.7		Sum of lost time (s)		13.4			
Intersection Capacity Utilization			58.8%		ICU Level of Service		B			
Analysis Period (min)			15							
c. Critical Lane Group										

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	64.2	52.6	40.8	11.9	8.7	46.6	39.5
Average Queue (m)	38.3	27.3	19.1	6.0	1.1	25.6	21.1
95th Queue (m)	59.7	40.6	33.3	10.3	5.6	39.7	36.4
Link Distance (m)	460.8	539.5	539.5			617.0	617.0
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			0			2	
Queuing Penalty (veh)			1			0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	15.0	9.2
Average Queue (m)	8.8	3.3
95th Queue (m)	14.5	10.5
Link Distance (m)	510.9	376.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: River Road & Harmony Road

Movement	EB	NB	SB
Directions Served	LTR	LTR	
Maximum Queue (m)	7.7	22.1	22.7
Average Queue (m)	0.3	9.7	6.1
95th Queue (m)	2.5	16.3	14.8
Link Distance (m)	510.9	215.8	332.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Harmony Road & Homan Road

Movement	SB
Directions Served	LR
Maximum Queue (m)	15.0
Average Queue (m)	2.0
95th Queue (m)	8.8
Link Distance (m)	490.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	8.3	9.2
Average Queue (m)	0.3	5.2
95th Queue (m)	2.7	12.3
Link Distance (m)	902.5	551.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	SB
Directions Served	LR
Maximum Queue (m)	8.5
Average Queue (m)	1.4
95th Queue (m)	6.5
Link Distance (m)	388.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Harmony Public School & Harmony Road									
Movement	WB	NB	WB	NB	WB	NB	WB	NB	WB
Directions Served	L	R	L	R	L	R	L	R	L
Maximum Queue (m)	9.0	9.3							
Average Queue (m)	0.3	7.8							
95th Queue (m)	3.0	12.9							
Link Distance (m)	463.5	212.1							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

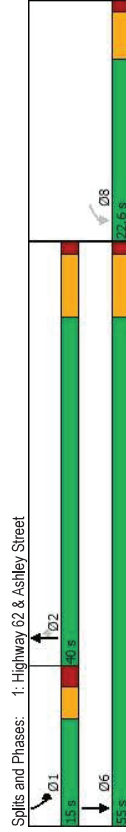
Intersection: 8: Harmony Road & Highway 37									
Movement	EB	WB	NB	NB	SB	SB	EB	WB	NB
Directions Served	L	R	L	TR	L	TR	L	R	TR
Maximum Queue (m)	58.7	25.4	11.9	48.4	3.5	39.3			
Average Queue (m)	13.4	6.6	2.8	18.9	0.2	12.5			
95th Queue (m)	32.2	16.6	8.0	41.3	1.6	32.2			
Link Distance (m)	463.5	263.1		2731.5		954.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)						82.0			
Queuing Penalty (veh)									

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road									
Movement	EB	WB	NB	NB	SB	SB	EB	WB	NB
Directions Served	L	R	L	T	R	L	T	R	
Maximum Queue (m)	35.2	34.0	5.6	75.3	11.5	6.4	48.7	9.6	
Average Queue (m)	19.1	12.6	0.4	20.6	3.0	0.8	15.5	0.9	
95th Queue (m)	34.7	24.5	2.8	49.2	8.4	4.0	36.2	4.3	
Link Distance (m)	437.7	564.0		780.7		2731.5			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)						85.0	75.0	79.0	
Queuing Penalty (veh)									

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	NB	SB	SB	EB	WB	NB
Directions Served	L	R	L	T	R	L	T	R	
Maximum Queue (m)	49.6	32.2	18.6	52.5	4.5	8.0	51.2	16.0	
Average Queue (m)	19.5	16.8	4.4	19.2	0.2	0.6	14.0	0.7	
95th Queue (m)	35.3	29.5	15.7	40.9	1.7	3.8	35.9	5.6	
Link Distance (m)	593.4	692.0		405.0		780.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)						66.0	70.0	68.0	70.0
Queuing Penalty (veh)									

Network Summary									
Network wide Queuing Penalty: 1									

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	176	848	294	5	453
Future Volume (vph)	176	848	294	5	453
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	0.54	0.43	0.30	0.04	0.25
Control Delay	32.6	10.6	2.3	33.0	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	32.6	10.6	2.3	33.0	7.1
LOS	C	B	A	C	A
Approach Delay	32.6	8.4		7.4	
Approach LOS	C	A		A	
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 70					
Control Type: Semi Act-Uncoordinated					
Maximum v/c Ratio: 0.54					
Intersection Signal Delay: 10.7					
Intersection LOS: B					
Intersection Capacity Utilization 44.6%					
Analysis Period (min) 15					
ICU Level of Service A					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	176	12	848	294	5	453
Traffic Volume (vph)	176	12	848	294	5	453
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	5.6	7.2	7.2	5.0	7.2	7.2
Total Lost time (s)	1.00	0.95	1.00	1.00	1.00	0.95
Lane Util. Factor	0.99	1.00	0.85	1.00	1.00	1.00
Fit	0.96	1.00	1.00	1.00	0.95	1.00
Fit Protected	1687	3539	1568	1770	3374	
Satd. Flow (prot)	0.96	1.00	1.00	0.95	1.00	
Fit Permitted	1687	3539	1568	1770	3374	
Satd. Flow (perm)	0.93	0.93	0.95	0.95	0.87	0.87
Peak-hour factor, PHF	189	13	893	309	6	521
Adj. Flow (vph)	3	0	0	135	0	0
RTOR Reduction (vph)	199	0	893	174	6	521
Lane Group Flow (vph)	7%	2%	2%	3%	2%	7%
Heavy Vehicles (%)	Perm	NA	Perm	Prot	NA	
Turn Type		2		1	6	
Protected Phases						
Permitted Phases	8			2		
Actuated Green, G (s)	17.0	45.4	45.4	1.4	51.8	
Effective Green, g (s)	17.0	45.4	45.4	1.4	51.8	
Actuated g/C Ratio	0.21	0.56	0.56	0.02	0.63	
Clearance Time (s)	5.6	7.2	7.2	5.0	7.2	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5	
Lane Grp Cap (vph)	351	1969	872	30	2141	
v/s Ratio Prot		c0.25		0.00	c0.15	
v/s Ratio Perm	c0.12			0.11		
v/c Ratio	0.57	0.45	0.20	0.20	0.24	
Uniform Delay, d1	29.0	10.7	9.0	39.5	6.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.5	0.8	0.5	3.3	0.3	
Delay (s)	35.5	11.5	9.5	42.8	6.7	
Level of Service	D	B	A	D	A	
Approach Delay (s)	35.5		11.0		7.1	
Approach LOS	D	B		A		
Intersection Summary						
HCM 2000 Control Delay		12.5			HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.49				
Actuated Cycle Length (s)		81.6			Sum of lost time (s)	17.8
Intersection Capacity Utilization		44.6%			ICU Level of Service	A
Analysis Period (min)		15				
Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis <Existing 2025> Saturday Peak Hour
 2. Ashley Street & Harmony Road 02-12-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	60	40	79	83	52	69
Future Volume (Veh/h)	60	40	79	83	52	69
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	68	45	88	92	65	86
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
VC, conflicting volume	350	134			180	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	350	134			180	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	89	95			95	
cM capacity (veh/h)	617	915			1396	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	113	180	151			
Volume Left	68	0	65			
Volume Right	45	92	0			
cSH	709	1700	1396			
Volume to Capacity	0.16	0.11	0.05			
Queue Length 95th (m)	4.5	0.0	1.2			
Control Delay (s)	11.0	0.0	3.5			
Lane LOS	B	A	A			
Approach Delay (s)	11.0	0.0	3.5			
Approach LOS	B					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			31.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <Existing 2025> Saturday Peak Hour
 3. River Road & Harmony Road 02-12-2025

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4		4			4			4	
Traffic Volume (veh/h)	14	121	27	21	14	5	50	5	12	14	4
Future Volume (Veh/h)	14	121	27	21	14	5	50	5	12	14	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.80	0.80	0.80	0.72	0.72	0.39	0.39	0.39
Hourly flow rate (vph)	16	141	31	26	18	6	69	7	17	36	10
Pedestrians											
Lane Width (m)											
Walking Speed (m/s)											
Percent Blockage											
Right turn flare (veh)											
Median type						None					
Median storage (veh)											
Upstream signal (m)											
pX, platoon unblocked											
VC, conflicting volume	24			172		276	264	156	282	277	21
VC1, stage 1 conf vol											
VC2, stage 2 conf vol											
VCu, unblocked vol	24			172		276	264	156	282	277	21
IC, single (s)	4.1			4.1		7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)											
IF (s)	2.2			2.2		3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98		89	99	98	94	98	99
cM capacity (veh/h)	1591			1405		647	623	889	638	613	1056
Direction, Lane #	EB 1	WB 1	NB 1	SB 1							
Volume Total	188	50	93	56							
Volume Left	16	26	69	36							
Volume Right	31	6	17	10							
cSH	1591	1405	679	681							
Volume to Capacity	0.01	0.02	0.14	0.08							
Queue Length 95th (m)	0.2	0.5	3.8	2.1							
Control Delay (s)	0.7	4.0	11.1	10.8							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.7	4.0	11.1	10.8							
Approach LOS	B			B							
Intersection Summary											
Average Delay			5.1								
Intersection Capacity Utilization			20.2%						ICU Level of Service	A	
Analysis Period (min)			15								

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	4	1	1	5
Traffic Volume (veh/h)	5	61	48	1	1	5
Future Volume (Veh/h)	5	61	48	1	1	5
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.66	0.66	0.50	0.50
Hourly flow rate (vph)	6	76	73	2	2	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	75			162	74	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	75			162	74	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	99	
cM capacity (veh/h)	1524			826	988	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	82	75	12			
Volume Left	6	0	2			
Volume Right	0	2	10			
cSH	1524	1700	956			
Volume to Capacity	0.00	0.04	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.6	0.0	8.8			
Lane LOS	A	A	A			
Approach Delay (s)	0.6	0.0	8.8			
Approach LOS			A			
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			17.3%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	4	4	4	4	16
Traffic Volume (veh/h)	109	10	5	80	4	16
Future Volume (Veh/h)	109	10	5	80	4	16
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.74	0.74	0.50	0.50
Hourly flow rate (vph)	120	11	7	108	8	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	131	115	40			
Volume Left	0	7	8			
Volume Right	11	0	32			
cSH	1700	1454	880			
Volume to Capacity	0.08	0.00	0.05			
Queue Length 95th (m)	0.0	0.1	1.1			
Control Delay (s)	0.0	0.5	9.3			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.5	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			18.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Existing 2025> Saturday Peak Hour
02-12-2025

<Existing 2025> Saturday Peak Hour
02-12-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	4	W		
Traffic Volume (veh/h)	1	56	44	1	0	0
Future Volume (Veh/h)	1	56	44	1	0	0
Sign Control		Free	Free	Stop		
Grade		0%	0%	0%		
Peak Hour Factor	0.60	0.60	0.70	0.70	0.92	0.92
Hourly flow rate (vph)	2	93	63	1	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	64			160	64	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	64			160	64	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	100	
cM capacity (veh/h)	1538			829	1001	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	95	64	0			
Volume Left	2	0	0			
Volume Right	0	1	0			
cSH	1538	1700	1700			
Volume to Capacity	0.00	0.04	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.2	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.2	0.0	0.0			
Approach LOS		A	A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			7.1%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBT	WBL	NBL	NBR
Lane Configurations	4	4	4	4	W	
Traffic Volume (veh/h)	58	0	0	49	1	0
Future Volume (Veh/h)	58	0	0	49	1	0
Sign Control	Free	Free	Free	Stop		
Grade	0%	0%	0%	0%		
Peak Hour Factor	0.58	0.58	0.74	0.74	0.92	0.92
Hourly flow rate (vph)	100	0	0	66	1	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume				100	166	100
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol				100	166	100
IC single (s)				4.1	6.4	6.2
IC 2 stage (s)						
IF (s)				2.2	3.5	3.3
p0 queue free %				100	100	100
cM capacity (veh/h)				1493	824	956
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	100	66	1			
Volume Left	0	0	1			
Volume Right	0	0	0			
cSH	1700	1493	824			
Volume to Capacity	0.06	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	9.4			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.0	9.4			
Approach LOS		A	A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			13.3%		ICU Level of Service	A
Analysis Period (min)			15			

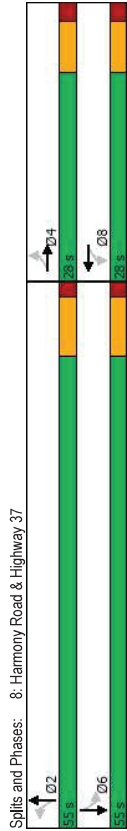
Timings
8: Harmony Road & Highway 37

HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37

<Existing 2025> Saturday Peak Hour
02-12-2025

<Existing 2025> Saturday Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	EB	EB	WB	WB	NB	NB	SB
Traffic Volume (vph)	22	13	19	7	23	234	235
Future Volume (vph)	22	13	19	7	23	234	235
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	4	8	8	2	2	6
Permitted Phases	4	4	8	8	2	2	6
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6
Lead/Lag							
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.4	10.4	10.4	10.4	54.7	54.7	54.7
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.73	0.73	0.73
v/c Ratio	0.37	0.37	0.19	0.03	0.20	0.21	0.21
Control Delay	22.5	22.5	28.1	4.7	4.9	5.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	22.5	28.1	4.7	4.9	5.0	5.0
LOS	C	C	C	A	A	A	A
Approach Delay	22.5	22.5	28.1	4.9	5.0	5.0	5.0
Approach LOS	C	C	C	A	A	A	A
Intersection Summary							
Cycle Length: 83							
Actuated Cycle Length: 74.5							
Natural Cycle: 30							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 0.37							
Intersection Signal Delay: 8.5							
Intersection Capacity Utilization 39.6%							
Analysis Period (min) 15							



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
Traffic Volume (vph)	22	13	28	19	7	3	23	234	19	0	235	23
Future Volume (vph)	22	13	28	19	7	3	23	234	19	0	235	23
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721
Flt Permitted	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Satd. Flow (perm)	1521	1521	1521	1521	1521	1521	1521	1521	1521	1521	1521	1521
Peak-hour factor, PHF	0.69	0.69	0.69	0.74	0.74	0.74	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	32	19	41	26	9	4	24	246	20	0	264	26
RTOR Reduction (vph)	0	37	0	0	4	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	55	0	0	35	0	24	264	0	0	287	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	Perm	Perm	Perm	NA	NA
Protected Phases	4	4	8	8	2	2	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	2	2	6	6
Actuated Green, G (s)	8.2	8.2	8.2	8.2	53.1	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Effective Green, g (s)	8.2	8.2	8.2	8.2	53.1	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	164	164	157	157	759	1284	1284	1284	1284	1284	1284	1284
v/s Ratio Prot	c0.04	c0.04	0.02	0.02	0.02	0.14	0.14	0.14	0.14	0.14	c0.16	c0.16
v/s Ratio Perm	0.34	0.34	0.23	0.23	0.03	0.21	0.21	0.21	0.21	0.21	0.22	0.22
Uniform Delay, d1	31.3	31.3	30.9	30.9	3.5	4.0	4.1	4.1	4.1	4.1	4.1	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.2	0.7	0.7	0.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Delay (s)	32.6	32.6	31.7	31.7	3.6	4.4	4.5	4.5	4.5	4.5	4.5	4.5
Level of Service	C	C	C	C	A	A	A	A	A	A	A	A
Approach Delay (s)	32.6	32.6	31.7	31.7	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3
Approach LOS	C	C	C	C	A	A	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	9.5	9.5	9.5	9.5	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Actuated Cycle Length (s)	75.9	75.9	75.9	75.9	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)
Intersection Capacity Utilization	39.6%	39.6%	39.6%	39.6%	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group												

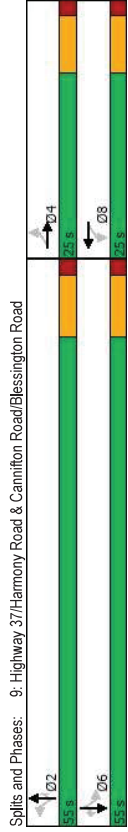
Timings
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

HCM Signalized Intersection Capacity Analysis
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

<Existing 2025> Saturday Peak Hour
02-12-2025

<Existing 2025> Saturday Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	69	37	29	27	2	377	82	10	240	24
Traffic Volume (vph)	69	37	29	27	2	377	82	10	240	24
Future Volume (vph)	69	37	29	27	2	377	82	10	240	24
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	12.4	12.4	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3
Actuated g/C Ratio	0.17	0.17	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
v/c Ratio	0.52	0.31	0.00	0.32	0.08	0.02	0.21	0.02	0.21	0.02
Control Delay	36.3	29.8	6.0	7.1	1.8	6.0	6.4	0.7	6.4	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	29.8	6.0	7.1	1.8	6.0	6.4	0.7	6.4	0.7
LOS	D	C	A	A	A	A	A	A	A	A
Approach Delay	36.3	29.8	6.1	6.1	5.9	5.9	5.9	5.9	5.9	5.9
Approach LOS	D	C	A	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 74.1										
Natural Cycle: 35										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.52										
Intersection Signal Delay: 11.4										
Intersection Capacity Utilization 60.2%										
Analysis Period (min) 15										



Splits and Phases: 9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	69	37	2	29	27	2	377	82	10	240
Traffic Volume (vph)	69	37	2	29	27	2	377	82	10	240
Future Volume (vph)	69	37	2	29	27	2	377	82	10	240
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.97	0.97	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1754	1754	1759	1759	1770	1770	1770	1770	1759	1759
Flt Permitted	0.76	0.76	0.83	0.83	0.60	0.60	0.60	0.60	0.52	0.52
Satd. Flow (perm)	1376	1376	1492	1492	1111	1111	1111	1111	964	964
Peak-hour factor, PHF	0.91	0.91	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	76	41	2	38	36	3	2	419	91	11
RTOR Reduction (vph)	0	1	0	0	0	0	0	30	0	0
Lane Group Flow (vph)	0	118	0	0	75	0	2	419	61	11
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	8%
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.3	10.3	10.3	10.3	50.7	50.7	50.7	50.7	50.7	50.7
Effective Green, g (s)	10.3	10.3	10.3	10.3	50.7	50.7	50.7	50.7	50.7	50.7
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	187	1249	203	745	1249	1061	646	1179	1011	1011
v/s Ratio Prot	c0.09	c0.09	0.05	0.05	0.00	0.00	0.04	0.01	0.15	0.15
v/s Ratio Perm	0.63	0.63	0.37	0.37	0.00	0.34	0.06	0.02	0.22	0.02
Uniform Delay, d1	30.9	30.9	29.7	29.7	4.1	5.3	4.3	4.1	4.8	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.8	6.8	1.1	1.1	0.0	0.7	0.1	0.0	0.4	0.0
Delay (s)	37.6	37.6	30.8	30.8	4.1	6.0	4.4	4.2	5.3	4.2
Level of Service	D	D	C	C	A	A	A	A	A	A
Approach Delay (s)	37.6	37.6	30.8	30.8	5.7	5.7	5.7	5.1	5.1	5.1
Approach LOS	D	D	C	C	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	11.2	11.2	HCM 2000 Level of Service	B	B	B	B	B	B	B
HCM 2000 Volume to Capacity ratio	0.39	0.39	Sum of lost time (s)	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	75.6	75.6	ICU Level of Service	B	B	B	B	B	B	B
Intersection Capacity Utilization	60.2%	60.2%	Analysis Period (min)	15	15	15	15	15	15	15
Analysis Period (min)	15	15	c. Critical Lane Group							

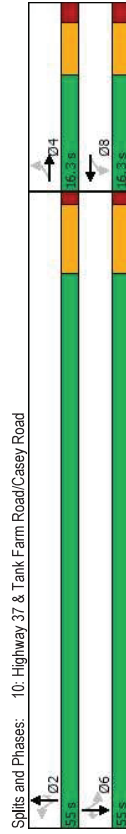
Timings
10: Highway 37 & Tank Farm Road/Casey Road

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Existing 2025> Saturday Peak Hour
02-12-2025

<Existing 2025> Saturday Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	42	42	34	31	420	40	4	242	7
Future Volume (vph)	20	42	42	34	31	420	40	4	242	7
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases										
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4
Actuated g/C Ratio	0.14	0.14	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
v/c Ratio	0.47	0.80	0.06	0.32	0.04	0.01	0.22	0.01	0.22	0.01
Control Delay	29.9	41.0	4.4	5.3	1.2	4.0	4.8	0.0	4.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	41.0	4.4	5.3	1.2	4.0	4.8	0.0	4.8	0.0
LOS	C	D	A	A	A	A	A	A	A	A
Approach Delay	29.9	41.0	4.9	4.9	4.9	4.9	4.6			
Approach LOS	C	D	A	A	A	A	A			
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71										
Natural Cycle: 45										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.60										
Intersection Signal Delay: 12.0										
Intersection Capacity Utilization 58.8%										
Analysis Period (min) 15										



Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	42	24	42	34	7	31	420	40	4
Future Volume (vph)	20	42	24	42	34	7	31	420	40	4
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3				7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96				0.99	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.99				0.98		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1743				1755		1455	1770	1743	1170
Flt Permitted	0.90				0.84		1.00	1.00	0.51	1.00
Satd. Flow (perm)	1594				1505		1455	1455	944	1170
Peak-hour factor, PHF	0.75	0.75	0.75	0.64	0.64	0.95	0.95	0.84	0.84	0.84
Adj. Flow (vph)	27	56	32	66	53	11	33	442	42	5
RTOR Reduction (vph)	0	20	0	0	0	0	0	12	0	0
Lane Group Flow (vph)	0	95	0	0	126	0	33	442	30	5
Heavy Vehicles (%)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4		8		2		2		6
Permitted Phases	4		8		2		2		6	
Actuated Green, G (s)	8.0		8.0		50.9		50.9		50.9	
Effective Green, g (s)	8.0		8.0		50.9		50.9		50.9	
Actuated g/C Ratio	0.11		0.11		0.70		0.70		0.70	
Clearance Time (s)	6.3		6.3		7.1		7.1		7.1	
Vehicle Extension (s)	3.0		3.0		4.8		4.8		4.8	
Lane Grp Cap (vph)	176		166		530		1024		664	
v/s Ratio Prot					c0.24					
v/s Ratio Perm	0.06		c0.08		0.04		0.02		0.01	
v/c Ratio	0.54		0.76		0.06		0.34		0.01	
Uniform Delay, d1	30.4		31.2		3.3		4.2		3.2	
Progression Factor	1.00		1.00		1.00		1.00		1.00	
Incremental Delay, d2	3.1		17.7		0.1		0.3		0.0	
Delay (s)	33.5		48.9		3.4		4.5		3.2	
Level of Service	C		D		A		A		A	
Approach Delay (s)	33.5		48.9		4.3		4.2		4.2	
Approach LOS	C		D		A		A		A	
Intersection Summary										
HCM 2000 Control Delay	12.9									
HCM 2000 Volume to Capacity ratio	0.39									
Actuated Cycle Length (s)	72.3									
Intersection Capacity Utilization	58.8%									
Analysis Period (min)	15									
c. Critical Lane Group										

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	SB	T
	LR	T	T	R	L	T	T	
Directions Served								
Maximum Queue (m)	62.1	47.5	40.4	19.2	15.5	35.9	28.8	
Average Queue (m)	30.0	27.5	21.7	7.2	1.9	18.0	11.4	
95th Queue (m)	50.9	40.6	37.2	14.0	8.1	29.8	22.6	
Link Distance (m)	460.8	539.5	539.5			617.0	617.0	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)				38.0	30.5			
Storage Blk Time (%)			0			1		
Queuing Penalty (veh)			1			0		

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB
	LR	LT
Directions Served		
Maximum Queue (m)	13.9	16.8
Average Queue (m)	8.3	2.4
95th Queue (m)	12.3	9.7
Link Distance (m)	510.9	376.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: River Road & Harmony Road

Movement	WB	NB	SB
	LTR	LTR	LTR
Directions Served			
Maximum Queue (m)	8.6	16.3	15.4
Average Queue (m)	1.6	8.4	4.9
95th Queue (m)	6.8	14.7	12.7
Link Distance (m)	962.1	215.8	332.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Harmony Road & Homan Road

Movement	SB
	LR
Directions Served	
Maximum Queue (m)	9.3
Average Queue (m)	2.1
95th Queue (m)	8.4
Link Distance (m)	490.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Plumpton & Harmony Road

Movement	NB
	LR
Directions Served	
Maximum Queue (m)	16.3
Average Queue (m)	4.1
95th Queue (m)	12.2
Link Distance (m)	551.1
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 7: Harmony Public School & Harmony Road

Movement	NB	WB	SB
Directions Served	LR		
Maximum Queue (m)	8.7		
Average Queue (m)	0.3		
95th Queue (m)	2.9		
Link Distance (m)	212.1		
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 8: Harmony Road & Highway 37

Movement	EB	WB	NB	SB
Directions Served	LTR	L	TR	TR
Maximum Queue (m)	21.0	14.3	5.8	34.2
Average Queue (m)	9.0	4.6	1.3	11.8
95th Queue (m)	18.4	11.5	4.8	29.2
Link Distance (m)	463.5	263.1	2731.5	954.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)			79.5	
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	L	T	R	T
Maximum Queue (m)	43.5	33.6	5.6	38.1	6.3
Average Queue (m)	16.7	9.0	0.2	16.0	3.2
95th Queue (m)	28.8	22.6	1.8	32.4	9.6
Link Distance (m)	437.7	564.0	780.7	2731.5	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)			82.0	85.0	75.0
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	L	T	R	T
Maximum Queue (m)	26.6	45.8	23.7	32.8	8.2
Average Queue (m)	13.2	15.3	4.0	15.3	0.3
95th Queue (m)	22.7	29.3	13.9	31.2	2.7
Link Distance (m)	593.4	692.0	405.0	780.7	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)			66.0	70.0	70.0
Storage Blk Time (%)					
Queuing Penalty (veh)					

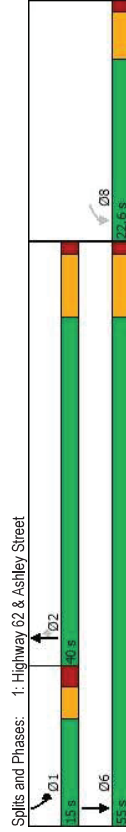
Network Summary

Network wide Queuing Penalty: 1



Future Background Conditions (2041 and 2046)

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	351	515	196	5	1281
Future Volume (vph)	351	515	196	5	1281
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	3.9	3.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	1.34	0.31	0.24	0.04	0.89
Control Delay	201.4	9.5	2.4	33.0	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	201.4	9.5	2.4	33.0	12.1
LOS	F	A	A	C	B
Approach Delay	201.4	7.5			12.2
Approach LOS	F	A			B
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 75					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 1.34					
Intersection Signal Delay: 40.5					
Intersection LOS: D					
Intersection Capacity Utilization 65.9%					
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	351	7	515	196	5	1281
Future Volume (vph)	351	7	515	196	5	1281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1450	3195	1392	1770	3505	3505
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1450	3195	1392	1770	3505	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86	0.86
Adj. Flow (vph)	418	8	572	218	6	1490
RTOR Reduction (vph)	1	0	0	97	0	0
Lane Group Flow (vph)	425	0	572	121	6	1490
Heavy Vehicles (%)	25%	5%	13%	16%	2%	3%
Turn Type	Perm	Perm	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0	45.4	45.4	1.4	51.8	
Effective Green, g (s)	17.0	45.4	45.4	1.4	51.8	
Actuated g/C Ratio	0.21	0.56	0.56	0.02	0.63	
Clearance Time (s)	5.6	7.2	7.2	5.0	7.2	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5	
Lane Grp Cap (vph)	302	1777	774	30	2224	
v/s Ratio Prot		0.18		0.00	c0.43	
v/s Ratio Perm	c0.29		0.09			
v/c Ratio	1.41	0.32	0.16	0.20	0.67	
Uniform Delay, d1	32.3	9.8	8.8	39.5	9.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	202.3	0.5	0.4	3.3	1.6	
Delay (s)	234.6	10.3	9.2	42.8	11.1	
Level of Service	F	B	A	D	B	
Approach Delay (s)	234.6		10.0		11.2	
Approach LOS	F	A			B	
Intersection Summary						
HCM 2000 Control Delay		45.9				D
HCM 2000 Volume to Capacity ratio		0.92				
Actuated Cycle Length (s)		81.6				17.8
Intersection Capacity Utilization		65.9%				C
Analysis Period (min)		15				
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road

<Background 2041> AM Peak Hour
 02-12-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	80	55	110	54	67	67
Future Volume (Veh/h)	80	55	110	54	67	67
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.89	0.89	0.80	0.80	0.85	0.85
Hourly flow rate (vph)	90	62	138	68	79	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	409	172			206	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	409	172			206	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	84	93			94	
cM capacity (veh/h)	564	872			1365	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	152	206	158			
Volume Left	90	0	79			
Volume Right	62	68	0			
cSH	659	1700	1365			
Volume to Capacity	0.23	0.12	0.06			
Queue Length 95th (m)	7.1	0.0	1.5			
Control Delay (s)	12.1	0.0	4.1			
Lane LOS	B	A	A			
Approach Delay (s)	12.1	0.0	4.1			
Approach LOS	B					
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			34.1%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road

<Background 2041> AM Peak Hour
 02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4		4				4			4	
Traffic Volume (veh/h)	3	103	36	3	96	0	27	1	5	60	5	5
Future Volume (Veh/h)	3	103	36	3	96	0	27	1	5	60	5	5
Sign Control		Free	Free	Free	Free		Stop	Stop			Stop	
Grade		0%	0%	0%	0%		0%	0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.69	0.51	0.51	
Hourly flow rate (vph)	4	123	43	3	108	0	39	1	7	118	10	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type			None			None						
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	108			166			282	266	144	274	288	108
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	108			166			282	266	144	274	288	108
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			94	100	99	82	98	99
cM capacity (veh/h)	1483			1412			653	636	903	670	619	946
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	170	111	47	138								
Volume Left	4	3	39	118								
Volume Right	43	0	7	10								
cSH	1483	1412	681	680								
Volume to Capacity	0.00	0.00	0.07	0.20								
Queue Length 95th (m)	0.1	0.1	1.8	6.0								
Control Delay (s)	0.2	0.2	10.7	11.6								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.2	0.2	10.7	11.6								
Approach LOS			B	B								
Intersection Summary												
Average Delay			4.6									
Intersection Capacity Utilization			19.8%							A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	1	
Traffic Volume (veh/h)	1	163	113	1	1	1
Future Volume (Veh/h)	1	163	113	1	1	1
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.77	0.77	0.51	0.50	0.50	
Hourly flow rate (vph)	1	212	222	2	2	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	224			437	223	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	224			437	223	
IC single (s)	4.1			6.4	7.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	4.2	
p0 queue free %	100			100	100	
cM capacity (veh/h)	1345			576	623	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	213	224	4			
Volume Left	1	0	2			
Volume Right	0	2	2			
cSH	1345	1700	599			
Volume to Capacity	0.00	0.13	0.01			
Queue Length 95th (m)	0.0	0.0	0.2			
Control Delay (s)	0.0	0.0	11.1			
Lane LOS	A	B	B			
Approach Delay (s)	0.0	0.0	11.1			
Approach LOS			B			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			19.4%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	1	4	1	10	
Traffic Volume (veh/h)	107	7	3	89	1	10
Future Volume (Veh/h)	107	7	3	89	1	10
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	
Hourly flow rate (vph)	132	9	3	102	1	15
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	141	105	16			
Volume Left	0	3	1			
Volume Right	9	0	15			
cSH	1700	1442	899			
Volume to Capacity	0.08	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.4			
Control Delay (s)	0.0	0.2	9.1			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.2	9.1			
Approach LOS			A			
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			17.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Background 2041> AM Peak Hour
02-12-2025

<Background 2041> AM Peak Hour
02-12-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	1	
Traffic Volume (veh/h)	0	181	115	0	0	0
Future Volume (Veh/h)	0	181	115	0	0	0
Sign Control		Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	
Peak Hour Factor	0.78	0.78	0.51	0.92	0.92	
Hourly flow rate (vph)	0	232	225	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	225			457	225	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	225			457	225	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	100	
CM capacity (veh/h)	1344			562	814	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	232	225	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1344	1700	1700			
Volume to Capacity	0.00	0.13	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS		A				
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			12.9%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	48	91	89	99	52	69
Future Volume (Veh/h)	48	91	89	99	52	69
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.54	0.54	0.78	0.30	0.30	
Hourly flow rate (vph)	89	169	114	127	173	230
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume			258		528	174
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol			258		528	174
IC single (s)			4.3		6.6	6.4
IC 2 stage (s)						
IF (s)			2.4		3.7	3.5
p0 queue free %			91		60	72
CM capacity (veh/h)			1224		434	821
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	258	241	403			
Volume Left	0	114	173			
Volume Right	169	0	230			
cSH	1700	1224	594			
Volume to Capacity	0.15	0.09	0.68			
Queue Length 95th (m)	0.0	2.5	41.6			
Control Delay (s)	0.0	4.3	22.9			
Lane LOS		A	C			
Approach Delay (s)	0.0	4.3	22.9			
Approach LOS		C				
Intersection Summary						
Average Delay			11.4			
Intersection Capacity Utilization			35.4%		ICU Level of Service	A
Analysis Period (min)			15			

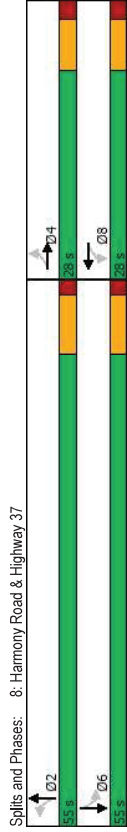
Timings

8: Harmony Road & Highway 37

<Background 2041> AM Peak Hour

02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EB	EB	WB	WB	NB	NB	SB	SB
Traffic Volume (vph)	21	11	69	27	45	220	5	673
Future Volume (vph)	21	11	69	27	45	220	5	673
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	13.5	13.5	52.4	52.4	52.4	52.4		
Actuated g/C Ratio	0.18	0.18	0.70	0.70	0.70	0.70		
v/c Ratio	0.30	0.30	0.57	0.18	0.27	0.01	0.66	
Control Delay	15.4	15.4	38.3	9.0	7.4	6.6	13.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	15.4	15.4	38.3	9.0	7.4	6.6	13.2	
LOS	B	B	D	A	A	A	B	
Approach Delay	15.4	15.4	38.3	7.6	7.6	13.1		
Approach LOS	B	B	D	A	A	B		
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 75.3								
Natural Cycle: 60								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.66								
Intersection Signal Delay: 14.2								
Intersection Capacity Utilization 62.4%								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis

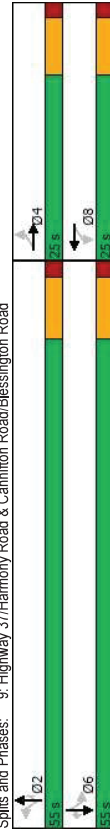
8: Harmony Road & Highway 37

<Background 2041> AM Peak Hour

02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
Traffic Volume (vph)	21	11	49	69	27	1	45	220	14	5	673	47
Future Volume (vph)	21	11	49	69	27	1	45	220	14	5	673	47
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1659	1659	1659	1659	1659	1659	1659	1659	1659	1659	1659	1659
Flt Permitted	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Satd. Flow (perm)	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499
Peak-hour factor, PHF	0.88	0.88	0.88	0.73	0.73	0.73	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	24	12	56	95	37	1	58	282	18	6	765	53
RTOR Reduction (vph)	0	48	0	0	0	0	0	2	0	0	2	0
Lane Group Flow (vph)	0	45	0	0	133	0	58	298	0	6	816	0
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%	11%	25%	5%	10%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	4	4	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	11.4	11.4	11.4	11.4	11.4	11.4	50.8	50.8	50.8	50.8	50.8	50.8
Effective Green, g (s)	11.4	11.4	11.4	11.4	11.4	11.4	50.8	50.8	50.8	50.8	50.8	50.8
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	222	222	222	192	192	192	303	101	580	1181	1181	1181
v/s Ratio Prot	0.03	0.03	0.03	0.10	0.10	0.10	0.13	0.13	0.01	0.01	0.01	0.01
v/s Ratio Perm	0.20	0.20	0.20	0.69	0.69	0.69	0.19	0.28	0.01	0.01	0.01	0.01
Uniform Delay, d1	28.7	28.7	28.7	31.0	31.0	31.0	5.0	5.4	4.4	8.1	8.1	8.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.5	0.5	10.3	10.3	10.3	1.4	0.7	0.0	3.3	3.3	3.3
Delay (s)	29.2	29.2	29.2	41.3	41.3	41.3	6.4	6.1	4.4	11.4	11.4	11.4
Level of Service	C	C	C	D	D	D	A	A	A	B	B	B
Approach Delay (s)	29.2	29.2	29.2	41.3	41.3	41.3	6.1	6.1	11.4	11.4	11.4	11.4
Approach LOS	C	C	C	D	D	D	A	A	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	14.1	14.1	14.1	HCM 2000 Level of Service	B	B						
HCM 2000 Volume to Capacity ratio	0.69	0.69	0.69									
Actuated Cycle Length (s)	76.8	76.8	76.8	Sum of lost time (s)	14.6	14.6						
Intersection Capacity Utilization	62.4%	62.4%	62.4%	ICU Level of Service	B	B						
Analysis Period (min)	15	15	15									
c. Critical Lane Group												

Timings
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
<Background 2041> AM Peak Hour 02-12-2025

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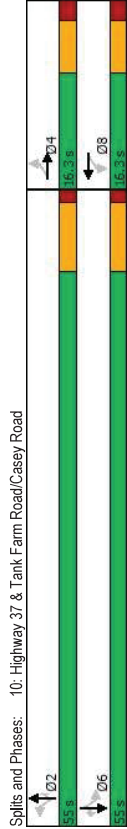
HCM Signalized Intersection Capacity Analysis
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
<Background 2041> AM Peak Hour
02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SPR
Lane Configurations		↔			↔			↔		↔		↔
Traffic Volume (vph)	49	21	0	158	47	3	5	281	47	4	734	85
Future Volume (vph)	49	21	0	158	47	3	5	281	47	4	734	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0			7.0			7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00			1.00			1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00			1.00			1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.97			0.96			0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1722			1683			1444	1610	1262	1770	1827	1553
Flt Permitted	0.72			0.72			0.15	1.00	1.00	0.56	1.00	1.00
Satd. Flow (perm)	1275			1265			232	1610	1262	1037	1827	1553
Peak-hour factor, PHF	0.68		0.68	0.76		0.76	0.83	0.83	0.83	0.81	0.81	0.81
Actd. Flow (vph)	72	31	0	208	62	4	6	339	57	5	906	105
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	23	0	0	43
Lane Group Flow (vph)	0	103	0	0	273	0	6	339	34	5	906	62
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4						2			6	
Permitted Phases	4		8	8			2		2	6		6
Actuated Green, G (s)	18.0		18.0	18.0		18.0	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	18.0		18.0	18.0		18.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22		0.22	0.22		0.22	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0		7.0	7.0		7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0		3.0	3.0		3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	286		284		284		137	953	747	614	1082	920
v/s Ratio Prot								0.21			cd.50	
v/s Ratio Perm	0.08		c0.22		0.03		0.03	0.03	0.00		0.04	
w/c Ratio	0.36		0.96		0.96		0.04	0.36	0.05	0.01	0.84	0.07
Uniform Delay, d1	26.1		30.7		30.7		6.8	8.4	6.8	6.7	13.2	6.9
Progression Factor	1.00		1.00		1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8		42.9		42.9		0.6	1.0	0.1	0.0	7.7	0.1
Delay (s)	26.9		73.5		73.5		7.4	9.5	6.9	6.7	20.9	7.1
Level of Service	C		E		E		A	A	A	A	C	A
Approach Delay (s)	26.9		73.5		73.5			9.1			19.4	
Approach LOS	C		E		E			A			B	
Intersection Summary												
HCM 2000 Control Delay			25.8				HCM 2000 Level of Service					
HCM 2000 Volume to Capacity ratio			0.87				C					
Actuated Cycle Length (s)			80.0				Sum of lost time (s)					
Intersection Capacity Utilization			64.2%				C					
Analysis Period (min)			15				Critical Lane Group					

Timings
10: Highway 37 & Tank Farm Road/Casey Road

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	18	41	100	67	18	314	63	10	857	19
Future Volume (vph)	18	41	100	67	18	314	63	10	857	19
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Actuated g/C Ratio	0.14	0.14	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
v/c Ratio	0.43	0.43	0.92	0.13	0.33	0.08	0.02	0.87	0.02	0.02
Control Delay	31.3	31.3	79.7	6.4	5.8	1.2	4.0	19.5	0.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	31.3	79.7	6.4	5.8	1.2	4.0	19.5	0.5	0.5
LOS	C	C	E	A	A	A	A	B	A	A
Approach Delay	31.3	31.3	79.7	79.7	5.1	5.1	19.0			
Approach LOS	C	C	E	E	A	A	B			
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 72.9										
Natural Cycle: 80										
Control Type: Semi-Act-Uncoord										
Maximum v/c Ratio: 0.92										
Intersection Signal Delay: 21.8										
Intersection Capacity Utilization 72.3%										
Analysis Period (min) 15										



Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	18	41	11	100	67	5	18	314	63	10
Future Volume (vph)	18	41	11	100	67	5	18	314	63	10
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.97	0.97	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1800	1800	1754	1754	1770	1770	1770	1770	1770	1770
Flt Permitted	0.86	0.86	0.82	0.82	0.14	0.14	0.14	0.52	0.52	0.52
Satd. Flow (perm)	1573	1573	1483	1483	262	262	262	1568	1568	1568
Peak-hour factor, PHF	0.73	0.73	0.73	0.91	0.91	0.91	0.75	0.75	0.82	0.82
Adj. Flow (vph)	25	56	15	110	74	5	24	419	84	12
RTOR Reduction (vph)	0	9	0	0	2	0	0	27	0	0
Lane Group Flow (vph)	0	87	0	0	187	0	24	419	57	12
Heavy Vehicles (%)	2%	2%	2%	7%	2%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	49.4	49.4	49.4	49.4	49.4	49.4
Effective Green, g (s)	10.0	10.0	10.0	10.0	49.4	49.4	49.4	49.4	49.4	49.4
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	216	216	203	203	177	177	1064	654	1205	1074
v/s Ratio Prot	0.06	0.06	c0.13	c0.13	0.09	0.09	0.04	0.01	0.01	0.01
v/s Ratio Perm	0.40	0.40	0.92	0.92	0.14	0.14	0.33	0.05	0.02	0.02
Uniform Delay, d1	28.7	28.7	31.0	31.0	4.1	4.1	4.9	3.9	3.8	3.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.2	41.8	41.8	0.7	0.7	0.3	0.0	0.1	0.1
Delay (s)	29.9	29.9	72.9	72.9	4.8	4.8	5.2	3.9	3.9	3.9
Level of Service	C	C	E	E	A	A	A	A	A	A
Approach Delay (s)	29.9	29.9	72.9	72.9	4.9	4.9	17.2			
Approach LOS	C	C	E	E	A	A	B			
Intersection Summary										
HCM 2000 Control Delay					20.0	20.0	13.4			
HCM 2000 Volume to Capacity ratio					0.88	0.88	13.4			
Actuated Cycle Length (s)					72.8	72.8	13.4			
Intersection Capacity Utilization					72.3%	72.3%	13.4			
Analysis Period (min)					15	15				
c. Critical Lane Group										

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	
Maximum Queue (m)	277.1	33.8	28.7	19.0	8.7	53.7	61.3
Average Queue (m)	212.9	19.3	12.1	10.6	1.1	34.4	30.1
95th Queue (m)	280.3	32.1	25.3	19.0	5.6	52.9	53.3
Link Distance (m)	460.8	539.5	539.5		617.0	617.0	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)						7	
Queuing Penalty (veh)						0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	23.6	16.8
Average Queue (m)	11.6	2.7
95th Queue (m)	19.3	10.3
Link Distance (m)	510.9	376.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: River Road & Harmony Road

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (m)	22.7	16.7
Average Queue (m)	5.2	9.3
95th Queue (m)	14.7	15.1
Link Distance (m)	215.8	332.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Harmony Road & Homan Road

Movement	WB	SB
Directions Served	TR	LR
Maximum Queue (m)	9.5	20.5
Average Queue (m)	0.3	1.3
95th Queue (m)	3.1	8.3
Link Distance (m)	41.0	490.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Plumpton & Harmony Road

Movement	NB
Directions Served	LR
Maximum Queue (m)	15.7
Average Queue (m)	2.5
95th Queue (m)	9.7
Link Distance (m)	551.1
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 7: Harmony Public School & Harmony Road									
Movement	EB	WB	NB	SB	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LR						
Maximum Queue (m)	39.4	27.6							
Average Queue (m)	7.5	16.4							
95th Queue (m)	23.7	26.3							
Link Distance (m)	463.5	212.1							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

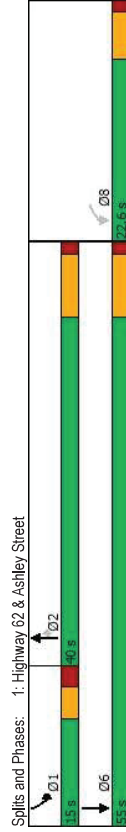
Intersection: 8: Harmony Road & Highway 37									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR			
Maximum Queue (m)	28.5	58.1	23.9	52.0	2.8	80.1			
Average Queue (m)	7.3	19.7	5.4	11.9	0.1	33.0			
95th Queue (m)	19.3	38.5	15.6	32.5	0.9	63.0			
Link Distance (m)	463.5	263.1		2731.5		954.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			79.5		82.0				
Storage Blk Time (%)						0			
Queuing Penalty (veh)						0			

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	T	R	
Maximum Queue (m)	42.4	47.8	5.9	24.3	17.8	6.3	96.1	12.2	
Average Queue (m)	12.5	29.5	0.2	8.5	2.6	0.5	46.5	4.2	
95th Queue (m)	28.4	47.2	1.9	20.5	9.8	3.2	83.1	10.5	
Link Distance (m)	437.7	564.0		780.7			2731.5		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			82.0		85.0	75.0		79.0	
Storage Blk Time (%)							1		
Queuing Penalty (veh)							1		

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	T	R	
Maximum Queue (m)	33.6	58.2	9.8	20.0	3.6	7.7	109.7	5.9	
Average Queue (m)	13.1	25.9	2.0	6.9	0.2	1.1	48.0	1.2	
95th Queue (m)	24.4	45.4	5.9	16.8	1.7	5.2	89.9	4.8	
Link Distance (m)	593.4	692.0		405.0			780.7		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			66.0		70.0	68.0		70.0	
Storage Blk Time (%)							3		
Queuing Penalty (veh)							1		

Network Summary									
Network wide Queuing Penalty: 2									

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	388	568	217	6	1414
Future Volume (vph)	388	568	217	6	1414
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	3.9	3.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Eff Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	1.48	0.34	0.26	0.04	0.76
Control Delay	261.2	9.8	2.4	33.0	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	261.2	9.8	2.4	33.0	13.8
LOS	F	A	A	C	B
Approach Delay	261.2	7.7			13.8
Approach LOS	F	A			B
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 90					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 1.48					
Intersection Signal Delay: 51.0					
Intersection LOS: D					
Intersection Capacity Utilization 71.7%					
Analysis Period (min) 15					
ICU Level of Service C					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	388	8	568	217	6	1414
Future Volume (vph)	388	8	568	217	6	1414
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	1.00		1.00	0.85	1.00	1.00
Flt Protected	0.95		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1450		3195	1392	1770	3505
Flt Permitted	0.95		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1450		3195	1392	1770	3505
Peak-hour factor, PHF	0.84		0.90	0.90	0.86	0.86
Adj. Flow (vph)	462		631	241	7	1644
RTOR Reduction (vph)	1		0	107	0	0
Lane Group Flow (vph)	471		631	134	7	1644
Heavy Vehicles (%)	25%		5%	13%	16%	2%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.4	45.4	1.4	51.8
Effective Green, g (s)	17.0		45.4	45.4	1.4	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	302		1777	774	30	2224
v/s Ratio Prot			0.20		0.00	c0.47
v/s Ratio Perm	c0.33			0.10		
v/c Ratio	1.56		0.36	0.17	0.23	0.74
Uniform Delay, d1	32.3		10.0	8.9	39.6	10.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	267.8		0.6	0.5	4.0	2.3
Delay (s)	300.1		10.6	9.4	43.5	12.5
Level of Service	F		B	A	D	B
Approach Delay (s)	300.1		10.2		12.6	
Approach LOS	F		B		B	
Intersection Summary						
HCM 2000 Control Delay			57.2			HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.02			
Actuated Cycle Length (s)			81.6			Sum of lost time (s) 17.8
Intersection Capacity Utilization			71.7%			ICU Level of Service C
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road

02-12-2025

<Background 2046> AM Peak Hour

<Background 2046> AM Peak Hour

02-12-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	88	61	121	59	74	74
Future Volume (Veh/h)	88	61	121	59	74	74
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.89	0.89	0.80	0.80	0.85	0.85
Hourly flow rate (vph)	99	69	151	74	87	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
VC, conflicting volume	449	188			225	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	449	188			225	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	81	92			94	
cM capacity (veh/h)	531	854			1344	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	168	225	174			
Volume Left	99	0	87			
Volume Right	69	74	0			
cSH	629	1700	1344			
Volume to Capacity	0.27	0.13	0.06			
Queue Length 95th (m)	8.6	0.0	1.7			
Control Delay (s)	12.8	0.0	4.2			
Lane LOS	B	A	A			
Approach Delay (s)	12.8	0.0	4.2			
Approach LOS	B					
Intersection Summary						
Average Delay			5.1			
Intersection Capacity Utilization			36.6%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		T	T	T	T			T			T	T
Traffic Volume (veh/h)	3	114	39	3	106	0	30	2	6	67	6	6
Future Volume (Veh/h)	3	114	39	3	106	0	30	2	6	67	6	6
Sign Control		Free		Free			Stop				Stop	
Grade		0%		0%			0%				0%	
Peak Hour Factor	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.69	0.51	0.51	0.51
Hourly flow rate (vph)	4	136	46	3	119	0	43	3	9	131	12	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type						None						
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
VC, conflicting volume	119			182			310	292	159	302	315	119
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	119			182			310	292	159	302	315	119
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			100			93	100	99	79	98	99
cM capacity (veh/h)	1469			1393			622	616	886	638	598	933
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	186	122	55	155								
Volume Left	4	3	43	131								
Volume Right	46	0	9	12								
cSH	1469	1393	654	651								
Volume to Capacity	0.00	0.00	0.08	0.24								
Queue Length 95th (m)	0.1	0.1	2.2	7.4								
Control Delay (s)	0.2	0.2	11.0	12.3								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.2	0.2	11.0	12.3								
Approach LOS	B	B										
Intersection Summary												
Average Delay				4.9								
Intersection Capacity Utilization				21.3%						ICU Level of Service	A	
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	4	W		
Traffic Volume (veh/h)	2	180	124	2	2	2
Future Volume (Veh/h)	2	180	124	2	2	2
Sign Control		Free	Free	Stop		
Grade		0%	0%	0%		
Peak Hour Factor	0.77	0.77	0.51	0.50	0.50	
Hourly flow rate (vph)	3	234	243	4	4	4
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked				485	245	
VC conflicting volume	247					
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	247			485	245	
IC single (s)	4.1			6.4	7.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	4.2	
p0 queue free %	100			99	99	
cM capacity (veh/h)	1319			540	604	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	237	247	8			
Volume Left	3	0	4			
Volume Right	0	4	4			
cSH	1319	1700	570			
Volume to Capacity	0.00	0.15	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.1	0.0	11.4			
Lane LOS	A	B	B			
Approach Delay (s)	0.1	0.0	11.4			
Approach LOS			B			
Intersection Summary						
Average Delay			0.2			
Intersection Capacity Utilization			21.1%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	4	4	W		
Traffic Volume (veh/h)	118	8	3	99	2	11
Future Volume (Veh/h)	118	8	3	99	2	11
Sign Control	Free	Free	Free	Stop		
Grade	0%	0%	0%	0%		
Peak Hour Factor	0.81	0.81	0.87	0.67	0.67	
Hourly flow rate (vph)	146	10	3	114	3	16
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked				271	151	
VC conflicting volume			156			
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol			156	271	151	
IC single (s)			4.1	6.4	6.2	
IC 2 stage (s)						
IF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	98	
cM capacity (veh/h)			1424	717	895	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	156	117	19			
Volume Left	0	3	3			
Volume Right	10	0	16			
cSH	1700	1424	861			
Volume to Capacity	0.09	0.00	0.02			
Queue Length 95th (m)	0.0	0.1	0.5			
Control Delay (s)	0.0	0.2	9.3			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.2	9.3			
Approach LOS			A			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			17.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

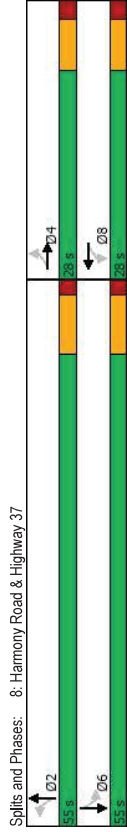
Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4		W		
Traffic Volume (veh/h)	0	200	127	0	0	0
Future Volume (Veh/h)	0	200	127	0	0	0
Sign Control		Free	Free	Stop		
Grade		0%	0%	0%		
Peak Hour Factor	0.78	0.78	0.51	0.92	0.92	
Hourly flow rate (vph)	0	256	249	0	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked				505	249	
VC, conflicting volume	249					
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	249			505	249	
IC, single (s)	4.1			6.4	6.2	
IC, 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	100	
cM capacity (veh/h)	1317			527	790	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	256	249	0			
Volume Left	0	0	0			
Volume Right	0	0	0			
cSH	1317	1700	1700			
Volume to Capacity	0.00	0.15	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	0.0			
Lane LOS		A				
Approach Delay (s)	0.0	0.0	0.0			
Approach LOS		A				
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization		13.9%			ICU Level of Service	A
Analysis Period (min)		15				

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4			W		
Traffic Volume (veh/h)	53	100	99	109	58	76
Future Volume (Veh/h)	53	100	99	109	58	76
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.54	0.54	0.78	0.30	0.30	
Hourly flow rate (vph)	98	185	127	140	193	253
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None			None	
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked				283	584	190
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol				283	584	190
IC, single (s)				4.3	6.6	6.4
IC, 2 stage (s)						
IF (s)				2.4	3.7	3.5
p0 queue free %				89	51	68
cM capacity (veh/h)				1198	396	803
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	283	287	446			
Volume Left	0	127	193			
Volume Right	185	0	253			
cSH	1700	1198	556			
Volume to Capacity	0.17	0.11	0.80			
Queue Length 95th (m)	0.0	2.8	62.1			
Control Delay (s)	0.0	4.5	32.7			
Lane LOS		A	D			
Approach Delay (s)	0.0	4.5	32.7			
Approach LOS		D				
Intersection Summary						
Average Delay			15.8			
Intersection Capacity Utilization		38.0%			ICU Level of Service	A
Analysis Period (min)		15				

Timings
8: Harmony Road & Highway 37

<Background 2046> AM Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	8	8	2	2	6	6
Traffic Volume (vph)	23	12	76	30	50	243	6	743
Future Volume (vph)	23	12	76	30	50	243	6	743
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	27.6	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	14.5	14.5	50.3	50.3	50.3	50.3	50.3	50.3
Actuated g/C Ratio	0.18	0.18	0.63	0.63	0.63	0.63	0.63	0.63
v/c Ratio	0.32	0.32	0.60	0.30	0.33	0.01	0.80	0.80
Control Delay	14.7	14.7	38.8	13.1	8.5	7.2	19.1	19.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	14.7	38.8	13.1	8.5	7.2	19.1	19.1
LOS	B	B	D	B	A	A	A	B
Approach Delay	14.7	14.7	38.8	38.8	9.3	19.1	19.1	19.1
Approach LOS	B	B	D	D	A	A	B	B
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 79.5								
Natural Cycle: 70								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.80								
Intersection Signal Delay: 18.2								
Intersection Capacity Utilization 67.0%								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37

<Background 2046> AM Peak Hour
02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	6	6	6	6	6	6
Traffic Volume (vph)	23	12	55	76	30	2	50	243	15	6	743	52
Future Volume (vph)	23	12	55	76	30	2	50	243	15	6	743	52
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1657	1657	1657	1657	1657	1657	1657	1657	1657	1657	1657	1657
Flt Permitted	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Satd. Flow (perm)	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499	1499
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	26	14	62	104	41	3	64	312	19	7	844	59
RTOR Reduction (vph)	0	51	0	0	1	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	52	0	0	147	0	64	329	0	7	900	0
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%	11%	25%	5%	10%
Turn Type	Perm	NA	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	6	6	6	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6	6	6	6
Actuated Green, G (s)	14.5	14.5	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3
Effective Green, g (s)	14.5	14.5	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3	50.3
Actuated g/C Ratio	0.18	0.18	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	273	273	273	273	273	273	273	273	273	273	273	273
v/s Ratio Prot	0.03	0.03	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
v/s Ratio Perm	0.19	0.19	0.60	0.60	0.30	0.33	0.01	0.80	0.80	0.80	0.80	0.80
Uniform Delay, d1	27.5	27.5	29.8	29.8	6.6	6.7	5.4	10.8	10.8	10.8	10.8	10.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3	3.8	3.8	3.7	0.9	0.0	5.8	5.8	5.8	5.8	5.8
Delay (s)	27.8	27.8	33.6	33.6	10.3	7.6	5.4	16.6	16.6	16.6	16.6	16.6
Level of Service	C	C	C	C	B	A	A	B	B	B	B	B
Approach Delay (s)	27.8	27.8	33.6	33.6	8.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5
Approach LOS	C	C	C	C	A	B	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7
HCM 2000 Volume to Capacity ratio	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Actuated Cycle Length (s)	79.4	79.4	79.4	79.4	79.4	79.4	79.4	79.4	79.4	79.4	79.4	79.4
Intersection Capacity Utilization	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%	67.0%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group												

Timings

9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

<Background 2046> AM Peak Hour

02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	55	23	174	52	6	311	52	5	811	94
Traffic Volume (vph)	55	23	174	52	6	311	52	5	811	94
Future Volume (vph)	55	23	174	52	6	311	52	5	811	94
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Minimum Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
v/c Ratio	0.40	0.40	1.03	1.03	0.39	0.39	0.01	0.93	0.12	0.12
Control Delay	31.3	31.3	95.7	10.2	10.2	2.3	6.8	30.9	1.8	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.3	31.3	95.7	10.2	10.2	2.3	6.8	30.9	1.8	1.8
LOS	C	C	F	B	B	A	A	C	A	A
Approach Delay	31.3	31.3	95.7	9.1	A	A	A	27.8	C	C
Approach LOS	C	C	F	F	A	A	A	C	C	C
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 80										
Natural Cycle: 90										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.03										
Intersection Signal Delay: 34.1										
Intersection Capacity Utilization 69.5%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis

9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

<Background 2046> AM Peak Hour

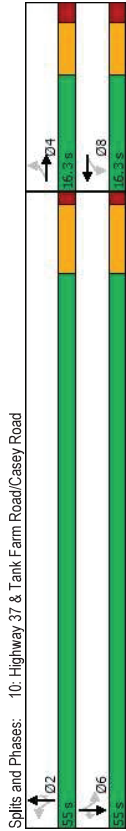
02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	55	23	0	174	52	3	6	311	52	5	811	94
Traffic Volume (vph)	55	23	0	174	52	3	6	311	52	5	811	94
Future Volume (vph)	55	23	0	174	52	3	6	311	52	5	811	94
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.97	0.96	0.96	0.96	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1722	1722	1722	1683	1683	1683	1444	1610	1262	1770	1827	1553
Flt Permitted	0.72	0.72	0.72	0.74	0.74	0.74	0.09	1.00	1.00	0.53	1.00	1.00
Satd. Flow (perm)	1281	1281	1281	1292	1292	1292	137	1610	1262	983	1827	1553
Peak-hour factor, PHF	0.68	0.68	0.68	0.76	0.76	0.76	0.83	0.83	0.83	0.81	0.81	0.81
Adj. Flow (vph)	81	34	0	229	68	4	7	375	63	6	1001	116
RTOR Reduction (vph)	0	0	0	1	0	0	0	0	26	0	0	47
Lane Group Flow (vph)	0	115	0	0	300	0	7	375	37	6	1001	69
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	18.0	18.0	18.0	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	18.0	18.0	18.0	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	288	288	288	290	290	290	81	953	747	582	1082	920
v/s Ratio Prot	0.09	0.40	0.40	c0.23	c0.23	c0.23	0.05	0.23	0.03	0.01	c0.55	0.04
v/s Ratio Perm	0.40	0.40	0.40	1.04	1.04	1.04	0.09	0.39	0.05	0.01	0.93	0.07
Uniform Delay, d1	26.4	26.4	26.4	31.0	31.0	31.0	7.0	8.7	6.8	6.7	14.7	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.9	0.9	62.3	62.3	62.3	2.1	1.2	0.1	0.0	14.4	0.2
Delay (s)	27.3	27.3	27.3	93.3	93.3	93.3	9.1	9.9	7.0	6.7	29.1	7.1
Level of Service	C	C	C	F	F	F	A	A	A	A	C	A
Approach Delay (s)	27.3	27.3	27.3	93.3	93.3	93.3	9.5	9.5	26.7	26.7	26.7	26.7
Approach LOS	C	C	C	F	F	F	A	A	C	C	C	C
Intersection Summary												
HCM 2000 Control Delay	33.0											
HCM 2000 Level of Service	C											
HCM 2000 Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	14.6											
Intersection Capacity Utilization	69.5%											
ICU Level of Service	C											
Analysis Period (min)	15											
c. Critical Lane Group												

Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Background 2046> AM Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	45	111	74	20	347	70	11	946	21
Future Volume (vph)	20	45	111	74	20	347	70	11	946	21
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Detector Phase	4	4	8	8	2	2	2	2	6	6
Switch Phase	4	4	8	8	2	2	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	None	None	None
Act Eff Green (s)	10.0	10.0	10.0	10.0	48.0	48.0	48.0	48.0	48.0	48.0
Act Eff Green (s)	10.0	10.0	10.0	10.0	48.0	48.0	48.0	48.0	48.0	48.0
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.46	0.46	0.46	0.46	0.26	0.37	0.09	0.02	0.97	0.02
Control Delay	32.5	32.5	32.5	32.5	12.1	12.1	6.1	1.2	4.1	32.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	32.5	32.5	32.5	12.1	12.1	6.1	1.2	4.1	32.6
LOS	C	C	F	F	B	B	A	A	C	A
Approach Delay	32.5	32.5	32.5	32.5	12.1	12.1	6.1	1.2	4.1	32.6
Approach LOS	C	C	F	F	A	A	A	A	C	C
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.4										
Natural Cycle: 90										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.00										
Intersection Signal Delay: 31.2										
Intersection Capacity Utilization 78.0%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Background 2046> AM Peak Hour
02-12-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	20	45	111	74	20	347	70	11	946	21
Future Volume (vph)	20	45	111	74	20	347	70	11	946	21
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.99	0.99	0.97	0.97	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1801	1801	1752	1752	1770	1770	1770	1770	1770	1770
Flt Permitted	0.86	0.86	0.82	0.82	0.08	0.08	0.08	0.08	0.08	0.08
Satd. Flow (perm)	1564	1564	1484	1484	155	155	155	155	155	155
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.91	0.91	0.75	0.75	0.82	0.82
Adj. Flow (vph)	27	62	16	122	81	7	27	463	93	1154
RTOR Reduction (vph)	0	9	0	0	2	0	0	0	0	0
Lane Group Flow (vph)	0	96	0	0	208	0	27	463	63	1154
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	48.0	48.0	48.0	48.0	48.0	48.0
Effective Green, g (s)	10.0	10.0	10.0	10.0	48.0	48.0	48.0	48.0	48.0	48.0
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	219	219	207	207	104	1252	1054	609	1193	1064
v/s Ratio Prot	0.06	0.06	c0.14	c0.14	0.17	0.25	0.04	0.04	0.01	0.01
v/s Ratio Perm	0.44	0.44	1.01	1.01	0.26	0.37	0.06	0.02	0.97	0.02
Uniform Delay, d1	28.1	28.1	30.7	30.7	4.5	5.1	4.0	3.9	11.0	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.4	64.2	64.2	2.6	0.4	0.0	0.1	19.3	0.0
Delay (s)	29.5	29.5	94.9	94.9	7.2	5.5	4.0	4.0	30.3	3.9
Level of Service	C	C	F	F	A	A	A	A	C	A
Approach Delay (s)	29.5	29.5	94.9	94.9	5.3	5.3	29.4	29.4	29.4	29.4
Approach LOS	C	C	F	F	A	A	C	C	C	C
Intersection Summary										
HCM 2000 Control Delay	29.3	29.3	HCM 2000 Level of Service	HCM 2000 Level of Service	C	C	C	C	C	C
HCM 2000 Volume to Capacity ratio	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Actuated Cycle Length (s)	71.4	71.4	71.4	71.4	71.4	71.4	71.4	71.4	71.4	71.4
Intersection Capacity Utilization	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%	78.0%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group										

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	282.9	56.0	52.2	15.7	8.6	67.4	68.2
Average Queue (m)	258.9	24.2	13.8	10.3	1.2	41.9	42.6
95th Queue (m)	276.2	40.9	33.2	16.9	5.8	63.1	65.9
Link Distance (m)	460.8	539.5	539.5			617.0	617.0
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			0			11	
Queuing Penalty (veh)			0			1	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	27.6	21.3
Average Queue (m)	12.8	3.9
95th Queue (m)	23.5	13.3
Link Distance (m)	510.9	376.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: River Road & Harmony Road

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (m)	28.1	22.0
Average Queue (m)	8.5	10.2
95th Queue (m)	16.8	16.5
Link Distance (m)	215.8	332.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Harmony Road & Homan Road

Movement	WB	SB
Directions Served	TR	LR
Maximum Queue (m)	11.4	16.5
Average Queue (m)	0.4	2.5
95th Queue (m)	3.8	11.2
Link Distance (m)		41.0 490.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	8.6	9.2
Average Queue (m)	0.3	2.6
95th Queue (m)	2.8	9.2
Link Distance (m)		902.5 551.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	
Directions Served	
Maximum Queue (m)	
Average Queue (m)	
95th Queue (m)	
Link Distance (m)	
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Harmony Public School & Harmony Road									
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	TR	LT	LR						
Maximum Queue (m)	12.5	23.9	32.6						
Average Queue (m)	0.4	3.5	16.7						
95th Queue (m)	4.1	12.7	26.9						
Link Distance (m)	584.7	463.5	212.1						
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

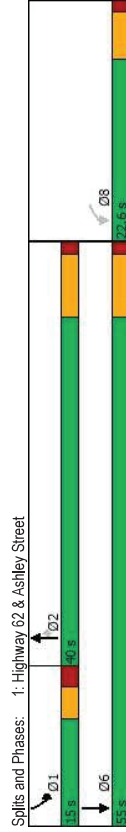
Intersection: 8: Harmony Road & Highway 37									
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	32.2	60.4	18.9	36.1	18.0	104.7			
Average Queue (m)	8.1	18.8	7.6	9.4	1.2	39.9			
95th Queue (m)	22.0	40.2	18.1	24.6	7.2	71.5			
Link Distance (m)	463.5	263.1	2731.5			954.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			79.5			82.0			
Storage Blk Time (%)									1
Queuing Penalty (veh)									0

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road									
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	LTR	L	T	R	T	R			
Maximum Queue (m)	29.4	106.2	11.2	44.0	15.4	108.4	18.4		
Average Queue (m)	11.0	38.7	0.9	17.1	2.4	50.8	3.4		
95th Queue (m)	22.9	70.7	4.7	37.8	9.8	92.0	10.4		
Link Distance (m)	437.7	564.0	780.7			2731.5			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			82.0			85.0	79.0		
Storage Blk Time (%)									2
Queuing Penalty (veh)									2

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	LTR	L	T	R	L	T	R	L	T
Maximum Queue (m)	27.2	52.4	11.3	26.9	10.2	14.2	147.3	6.0	
Average Queue (m)	11.3	25.5	1.9	9.0	0.9	2.2	66.6	1.1	
95th Queue (m)	21.5	40.6	7.2	20.9	5.2	8.7	120.5	4.6	
Link Distance (m)	593.4	692.0	405.0			780.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)			66.0			70.0	68.0		70.0
Storage Blk Time (%)									6
Queuing Penalty (veh)									2

Network Summary									
Network wide Queuing Penalty: 5									

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	↑↑	↑↑	↓	↓↓
Traffic Volume (vph)	275	1323	457	7	707
Future Volume (vph)	275	1323	457	7	707
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Eff Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	0.85	0.67	0.46	0.05	0.39
Control Delay	51.4	14.4	5.4	33.1	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	14.4	5.4	33.1	8.2
LOS	D	B	A	C	A
Approach Delay	51.4	12.1			8.5
Approach LOS	D	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 75					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.85					
Intersection Signal Delay: 15.2					Intersection LOS: B
Intersection Capacity Utilization 63.6%					ICU Level of Service B
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		↑↑	↑↑	↓	↓↓
Traffic Volume (vph)	275	18	1323	457	7	707
Future Volume (vph)	275	18	1323	457	7	707
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	0.99		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687		3539	1568	1770	3374
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687		3539	1568	1770	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	296	19	1393	481	8	813
RTOR Reduction (vph)	3	0	0	134	0	0
Lane Group Flow (vph)	312	0	1393	347	8	813
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.4	45.4	1.4	51.8
Effective Green, g (s)	17.0		45.4	45.4	1.4	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	351		1969	872	30	2141
v/s Ratio Prot			c0.39		0.00	c0.24
v/s Ratio Perm	c0.18			0.22		
v/c Ratio	0.89		0.71	0.40	0.27	0.38
Uniform Delay, d1	31.4		13.2	10.3	39.6	7.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	26.7		2.2	1.4	4.7	0.5
Delay (s)	58.0		15.4	11.7	44.3	7.7
Level of Service	E		B	B	D	A
Approach Delay (s)	58.0		14.5		8.0	
Approach LOS	E		B		A	
Intersection Summary						
HCM 2000 Control Delay			17.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.76			
Actuated Cycle Length (s)			81.6		Sum of lost time (s)	17.8
Intersection Capacity Utilization			63.6%		ICU Level of Service	B
Analysis Period (min)			15			
Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road

<Background 2041> PM Peak Hour
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Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	74	82	162	124	89	84
Future Volume (Veh/h)	74	82	162	124	89	84
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.96	0.96	0.86	0.86
Hourly flow rate (vph)	84	93	169	129	103	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
VC, conflicting volume	538	234				298
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	538	234				298
IC, single (s)	6.4	6.2				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	82	88				92
cM capacity (veh/h)	463	806				1263
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	177	298	201			
Volume Left	84	0	103			
Volume Right	93	129	0			
cSH	596	1700	1263			
Volume to Capacity	0.30	0.18	0.08			
Queue Length 95th (m)	9.9	0.0	2.1			
Control Delay (s)	13.6	0.0	4.5			
Lane LOS	B	A	A			
Approach Delay (s)	13.6	0.0	4.5			
Approach LOS	B					
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization			44.6%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road

<Background 2041> PM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4		4			4			4	
Traffic Volume (veh/h)	12	173	48	3	124	3	92	5	14	25	11
Future Volume (Veh/h)	12	173	48	3	124	3	92	5	14	25	11
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.71	0.71	0.71	0.83	0.83	0.83
Hourly flow rate (vph)	13	190	53	3	129	3	130	7	20	30	13
Pedestrians											
Lane Width (m)											
Walking Speed (m/s)											
Percent Blockage											
Right turn flare (veh)											
Median type						None					
Median storage (veh)											
Upstream signal (m)											
pX, platoon unblocked											
VC, conflicting volume	132			243			380	216	402	406	130
VC1, stage 1 conf vol											
VC2, stage 2 conf vol											
VCu, unblocked vol	132			243			380	216	402	406	130
IC, single (s)	4.1			4.1			6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)											
IF (s)	2.2			2.2			3.5	4.0	3.3	4.0	3.3
p0 queue free %	99			100			76	99	98	94	98
cM capacity (veh/h)	1463			1323			549	823	535	528	919
Direction, Lane #	EB 1	WB 1	NB 1	SB 1							
Volume Total	256	135	157	49							
Volume Left	13	3	130	30							
Volume Right	53	3	20	6							
cSH	1453	1323	573	562							
Volume to Capacity	0.01	0.00	0.27	0.09							
Queue Length 95th (m)	0.2	0.1	8.9	2.3							
Control Delay (s)	0.5	0.2	13.6	12.0							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.5	0.2	13.6	12.0							
Approach LOS	B		B								
Intersection Summary											
Average Delay			4.8								
Intersection Capacity Utilization			33.2%		ICU Level of Service				A		
Analysis Period (min)			15								

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	3	3	5	
Traffic Volume (veh/h)	5	129	114	3	3	5	
Future Volume (Veh/h)	5	129	114	3	3	5	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.69	0.69	0.63	0.63	0.75	0.75	
Hourly flow rate (vph)	7	187	181	5	4	7	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked	186				384	184	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	186				384	184	
IC single (s)	4.1				6.4	6.5	
IC 2 stage (s)							
IF (s)	2.2				3.5	3.5	
p0 queue free %	99				99	99	
CM capacity (veh/h)	1388				615	803	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	194	186	11				
Volume Left	7	0	4				
Volume Right	0	5	7				
cSH	1388	1700	723				
Volume to Capacity	0.01	0.11	0.02				
Queue Length 95th (m)	0.1	0.0	0.4				
Control Delay (s)	0.3	0.0	10.1				
Lane LOS	A		B				
Approach Delay (s)	0.3	0.0	10.1				
Approach LOS			B				
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			20.8%			ICU Level of Service	A
Analysis Period (min)			15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4	4	4	4	4	4	
Traffic Volume (veh/h)	159	5	4	108	8	21	
Future Volume (Veh/h)	159	5	4	108	8	21	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.95	0.95	0.87	0.87	0.75	0.75	
Hourly flow rate (vph)	167	5	5	124	11	28	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None		None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol							
IC single (s)							
IC 2 stage (s)							
IF (s)							
p0 queue free %							
CM capacity (veh/h)							
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	172	129	39				
Volume Left	0	5	11				
Volume Right	5	0	28				
cSH	1700	1405	811				
Volume to Capacity	0.10	0.00	0.05				
Queue Length 95th (m)	0.0	0.1	1.2				
Control Delay (s)	0.0	0.3	9.7				
Lane LOS		A	A				
Approach Delay (s)	0.0	0.3	9.7				
Approach LOS			A				
Intersection Summary							
Average Delay			1.2				
Intersection Capacity Utilization			18.9%			ICU Level of Service	A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

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Movement	EBL	EBT	WBT	SBL	SBR
Lane Configurations		4	4	W	W
Traffic Volume (veh/h)	0	122	108	0	1
Future Volume (Veh/h)	0	122	108	0	1
Sign Control		Free	Free	Stop	Stop
Grade		0%	0%	0%	0%
Peak Hour Factor	0.80	0.80	0.61	0.61	0.50
Hourly flow rate (vph)	0	152	177	0	2
Pedestrians					
Lane Width (m)					
Walking Speed (m/s)					
Percent Blockage					
Right turn flare (veh)					
Median type		None	None		
Median storage (veh)					
Upstream signal (m)					
pX platoon unblocked	177			329	177
VC conflicting volume					
VC1 stage 1 conf vol					
VC2 stage 2 conf vol					
VCu unblocked vol	177			329	177
IC single (s)	4.1			6.4	6.2
IC 2 stage (s)					
IF (s)	2.2			3.5	3.3
p0 queue free %	100			100	100
cM capacity (veh/h)	1399			665	866
Direction, Lane #	EB 1	WB 1	SB 1		
Volume Total	152	177	4		
Volume Left	0	0	2		
Volume Right	0	0	2		
cSH	1399	1700	753		
Volume to Capacity	0.00	0.10	0.01		
Queue Length 95th (m)	0.0	0.0	0.1		
Control Delay (s)	0.0	0.0	9.8		
Lane LOS		A	A		
Approach Delay (s)	0.0	0.0	9.8		
Approach LOS		A	A		
Intersection Summary					
Average Delay			0.1		
Intersection Capacity Utilization			16.4%		ICU Level of Service A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

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Movement	EBT	EBR	WBL	NBL	NBR
Lane Configurations	4	4	4	W	W
Traffic Volume (veh/h)	137	3	10	74	23
Future Volume (Veh/h)	137	3	10	74	23
Sign Control	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%
Peak Hour Factor	1.00	1.00	0.76	0.43	0.43
Hourly flow rate (vph)	137	3	13	97	53
Pedestrians					
Lane Width (m)					
Walking Speed (m/s)					
Percent Blockage					
Right turn flare (veh)					
Median type		None	None		
Median storage (veh)					
Upstream signal (m)					
pX platoon unblocked			140	262	138
VC conflicting volume					
VC1 stage 1 conf vol					
VC2 stage 2 conf vol					
VCu unblocked vol			140	262	138
IC single (s)			4.1	6.4	6.2
IC 2 stage (s)					
IF (s)			2.2	3.5	3.3
p0 queue free %			99	93	90
cM capacity (veh/h)			1443	721	910
Direction, Lane #	EB 1	WB 1	NB 1		
Volume Total	140	110	148		
Volume Left	0	13	53		
Volume Right	3	0	95		
cSH	1700	1443	832		
Volume to Capacity	0.08	0.01	0.18		
Queue Length 95th (m)	0.0	0.2	5.2		
Control Delay (s)	0.0	1.0	10.3		
Lane LOS		A	B		
Approach Delay (s)	0.0	1.0	10.3		
Approach LOS		B	B		
Intersection Summary					
Average Delay			4.1		
Intersection Capacity Utilization			22.8%		ICU Level of Service A
Analysis Period (min)			15		

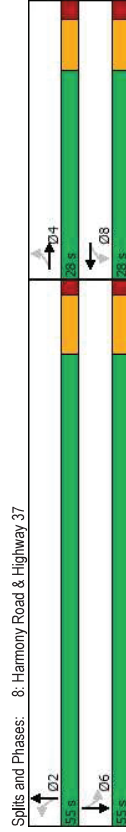
Timings
8: Harmony Road & Highway 37

HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37

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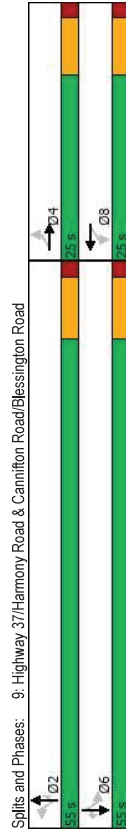
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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	66	40	30	10	51	620	4	435
Traffic Volume (vph)	66	40	30	10	51	620	4	435
Future Volume (vph)	66	40	30	10	51	620	4	435
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	4	4	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	14.0	14.0	50.2	50.2	50.2	50.2	50.2	50.2
Actuated g/C Ratio	0.18	0.18	0.64	0.64	0.64	0.64	0.64	0.64
v/c Ratio	0.65	0.65	0.24	0.12	0.64	0.01	0.51	0.51
Control Delay	34.2	34.2	28.7	7.6	12.6	7.0	10.2	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	34.2	34.2	28.7	7.6	12.6	7.0	10.2	10.2
LOS	C	C	A	A	B	A	B	B
Approach Delay	34.2	34.2	28.7	12.3	10.2	10.2	10.2	10.2
Approach LOS	C	C	B	B	B	B	B	B
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 78.8								
Natural Cycle: 60								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.65								
Intersection Signal Delay: 14.7								
Intersection Capacity Utilization 64.2%								
Analysis Period (min) 15								



Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBT
Lane Configurations	66	40	30	10	51	620	4	435	86
Traffic Volume (vph)	66	40	30	10	51	620	4	435	86
Future Volume (vph)	66	40	30	10	51	620	4	435	86
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1702	1702	1663	1663	1770	1841	1770	1693	1693
Flt Permitted	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Satd. Flow (perm)	1478	1478	1128	1128	1265	1341	1265	1193	1193
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	73	44	72	36	12	1	57	689	58
RTOR Reduction (vph)	0	30	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	159	0	0	48	0	57	744	0
Heavy Vehicles (%)	2%	2%	7%	10%	2%	100%	2%	2%	7%
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6
Actuated Green, G (s)	13.9	13.9	13.9	13.9	50.2	50.2	50.2	50.2	50.2
Effective Green, g (s)	13.9	13.9	13.9	13.9	50.2	50.2	50.2	50.2	50.2
Actuated g/C Ratio	0.18	0.18	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	261	261	199	199	487	1174	339	1079	1079
v/s Ratio Prot	c0.11	c0.11	0.04	0.04	0.07	c0.40	0.01	0.32	0.32
v/s Ratio Perm	0.61	0.61	0.24	0.24	0.12	0.63	0.01	0.51	0.51
Uniform Delay, d1	29.9	29.9	27.9	27.9	5.6	8.7	5.2	7.6	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.2	4.2	0.6	0.6	0.5	2.6	0.1	1.7	1.7
Delay (s)	34.1	34.1	28.5	28.5	6.1	11.3	5.3	9.3	9.3
Level of Service	C	C	C	C	A	B	A	A	A
Approach Delay (s)	34.1	34.1	28.5	28.5	10.9	9.3	9.3	9.3	9.3
Approach LOS	C	C	C	C	B	B	A	A	A
Intersection Summary									
HCM 2000 Control Delay	13.6	13.6	HCM 2000 Level of Service	B					
HCM 2000 Volume to Capacity ratio	0.63	0.63							
Actuated Cycle Length (s)	78.7	78.7	Sum of lost time (s)	14.6					
Intersection Capacity Utilization	64.2%	64.2%	ICU Level of Service	C					
Analysis Period (min)	15	15							
c. Critical Lane Group									

Timings
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
<Background 2041> PM Peak Hour
02-12-2025

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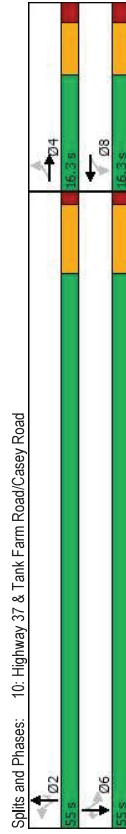
HCM Signalized Intersection Capacity Analysis
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
02-12-2025
<Background 2041> PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	122	66	3	51	48	3	4	664	144	16	423
Future Volume (vph)	122	66	3	51	48	3	4	664	144	16	423
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0			7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97			0.98	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1754			1761	1770	1863	1583	1770	1759	1509	1509
Flt Permitted	0.77			0.76	0.47	1.00	1.00	0.28	1.00	1.00	1.00
Satd. Flow (perm)	1386			1376	868	1863	1583	517	1759	1509	1509
Peak-hour factor, PHF	0.91	0.91	0.91	0.76	0.76	0.76	0.90	0.90	0.90	0.91	0.91
Aid. Flow (vph)	134	73	3	67	63	4	4	738	160	18	465
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	62	0	0
Lane Group Flow (vph)	0	209	0	0	132	0	4	738	98	18	465
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm
Protected Phases	4			8			2		2	6	6
Permitted Phases				8			2		2	6	6
Actuated Green, G (s)	15.4			15.4	15.4	47.5	47.5	47.5	47.5	47.5	47.5
Effective Green, g (s)	15.4			15.4	15.4	47.5	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.20			0.20	0.20	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	7.0			7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0			3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	275			273	532	1141	970	316	1078	924	
v/s Ratio Prot	c0.15			0.10	0.00	0.06	0.06	0.03	0.26		
v/c Ratio Perm	0.76			0.48	0.01	0.65	0.10	0.06	0.43	0.03	
Uniform Delay, d1	29.3			27.5	5.8	9.6	6.2	6.0	7.9	5.9	
Progression Factor	1.00			1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.7			1.4	0.0	2.8	0.2	0.3	1.3	0.1	
Delay (s)	41.0			28.9	5.9	12.5	6.4	6.4	9.2	6.0	
D Level of Service	D			C	A	B	A	A	A	A	
Approach Delay (s)	41.0			28.9				11.4		8.8	
Approach LOS	D			C				B		A	
Intersection Summary											
HCM 2000 Control Delay				15.4	HCM 2000 Level of Service						
HCM 2000 Volume to Capacity ratio				0.67	B						
Actuated Cycle Length (s)				77.5	Sum of lost time (s)						
Intersection Capacity Utilization				62.2%	ICU Level of Service						
Analysis Period (min)				15	B						
Critical Lane Group					Critical Lane Group						

Timings
10: Highway 37 & Tank Farm Road/Casey Road

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	34	74	74	58	54	740	71	7	426	14
Future Volume (vph)	34	74	74	58	54	740	71	7	426	14
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Detector Phase	4	4	8	8	2	2	2	2	6	6
Switch Phase	4	4	8	8	2	2	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	Max	Max
Recall Mode	None	None	None	None	None	None	None	None	Max	Max
Act Eff Green (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.87	0.87	1.34	0.14	0.62	0.07	0.02	0.43	0.02	0.02
Control Delay	64.2	64.2	215.9	5.3	9.4	1.3	4.1	6.8	0.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	64.2	215.9	5.3	9.4	1.3	4.1	6.8	0.2	0.2
LOS	E	F	F	A	A	A	A	A	A	A
Approach Delay	64.2	215.9	5.3	9.4	1.3	4.1	6.8	0.2	0.2	0.2
Approach LOS	E	F	F	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 60										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.34										
Intersection Signal Delay: 39.3										
Intersection Capacity Utilization 70.7%										
Analysis Period (min) 15										



Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	34	74	74	58	54	740	71	7	426	14
Future Volume (vph)	34	74	74	58	54	740	71	7	426	14
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Detector Phase	4	4	8	8	2	2	2	2	6	6
Switch Phase	4	4	8	8	2	2	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	Max	Max
Recall Mode	None	None	None	None	None	None	None	None	Max	Max
Act Eff Green (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.87	0.87	1.34	0.14	0.62	0.07	0.02	0.43	0.02	0.02
Control Delay	64.2	64.2	215.9	5.3	9.4	1.3	4.1	6.8	0.2	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	64.2	215.9	5.3	9.4	1.3	4.1	6.8	0.2	0.2
LOS	E	F	F	A	A	A	A	A	A	A
Approach Delay	64.2	215.9	5.3	9.4	1.3	4.1	6.8	0.2	0.2	0.2
Approach LOS	E	F	F	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 60										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.34										
Intersection Signal Delay: 39.3										
Intersection Capacity Utilization 70.7%										
Analysis Period (min) 15										

Intersection Summary										
HCM 2000 Control Delay	39.3	HCM 2000 Level of Service	D							
HCM 2000 Volume to Capacity ratio	0.75									
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	13.4							
Intersection Capacity Utilization	70.7%	ICU Level of Service	C							
Analysis Period (min)	15									
c. Critical Lane Group										

Intersection: 1: Highway 62 & Ashley Street												
Movement	WB	NB	NB	SB	SB	SB	SB	SB	T	SB	SB	T
Directions Served	LR		T		R		L					
Maximum Queue (m)	117.1	54.3	59.7	15.7	8.7	51.5	48.0					
Average Queue (m)	91.4	37.6	32.2	8.1	2.1	27.6	19.6					
95th Queue (m)	120.6	55.3	53.1	13.9	7.4	46.0	41.6					
Link Distance (m)	460.8	539.5	539.5			617.0	617.0					
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)					38.0	30.5						
Storage Blk Time (%)			2			3						
Queuing Penalty (veh)			10			0						

Intersection: 2: Ashley Street & Harmony Road												
Movement	WB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LR	LT										
Maximum Queue (m)	26.9	16.0										
Average Queue (m)	14.3	7.6										
95th Queue (m)	24.9	16.0										
Link Distance (m)	510.9	376.6										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 3: River Road & Harmony Road												
Movement	NB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LTR	LTR										
Maximum Queue (m)	29.5	9.1										
Average Queue (m)	12.6	4.2										
95th Queue (m)	21.8	11.5										
Link Distance (m)	215.8	332.3										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 4: Harmony Road & Homan Road												
Movement	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LR	LR										
Maximum Queue (m)		9.3										
Average Queue (m)		3.6										
95th Queue (m)		10.9										
Link Distance (m)		490.2										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 5: Plumpton & Harmony Road												
Movement	NB	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Directions Served	LR	LR										
Maximum Queue (m)		9.2										
Average Queue (m)		5.8										
95th Queue (m)		12.6										
Link Distance (m)		551.1										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access												
Movement	NB	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Directions Served	LR	LR										
Maximum Queue (m)		9.2										
Average Queue (m)		5.8										
95th Queue (m)		12.6										
Link Distance (m)		551.1										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 7: Harmony Public School & Harmony Road									
Movement	WB	NB	WB	NB	WB	NB	WB	NB	WB
Directions Served	L	R	L	R	L	R	L	R	L
Maximum Queue (m)	8.7	16.5							
Average Queue (m)	0.6	11.8							
95th Queue (m)	4.2	17.2							
Link Distance (m)	463.5	212.1							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

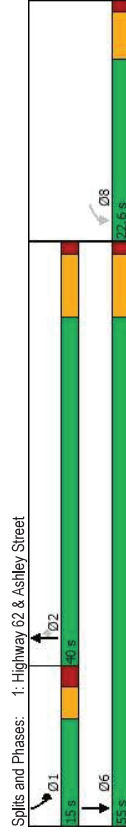
Intersection: 8: Harmony Road & Highway 37									
Movement	EB	WB	NB	NB	SB	SB	EB	WB	SB
Directions Served	L	L	T	R	L	T	L	T	R
Maximum Queue (m)	27.6	14.3	12.3	55.0	3.3	33.2			
Average Queue (m)	13.8	6.2	4.3	22.8	0.3	16.4			
95th Queue (m)	26.4	13.1	10.2	49.6	1.6	34.2			
Link Distance (m)	463.5	263.1		2731.5		954.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				79.5		82.0			
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road									
Movement	EB	WB	NB	NB	SB	SB	EB	WB	SB
Directions Served	L	L	T	R	L	T	L	T	R
Maximum Queue (m)	53.9	33.5	5.5	56.2	16.6	6.3	2730.4	3.8	
Average Queue (m)	27.8	16.3	0.4	26.4	4.3	1.7	203.4	0.5	
95th Queue (m)	43.9	30.2	2.6	56.8	12.0	6.2	1318.0	2.5	
Link Distance (m)	437.7	564.0		780.7		2731.5			
Upstream Blk Time (%)							0		
Queuing Penalty (veh)							1		
Storage Bay Dist (m)				82.0		85.0	75.0	79.0	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	NB	SB	SB	EB	WB	SB
Directions Served	L	L	T	R	L	T	L	T	R
Maximum Queue (m)	44.7	39.0	24.2	64.8	8.2	7.8	63.7		
Average Queue (m)	23.8	22.5	10.1	26.7	1.1	1.5	22.7		
95th Queue (m)	40.2	39.8	23.9	52.2	5.1	6.6	51.3		
Link Distance (m)	593.4	692.0		405.0		780.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				66.0		70.0	68.0		
Storage Blk Time (%)				0		0	0		
Queuing Penalty (veh)				0		0	0		

Network Summary									
Network wide Queuing Penalty: 11									

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	303	1461	505	8	781
Future Volume (vph)	303	1461	505	8	781
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Eff Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	0.94	0.74	0.51	0.06	0.43
Control Delay	65.1	16.3	6.4	33.2	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	65.1	16.3	6.4	33.2	8.6
LOS	E	B	A	C	A
Approach Delay	65.1	13.7			8.8
Approach LOS	E	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 90					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.94					
Intersection Signal Delay: 17.8					
Intersection LOS: B					
ICU Level of Service C					
Intersection Capacity Utilization 69.1%					
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	303	20	1461	505	8	781
Future Volume (vph)	303	20	1461	505	8	781
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687		3539	1568	1770	3374
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687		3539	1568	1770	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	326	22	1538	532	9	898
RTOR Reduction (vph)	3	0	0	135	0	0
Lane Group Flow (vph)	345	0	1538	397	9	898
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.4	45.4	1.4	51.8
Effective Green, g (s)	17.0		45.4	45.4	1.4	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	351		1969	872	30	2141
v/s Ratio Prot			0.043		0.01	
v/s Ratio Perm	0.20			0.25		
v/c Ratio	0.98		0.78	0.46	0.30	0.42
Uniform Delay, d1	32.2		14.2	10.8	39.6	7.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	43.8		3.2	1.7	5.6	0.6
Delay (s)	76.0		17.4	12.5	45.2	8.0
Level of Service	E		B	B	D	A
Approach Delay (s)	76.0		16.1		8.4	
Approach LOS	E		B		A	
Intersection Summary						
HCM 2000 Control Delay			20.3			
HCM 2000 Level of Service						C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			81.6			
Sum of lost time (s)						17.8
Intersection Capacity Utilization			68.1%			
ICU Level of Service						C
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road

02-12-2025

<Background 2046> PM Peak Hour

02-12-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	82	91	179	136	99	92
Future Volume (Veh/h)	82	91	179	136	99	92
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.96	0.96	0.86	0.86
Hourly flow rate (vph)	93	103	186	142	115	107
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	594	257				328
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	594	257				328
IC single (s)	6.4	6.2				4.1
IC 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	78	87				91
CM capacity (veh/h)	424	782				1232
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	196	328	222			
Volume Left	93	0	115			
Volume Right	103	142	0			
cSH	568	1700	1232			
Volume to Capacity	0.35	0.19	0.09			
Queue Length 95th (m)	12.6	0.0	2.5			
Control Delay (s)	14.9	0.0	4.7			
Lane LOS	B	A	A			
Approach Delay (s)	14.9	0.0	4.7			
Approach LOS	B					
Intersection Summary						
Average Delay			5.3			
Intersection Capacity Utilization			48.2%			A
Analysis Period (min)			15			

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4		4			4			4	
Traffic Volume (veh/h)	14	191	53	3	136	3	102	6	15	27	12
Future Volume (Veh/h)	14	191	53	3	136	3	102	6	15	27	12
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.71	0.71	0.71	0.83	0.83	0.83
Hourly flow rate (vph)	15	210	58	3	142	3	144	8	21	33	14
Pedestrians											
Lane Width (m)											
Walking Speed (m/s)											
Percent Blockage											
Right turn flare (veh)											
Median type						None					
Median storage (veh)											
Upstream signal (m)											
pX platoon unblocked											
VC conflicting volume	145			268					432	420	448
VC1 stage 1 conf vol											
VC2 stage 2 conf vol											
VCu unblocked vol	145			268					432	420	448
IC single (s)	4.1			4.1					7.1	6.5	6.2
IC 2 stage (s)											
IF (s)	2.2			2.2					3.5	4.0	3.3
p0 queue free %	99			100					72	98	97
CM capacity (veh/h)	1437			1296					513	518	904
Direction, Lane #	EB 1	WB 1	NB 1	SB 1							
Volume Total	283	148	173	54							
Volume Left	15	3	144	33							
Volume Right	58	3	21	7							
cSH	1437	1296	537	531							
Volume to Capacity	0.01	0.00	0.32	0.10							
Queue Length 95th (m)	0.3	0.1	11.1	2.7							
Control Delay (s)	0.5	0.2	14.9	12.6							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.5	0.2	14.9	12.6							
Approach LOS	B										
Intersection Summary											
Average Delay				5.2							
Intersection Capacity Utilization				36.7%							A
Analysis Period (min)				15							

HCM Unsignalized Intersection Capacity Analysis
 4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
 5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations	6	142	126	3	3	6
Traffic Volume (veh/h)	6	142	126	3	3	6
Future Volume (Veh/h)	6	142	126	3	3	6
Sign Control	Free	Free	Free	Stop	Stop	0%
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.69	0.69	0.63	0.63	0.75	0.75
Hourly flow rate (vph)	9	206	200	5	4	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	205			426	202	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	205			426	202	
IC single (s)	4.1			6.4	6.5	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.5	
p0 queue free %	99			99	99	
cM capacity (veh/h)	1366			581	783	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	215	205	12			
Volume Left	9	0	4			
Volume Right	0	5	8			
cSH	1366	1700	702			
Volume to Capacity	0.01	0.12	0.02			
Queue Length 95th (m)	0.2	0.0	0.4			
Control Delay (s)	0.4	0.0	10.2			
Lane LOS	A	A	B			
Approach Delay (s)	0.4	0.0	10.2			
Approach LOS			B			
Intersection Summary						
Average Delay			0.5			A
Intersection Capacity Utilization			22.3%			ICU Level of Service
Analysis Period (min)			15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	176	6	5	120	9	23
Traffic Volume (veh/h)	176	6	5	120	9	23
Future Volume (Veh/h)	176	6	5	120	9	23
Sign Control	Free	Free	Free	Stop	Stop	0%
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.87	0.87	0.75	0.75
Hourly flow rate (vph)	185	6	6	138	12	31
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked			191	338	188	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol			191	338	188	
IC single (s)			4.1	6.4	6.2	
IC 2 stage (s)						
IF (s)			2.2	3.5	3.3	
p0 queue free %			100	98	96	
cM capacity (veh/h)			1383	655	854	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	191	144	43			
Volume Left	0	6	12			
Volume Right	6	0	31			
cSH	1700	1383	787			
Volume to Capacity	0.11	0.00	0.05			
Queue Length 95th (m)	0.0	0.1	1.4			
Control Delay (s)	0.0	0.4	9.8			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.4	9.8			
Approach LOS			A			
Intersection Summary						
Average Delay			1.3			A
Intersection Capacity Utilization			20.4%			ICU Level of Service
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4		W	W	
Traffic Volume (veh/h)	0	135	120	0	2	2	
Future Volume (Veh/h)	0	135	120	0	2	2	
Sign Control		Free	Free		Stop	Stop	
Grade		0%	0%		0%	0%	
Peak Hour Factor	0.80	0.80	0.61	0.61	0.50	0.50	
Hourly flow rate (vph)	0	169	197	0	4	4	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked	197				366	197	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	197				366	197	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)	2.2				3.5	3.3	
p0 queue free %	100				99	100	
CM capacity (veh/h)	1376				634	844	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	169	197	8				
Volume Left	0	0	4				
Volume Right	0	0	4				
cSH	1376	1700	724				
Volume to Capacity	0.00	0.12	0.01				
Queue Length 95th (m)	0.0	0.0	0.3				
Control Delay (s)	0.0	0.0	10.0				
Lane LOS			B				
Approach Delay (s)	0.0	0.0	10.0				
Approach LOS			B				
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			17.1%				A
Analysis Period (min)			15				

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4	4	4	4	W	W	
Traffic Volume (veh/h)	152	3	11	82	26	45	
Future Volume (Veh/h)	152	3	11	82	26	45	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	1.00	1.00	0.76	0.76	0.43	0.43	
Hourly flow rate (vph)	152	3	14	108	60	105	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None	None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked				155	290	154	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				155	290	154	
IC single (s)				4.1	6.4	6.2	
IC 2 stage (s)				2.2	3.5	3.3	
p0 queue free %				99	91	88	
CM capacity (veh/h)				1425	694	892	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	155	122	165				
Volume Left	0	14	60				
Volume Right	3	0	105				
cSH	1700	1425	809				
Volume to Capacity	0.09	0.01	0.20				
Queue Length 95th (m)	0.0	0.2	6.1				
Control Delay (s)	0.0	0.9	10.6				
Lane LOS		A	B				
Approach Delay (s)	0.0	0.9	10.6				
Approach LOS		B					
Intersection Summary							
Average Delay			4.2				
Intersection Capacity Utilization			24.4%				A
Analysis Period (min)			15				

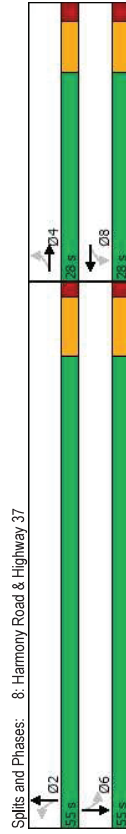
Timings
8: Harmony Road & Highway 37

HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37

<Background 2046> PM Peak Hour
02-12-2025

<Background 2046> PM Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	8	8	2	2	6	6
Traffic Volume (vph)	73	44	33	11	56	685	5	480
Future Volume (vph)	73	44	33	11	56	685	5	480
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	4	4	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	14.7	14.7	14.7	14.7	49.1	49.1	49.1	49.1
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.63	0.63	0.63	0.63
v/c Ratio	0.69	0.26	0.14	0.71	0.02	0.02	0.57	0.57
Control Delay	36.0	28.5	8.4	15.4	7.4	11.8		
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0		
Total Delay	36.0	28.5	8.4	15.4	7.4	11.8		
LOS	D	C	A	B	A	B		
Approach Delay	36.0	28.5	14.9	11.8				
Approach LOS	D	C	B	B				
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 78.5								
Natural Cycle: 60								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.71								
Intersection Signal Delay: 16.7								
Intersection Capacity Utilization 69.4%								
Analysis Period (min) 15								

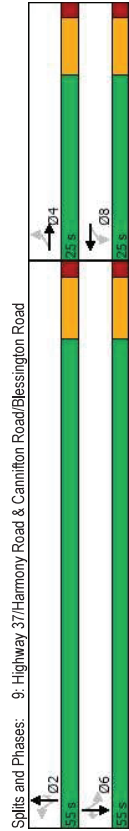


Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	4	4	8	8	2	2	6	6
Traffic Volume (vph)	73	44	33	11	56	685	5	480
Future Volume (vph)	73	44	33	11	56	685	5	480
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.95	0.95	0.99	0.99	1.00	0.99	1.00	0.98
Flt Protected	0.98	0.98	0.97	0.97	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1703	1703	1638	1638	1770	1841	1770	1693
Flt Permitted	0.85	0.85	0.84	0.84	0.37	1.00	0.23	1.00
Satd. Flow (perm)	1474	1474	1081	1081	683	1841	429	1693
Peak-hour factor, PHF	0.90	0.90	0.84	0.84	0.90	0.90	0.94	0.94
Adj. Flow (vph)	81	49	39	13	2	62	64	51
RTOR Reduction (vph)	0	28	0	0	0	0	0	7
Lane Group Flow (vph)	0	181	0	0	52	0	822	0
Heavy Vehicles (%)	2%	2%	7%	10%	2%	2%	2%	7%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Actuated Green, G (s)	14.8	14.8	14.8	14.8	49.2	49.2	49.2	49.2
Effective Green, g (s)	14.8	14.8	14.8	14.8	49.2	49.2	49.2	49.2
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.63	0.63	0.63	0.63
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	277	277	203	203	427	1152	268	1059
v/s Ratio Prot	c0.12	c0.12	0.05	0.05	0.09	c0.45	0.01	0.36
v/s Ratio Perm	0.65	0.65	0.26	0.26	0.15	0.71	0.02	0.57
Uniform Delay, d1	29.5	29.5	27.2	27.2	6.0	9.9	5.6	8.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	5.4	0.7	0.7	0.7	3.8	0.1	2.2
Delay (s)	34.9	34.9	27.9	27.9	6.8	13.7	5.7	10.8
Level of Service	C	C	C	C	A	B	A	B
Approach Delay (s)	34.9	34.9	27.9	27.9	13.2	10.7	10.7	10.7
Approach LOS	C	C	C	C	B	B	B	B
Intersection Summary								
HCM 2000 Control Delay	15.4	15.4	HCM 2000 Level of Service	HCM 2000 Level of Service	B	B	B	B
HCM 2000 Volume to Capacity ratio	0.70	0.70	Sum of lost time (s)	Sum of lost time (s)	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	78.6	78.6	ICU Level of Service	ICU Level of Service	C	C	C	C
Intersection Capacity Utilization	69.4%	69.4%	Analysis Period (min)	Analysis Period (min)	15	15	15	15
c. Critical Lane Group								

Timings
 9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

HCM Signalized Intersection Capacity Analysis
 9. Highway 37/Harmony Road & Cannifton Road/Blessington Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	135	73	56	53	5	734	159	18	467	47
Future Volume (vph)	135	73	56	53	5	734	159	18	467	47
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	16.2	16.2	16.2	16.2	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.61	0.61	0.61	0.61	0.61	0.61
v/c Ratio	0.82	0.82	0.52	0.52	0.01	0.72	0.17	0.08	0.48	0.06
Control Delay	53.8	53.8	34.3	34.3	6.8	16.0	1.7	8.0	10.9	2.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.8	53.8	34.3	34.3	6.8	16.0	1.7	8.0	10.9	2.2
LOS	D	D	C	C	A	B	A	A	B	A
Approach Delay	53.8	53.8	34.3	34.3	13.4	13.4	10.0	10.0	10.0	10.0
Approach LOS	D	D	C	C	B	B	A	A	A	A
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 78.3										
Natural Cycle: 65										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.82										
Intersection Signal Delay: 18.7										
Intersection Capacity Utilization 66.7%										
Analysis Period (min) 15										

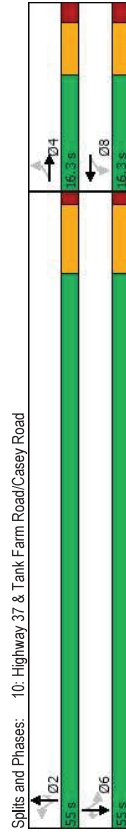


Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	135	73	56	53	5	734	159	18	467	47
Future Volume (vph)	135	73	56	53	5	734	159	18	467	47
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.98	0.98	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	1754	1761	1761	1770	1863	1863	1770	1759	1509
Flt Permitted	0.75	0.75	0.75	0.75	0.43	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	1356	1356	1363	1363	796	1863	1863	414	1759	1509
Peak-hour factor, PHF	0.91	0.91	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	148	80	3	74	70	4	6	816	177	20
RTOR Reduction (vph)	0	1	0	0	2	0	0	70	0	0
Lane Group Flow (vph)	0	230	0	0	146	0	6	816	107	20
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	16.3	16.3	16.3	16.3	47.5	47.5	47.5	47.5	47.5	47.5
Effective Green, g (s)	16.3	16.3	16.3	16.3	47.5	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	281	281	283	283	482	1128	959	250	1065	914
v/s Ratio Prot	c0.17	c0.17	0.11	0.11	0.01	0.01	0.07	0.05	0.02	0.02
v/s Ratio Perm	0.82	0.82	0.52	0.52	0.01	0.72	0.11	0.08	0.48	0.03
Uniform Delay, d1	29.6	29.6	27.6	27.6	6.1	10.8	6.5	6.4	8.6	6.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.8	16.8	1.6	1.6	0.0	4.0	0.2	0.6	1.6	0.1
Delay (s)	46.4	46.4	29.2	29.2	6.2	14.9	6.8	7.0	10.2	6.3
Level of Service	D	D	C	C	A	B	A	A	B	A
Approach Delay (s)	46.4	46.4	29.2	29.2	13.4	13.4	10.0	9.7	9.7	9.7
Approach LOS	D	D	C	C	B	B	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	17.4	17.4	HCM 2000 Level of Service	HCM 2000 Level of Service	B	B	B	B	B	B
HCM 2000 Volume to Capacity ratio	0.75	0.75	Sum of lost time (s)	Sum of lost time (s)	14.6	14.6	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	78.4	78.4	ICU Level of Service	ICU Level of Service	C	C	C	C	C	C
Intersection Capacity Utilization	66.7%	66.7%	Analysis Period (min)	Analysis Period (min)	15	15	15	15	15	15
Analysis Period (min)	15	15	c. Critical Lane Group	c. Critical Lane Group						

Timings
10: Highway 37 & Tank Farm Road/Casey Road

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	38	82	82	82	64	59	817	79	8	470
Traffic Volume (vph)	38	82	82	82	64	59	817	79	8	470
Future Volume (vph)	38	82	82	82	64	59	817	79	8	470
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.98	1.58	0.17	0.69	0.08	0.03	0.48	0.02	0.02	0.02
Control Delay	87.3	314.7	5.7	10.8	1.3	4.4	7.3	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.3	314.7	5.7	10.8	1.3	4.4	7.3	0.3	0.3	0.3
LOS	F	F	A	B	A	A	A	A	A	A
Approach Delay	87.3	314.7	5.7	10.8	1.3	4.4	7.3	0.3	0.3	0.3
Approach LOS	F	F	A	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 65										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.58										
Intersection Signal Delay: 54.3										
Intersection Capacity Utilization 77.9%										
Analysis Period (min) 15										



Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	38	82	47	82	64	15	59	817	79	8
Traffic Volume (vph)	38	82	47	82	64	15	59	817	79	8
Future Volume (vph)	38	82	47	82	64	15	59	817	79	8
Future Volume (vph)	38	82	47	82	64	15	59	817	79	8
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.98	1.58	0.17	0.69	0.08	0.03	0.48	0.02	0.02	0.02
Control Delay	87.3	314.7	5.7	10.8	1.3	4.4	7.3	0.3	0.3	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.3	314.7	5.7	10.8	1.3	4.4	7.3	0.3	0.3	0.3
LOS	F	F	A	B	A	A	A	A	A	A
Approach Delay	87.3	314.7	5.7	10.8	1.3	4.4	7.3	0.3	0.3	0.3
Approach LOS	F	F	A	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 65										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.58										
Intersection Signal Delay: 54.3										
Intersection Capacity Utilization 77.9%										
Analysis Period (min) 15										

Intersection Summary										
HCM 2000 Control Delay	55.3	HCM 2000 Level of Service	E							
HCM 2000 Volume to Capacity ratio	0.84									
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	13.4							
Intersection Capacity Utilization	77.9%	ICU Level of Service	D							
Analysis Period (min)	15									
c. Critical Lane Group										

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR						
Maximum Queue (m)	184.0	94.8	83.6	16.1	15.7	46.2	47.4
Average Queue (m)	78.1	46.8	41.6	8.8	2.6	23.9	19.3
95th Queue (m)	154.3	76.1	71.7	16.1	10.2	37.6	37.9
Link Distance (m)	460.8	539.5	539.5			617.0	617.0
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			7			1	
Queuing Penalty (veh)			37			0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	34.6	22.5
Average Queue (m)	13.5	7.9
95th Queue (m)	23.3	17.8
Link Distance (m)	510.9	376.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: River Road & Harmony Road

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (m)	22.9	20.1
Average Queue (m)	12.3	9.2
95th Queue (m)	19.7	15.7
Link Distance (m)	215.8	332.3
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Harmony Road & Homan Road

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	7.5	15.0
Average Queue (m)	0.3	3.0
95th Queue (m)	2.5	11.4
Link Distance (m)	962.1	490.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	8.2	9.3
Average Queue (m)	0.3	5.6
95th Queue (m)	2.7	12.6
Link Distance (m)	902.5	551.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	SB
Directions Served	LR
Maximum Queue (m)	8.4
Average Queue (m)	0.3
95th Queue (m)	2.8
Link Distance (m)	388.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 7: Harmony Public School & Harmony Road									
Movement	WB	NB	WB	NB	WB	NB	WB	NB	WB
Directions Served	L	R	L	R	L	R	L	R	L
Maximum Queue (m)	9.2	16.5							
Average Queue (m)	0.9	9.2							
95th Queue (m)	5.4	14.5							
Link Distance (m)	463.5	212.1							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

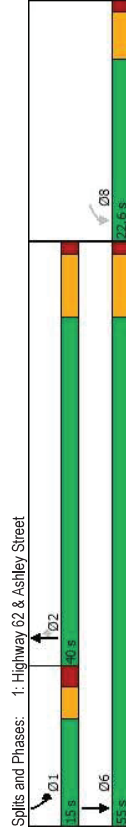
Intersection: 8: Harmony Road & Highway 37									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	TR	L	TR	L	TR	L
Maximum Queue (m)	47.8	14.3	18.3	72.8	4.7	60.3			
Average Queue (m)	17.1	6.5	6.3	28.4	0.7	24.2			
95th Queue (m)	32.9	14.0	14.2	58.1	3.1	50.7			
Link Distance (m)	463.5	263.1		2731.5		954.7			
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				79.5		82.0			
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	R	L	T	R	L
Maximum Queue (m)	67.0	34.4	5.7	72.4	27.6	20.4	64.4	18.8	
Average Queue (m)	35.3	19.8	1.1	39.3	5.4	3.4	32.6	3.3	
95th Queue (m)	58.5	36.3	4.6	66.4	16.2	11.9	57.3	10.3	
Link Distance (m)	437.7	564.0		780.7			2731.5		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				82.0		85.0	75.0	79.0	
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB
Directions Served	L	R	L	T	R	L	T	R	L
Maximum Queue (m)	64.7	112.3	29.9	87.3	11.3	7.9	56.3	19.8	
Average Queue (m)	29.8	48.4	8.0	39.5	1.7	0.8	21.6	1.4	
95th Queue (m)	56.8	89.4	20.5	72.8	6.5	4.5	49.4	7.7	
Link Distance (m)	593.4	692.0		405.0			780.7		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				66.0		70.0	68.0	70.0	
Storage Blk Time (%)						1			
Queuing Penalty (veh)						2			

Network Summary									
Network wide Queuing Penalty: 39									

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	242	1164	404	7	622
Future Volume (vph)	242	1164	404	7	622
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	0.74	0.59	0.41	0.05	0.34
Control Delay	42.1	12.6	4.4	33.1	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	42.1	12.6	4.4	33.1	7.8
LOS	D	B	A	C	A
Approach Delay	42.1	10.5			8.1
Approach LOS	D	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 70					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.74					
Intersection Signal Delay: 13.2					
Intersection LOS: B					
ICU Level of Service B					
Intersection Capacity Utilization 57.2%					
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	242	16	1164	404	7	622
Future Volume (vph)	242	16	1164	404	7	622
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	0.99		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687		3539	1568	1770	3374
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687		3539	1568	1770	3374
Peak-hour factor, PHF	0.93		0.93	0.95	0.95	0.87
Adj. Flow (vph)	260		17	1225	425	8
RTOR Reduction (vph)	3		0	0	135	0
Lane Group Flow (vph)	274		0	1225	290	8
Heavy Vehicles (%)	7%		2%	2%	3%	7%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.4	45.4	1.4	51.8
Effective Green, g (s)	17.0		45.4	45.4	1.4	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	351		1969	872	30	2141
v/s Ratio Prot	c0.16		c0.35		0.00	c0.21
v/s Ratio Perm	0.78		0.62	0.33	0.27	0.33
Uniform Delay, d1	30.5		12.3	9.9	39.6	6.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	15.7		1.5	1.0	4.7	0.4
Delay (s)	46.2		13.8	10.9	44.3	7.3
Level of Service	D		B	B	D	A
Approach Delay (s)	46.2		13.0		7.7	
Approach LOS	D		B		A	
Intersection Summary						
HCM 2000 Control Delay			15.1			HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.67			
Actuated Cycle Length (s)			81.6			Sum of lost time (s) 17.8
Intersection Capacity Utilization			57.2%			ICU Level of Service B
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis <Background 2041> Saturday Peak Hour
 2. Ashley Street & Harmony Road 02-12-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	60	40	79	83	52	69
Future Volume (Veh/h)	60	40	79	83	52	69
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	68	45	88	92	65	86
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	350	134			180	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	350	134			180	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	89	95			95	
CM capacity (veh/h)	617	915			1396	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	113	180	151			
Volume Left	68	0	65			
Volume Right	45	92	0			
cSH	709	1700	1396			
Volume to Capacity	0.16	0.11	0.05			
Queue Length 95th (m)	4.5	0.0	1.2			
Control Delay (s)	11.0	0.0	3.5			
Lane LOS	B	A	A			
Approach Delay (s)	11.0	0.0	3.5			
Approach LOS	B					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			31.5%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <Background 2041> Saturday Peak Hour
 3. River Road & Harmony Road 02-12-2025

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4		4			4	
Traffic Volume (veh/h)	14	121	27	21	14	5	50	5	12	14	4
Future Volume (Veh/h)	14	121	27	21	14	5	50	5	12	14	4
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.80	0.80	0.80	0.72	0.72	0.39	0.39	0.39
Hourly flow rate (vph)	16	141	31	26	18	6	69	7	17	36	10
Pedestrians											
Lane Width (m)											
Walking Speed (m/s)											
Percent Blockage											
Right turn flare (veh)											
Median type						None					
Median storage (veh)											
Upstream signal (m)											
pX platoon unblocked											
VC conflicting volume	24			172		276	264	156	282	277	21
VC1 stage 1 conf vol											
VC2 stage 2 conf vol											
VCu unblocked vol	24			172		276	264	156	282	277	21
IC single (s)	4.1			4.1		7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)											
IF (s)	2.2			2.2		3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98		89	99	98	94	98	99
CM capacity (veh/h)	1591			1405		647	623	889	638	613	1056
Direction, Lane #	EB 1	WB 1	NB 1	SB 1							
Volume Total	188	50	93	56							
Volume Left	16	26	69	36							
Volume Right	31	6	17	10							
cSH	1591	1405	679	681							
Volume to Capacity	0.01	0.02	0.14	0.08							
Queue Length 95th (m)	0.2	0.5	3.8	2.1							
Control Delay (s)	0.7	4.0	11.1	10.8							
Lane LOS	A	A	B	B							
Approach Delay (s)	0.7	4.0	11.1	10.8							
Approach LOS	B		B								
Intersection Summary											
Average Delay			5.1								
Intersection Capacity Utilization			20.2%						ICU Level of Service	A	
Analysis Period (min)			15								

HCM Unsignalized Intersection Capacity Analysis <Background 2041> Saturday Peak Hour
4: Harmony Road & Homan Road 02-12-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	5	
Traffic Volume (veh/h)	5	61	48	1	1	5
Future Volume (Veh/h)	5	61	48	1	1	5
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.66	0.66	0.50	0.50
Hourly flow rate (vph)	6	76	73	2	2	10
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	75			162	74	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	75			162	74	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	99	
cM capacity (veh/h)	1524			826	988	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	82	75	12			
Volume Left	6	0	2			
Volume Right	0	2	10			
cSH	1524	1700	956			
Volume to Capacity	0.00	0.04	0.01			
Queue Length 95th (m)	0.1	0.0	0.3			
Control Delay (s)	0.6	0.0	8.8			
Lane LOS	A	A	A			
Approach Delay (s)	0.6	0.0	8.8			
Approach LOS		A				
Intersection Summary						
Average Delay			0.9			
Intersection Capacity Utilization			17.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <Background 2041> Saturday Peak Hour
5: Plumpton & Harmony Road 02-12-2025

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	1	1	4	4	16	
Traffic Volume (veh/h)	109	10	5	80	4	16
Future Volume (Veh/h)	109	10	5	80	4	16
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.74	0.74	0.50	0.50
Hourly flow rate (vph)	120	11	7	108	8	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	131	115	40			
Volume Left	0	7	8			
Volume Right	11	0	32			
cSH	1700	1454	880			
Volume to Capacity	0.08	0.00	0.05			
Queue Length 95th (m)	0.0	0.1	1.1			
Control Delay (s)	0.0	0.5	9.3			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.5	9.3			
Approach LOS		A				
Intersection Summary						
Average Delay			1.5			
Intersection Capacity Utilization			18.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <Background 2041> Saturday Peak Hour
6: Harmony Road & Black Bear Ridge Resort Access 02-12-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	4	W		
Traffic Volume (veh/h)	1	56	44	1	0	0
Future Volume (Veh/h)	1	56	44	1	0	0
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.60	0.60	0.70	0.70	0.92	0.92
Hourly flow rate (vph)	2	93	63	1	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	64			160	64	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	64			160	64	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	100			100	100	
cM capacity (veh/h)	1538			829	1001	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	95	64	0			
Volume Left	2	0	0			
Volume Right	0	1	0			
cSH	1538	1700	1700			
Volume to Capacity	0.00	0.04	0.01			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.2	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.2	0.0	0.0			
Approach LOS	A		A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			7.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <Background 2041> Saturday Peak Hour
7: Harmony Public School & Harmony Road 02-12-2025

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	4	4	W		
Traffic Volume (veh/h)	58	0	0	49	1	0
Future Volume (Veh/h)	58	0	0	49	1	0
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.58	0.58	0.74	0.74	0.92	0.92
Hourly flow rate (vph)	100	0	0	66	1	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	100	66	1			
Volume Left	0	0	1			
Volume Right	0	0	0			
cSH	1700	1493	824			
Volume to Capacity	0.06	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.0	0.0	9.4			
Lane LOS	A	A	A			
Approach Delay (s)	0.0	0.0	9.4			
Approach LOS	A		A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			13.3%		ICU Level of Service	A
Analysis Period (min)			15			

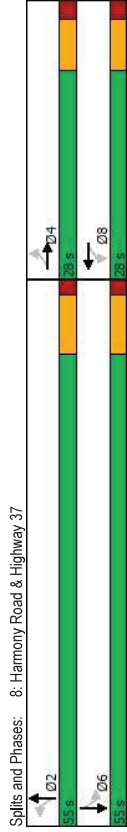
Timings
8: Harmony Road & Highway 37

HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37

<Background 2041> Saturday Peak Hour
02-12-2025

<Background 2041> Saturday Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Traffic Volume (vph)	22	13	19	7	23	234	235
Future Volume (vph)	22	13	19	7	23	234	235
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	4	8	8	2	2	6
Permitted Phases	4	4	8	8	2	2	6
Detector Phase	4	4	8	8	2	2	6
Switch Phase	4	4	8	8	2	2	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6
Lead/Lag							
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.4	10.4	10.4	10.4	54.7	54.7	54.7
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.73	0.73	0.73
v/c Ratio	0.37	0.37	0.19	0.03	0.20	0.21	0.21
Control Delay	22.5	22.5	28.1	4.7	4.9	5.0	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.5	22.5	28.1	4.7	4.9	5.0	5.0
LOS	C	C	C	A	A	A	A
Approach Delay	22.5	22.5	28.1	4.9	5.0	5.0	5.0
Approach LOS	C	C	C	A	A	A	A
Intersection Summary							
Cycle Length: 83							
Actuated Cycle Length: 74.5							
Natural Cycle: 30							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 0.37							
Intersection Signal Delay: 8.5							
Intersection Capacity Utilization 39.6%							
Analysis Period (min) 15							



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	22	13	28	19	7	3	23	234	19	0	235	23
Future Volume (vph)	22	13	28	19	7	3	23	234	19	0	235	23
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.94	0.94	0.94	0.94	0.94	0.94	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1721	1721	1721	1721	1721	1721	1770	1770	1770	1770	1770	1770
Flt Permitted	0.87	0.87	0.87	0.87	0.87	0.87	0.58	0.58	0.58	0.58	0.58	0.58
Satd. Flow (perm)	1521	1521	1521	1521	1521	1521	1085	1085	1085	1085	1085	1085
Peak-hour factor, PHF	0.69	0.69	0.69	0.74	0.74	0.74	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	19	41	26	9	4	24	246	20	0	264	26
RTOR Reduction (vph)	0	37	0	0	4	0	0	2	0	0	3	0
Lane Group Flow (vph)	0	55	0	0	35	0	24	264	0	0	287	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	2%	6%	2%	2%	2%
Protected Phases	4	4	8	8	2	2	2	2	2	2	2	2
Permitted Phases	4	4	8	8	2	2	2	2	2	2	2	2
Actuated Green, G (s)	8.2	8.2	8.2	8.2	53.1	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Effective Green, g (s)	8.2	8.2	8.2	8.2	53.1	53.1	53.1	53.1	53.1	53.1	53.1	53.1
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	164	164	157	157	759	1284	1284	1284	1284	1284	1284	1284
v/s Ratio Prot	c0.04	c0.04	0.02	0.02	0.02	0.14	c0.16	c0.16	c0.16	c0.16	c0.16	c0.16
v/s Ratio Perm	0.34	0.34	0.23	0.23	0.03	0.21	0.22	0.22	0.22	0.22	0.22	0.22
Uniform Delay, d1	31.3	31.3	30.9	30.9	3.5	4.0	4.1	4.1	4.1	4.1	4.1	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.2	0.7	0.7	0.1	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Delay (s)	32.6	32.6	31.7	31.7	3.6	4.4	4.5	4.5	4.5	4.5	4.5	4.5
Level of Service	C	C	C	C	A	A	A	A	A	A	A	A
Approach Delay (s)	32.6	32.6	31.7	31.7	4.3	4.3	4.5	4.5	4.5	4.5	4.5	4.5
Approach LOS	C	C	C	C	A	A	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	9.5	9.5	9.5	9.5	HCM 2000 Level of Service	A	A	A	A	A	A	A
HCM 2000 Volume to Capacity ratio	0.24	0.24	0.24	0.24	Sum of lost time (s)	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	75.9	75.9	75.9	75.9	ICU Level of Service	A	A	A	A	A	A	A
Intersection Capacity Utilization	39.6%	39.6%	39.6%	39.6%	Analysis Period (min)	15	15	15	15	15	15	15
Analysis Period (min)	15	15	15	15	c. Critical Lane Group							

Timings <Background 2041> Saturday Peak Hour
9. Highway 37/Harmony Road & Canniford Road/Blessington Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	69	37	29	27	2	377	82	10	240	24
Traffic Volume (vph)	69	37	29	27	2	377	82	10	240	24
Future Volume (vph)	69	37	29	27	2	377	82	10	240	24
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	12.4	12.4	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3
Actuated g/C Ratio	0.17	0.17	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
v/c Ratio	0.52	0.31	0.00	0.32	0.08	0.02	0.21	0.02	0.21	0.02
Control Delay	36.3	29.8	6.0	7.1	1.8	6.0	6.4	0.7	6.4	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.3	29.8	6.0	7.1	1.8	6.0	6.4	0.7	6.4	0.7
LOS	D	C	A	A	A	A	A	A	A	A
Approach Delay	36.3	29.8	6.1	6.1	5.9	5.9	5.9	5.9	5.9	5.9
Approach LOS	D	C	A	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 74.1										
Natural Cycle: 35										
Control Type: Semi Act-Uncoordinated										
Maximum v/c Ratio: 0.52										
Intersection Signal Delay: 11.4										
Intersection Capacity Utilization 60.2%										
Analysis Period (min) 15										



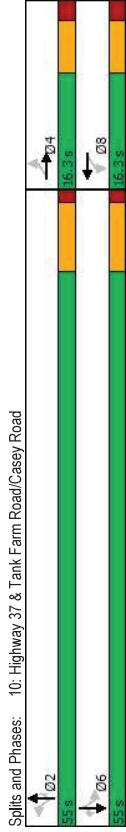
HCM Signalized Intersection Capacity Analysis <Background 2041> Saturday Peak Hour
9. Highway 37/Harmony Road & Canniford Road/Blessington Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	69	37	2	29	27	2	377	82	10	240	24	24
Traffic Volume (vph)	69	37	2	29	27	2	377	82	10	240	24	24
Future Volume (vph)	69	37	2	29	27	2	377	82	10	240	24	24
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	1.00	0.85	1.00	0.85	1.00	1.00	0.95	1.00	0.85
Flt Protected	0.97	0.97	0.98	0.98	0.98	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1754	1754	1759	1759	1759	1770	1863	1863	1770	1759	1759	1509
Flt Permitted	0.76	0.76	0.83	0.83	0.83	0.60	1.00	1.00	0.52	1.00	1.00	0.52
Satd. Flow (perm)	1376	1376	1492	1492	1492	1111	1863	1863	964	1759	1509	964
Peak-hour factor, PHF	0.91	0.91	0.91	0.76	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	76	41	2	38	36	3	2	419	91	11	264	26
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	118	0	0	75	0	2	419	61	11	264	17
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	10.3	10.3	10.3	10.3	10.3	10.3	50.7	50.7	50.7	50.7	50.7	50.7
Effective Green, g (s)	10.3	10.3	10.3	10.3	10.3	10.3	50.7	50.7	50.7	50.7	50.7	50.7
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	187	187	187	203	203	203	745	1249	1061	646	1179	1011
v/s Ratio Prot	c0.09	c0.09	c0.09	c0.05	c0.05	c0.05	c0.22	c0.22	c0.22	c0.15	c0.15	c0.15
v/s Ratio Perm	0.63	0.63	0.63	0.37	0.37	0.37	0.00	0.00	0.04	0.01	0.01	0.01
Uniform Delay, d1	30.9	30.9	30.9	29.7	29.7	29.7	4.1	5.3	4.3	4.1	4.8	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.8	6.8	6.8	1.1	1.1	1.1	0.0	0.7	0.1	0.0	0.4	0.0
Delay (s)	37.6	37.6	37.6	30.8	30.8	30.8	4.1	6.0	4.4	4.2	5.3	4.2
Level of Service	D	D	D	C	C	C	A	A	A	A	A	A
Approach Delay (s)	37.6	37.6	37.6	30.8	30.8	30.8	5.7	5.7	5.7	5.1	5.1	5.1
Approach LOS	D	D	D	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	11.2											
HCM 2000 Level of Service	B											
HCM 2000 Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	75.6											
Intersection Capacity Utilization	60.2%											
Analysis Period (min)	15											
c. Critical Lane Group												

Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Background 2041> Saturday Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	42	42	34	31	420	40	4	242	7
Future Volume (vph)	20	42	42	34	31	420	40	4	242	7
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4	52.4
Actuated g/C Ratio	0.14	0.14	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
v/c Ratio	0.47	0.80	0.06	0.32	0.04	0.01	0.22	0.01	0.22	0.01
Control Delay	29.9	41.0	4.4	5.3	1.2	4.0	0.0	0.0	4.8	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.9	41.0	4.4	5.3	1.2	4.0	4.8	4.8	0.0	0.0
LOS	C	D	A	A	A	A	A	A	A	A
Approach Delay	29.9	41.0	4.9	4.9				4.6		
Approach LOS	C	D	A	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71										
Natural Cycle: 45										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.60										
Intersection Signal Delay: 12.0										
Intersection Capacity Utilization 58.8%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Background 2041> Saturday Peak Hour
02-12-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	42	42	34	31	420	40	4	242	7
Future Volume (vph)	20	42	42	34	31	420	40	4	242	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.99	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1743	1755	1755	1755	1228	1863	1455	1770	1743	1170
Satd. Flow (prot)	0.90	0.84	0.84	0.84	0.58	1.00	1.00	0.51	1.00	1.00
Flt Permitted	1594	1505	1505	1505	754	1863	1455	944	1743	1170
Satd. Flow (perm)	0.75	0.75	0.64	0.64	0.64	0.95	0.95	0.84	0.84	0.84
Peak-hour factor, PHF	27	56	32	66	53	11	33	442	42	5
Adj. Flow (vph)	0	20	0	0	0	0	0	12	0	0
RTOR Reduction (vph)	0	95	0	0	126	0	33	442	30	5
Lane Group Flow (vph)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Heavy Vehicles (%)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	8.0	8.0	8.0	8.0	50.9	50.9	50.9	50.9	50.9	50.9
Effective Green, g (s)	8.0	8.0	8.0	8.0	50.9	50.9	50.9	50.9	50.9	50.9
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	176	166	166	166	530	1311	1024	664	1227	823
v/s Ratio Prot	0.06	0.06	0.06	0.06	0.04	0.04	0.02	0.01	0.17	0.00
v/s Ratio Perm	0.54	0.76	0.76	0.76	0.06	0.34	0.03	0.01	0.23	0.01
Uniform Delay, d1	30.4	31.2	31.2	31.2	3.3	4.2	3.2	3.2	3.8	3.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	17.7	17.7	17.7	0.1	0.3	0.0	0.0	0.4	0.0
Delay (s)	33.5	48.9	48.9	48.9	3.4	4.5	3.3	3.2	4.2	3.2
Level of Service	C	D	D	D	A	A	A	A	A	A
Approach Delay (s)	33.5	48.9	48.9	48.9	4.3	4.3	4.3	4.2	4.2	4.2
Approach LOS	C	D	D	D	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	12.9	HCM 2000 Level of Service	B							
HCM 2000 Volume to Capacity ratio	0.39									
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	13.4							
Intersection Capacity Utilization	58.8%	ICU Level of Service	B							
Analysis Period (min)	15									
c. Critical Lane Group										

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	82.8	59.1	83.3	18.9	8.7	46.8	40.4
Average Queue (m)	41.8	36.2	34.0	7.2	1.8	21.2	15.5
95th Queue (m)	76.9	52.7	59.6	13.9	6.8	37.7	30.9
Link Distance (m)	460.8	539.5	539.5			617.0	617.0
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			3			1	
Queuing Penalty (veh)			14			0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB	SB
Directions Served	LR	LT	
Maximum Queue (m)	14.5	16.4	
Average Queue (m)	8.5	2.7	
95th Queue (m)	12.9	10.3	
Link Distance (m)	510.9	376.6	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	
Maximum Queue (m)	8.2	7.9	16.1	15.4
Average Queue (m)	0.5	0.7	9.0	4.6
95th Queue (m)	3.8	4.4	14.0	12.5
Link Distance (m)	510.9	962.1	215.8	332.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Harmony Road & Homan Road

Movement	SB	SB
Directions Served	LR	
Maximum Queue (m)		9.3
Average Queue (m)		1.8
95th Queue (m)		7.8
Link Distance (m)		490.2
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Plumpton & Harmony Road

Movement	EB	NB	NB
Directions Served	TR	LR	
Maximum Queue (m)	12.2	9.2	
Average Queue (m)	0.4	5.5	
95th Queue (m)	4.0	12.4	
Link Distance (m)	41.0	551.1	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement		
Directions Served		
Maximum Queue (m)		
Average Queue (m)		
95th Queue (m)		
Link Distance (m)		
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Harmony Public School & Harmony Road									
Movement		NB		WB		SB		EB	
Directions Served		LR		LTR		L		TR	
Maximum Queue (m)		8.6		27.0		5.1		40.3	
Average Queue (m)		0.3		9.2		4.3		2.0	
95th Queue (m)		2.9		20.9		13.2		5.5	
Link Distance (m)		212.1		463.5		263.1		2731.5	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 8: Harmony Road & Highway 37

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	L	TR
Maximum Queue (m)	27.0	20.7	5.1	40.3
Average Queue (m)	9.2	4.3	2.0	7.4
95th Queue (m)	20.9	13.2	5.5	26.2
Link Distance (m)	463.5	263.1	2731.5	954.7
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

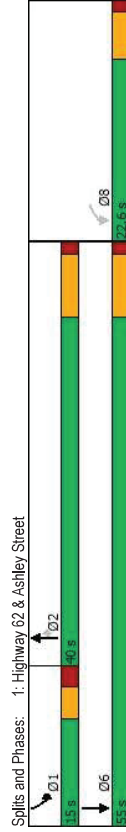
Movement	EB	WB	NB	SB	SB	SB
Directions Served	LTR	LTR	T	R	L	R
Maximum Queue (m)	52.6	33.4	36.2	11.4	6.6	26.9
Average Queue (m)	21.0	12.6	15.7	2.4	1.4	8.1
95th Queue (m)	36.1	25.0	32.3	8.2	5.5	21.4
Link Distance (m)	437.7	564.0	780.7	2731.5		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	85.0 75.0 79.0					
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road										
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	T	R		
Maximum Queue (m)	32.8	52.3	18.8	39.6	3.6	7.7	43.6	13.2		
Average Queue (m)	12.9	17.4	3.9	14.1	0.3	0.5	11.8	0.8		
95th Queue (m)	25.7	37.7	13.4	30.6	1.9	3.6	30.1	5.2		
Link Distance (m)	593.4	692.0	405.0		780.7					
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)			66.0		70.0		68.0		70.0	
Storage Blk Time (%)										
Queuing Penalty (veh)										

Network Summary

Network wide Queuing Penalty: 14

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	267	1285	446	8	687
Future Volume (vph)	267	1285	446	8	687
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases	8	2	2	1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Eff Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	0.82	0.65	0.45	0.06	0.38
Control Delay	48.7	13.8	5.2	33.2	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	13.8	5.2	33.2	8.1
LOS	D	B	A	C	A
Approach Delay	48.7	11.6			8.4
Approach LOS	D	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 70					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.82					
Intersection Signal Delay: 14.6					
Intersection LOS: B					
Intersection Capacity Utilization 62.1%					
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	267	18	1285	446	8	687
Future Volume (vph)	267	18	1285	446	8	687
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	
Frt	0.99	1.00	0.85	1.00	1.00	
Flt Protected	0.96		1.00	1.00	0.95	
Satd. Flow (prot)	1687		3539	1568	1770	3374
Flt Permitted	0.96		1.00	1.00	0.95	
Satd. Flow (perm)	1687		3539	1568	1770	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	287	19	1353	469	9	790
RTOR Reduction (vph)	3	0	0	135	0	0
Lane Group Flow (vph)	303	0	1353	334	9	790
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	
Protected Phases			2	1	6	
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.4	45.4	1.4	51.8
Effective Green, g (s)	17.0		45.4	45.4	1.4	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	351		1969	872	30	2141
v/s Ratio Prot			c0.38		0.01	c0.23
v/s Ratio Perm	c0.18			0.21		
v/c Ratio	0.86		0.69	0.38	0.30	0.37
Uniform Delay, d1	31.2		13.0	10.2	39.6	7.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	23.4		2.0	1.3	5.6	0.5
Delay (s)	54.6		15.0	11.5	45.2	7.6
Level of Service	D		B	B	D	A
Approach Delay (s)	54.6		14.1		8.0	
Approach LOS	D		B		A	
Intersection Summary						
HCM 2000 Control Delay			16.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.74			
Actuated Cycle Length (s)			81.6		Sum of lost time (s)	17.8
Intersection Capacity Utilization			62.1%		ICU Level of Service	B
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis <Background 2046> Saturday Peak Hour
 2. Ashley Street & Harmony Road

02-12-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	91	61	120	126	79	105
Future Volume (Veh/h)	91	61	120	126	79	105
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	103	69	133	140	99	131
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	532	203			273	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	532	203			273	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	78	92			92	
cM capacity (veh/h)	469	838			1290	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	172	273	230			
Volume Left	103	0	99			
Volume Right	69	140	0			
cSH	570	1700	1290			
Volume to Capacity	0.30	0.16	0.08			
Queue Length 95th (m)	10.1	0.0	2.0			
Control Delay (s)	14.0	0.0	3.8			
Lane LOS	B	A	A			
Approach Delay (s)	14.0	0.0	3.8			
Approach LOS	B					
Intersection Summary						
Average Delay			4.9			
Intersection Capacity Utilization			42.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <Background 2046> Saturday Peak Hour
 3. River Road & Harmony Road

02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4				4
Traffic Volume (veh/h)	21	183	41	32	21	8	76	8	18	21	6	6
Future Volume (Veh/h)	21	183	41	32	21	8	76	8	18	21	6	6
Sign Control		Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade		0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.80	0.80	0.80	0.72	0.72	0.72	0.39	0.39	0.39
Hourly flow rate (vph)	24	213	48	40	26	10	106	11	25	54	15	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type			None			None						
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	36			261			418	401	237	426	420	31
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	36			261			418	401	237	426	420	31
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			79	98	97	89	97	99
cM capacity (veh/h)	1575			1303			507	513	802	495	501	1043
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	285	76	142	84								
Volume Left	24	40	106	54								
Volume Right	48	10	25	15								
cSH	1575	1303	542	548								
Volume to Capacity	0.02	0.03	0.26	0.15								
Queue Length 95th (m)	0.4	0.8	8.3	4.3								
Control Delay (s)	0.7	4.2	14.0	12.8								
Lane LOS	A	A	B	B								
Approach Delay (s)	0.7	4.2	14.0	12.8								
Approach LOS			B	B								
Intersection Summary												
Average Delay			6.1									
Intersection Capacity Utilization			27.1%							ICU Level of Service	A	
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis <Background 2046> Saturday Peak Hour
4: Harmony Road & Homan Road 02-12-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	2	2	8	
Traffic Volume (veh/h)	8	92	73	2	2	8	
Future Volume (Veh/h)	8	92	73	2	2	8	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.66	0.66	0.50	0.50	
Hourly flow rate (vph)	10	115	111	3	4	16	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None						
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked	114				248	112	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	114				248	112	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)	2.2				3.5	3.3	
IF (s)	99				99	98	
p0 queue free %	1475				736	940	
cM capacity (veh/h)							
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	125	114	20				
Volume Left	10	0	4				
Volume Right	0	3	16				
cSH	1475	1700	891				
Volume to Capacity	0.01	0.07	0.02				
Queue Length 95th (m)	0.2	0.0	0.6				
Control Delay (s)	0.6	0.0	9.1				
Lane LOS	A	A	A				
Approach Delay (s)	0.6	0.0	9.1				
Approach LOS			A				
Intersection Summary							
Average Delay			1.0				
Intersection Capacity Utilization			21.5%			ICU Level of Service	A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis <Background 2046> Saturday Peak Hour
5: Plumpton & Harmony Road 02-12-2025

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4	4	4	4	4	4	
Traffic Volume (veh/h)	165	15	8	121	6	24	
Future Volume (Veh/h)	165	15	8	121	6	24	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.74	0.74	0.50	0.50	
Hourly flow rate (vph)	181	16	11	164	12	48	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None						
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol							
IC single (s)							
IC 2 stage (s)							
IF (s)							
p0 queue free %							
cM capacity (veh/h)							
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	197	175	60				
Volume Left	0	11	12				
Volume Right	16	0	48				
cSH	1700	1376	794				
Volume to Capacity	0.12	0.01	0.08				
Queue Length 95th (m)	0.0	0.2	2.0				
Control Delay (s)	0.0	0.5	9.9				
Lane LOS	A	A	A				
Approach Delay (s)	0.0	0.5	9.9				
Approach LOS			A				
Intersection Summary							
Average Delay			1.6				
Intersection Capacity Utilization			22.9%			ICU Level of Service	A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis <Background 2046> Saturday Peak Hour
6: Harmony Road & Black Bear Ridge Resort Access 02-12-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	1	
Traffic Volume (veh/h)	2	85	67	2	0	0
Future Volume (Veh/h)	2	85	67	2	0	0
Sign Control		Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	
Peak Hour Factor	0.60	0.60	0.70	0.70	0.92	0.92
Hourly flow rate (vph)	3	142	96	3	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	99			246	98	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol	99			246	98	
VCu unblocked vol	4.1			6.4	6.2	
IC single (s)						
IC 2 stage (s)	2.2			3.5	3.3	
p0 queue free %	100			100	100	
IF (s)						
p0 capacity (veh/h)	1494			741	959	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	145	99	0			
Volume Left	3	0	0			
Volume Right	0	3	0			
cSH	1494	1700	1700			
Volume to Capacity	0.00	0.06	0.00			
Queue Length 95th (m)	0.0	0.0	0.0			
Control Delay (s)	0.2	0.0	0.0			
Lane LOS	A	A	A			
Approach Delay (s)	0.2	0.0	0.0			
Approach LOS		A	A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			9.4%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis <Background 2046> Saturday Peak Hour
7: Harmony Public School & Harmony Road 02-12-2025

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	1	1	1	1	1	
Traffic Volume (veh/h)	88	0	0	74	2	0
Future Volume (Veh/h)	88	0	0	74	2	0
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.58	0.58	0.74	0.74	0.92	0.92
Hourly flow rate (vph)	152	0	0	100	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume			152	252	152	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol			152	252	152	
IC single (s)			4.1	6.4	6.2	
IC 2 stage (s)			2.2	3.5	3.3	
p0 queue free %			100	100	100	
IF (s)						
p0 capacity (veh/h)			1429	737	894	
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	152	100	2			
Volume Left	0	0	2			
Volume Right	0	0	0			
cSH	1700	1429	737			
Volume to Capacity	0.09	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	9.9			
Lane LOS		A	A			
Approach Delay (s)	0.0	0.0	9.9			
Approach LOS		A	A			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			14.6%		ICU Level of Service	A
Analysis Period (min)			15			

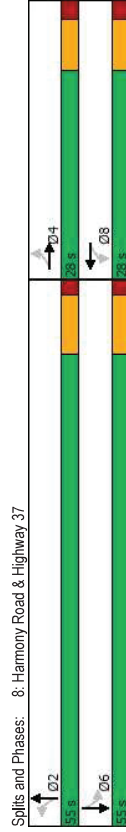
Timings
8: Harmony Road & Highway 37

HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37

<Background 2046> Saturday Peak Hour
02-12-2025

<Background 2046> Saturday Peak Hour
02-12-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	33	20	29	11	35	355	356
Traffic Volume (vph)	33	20	29	11	35	355	356
Future Volume (vph)	33	20	29	11	35	355	356
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	8	8	2	2	2	6
Permitted Phases	4	4	8	8	2	2	6
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6
Lead/Lag							
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max
Act Eff Green (s)	11.3	11.3	11.3	11.3	52.1	52.1	52.1
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.71	0.71	0.71
v/c Ratio	0.51	0.27	0.05	0.31	0.33	0.33	0.33
Control Delay	26.3	26.3	28.0	5.6	6.3	6.5	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.3	26.3	28.0	5.6	6.3	6.5	6.5
LOS	C	C	C	A	A	A	A
Approach Delay	26.3	26.3	28.0	6.2	6.5	6.5	6.5
Approach LOS	C	C	C	A	A	A	A
Intersection Summary							
Cycle Length: 83							
Actuated Cycle Length: 72.9							
Natural Cycle: 50							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 0.51							
Intersection Signal Delay: 10.1							
Intersection Capacity Utilization 49.6%							
Analysis Period (min) 15							

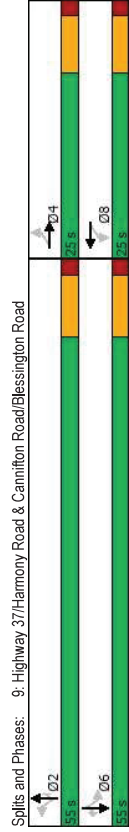


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	33	20	42	29	11	5	35	355	29	0	356	35
Traffic Volume (vph)	33	20	42	29	11	5	35	355	29	0	356	35
Future Volume (vph)	33	20	42	29	11	5	35	355	29	0	356	35
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1722	1722	1722	1722	1722	1722	1722	1722	1722	1722	1722	1722
Flt Permitted	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Satd. Flow (perm)	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506	1506
Peak-hour factor, PHF	0.69	0.69	0.69	0.74	0.74	0.74	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	48	29	61	39	15	7	37	374	31	0	400	39
RTOR Reduction (vph)	0	40	0	0	6	0	0	3	0	0	3	0
Lane Group Flow (vph)	0	98	0	0	55	0	37	402	0	0	436	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	NA	NA
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	9.2	9.2	9.2	9.2	9.2	9.2	50.6	50.6	50.6	50.6	50.6	50.6
Effective Green, g (s)	9.2	9.2	9.2	9.2	9.2	9.2	50.6	50.6	50.6	50.6	50.6	50.6
Actuated g/C Ratio	0.12	0.12	0.12	0.12	0.12	0.12	0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	186	186	186	174	174	174	642	1248	1248	1250	1250	1250
v/s Ratio Prot	c0.06	c0.06	c0.06	0.04	0.04	0.04	0.04	0.22	0.22	c0.24	c0.24	c0.24
v/s Ratio Perm	0.53	0.53	0.53	0.32	0.32	0.32	0.06	0.32	0.32	0.35	0.35	0.35
Uniform Delay, d1	30.6	30.6	30.6	29.7	29.7	29.7	4.0	4.9	4.9	5.0	5.0	5.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.7	2.7	2.7	1.0	1.0	1.0	0.2	0.7	0.7	0.8	0.8	0.8
Delay (s)	33.2	33.2	33.2	30.8	30.8	30.8	4.1	5.6	5.6	5.8	5.8	5.8
Level of Service	C	C	C	C	C	C	A	A	A	A	A	A
Approach Delay (s)	33.2	33.2	33.2	30.8	30.8	30.8	5.4	5.4	5.4	5.8	5.8	5.8
Approach LOS	C	C	C	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	10.6	10.6	10.6	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	B	B	B	B	B	B
HCM 2000 Volume to Capacity ratio	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Actuated Cycle Length (s)	74.4	74.4	74.4	74.4	74.4	74.4	14.6	14.6	14.6	14.6	14.6	14.6
Intersection Capacity Utilization	49.6%	49.6%	49.6%	49.6%	49.6%	49.6%	A	A	A	A	A	A
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group												

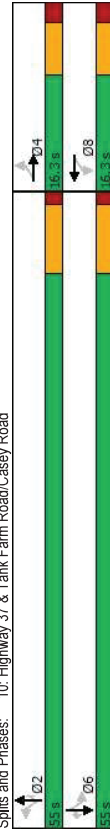
Timings
 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

HCM Signalized Intersection Capacity Analysis
 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	105	56	44	41	3	571	124	15	364	36
Future Volume (vph)	105	56	44	41	3	571	124	15	364	36
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	14.7	14.7	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9
Actuated g/C Ratio	0.19	0.19	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
v/c Ratio	0.68	0.44	0.00	0.54	0.13	0.04	0.36	0.04	0.36	0.04
Control Delay	42.4	32.4	6.7	11.1	1.7	7.1	8.8	1.6	8.8	1.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	32.4	6.7	11.1	1.7	7.1	8.8	1.6	8.8	1.6
LOS	D	C	A	B	A	A	A	A	A	A
Approach Delay	42.4	32.4	6.7	11.1	1.7	7.1	8.8	1.6	8.8	1.6
Approach LOS	D	C	A	B	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 78.2										
Natural Cycle: 60										
Control Type: Semi-Act-Uncoordinated										
Maximum v/c Ratio: 0.68										
Intersection Signal Delay: 14.7										
Intersection Capacity Utilization 60.8%										
Analysis Period (min) 15										



Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	105	56	3	44	41	3	571	124	15	364
Future Volume (vph)	105	56	3	44	41	3	571	124	15	364
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	0.85	1.00	1.00	1.00	1.00	0.85
Flt Protected	0.97	0.97	0.98	0.98	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1754	1754	1760	1760	1770	1863	1863	1770	1759	1509
Flt Permitted	0.78	0.78	0.78	0.78	0.52	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	1412	1412	1401	1401	965	1863	1863	655	1759	1509
Peak-hour factor, PHF	0.91	0.91	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	115	62	3	58	54	4	3	634	138	400
RTOR Reduction (vph)	0	1	0	0	2	0	0	52	0	15
Lane Group Flow (vph)	0	179	0	0	114	0	3	634	86	400
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	14.7	14.7	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9
Effective Green, g (s)	14.7	14.7	48.9	48.9	48.9	48.9	48.9	48.9	48.9	48.9
Actuated g/C Ratio	0.19	0.19	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	265	265	263	263	603	1164	989	409	1099	943
v/s Ratio Prot	c0.13	c0.13	0.08	0.08	0.00	c0.34	0.05	0.02	0.23	0.02
v/s Ratio Perm	0.68	0.68	0.43	0.43	0.00	0.54	0.09	0.04	0.36	0.03
Uniform Delay, d1	29.5	29.5	28.1	28.1	5.5	8.3	5.8	5.6	7.1	5.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.7	6.7	1.2	1.2	0.0	1.8	0.2	0.2	0.9	0.1
Delay (s)	36.2	36.2	29.2	29.2	5.5	10.2	6.0	5.8	8.0	5.6
Level of Service	D	D	C	C	A	B	A	A	A	A
Approach Delay (s)	36.2	36.2	29.2	29.2	9.4	9.4	7.8	7.8	7.8	7.8
Approach LOS	D	D	C	C	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	13.6	13.6	HCM 2000 Level of Service							
HCM 2000 Volume to Capacity ratio	0.57	0.57								
Actuated Cycle Length (s)	78.2	78.2	Sum of lost time (s)							
Intersection Capacity Utilization	60.8%	60.8%	ICU Level of Service							
Analysis Period (min)	15	15								
c. Critical Lane Group										

[illegible]

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road
<Background 2046> Saturday Peak Hour
02-12-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBP
Lane Configurations		↔		↔			↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	30	64	36	64	52	11	47	637	61	6	367	11
Future Volume (vph)	30	64	36	64	52	11	47	637	61	6	367	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3			6.3			7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00			1.00			1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.96			0.99			1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.99			0.98			0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1744			1755			1228	1863	1455	1770	1743	1170
Flt Permitted	0.86			0.72			0.50	1.00	1.00	0.35	1.00	1.00
Satd. Flow (perm)	1518			1298			652	1863	1455	655	1743	1170
Peak-hour factor, PHF	0.75	0.75	0.75	0.64	0.64	0.64	0.95	0.95	0.95	0.84	0.84	0.84
Adj. Flow (vph)	40	85	48	100	81	17	49	671	64	7	437	13
RTOR Reduction (vph)	0	20	0	0	5	0	0	0	0	21	0	4
Lane Group Flow (vph)	0	153	0	0	193	0	49	671	43	7	437	9
Heavy Vehicles (%)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%	9%	38%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	Perm	Perm	Perm	NA	Perm
Protected Phases	4			8			2		2		6	
Permitted Phases	4			8			2		2		6	
Actuated Green, G (s)	10.0			10.0			47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0			10.0			47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14			0.14			0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3			6.3			7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0			3.0			4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	212			182			438	1251	977	440	1170	786
v/s Ratio Prot							c0.36				0.25	
v/s Ratio Perm	0.10			c0.15			0.08		0.03	0.01		0.01
v/c Ratio	0.72			1.06			0.11	0.54	0.04	0.02	0.37	0.01
Uniform Delay, d1	29.3			30.6			4.2	6.0	4.0	3.9	5.1	3.9
Progression Factor, g	1.00			1.00			1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5			83.4			0.2	0.8	0.0	0.1	0.9	0.0
Delay (s)	40.8			114.0			4.4	6.8	4.0	3.9	6.0	3.9
Level of Service	D			F			A	A	A	A	A	A
Approach Delay (s)	40.8			114.0			6.4				5.9	
Approach LOS	D			F			A				A	
Intersection Summary												
HCM 2000 Control Delay				23.2			HCM 2000 Level of Service					
HCM 2000 Volume to Capacity ratio				0.63			C					
Actuated Cycle Length (s)				71.3			Sum of lost time (s)					
Intersection Capacity Utilization				63.8%			13.4					
Analysis Period (min)				15			B					
Critical Lane Group												

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	NB	SB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T		
Maximum Queue (m)	104.9	76.4	75.2	15.8	8.6	41.1	41.7		
Average Queue (m)	52.3	37.3	34.1	8.3	1.6	21.8	20.7		
95th Queue (m)	96.0	57.2	59.6	15.5	6.8	31.5	36.3		
Link Distance (m)	460.8	539.5	539.5			617.0	617.0		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				38.0	30.5				
Storage Blk Time (%)				4		1			
Queuing Penalty (veh)				16		0			

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB
Directions Served	LR	LT
Maximum Queue (m)	21.5	22.4
Average Queue (m)	10.3	7.4
95th Queue (m)	18.4	18.0
Link Distance (m)	510.9	376.6
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	
Maximum Queue (m)	8.2	15.6	23.7	16.2
Average Queue (m)	0.3	1.5	9.8	5.1
95th Queue (m)	2.7	7.5	17.1	13.4
Link Distance (m)	510.9	962.1	215.8	332.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Harmony Road & Homan Road

Movement	SB
Directions Served	LR
Maximum Queue (m)	9.2
Average Queue (m)	1.8
95th Queue (m)	7.8
Link Distance (m)	490.2
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 5: Plumpton & Harmony Road

Movement	EB	NB
Directions Served	TR	LR
Maximum Queue (m)	9.8	9.2
Average Queue (m)	0.3	6.4
95th Queue (m)	3.2	12.7
Link Distance (m)	41.0	551.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 7: Harmony Public School & Harmony Road									
Movement		NB		WB		NB		SB	
Directions Served		LR		LTR		L		TR	
Maximum Queue (m)		9.2		31.8		18.7		35.5	
Average Queue (m)		0.9		8.9		2.5		13.5	
95th Queue (m)		5.4		20.9		8.7		31.6	
Link Distance (m)		212.1		463.5		263.1		2731.5	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 8: Harmony Road & Highway 37

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	LTR	L	TR	TR
Maximum Queue (m)	20.9	31.8	18.7	35.5	27.2
Average Queue (m)	11.5	8.9	2.5	13.5	10.5
95th Queue (m)	20.9	20.5	8.7	31.6	23.2
Link Distance (m)	463.5	263.1		2731.5	954.7
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)				79.5	
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	T	R	T
Maximum Queue (m)	57.9	27.8	5.6	69.6	16.8	6.4
Average Queue (m)	29.2	14.1	0.5	29.2	2.9	0.8
95th Queue (m)	48.2	26.1	2.8	59.1	9.2	4.2
Link Distance (m)	437.7	564.0		780.7		2731.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				82.0		79.0
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	
Directions Served	LTR	LTR	L	T	R	L	T	R	
Maximum Queue (m)	51.9	59.6	18.8	55.2	4.0	7.9	52.6	11.0	
Average Queue (m)	21.9	24.8	7.6	25.1	0.3	0.8	18.5	0.5	
95th Queue (m)	38.0	50.6	18.5	44.6	1.9	4.5	43.8	4.1	
Link Distance (m)	593.4	692.0		405.0			780.7		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				66.0		70.0	68.0		70.0
Storage Blk Time (%)									
Queuing Penalty (veh)									

Network Summary

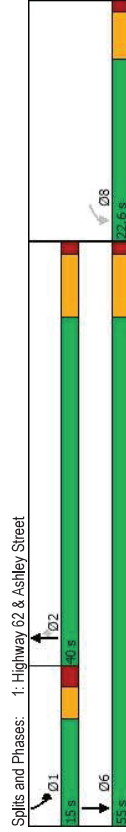
Network wide Queuing Penalty: 16



Future Total Conditions

(2041 and 2046)

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	394	515	242	8	1281
Future Volume (vph)	394	515	242	8	1281
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	3.9	3.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	1.51	0.31	0.29	0.06	0.89
Control Delay	272.3	9.5	2.4	33.2	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	272.3	9.5	2.4	33.2	12.1
LOS	F	A	A	C	B
Approach Delay	272.3	7.2			12.2
Approach LOS	F	A			B
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 80					
Control Type: Semi Act-Uncoordinated					
Maximum v/c Ratio: 1.51					
Intersection Signal Delay: 55.2					Intersection LOS: E
Intersection Capacity Utilization 68.6%					ICU Level of Service C
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		W	W	W	W
Traffic Volume (vph)	394	11	515	242	8	1281
Future Volume (vph)	394	11	515	242	8	1281
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	1.00		1.00	0.85	1.00	1.00
Flt Protected	0.95		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1450		3195	1392	1770	3505
Flt Permitted	0.95		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1450		3195	1392	1770	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86	0.86
Adj. Flow (vph)	469	13	572	269	9	1490
RTOR Reduction (vph)	2	0	0	119	0	0
Lane Group Flow (vph)	480	0	572	150	9	1490
Heavy Vehicles (%)	25%	5%	13%	16%	2%	3%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.4	45.4	1.4	51.8
Effective Green, g (s)	17.0		45.4	45.4	1.4	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	302		1777	774	30	2224
v/s Ratio Prot			0.18		0.01	c0.43
v/s Ratio Perm	c0.33			0.11		
v/c Ratio	1.59		0.32	0.19	0.30	0.67
Uniform Delay, d1	32.3		9.8	9.0	39.6	9.5
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	281.0		0.5	0.6	5.6	1.6
Delay (s)	313.3		10.3	9.6	45.2	11.1
Level of Service	F		B	A	D	B
Approach Delay (s)	313.3		10.0		11.3	
Approach LOS	F		B		B	
Intersection Summary						
HCM 2000 Control Delay			62.5		HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio			0.97			
Actuated Cycle Length (s)			81.6		Sum of lost time (s)	17.8
Intersection Capacity Utilization			68.6%		ICU Level of Service	C
Analysis Period (min)			15			
Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

2. Ashley Street & Harmony Road

<Total 2041> AM Peak Hour

03-05-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	126	130	110	103	155	67
Future Volume (Veh/h)	126	130	110	103	155	67
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.89	0.89	0.80	0.80	0.85	0.85
Hourly flow rate (vph)	142	146	138	129	182	79
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	646	202			267	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	646	202			267	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	62	83			86	
cM capacity (veh/h)	375	838			1297	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	288	267	261			
Volume Left	142	0	182			
Volume Right	146	129	0			
cSH	521	1700	1297			
Volume to Capacity	0.55	0.16	0.14			
Queue Length 95th (m)	26.6	0.0	3.9			
Control Delay (s)	20.1	0.0	6.1			
Lane LOS	C		A			
Approach Delay (s)	20.1	0.0	6.1			
Approach LOS	C					
Intersection Summary						
Average Delay			9.1			
Intersection Capacity Utilization			49.1%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3. River Road & Harmony Road

<Total 2041> AM Peak Hour

03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		T		T			T			T		T
Traffic Volume (veh/h)	3	239	36	11	217	0	27	1	15	60	5	5
Future Volume (Veh/h)	3	239	36	11	217	0	27	1	15	60	5	5
Sign Control		Free		Free			Stop		Stop		Stop	
Grade		0%		0%			0%		0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.69	0.51	0.51	0.51
Hourly flow rate (vph)	4	285	43	12	244	0	39	1	22	118	10	10
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type			None				None					
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	244			328			598	582	306	605	604	244
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	244			328			598	582	306	605	604	244
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			90	100	97	70	98	99
cM capacity (veh/h)	1322			1232			398	419	733	393	407	795
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	332	256	62	138								
Volume Left	4	12	39	118								
Volume Right	43	0	22	10								
cSH	1322	1232	475	409								
Volume to Capacity	0.00	0.01	0.13	0.34								
Queue Length 95th (m)	0.1	0.2	3.6	11.7								
Control Delay (s)	0.1	0.5	13.7	18.2								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.5	13.7	18.2								
Approach LOS		B	C									
Intersection Summary												
Average Delay			4.5									
Intersection Capacity Utilization			30.2%							A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

<Total 2041> AM Peak Hour
03-05-2025

<Total 2041> AM Peak Hour
03-05-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations						
Traffic Volume (veh/h)	1	309	241	1	1	1
Future Volume (Veh/h)	1	309	241	1	1	1
Sign Control		Free	Free	Stop		
Grade		0%	0%	0%		
Peak Hour Factor	0.77	0.77	0.51	0.50	0.50	
Hourly flow rate (vph)	1	401	473	2	2	2
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	475			877	474	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	475			877	474	
IC single (s)	4.1			6.4	7.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	4.2	
p0 queue free %	100			99	100	
cM capacity (veh/h)	1087			319	432	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	402	475	4			
Volume Left	1	0	2			
Volume Right	0	2	2			
cSH	1087	1700	367			
Volume to Capacity	0.00	0.28	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	14.9			
Lane LOS	A		B			
Approach Delay (s)	0.0	0.0	14.9			
Approach LOS			B			
Intersection Summary						
Average Delay			0.1			
Intersection Capacity Utilization			27.1%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	253	7	18	217	1	13
Future Volume (Veh/h)	253	7	18	217	1	13
Sign Control	Free	Free	Free	Stop		
Grade	0%	0%	0%	0%		
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	0.67
Hourly flow rate (vph)	312	9	21	249	1	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	321	270	20			
Volume Left	0	21	1			
Volume Right	9	0	19			
cSH	1700	1239	703			
Volume to Capacity	0.19	0.02	0.03			
Queue Length 95th (m)	0.0	0.4	0.7			
Control Delay (s)	0.0	0.8	10.3			
Lane LOS	A		B			
Approach Delay (s)	0.0	0.8	10.3			
Approach LOS			B			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			36.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2041> AM Peak Hour
03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	4	4	4	
Traffic Volume (veh/h)	51	276	207	34	75	50	
Future Volume (Veh/h)	51	276	207	34	75	50	
Sign Control		Free	Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	0%	
Peak Hour Factor	0.78	0.78	0.51	0.51	0.92	0.92	
Hourly flow rate (vph)	65	354	406	67	82	54	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume	473				924	440	
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	473				924	440	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)							
IF (s)	2.2				3.5	3.3	
p0 queue free %	94				71	91	
cM capacity (veh/h)	1089				281	617	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	419	473	136				
Volume Left	65	0	82				
Volume Right	0	67	54				
cSH	1089	1700	359				
Volume to Capacity	0.06	0.28	0.38				
Queue Length 95th (m)	1.5	0.0	13.8				
Control Delay (s)	1.9	0.0	21.0				
Lane LOS	A	C	C				
Approach Delay (s)	1.9	0.0	21.0				
Approach LOS		C	C				
Intersection Summary							
Average Delay			3.5				
Intersection Capacity Utilization			47.5%				
Analysis Period (min)			15				
					ICU Level of Service		A

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2041> AM Peak Hour
03-05-2025

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4	4	4	4	4	4	
Traffic Volume (veh/h)	190	91	89	162	52	69	
Future Volume (Veh/h)	190	91	89	162	52	69	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.54	0.54	0.78	0.78	0.30	0.30	
Hourly flow rate (vph)	352	169	114	208	173	230	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None	None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume				521	872	436	
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				521	872	436	
IC single (s)				4.3	6.6	6.4	
IC 2 stage (s)							
IF (s)				2.4	3.7	3.5	
p0 queue free %				88	34	60	
cM capacity (veh/h)				973	263	580	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	521	322	403				
Volume Left	0	114	173				
Volume Right	169	0	230				
cSH	1700	973	382				
Volume to Capacity	0.31	0.12	1.06				
Queue Length 95th (m)	0.0	3.2	109.5				
Control Delay (s)	0.0	4.0	95.0				
Lane LOS	A	F	F				
Approach Delay (s)	0.0	4.0	95.0				
Approach LOS		F	F				
Intersection Summary							
Average Delay			31.8				
Intersection Capacity Utilization			46.1%				
Analysis Period (min)			15				
					ICU Level of Service		A

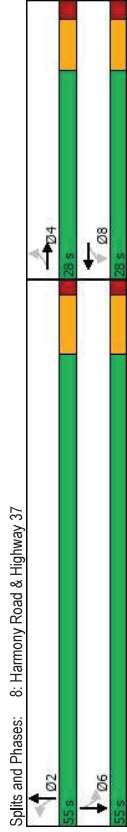
Timings

8: Harmony Road & Highway 37

<Total 2041> AM Peak Hour

03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	60	79	69	47	82	220	5	673
Traffic Volume (vph)	60	79	69	47	82	220	5	673
Future Volume (vph)	60	79	69	47	82	220	5	673
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	4	4	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	17.9	17.9	47.5	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59
v/c Ratio	0.84	0.84	0.81	0.81	0.32	0.01	0.85	0.85
Control Delay	43.5	43.5	58.0	58.0	9.7	7.8	23.8	23.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.5	43.5	58.0	58.0	9.7	7.8	23.8	23.8
LOS	D	D	E	C	A	A	C	C
Approach Delay	43.5	43.5	58.0	58.0	15.2	23.7		
Approach LOS	D	D	E	B	B	C		
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 80.1								
Natural Cycle: 70								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.85								
Intersection Signal Delay: 28.5								
Intersection Capacity Utilization 93.9%								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis

8: Harmony Road & Highway 37

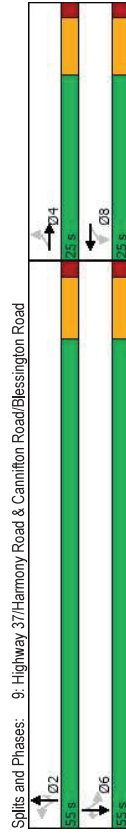
<Total 2041> AM Peak Hour

03-05-2025

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	60	79	148	69	47	1	82	220	14	5	673	109
Traffic Volume (vph)	60	79	148	69	47	1	82	220	14	5	673	109
Future Volume (vph)	60	79	148	69	47	1	82	220	14	5	673	109
Total Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Flt Protected	0.99	0.99	0.99	0.97	0.97	0.97	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1689	1689	1689	1689	1689	1689	1687	1589	1444	1444	1760	1760
Flt Permitted	0.90	0.90	0.90	0.52	0.52	0.52	0.16	0.16	0.58	0.58	1.00	1.00
Satd. Flow (perm)	1528	1528	1528	901	901	901	292	1589	877	877	1760	1760
Peak-hour factor, PHF	0.88	0.88	0.88	0.73	0.73	0.73	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	68	90	168	95	64	1	105	282	18	6	765	124
RTOR Reduction (vph)	0	48	0	0	0	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	278	0	0	160	0	105	298	0	6	883	0
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%	11%	25%	5%	10%
Turn Type	Perm	NA	NA	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	NA
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	47.5	47.5	47.5	47.5	47.5	47.5	47.5
Effective Green, g (s)	17.9	17.9	17.9	17.9	17.9	47.5	47.5	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.22	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	341	341	341	201	201	173	943	943	520	1045	1045	1045
v/s Ratio Prot	c0.18	c0.18	c0.18	0.18	0.18	0.36	0.36	0.36	0.01	0.01	0.01	0.01
v/s Ratio Perm	0.81	0.81	0.81	0.80	0.80	0.61	0.61	0.61	0.01	0.01	0.84	0.84
Uniform Delay, d1	29.5	29.5	29.5	29.3	29.3	10.3	8.1	8.1	6.6	13.2	13.2	13.2
Progression Factor, d2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.9	13.9	13.9	19.2	19.2	14.8	0.9	0.9	0.0	8.4	8.4	8.4
Delay (s)	43.3	43.3	43.3	48.6	48.6	25.1	9.0	9.0	6.7	21.6	21.6	21.6
Level of Service	D	D	D	D	D	C	A	A	A	C	C	C
Approach Delay (s)	43.3	43.3	43.3	48.6	48.6	13.2	13.2	13.2	21.5	21.5	21.5	21.5
Approach LOS	D	D	D	D	D	B	B	B	C	C	C	C
Intersection Summary												
HCM 2000 Control Delay	26.0	26.0	26.0	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Actuated Cycle Length (s)	80.0	80.0	80.0	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)
Intersection Capacity Utilization	93.9%	93.9%	93.9%	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service	ICU Level of Service
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group												

Timings
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road <Total 2041> AM Peak Hour 03-05-2025

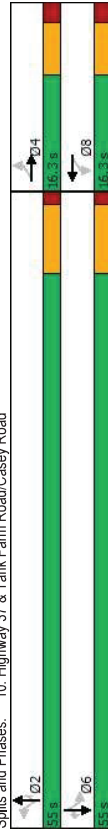
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	54	21	158	47	5	313	47	8	819	96
Future Volume (vph)	54	21	158	47	5	313	47	8	819	96
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Detector Phase	4	4	8	8	2	2	2	2	6	6
Switch Phase	4	4	8	8	2	2	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag	None	None	None	None	Max	Max	Max	Max	Max	Max
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
v/c Ratio	0.39	0.39	0.94	0.08	0.40	0.07	0.02	0.93	0.12	0.12
Control Delay	31.1	73.5	10.0	10.2	2.4	6.9	32.3	1.8	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.1	73.5	10.0	10.2	2.4	6.9	32.3	1.8	0.0	0.0
LOS	C	E	A	B	A	A	A	C	A	A
Approach Delay	31.1	73.5	9.2	9.2	A	A	A	C	C	C
Approach LOS	C	E	A	A	A	A	A	C	C	C
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 80										
Natural Cycle: 90										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.94										
Intersection Signal Delay: 30.8										
Intersection Capacity Utilization 68.4%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road <Total 2041> AM Peak Hour 03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	2	2	6	6
Traffic Volume (vph)	54	21	0	158	47	3	5	313	47	8	819	96
Future Volume (vph)	54	21	0	158	47	3	5	313	47	8	819	96
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Satd. Flow (prot)	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721	1721
Flt Permitted	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Satd. Flow (perm)	1266	1266	1266	1266	1266	1266	1266	1266	1266	1266	1266	1266
Peak-hour factor, PHF	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68	0.68
Adj. Flow (vph)	79	31	0	208	62	4	6	377	57	10	1011	119
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	110	0	0	273	0	6	377	34	10	1011	71
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	18.0	18.0	18.0	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	18.0	18.0	18.0	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	284	284	284	290	290	290	75	933	747	580	1082	920
v/s Ratio Prot	0.09	0.09	0.09	0.21	0.21	0.21	0.23	0.23	0.23	0.23	0.23	0.23
v/s Ratio Perm	0.39	0.39	0.39	0.94	0.94	0.94	0.08	0.08	0.08	0.08	0.08	0.08
Uniform Delay, d1	26.3	26.3	26.3	30.5	30.5	30.5	7.0	8.7	8.7	6.7	14.9	7.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	0.9	0.9	37.5	37.5	37.5	2.1	1.2	1.2	0.1	15.5	0.2
Delay (s)	27.2	27.2	27.2	68.0	68.0	68.0	9.0	9.9	9.9	6.8	30.4	7.1
Level of Service	C	C	C	E	E	E	A	A	A	A	C	A
Approach Delay (s)	27.2	27.2	27.2	68.0	68.0	68.0	9.5	9.5	9.5	27.8	27.8	27.8
Approach LOS	C	C	C	E	E	E	A	A	A	C	C	C
Intersection Summary												
HCM 2000 Control Delay	29.3											
HCM 2000 Level of Service	C											
HCM 2000 Volume to Capacity ratio	0.94											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	14.6											
Intersection Capacity Utilization	68.4%											
ICU Level of Service	C											
Analysis Period (min)	15											
c. Critical Lane Group												

Timings
10: Highway 37 & Tank Farm Road/Casey Road

[illegible]

HCM Signalized Intersection Capacity Analysis

10: Highway 37 & Tank Farm Road/Casey Road

[illegible]

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		W	
Traffic Volume (veh/h)	44	307	228	30	75	50
Future Volume (Veh/h)	44	307	228	30	75	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	334	248	33	82	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	281				694	264
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	281				694	264
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	96				79	93
cM capacity (veh/h)	1282				393	774
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	382	281	136			
Volume Left	48	0	82			
Volume Right	0	33	54			
cSH	1282	1700	489			
Volume to Capacity	0.04	0.17	0.28			
Queue Length 95th (m)	0.9	0.0	9.0			
Control Delay (s)	1.3	0.0	15.2			
Lane LOS	A		C			
Approach Delay (s)	1.3	0.0	15.2			
Approach LOS			C			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			49.5%			A
Analysis Period (min)			15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		W	
Traffic Volume (veh/h)	51	259	182	34	64	43
Future Volume (Veh/h)	51	259	182	34	64	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	282	198	37	70	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	235				608	216
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	235				608	216
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	96				84	94
cM capacity (veh/h)	1332				440	823
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	337	235	117			
Volume Left	55	0	70			
Volume Right	0	37	47			
cSH	1332	1700	541			
Volume to Capacity	0.04	0.14	0.22			
Queue Length 95th (m)	1.0	0.0	6.5			
Control Delay (s)	1.6	0.0	13.5			
Lane LOS	A		B			
Approach Delay (s)	1.6	0.0	13.5			
Approach LOS			B			
Intersection Summary						
Average Delay			3.1			
Intersection Capacity Utilization			44.3%			A
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street													
Movement	WB	NB	NB	SB	SB	SB	T	SB	SB	SB	T		
Directions Served	LR		TR	LT		R		L					
Maximum Queue (m)	290.8	47.7	47.1	19.1	8.6	71.0	78.2						
Average Queue (m)	263.0	23.5	13.5	12.0	2.6	37.2	35.0						
95th Queue (m)	282.8	39.2	31.7	18.4	8.5	60.9	64.9						
Link Distance (m)	460.8	539.5	539.5			617.0	617.0						
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)					38.0	30.5					6		
Storage Blk Time (%)					0								
Queuing Penalty (veh)					0						1		

Intersection: 2: Ashley Street & Harmony Road													
Movement	WB	NB	NB	SB	SB	SB	LT						
Directions Served	LR	TR		LT									
Maximum Queue (m)	47.6	8.6	26.0										
Average Queue (m)	20.0	0.3	10.5										
95th Queue (m)	41.4	2.8	23.7										
Link Distance (m)	510.9	460.8	376.6										
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 3: River Road & Harmony Road													
Movement	EB	WB	NB	SB	SB	SB	LTR						
Directions Served	LTR		TR	LT									
Maximum Queue (m)	7.9	7.7	20.1	22.3									
Average Queue (m)	0.5	0.7	8.9	8.8									
95th Queue (m)	3.8	4.3	16.4	17.4									
Link Distance (m)	510.9	962.1	215.8	332.3									
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 4: Harmony Road & Homan Road													
Movement	EB	WB	SB	SB	SB	SB	LT						
Directions Served	LT	TR	LR										
Maximum Queue (m)	22.7	13.8	15.1										
Average Queue (m)	0.8	0.5	1.4										
95th Queue (m)	7.5	4.5	7.3										
Link Distance (m)	962.1	41.0	490.2										
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 5: Plumpton & Harmony Road													
Movement	WB	NB	SB	SB	SB	SB	LT						
Directions Served	LT	LR											
Maximum Queue (m)	15.0	9.2											
Average Queue (m)	1.6	3.5											
95th Queue (m)	7.7	10.4											
Link Distance (m)	902.5	551.1											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access													
Movement	EB	SB	SB	SB	SB	SB	LT						
Directions Served	LT	LR											
Maximum Queue (m)	29.9	35.8											
Average Queue (m)	4.4	13.5											
95th Queue (m)	15.5	24.8											
Link Distance (m)	902.5	388.9											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 7: Harmony Public School & Harmony Road												
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	34.3	40.4										
Average Queue (m)	8.1	15.9										
95th Queue (m)	22.3	27.2										
Link Distance (m)	64.8	212.2										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 8: Harmony Road & Highway 37

Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	57.0	48.4	36.9	42.1	10.1	119.9						
Average Queue (m)	34.0	23.6	15.7	15.1	0.8	54.4						
95th Queue (m)	57.5	42.7	33.1	34.8	4.4	95.7						
Link Distance (m)	382.1	263.1		2731.5		954.7						
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)				79.5	82.0							
Storage Blk Time (%)						2						
Queuing Penalty (veh)						0						

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	33.9	89.6	13.3	54.3	10.0	6.5	2739.4	18.5				
Average Queue (m)	15.4	34.3	0.6	19.0	1.8	1.7	238.0	4.3				
95th Queue (m)	30.7	59.6	4.8	36.5	6.9	6.2	1341.7	11.8				
Link Distance (m)	437.7	564.0		780.7			2731.5					
Upstream Blk Time (%)							0					
Queuing Penalty (veh)							1					
Storage Bay Dist (m)				82.0	85.0	75.0		79.0				
Storage Blk Time (%)							4					
Queuing Penalty (veh)							4					

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road												
Movement	EB	WB	NB	NB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	25.8	69.4	10.6	35.3	10.5	14.7	100.8	12.8				
Average Queue (m)	12.3	30.5	1.6	9.2	0.6	3.4	70.2	1.8				
95th Queue (m)	23.5	54.5	6.4	24.6	4.0	10.8	107.2	7.5				
Link Distance (m)	593.4	692.0		405.0			780.7					
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)				66.0	70.0	68.0		70.0				
Storage Blk Time (%)							7					
Queuing Penalty (veh)							4					

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LT	LR										
Maximum Queue (m)	34.2	28.5										
Average Queue (m)	4.6	12.7										
95th Queue (m)	16.6	21.8										
Link Distance (m)	470.1	145.5										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	LT	LR										
Maximum Queue (m)	49.2	21.7										
Average Queue (m)	5.7	12.9										
95th Queue (m)	21.8	19.3										
Link Distance (m)	64.8	138.4										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Network Summary

Network wide Queuing Penalty: 10

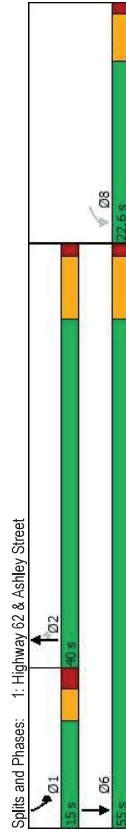
Timings

1: Highway 62 & Ashley Street

<Total 2046> AM Peak Hour

03-05-2025

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	431	568	263	9	1414
Future Volume (vph)	431	568	263	9	1414
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	3.9	3.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.4	45.4	7.0	47.8
Actuated g/C Ratio	0.22	0.59	0.59	0.09	0.62
v/c Ratio	1.65	0.34	0.31	0.06	0.76
Control Delay	332.4	9.8	2.5	33.3	13.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	332.4	9.8	2.5	33.3	13.8
LOS	F	A	A	C	B
Approach Delay	332.4	7.5			13.9
Approach LOS	F	A			B
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 90					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 1.65					
Intersection Signal Delay: 66.1					
Intersection LOS: E					
Intersection Capacity Utilization 74.4%					
Analysis Period (min) 15					



HCM Signalized Intersection Capacity Analysis

1: Highway 62 & Ashley Street

<Total 2046> AM Peak Hour

03-05-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	431	12	568	263	9	1414
Future Volume (vph)	431	12	568	263	9	1414
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Frt	1.00		1.00	0.85	1.00	1.00
Flt Protected	0.95		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1450		3195	1392	1770	3505
Flt Permitted	0.95		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1450		3195	1392	1770	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86	0.86
Adj. Flow (vph)	513	14	631	292	10	1644
RTOR Reduction (vph)	2	0	0	130	0	0
Lane Group Flow (vph)	525	0	631	162	10	1644
Heavy Vehicles (%)	25%	5%	13%	16%	2%	3%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.4	45.4	1.4	51.8
Effective Green, g (s)	17.0		45.4	45.4	1.4	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	302		1777	774	30	2224
v/s Ratio Prot			0.20		0.01	c0.47
v/s Ratio Perm	c0.36			0.12		
v/c Ratio	1.74		0.36	0.21	0.33	0.74
Uniform Delay, d1	32.3		10.0	9.1	39.6	10.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	346.4		0.6	0.6	6.5	2.3
Delay (s)	378.7		10.6	9.7	46.1	12.5
Level of Service	F		B	A	D	B
Approach Delay (s)	378.7		10.3			12.7
Approach LOS	F		B			B
Intersection Summary						
HCM 2000 Control Delay			74.1			HCM 2000 Level of Service E
HCM 2000 Volume to Capacity ratio			1.06			
Actuated Cycle Length (s)			81.6			Sum of lost time (s) 17.8
Intersection Capacity Utilization			74.4%			ICU Level of Service D
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

2. Ashley Street & Harmony Road

<Total 2046> AM Peak Hour

03-05-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	T	T	T	T
Traffic Volume (veh/h)	134	136	121	108	162	74
Future Volume (Veh/h)	134	136	121	108	162	74
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.89	0.89	0.80	0.80	0.85	0.85
Hourly flow rate (vph)	151	153	151	135	191	87
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	688	218				286
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	688	218				286
IC single (s)	6.4	6.2				4.1
IC 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	57	81				85
CM capacity (veh/h)	351	821				1276
Direction, Lane #	WBL	NB 1	SB 1			
Volume Total	304	286	278			
Volume Left	151	0	191			
Volume Right	153	135	0			
cSH	483	1700	1276			
Volume to Capacity	0.62	0.17	0.15			
Queue Length 95th (m)	32.9	0.0	4.2			
Control Delay (s)	23.4	0.0	6.1			
Lane LOS	C	A	A			
Approach Delay (s)	23.4	0.0	6.1			
Approach LOS	C					
Intersection Summary						
Average Delay			10.1			
Intersection Capacity Utilization			51.6%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3. River Road & Harmony Road

<Total 2046> AM Peak Hour

03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	3	250	39	11	227	0	30	2	16	67	6	6
Future Volume (Veh/h)	3	250	39	11	227	0	30	2	16	67	6	6
Sign Control		Free	Free	Free	Free			Stop			Stop	
Grade		0%	0%	0%	0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.69	0.51	0.51	
Hourly flow rate (vph)	4	298	46	12	255	0	43	3	23	131	12	12
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	255			344			626	608	321	632	631	255
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	255			344			626	608	321	632	631	255
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			99			89	99	97	65	97	98
CM capacity (veh/h)	1310			1215			378	405	720	374	393	784
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	348	267	69	155								
Volume Left	4	12	43	131								
Volume Right	46	0	23	12								
cSH	1310	1215	450	392								
Volume to Capacity	0.00	0.01	0.15	0.40								
Queue Length 95th (m)	0.1	0.2	4.3	14.8								
Control Delay (s)	0.1	0.4	14.4	20.1								
Lane LOS	A	A	B	C								
Approach Delay (s)	0.1	0.4	14.4	20.1								
Approach LOS		B	C									
Intersection Summary												
Average Delay				5.1								
Intersection Capacity Utilization				31.4%							A	
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	2	2	2	
Traffic Volume (veh/h)	2	326	252	2	2	2	
Future Volume (Veh/h)	2	326	252	2	2	2	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.77	0.77	0.51	0.51	0.50	0.50	
Hourly flow rate (vph)	3	423	494	4	4	4	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked					925	496	
VC conflicting volume	498						
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	498				925	496	
IC single (s)	4.1				6.4	7.2	
IC 2 stage (s)							
IF (s)	2.2				3.5	4.2	
p0 queue free %	100				99	99	
cM capacity (veh/h)	1066				298	419	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	426	498	8				
Volume Left	3	0	4				
Volume Right	0	4	4				
cSH	1066	1700	348				
Volume to Capacity	0.00	0.29	0.02				
Queue Length 95th (m)	0.1	0.0	0.6				
Control Delay (s)	0.1	0.0	15.6				
Lane LOS	A		C				
Approach Delay (s)	0.1	0.0	15.6				
Approach LOS			C				
Intersection Summary							
Average Delay			0.2				
Intersection Capacity Utilization			28.7%				A
Analysis Period (min)			15				

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4	4	4	2	2	14	
Traffic Volume (veh/h)	264	8	18	227	2	14	
Future Volume (Veh/h)	264	8	18	227	2	14	
Sign Control	Free	Free	Free	Stop	Stop		
Grade	0%	0%	0%	0%	0%		
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	0.67	
Hourly flow rate (vph)	326	10	21	261	3	21	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None		None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked					634	331	
VC conflicting volume				336			
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				336		331	
IC single (s)				4.1		6.4	
IC 2 stage (s)							
IF (s)				2.2		3.5	
p0 queue free %				98		99	
cM capacity (veh/h)				1223		436	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	336	282	24				
Volume Left	0	21	3				
Volume Right	10	0	21				
cSH	1700	1223	659				
Volume to Capacity	0.20	0.02	0.04				
Queue Length 95th (m)	0.0	0.4	0.9				
Control Delay (s)	0.0	0.7	10.7				
Lane LOS		A	B				
Approach Delay (s)	0.0	0.7	10.7				
Approach LOS			B				
Intersection Summary							
Average Delay			0.7				
Intersection Capacity Utilization			38.8%				A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2046> AM Peak Hour
03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	3	4	3	
Traffic Volume (veh/h)	51	295	219	34	75	50	
Future Volume (Veh/h)	51	295	219	34	75	50	
Sign Control		Free	Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	0%	
Peak Hour Factor	0.78	0.78	0.51	0.51	0.92	0.92	
Hourly flow rate (vph)	65	378	429	67	82	54	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume	496				970	462	
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	496				970	462	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)							
IF (s)	2.2				3.5	3.3	
p0 queue free %	94				69	91	
cM capacity (veh/h)	1068				264	599	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	443	496	136				
Volume Left	65	0	82				
Volume Right	0	67	54				
cSH	1068	1700	339				
Volume to Capacity	0.06	0.29	0.40				
Queue Length 95th (m)	1.6	0.0	15.0				
Control Delay (s)	1.8	0.0	22.6				
Lane LOS	A		C				
Approach Delay (s)	1.8	0.0	22.6				
Approach LOS			C				
Intersection Summary							
Average Delay			3.6				
Intersection Capacity Utilization			49.2%				
Analysis Period (min)			15				
					ICU Level of Service		A

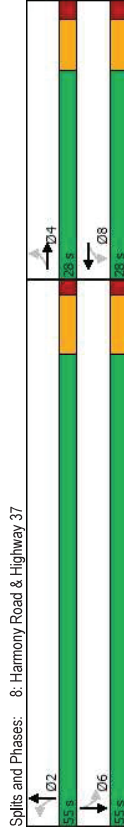
HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2046> AM Peak Hour
03-05-2025

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4	4	4	4	4	4	
Traffic Volume (veh/h)	195	100	99	172	58	76	
Future Volume (Veh/h)	195	100	99	172	58	76	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.54	0.54	0.78	0.78	0.30	0.30	
Hourly flow rate (vph)	361	185	127	221	193	253	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None		None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume				546	928	454	
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				546	928	454	
IC single (s)				4.3	6.6	6.4	
IC 2 stage (s)							
IF (s)				2.4	3.7	3.5	
p0 queue free %				87	19	55	
cM capacity (veh/h)				952	238	567	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	546	348	446				
Volume Left	0	127	193				
Volume Right	185	0	253				
cSH	1700	952	355				
Volume to Capacity	0.32	0.13	1.26				
Queue Length 95th (m)	0.0	3.7	156.5				
Control Delay (s)	0.0	4.3	167.9				
Lane LOS		A	F				
Approach Delay (s)	0.0	4.3	167.9				
Approach LOS			F				
Intersection Summary							
Average Delay			57.0				
Intersection Capacity Utilization			48.8%				
Analysis Period (min)			15				
					ICU Level of Service		A

Timings
8: Harmony Road & Highway 37 <Total 2046> AM Peak Hour
03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	62	80	76	50	87	243	6	743
Traffic Volume (vph)	62	80	76	50	87	243	6	743
Future Volume (vph)	62	80	76	50	87	243	6	743
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Minimum Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Total Split (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
Yellow Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag	None	None	None	None	Max	Max	Max	Max
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	18.4	18.4	18.4	18.4	47.5	47.5	47.5	47.5
Act Eff Green (s)	0.23	0.23	0.23	0.23	0.59	0.59	0.59	0.59
Actuated g/C Ratio	0.85	0.85	0.86	1.03	0.35	0.01	0.93	0.93
v/c Ratio	45.1	66.9	119.3	10.3	7.8	33.1	7.8	33.1
Queue Delay	45.1	66.9	119.3	10.3	7.8	33.1	7.8	33.1
Total Delay	45.1	66.9	119.3	10.3	7.8	33.1	7.8	33.1
LOS	D	E	F	B	A	C	A	C
Approach Delay	45.1	66.9	66.9	37.8	32.9	32.9	32.9	32.9
Approach LOS	D	E	E	D	C	C	C	C
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 80.5								
Natural Cycle: 90								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 1.03								
Intersection Signal Delay: 39.2								
Intersection Capacity Utilization 98.4%								
Analysis Period (min) 15								

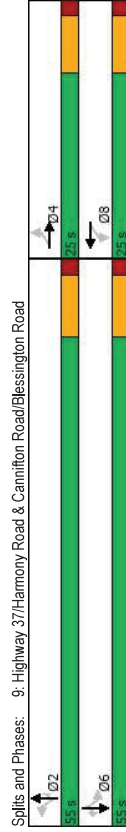


HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37 <Total 2046> AM Peak Hour
03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	62	80	154	76	50	2	87	243
Traffic Volume (vph)	62	80	154	76	50	2	87	243
Future Volume (vph)	62	80	154	76	50	2	87	243
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Flt Protected	1688	1688	1688	1688	1688	1688	1688	1688
Satd. Flow (prot)	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Flt Permitted	1518	1518	1518	1518	1518	1518	1518	1518
Satd. Flow (perm)	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Peak-hour factor, PHF	70	91	175	104	68	3	112	312
Adj. Flow (vph)	0	49	0	0	1	0	2	0
RTOR Reduction (vph)	0	287	0	0	174	0	112	329
Lane Group Flow (vph)	7%	2%	3%	4%	17%	2%	7%	19%
Heavy Vehicles (%)	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Actuated Green, G (s)	18.4	18.4	18.4	18.4	47.5	47.5	47.5	47.5
Effective Green, g (s)	18.4	18.4	18.4	18.4	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	346	346	203	203	110	937	503	1039
v/s Ratio Prot	0.19	0.19	0.20	0.20	0.60	0.21	0.01	0.55
v/s Ratio Perm	0.83	0.83	0.86	0.86	1.02	0.35	0.01	0.93
Uniform Delay, d1	29.6	29.6	29.8	29.8	16.5	8.5	6.8	15.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.4	15.4	28.3	28.3	90.8	1.0	0.1	15.6
Delay (s)	45.0	45.0	58.1	58.1	107.3	9.6	6.9	30.6
Level of Service	D	D	E	E	F	A	A	C
Approach Delay (s)	45.0	45.0	58.1	58.1	34.3	30.4	30.4	30.4
Approach LOS	D	D	E	E	C	C	C	C
Intersection Summary								
HCM 2000 Control Delay	36.3							
HCM 2000 Level of Service	D							
HCM 2000 Volume to Capacity ratio	0.97							
Actuated Cycle Length (s)	80.5							
Intersection Capacity Utilization	98.4%							
Analysis Period (min)	15							
c. Critical Lane Group								

Timings
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road <Total 2046> AM Peak Hour 03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group											
Lane Configurations	60	23	174	52	6	343	52	9	896	105	
Traffic Volume (vph)	60	23	174	52	6	343	52	9	896	105	
Future Volume (vph)	60	23	174	52	6	343	52	9	896	105	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	4	4	8	8	2	2	2	6	6	6	
Permitted Phases	4	4	8	8	2	2	2	6	6	6	
Detector Phase	4	4	8	8	2	2	2	6	6	6	
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	
Minimum Initial (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6	
Minimum Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9	
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Lead/Lag											
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max	
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max	
Act Eff Green (s)	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
Actuated g/C Ratio	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	
v/c Ratio	0.43	1.04	0.09	0.43	0.08	0.02	1.02	0.13	0.13	0.13	
Control Delay	32.0	96.7	10.5	10.7	2.3	6.9	51.8	1.8	1.8	1.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	32.0	96.7	10.5	10.7	2.3	6.9	51.8	1.8	1.8	1.8	
LOS	C	F	B	B	A	A	A	D	A	A	
Approach Delay	32.0	96.7	9.5	9.5				46.2			
Approach LOS	C	F	A	A				D			
Intersection Summary											
Cycle Length: 80											
Actuated Cycle Length: 80											
Natural Cycle: 90											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 1.04											
Intersection Signal Delay: 44.2											
Intersection LOS: D											
Intersection Capacity Utilization 73.7%											
ICU Level of Service D											
Analysis Period (min) 15											



HCM Signalized Intersection Capacity Analysis
9. Highway 37/Harmony Road & Cannifton Road/Blessington Road <Total 2046> AM Peak Hour 03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Movement											
Lane Configurations	60	23	0	174	52	6	343	52	9	896	105
Traffic Volume (vph)	60	23	0	174	52	6	343	52	9	896	105
Future Volume (vph)	60	23	0	174	52	6	343	52	9	896	105
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.96	0.96	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1721	1721	1683	1683	1444	1444	1262	1770	1827	1553	1553
Flt Permitted	0.71	0.71	0.74	0.74	0.08	0.08	0.10	0.50	1.00	1.00	1.00
Satd. Flow (perm)	1273	1273	1285	1285	128	128	1262	926	1827	1553	1553
Peak-hour factor, PHF	0.68	0.68	0.76	0.76	0.83	0.83	0.83	0.81	0.81	0.81	0.81
Adj. Flow (vph)	88	34	0	229	68	4	7	413	63	11	1106
RTOR Reduction (vph)	0	0	0	1	0	0	0	26	0	0	53
Lane Group Flow (vph)	0	122	0	0	300	0	7	413	37	11	1106
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6	
Permitted Phases	4	4	8	8	2	2	2	6	6	6	
Actuated Green, G (s)	18.0	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4	
Effective Green, g (s)	18.0	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4	
Actuated g/C Ratio	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)	286	286	289	289	75	933	747	548	1082	920	
v/s Ratio Prot	0.10	0.10	c0.23	c0.23	0.05	0.26	0.03	0.01	0.05	0.05	
v/s Ratio Perm	0.43	0.43	1.04	1.04	0.09	0.43	0.05	0.02	1.02	1.02	
Uniform Delay, d1	26.6	26.6	31.0	31.0	7.0	8.9	6.8	6.7	16.3	7.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	1.0	63.4	63.4	2.5	1.4	0.1	0.1	33.1	0.2	
Delay (s)	27.6	27.6	94.4	94.4	9.5	10.4	7.0	6.8	49.4	7.2	
Level of Service	C	C	F	F	A	B	A	A	D	A	
Approach Delay (s)	27.6	27.6	94.4	94.4					44.6		
Approach LOS	C	C	F	F	A	A			D		
Intersection Summary											
HCM 2000 Control Delay	42.8	42.8	HCM 2000 Level of Service								
HCM 2000 Volume to Capacity ratio	1.03	1.03									
Actuated Cycle Length (s)	80.0	80.0	Sum of lost time (s)								
Intersection Capacity Utilization	73.7%	73.7%	ICU Level of Service								
Analysis Period (min)	15	15									
c. Critical Lane Group											

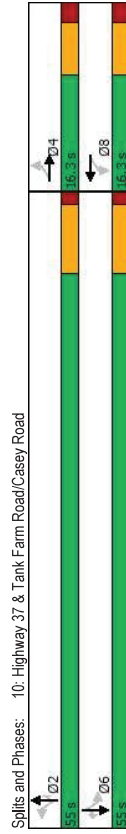
Timings
10: Highway 37 & Tank Farm Road/Casey Road

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2046> AM Peak Hour
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<Total 2046> AM Peak Hour
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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	45	111	74	20	374	70	19	1010	36
Future Volume (vph)	20	45	111	74	20	374	70	19	1010	36
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0	48.0
Actuated g/C Ratio	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.46	0.46	1.00	0.26	0.40	0.09	0.04	1.03	0.04	1.03
Control Delay	32.5	32.5	99.1	12.1	6.4	1.2	4.2	49.4	1.3	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.5	32.5	99.1	12.1	6.4	1.2	4.2	49.4	1.3	4.2
LOS	C	C	F	B	A	A	A	D	A	A
Approach Delay	32.5	32.5	99.1	99.1	5.9	5.9	47.0			
Approach LOS	C	C	F	F	A	A	D			
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.4										
Natural Cycle: 90										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.03										
Intersection Signal Delay: 39.8										
Intersection LOS: D										
ICU Level of Service D										
Intersection Capacity Utilization 81.4%										
Analysis Period (min) 15										



Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations										
Traffic Volume (vph)	20	45	12	111	74	20	374	70	19	1010
Future Volume (vph)	20	45	12	111	74	20	374	70	19	1010
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.97	0.97	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1801	1801	1752	1752	1770	1770	1770	1770	1770	1770
Flt Permitted	0.86	0.86	0.82	0.82	0.08	0.08	0.08	0.08	0.08	0.08
Satd. Flow (perm)	1564	1564	1484	1484	155	155	155	155	155	155
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.91	0.91	0.75	0.75	0.75	0.75
Adj. Flow (vph)	27	62	16	122	81	7	27	499	93	23
RTOR Reduction (vph)	0	9	0	0	2	0	0	30	0	0
Lane Group Flow (vph)	0	96	0	0	208	0	27	499	63	23
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	48.0	48.0	48.0	48.0	48.0	48.0
Effective Green, g (s)	10.0	10.0	10.0	10.0	48.0	48.0	48.0	48.0	48.0	48.0
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	219	219	207	207	104	1252	1054	578	1193	1064
v/s Ratio Prot	0.06	0.06	c0.14	c0.14	0.17	0.27	0.04	0.04	0.04	0.02
v/s Ratio Perm	0.44	0.44	1.01	1.01	0.26	0.40	0.06	0.04	1.03	0.03
Uniform Delay, d1	28.1	28.1	30.7	30.7	4.5	5.2	4.0	3.9	11.7	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	1.4	64.2	64.2	2.6	0.4	0.0	0.1	34.8	0.0
Delay (s)	29.5	29.5	94.9	94.9	7.2	5.6	4.0	4.1	46.5	4.0
Level of Service	C	C	F	F	A	A	A	A	D	A
Approach Delay (s)	29.5	29.5	94.9	94.9	5.5	5.5	44.3			
Approach LOS	C	C	F	F	A	A	D			
Intersection Summary										
HCM 2000 Control Delay	37.6	37.6	HCM 2000 Level of Service	D						
HCM 2000 Volume to Capacity ratio	1.03	1.03								
Actuated Cycle Length (s)	71.4	71.4	Sum of lost time (s)	13.4						
Intersection Capacity Utilization	81.4%	81.4%	ICU Level of Service	D						
Analysis Period (min)	15	15								
c. Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

<Total 2046> AM Peak Hour
 03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		W	
Traffic Volume (veh/h)	44	326	204	30	75	50
Future Volume (Veh/h)	44	326	204	30	75	50
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	354	222	33	82	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	255				688	238
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	255				688	238
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	96				79	93
cM capacity (veh/h)	1310				397	800
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	402	255	136			
Volume Left	48	0	82			
Volume Right	0	33	54			
cSH	1310	1700	496			
Volume to Capacity	0.04	0.15	0.27			
Queue Length 95th (m)	0.9	0.0	8.8			
Control Delay (s)	1.3	0.0	15.0			
Lane LOS	A		B			
Approach Delay (s)	1.3	0.0	15.0			
Approach LOS		B				
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			49.4%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

<Total 2046> AM Peak Hour
 03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		W	
Traffic Volume (veh/h)	51	271	195	34	64	43
Future Volume (Veh/h)	51	271	195	34	64	43
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	55	295	212	37	70	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	249				636	230
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	249				636	230
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	96				83	94
cM capacity (veh/h)	1317				424	809
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	350	249	117			
Volume Left	55	0	70			
Volume Right	0	37	47			
cSH	1317	1700	524			
Volume to Capacity	0.04	0.15	0.22			
Queue Length 95th (m)	1.0	0.0	6.8			
Control Delay (s)	1.6	0.0	13.8			
Lane LOS	A		B			
Approach Delay (s)	1.6	0.0	13.8			
Approach LOS		B				
Intersection Summary						
Average Delay			3.0			
Intersection Capacity Utilization			45.6%			A
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	283.6	43.2	45.9	19.0	14.9	67.5	60.8
Average Queue (m)	259.5	22.4	12.4	10.1	3.6	36.4	32.3
95th Queue (m)	277.5	37.4	29.1	17.2	11.0	53.7	52.3
Link Distance (m)	460.8	539.5	539.5		617.0	617.0	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			0			8	
Queuing Penalty (veh)			1			1	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	SB	SB
Directions Served	LR	LT	
Maximum Queue (m)	34.1	15.7	
Average Queue (m)	17.3	7.6	
95th Queue (m)	28.0	15.9	
Link Distance (m)	510.9	376.6	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 3: River Road & Harmony Road

Movement	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	
Maximum Queue (m)	14.9	16.1	21.8	
Average Queue (m)	1.5	8.4	10.3	
95th Queue (m)	7.2	13.8	17.8	
Link Distance (m)	962.1	215.8	332.3	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Harmony Road & Homan Road

Movement	WB	SB	SB	LR
Directions Served	TR	LR		
Maximum Queue (m)	18.0	20.4		
Average Queue (m)	1.0	2.5		
95th Queue (m)	7.3	11.4		
Link Distance (m)	41.0	490.2		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB	NB
Directions Served	LT	LR	
Maximum Queue (m)	8.9	9.2	
Average Queue (m)	0.3	3.5	
95th Queue (m)	2.9	10.6	
Link Distance (m)	902.5	551.1	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	SB	SB	LR
Directions Served	LT			
Maximum Queue (m)	23.2	21.3		
Average Queue (m)	6.3	10.6		
95th Queue (m)	18.5	17.7		
Link Distance (m)	902.5	388.9		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Harmony Public School & Harmony Road												
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	TR	LT	LR	TR	LT	LR	TR	LT	LR	TR	LT	LR
Maximum Queue (m)	16.9	28.7	53.5	16.9	28.7	53.5	16.9	28.7	53.5	16.9	28.7	53.5
Average Queue (m)	0.8	11.0	20.8	0.8	11.0	20.8	0.8	11.0	20.8	0.8	11.0	20.8
95th Queue (m)	6.1	25.9	36.7	6.1	25.9	36.7	6.1	25.9	36.7	6.1	25.9	36.7
Link Distance (m)	97.7	64.8	212.2	97.7	64.8	212.2	97.7	64.8	212.2	97.7	64.8	212.2
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 8: Harmony Road & Highway 37												
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	LTR	LTR	L	TR	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	69.4	51.8	49.4	70.9	10.0	131.4	69.4	51.8	49.4	70.9	10.0	131.4
Average Queue (m)	34.3	20.0	22.7	21.3	0.4	66.1	34.3	20.0	22.7	21.3	0.4	66.1
95th Queue (m)	63.4	38.8	45.2	49.0	3.5	112.3	63.4	38.8	45.2	49.0	3.5	112.3
Link Distance (m)	382.1	263.1		2731.5		954.7	382.1	263.1		2731.5		954.7
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road												
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	LTR	LTR	L	T	R	L	T	R	L	T	R	L
Maximum Queue (m)	41.6	72.3	20.8	50.6	17.6	7.5	95.6	18.6	41.6	72.3	20.8	50.6
Average Queue (m)	15.6	39.4	3.2	24.9	1.9	1.3	59.5	3.2	15.6	39.4	3.2	24.9
95th Queue (m)	32.7	60.6	12.9	46.0	8.0	5.6	92.6	9.3	32.7	60.6	12.9	46.0
Link Distance (m)	437.7	564.0		780.7			2731.5		437.7	564.0		780.7
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

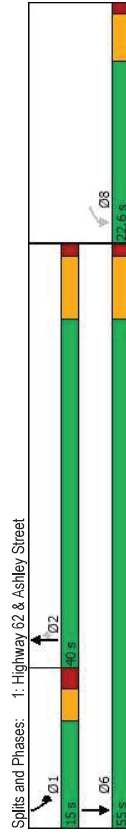
Intersection: 10: Highway 37 & Tank Farm Road/Casey Road												
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB	NB
Directions Served	LTR	LTR	L	T	R	L	T	R	L	T	R	L
Maximum Queue (m)	39.1	59.0	10.6	26.6	3.7	7.9	181.0	169.8	39.1	59.0	10.6	26.6
Average Queue (m)	14.9	30.4	2.3	13.0	0.2	2.0	69.6	6.5	14.9	30.4	2.3	13.0
95th Queue (m)	28.7	46.9	6.4	24.7	1.8	7.6	126.0	56.6	28.7	46.9	6.4	24.7
Link Distance (m)	593.4	692.0		405.0			780.7		593.4	692.0		405.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Harmony Road & Proposed Site Access 2												
Movement	EB	SB	EB	SB	EB	SB	EB	SB	EB	SB	EB	SB
Directions Served	LT	LR	LT	LR	LT	LR	LT	LR	LT	LR	LT	LR
Maximum Queue (m)	22.7	34.2	22.7	34.2	22.7	34.2	22.7	34.2	22.7	34.2	22.7	34.2
Average Queue (m)	3.9	14.2	3.9	14.2	3.9	14.2	3.9	14.2	3.9	14.2	3.9	14.2
95th Queue (m)	14.8	23.9	14.8	23.9	14.8	23.9	14.8	23.9	14.8	23.9	14.8	23.9
Link Distance (m)	470.1	145.5	470.1	145.5	470.1	145.5	470.1	145.5	470.1	145.5	470.1	145.5
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 12: Harmony Road & Proposed Site Access 3												
Movement	EB	SB	EB	SB	EB	SB	EB	SB	EB	SB	EB	SB
Directions Served	LT	LR	LT	LR	LT	LR	LT	LR	LT	LR	LT	LR
Maximum Queue (m)	24.2	30.2	24.2	30.2	24.2	30.2	24.2	30.2	24.2	30.2	24.2	30.2
Average Queue (m)	5.3	11.3	5.3	11.3	5.3	11.3	5.3	11.3	5.3	11.3	5.3	11.3
95th Queue (m)	15.5	19.1	15.5	19.1	15.5	19.1	15.5	19.1	15.5	19.1	15.5	19.1
Link Distance (m)	64.8	138.4	64.8	138.4	64.8	138.4	64.8	138.4	64.8	138.4	64.8	138.4
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Network Summary												
Network wide Queuing Penalty: 9												

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	356	1323	584	12	707
Future Volume (vph)	356	1323	584	12	707
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.22	0.58	0.58	0.09	0.62
v/c Ratio	1.10	0.57	0.57	0.09	0.39
Control Delay	108.7	14.5	6.5	33.6	8.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	108.7	14.5	6.5	33.6	8.2
LOS	F	B	A	C	A
Approach Delay	108.7	12.1			8.6
Approach LOS	F	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 90					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 1.10					
Intersection Signal Delay: 23.4					
Intersection LOS: C					
Intersection Capacity Utilization 68.5%					
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	356	25	1323	584	12	707
Future Volume (vph)	356	25	1323	584	12	707
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687		3539	1568	1770	3374
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687		3539	1568	1770	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	383	27	1393	615	14	813
RTOR Reduction (vph)	3	0	0	173	0	0
Lane Group Flow (vph)	407	0	1393	442	14	813
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.3	45.3	1.5	51.8
Effective Green, g (s)	17.0		45.3	45.3	1.5	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	351		1964	870	32	2141
v/s Ratio Prot	c0.24		c0.39		0.01	c0.24
v/s Ratio Perm	1.16		0.71	0.51	0.44	0.38
Uniform Delay, d1	32.3		13.3	11.2	39.6	7.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	98.7		2.2	2.1	9.3	0.5
Delay (s)	131.0		15.5	13.4	48.9	7.7
Level of Service	F		B	B	D	A
Approach Delay (s)	131.0		14.9		8.4	
Approach LOS	F		B		A	
Intersection Summary						
HCM 2000 Control Delay			27.9			
HCM 2000 Level of Service						C
HCM 2000 Volume to Capacity ratio			0.84			
Actuated Cycle Length (s)			81.6			
Sum of lost time (s)						17.8
Intersection Capacity Utilization			68.5%			
ICU Level of Service						C
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis

2. Ashley Street & Harmony Road

<Total 2041> PM Peak Hour

03-05-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	162	138	162	256	173	84
Future Volume (Veh/h)	162	138	162	256	173	84
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.96	0.96	0.86	0.86
Hourly flow rate (vph)	184	157	169	267	201	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	802	302			436	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	802	302			436	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	37	79			82	
cM capacity (veh/h)	290	737			1124	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	341	436	299			
Volume Left	184	0	201			
Volume Right	157	267	0			
cSH	402	1700	1124			
Volume to Capacity	0.86	0.26	0.18			
Queue Length 95th (m)	64.9	0.0	5.2			
Control Delay (s)	47.4	0.0	6.5			
Lane LOS	E	A	A			
Approach Delay (s)	47.4	0.0	6.5			
Approach LOS	E					
Intersection Summary						
Average Delay			16.9			C
Intersection Capacity Utilization			65.7%			ICU Level of Service
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3. River Road & Harmony Road

<Total 2041> PM Peak Hour

03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4				4
Traffic Volume (veh/h)	12	388	48	10	268	3	92	5	32	25	11	5
Future Volume (Veh/h)	12	388	48	10	268	3	92	5	32	25	11	5
Sign Control		Free			Free			Stop				Stop
Grade		0%			0%			0%				0%
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.71	0.71	0.71	0.83	0.83	0.83
Hourly flow rate (vph)	13	426	53	10	279	3	130	7	45	30	13	6
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	282			479			792	780	452	828	806	280
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	282			479			792	780	452	828	806	280
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			55	98	93	88	96	99
cM capacity (veh/h)	1280			1083			291	320	607	261	310	758
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	492	292	182	49								
Volume Left	13	10	130	30								
Volume Right	53	3	45	6								
cSH	1280	1083	335	297								
Volume to Capacity	0.01	0.01	0.54	0.17								
Queue Length 95th (m)	0.2	0.2	24.6	4.7								
Control Delay (s)	0.3	0.4	27.8	19.5								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.3	0.4	27.8	19.5								
Approach LOS	D		C									
Intersection Summary												
Average Delay			6.2									
Intersection Capacity Utilization			44.1%							A		
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

<Total 2041> PM Peak Hour
03-05-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	4	3	5	
Traffic Volume (veh/h)	5	361	265	3	3	5
Future Volume (Veh/h)	5	361	265	3	3	5
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.69	0.69	0.63	0.63	0.75	0.75
Hourly flow rate (vph)	7	523	421	5	4	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	426			960	424	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	426			960	424	
IC single (s)	4.1			6.4	6.5	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.5	
p0 queue free %	99			99	99	
cM capacity (veh/h)	1133			283	584	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	530	426	11			
Volume Left	7	0	4			
Volume Right	0	5	7			
cSH	1133	1700	421			
Volume to Capacity	0.01	0.25	0.03			
Queue Length 95th (m)	0.1	0.0	0.6			
Control Delay (s)	0.2	0.0	13.8			
Lane LOS	A	B	B			
Approach Delay (s)	0.2	0.0	13.8			
Approach LOS		B	B			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			33.0%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

<Total 2041> PM Peak Hour
03-05-2025

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	4	4	4	4	
Traffic Volume (veh/h)	391	5	15	259	8	26
Future Volume (Veh/h)	391	5	15	259	8	26
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.95	0.95	0.87	0.87	0.75	0.75
Hourly flow rate (vph)	412	5	17	298	11	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	417	315	46			
Volume Left	0	17	11			
Volume Right	5	0	35			
cSH	1700	1142	546			
Volume to Capacity	0.25	0.01	0.08			
Queue Length 95th (m)	0.0	0.4	2.2			
Control Delay (s)	0.0	0.6	12.2			
Lane LOS	A	B	B			
Approach Delay (s)	0.0	0.6	12.2			
Approach LOS		B	B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			35.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2041> PM Peak Hour
03-05-2025

<Total 2041> PM Peak Hour
03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4		W		
Traffic Volume (veh/h)	84	275	213	70	68	57	
Future Volume (Veh/h)	84	275	213	70	68	57	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.80	0.80	0.61	0.61	0.50	0.50	
Hourly flow rate (vph)	105	344	349	115	136	114	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked					960	406	
VC conflicting volume	464						
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	464				960	406	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)							
IF (s)	2.2				3.5	3.3	
p0 queue free %	90				47	82	
CM capacity (veh/h)	1097				257	644	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	449	464	250				
Volume Left	105	0	136				
Volume Right	0	115	114				
cSH	1097	1700	354				
Volume to Capacity	0.10	0.27	0.71				
Queue Length 95th (m)	2.5	0.0	41.2				
Control Delay (s)	2.8	0.0	36.2				
Lane LOS	A	E	E				
Approach Delay (s)	2.8	0.0	36.2				
Approach LOS		E	E				
Intersection Summary							
Average Delay			8.9				
Intersection Capacity Utilization			51.8%			ICU Level of Service	A
Analysis Period (min)			15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4	4		4	W		
Traffic Volume (veh/h)	270	3	10	206	23	41	
Future Volume (Veh/h)	270	3	10	206	23	41	
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Peak Hour Factor	1.00	1.00	0.76	0.76	0.43	0.43	
Hourly flow rate (vph)	270	3	13	271	53	95	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked				273	568	272	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				273	568	272	
IC single (s)				4.1	6.4	6.2	
IC 2 stage (s)							
IF (s)				2.2	3.5	3.3	
p0 queue free %				99	89	88	
CM capacity (veh/h)				1290	479	767	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	273	284	148				
Volume Left	0	13	53				
Volume Right	3	0	95				
cSH	1700	1290	631				
Volume to Capacity	0.16	0.01	0.23				
Queue Length 95th (m)	0.0	0.2	7.2				
Control Delay (s)	0.0	0.4	12.4				
Lane LOS	A	B	B				
Approach Delay (s)	0.0	0.4	12.4				
Approach LOS		B	B				
Intersection Summary							
Average Delay			2.8				
Intersection Capacity Utilization			29.4%			ICU Level of Service	A
Analysis Period (min)			15				

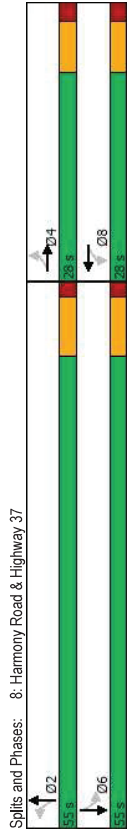
Timings

8: Harmony Road & Highway 37

<Total 2041> PM Peak Hour

03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Traffic Volume (vph)	140	82	30	24	121	620	4	435
Future Volume (vph)	140	82	30	24	121	620	4	435
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	4	4	8	8	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57
v/c Ratio	1.01	1.01	0.23	0.44	0.71	0.02	0.71	0.71
Control Delay	78.5	78.5	26.8	15.7	17.3	8.0	17.2	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.5	78.5	26.8	15.7	17.3	8.0	17.2	17.2
LOS	E	E	C	B	B	A	A	B
Approach Delay	78.5	78.5	26.8	26.8	17.1	17.1	17.1	17.1
Approach LOS	E	E	C	C	B	B	B	B
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 83								
Natural Cycle: 65								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 1.01								
Intersection Signal Delay: 29.6								
Intersection Capacity Utilization 93.9%								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis

8: Harmony Road & Highway 37

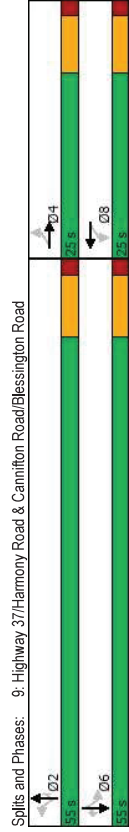
<Total 2041> PM Peak Hour

03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Traffic Volume (vph)	140	82	139	30	24	1	121	620
Future Volume (vph)	140	82	139	30	24	1	121	620
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.97	0.97	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1700	1700	1711	1711	1770	1770	1770	1770
Flt Permitted	0.84	0.84	0.85	0.85	0.29	0.29	0.24	0.24
Satd. Flow (perm)	1463	1463	1147	1147	541	541	446	446
Peak-hour factor, PHF	0.90	0.90	0.90	0.84	0.84	0.90	0.90	0.94
Adj. Flow (vph)	156	91	154	36	29	1	134	689
RTOR Reduction (vph)	0	27	0	0	1	0	0	0
Lane Group Flow (vph)	0	374	0	0	65	0	134	743
Heavy Vehicles (%)	2%	2%	7%	10%	2%	2%	2%	7%
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Actuated Green, G (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4
Effective Green, g (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	370	370	290	290	308	1051	254	925
v/s Ratio Prot	c0.26	c0.26	0.06	0.06	0.25	c0.40	0.01	0.40
v/s Ratio Perm	1.01	1.01	0.23	0.23	0.44	0.71	0.02	0.71
Uniform Delay, d1	31.0	31.0	24.6	24.6	10.2	12.8	7.7	12.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	49.6	49.6	0.4	0.4	4.4	4.0	0.1	4.5
Delay (s)	80.6	80.6	25.0	25.0	14.6	16.8	7.8	17.4
Level of Service	F	F	C	C	B	B	A	B
Approach Delay (s)	80.6	80.6	25.0	25.0	16.5	17.3	17.3	17.3
Approach LOS	F	F	C	C	B	B	B	B
Intersection Summary								
HCM 2000 Control Delay	29.7	29.7	HCM 2000 Level of Service	C				
HCM 2000 Volume to Capacity ratio	0.80	0.80						
Actuated Cycle Length (s)	83.0	83.0	Sum of lost time (s)	14.6				
Intersection Capacity Utilization	93.9%	93.9%	ICU Level of Service	F				
Analysis Period (min)	15	15						
c. Critical Lane Group								

Timings
9. Highway 37/Harmony Road & Canniford Road/Blessington Road <Total 2041> PM Peak Hour 03-05-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	140	66	51	48	4	721	144	20	486	50
Future Volume (vph)	140	66	51	48	4	721	144	20	486	50
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	16.2	16.2	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.21	0.21	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
v/c Ratio	0.81	0.47	0.01	0.71	0.16	0.08	0.50	0.06	0.06	0.06
Control Delay	52.5	32.7	6.8	15.5	1.7	8.1	11.1	2.3	2.3	2.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	32.7	6.8	15.5	1.7	8.1	11.1	2.3	2.3	2.3
LOS	D	C	A	B	A	A	A	B	A	A
Approach Delay	52.5	32.7	6.8	15.5	1.7	8.1	11.1	2.3	2.3	2.3
Approach LOS	D	C	B	B	B	B	B	B	B	B
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 78.2										
Natural Cycle: 65										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.81										
Intersection Signal Delay: 18.3										
Intersection Capacity Utilization 66.3%										
Analysis Period (min) 15										



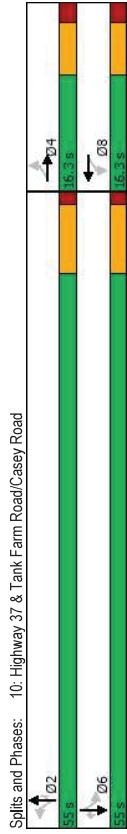
HCM Signalized Intersection Capacity Analysis
9. Highway 37/Harmony Road & Canniford Road/Blessington Road <Total 2041> PM Peak Hour 03-05-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	140	66	51	48	4	721	144	20	486	50
Future Volume (vph)	140	66	51	48	4	721	144	20	486	50
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.95	1.00	1.00
Flt Protected	0.97	0.97	0.98	0.98	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1756	1756	1761	1761	1770	1863	1863	1770	1759	1509
Flt Permitted	0.76	0.76	0.76	0.76	0.41	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	1371	1371	1375	1375	768	1863	1863	433	1759	1509
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	154	73	3	67	63	4	801	160	22	534
RTOR Reduction (vph)	0	1	0	0	0	0	0	63	0	22
Lane Group Flow (vph)	0	229	0	0	132	0	4	801	97	22
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	16.2	16.2	16.2	16.2	47.5	47.5	47.5	47.5	47.5	47.5
Effective Green, g (s)	16.2	16.2	16.2	16.2	47.5	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.21	0.21	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	283	283	284	284	465	1130	960	262	1067	915
v/s Ratio Prot	c0.17	c0.17	0.10	0.10	0.01	c0.43	0.06	0.05	0.30	0.02
v/s Ratio Perm	0.81	0.81	0.47	0.47	0.01	0.71	0.10	0.08	0.50	0.04
Uniform Delay, d1	29.6	29.6	27.3	27.3	6.1	10.6	6.5	6.4	8.7	6.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.6	15.6	1.2	1.2	0.0	3.8	0.2	0.6	1.7	0.1
Delay (s)	45.2	45.2	28.5	28.5	6.1	14.4	6.7	7.0	10.4	6.3
Level of Service	D	D	C	C	A	B	A	A	B	A
Approach Delay (s)	45.2	45.2	28.5	28.5		13.1		9.9		
Approach LOS	D	D	C	C	B	B	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	16.9	16.9	HCM 2000 Level of Service				B			
HCM 2000 Volume to Capacity ratio	0.73	0.73								
Actuated Cycle Length (s)	78.3	78.3	Sum of lost time (s)				14.6			
Intersection Capacity Utilization	66.3%	66.3%	ICU Level of Service				C			
Analysis Period (min)	15	15								
c. Critical Lane Group										

Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2041> PM Peak Hour
03-05-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	34	74	74	58	54	793	71	11	482	18
Future Volume (vph)	34	74	74	58	54	793	71	11	482	18
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Detector Phase	4	4	8	8	2	2	2	2	6	6
Switch Phase	4	4	8	8	2	2	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	None	Max	Max
Act Eff Green (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.87	1.34	0.16	0.16	0.67	0.07	0.07	0.04	0.49	0.03
Control Delay	64.2	215.9	5.6	10.3	1.3	4.4	7.5	0.4	7.5	0.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.2	215.9	5.6	10.3	1.3	4.4	7.5	0.4	7.5	0.4
LOS	E	F	A	B	A	A	A	A	A	A
Approach Delay	64.2	215.9	5.6	10.3	1.3	4.4	7.5	0.4	7.5	0.4
Approach LOS	E	F	A	B	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 35										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.34										
Intersection Signal Delay: 37.8										
Intersection Capacity Utilization 70.7%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2041> PM Peak Hour
03-05-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	34	74	74	58	54	793	71	11	482	18
Future Volume (vph)	34	74	74	58	54	793	71	11	482	18
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.99	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1743	1743	1751	1751	1228	1863	1455	1770	1743	1170
Flt Permitted	0.85	0.85	0.86	0.86	0.41	0.41	0.41	0.26	0.26	0.26
Satd. Flow (perm)	1498	1498	1182	1182	533	1863	1455	1743	1170	1170
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.64	0.64	0.64	0.95	0.95	0.84
Adj. Flow (vph)	45	99	57	116	91	22	57	835	75	13
RTOR Reduction (vph)	0	20	0	5	0	0	0	25	0	0
Lane Group Flow (vph)	0	181	0	0	224	0	57	835	50	13
Heavy Vehicles (%)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	210	165	165	165	358	1251	977	319	1170	786
v/s Ratio Prot	0.12	0.19	0.19	0.19	0.11	0.11	0.03	0.03	0.33	0.01
v/s Ratio Perm	0.86	1.36	1.36	1.36	0.16	0.16	0.05	0.04	0.49	0.02
Uniform Delay, d1	30.0	30.6	30.6	30.6	4.3	7.0	4.0	3.9	5.7	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.6	194.7	194.7	194.7	0.4	1.7	0.0	0.2	1.5	0.0
Delay (s)	58.6	225.3	225.3	225.3	4.7	8.7	4.0	4.2	7.2	3.9
Level of Service	E	F	F	F	A	A	A	A	A	A
Approach Delay (s)	58.6	225.3	225.3	225.3	8.1	8.1	4.0	4.2	7.0	3.9
Approach LOS	E	F	F	F	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	37.6	71.3	71.3	71.3	13.4	13.4	13.4	13.4	13.4	13.4
HCM 2000 Volume to Capacity ratio	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Actuated Cycle Length (s)	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3	71.3
Intersection Capacity Utilization	70.7%	70.7%	70.7%	70.7%	70.7%	70.7%	70.7%	70.7%	70.7%	70.7%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	273	216	62	67	56
Future Volume (Veh/h)	70	273	216	62	67	56
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	297	235	67	73	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	302				718	268
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	302				718	268
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	94				80	92
cM capacity (veh/h)	1259				372	770
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	373	302	134			
Volume Left	76	0	73			
Volume Right	0	67	61			
cSH	1259	1700	487			
Volume to Capacity	0.06	0.18	0.28			
Queue Length 95th (m)	1.5	0.0	8.9			
Control Delay (s)	2.1	0.0	15.2			
Lane LOS	A	C	C			
Approach Delay (s)	2.1	0.0	15.2			
Approach LOS		C	C			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			50.5%			
Analysis Period (min)			15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	311	279	70	56	49
Future Volume (Veh/h)	84	311	279	70	56	49
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	338	303	76	61	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	379				861	341
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	379				861	341
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	92				80	92
cM capacity (veh/h)	1179				301	701
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	429	379	114			
Volume Left	91	0	61			
Volume Right	0	76	53			
cSH	1179	1700	410			
Volume to Capacity	0.08	0.22	0.28			
Queue Length 95th (m)	2.0	0.0	9.0			
Control Delay (s)	2.4	0.0	17.1			
Lane LOS	A	C	C			
Approach Delay (s)	2.4	0.0	17.1			
Approach LOS		C	C			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			56.1%			
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street													
Movement	WB	NB	NB	SB	SB	SB	T	SB	SB	SB	T	SB	T
Directions Served	LR		TR		R	L							
Maximum Queue (m)	257.0	87.8	82.7	19.1	15.7	46.9		36.8					
Average Queue (m)	178.3	45.8	41.1	10.7	5.1	22.8		18.3					
95th Queue (m)	248.7	73.0	68.1	17.6	13.4	35.1		33.6					
Link Distance (m)	460.8	539.5	539.5			617.0		617.0					
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)				38.0	30.5								
Storage Blk Time (%)			7			1							
Queuing Penalty (veh)			41			0							

Intersection: 2: Ashley Street & Harmony Road													
Movement	WB	NB	NB	SB	SB	SB	TR	SB	SB	SB	TR	SB	TR
Directions Served	LR		TR		L								
Maximum Queue (m)	52.3	6.7	35.6										
Average Queue (m)	22.5	0.8	14.5										
95th Queue (m)	42.5	4.4	30.2										
Link Distance (m)	510.9	460.8	376.6										
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 3: River Road & Harmony Road													
Movement	EB	WB	NB	SB	SB	SB	LTR	SB	SB	SB	LTR	SB	LTR
Directions Served													
Maximum Queue (m)	28.6	21.2	35.7	16.5									
Average Queue (m)	2.6	1.2	15.3	7.4									
95th Queue (m)	13.2	8.7	25.2	16.4									
Link Distance (m)	510.9	962.1	215.8	332.3									
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 4: Harmony Road & Homan Road													
Movement	WB	SB	TR	LR	TR	LR	TR	LR	TR	LR	TR	LR	TR
Directions Served													
Maximum Queue (m)	4.7	9.3											
Average Queue (m)	0.2	1.7											
95th Queue (m)	1.5	7.3											
Link Distance (m)	41.0	490.2											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 5: Plumpton & Harmony Road													
Movement	WB	NB	LT	LR	LT	LR	LT	LR	LT	LR	LT	LR	LT
Directions Served													
Maximum Queue (m)	9.1	14.9											
Average Queue (m)	1.1	6.4											
95th Queue (m)	5.9	13.5											
Link Distance (m)	902.5	551.1											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access													
Movement	EB	SB	LT	LR	LT	LR	LT	LR	LT	LR	LT	LR	LT
Directions Served													
Maximum Queue (m)	29.0	20.0											
Average Queue (m)	7.6	10.9											
95th Queue (m)	23.7	16.8											
Link Distance (m)	902.5	388.9											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 7: Harmony Public School & Harmony Road													
Movement		NB		WB		NB		WB		NB		WB	
Directions Served		LR											
Maximum Queue (m)		15.6		33.6		31.9		87.8		3.0		76.0	
Average Queue (m)		8.5		10.2		12.2		35.8		0.2		40.4	
95th Queue (m)		14.7				24.3		71.2		1.4		69.0	
Link Distance (m)		212.2						2731.5				954.7	
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 8: Harmony Road & Highway 37

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	L	TR
Maximum Queue (m)	96.8	33.6	31.9	87.8	3.0	76.0
Average Queue (m)	41.4	10.2	12.2	35.8	0.2	40.4
95th Queue (m)	77.0	23.0	24.3	71.2	1.4	69.0
Link Distance (m)	382.1	263.1		2731.5		954.7
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)			79.5		82.0	
Storage Blk Time (%)				0		0
Queuing Penalty (veh)				1		0

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	T	R	L
Maximum Queue (m)	53.9	45.3	5.7	94.6	22.9	20.6
Average Queue (m)	34.6	15.0	0.2	38.7	4.7	4.1
95th Queue (m)	51.2	30.3	1.9	76.5	13.2	14.0
Link Distance (m)	437.7	564.0		780.7		2731.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)			82.0		85.0	75.0
Storage Blk Time (%)				0		0
Queuing Penalty (veh)				1		0

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road												
Movement	EB		WB		NB		NB		SB		SB	
	LTR	R	LTR	L	T	R	L	T	R	L	T	R
Directions Served												
Maximum Queue (m)	44.5		63.1		17.3	77.1	11.7	14.3	73.6	4.5		
Average Queue (m)	24.5		28.5		6.3	32.3	1.5	2.1	26.5	0.1		
95th Queue (m)	36.8		53.6		15.2	63.4	6.5	8.4	55.5	1.5		
Link Distance (m)	593.4		692.0			405.0				780.7		
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)				66.0			70.0	68.0		70.0		
Storage Blk Time (%)					1				1		1	
Queuing Penalty (veh)						1				0		

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	16.8	21.7
Average Queue (m)	3.5	11.0
95th Queue (m)	13.8	17.0
Link Distance (m)	470.1	145.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

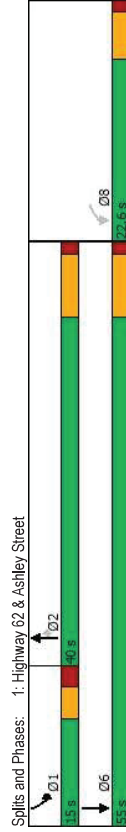
Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	50.5	6.7	21.9
Average Queue (m)	10.1	0.2	11.0
95th Queue (m)	25.2	2.2	18.1
Link Distance (m)	64.8	382.1	138.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 44

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	384	1461	632	13	781
Future Volume (vph)	384	1461	632	13	781
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.22	0.58	0.58	0.09	0.62
v/c Ratio	1.19	0.74	0.62	0.09	0.43
Control Delay	138.8	16.5	7.9	33.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	138.8	16.5	7.9	33.7	8.6
LOS	F	B	A	C	A
Approach Delay	138.8	13.9			9.0
Approach LOS	F	B			A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	384	27	1461	632	13	781
Future Volume (vph)	384	27	1461	632	13	781
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1687		3539	1568	1770	3374
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1687		3539	1568	1770	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	413	29	1538	665	15	898
RTOR Reduction (vph)	3	0	0	169	0	0
Lane Group Flow (vph)	439	0	1538	496	15	898
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.3	45.3	1.5	51.8
Effective Green, g (s)	17.0		45.3	45.3	1.5	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	351		1964	870	32	2141
v/s Ratio Prot			c0.43		0.01	c0.27
v/s Ratio Perm	c0.26			0.32		
v/c Ratio	1.25		0.78	0.57	0.47	0.42
Uniform Delay, d1	32.3		14.3	11.8	39.7	7.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	134.1		3.2	2.7	10.5	0.6
Delay (s)	166.4		17.5	14.5	50.1	8.0
Level of Service	F		B	B	D	A
Approach Delay (s)	166.4		16.6		8.7	
Approach LOS	F		B		A	

Intersection Summary					
HCM 2000 Control Delay	33.2	HCM 2000 Level of Service			
HCM 2000 Volume to Capacity ratio	0.91				
Actuated Cycle Length (s)	81.6	Sum of lost time (s)			
Intersection Capacity Utilization	74.0%	ICU Level of Service			
Analysis Period (min)	15				
c. Critical Lane Group					

HCM Unsignalized Intersection Capacity Analysis

2. Ashley Street & Harmony Road

<Total 2046> PM Peak Hour

03-05-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W					4
Traffic Volume (veh/h)	170	147	179	268	183	92
Future Volume (Veh/h)	170	147	179	268	183	92
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.88	0.88	0.96	0.96	0.86	0.86
Hourly flow rate (vph)	183	167	186	279	213	107
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
VC, conflicting volume	858	326				465
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	858	326				465
IC, single (s)	6.4	6.2				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	27	77				81
cM capacity (veh/h)	264	716				1096
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	360	465	320			
Volume Left	193	0	213			
Volume Right	167	279	0			
cSH	373	1700	1096			
Volume to Capacity	0.97	0.27	0.19			
Queue Length 95th (m)	86.8	0.0	5.7			
Control Delay (s)	72.2	0.0	6.7			
Lane LOS	F	A	A			
Approach Delay (s)	72.2	0.0	6.7			
Approach LOS	F					
Intersection Summary						
Average Delay			24.6			
Intersection Capacity Utilization			69.2%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3. River Road & Harmony Road

<Total 2046> PM Peak Hour

03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			4	
Traffic Volume (veh/h)	14	406	53	10	280	3	102	6	33	27	12	6
Future Volume (Veh/h)	14	406	53	10	280	3	102	6	33	27	12	6
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.71	0.71	0.71	0.83	0.83	
Hourly flow rate (vph)	15	446	58	10	292	3	144	8	46	33	14	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
VC, conflicting volume	295			504			832	820	475	868	848	294
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	295			504			832	820	475	868	848	294
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			47	97	92	86	95	99
cM capacity (veh/h)	1266			1061			271	303	590	242	292	746
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	519	305	198	54								
Volume Left	15	10	144	33								
Volume Right	58	3	46	7								
cSH	1266	1061	311	279								
Volume to Capacity	0.01	0.01	0.64	0.19								
Queue Length 95th (m)	0.3	0.2	32.6	5.6								
Control Delay (s)	0.4	0.4	34.8	21.0								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.4	0.4	34.8	21.0								
Approach LOS	D		C									
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			47.3%							ICU Level of Service	A	
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations	6	374	277	3	3	6
Traffic Volume (veh/h)	6	374	277	3	3	6
Future Volume (Veh/h)	6	374	277	3	3	6
Sign Control	Free	Free	Free	Stop	Stop	0%
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.69	0.69	0.63	0.63	0.75	0.75
Hourly flow rate (vph)	9	542	440	5	4	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	445			1002	442	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	445			1002	442	
IC single (s)	4.1			6.4	6.5	
IC 2 stage (s)	2.2			3.5	3.5	
p0 queue free %	99			98	99	
IF (s)	1115			266	570	
CM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	551	445	12			
Volume Left	9	0	4			
Volume Right	0	5	8			
cSH	1115	1700	413			
Volume to Capacity	0.01	0.26	0.03			
Queue Length 95th (m)	0.2	0.0	0.7			
Control Delay (s)	0.2	0.0	14.0			
Lane LOS	A	B	B			
Approach Delay (s)	0.2	0.0	14.0			
Approach LOS		B				
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			34.5%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	6	16	271	9	28
Traffic Volume (veh/h)	408	6	16	271	9	28
Future Volume (Veh/h)	408	6	16	271	9	28
Sign Control	Free	Free	Free	Stop	Stop	0%
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.95	0.95	0.87	0.87	0.75	0.75
Hourly flow rate (vph)	429	6	18	311	12	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
p0 queue free %						
IF (s)						
p0 capacity (veh/h)						
CM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	435	329	49			
Volume Left	0	18	12			
Volume Right	6	0	37			
cSH	1700	1125	528			
Volume to Capacity	0.26	0.02	0.09			
Queue Length 95th (m)	0.0	0.4	2.4			
Control Delay (s)	0.0	0.6	12.5			
Lane LOS	A	B	B			
Approach Delay (s)	0.0	0.6	12.5			
Approach LOS		B				
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			37.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2046> PM Peak Hour
03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4		W		
Traffic Volume (veh/h)	84	288	225	70	69	58	
Future Volume (Veh/h)	84	288	225	70	69	58	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.61	0.61	0.50	0.50	
Hourly flow rate (vph)	105	360	369	115	138	116	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None		None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked					996	426	
VC conflicting volume	484						
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	484				996	426	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)							
IF (s)	2.2				3.5	3.3	
p0 queue free %	90				44	82	
cM capacity (veh/h)	1079				244	628	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	465	484	254				
Volume Left	105	0	138				
Volume Right	0	115	116				
cSH	1079	1700	339				
Volume to Capacity	0.10	0.28	0.75				
Queue Length 95th (m)	2.6	0.0	46.4				
Control Delay (s)	2.8	0.0	41.4				
Lane LOS	A	E	E				
Approach Delay (s)	2.8	0.0	41.4				
Approach LOS			E				
Intersection Summary							
Average Delay			9.8				
Intersection Capacity Utilization			53.3%				A
Analysis Period (min)			15				

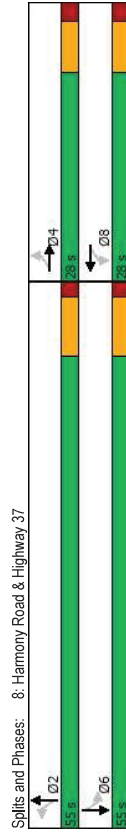
HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2046> PM Peak Hour
03-05-2025

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4	4	4	4	W	W	
Traffic Volume (veh/h)	285	3	11	214	26	45	
Future Volume (Veh/h)	285	3	11	214	26	45	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	1.00	1.00	0.76	0.76	0.43	0.43	
Hourly flow rate (vph)	285	3	14	282	60	105	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None		None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked				288	596	286	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				288	596	286	
IC single (s)				4.1	6.4	6.2	
IC 2 stage (s)							
IF (s)				2.2	3.5	3.3	
p0 queue free %				99	87	86	
cM capacity (veh/h)				1274	461	753	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	288	296	165				
Volume Left	0	14	60				
Volume Right	3	0	105				
cSH	1700	1274	612				
Volume to Capacity	0.17	0.01	0.27				
Queue Length 95th (m)	0.0	0.3	8.7				
Control Delay (s)	0.0	0.5	13.0				
Lane LOS	A	A	B				
Approach Delay (s)	0.0	0.5	13.0				
Approach LOS			B				
Intersection Summary							
Average Delay			3.1				
Intersection Capacity Utilization			31.1%				A
Analysis Period (min)			15				

Timings
8: Harmony Road & Highway 37 <Total 2046> PM Peak Hour
03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	147	86	33	25	126	685	5	480	
Traffic Volume (vph)	147	86	33	25	126	685	5	480	
Future Volume (vph)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Turn Type	4	4	8	8	2	2	6	6	
Protected Phases	4	4	8	8	2	2	6	6	
Permitted Phases	4	4	8	8	2	2	6	6	
Detector Phase	4	4	8	8	2	2	6	6	
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	
Minimum Initial (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6	
Minimum Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0	
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%	
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%	
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9	
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	
Lead/Lag									
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	
Recall Mode	None	None	None	None	Max	Max	Max	Max	
Act Eff Green (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57	
v/c Ratio	1.06	1.06	0.25	0.52	0.78	0.03	0.77	0.77	
Control Delay	92.4	92.4	27.2	19.8	20.3	8.4	19.7	19.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	92.4	92.4	27.2	19.8	20.3	8.4	19.7	19.7	
LOS	F	F	C	B	C	A	B	B	
Approach Delay	92.4	92.4	27.2	20.3	20.3	19.6			
Approach LOS	F	F	C	C	C	B			
Intersection Summary									
Cycle Length: 83									
Actuated Cycle Length: 83									
Natural Cycle: 90									
Control Type: Semi Act-Uncoord									
Maximum v/c Ratio: 1.06									
Intersection Signal Delay: 34.1									
Intersection Capacity Utilization 98.6%									
Analysis Period (min) 15									

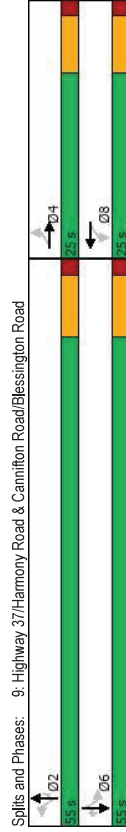


HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37 <Total 2046> PM Peak Hour
03-05-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	
Lane Configurations	147	86	145	33	25	126	685	5	480
Traffic Volume (vph)	147	86	145	33	25	126	685	5	480
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900
Initial Flow (vph)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flt Protected	0.98	0.98	0.97	0.97	0.95	0.95	0.95	0.95	
Satd. Flow (prot)	1701	1701	1688	1688	1770	1770	1770	1770	
Flt Permitted	0.84	0.84	0.83	0.83	0.25	0.25	0.19	0.19	
Satd. Flow (perm)	1460	1460	1098	1098	467	467	347	347	
Peak-hour factor, PHF	0.90	0.90	0.90	0.84	0.84	0.90	0.90	0.94	
Adj. Flow (vph)	163	96	161	39	30	2	140	761	
RTOR Reduction (vph)	0	27	0	0	1	0	4	0	
Lane Group Flow (vph)	0	393	0	0	70	0	140	821	
Heavy Vehicles (%)	2%	2%	7%	10%	2%	2%	2%	7%	
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	NA	
Protected Phases	4	4	8	8	2	2	6	6	
Permitted Phases	4	4	8	8	2	2	6	6	
Actuated Green, G (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	
Effective Green, g (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)	369	369	277	277	266	1045	198	929	
v/s Ratio Prot	c0.27	c0.27	0.06	0.06	0.30	0.41	0.01	0.44	
v/s Ratio Perm	1.07	1.07	0.25	0.25	0.53	0.78	0.03	0.77	
Uniform Delay, d1	31.0	31.0	24.7	24.7	10.9	13.8	7.7	13.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	65.2	65.2	0.5	0.5	7.3	5.8	0.2	6.0	
Delay (s)	96.2	96.2	25.2	25.2	18.2	19.6	8.0	19.6	
Level of Service	F	F	C	C	B	B	A	B	
Approach Delay (s)	96.2	96.2	25.2	25.2	19.4	19.4	19.5	19.5	
Approach LOS	F	F	C	C	B	B	B	B	
Intersection Summary									
HCM 2000 Control Delay	34.3	34.3	HCM 2000 Level of Service	C					
HCM 2000 Volume to Capacity ratio	0.87	0.87							
Actuated Cycle Length (s)	83.0	83.0	Sum of lost time (s)	14.6					
Intersection Capacity Utilization	98.6%	98.6%	ICU Level of Service	F					
Analysis Period (min)	15	15							
c. Critical Lane Group									

Timings
9. Highway 37/Harmony Road & Canniford Road/Blessington Road <Total 2046> PM Peak Hour 03-05-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	153	73	56	53	5	791	159	22	530	54
Future Volume (vph)	153	73	56	53	5	791	159	22	530	54
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Total Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag	None	None	None	None	Max	Max	Max	Max	Max	Max
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Eff Green (s)	17.0	17.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.21	0.21	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
v/c Ratio	0.87	0.87	0.50	0.01	0.79	0.17	0.12	0.35	0.06	0.06
Control Delay	59.7	33.5	6.8	18.9	1.7	9.0	12.2	2.3	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.7	33.5	6.8	18.9	1.7	9.0	12.2	2.3	0.0	0.0
LOS	E	C	A	B	A	A	A	B	A	A
Approach Delay	59.7	33.5	6.8	18.9	16.0	11.2				
Approach LOS	E	C	C	B	B	B				
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 79.1										
Natural Cycle: 70										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.87										
Intersection Signal Delay: 20.9										
Intersection LOS: C										
Intersection Capacity Utilization 71.5%										
ICU Level of Service C										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
9. Highway 37/Harmony Road & Canniford Road/Blessington Road <Total 2046> PM Peak Hour 03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	153	73	3	56	53	3	5	791	159	22	530	54
Future Volume (vph)	153	73	3	56	53	3	5	791	159	22	530	54
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	0.97	0.97	0.98	0.98	0.98	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1756	1756	1756	1761	1761	1761	1770	1863	1863	1770	1759	1509
Flt Permitted	0.74	0.74	0.74	0.76	0.76	0.76	0.37	1.00	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1343	1343	1343	1365	1365	1365	698	1863	1863	329	1759	1509
Peak-hour factor, PHF	0.91	0.91	0.91	0.76	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	168	80	3	74	70	4	6	879	177	24	582	59
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	71	0	0	24
Lane Group Flow (vph)	0	250	0	0	146	0	6	879	106	24	582	35
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22	0.22	0.22	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	289	289	289	293	293	293	418	1117	949	197	1055	905
v/s Ratio Prot	c0.19	c0.19	c0.19	0.11	0.11	0.11	0.01	0.07	0.07	0.33	0.02	0.02
v/c Ratio	0.87	0.87	0.87	0.50	0.50	0.50	0.01	0.79	0.11	0.12	0.55	0.04
Uniform Delay, d1	29.9	29.9	29.9	27.3	27.3	27.3	6.4	12.0	6.8	9.4	6.5	6.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.7	22.7	22.7	1.3	1.3	1.3	0.1	5.6	0.2	1.3	2.1	0.1
Delay (s)	52.6	52.6	52.6	28.6	28.6	28.6	6.4	17.6	7.0	8.1	11.5	6.6
Level of Service	D	D	D	C	C	C	A	B	A	A	B	A
Approach Delay (s)	52.6	52.6	52.6	28.6	28.6	28.6	15.8	11.0	11.0	11.0	11.0	11.0
Approach LOS	D	D	D	C	C	C	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	19.5	19.5	19.5	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	B	B	B	B	B	B
HCM 2000 Volume to Capacity ratio	0.81	0.81	0.81	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	14.6	14.6	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	79.0	79.0	79.0	ICU Level of Service	ICU Level of Service	ICU Level of Service	C	C	C	C	C	C
Intersection Capacity Utilization	71.5%	71.5%	71.5%	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	15	15	15	15	15	15
c. Critical Lane Group												

Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2046> PM Peak Hour
03-05-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	38	82	82	82	64	59	870	79	12	526
Traffic Volume (vph)	38	82	82	82	64	59	870	79	12	526
Future Volume (vph)	38	82	82	82	64	59	870	79	12	526
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.98	1.58	0.19	0.73	0.08	0.05	0.54	0.03	0.03	0.03
Control Delay	87.3	314.7	6.1	12.0	1.3	4.7	8.1	0.5	0.5	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.3	314.7	6.1	12.0	1.3	4.7	8.1	0.5	0.5	0.5
LOS	F	F	A	B	A	A	A	A	A	A
Approach Delay	87.3	314.7	10.8	7.7						
Approach LOS	F	F	B	A						
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 70										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.58										
Intersection Signal Delay: 52.4										
Intersection Capacity Utilization 77.9%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2046> PM Peak Hour
03-05-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	38	82	47	82	64	15	59	870	79	12
Traffic Volume (vph)	38	82	47	82	64	15	59	870	79	12
Future Volume (vph)	38	82	47	82	64	15	59	870	79	12
Future Volume (vph)	38	82	47	82	64	15	59	870	79	12
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Total Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Initial Flow (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.99	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1743	1743	1752	1752	1863	1863	1455	1770	1743	1770
Satd. Flow (prot)	0.84	0.84	0.61	0.61	0.38	0.38	0.10	0.21	0.10	0.10
Flt Permitted	1480	1480	1100	1100	490	490	1455	390	1743	1170
Satd. Flow (perm)	0.75	0.75	0.64	0.64	0.35	0.35	0.09	0.14	0.09	0.14
Peak-hour factor, PHF	51	109	63	128	100	23	62	916	83	14
Adj. Flow (vph)	0	20	0	5	0	0	0	27	0	8
RTOR Reduction (vph)	0	203	0	246	0	62	916	56	14	626
Lane Group Flow (vph)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Heavy Vehicles (%)	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Turn Type	4	4	8	8	2	2	2	6	6	6
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	207	207	154	154	329	329	977	262	1170	786
v/s Ratio Prot	0.14	0.14	c0.22	c0.22	0.13	0.13	c0.49	0.04	0.04	0.04
v/s Ratio Perm	0.98	0.98	1.60	1.60	0.19	0.19	0.73	0.06	0.06	0.06
Uniform Delay, d1	30.6	30.6	30.6	30.6	4.4	4.4	7.6	4.0	4.0	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	57.0	57.0	296.7	296.7	0.5	0.5	2.7	0.0	0.4	1.8
Delay (s)	87.6	87.6	327.3	327.3	4.9	4.9	10.2	4.0	4.4	7.8
Level of Service	F	F	F	F	A	A	B	A	A	A
Approach Delay (s)	87.6	87.6	327.3	327.3	9.4	9.4	7.5	7.5	7.5	7.5
Approach LOS	F	F	F	F	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	53.1	53.1	HCM 2000 Level of Service	D						
HCM 2000 Volume to Capacity ratio	0.88	0.88								
Actuated Cycle Length (s)	71.3	71.3	Sum of lost time (s)	13.4						
Intersection Capacity Utilization	77.9%	77.9%	ICU Level of Service	D						
Analysis Period (min)	15	15								
c. Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	286	239	62	67	56
Future Volume (Veh/h)	70	286	239	62	67	56
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	311	260	67	73	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	327				756	294
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	327				756	294
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	94				79	92
cM capacity (veh/h)	1233				352	746
Direction_Lane #	EB 1	WB 1	SB 1			
Volume Total	387	327	134			
Volume Left	76	0	73			
Volume Right	0	67	61			
cSH	1233	1700	464			
Volume to Capacity	0.06	0.19	0.29			
Queue Length 95th (m)	1.6	0.0	9.5			
Control Delay (s)	2.1	0.0	15.9			
Lane LOS	A	C	C			
Approach Delay (s)	2.1	0.0	15.9			
Approach LOS		C	C			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			52.4%			
Analysis Period (min)			15			
ICU Level of Service			A			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	330	294	70	56	49
Future Volume (Veh/h)	84	330	294	70	56	49
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	359	320	76	61	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	396				899	358
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	396				899	358
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	92				79	92
cM capacity (veh/h)	1163				285	686
Direction_Lane #	EB 1	WB 1	SB 1			
Volume Total	450	396	114			
Volume Left	91	0	61			
Volume Right	0	76	53			
cSH	1163	1700	392			
Volume to Capacity	0.08	0.23	0.29			
Queue Length 95th (m)	2.0	0.0	9.5			
Control Delay (s)	2.4	0.0	17.9			
Lane LOS	A	C	C			
Approach Delay (s)	2.4	0.0	17.9			
Approach LOS		C	C			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			57.8%			
Analysis Period (min)			15			
ICU Level of Service			B			

Intersection: 1: Highway 62 & Ashley Street													
Movement	WB	NB	NB	NB	SB	SB	SB	SB	T				
Directions Served	LR		TR	LT		R	L		T				
Maximum Queue (m)	320.1	93.1	95.6	19.1	15.0	41.0	41.0	47.9					
Average Queue (m)	259.7	47.4	41.7	11.1	3.3	23.6	22.0						
95th Queue (m)	302.8	72.7	71.9	19.2	10.0	37.9	40.9						
Link Distance (m)	460.8	539.5	539.5			617.0	617.0						
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)					38.0	30.5							
Storage Blk Time (%)					6		2						
Queuing Penalty (veh)					39		0						

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	NB	NB	SB									
Directions Served	LR	TR	LT										
Maximum Queue (m)	123.3	6.8	34.4										
Average Queue (m)	42.5	1.1	17.1										
95th Queue (m)	91.2	5.1	29.9										
Link Distance (m)	510.9	460.8	376.6										
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB									
Directions Served	LTR	LTR	LTR	LTR									
Maximum Queue (m)	8.6	7.8	47.6	30.6									
Average Queue (m)	0.5	0.8	13.9	7.5									
95th Queue (m)	3.9	4.4	26.2	18.9									
Link Distance (m)	510.9	962.1	215.8	332.3									
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 4: Harmony Road & Homan Road													
Movement	EB	WB	SB										
Directions Served	LT	TR	LR										
Maximum Queue (m)	33.9	7.4	20.6										
Average Queue (m)	2.2	0.2	3.6										
95th Queue (m)	13.4	2.4	12.7										
Link Distance (m)	962.1	41.0	490.2										
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB											
Directions Served	LT	LR											
Maximum Queue (m)	9.0	9.3											
Average Queue (m)	0.8	5.8											
95th Queue (m)	5.0	12.7											
Link Distance (m)	902.5	551.1											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	SB											
Directions Served	LT	LR											
Maximum Queue (m)	29.1	34.6											
Average Queue (m)	9.4	13.6											
95th Queue (m)	27.0	24.2											
Link Distance (m)	902.5	388.9											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 7: Harmony Public School & Harmony Road												
Movement	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	117.3	26.5	61.2	80.2	3.3	97.4						
Average Queue (m)	61.2	7.2	19.0	40.8	0.4	47.8						
95th Queue (m)	104.1	18.6	42.5	72.9	2.1	84.5						
Link Distance (m)	382.1	263.1		2731.5		954.7						
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 8: Harmony Road & Highway 37

Movement	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	117.3	26.5	61.2	80.2	3.3	97.4						
Average Queue (m)	61.2	7.2	19.0	40.8	0.4	47.8						
95th Queue (m)	104.1	18.6	42.5	72.9	2.1	84.5						
Link Distance (m)	382.1	263.1		2731.5		954.7						
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 9: Highway 37/Harmony Road & Cannifton Road/Blessington Road

Movement	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	84.9	57.3	5.8	133.0	28.5	19.2	2756.6	18.4				
Average Queue (m)	41.2	19.5	0.2	43.4	4.0	3.8	222.9	2.7				
95th Queue (m)	66.5	38.7	1.9	91.6	13.0	11.3	1338.7	9.6				
Link Distance (m)	437.7	564.0		780.7		2731.5						
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road												
Movement	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	79.4	63.9	48.2	141.0	15.0	14.1	70.5	11.8				
Average Queue (m)	30.9	28.6	8.8	46.3	1.4	3.4	29.4	2.6				
95th Queue (m)	55.1	52.1	26.2	100.1	6.9	10.4	61.7	8.6				
Link Distance (m)	593.4	692.0		405.0		780.7						
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	WB	SB	EB	WB	SB	EB	WB	SB	EB	WB	SB
Directions Served	LT	TR	LR									
Maximum Queue (m)	43.1	6.5	28.5									
Average Queue (m)	9.5	0.2	12.2									
95th Queue (m)	27.6	2.1	21.4									
Link Distance (m)	470.1	97.7	145.5									
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

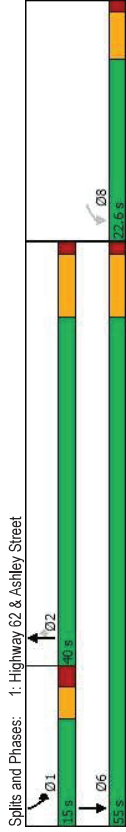
Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	SB	EB	SB	EB	SB	EB	SB	EB	SB	EB	SB
Directions Served	LT	LR										
Maximum Queue (m)	30.1	34.9										
Average Queue (m)	11.0	12.2										
95th Queue (m)	25.9	23.3										
Link Distance (m)	64.8	138.4										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Network Summary

Network wide Queuing Penalty: 49

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	↑↑	↑↑	↑	↑↑
Traffic Volume (vph)	302	1164	516	12	622
Future Volume (vph)	302	1164	516	12	622
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.22	0.58	0.58	0.09	0.62
v/c Ratio	0.94	0.59	0.50	0.09	0.34
Control Delay	66.1	12.7	5.0	33.6	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	66.1	12.7	5.0	33.6	7.8
LOS	E	B	A	C	A
Approach Delay	66.1	10.4			8.3
Approach LOS	E	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 70					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.94					
Intersection Signal Delay: 16.7					Intersection LOS: B
Intersection Capacity Utilization 61.0%					ICU Level of Service B
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	302	24	1164	516	12	622
Future Volume (vph)	302	24	1164	516	12	622
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Flt	0.99		1.00	0.85	1.00	1.00
Flt Protected	0.96		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1686		3539	1568	1770	3374
Flt Permitted	0.96		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1686		3539	1568	1770	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	325	26	1225	543	14	715
RTOR Reduction (vph)	4	0	0	173	0	0
Lane Group Flow (vph)	347	0	1225	370	14	715
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm		NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.3	45.3	1.5	51.8
Effective Green, g (s)	17.0		45.3	45.3	1.5	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	351		1964	870	32	2141
v/s Ratio Prot			c0.35		0.01	c0.21
v/s Ratio Perm	c0.21			0.24		
v/c Ratio	0.99		0.62	0.43	0.44	0.33
Uniform Delay, d1	32.2		12.4	10.6	39.6	6.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	45.3		1.5	1.5	9.3	0.4
Delay (s)	77.5		13.9	12.1	48.9	7.3
Level of Service	E		B	B	D	A
Approach Delay (s)	77.5		13.3		8.1	
Approach LOS	E		B		A	
Intersection Summary						
HCM 2000 Control Delay			19.9			HCM 2000 Level of Service B
HCM 2000 Volume to Capacity ratio			0.73			
Actuated Cycle Length (s)			81.6			Sum of lost time (s) 17.8
Intersection Capacity Utilization			61.0%			ICU Level of Service B
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road

<Total 2041> Saturday Peak Hour
 03-05-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	154	123	108	230	171	95
Future Volume (Veh/h)	154	123	108	230	171	95
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	175	140	120	256	214	119
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	795	248			376	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	795	248			376	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	40	82			82	
CM capacity (veh/h)	292	791			1182	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	315	376	333			
Volume Left	175	0	214			
Volume Right	140	256	0			
cSH	406	1700	1182			
Volume to Capacity	0.78	0.22	0.18			
Queue Length 95th (m)	52.7	0.0	5.3			
Control Delay (s)	38.6	0.0	6.2			
Lane LOS	E	A	A			
Approach Delay (s)	38.6	0.0	6.2			
Approach LOS	E					
Intersection Summary						
Average Delay			13.9			
Intersection Capacity Utilization			60.3%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road

<Total 2041> Saturday Peak Hour
 03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		T	T		T	T		T			T	T
Traffic Volume (veh/h)	19	381	37	37	158	7	69	7	33	19	5	5
Future Volume (Veh/h)	19	381	37	37	158	7	69	7	33	19	5	5
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.80	0.80	0.80	0.72	0.72	0.72	0.39	0.39	0.39
Hourly flow rate (vph)	22	443	43	46	198	9	96	10	46	49	13	13
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	207			486			822	808	464	854	824	202
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	207			486			822	808	464	854	824	202
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			96			64	97	92	80	96	98
CM capacity (veh/h)	1364			1077			266	297	598	240	290	838
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	508	253	152	75								
Volume Left	22	46	96	49								
Volume Right	43	9	46	13								
cSH	1364	1077	322	283								
Volume to Capacity	0.02	0.04	0.47	0.26								
Queue Length 95th (m)	0.4	1.1	19.2	8.3								
Control Delay (s)	0.5	1.9	25.7	22.2								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.5	1.9	25.7	22.2								
Approach LOS	D			C								
Intersection Summary												
Average Delay				6.4								
Intersection Capacity Utilization				38.7%						ICU Level of Service	A	
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
 4: Harmony Road & Homan Road

<Total 2041> Saturday Peak Hour
 03-05-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	7	
Traffic Volume (veh/h)	7	316	212	1	1	7
Future Volume (Veh/h)	7	316	212	1	1	7
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.66	0.66	0.50	0.50
Hourly flow rate (vph)	9	395	321	2	2	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	323			735	322	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	323			735	322	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	99			99	98	
cM capacity (veh/h)	1237			384	719	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	404	323	16			
Volume Left	9	0	2			
Volume Right	0	2	14			
cSH	1237	1700	648			
Volume to Capacity	0.01	0.19	0.02			
Queue Length 95th (m)	0.2	0.0	0.6			
Control Delay (s)	0.3	0.0	10.7			
Lane LOS	A		B			
Approach Delay (s)	0.3	0.0	10.7			
Approach LOS			B			
Intersection Summary						
Average Delay			0.4			
Intersection Capacity Utilization			32.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 5: Plumpton & Harmony Road

<Total 2041> Saturday Peak Hour
 03-05-2025

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4	1	2	4	5	27
Traffic Volume (veh/h)	382	14	22	256	5	27
Future Volume (Veh/h)	382	14	22	256	5	27
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.74	0.74	0.50	0.50
Hourly flow rate (vph)	420	15	30	346	10	54
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
cM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	435	376	64			
Volume Left	0	30	10			
Volume Right	15	0	54			
cSH	1700	1125	550			
Volume to Capacity	0.26	0.03	0.12			
Queue Length 95th (m)	0.0	0.7	3.1			
Control Delay (s)	0.0	0.9	12.4			
Lane LOS	A		B			
Approach Delay (s)	0.0	0.9	12.4			
Approach LOS			B			
Intersection Summary						
Average Delay			1.3			
Intersection Capacity Utilization			41.7%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2041> Saturday Peak Hour
03-05-2025



Movement	EBL	EBT	WBT	SBL	SBR
Lane Configurations		4	4	W	W
Traffic Volume (veh/h)	84	230	165	63	75
Future Volume (Veh/h)	84	230	165	63	75
Sign Control	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%
Peak Hour Factor	0.60	0.60	0.70	0.70	0.92
Hourly flow rate (vph)	140	383	236	90	82
Pedestrians					
Lane Width (m)					
Walking Speed (m/s)					
Percent Blockage					
Right turn flare (veh)					
Median type		None	None		
Median storage (veh)					
Upstream signal (m)					
pX platoon unblocked				944	281
VC conflicting volume	326				
VC1 stage 1 conf vol					
VC2 stage 2 conf vol					
VCu unblocked vol	326			944	281
IC single (s)	4.1			6.4	6.2
IC 2 stage (s)					
IF (s)	2.2			3.5	3.3
p0 queue free %	89			68	92
cM capacity (veh/h)	1234			258	758
Direction, Lane #	EB 1	WB 1	SB 1		
Volume Total	523	326	144		
Volume Left	140	0	82		
Volume Right	0	90	62		
cSH	1234	1700	360		
Volume to Capacity	0.11	0.19	0.40		
Queue Length 95th (m)	3.1	0.0	14.9		
Control Delay (s)	3.1	0.0	21.5		
Lane LOS	A	C	C		
Approach Delay (s)	3.1	0.0	21.5		
Approach LOS			C		
Intersection Summary					
Average Delay			4.8		
Intersection Capacity Utilization			46.9%		ICU Level of Service A
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

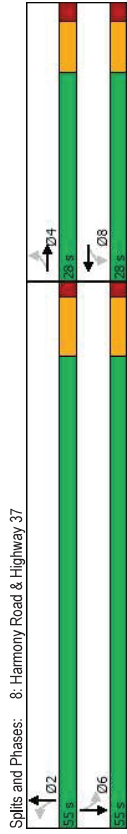
<Total 2041> Saturday Peak Hour
03-05-2025



Movement	EBT	EBR	WBT	NBL	NBR
Lane Configurations	4	4	4	W	W
Traffic Volume (veh/h)	238	0	0	183	1
Future Volume (Veh/h)	238	0	0	183	1
Sign Control	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%
Peak Hour Factor	0.58	0.58	0.74	0.74	0.92
Hourly flow rate (vph)	410	0	0	247	1
Pedestrians					
Lane Width (m)					
Walking Speed (m/s)					
Percent Blockage					
Right turn flare (veh)					
Median type		None	None		
Median storage (veh)					
Upstream signal (m)					
pX platoon unblocked				410	657
VC conflicting volume					
VC1 stage 1 conf vol					
VC2 stage 2 conf vol					
VCu unblocked vol				410	657
IC single (s)				4.1	6.4
IC 2 stage (s)					
IF (s)				2.2	3.5
p0 queue free %				100	100
cM capacity (veh/h)				1149	430
Direction, Lane #	EB 1	WB 1	NB 1		
Volume Total	410	247	1		
Volume Left	0	0	1		
Volume Right	0	0	0		
cSH	1700	1149	430		
Volume to Capacity	0.24	0.00	0.00		
Queue Length 95th (m)	0.0	0.0	0.1		
Control Delay (s)	0.0	0.0	13.4		
Lane LOS			B		
Approach Delay (s)	0.0	0.0	13.4		
Approach LOS			B		
Intersection Summary					
Average Delay			0.0		
Intersection Capacity Utilization			22.5%		ICU Level of Service A
Analysis Period (min)			15		

Timings
8: Harmony Road & Highway 37 <Total 2041> Saturday Peak Hour 03-05-2025

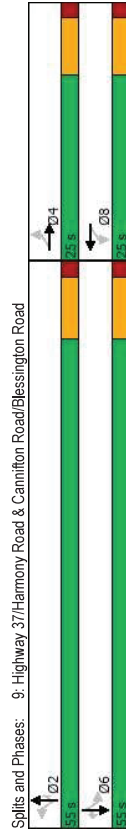
	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	113	67	26	31	111	321	323
Traffic Volume (vph)	113	67	26	31	111	321	323
Future Volume (vph)	113	67	26	31	111	321	323
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	8	8	2	2	2	6
Permitted Phases	4	4	8	8	2	2	6
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6
Lead/Lag							
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max
Act Eff Green (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57
v/c Ratio	1.10	1.10	0.26	0.26	0.35	0.47	0.47
Control Delay	104.3	104.3	26.1	26.1	10.8	10.4	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	104.3	104.3	26.1	26.1	10.8	10.4	11.4
LOS	F	F	C	C	B	B	B
Approach Delay	104.3	104.3	26.1	26.1	10.5	11.4	
Approach LOS	F	F	C	C	B	B	
Intersection Summary							
Cycle Length: 83							
Actuated Cycle Length: 83							
Natural Cycle: 35							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 1.10							
Intersection Signal Delay: 39.6							
Intersection Capacity Utilization 80.4%							
Analysis Period (min) 15							



HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37 <Total 2041> Saturday Peak Hour 03-05-2025

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	113	67	128	26	31	4	111	321	26	0	323	111
Traffic Volume (vph)	113	67	128	26	31	4	111	321	26	0	323	111
Future Volume (vph)	113	67	128	26	31	4	111	321	26	0	323	111
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726	1726
Flt Permitted	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485	1485
Peak-hour factor, PHF	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Adj. Flow (vph)	164	97	186	35	42	5	117	338	27	0	363	125
RTOR Reduction (vph)	0	31	0	0	3	0	0	3	0	0	15	0
Lane Group Flow (vph)	0	416	0	0	79	0	117	362	0	0	473	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	375	375	375	317	317	317	455	1049	455	1022	1022	1022
v/s Ratio Prot	c0.28	c0.28	c0.28	0.06	0.06	0.06	0.15	0.20	0.15	c0.26	c0.26	c0.26
v/s Ratio Perm	1.11	1.11	1.11	0.25	0.25	0.25	0.26	0.34	0.26	0.46	0.46	0.46
Uniform Delay, d1	31.0	31.0	31.0	24.7	24.7	24.7	8.9	9.5	8.9	10.4	10.4	10.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	79.7	79.7	79.7	0.4	0.4	0.4	1.4	0.9	1.4	1.5	1.5	1.5
Delay (s)	110.7	110.7	110.7	25.1	25.1	25.1	10.3	10.4	10.3	11.9	11.9	11.9
Level of Service	F	F	F	C	C	C	B	B	B	B	B	B
Approach Delay (s)	110.7	110.7	110.7	25.1	25.1	25.1	10.4	10.4	10.4	11.9	11.9	11.9
Approach LOS	F	F	F	C	C	C	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	41.6	41.6	41.6	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	D	D	D	D	D	D
HCM 2000 Volume to Capacity ratio	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66	0.66
Actuated Cycle Length (s)	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0
Intersection Capacity Utilization	80.4%	80.4%	80.4%	80.4%	80.4%	80.4%	80.4%	80.4%	80.4%	80.4%	80.4%	80.4%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15	15
c. Critical Lane Group												

Timings
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
<Total 2041> Saturday Peak Hour
03-05-2025

[illegible]

HCM Signalized Intersection Capacity Analysis
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
<Total 2041> Saturday Peak Hour
03-05-2025

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	108	51	3	40	37	3	3	585	113	18
Future Volume (vph)	108	51	3	40	37	3	3	585	113	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt Protected	0.97			0.99	0.98	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1755			1760	1770	1863	1583	1770	1759	1509
Flt Permitted	0.77			0.78	0.78	0.49	1.00	1.00	0.34	1.00
Satd. Flow (perm)	1403			1408		904	1863	1583	638	1759
Peak-hour factor, PHF	0.91	0.91	0.91	0.76	0.76	0.90	0.90	0.90	0.91	0.91
Adj. Flow (vph)	119	56	3	53	49	4	3	650	126	20
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	47	0
Lane Group Flow (vph)	0	177	0	0	104	0	3	650	79	20
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	8%
Turn Type	Perm	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm
Protected Phases	4			8		2		2		6
Permitted Phases	4			8		2		2		6
Actuated Green, G (s)	14.6			14.6		49.4		49.4		49.4
Effective Green, g (s)	14.6			14.6		49.4		49.4		49.4
Actuated g/C Ratio	0.19			0.19		0.63		0.63		0.63
Clearance Time (s)	7.0			7.0		7.6		7.6		7.6
Vehicle Extension (s)	3.0			3.0		4.5		4.5		4.5
Lane Grp Cap (vph)	260			261		588		1170		948
v/s Ratio Prot						c0.35				0.25
v/s Ratio Perm	c0.13			0.07		0.00		0.05		0.03
v/c Ratio	0.88			0.40		0.01		0.56		0.08
Uniform Delay, d1	29.8			28.1		5.4		5.7		5.5
Progression Factor	1.00			1.00		1.00		1.00		1.00
Incremental Delay, d2	7.2			1.0		0.0		1.9		0.2
Delay (s)	37.0			29.2		5.5		10.2		5.9
Level of Service	D			C		A		B		A
Approach Delay (s)	37.0			29.2		9.5		8.0		A
Approach LOS	D			C		A		A		A
Intersection Summary										
HCM 2000 Control Delay				13.4		HCM 2000 Level of Service				
HCM 2000 Volume to Capacity ratio				0.58		B				
Actuated Cycle Length (s)				78.6		Sum of lost time (s)				
Intersection Capacity Utilization				60.7%		ICU Level of Service				
Analysis Period (min)				15		B				
Critical Lane Group										

Timings
10: Highway 37 & Tank Farm Road/Casey Road

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	27	58	58	47	43	619	55	9	400	14
Future Volume (vph)	27	58	58	47	43	619	55	9	400	14
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.67	0.92	0.11	0.52	0.06	0.02	0.41	0.02	0.02	0.02
Control Delay	40.7	80.7	4.9	7.8	1.4	4.1	6.5	0.2	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.7	80.7	4.9	7.8	1.4	4.1	6.5	0.2	0.0	0.0
LOS	D	F	A	A	A	A	A	A	A	A
Approach Delay	40.7	80.7	4.9	7.8	1.4	4.1	6.5	0.2	0.0	0.0
Approach LOS	D	F	A	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 35										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.92										
Intersection Signal Delay: 18.4										
Intersection LOS: B										
ICU Level of Service B										
Intersection Capacity Utilization 59.4%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	27	58	58	47	43	619	55	9	400	14
Future Volume (vph)	27	58	58	47	43	619	55	9	400	14
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.99	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	1743	1743	1754	1754	1863	1863	1455	1770	1743	1170
Satd. Flow (prot)	0.87	0.87	0.76	0.76	0.48	0.48	1.00	0.36	1.00	1.00
Flt Permitted	1538	1538	1359	1359	617	617	1455	677	1743	1170
Satd. Flow (perm)	0.75	0.75	0.64	0.64	0.35	0.35	0.95	0.84	0.84	0.84
Peak-hour factor, PHF	36	77	44	91	73	16	45	652	58	11
Adj. Flow (vph)	0	20	0	0	5	0	0	19	0	0
RTOR Reduction (vph)	0	137	0	0	175	0	45	652	39	11
Lane Group Flow (vph)	5%	49%	2%	4%	3%	13%	47%	2%	11%	2%
Heavy Vehicles (%)	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	215	215	190	190	414	414	977	454	1170	786
v/s Ratio Prot	0.09	0.09	c0.13	c0.13	0.07	0.07	0.03	0.02	0.02	0.02
v/s Ratio Perm	0.64	0.64	0.92	0.92	0.11	0.11	0.52	0.04	0.02	0.01
Uniform Delay, d1	28.9	28.9	30.3	30.3	4.1	4.1	5.9	3.9	3.9	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.1	6.1	43.2	43.2	0.2	0.2	0.7	0.0	0.1	0.0
Delay (s)	35.0	35.0	73.5	73.5	4.4	4.4	6.6	4.0	4.0	3.9
Level of Service	D	D	E	E	A	A	A	A	A	A
Approach Delay (s)	35.0	35.0	73.5	73.5	6.3	6.3	6.2	6.2	6.2	6.2
Approach LOS	D	D	E	E	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	16.7	16.7	HCM 2000 Level of Service	B						
HCM 2000 Volume to Capacity ratio	0.59	0.59								
Actuated Cycle Length (s)	71.3	71.3	Sum of lost time (s)	13.4						
Intersection Capacity Utilization	59.4%	59.4%	ICU Level of Service	B						
Analysis Period (min)	15	15								
c. Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

<Total 2041> Saturday Peak Hour
 03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1		W	
Traffic Volume (veh/h)	71	236	178	54	75	57
Future Volume (Veh/h)	71	236	178	54	75	57
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	257	193	59	82	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	252				634	222
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	252				634	222
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	94				80	92
cM capacity (veh/h)	1313				417	817
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	334	252	144			
Volume Left	77	0	82			
Volume Right	0	59	62			
cSH	1313	1700	529			
Volume to Capacity	0.06	0.15	0.27			
Queue Length 95th (m)	1.5	0.0	8.8			
Control Delay (s)	2.2	0.0	14.3			
Lane LOS	A		B			
Approach Delay (s)	2.2	0.0	14.3			
Approach LOS			B			
Intersection Summary						
Average Delay			3.9			
Intersection Capacity Utilization			46.6%			A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

<Total 2041> Saturday Peak Hour
 03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1		W	
Traffic Volume (veh/h)	83	238	190	62	64	49
Future Volume (Veh/h)	83	238	190	62	64	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	259	207	67	70	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	274				680	240
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	274				680	240
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	93				82	93
cM capacity (veh/h)	1289				388	798
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	349	274	123			
Volume Left	90	0	70			
Volume Right	0	67	53			
cSH	1289	1700	498			
Volume to Capacity	0.07	0.16	0.25			
Queue Length 95th (m)	1.8	0.0	7.7			
Control Delay (s)	2.6	0.0	14.6			
Lane LOS	A		B			
Approach Delay (s)	2.6	0.0	14.6			
Approach LOS			B			
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			47.4%			A
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	119.9	55.0	59.3	15.8	15.4	45.9	34.5
Average Queue (m)	69.8	33.7	29.3	7.5	2.8	18.9	14.4
95th Queue (m)	113.1	50.5	51.8	13.9	9.6	34.0	28.0
Link Distance (m)	460.8	539.5	539.5			617.0	617.0
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			3			1	
Queuing Penalty (veh)			14			0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	NB	NB	SB	SB	SB	SB
Directions Served	LR	TR	LT				
Maximum Queue (m)	65.5	6.8	41.0				
Average Queue (m)	24.4	0.8	14.2				
95th Queue (m)	45.3	4.4	28.6				
Link Distance (m)	510.9	460.8	376.6				
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB	SB	SB	SB
Directions Served	LTR	LTR	LTR	LTR			
Maximum Queue (m)	7.8	15.6	27.1	15.8			
Average Queue (m)	1.0	2.5	12.0	6.6			
95th Queue (m)	5.2	10.0	21.1	13.7			
Link Distance (m)	510.9	962.1	215.8	332.3			
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 4: Harmony Road & Homan Road

Movement	EB	SB	SB	SB
Directions Served	LT	LR		
Maximum Queue (m)	22.9	9.3		
Average Queue (m)	1.3	3.6		
95th Queue (m)	8.7	10.8		
Link Distance (m)	962.1	490.2		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB	NB	NB
Directions Served	LT	LR		
Maximum Queue (m)	22.2	19.7		
Average Queue (m)	2.9	6.2		
95th Queue (m)	12.3	16.4		
Link Distance (m)	902.5	551.1		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	SB	SB	SB
Directions Served	LT	LR		
Maximum Queue (m)	35.5	23.0		
Average Queue (m)	8.5	10.9		
95th Queue (m)	25.3	18.4		
Link Distance (m)	902.5	388.9		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Harmony Public School & Harmony Road

Movement
Directions Served
Maximum Queue (m)
Average Queue (m)
95th Queue (m)
Link Distance (m)
Upstream Blk Time (%)
Queueing Penalty (veh)
Storage Bay Dist (m)
Storage Blk Time (%)
Queueing Penalty (veh)

Intersection: 8: Highway 37 & Harmony Road

Movement	EB	WB	NB	NB	SB
Directions Served	LTR	L	TR	TR	
Maximum Queue (m)	109.2	20.7	32.0	43.6	71.3
Average Queue (m)	37.7	9.4	10.6	18.7	19.1
95th Queue (m)	75.1	18.3	24.6	37.4	46.5
Link Distance (m)	382.1	263.1	2731.5	954.7	
Unstream Blk Time (%)					
Queueing Penalty (veh)					
Storage Bay Dist (m)			79.5		
Storage Blk Time (%)					
Queueing Penalty (veh)					

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road

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Network Summary

Network wide Queuing Penalty: 14

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road

Movement	EB	WB	NB	NB	NB	SB	SB	SB
Directions Served	LTR	LTR	L	T	R	L	T	R
Maximum Queue (m)	40.1	65.2	22.7	51.2	8.0	74.5	11.2	
Average Queue (m)	20.1	21.6	6.5	24.6	0.5	23.7	27.8	1.1
95th Queue (m)	35.0	44.4	17.7	49.5	4.0	8.1	59.5	6.0
Link Distance (m)	593.4	692.0		405.0			780.7	
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)		66.0		70.0	68.0		70.0	
Storage Blk Time (%)							0	
Queuing Penalty (veh)							0	

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	SB
Directions Served	LT LR	
Maximum Queue (m)	28.5	23.7
Average Queue (m)	7.0	12.3
95th Queue (m)	20.0	20.9
Link Distance (m)	470.1	145.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

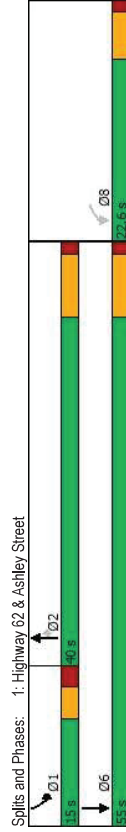
Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	29.6	30.3
Average Queue (m)	6.1	12.3
95th Queue (m)	18.0	19.9
Link Distance (m)	64.8	138.4
Upstream Blk Time (%)		
Queueing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queueing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 14

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	327	1285	558	13	687
Future Volume (vph)	327	1285	558	13	687
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.22	0.58	0.58	0.09	0.62
v/c Ratio	1.02	0.56	0.55	0.09	0.38
Control Delay	84.2	14.1	6.0	33.7	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	84.2	14.1	6.0	33.7	8.1
LOS	F	B	A	C	A
Approach Delay	84.2	11.6			8.6
Approach LOS	F	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 80					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 1.02					
Intersection Signal Delay: 19.7					
Intersection LOS: B					
Intersection Capacity Utilization 65.9%					
Analysis Period (min) 15					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	327	26	1285	558	13	687
Future Volume (vph)	327	26	1285	558	13	687
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1686	3539	1568	1770	3374	3374
Flt Permitted	0.96	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1686	3539	1568	1770	3374	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	352	28	1353	587	15	790
RTOR Reduction (vph)	4	0	0	169	0	0
Lane Group Flow (vph)	376	0	1353	418	15	790
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0	45.3	45.3	1.5	51.8	51.8
Effective Green, g (s)	17.0	45.3	45.3	1.5	51.8	51.8
Actuated g/C Ratio	0.21	0.56	0.56	0.02	0.63	0.63
Clearance Time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5	4.5
Lane Grp Cap (vph)	351	1964	870	32	2141	2141
v/s Ratio Prot	c0.22		c0.38		c0.23	
v/s Ratio Perm	1.07	0.69	0.48	0.47	0.37	0.37
Uniform Delay, d1	32.3	13.1	11.0	39.7	7.1	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	68.3	2.0	1.9	10.5	0.5	0.5
Delay (s)	100.6	15.1	12.9	50.1	7.6	7.6
Level of Service	F	B	B	D	A	A
Approach Delay (s)	100.6	14.4		8.4		
Approach LOS	F	B		A		
Intersection Summary						
HCM 2000 Control Delay		23.3				C
HCM 2000 Volume to Capacity ratio		0.80				
Actuated Cycle Length (s)		81.6				17.8
Intersection Capacity Utilization		65.9%				C
Analysis Period (min)		15				
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road
 <Total 2046> Saturday Peak Hour
 03-05-2025

Movement	WBL	WBR	NBT	NBL	SBT
Lane Configurations	W		T		T
Traffic Volume (veh/h)	163	129	120	242	179
Future Volume (Veh/h)	163	129	120	242	179
Sign Control	Stop	Stop	Free	Free	Free
Grade	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.90	0.90	0.80
Hourly flow rate (vph)	185	147	133	269	224
Pedestrians					
Lane Width (m)					
Walking Speed (m/s)					
Percent Blockage					
Right turn flare (veh)					
Median type			None		None
Median storage (veh)					
Upstream signal (m)					
pX platoon unblocked					
VC conflicting volume	846	268			402
VC1 stage 1 conf vol					
VC2 stage 2 conf vol					
VCu unblocked vol	846	268			402
IC single (s)	6.4	6.2			4.1
IC 2 stage (s)					
IF (s)	3.5	3.3			2.2
p0 queue free %	31	81			81
CM capacity (veh/h)	268	771			1157
Direction, Lane #	WB 1	NB 1	SB 1		
Volume Total	332	402	355		
Volume Left	185	0	224		
Volume Right	147	269	0		
cSH	377	1700	1157		
Volume to Capacity	0.88	0.24	0.19		
Queue Length 95th (m)	69.6	0.0	5.7		
Control Delay (s)	54.8	0.0	6.3		
Lane LOS	F	A	A		
Approach Delay (s)	54.8	0.0	6.3		
Approach LOS	F				
Intersection Summary					
Average Delay			18.8		
Intersection Capacity Utilization			63.5%		ICU Level of Service
Analysis Period (min)			15		B

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road
 <Total 2046> Saturday Peak Hour
 03-05-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		T	T	T	T	T		T		T	T	T
Traffic Volume (veh/h)	21	398	41	40	160	8	76	8	35	21	6	6
Future Volume (Veh/h)	21	398	41	40	160	8	76	8	35	21	6	6
Sign Control		Free	Free	Free	Free	Free		Stop		Stop	Stop	Stop
Grade		0%	0%	0%	0%	0%		0%		0%	0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.80	0.80	0.80	0.72	0.72	0.72	0.39	0.39	0.39
Hourly flow rate (vph)	24	463	48	50	200	10	106	11	49	54	15	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	210			511			862	845	487	894	864	205
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	210			511			862	845	487	894	864	205
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			95			57	96	92	76	95	98
CM capacity (veh/h)	1361			1054			246	280	581	221	273	836
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	535	260	166	84								
Volume Left	24	50	106	54								
Volume Right	48	10	49	15								
cSH	1361	1054	300	265								
Volume to Capacity	0.02	0.05	0.55	0.32								
Queue Length 95th (m)	0.4	1.2	25.1	10.5								
Control Delay (s)	0.5	2.0	31.0	24.8								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.5	2.0	31.0	24.8								
Approach LOS		D		C								
Intersection Summary												
Average Delay			7.7									
Intersection Capacity Utilization			40.8%									
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis
 4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
 5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	2	2	8	
Traffic Volume (veh/h)	8	324	219	2	2	8	
Future Volume (Veh/h)	8	324	219	2	2	8	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.66	0.66	0.50	0.50	
Hourly flow rate (vph)	10	405	332	3	4	16	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None		None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked	335				758	334	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol	335				758	334	
VCu unblocked vol	4.1				6.4	6.2	
IC single (s)							
IC 2 stage (s)	2.2				3.5	3.3	
p0 queue free %	99				99	98	
IF (s)							
CM capacity (veh/h)	1224				372	708	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	415	335	20				
Volume Left	10	0	4				
Volume Right	0	3	16				
cSH	1224	1700	600				
Volume to Capacity	0.01	0.20	0.03				
Queue Length 95th (m)	0.2	0.0	0.8				
Control Delay (s)	0.3	0.0	11.2				
Lane LOS	A	B	B				
Approach Delay (s)	0.3	0.0	11.2				
Approach LOS		B	B				
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			33.5%			ICU Level of Service	A
Analysis Period (min)			15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4	4	2	4	4	2	
Traffic Volume (veh/h)	397	15	23	267	6	29	
Future Volume (Veh/h)	397	15	23	267	6	29	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.74	0.74	0.50	0.50	
Hourly flow rate (vph)	436	16	31	361	12	58	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None		None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked				452	867	444	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				452	867	444	
IC single (s)				4.1	6.4	6.2	
IC 2 stage (s)				2.2	3.5	3.3	
p0 queue free %				97	96	91	
IF (s)							
CM capacity (veh/h)				1109	314	614	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	452	392	70				
Volume Left	0	31	12				
Volume Right	16	0	58				
cSH	1700	1109	528				
Volume to Capacity	0.27	0.03	0.13				
Queue Length 95th (m)	0.0	0.7	3.6				
Control Delay (s)	0.0	0.9	12.9				
Lane LOS	A	A	B				
Approach Delay (s)	0.0	0.9	12.9				
Approach LOS		B	B				
Intersection Summary							
Average Delay			1.4				
Intersection Capacity Utilization			43.1%			ICU Level of Service	A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2046> Saturday Peak Hour
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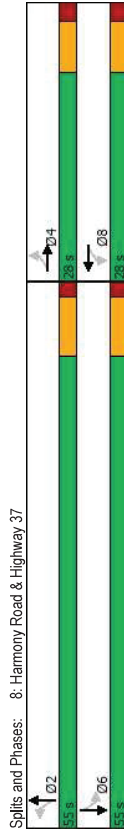
<Total 2046> Saturday Peak Hour
03-05-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	1	
Traffic Volume (veh/h)	85	238	172	64	75	57
Future Volume (Veh/h)	85	238	172	64	75	57
Sign Control		Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	
Peak Hour Factor	0.60	0.60	0.70	0.70	0.92	0.92
Hourly flow rate (vph)	142	397	246	91	82	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	337			972	292	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	337			972	292	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	88			67	92	
cM capacity (veh/h)	1222			247	748	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	539	337	144			
Volume Left	142	0	82			
Volume Right	0	91	62			
cSH	1222	1700	347			
Volume to Capacity	0.12	0.20	0.41			
Queue Length 95th (m)	3.1	0.0	15.8			
Control Delay (s)	3.1	0.0	22.5			
Lane LOS	A	C	C			
Approach Delay (s)	3.1	0.0	22.5			
Approach LOS		C	C			
Intersection Summary						
Average Delay			4.8			
Intersection Capacity Utilization			47.8%			A
Analysis Period (min)			15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	246	0	0	190	2	0
Future Volume (Veh/h)	246	0	0	190	2	0
Sign Control	Free	Free	Free	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.58	0.58	0.74	0.74	0.92	0.92
Hourly flow rate (vph)	424	0	0	257	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume			424		681	424
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol			424		681	424
IC single (s)			4.1		6.4	6.2
IC 2 stage (s)						
IF (s)			2.2		3.5	3.3
p0 queue free %			100		100	100
cM capacity (veh/h)			1135		416	630
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	424	257	2			
Volume Left	0	0	2			
Volume Right	0	0	0			
cSH	1700	1135	416			
Volume to Capacity	0.25	0.00	0.00			
Queue Length 95th (m)	0.0	0.0	0.1			
Control Delay (s)	0.0	0.0	13.7			
Lane LOS			B			
Approach Delay (s)	0.0	0.0	13.7			
Approach LOS			B			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			22.9%			A
Analysis Period (min)			15			

Timings
8: Harmony Road & Highway 37 <Total 2046> Saturday Peak Hour 03-05-2025

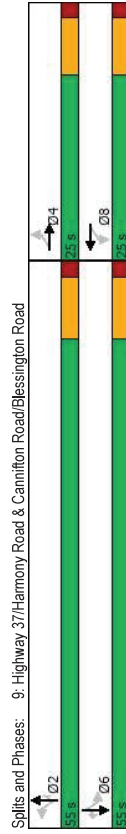
	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	116	69	29	32	114	355	356
Traffic Volume (vph)	116	69	29	32	114	355	356
Future Volume (vph)	116	69	29	32	114	355	356
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	4	8	8	2	2	6
Permitted Phases	4	4	8	8	2	2	6
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6
Lead/Lag							
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max
Act Eff Green (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57
v/c Ratio	1.13	1.13	0.29	0.28	0.38	0.51	0.51
Control Delay	115.4	115.4	26.6	26.6	11.4	10.9	12.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	115.4	115.4	26.6	26.6	11.4	10.9	12.1
LOS	F	F	C	C	B	B	B
Approach Delay	115.4	115.4	26.6	26.6	11.0	12.1	12.1
Approach LOS	F	F	C	C	B	B	B
Intersection Summary							
Cycle Length: 83							
Actuated Cycle Length: 83							
Natural Cycle: 60							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 1.13							
Intersection Signal Delay: 42.2							
Intersection Capacity Utilization 82.6%							
Analysis Period (min) 15							



HCM Signalized Intersection Capacity Analysis
8: Harmony Road & Highway 37 <Total 2046> Saturday Peak Hour 03-05-2025

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	116	69	132	29	32	5	114	355	29	0	356	114
Traffic Volume (vph)	116	69	132	29	32	5	114	355	29	0	356	114
Future Volume (vph)	116	69	132	29	32	5	114	355	29	0	356	114
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1727	1727	1727	1727	1727	1727	1727	1727	1727	1727	1727	1727
Flt Permitted	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481	1481
Peak-hour factor, PHF	0.69	0.69	0.69	0.74	0.74	0.74	0.95	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	168	100	191	39	43	7	120	374	31	0	400	128
RTOR Reduction (vph)	0	31	0	0	4	0	0	3	0	0	14	0
Lane Group Flow (vph)	0	428	0	0	85	0	120	402	0	0	514	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	374	374	374	306	306	306	422	422	422	422	422	422
v/s Ratio Prot	c0.29	c0.29	c0.29	0.07	0.07	0.07	0.16	0.16	0.16	0.16	0.16	0.16
v/s Ratio Perm	1.15	1.15	1.15	0.28	0.28	0.28	0.38	0.38	0.38	0.38	0.38	0.38
Uniform Delay, d1	31.0	31.0	31.0	24.9	24.9	24.9	9.1	9.1	9.1	9.1	9.1	9.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	92.3	92.3	92.3	0.5	0.5	0.5	1.7	1.7	1.7	1.7	1.7	1.7
Delay (s)	123.3	123.3	123.3	25.4	25.4	25.4	10.8	10.8	10.8	10.8	12.5	12.5
Level of Service	F	F	F	C	C	C	B	B	B	B	B	B
Approach Delay (s)	123.3	123.3	123.3	25.4	25.4	25.4	10.8	10.8	10.8	12.5	12.5	12.5
Approach LOS	F	F	F	C	C	C	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	44.4	44.4	44.4	HCM 2000 Level of Service	D	D	D	D	D	D	D	D
HCM 2000 Volume to Capacity ratio	0.70	0.70	0.70	Sum of lost time (s)	14.6	14.6	14.6	14.6	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	83.0	83.0	83.0	ICU Level of Service	E	E	E	E	E	E	E	E
Intersection Capacity Utilization	82.6%	82.6%	82.6%	Analysis Period (min)	15	15	15	15	15	15	15	15
Analysis Period (min)	15	15	15	c. Critical Lane Group								

Timings
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
<Total 2046> Saturday Peak Hour
03-05-2025

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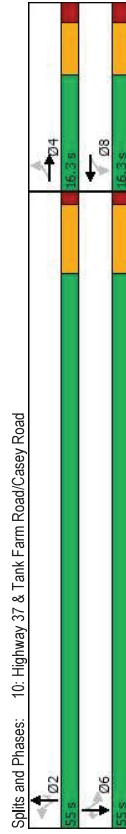
HCM Signalized Intersection Capacity Analysis
9: Highway 37/Harmony Road & Cannifton Road/Blessington Road
<Total 2046> Saturday Peak Hour
03-05-2025

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Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2046> Saturday Peak Hour
03-05-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	30	64	64	64	52	47	679	61	10	435
Traffic Volume (vph)	30	64	64	64	52	47	679	61	10	435
Future Volume (vph)	30	64	64	64	52	47	679	61	10	435
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.75	0.75	1.06	1.06	0.13	0.57	0.06	0.03	0.44	0.02
Control Delay	47.4	47.4	115.9	115.9	5.1	8.5	1.4	4.2	6.9	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	47.4	115.9	115.9	5.1	8.5	1.4	4.2	6.9	0.3
LOS	D	D	F	F	A	A	A	A	A	A
Approach Delay	47.4	47.4	115.9	115.9	7.7	7.7	6.6	6.6	6.6	6.6
Approach LOS	D	D	F	F	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 60										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.06										
Intersection Signal Delay: 23.6										
Intersection Capacity Utilization 63.8%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2046> Saturday Peak Hour
03-05-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	30	64	64	64	52	47	679	61	10	435
Traffic Volume (vph)	30	64	64	64	52	47	679	61	10	435
Future Volume (vph)	30	64	64	64	52	47	679	61	10	435
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1744	1744	1744	1744	1744	1744	1744	1744	1744	1744
Flt Permitted	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Satd. Flow (perm)	1518	1518	1518	1518	1518	1518	1518	1518	1518	1518
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	40	85	48	100	81	17	49	715	64	12
RTOR Reduction (vph)	0	20	0	0	5	0	0	21	0	0
Lane Group Flow (vph)	0	153	0	0	193	0	49	715	43	12
Heavy Vehicles (%)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	212	212	182	182	389	1251	977	407	1170	786
v/s Ratio Prot	0.10	0.10	c0.15	c0.15	0.08	0.08	0.03	0.03	0.30	0.01
v/s Ratio Perm	0.72	0.72	1.06	1.06	0.13	0.57	0.04	0.02	0.44	0.02
Uniform Delay, d1	29.3	29.3	30.6	30.6	4.2	6.2	4.0	3.9	5.5	3.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.5	11.5	83.4	83.4	0.3	1.0	0.0	0.1	1.2	0.0
Delay (s)	40.8	40.8	114.0	114.0	4.5	7.2	4.0	4.1	6.7	3.9
Level of Service	D	D	F	F	A	A	A	A	A	A
Approach Delay (s)	40.8	40.8	114.0	114.0	6.8	6.8	6.5	6.5	6.5	6.5
Approach LOS	D	D	F	F	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	22.2	22.2	HCM 2000 Level of Service	C						
HCM 2000 Volume to Capacity ratio	0.66	0.66								
Actuated Cycle Length (s)	71.3	71.3	Sum of lost time (s)	13.4						
Intersection Capacity Utilization	63.8%	63.8%	ICU Level of Service	B						
Analysis Period (min)	15	15								
c. Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

<Total 2046> Saturday Peak Hour
 03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1		W	
Traffic Volume (veh/h)	71	243	180	54	75	57
Future Volume (Veh/h)	71	243	180	54	75	57
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	264	196	59	82	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	255				644	226
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	255				644	226
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	94				80	92
cM capacity (veh/h)	1310				412	814
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	341	255	144			
Volume Left	77	0	82			
Volume Right	0	59	62			
cSH	1310	1700	523			
Volume to Capacity	0.06	0.15	0.28			
Queue Length 95th (m)	1.5	0.0	8.9			
Control Delay (s)	2.2	0.0	14.5			
Lane LOS	A		B			
Approach Delay (s)	2.2	0.0	14.5			
Approach LOS		B				
Intersection Summary						
Average Delay			3.8			A
Intersection Capacity Utilization			47.1%			
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

<Total 2046> Saturday Peak Hour
 03-05-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1		W	
Traffic Volume (veh/h)	83	246	197	62	64	49
Future Volume (Veh/h)	83	246	197	62	64	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	267	214	67	70	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	281				694	248
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	281				694	248
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	93				82	93
cM capacity (veh/h)	1282				380	791
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	357	281	123			
Volume Left	90	0	70			
Volume Right	0	67	53			
cSH	1282	1700	489			
Volume to Capacity	0.07	0.17	0.25			
Queue Length 95th (m)	1.8	0.0	7.9			
Control Delay (s)	2.5	0.0	14.8			
Lane LOS	A		B			
Approach Delay (s)	2.5	0.0	14.8			
Approach LOS		B				
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			48.2%			A
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	276.4	72.3	86.0	25.4	15.2	34.4	28.3
Average Queue (m)	191.5	44.2	39.5	7.6	2.9	21.4	15.8
95th Queue (m)	315.8	63.2	63.5	15.5	10.8	35.4	29.5
Link Distance (m)	460.8	539.5	539.5			617.0	617.0
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			5			1	
Queuing Penalty (veh)			28			0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	TR	LT				
Maximum Queue (m)	46.8	6.7	35.5				
Average Queue (m)	25.3	0.2	13.5				
95th Queue (m)	41.7	2.2	29.8				
Link Distance (m)	510.9	460.8	376.6				
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB	SB	SB	T
Directions Served	LTR	LTR	LTR	LTR			
Maximum Queue (m)	15.7	27.5	22.2	16.4			
Average Queue (m)	1.0	5.5	12.5	7.4			
95th Queue (m)	7.4	16.0	21.9	15.7			
Link Distance (m)	510.9	962.1	215.8	332.3			
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)							
Storage Blk Time (%)							
Queuing Penalty (veh)							

Intersection: 4: Harmony Road & Homan Road

Movement	EB	SB	SB	T
Directions Served	LT	LR		
Maximum Queue (m)	8.1	9.1		
Average Queue (m)	0.5	1.8		
95th Queue (m)	3.7	7.8		
Link Distance (m)	962.1	490.2		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 5: Plumpton & Harmony Road

Movement	EB	WB	NB	NR
Directions Served	TR	LT	LR	
Maximum Queue (m)	13.4	28.4	15.0	
Average Queue (m)	0.4	3.5	6.4	
95th Queue (m)	4.4	14.0	13.1	
Link Distance (m)	41.0	902.5	551.1	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	SB	SB	T
Directions Served	LT	LR		
Maximum Queue (m)	16.6	36.6		
Average Queue (m)	5.6	12.3		
95th Queue (m)	15.8	22.4		
Link Distance (m)	902.5	388.9		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Harmony Public School & Harmony Road									
Movement		NB		WB		NB		SB	
Directions Served		LR		LTR		L		TR	
Maximum Queue (m)		9.2		33.4		35.9		50.8	
Average Queue (m)		1.5		9.5		11.1		14.7	
95th Queue (m)		7.1				26.9		38.2	
Link Distance (m)		212.2						2731.5	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 8: Highway 37 & Harmony Road

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	TR	TR	
Maximum Queue (m)	65.1	33.4	35.9	50.8	47.4	
Average Queue (m)	35.4	9.5	11.1	14.7	17.5	
95th Queue (m)	62.0	24.2	26.9	38.2	36.3	
Link Distance (m)	382.1	263.1		2731.5	954.7	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				79.5		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road

Movement	EB	WB	NB	NB	SB	SB
Directions Served	LTR	LTR	L	T	R	T
Maximum Queue (m)	60.4	27.6	5.4	69.5	16.3	63.9
Average Queue (m)	28.0	13.6	0.2	25.9	3.5	1.8
95th Queue (m)	48.1	25.8	1.8	54.7	10.3	7.4
Link Distance (m)	437.7	564.0		780.7		2731.5
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				82.0		79.0
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	NB	SB	SB	SB	SB	
Directions Served	LTR	LTR	L	T	R	L	T	R	
Maximum Queue (m)	51.8	78.3	23.7	54.6	10.7	7.9	86.2	12.4	
Average Queue (m)	21.1	21.7	5.9	25.4	0.6	2.9	28.6	1.1	
95th Queue (m)	41.8	51.1	16.9	50.6	3.9	8.9	67.1	5.7	
Link Distance (m)	593.4	692.0		405.0			780.7		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				66.0		70.0	68.0		70.0
Storage Blk Time (%)									1
Queuing Penalty (veh)									0

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	WB	SB	SB
Directions Served	LT	TR	LR	
Maximum Queue (m)	38.0	6.7	28.5	
Average Queue (m)	4.4	0.2	13.9	
95th Queue (m)	18.0	2.2	24.1	
Link Distance (m)	470.1	97.7	145.5	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	SB	SB
Directions Served	LT	LR	
Maximum Queue (m)	22.1	22.1	
Average Queue (m)	6.5	12.0	
95th Queue (m)	16.6	20.1	
Link Distance (m)	64.8	138.4	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 28



Adjusted Future Total Conditions (2046)

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	WB	NB	NB	SB	SB	SB	SB	T
Directions Served	L	LR	T	TR	R	L	T	T	
Maximum Queue (m)	63.5	67.4	41.6	38.2	19.0	8.8	54.6	51.9	
Average Queue (m)	37.1	36.8	22.2	14.1	10.8	2.0	35.0	34.1	
95th Queue (m)	59.9	59.2	36.0	29.3	16.5	7.3	51.6	50.1	
Link Distance (m)	459.2	499.2	537.0	537.0			613.7	613.7	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)					38.0	30.5			
Storage Blk Time (%)					0			7	
Queuing Penalty (veh)					0			1	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	WB	NB	NB	SB	SB	SB	SB	T
Directions Served	L	R	TR	LT					
Maximum Queue (m)	31.9	20.5	15.7	34.9					
Average Queue (m)	12.4	10.0	1.2	8.5					
95th Queue (m)	22.4	16.8	6.8	23.1					
Link Distance (m)	511.0		459.2	373.0					
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		30.0							
Storage Blk Time (%)		0							
Queuing Penalty (veh)		0							

Intersection: 3: River Road & Harmony Road

Movement	WB	NB	SB	SB	SB	SB	SB	SB	T
Directions Served	LTR	LTR	LTR						
Maximum Queue (m)	15.0	15.6	16.3						
Average Queue (m)	2.4	8.1	9.0						
95th Queue (m)	10.8	14.9	15.5						
Link Distance (m)	962.1	215.8	332.3						
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 4: Harmony Road & Homan Road

Movement	EB	SB	SB	SB	SB	SB	SB	SB	T
Directions Served	LT	LR							
Maximum Queue (m)	8.4	15.0							
Average Queue (m)	0.3	1.8							
95th Queue (m)	2.8	9.5							
Link Distance (m)	962.1	490.2							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB	NB	NB	NB	NB	NB	NB	T
Directions Served	LT	LR							
Maximum Queue (m)	21.8	9.2							
Average Queue (m)	3.2	2.5							
95th Queue (m)	12.8	9.0							
Link Distance (m)	898.9	551.1							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	SB	SB	SB	SB	SB	SB	SB	T
Directions Served	LT	L	R						
Maximum Queue (m)	27.6	21.4	21.1						
Average Queue (m)	6.2	9.6	7.4						
95th Queue (m)	21.2	14.9	15.3						
Link Distance (m)	898.9	388.9							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 7: Harmony Public School & Harmony Road													
Movement	EB	WB	NB	NB	LB	R							
Directions Served	TR	LT											
Maximum Queue (m)	6.6	27.4	23.9	27.4									
Average Queue (m)	0.2	9.7	11.4	12.3									
95th Queue (m)	2.2	22.9	20.4	21.3									
Link Distance (m)	97.7	61.2	212.2	212.2									
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 8: Highway 37 & Harmony Road													
Movement	EB	EB	WB	NB	NB	SB	SB						
Directions Served	LT	R	LTR	L	TR	L	TR						
Maximum Queue (m)	58.9	50.0	36.6	41.4	71.4	4.0	119.3						
Average Queue (m)	24.4	5.5	20.2	20.6	19.8	0.4	63.8						
95th Queue (m)	44.8	29.2	36.7	37.6	52.6	2.3	105.1						
Link Distance (m)	382.1		263.1		2730.4		954.7						
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)		30.0		79.5		82.0		4					
Storage Blk Time (%)		3		2									
Queuing Penalty (veh)		5		3				0					

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road													
Movement	EB	WB	WB	NB	NB	SB	SB						
Directions Served	LTR	L	TR	L	T	R	L	T	R				
Maximum Queue (m)	33.4	48.5	69.4	20.6	33.1	11.4	6.7	2723.3	18.0				
Average Queue (m)	15.1	34.1	16.0	1.8	14.9	2.3	1.8	141.8	3.8				
95th Queue (m)	29.1	48.0	39.0	9.6	31.3	8.6	6.5	933.5	11.8				
Link Distance (m)	437.2		564.5		777.0		2730.4						
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)		30.0		82.0		85.0	75.0		79.0				
Storage Blk Time (%)		24		0					1				
Queuing Penalty (veh)		13		0					2				

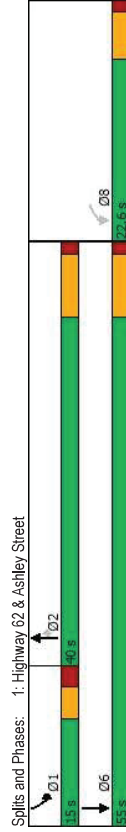
Intersection: 10: Highway 37 & Tank Farm Road/Casey Road													
Movement	EB	EB	WB	WB	NB	NB	SB	SB					
Directions Served	L	TR	L	TR	L	T	R	L	T	R			
Maximum Queue (m)	11.5	20.9	35.9	33.9	8.8	24.8	7.9	20.9	142.3	12.5			
Average Queue (m)	3.8	8.5	22.4	14.4	1.6	11.9	0.3	3.5	64.2	2.8			
95th Queue (m)	9.8	18.8	34.3	25.8	4.8	24.3	2.6	12.3	107.1	9.4			
Link Distance (m)	591.6	591.6		653.9		401.7			777.0				
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)			30.0		66.0		70.0	68.0		70.0			
Storage Blk Time (%)			3		0					5			
Queuing Penalty (veh)			2		0					3			

Intersection: 11: Harmony Road & Proposed Site Access 2													
Movement	EB	SB											
Directions Served	LT	LR											
Maximum Queue (m)	30.0	36.1											
Average Queue (m)	6.9	14.0											
95th Queue (m)	21.5	25.6											
Link Distance (m)	470.1	145.5											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 12: Harmony Road & Proposed Site Access 3													
Movement	EB	SB											
Directions Served	LT	LR											
Maximum Queue (m)	16.7	20.8											
Average Queue (m)	2.7	11.3											
95th Queue (m)	11.3	18.0											
Link Distance (m)	61.2	138.4											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Network Summary													
Network wide Queuing Penalty: 29													

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	384	1461	632	13	781
Future Volume (vph)	384	1461	632	13	781
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.22	0.58	0.58	0.09	0.62
v/c Ratio	0.61	0.74	0.62	0.09	0.43
Control Delay	31.0	16.5	7.9	33.7	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.0	16.5	7.9	33.7	8.6
LOS	C	B	A	C	A
Approach Delay	31.0	13.9			9.0
Approach LOS	C	B			A



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	384	27	1461	632	13	781
Future Volume (vph)	384	27	1461	632	13	781
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3269	3539	1568	1770	3374	3374
Flt Permitted	0.96	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3269	3539	1568	1770	3374	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	413	29	1538	665	15	898
RTOR Reduction (vph)	7	0	0	169	0	0
Lane Group Flow (vph)	435	0	1538	496	15	898
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.3	45.3	1.5	51.8
Effective Green, g (s)	17.0		45.3	45.3	1.5	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	681		1964	870	32	2141
v/s Ratio Prot			c0.43		0.01	c0.27
v/s Ratio Perm	c0.13			0.32		
v/c Ratio	0.64		0.78	0.57	0.47	0.42
Uniform Delay, d1	29.5		14.3	11.8	39.7	7.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5		3.2	2.7	10.5	0.6
Delay (s)	34.0		17.5	14.5	50.1	8.0
Level of Service	C		B	B	D	A
Approach Delay (s)	34.0		16.6		8.7	
Approach LOS	C		B		A	

Intersection Summary						
HCM 2000 Control Delay	16.7					HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.75					B
Actuated Cycle Length (s)	81.6					Sum of lost time (s)
Intersection Capacity Utilization	62.9%					17.8
Analysis Period (min)	15					ICU Level of Service
c. Critical Lane Group						B

HCM Unsignalized Intersection Capacity Analysis

2. Ashley Street & Harmony Road

<Total 2046> PM Peak Hour

03-06-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↩	↩	↩	↩	↩	↩
Traffic Volume (veh/h)	170	147	179	268	183	92
Future Volume (Veh/h)	170	147	179	268	183	92
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.96	0.96	0.86	0.86
Hourly flow rate (vph)	183	167	186	279	213	107
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
VC, conflicting volume	858	326				465
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	858	326				465
IC, single (s)	6.4	6.2				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	27	77				81
cM capacity (veh/h)	264	716				1096
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	360	465	320			
Volume Left	193	0	213			
Volume Right	167	279	0			
cSH	492	1700	1096			
Volume to Capacity	0.73	0.27	0.19			
Queue Length 95th (m)	48.1	0.0	5.7			
Control Delay (s)	31.4	0.0	6.7			
Lane LOS	D	A	A			
Approach Delay (s)	31.4	0.0	6.7			
Approach LOS	D					
Intersection Summary						
Average Delay			11.7			
Intersection Capacity Utilization			60.2%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

3. River Road & Harmony Road

<Total 2046> PM Peak Hour

03-06-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩	↩
Traffic Volume (veh/h)	14	406	53	10	280	3	102	6	33	27	12	6
Future Volume (Veh/h)	14	406	53	10	280	3	102	6	33	27	12	6
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.91	0.91	0.91	0.96	0.96	0.96	0.71	0.71	0.71	0.83	0.83	0.83
Hourly flow rate (vph)	15	446	58	10	292	3	144	8	46	33	14	7
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
VC, conflicting volume	295			504			832	820	475	868	848	294
VC1, stage 1 conf vol												
VC2, stage 2 conf vol												
VCu, unblocked vol	295			504			832	820	475	868	848	294
IC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC, 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			99			47	97	92	86	95	99
cM capacity (veh/h)	1266			1061			271	303	590	242	292	746
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	519	305	198	54								
Volume Left	15	10	144	33								
Volume Right	58	3	46	7								
cSH	1266	1061	311	279								
Volume to Capacity	0.01	0.01	0.64	0.19								
Queue Length 95th (m)	0.3	0.2	32.6	5.6								
Control Delay (s)	0.4	0.4	34.8	21.0								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.4	0.4	34.8	21.0								
Approach LOS	D	D	C									
Intersection Summary												
Average Delay				7.7								
Intersection Capacity Utilization				47.3%						ICU Level of Service	A	
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	4	W		
Traffic Volume (veh/h)	6	374	277	3	3	6
Future Volume (Veh/h)	6	374	277	3	3	6
Sign Control		Free	Free	Stop		
Grade		0%	0%	0%		
Peak Hour Factor	0.69	0.69	0.63	0.63	0.75	0.75
Hourly flow rate (vph)	9	542	440	5	4	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	445			1002	442	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	445			1002	442	
IC single (s)	4.1			6.4	6.5	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.5	
p0 queue free %	99			98	99	
CM capacity (veh/h)	1115			266	570	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	551	445	12			
Volume Left	9	0	4			
Volume Right	0	5	8			
cSH	1115	1700	413			
Volume to Capacity	0.01	0.26	0.03			
Queue Length 95th (m)	0.2	0.0	0.7			
Control Delay (s)	0.2	0.0	14.0			
Lane LOS	A		B			
Approach Delay (s)	0.2	0.0	14.0			
Approach LOS			B			
Intersection Summary						
Average Delay			0.3			
Intersection Capacity Utilization			34.5%		ICU Level of Service	A
Analysis Period (min)			15			

Movement	EBT	EBR	WBT	NBL	NBR	
Lane Configurations	4	4	4	W		
Traffic Volume (veh/h)	408	6	16	271	9	28
Future Volume (Veh/h)	408	6	16	271	9	28
Sign Control	Free		Free	Stop		
Grade	0%		0%	0%		
Peak Hour Factor	0.95	0.95	0.87	0.87	0.75	0.75
Hourly flow rate (vph)	429	6	18	311	12	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None				
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
IF (s)						
p0 queue free %						
CM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	435	329	49			
Volume Left	0	18	12			
Volume Right	6	0	37			
cSH	1700	1125	528			
Volume to Capacity	0.26	0.02	0.09			
Queue Length 95th (m)	0.0	0.4	2.4			
Control Delay (s)	0.0	0.6	12.5			
Lane LOS		A	B			
Approach Delay (s)	0.0	0.6	12.5			
Approach LOS			B			
Intersection Summary						
Average Delay			1.0			
Intersection Capacity Utilization			37.3%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2046> PM Peak Hour
03-06-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4		4	4	
Traffic Volume (veh/h)	84	288	225	70	69	58	
Future Volume (Veh/h)	84	288	225	70	69	58	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.61	0.61	0.50	0.50	
Hourly flow rate (vph)	105	360	369	115	138	116	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)					4		
Median type	None	None	None	None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked					996	426	
VC conflicting volume	484						
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	484				996	426	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)							
IF (s)	2.2				3.5	3.3	
p0 queue free %	90				44	82	
cM capacity (veh/h)	1079				244	628	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	465	484	254				
Volume Left	105	0	138				
Volume Right	0	115	116				
cSH	1079	1700	450				
Volume to Capacity	0.10	0.28	0.56				
Queue Length 95th (m)	2.6	0.0	27.3				
Control Delay (s)	2.8	0.0	25.7				
Lane LOS	A	D	D				
Approach Delay (s)	2.8	0.0	25.7				
Approach LOS	D						
Intersection Summary							
Average Delay			6.5				
Intersection Capacity Utilization			49.7%				A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2046> PM Peak Hour
03-06-2025

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4	4	4	4	4	4	
Traffic Volume (veh/h)	285	3	11	214	26	45	
Future Volume (Veh/h)	285	3	11	214	26	45	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	1.00	1.00	0.76	0.76	0.43	0.43	
Hourly flow rate (vph)	285	3	14	282	60	105	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)	None	None	None	None			
Median type	None	None	None	None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked				288	596	286	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				288	596	286	
IC single (s)				4.1	6.4	6.2	
IC 2 stage (s)							
IF (s)				2.2	3.5	3.3	
p0 queue free %				99	87	86	
cM capacity (veh/h)				1274	461	753	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2			
Volume Total	288	296	60	105			
Volume Left	0	14	60	0			
Volume Right	3	0	0	105			
cSH	1700	1274	461	753			
Volume to Capacity	0.17	0.01	0.13	0.14			
Queue Length 95th (m)	0.0	0.3	3.6	3.9			
Control Delay (s)	0.0	0.5	14.0	10.6			
Lane LOS	A	A	B	B			
Approach Delay (s)	0.0	0.5	11.8				
Approach LOS	B						
Intersection Summary							
Average Delay			2.8				
Intersection Capacity Utilization			30.2%				A
Analysis Period (min)			15				

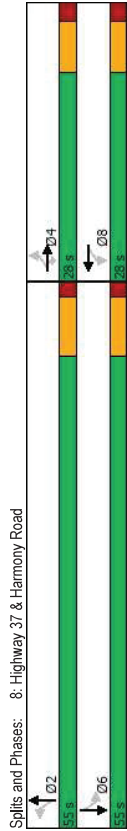
Timings
8: Highway 37 & Harmony Road

HCM Signalized Intersection Capacity Analysis
8: Highway 37 & Harmony Road

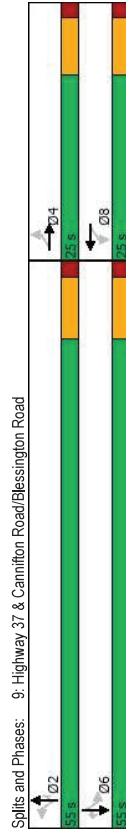
<Total 2046> PM Peak Hour
03-06-2025

<Total 2046> PM Peak Hour
03-06-2025

Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBT
Lane Configurations	4	4	4	8	8	2	2	6	6	6
Traffic Volume (vph)	147	86	145	33	25	126	685	5	480	207
Future Volume (vph)	147	86	145	33	25	126	685	5	480	207
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	0.97	1.00	0.97	0.97	0.97	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1806	1509	1688	1770	1841	1770	1841	1770	1841	1627
Flt Permitted	0.77	1.00	0.63	0.27	1.00	0.21	1.00	0.21	1.00	0.21
Satd. Flow (perm)	1428	1509	1093	498	1841	382	1627	382	1627	1627
Peak-hour factor, PHF	0.90	0.90	0.90	0.84	0.84	0.90	0.90	0.90	0.94	0.94
Adj. Flow (vph)	163	96	161	39	30	2	140	761	64	5
RTOR Reduction (vph)	0	0	125	0	2	0	4	0	0	18
Lane Group Flow (vph)	0	259	36	0	69	0	140	821	0	5
Heavy Vehicles (%)	2%	2%	7%	10%	2%	100%	2%	2%	2%	7%
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	6	6	6
Actuated Green, G (s)	18.1	18.1	18.1	18.1	18.1	47.5	47.5	47.5	47.5	47.5
Effective Green, g (s)	18.1	18.1	18.1	18.1	18.1	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	322	340	340	246	246	294	1090	226	963	963
v/s Ratio Prot	c0.18	0.02	0.02	0.06	0.06	0.28	c0.45	0.01	0.44	0.44
v/s Ratio Perm	0.80	0.11	0.11	0.28	0.28	0.48	0.75	0.02	0.74	0.74
Uniform Delay, d1	29.4	24.6	24.6	25.7	25.7	9.3	12.0	6.8	11.9	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.5	0.1	0.1	0.6	0.6	5.4	4.8	0.2	5.1	5.1
Delay (s)	42.9	24.8	24.8	26.3	26.3	14.7	16.9	6.9	17.0	17.0
Level of Service	D	C	C	C	C	B	B	A	B	B
Approach Delay (s)	36.0			26.3		16.6		16.9		
Approach LOS	D			C		B		B		
Intersection Summary										
HCM 2000 Control Delay				20.7		HCM 2000 Level of Service		C		
HCM 2000 Volume to Capacity ratio				0.77						
Actuated Cycle Length (s)				80.2		Sum of lost time (s)		14.6		
Intersection Capacity Utilization				91.1%		ICU Level of Service		F		
Analysis Period (min)				15						
c. Critical Lane Group										



Timings
9: Highway 37 & Cannifton Road/Blessington Road
<Total 2046> PM Peak Hour
03-06-2025

[illegible]

HCM Signalized Intersection Capacity Analysis
9: Highway 37 & Cannifton Road/Blessington Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SEB
Lane Configurations		↔	↔	↔	↔		↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	153	73	3	56	53	3	5	791	159	22	530	54
Future Volume (vph)	153	73	3	56	53	3	5	791	159	22	530	54
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.5	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	0.99	1.00	0.99	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Satd. Flow (prot)	1756	1752	1766	1770	1766	1770	1863	1583	1770	1759	1509	1509
Flt Permitted	0.75	0.64	1.00	0.37	1.00	0.37	1.00	0.18	1.00	0.18	1.00	1.00
Satd. Flow (perm)	1367	1174	1766	699	1863	699	1863	1583	331	1759	1509	1509
Peak-hour factor, PHF	0.91	0.91	0.91	0.76	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91
Adj. Flow (vph)	168	80	3	74	70	4	6	879	177	24	582	59
RTOR Reduction (vph)	0	1	0	0	2	0	0	0	71	0	0	24
Lane Group Flow (vph)	0	250	0	74	72	0	6	879	106	24	582	35
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	2%	8%	7%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	4	4	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	6	6	6
Actuated Green, G(s)	17.0	17.0	17.0	17.0	17.0	17.0	47.5	47.6	47.6	47.6	47.6	47.6
Effective Green, g(s)	17.0	17.0	17.0	17.0	17.0	17.0	47.6	47.6	47.6	47.6	47.6	47.6
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21	0.21	0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane CIP Cap (vph)	293	251	379	420	1119	951	198	1057	906	1057	906	906
vis Ratio Prot	c0.18	0.06	0.04	0.01	0.01	0.01	c0.47	0.33	0.33	0.33	0.33	0.33
vis Ratio Perm	0.85	0.29	0.19	0.19	0.19	0.19	0.01	0.79	0.11	0.12	0.55	0.04
w/c Ratio	29.9	26.1	25.5	6.4	11.9	6.8	6.4	11.9	6.8	9.4	6.5	6.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	20.8	0.7	0.2	0.1	5.6	0.2	1.2	2.1	2.1	2.1	2.1	2.1
Incremental Delay, d2	50.7	26.7	25.7	6.4	17.5	7.0	8.0	11.5	6.5	6.5	6.5	6.5
Delay (s)	D	C	C	A	B	A	A	B	A	B	A	A
Level of Service	D	C	C	A	B	A	A	B	A	B	A	A
Approach Delay (s)	50.7	26.2	26.2	6.4	15.7	7.0	8.0	11.5	6.5	6.5	6.5	6.5
Approach LOS	D	C	C	A	B	A	A	B	A	B	A	A

Intersection Summary			
HCM 2000 Control Delay	19.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	79.2	Sum of lost time (s)	14.6
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	70	286	239	62	67	56
Future Volume (Veh/h)	70	286	239	62	67	56
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	76	311	260	67	73	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	327				756	294
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	327				756	294
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	94				79	92
cM capacity (veh/h)	1233				352	746
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	387	327	134			
Volume Left	76	0	73			
Volume Right	0	67	61			
cSH	1233	1700	464			
Volume to Capacity	0.06	0.19	0.29			
Queue Length 95th (m)	1.6	0.0	9.5			
Control Delay (s)	2.1	0.0	15.9			
Lane LOS	A	C	C			
Approach Delay (s)	2.1	0.0	15.9			
Approach LOS		C	C			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			52.4%			
Analysis Period (min)			15			

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	330	294	70	56	49
Future Volume (Veh/h)	84	330	294	70	56	49
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	359	320	76	61	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None	None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	396				899	358
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	396				899	358
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	92				79	92
cM capacity (veh/h)	1163				285	686
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	450	396	114			
Volume Left	91	0	61			
Volume Right	0	76	53			
cSH	1163	1700	392			
Volume to Capacity	0.08	0.23	0.29			
Queue Length 95th (m)	2.0	0.0	9.5			
Control Delay (s)	2.4	0.0	17.9			
Lane LOS	A	C	C			
Approach Delay (s)	2.4	0.0	17.9			
Approach LOS		C	C			
Intersection Summary						
Average Delay			3.2			
Intersection Capacity Utilization			57.8%			
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	WB	NB	NB	SB	SB	SB	SB	T
Directions Served	L	LR	T	TR	R	L	T	T	
Maximum Queue (m)	68.3	68.5	98.1	90.8	23.5	13.8	39.3	43.1	
Average Queue (m)	29.1	30.8	47.2	42.3	9.8	1.9	23.4	19.4	
95th Queue (m)	52.3	54.1	78.9	74.8	19.2	8.0	36.8	33.9	
Link Distance (m)	459.2	459.2	537.0	537.0			613.7	613.7	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)					38.0	30.5			
Storage Blk Time (%)					8			1	
Queuing Penalty (veh)					49			0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	WB	NB	NB	SB	SB
Directions Served	L	R	TR	LT		
Maximum Queue (m)	71.3	15.0	21.6	35.8		
Average Queue (m)	25.4	9.0	3.3	16.6		
95th Queue (m)	49.6	14.3	12.9	31.4		
Link Distance (m)	511.0		459.2	373.0		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)		30.0				
Storage Blk Time (%)		8				
Queuing Penalty (veh)		12				

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LTR	
Maximum Queue (m)	8.6	14.7	28.4	23.5	
Average Queue (m)	1.0	1.0	14.9	9.2	
95th Queue (m)	5.5	6.3	23.6	18.2	
Link Distance (m)	511.0	962.1	215.8	332.3	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Harmony Road & Homan Road

Movement	SB	SB
Directions Served	LR	
Maximum Queue (m)	14.8	
Average Queue (m)	3.2	
95th Queue (m)	10.9	
Link Distance (m)	490.2	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Plumpton & Harmony Road

Movement	EB	WB	NB	NB
Directions Served	TR	LT	LR	
Maximum Queue (m)	9.2	16.3	16.1	
Average Queue (m)	0.3	2.2	6.9	
95th Queue (m)	3.0	9.8	14.4	
Link Distance (m)	41.0	898.9	551.1	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	WB	SB	SB	L	R
Directions Served	LT	TR	L	R		
Maximum Queue (m)	35.8	14.2	21.7	15.7		
Average Queue (m)	6.2	0.5	9.3	8.0		
95th Queue (m)	20.5	4.7	17.6	13.2		
Link Distance (m)	898.9	470.1	388.9			
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)				30.0		
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 7: Harmony Public School & Harmony Road												
Movement	WB	NB	NB	WB	NB	NB	WB	NB	NB	WB	NB	WB
Directions Served	LT	L	R									
Maximum Queue (m)	16.2	9.3	17.0									
Average Queue (m)	0.8	6.0	8.5									
95th Queue (m)	6.2	13.1	15.7									
Link Distance (m)	61.2	212.2	212.2									
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 8: Highway 37 & Harmony Road

Movement	EB	EB	WB	NB	NB	NB	WB	NB	NB	WB	NB	WB
Directions Served	LT	R	LTR	L	TR	L	TR	L	TR			
Maximum Queue (m)	123.2	50.0	20.2	45.1	88.9	3.4	72.5					
Average Queue (m)	40.1	8.3	8.7	22.1	47.3	0.3	37.9					
95th Queue (m)	83.1	39.0	19.4	37.5	87.1	1.9	68.8					
Link Distance (m)	382.1		263.1		2730.4		954.7					
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	30.0		79.5		82.0							
Storage Blk Time (%)	15	0			1							
Queuing Penalty (veh)	22	0			1							

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road

Movement	EB	WB	WB	NB	NB	NB	WB	NB	NB	WB	NB	WB
Directions Served	LTR	L	TR	L	TR	L	TR	L	TR	L	TR	R
Maximum Queue (m)	65.8	21.9	26.5	13.6	68.2	18.3	13.4	79.1	16.0			
Average Queue (m)	38.6	8.5	10.9	1.3	35.0	5.2	3.3	37.8	2.8			
95th Queue (m)	63.3	16.9	22.2	6.1	65.6	13.9	8.8	65.6	9.7			
Link Distance (m)	437.2		564.5		777.0			2730.4				
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	30.0		82.0		85.0		75.0		79.0			
Storage Blk Time (%)			0					0				
Queuing Penalty (veh)			0					0				

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road												
Movement	EB	EB	WB	WB	NB	NB	WB	NB	NB	WB	NB	WB
Directions Served	L	TR	L	TR	L	TR	L	TR	L	TR	L	R
Maximum Queue (m)	12.2	52.5	35.2	34.9	39.9	76.2	7.2	7.9	91.9	11.6		
Average Queue (m)	3.8	18.9	16.0	14.6	12.5	38.6	1.1	1.3	32.6	1.3		
95th Queue (m)	10.1	39.8	28.0	28.7	29.5	70.0	4.7	6.0	69.6	6.4		
Link Distance (m)	591.6	591.6		653.9		401.7			777.0			
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)			30.0		66.0		70.0	68.0		70.0		
Storage Blk Time (%)			2	1		1			1			
Queuing Penalty (veh)			1	1		1			0			

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	SB										
Directions Served	LT	LR										
Maximum Queue (m)	41.3	22.2										
Average Queue (m)	5.8	12.3										
95th Queue (m)	21.0	19.0										
Link Distance (m)	470.1	145.5										
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

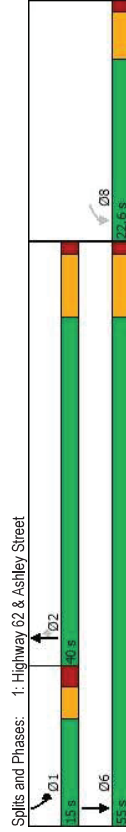
Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	WB	SB									
Directions Served	LT	TR	LR									
Maximum Queue (m)	34.2	6.5	22.7									
Average Queue (m)	9.7	0.4	12.2									
95th Queue (m)	23.6	3.1	19.6									
Link Distance (m)	61.2	382.1	138.4									
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)												
Storage Blk Time (%)												
Queuing Penalty (veh)												

Network Summary

Network wide Queuing Penalty: 89

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	T	T	T	T
Traffic Volume (vph)	327	1285	558	13	687
Future Volume (vph)	327	1285	558	13	687
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Eff Green (s)	17.0	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.22	0.58	0.58	0.09	0.62
v/c Ratio	0.53	0.66	0.55	0.09	0.38
Control Delay	29.1	14.1	6.0	33.7	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	29.1	14.1	6.0	33.7	8.1
LOS	C	B	A	C	A
Approach Delay	29.1	11.6			8.6
Approach LOS	C	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 70					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.66					
Intersection Signal Delay: 13.0					
Intersection LOS: B					
Intersection Capacity Utilization 56.3%					
Analysis Period (min) 15					
ICU Level of Service B					



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	THW		TH	TH	TH	TH
Traffic Volume (vph)	327	26	1285	558	13	687
Future Volume (vph)	327	26	1285	558	13	687
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	0.95
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	3267	3539	1568	1770	3374	3374
Flt Permitted	0.96	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3267	3539	1568	1770	3374	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	352	28	1353	587	15	790
RTOR Reduction (vph)	8	0	0	169	0	0
Lane Group Flow (vph)	372	0	1353	418	15	790
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0	45.3	45.3	1.5	51.8	51.8
Effective Green, g (s)	17.0	45.3	45.3	1.5	51.8	51.8
Actuated g/C Ratio	0.21	0.56	0.56	0.02	0.63	0.63
Clearance Time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5	4.5
Lane Grp Cap (vph)	680	1964	870	32	2141	
v/s Ratio Prot		c0.38		0.01	c0.23	
v/s Ratio Perm	c0.11		0.27			
v/c Ratio	0.55	0.69	0.48	0.47	0.37	
Uniform Delay, d1	28.9	13.1	11.0	39.7	7.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.1	2.0	1.9	10.5	0.5	
Delay (s)	32.0	15.1	12.9	50.1	7.6	
Level of Service	C	B	B	D	A	
Approach Delay (s)	32.0	14.4		8.4		
Approach LOS	C	B		A		
Intersection Summary						
HCM 2000 Control Delay	15.0			HCM 2000 Level of Service		
HCM 2000 Volume to Capacity ratio	0.66			B		
Actuated Cycle Length (s)	81.6			Sum of lost time (s)		
Intersection Capacity Utilization	56.3%			ICU Level of Service		
Analysis Period (min)	15			B		
Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road

<Total 2046> Saturday Peak Hour
 03-06-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	163	129	120	242	179	105
Future Volume (Veh/h)	163	129	120	242	179	105
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	185	147	133	269	224	131
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		4				
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	846	268				402
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	846	268				402
IC single (s)	6.4	6.2				4.1
IC 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	31	81				81
CM capacity (veh/h)	268	771				1157
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	332	402	355			
Volume Left	185	0	224			
Volume Right	147	269	0			
cSH	481	1700	1157			
Volume to Capacity	0.69	0.24	0.19			
Queue Length 95th (m)	41.8	0.0	5.7			
Control Delay (s)	29.1	0.0	6.3			
Lane LOS	D	A	A			
Approach Delay (s)	29.1	0.0	6.3			
Approach LOS	D					
Intersection Summary						
Average Delay			10.9			
Intersection Capacity Utilization			55.0%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road

<Total 2046> Saturday Peak Hour
 03-06-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (veh/h)	21	398	41	40	160	8	76	8	35	21	6	6
Future Volume (Veh/h)	21	398	41	40	160	8	76	8	35	21	6	6
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.80	0.80	0.80	0.72	0.72	0.72	0.39	0.39	0.39
Hourly flow rate (vph)	24	463	48	50	200	10	106	11	49	54	15	15
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	210			511			862	845	487	894	864	205
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	210			511			862	845	487	894	864	205
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			95			57	96	92	76	95	98
CM capacity (veh/h)	1361			1054			246	280	581	221	273	836
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	535	260	166	84								
Volume Left	24	50	106	54								
Volume Right	48	10	49	15								
cSH	1361	1054	300	265								
Volume to Capacity	0.02	0.05	0.55	0.32								
Queue Length 95th (m)	0.4	1.2	25.1	10.5								
Control Delay (s)	0.5	2.0	31.0	24.8								
Lane LOS	A	A	D	C								
Approach Delay (s)	0.5	2.0	31.0	24.8								
Approach LOS	D			C								
Intersection Summary												
Average Delay				7.7								
Intersection Capacity Utilization				40.8%						ICU Level of Service	A	
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
 4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
 5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	2	2	8	
Traffic Volume (veh/h)	8	324	219	2	2	8	
Future Volume (Veh/h)	8	324	219	2	2	8	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.66	0.66	0.50	0.50	
Hourly flow rate (vph)	10	405	332	3	4	16	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked	335				758	334	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol	335				758	334	
VCu unblocked vol	4.1				6.4	6.2	
IC single (s)							
IC 2 stage (s)	2.2				3.5	3.3	
p0 queue free %	99				99	98	
IF (s)							
CM capacity (veh/h)	1224				372	708	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	415	335	20				
Volume Left	10	0	4				
Volume Right	0	3	16				
cSH	1224	1700	600				
Volume to Capacity	0.01	0.20	0.03				
Queue Length 95th (m)	0.2	0.0	0.8				
Control Delay (s)	0.3	0.0	11.2				
Lane LOS	A	B	B				
Approach Delay (s)	0.3	0.0	11.2				
Approach LOS			B				
Intersection Summary							
Average Delay			0.4				
Intersection Capacity Utilization			33.5%			ICU Level of Service	A
Analysis Period (min)			15				

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4	4	2	4	4	2	
Traffic Volume (veh/h)	397	15	23	267	6	29	
Future Volume (Veh/h)	397	15	23	267	6	29	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.74	0.74	0.50	0.50	
Hourly flow rate (vph)	436	16	31	361	12	58	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None	None	None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol							
IC single (s)							
IC 2 stage (s)							
p0 queue free %							
IF (s)							
CM capacity (veh/h)							
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	452	392	70				
Volume Left	0	31	12				
Volume Right	16	0	58				
cSH	1700	1109	528				
Volume to Capacity	0.27	0.03	0.13				
Queue Length 95th (m)	0.0	0.7	3.6				
Control Delay (s)	0.0	0.9	12.9				
Lane LOS	A	A	B				
Approach Delay (s)	0.0	0.9	12.9				
Approach LOS			B				
Intersection Summary							
Average Delay			1.4				
Intersection Capacity Utilization			43.1%			ICU Level of Service	A
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2046> Saturday Peak Hour
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<Total 2046> Saturday Peak Hour
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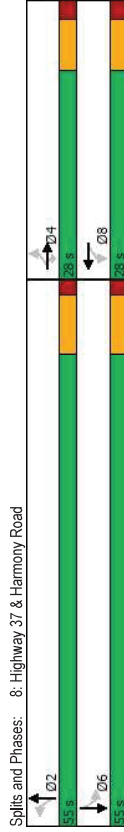
Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	1	1	1	
Traffic Volume (veh/h)	85	238	172	64	75	57
Future Volume (Veh/h)	85	238	172	64	75	57
Sign Control		Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	
Peak Hour Factor	0.60	0.60	0.70	0.70	0.92	0.92
Hourly flow rate (vph)	142	397	246	91	82	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)					4	
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	337			972	292	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	337			972	292	
IC, single (s)	4.1			6.4	6.2	
IC, 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	88			67	92	
cM capacity (veh/h)	1222			247	748	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	539	337	144			
Volume Left	142	0	82			
Volume Right	0	91	62			
cSH	1222	1700	434			
Volume to Capacity	0.12	0.20	0.33			
Queue Length 95th (m)	3.1	0.0	11.5			
Control Delay (s)	3.1	0.0	19.6			
Lane LOS	A		C			
Approach Delay (s)	3.1	0.0	19.6			
Approach LOS			C			
Intersection Summary						
Average Delay			4.4			
Intersection Capacity Utilization			44.3%			A
Analysis Period (min)			15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	1	1	1	1	1	1
Traffic Volume (veh/h)	246	0	0	190	2	0
Future Volume (Veh/h)	246	0	0	190	2	0
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.58	0.58	0.74	0.74	0.92	0.92
Hourly flow rate (vph)	424	0	0	257	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume		424		681	424	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol		424		681	424	
IC, single (s)		4.1		6.4	6.2	
IC, 2 stage (s)						
IF (s)		2.2		3.5	3.3	
p0 queue free %		100		100	100	
cM capacity (veh/h)		1135		416	630	
Direction, Lane #	EB 1	WB 1	NB 1	NB 2		
Volume Total	424	257	2	0		
Volume Left	0	0	2	0		
Volume Right	0	0	0	0		
cSH	1700	1135	416	1700		
Volume to Capacity	0.25	0.00	0.00	0.14		
Queue Length 95th (m)	0.0	0.0	0.1	0.0		
Control Delay (s)	0.0	0.0	13.7	0.0		
Lane LOS			B	A		
Approach Delay (s)	0.0	0.0	13.7			
Approach LOS			B			
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			22.9%			A
Analysis Period (min)			15			

Timings
8: Highway 37 & Harmony Road

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	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBT
Lane Configurations	116	69	132	29	32	114	355	356
Traffic Volume (vph)	116	69	132	29	32	114	355	356
Future Volume (vph)	116	69	132	29	32	114	355	356
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	NA
Protected Phases	4	4	4	8	8	2	2	6
Permitted Phases	4	4	4	8	8	2	2	6
Detector Phase	4	4	4	8	8	2	2	6
Switch Phase	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0
Minimum Initial (s)	22.0	22.0	22.0	22.0	22.0	27.6	27.6	27.6
Minimum Split (s)	28.0	28.0	28.0	28.0	28.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Total Split (%)	33.7%	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	18.6	18.6	18.6	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.23	0.23	0.23	0.59	0.59	0.59	0.59	0.59
v/c Ratio	0.83	0.37	0.31	0.27	0.37	0.49	0.49	0.49
Control Delay	51.5	6.4	27.3	10.9	10.3	11.4	11.4	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	6.4	27.3	10.9	10.3	11.4	11.4	11.4
LOS	D	A	C	B	B	B	B	B
Approach Delay	32.7		27.3		10.4	11.4		
Approach LOS	C		C		B	B		
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 80.7								
Natural Cycle: 60								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.83								
Intersection Signal Delay: 18.1								
Intersection Capacity Utilization 75.9%								
Analysis Period (min) 15								



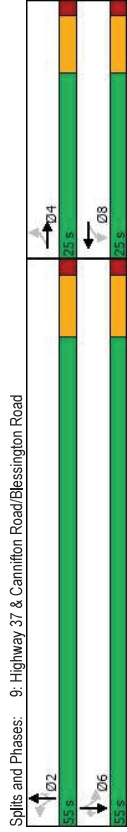
HCM Signalized Intersection Capacity Analysis
8: Highway 37 & Harmony Road

<Total 2046> Saturday Peak Hour
03-06-2025

	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBT
Movement	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT	SBT
Lane Configurations	116	69	132	29	32	114	355	29	0	356
Traffic Volume (vph)	116	69	132	29	32	114	355	29	0	356
Future Volume (vph)	116	69	132	29	32	114	355	29	0	356
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	0.99	1.00	0.99	1.00	0.99	0.96	0.96	0.96
Flt Protected	0.97	1.00	0.98	0.98	0.95	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1806	1583	1803	1803	1770	1836	1795	1795	1795	1795
Flt Permitted	0.76	1.00	0.66	0.66	0.41	1.00	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1410	1583	1216	1216	758	1836	1795	1795	1795	1795
Peak-hour factor, PHF	0.69	0.69	0.69	0.74	0.74	0.95	0.95	0.89	0.89	0.89
Adj. Flow (vph)	168	100	191	39	43	7	120	374	31	400
RTOR Reduction (vph)	0	0	147	0	4	0	0	0	0	13
Lane Group Flow (vph)	0	268	44	0	85	0	120	402	0	515
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	6%	2%	2%
Turn Type	Perm	NA	Perm	Perm	Perm	Perm	Perm	Perm	Perm	NA
Protected Phases	4	4	4	8	8	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	6	6	6
Actuated Green, G (s)	18.6	18.6	18.6	47.5	47.5	47.5	47.5	47.5	47.5	47.5
Effective Green, g (s)	18.6	18.6	18.6	47.5	47.5	47.5	47.5	47.5	47.5	47.5
Actuated g/C Ratio	0.23	0.23	0.23	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	324	364	364	280	446	1080	1056	1056	1056	1056
v/s Ratio Prot	c0.19	0.03	0.07	0.16	0.22	c0.29	c0.29	c0.29	c0.29	c0.29
v/s Ratio Perm	0.83	0.12	0.30	0.27	0.37	0.49	0.49	0.49	0.49	0.49
Uniform Delay, d1	29.5	24.6	25.7	8.1	8.7	9.6	9.6	9.6	9.6	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.7	0.1	0.6	1.5	1.0	1.6	1.6	1.6	1.6	1.6
Delay (s)	45.3	24.7	26.3	9.6	9.7	11.2	11.2	11.2	11.2	11.2
Level of Service	D	C	C	A	A	A	A	A	A	B
Approach Delay (s)	36.7		26.3		9.7	11.2	11.2	11.2	11.2	11.2
Approach LOS	D		C		A	A	A	A	A	B
Intersection Summary										
HCM 2000 Control Delay	18.9									
HCM 2000 Volume to Capacity ratio	0.58									
Actuated Cycle Length (s)	80.7									
Intersection Capacity Utilization	75.9%									
Analysis Period (min)	15									
c. Critical Lane Group										

Timings
9: Highway 37 & Cannifton Road/Blessington Road <Total 2046> Saturday Peak Hour 03-06-2025

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	118	56	44	41	3	638	124	19	439	48	
Traffic Volume (vph)	118	56	44	41	3	638	124	19	439	48	
Future Volume (vph)	118	56	44	41	3	638	124	19	439	48	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	4	4	8	8	2	2	2	6	6	6	
Permitted Phases	4	4	8	8	2	2	2	6	6	6	
Detector Phase	4	4	8	8	2	2	2	6	6	6	
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	
Minimum Initial (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6	
Minimum Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9	
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Lead/Lag											
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max	
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max	
Act Eff Green (s)	15.1	15.1	15.1	15.1	49.8	49.8	49.8	49.8	49.8	49.8	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.63	0.63	0.63	0.63	0.63	0.63	
v/c Ratio	0.74	0.25	0.17	0.01	0.61	0.13	0.06	0.44	0.05	0.05	
Control Delay	47.0	28.8	25.2	6.7	12.4	1.7	7.4	9.8	2.2	2.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Delay	47.0	28.8	25.2	6.7	12.4	1.7	7.4	9.8	2.2	2.2	
LOS	D	C	C	A	B	A	A	A	A	A	
Approach Delay	47.0										
Approach LOS	D	C	C	B	B	B	B	A	A	A	
Intersection Summary											
Cycle Length: 80											
Actuated Cycle Length: 79.5											
Natural Cycle: 60											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.74											
Intersection Signal Delay: 15.4											
Intersection LOS: B											
Intersection Capacity Utilization 62.1%											
Analysis Period (min) 15											



HCM Signalized Intersection Capacity Analysis
9: Highway 37 & Cannifton Road/Blessington Road <Total 2046> Saturday Peak Hour 03-06-2025

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	118	56	3	44	41	3	638	124	19	439	
Traffic Volume (vph)	118	56	3	44	41	3	638	124	19	439	
Future Volume (vph)	118	56	3	44	41	3	638	124	19	439	
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.99	1.00	1.00	0.85	1.00	1.00	1.00	0.85	
Flt Protected	0.97	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1755	1752	1763	1770	1863	1583	1770	1759	1509	1509	
Flt Permitted	0.76	0.66	1.00	0.46	1.00	0.30	1.00	0.30	1.00	0.30	
Satd. Flow (perm)	1386	1219	1763	850	1863	1583	1564	1759	1509	1509	
Peak-hour factor, PHF	0.91	0.91	0.76	0.76	0.90	0.90	0.90	0.91	0.91	0.91	
Adj. Flow (vph)	130	62	3	58	54	4	3	709	138	21	
RTOR Reduction (vph)	0	1	0	0	3	0	0	52	0	0	
Lane Group Flow (vph)	0	194	0	58	55	0	3	709	86	21	
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	8%	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm	
Protected Phases	4	4	8	8	2	2	2	6	6	6	
Permitted Phases	4	4	8	8	2	2	2	6	6	6	
Actuated Green, G (s)	15.1	15.1	15.1	15.1	49.8	49.8	49.8	49.8	49.8	49.8	
Effective Green, g (s)	15.1	15.1	15.1	15.1	49.8	49.8	49.8	49.8	49.8	49.8	
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.63	0.63	0.63	0.63	0.63	0.63	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)	263	231	334	532	1167	991	353	1101	945	945	
v/s Ratio Prot	c0.14	0.05	0.03	0.00	c0.38	0.05	0.04	0.27	0.02	0.02	
v/s Ratio Perm	0.74	0.25	0.16	0.01	0.61	0.09	0.06	0.44	0.04	0.04	
Uniform Delay, d1	30.3	27.4	26.9	5.6	9.0	5.9	5.8	7.6	5.7	5.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.3	0.6	0.2	0.0	2.4	0.2	0.3	1.3	0.1	0.1	
Delay (s)	40.7	28.0	27.2	5.6	11.3	6.0	6.1	8.9	5.7	5.7	
Level of Service	D	C	C	C	A	B	A	A	A	A	
Approach Delay (s)	40.7										
Approach LOS	D	C	C	C	B	B	A	A	A	A	
Intersection Summary											
HCM 2000 Control Delay	14.4										
HCM 2000 Level of Service	B										
HCM 2000 Volume to Capacity ratio	0.64										
Actuated Cycle Length (s)	79.5										
Intersection Capacity Utilization	62.1%										
Analysis Period (min)	15										
c. Critical Lane Group											

Timings
10: Highway 37 & Tank Farm Road/Casey Road

HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	30	64	64	52	47	679	61	10	435	15
Future Volume (vph)	30	64	64	52	47	679	61	10	435	15
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	10.0	10.0	52.4	52.4	52.4	52.4	52.4	52.4
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.74	0.74	0.74	0.74	0.74	0.74
v/c Ratio	0.23	0.49	0.58	0.38	0.11	0.52	0.06	0.03	0.40	0.02
Control Delay	30.9	28.1	44.0	29.4	5.0	7.3	1.4	4.2	6.1	0.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.9	28.1	44.0	29.4	5.0	7.3	1.4	4.2	6.1	0.3
LOS	C	C	D	C	A	A	A	A	A	A
Approach Delay	28.7	36.8	6.7	A	A	A	A	5.9	A	A
Approach LOS	C	D	D	A	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71										
Natural Cycle: 60										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.58										
Intersection Signal Delay: 12.0										
Intersection Capacity Utilization 60.4%										
Analysis Period (min) 15										



Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	30	64	64	52	47	679	61	10	435	15
Future Volume (vph)	30	64	64	52	47	679	61	10	435	15
Total Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.95	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1740	1736	1767	1228	1863	1455	1770	1743	1170
Flt Permitted	0.69	1.00	0.67	1.00	0.46	1.00	1.00	0.34	1.00	1.00
Satd. Flow (perm)	1255	1740	1228	1767	592	1863	1455	632	1743	1170
Peak-hour factor, PHF	0.75	0.75	0.75	0.64	0.64	0.95	0.95	0.84	0.84	0.84
Adj. Flow (vph)	40	85	48	100	81	17	49	715	64	12
RTOR Reduction (vph)	0	29	0	0	11	0	0	19	0	0
Lane Group Flow (vph)	40	104	0	100	87	0	49	715	45	12
Heavy Vehicles (%)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	8.0	8.0	8.0	8.0	50.9	50.9	50.9	50.9	50.9	50.9
Effective Green, g (s)	8.0	8.0	8.0	8.0	50.9	50.9	50.9	50.9	50.9	50.9
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	138	192	135	195	416	1311	1024	444	1227	823
v/s Ratio Prot	0.03	0.06	0.05	0.05	0.08	c0.38	0.03	0.02	0.30	0.01
v/s Ratio Perm	0.29	0.54	0.74	0.45	0.12	0.55	0.04	0.03	0.42	0.02
Uniform Delay, d1	29.5	30.4	31.1	30.1	3.5	5.1	3.3	3.2	4.5	3.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	2.9	19.5	1.6	0.2	0.8	0.0	0.1	1.1	0.0
Delay (s)	30.7	33.3	50.6	31.7	3.7	5.9	3.3	3.3	5.6	3.2
Level of Service	C	C	D	C	A	A	A	A	A	A
Approach Delay (s)	32.7	41.3	5.6	5.6	5.6	5.6	5.6	5.4	5.4	5.4
Approach LOS	C	C	D	D	A	A	A	A	A	A
Intersection Summary										
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B							
HCM 2000 Volume to Capacity ratio	0.57									
Actuated Cycle Length (s)	72.3	Sum of lost time (s)	13.4							
Intersection Capacity Utilization	60.4%	ICU Level of Service	B							
Analysis Period (min)	15									
c. Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

<Total 2046> Saturday Peak Hour
 03-06-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1		W	
Traffic Volume (veh/h)	71	243	180	54	75	57
Future Volume (Veh/h)	71	243	180	54	75	57
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	77	264	196	59	82	62
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	255				644	226
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	255				644	226
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	94				80	92
cM capacity (veh/h)	1310				412	814
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	341	255	144			
Volume Left	77	0	82			
Volume Right	0	59	62			
cSH	1310	1700	523			
Volume to Capacity	0.06	0.15	0.28			
Queue Length 95th (m)	1.5	0.0	8.9			
Control Delay (s)	2.2	0.0	14.5			
Lane LOS	A	B	B			
Approach Delay (s)	2.2	0.0	14.5			
Approach LOS		B				
Intersection Summary						
Average Delay			3.8			A
Intersection Capacity Utilization			47.1%			
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

<Total 2046> Saturday Peak Hour
 03-06-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	1		W	
Traffic Volume (veh/h)	83	246	197	62	64	49
Future Volume (Veh/h)	83	246	197	62	64	49
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	90	267	214	67	70	53
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	281				694	248
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	281				694	248
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	93				82	93
cM capacity (veh/h)	1282				380	791
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	357	281	123			
Volume Left	90	0	70			
Volume Right	0	67	53			
cSH	1282	1700	489			
Volume to Capacity	0.07	0.17	0.25			
Queue Length 95th (m)	1.8	0.0	7.9			
Control Delay (s)	2.5	0.0	14.8			
Lane LOS	A	B	B			
Approach Delay (s)	2.5	0.0	14.8			
Approach LOS		B				
Intersection Summary						
Average Delay			3.6			
Intersection Capacity Utilization			48.2%			A
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	WB	NB	NB	SB	SB	SB	SB	T
	L	LR	T	R	L	T	T	T	
Directions Served									
Maximum Queue (m)	45.6	52.4	63.4	65.0	19.0	15.5	41.7	42.4	
Average Queue (m)	22.5	27.5	42.8	38.2	8.1	4.8	22.5	16.6	
95th Queue (m)	37.8	45.5	62.2	58.5	15.4	12.6	37.5	30.8	
Link Distance (m)	459.2	459.2	537.0	537.0			613.7	613.7	
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				38.0	30.5				
Storage Blk Time (%)				5			2		
Queuing Penalty (veh)				30			0		

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	WB	NB	NB	SB	SB	SB	SB	T
	L	R	TR	LT					
Directions Served									
Maximum Queue (m)	45.0	19.8	9.3	39.1					
Average Queue (m)	17.5	8.8	1.8	16.7					
95th Queue (m)	33.4	15.2	6.9	31.9					
Link Distance (m)	511.0		459.2	373.0					
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		30.0							
Storage Blk Time (%)		2							
Queuing Penalty (veh)		2							

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB	SB	SB	SB	SB	T
	LTR	LTR	LTR	LTR					
Directions Served									
Maximum Queue (m)	20.0	20.9	21.1	15.2					
Average Queue (m)	1.7	4.1	11.8	6.5					
95th Queue (m)	8.9	13.0	19.1	13.7					
Link Distance (m)	511.0	962.1	215.8	332.3					
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 4: Harmony Road & Homan Road

Movement	EB	SB	SB	SB	SB	SB	SB	SB	T
	LT	LR							
Directions Served									
Maximum Queue (m)	8.6	9.2							
Average Queue (m)	0.7	3.1							
95th Queue (m)	4.4	10.0							
Link Distance (m)	962.1	490.2							
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 5: Plumpton & Harmony Road

Movement	EB	WB	NB	SB	SB	SB	SB	SB	T
	TR	LT	LR						
Directions Served									
Maximum Queue (m)	16.1	9.0	16.5						
Average Queue (m)	1.0	1.4	4.8						
95th Queue (m)	7.0	6.6	13.3						
Link Distance (m)	41.0	898.9	551.1						
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	WB	SB	SB	SB	SB	SB	SB	T
	LT	TR	L	R					
Directions Served									
Maximum Queue (m)	35.1	6.6	29.4	15.4					
Average Queue (m)	7.2	0.2	10.9	8.4					
95th Queue (m)	22.8	2.2	19.8	16.2					
Link Distance (m)	898.9	470.1	388.9						
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)				30.0					
Storage Blk Time (%)				0					
Queuing Penalty (veh)				0					

Intersection: 7: Harmony Public School & Harmony Road													
Movement		NB											
Directions Served		L											
Maximum Queue (m)		9.2											
Average Queue (m)		1.5											
95th Queue (m)		7.1											
Link Distance (m)		212.2											
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)													

Intersection: 8: Highway 37 & Harmony Road

Movement	EB	WB	NB	NB	SB
Directions Served	LT	LTR	L	TR	TR
Maximum Queue (m)	52.1	26.5	33.2	45.1	59.5
Average Queue (m)	25.9	7.5	11.8	20.5	19.5
95th Queue (m)	42.4	18.0	24.0	41.5	41.1
Link Distance (m)	382.1	263.1	2730.4	954.7	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					79.5
Storage Blk Time (%)	5				
Queuing Penalty (veh)	7				

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road

Movement	EB	WB	WB	NB	NB	SB	SB	SB
Directions Served	LTR	L	TR	L	T	R	L	R
Maximum Queue (m)	72.1	27.0	27.9	5.9	94.1	13.8	13.0	2730.7
Average Queue (m)	26.6	9.2	11.0	0.2	31.4	3.1	1.9	115.0
95th Queue (m)	49.3	20.7	21.6	1.9	62.6	9.7	7.3	916.8
Link Distance (m)	437.2	564.5	564.5	777.0			2730.4	
Upstream Blk Time (%)								0
Queuing Penalty (veh)								1
Storage Bay Dist (m)								79.0
Storage Blk Time (%)	0	0	0	0	0	0	0	0
Queuing Penalty (veh)	0	0	0	0	0	0	0	0

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road													
Movement	EB	EB	WB	WB	NB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	R	L	T	R	L	T	R
Maximum Queue (m)	18.5	33.6	28.9	28.6	17.7	49.3	6.2	7.9	72.9	11.5	6.2	7.9	72.9
Average Queue (m)	6.5	14.1	10.8	10.8	6.6	17.0	0.2	2.4	27.6	1.1	0.2	2.4	27.6
95th Queue (m)	16.2	27.2	24.4	21.1	15.6	39.8	2.1	8.1	55.7	6.1	1.1	8.1	55.7
Link Distance (m)	591.6	591.6	653.9	653.9	401.7				777.0				
Upstream Blk Time (%)													
Queuing Penalty (veh)													
Storage Bay Dist (m)													
Storage Blk Time (%)													
Queuing Penalty (veh)	1	0	0	0	0	0	0	0	0	0	0	0	0

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	34.0	27.0
Average Queue (m)	6.6	13.8
95th Queue (m)	21.1	24.9
Link Distance (m)	470.1	145.5
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	WB	SB
Directions Served	LT	TR	LR
Maximum Queue (m)	27.8	6.7	21.9
Average Queue (m)	7.9	0.2	12.0
95th Queue (m)	20.9	2.2	18.7
Link Distance (m)	61.2	382.1	138.4
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

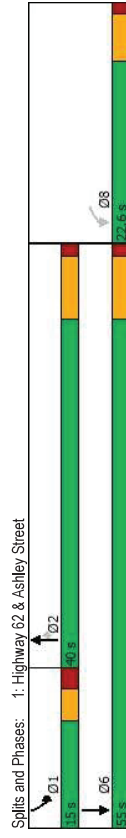
Network Summary
Network wide Queuing Penalty: 42



Future Total Conditions

(2056)

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	🚗🚗	🚗🚗	🚗	🚗	🚗🚗
Traffic Volume (vph)	568	692	365	14	1724
Future Volume (vph)	568	692	365	14	1724
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8		2		
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag		Lag	Lag	Lead	
Lead-Lag Optimize?		Yes	Yes	Yes	
Recall Mode	Max	Yes	Max	None	Max
Act Effd Green (s)	17.0	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.22	0.38	0.58	0.09	0.62
v/c Ratio	2.19	0.41	0.41	0.10	0.93
Control Delay	567.4	10.6	2.7	33.7	23.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	567.4	10.6	2.7	33.7	23.0
LOS	F	B	A	C	C
Approach Delay	567.4	7.9			23.1
Approach LOS	F	A			C
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 140					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 2.19					
Intersection Signal Delay: 116.2					
Intersection Capacity Utilization 90.9%					
Analysis Period (min) 15					
				Intersection LOS: F	
				ICU Level of Service E	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔↔		↔↔	↔	↔	↔↔
Traffic Volume (vph)	568	19	692	365	14	1724
Future Volume (vph)	568	19	692	365	14	1724
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	1.00		0.95	1.00	1.00	0.95
Flt	1.00		1.00	0.85	1.00	1.00
Flt Protected	0.95		1.00	1.00	0.95	1.00
Satd. Flow (prot)	1451		3195	1392	1770	3505
Flt Permitted	0.95		1.00	1.00	0.95	1.00
Satd. Flow (perm)	1451		3195	1392	1770	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86	0.86
Adj. Flow (vph)	676	23	769	406	16	2005
RTOR Reduction (vph)	2	0	0	181	0	0
Lane Group Flow (vph)	697	0	769	225	16	2005
Heavy Vehicles (%)	25%	5%	13%	16%	2%	3%
Turn Type	Perm	NA	Perm	Prot	NA	
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0		45.3	45.3	1.5	51.8
Effective Green, g (s)	17.0		45.3	45.3	1.5	51.8
Actuated g/C Ratio	0.21		0.56	0.56	0.02	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	302		1773	772	32	2224
v/s Ratio Prot			0.24		0.01	c0.57
v/s Ratio Perm	c0.48			0.16		
v/c Ratio	2.31		0.43	0.29	0.50	0.90
Uniform Delay, d1	32.3		10.6	9.6	39.7	12.7
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	599.5		0.8	1.0	11.8	6.5
Delay (s)	631.8		11.4	10.6	51.4	19.2
Level of Service	F		B	B	D	B
Approach Delay (s)	631.8		11.1			19.4
Approach LOS	F		B			B
Intersection Summary						
HCM 2000 Control Delay					HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			126.8			
Actuated Cycle Length (s)			1.35		Sum of lost time (s)	17.8
Intersection Capacity Utilization			81.6		ICU Level of Service	E
Analysis Period (min)			90.9%			
Critical Lane Group			15			

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road

<Total 2056> AM Peak Hour
 03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T			T
Traffic Volume (veh/h)	209	241	147	178	280	90
Future Volume (Veh/h)	209	241	147	178	280	90
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.89	0.89	0.80	0.80	0.85	0.85
Hourly flow rate (vph)	235	271	184	222	329	106
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	1059	295			406	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	1059	295			406	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	0	64			71	
cM capacity (veh/h)	178	744			1153	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	506	406	435			
Volume Left	235	0	329			
Volume Right	271	222	0			
cSH	300	1700	1153			
Volume to Capacity	1.69	0.24	0.29			
Queue Length 95th (m)	254.0	0.0	9.5			
Control Delay (s)	353.4	0.0	7.8			
Lane LOS	F	A	A			
Approach Delay (s)	353.4	0.0	7.8			
Approach LOS	F					
Intersection Summary						
Average Delay			135.3			D
Intersection Capacity Utilization			75.2%		ICU Level of Service	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road

<Total 2056> AM Peak Hour
 03-11-2025

Movement	EBL	EBT	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		T	T	T	T	T	T			T	T
Traffic Volume (veh/h)	4	434	48	24	398	4	37	2	30	82	7
Future Volume (Veh/h)	4	434	48	24	398	4	37	2	30	82	7
Sign Control	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.51	0.51	0.51
Hourly flow rate (vph)	5	517	57	27	447	4	54	3	43	161	14
Pedestrians											
Lane Width (m)											
Walking Speed (m/s)											
Percent Blockage											
Right turn flare (veh)											
Median type			None								
Median storage (veh)											
Upstream signal (m)											
pX platoon unblocked											
VC conflicting volume	451			574			1080	1060	546	1103	1087
VC1 stage 1 conf vol											
VC2 stage 2 conf vol											
VCu unblocked vol	451			574			1080	1060	546	1103	1087
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5
IC 2 stage (s)											
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0
p0 queue free %	100			97			70	99	92	4	93
cM capacity (veh/h)	1109			999			177	217	538	168	209
Direction, Lane #	EB 1	WB 1	NB 1	SB 1							
Volume Total	579	478	100	189							
Volume Left	5	27	54	161							
Volume Right	57	4	43	14							
cSH	1109	999	251	180							
Volume to Capacity	0.00	0.03	0.40	1.05							
Queue Length 95th (m)	0.1	0.7	14.5	72.0							
Control Delay (s)	0.1	0.8	28.5	134.1							
Lane LOS	A	A	D	F							
Approach Delay (s)	0.1	0.8	28.5	134.1							
Approach LOS	D		F								
Intersection Summary											
Average Delay			21.3								
Intersection Capacity Utilization			51.9%						ICU Level of Service		A
Analysis Period (min)			15								

HCM Unsignalized Intersection Capacity Analysis
4: Harmony Road & Homan Road

<Total 2056> AM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4			W		
Traffic Volume (veh/h)	32	506	417	17	41	27	
Future Volume (Veh/h)	32	506	417	17	41	27	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Peak Hour Factor	0.77	0.77	0.51	0.51	0.50	0.50	
Hourly flow rate (vph)	42	657	818	33	82	54	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None		None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked	851				1576	834	
VC, conflicting volume							
VC1, stage 1 conf vol							
VC2, stage 2 conf vol							
VCu, unblocked vol	851				1576	834	
IC, single (s)	4.1				6.4	7.2	
IC, 2 stage (s)							
IF (s)	2.2				3.5	4.2	
p0 queue free %	95				28	79	
cM capacity (veh/h)	788				114	253	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	699	851	136				
Volume Left	42	0	82				
Volume Right	0	33	54				
cSH	788	1700	146				
Volume to Capacity	0.05	0.50	0.93				
Queue Length 95th (m)	1.3	0.0	52.3				
Control Delay (s)	1.4	0.0	116.8				
Lane LOS	A		F				
Approach Delay (s)	1.4	0.0	116.8				
Approach LOS			F				
Intersection Summary							
Average Delay				10.0			
Intersection Capacity Utilization				63.4%		ICU Level of Service	B
Analysis Period (min)				15			

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

<Total 2056> AM Peak Hour
03-11-2025

Movement	EBT	EBR	WBT	WBR	NBL	NBR	
Lane Configurations	4				W		
Traffic Volume (veh/h)	470	10	30	402	2	20	
Future Volume (Veh/h)	470	10	30	402	2	20	
Sign Control	Free				Stop		
Grade	0%				0%		
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	0.67	
Hourly flow rate (vph)	580	12	34	462	3	30	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type		None		None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked				592	1116	586	
VC, conflicting volume							
VC1, stage 1 conf vol							
VC2, stage 2 conf vol							
VCu, unblocked vol				592	1116	586	
IC, single (s)				4.1	6.4	6.2	
IC, 2 stage (s)							
IF (s)				2.2	3.5	3.3	
p0 queue free %				97	99	94	
cM capacity (veh/h)				984	222	510	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	592	496	33				
Volume Left	0	34	3				
Volume Right	12	0	30				
cSH	1700	984	456				
Volume to Capacity	0.35	0.03	0.07				
Queue Length 95th (m)	0.0	0.9	1.9				
Control Delay (s)	0.0	1.0	13.5				
Lane LOS		A	B				
Approach Delay (s)	0.0	1.0	13.5				
Approach LOS			B				
Intersection Summary							
Average Delay				0.8			
Intersection Capacity Utilization				55.9%		ICU Level of Service	B
Analysis Period (min)				15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2056> AM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		4	4	66	141	97	
Traffic Volume (veh/h)	96	477	364	66	141	97	
Future Volume (Veh/h)	96	477	364	66	141	97	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.78	0.78	0.51	0.51	0.92	0.92	
Hourly flow rate (vph)	123	612	714	129	153	105	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None	None	None	None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked					1636	778	
VC conflicting volume	843						
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	843				1636	778	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)							
IF (s)	2.2				3.5	3.3	
p0 queue free %	84				0	73	
CM capacity (veh/h)	793				94	396	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	735	843	258				
Volume Left	123	0	153				
Volume Right	0	129	105				
cSH	793	1700	136				
Volume to Capacity	0.16	0.50	1.90				
Queue Length 95th (m)	4.4	0.0	160.7				
Control Delay (s)	3.8	0.0	486.2				
Lane LOS	A	F	F				
Approach Delay (s)	3.8	0.0	486.2				
Approach LOS	F	F	F				
Intersection Summary							
Average Delay			69.9				
Intersection Capacity Utilization			77.3%		ICU Level of Service	D	
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2056> AM Peak Hour
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Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	4	4	4	4	4	4	
Traffic Volume (veh/h)	418	122	121	302	71	93	
Future Volume (Veh/h)	418	122	121	302	71	93	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.54	0.54	0.78	0.78	0.30	0.30	
Hourly flow rate (vph)	774	226	155	387	237	310	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)	None	None	None	None			
Median type	None	None	None	None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked				1000	1584	887	
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol				1000	1584	887	
IC single (s)				4.3	6.6	6.4	
IC 2 stage (s)							
IF (s)				2.4	3.7	3.5	
p0 queue free %				76	0	2	
CM capacity (veh/h)				636	81	316	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	1000	542	547				
Volume Left	0	155	237				
Volume Right	226	0	310				
cSH	1700	636	141				
Volume to Capacity	0.59	0.24	3.89				
Queue Length 95th (m)	0.0	7.6	Err				
Control Delay (s)	0.0	6.4	Err				
Lane LOS	A	F	F				
Approach Delay (s)	0.0	6.4	Err				
Approach LOS	F	F	F				
Intersection Summary							
Average Delay			2619.9				
Intersection Capacity Utilization			71.6%		ICU Level of Service	C	
Analysis Period (min)			15				

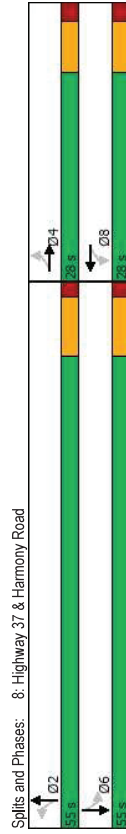
Timings
8: Highway 37 & Harmony Road

HCM Signalized Intersection Capacity Analysis
8: Highway 37 & Harmony Road

<Total 2056> AM Peak Hour
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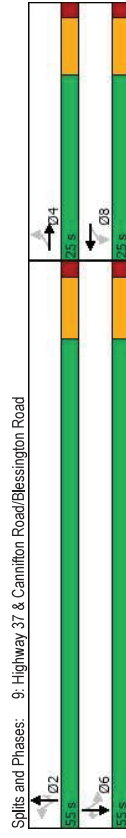
<Total 2056> AM Peak Hour
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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	115	169	93	81	138	296	7	906
Traffic Volume (vph)	115	169	93	81	138	296	7	906
Future Volume (vph)	115	169	93	81	138	296	7	906
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Minimum Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Total Split (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
Yellow Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4
Act Eff Green (s)	0.25	0.25	0.57	0.57	0.57	0.57	0.57	0.57
Actuated g/C Ratio	1.56	1.58	2.08	0.44	0.02	1.24	0.02	1.24
v/c Ratio	286.9	314.6	544.2	12.0	8.0	137.5	0.0	137.5
Control Delay	286.9	314.6	544.2	12.0	8.0	137.5	0.0	137.5
Queue Delay	286.9	314.6	544.2	12.0	8.0	137.5	0.0	137.5
LOS	F	F	F	F	B	A	F	F
Approach Delay	286.9	314.6	544.2	12.0	8.0	137.5	0.0	137.5
Approach LOS	F	F	F	F	F	F	F	F
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 83								
Natural Cycle: 70								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 2.08								
Intersection Signal Delay: 196.4								
Intersection Capacity Utilization 128.6%								
Analysis Period (min) 15								



Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	115	169	291	93	81	2	138	296
Traffic Volume (vph)	115	169	291	93	81	2	138	296
Future Volume (vph)	115	169	291	93	81	2	138	296
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900
Total Flow time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1693	1693	1681	1681	1687	1589	1444	1747
Flt Permitted	0.87	0.87	0.35	0.35	0.08	0.08	0.50	1.00
Satd. Flow (perm)	1485	1485	605	605	150	1589	754	1747
Peak-hour factor, PHF	0.88	0.88	0.88	0.73	0.73	0.78	0.78	0.88
Adj. Flow (vph)	131	192	331	127	111	3	177	379
RTOR Reduction (vph)	0	45	0	0	1	0	3	0
Lane Group Flow (vph)	0	609	0	0	240	0	177	399
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Actuated Green, G (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4
Effective Green, g (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	375	375	153	153	85	907	430	997
v/s Ratio Prot	c0.41	c0.41	0.40	0.40	c1.18	0.25	0.01	0.71
v/s Ratio Perm	1.62	1.62	1.57	1.57	2.08	0.44	0.02	1.24
Uniform Delay, d1	31.0	31.0	31.0	31.0	17.8	10.2	7.7	17.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	293.0	293.0	285.7	285.7	524.9	1.6	0.1	118.0
Delay (s)	324.0	324.0	316.7	316.7	542.7	11.8	7.8	135.8
Level of Service	F	F	F	F	B	A	A	F
Approach Delay (s)	324.0	324.0	316.7	316.7	174.1	135.0	135.0	135.0
Approach LOS	F	F	F	F	F	F	F	F
Intersection Summary								
HCM 2000 Control Delay	204.6	204.6	204.6	204.6	HCM 2000 Level of Service	F	F	F
HCM 2000 Volume to Capacity ratio	1.93	1.93	1.93	1.93	Sum of lost time (s)	14.6	14.6	14.6
Actuated Cycle Length (s)	83.0	83.0	83.0	83.0	ICU Level of Service	H	H	H
Intersection Capacity Utilization	128.6%	128.6%	128.6%	128.6%	Analysis Period (min)	15	15	15
Analysis Period (min)	15	15	15	15	c. Critical Lane Group			

Timings
9: Highway 37 & Cannifton Road/Blessington Road
<Total 2056> AM Peak Hour
03-11-2025

[illegible]

HCM Signalized Intersection Capacity Analysis
9: Highway 37 & Cannifton Road/Blessington Road

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBP
Lane Configurations		↔		↔			↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	78	28	0	212	63	7	7	443	63	19	1177	1391
Future Volume (vph)	78	28	0	212	63	7	7	443	63	19	1177	1391
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0			7.0			7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00			1.00			1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected												
Frt												
Satd. Flow (prot)	1720			1680			1444	1610	1262	1770	1827	1553
Flt Permitted	0.72			0.72			0.08	1.00	1.00	0.40	1.00	1.00
Satd. Flow (perm)	1292			1247			128	1610	1262	754	1827	1553
Peak-hour factor, PHF	0.68		0.68	0.76		0.76	0.83	0.83	0.83	0.81	0.81	0.81
Actd. Flow (vph)	115	41	0	279	83	9	8	534	76	23	1453	172
RTOR Reduction (vph)	0	0	0	0	1	0	0	0	0	31	0	0
Lane Group Flow (vph)	0	156	0	0	370	0	8	534	45	23	1453	114
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases		4			8		2		2		6	6
Permitted Phases	4			8			2		2		6	6
Actuated Green, G (s)	18.0			18.0			47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	18.0			18.0			47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22			0.22			0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0			7.0			7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0			3.0			4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	290			280			75	953	747	446	1082	920
v/s Ratio Prot							0.33				cd.80	
v/s Ratio Perm	0.12			c0.30			0.06	0.04	0.03	0.03	0.07	
Uniform Delay, d1	27.3			31.0			0.11	0.56	0.06	0.05	1.34	0.12
Progression Factor	1.00			1.00			1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9			167.8			2.8	2.4	0.2	0.2	160.6	0.3
Delay (s)	29.3			198.8			9.9	12.3	7.0	7.1	176.9	7.4
Level of Service	C			F			A	B	A	A	F	A
Approach Delay (s)	29.3			198.8				11.6			156.8	
Approach LOS	C			F				B			F	
Intersection Summary												
HCM 2000 Control Delay			123.1				HCM 2000 Level of Service					
HCM 2000 Volume to Capacity ratio			1.34				F					
Actuated Cycle Length (s)			80.0				Sum of lost time (s)					
Intersection Capacity Utilization			91.6%				F					
Analysis Period (min)			15				ICU Level of Service					
Critical Lane Group							F					

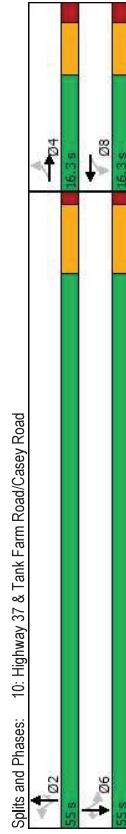
Timings

10: Highway 37 & Tank Farm Road/Casey Road

<Total 2056> AM Peak Hour

03-11-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	27	55	135	90	24	478	85	31	1295	59
Future Volume (vph)	27	55	135	90	24	478	85	31	1295	59
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	4	4	8	8	2	2	2	6	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Eff Green (s)	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.60	0.60	1.28	0.31	0.51	0.10	0.08	1.32	0.07	0.07
Control Delay	38.9	38.9	190.1	14.2	7.6	1.2	4.6	169.3	1.4	1.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.9	38.9	190.1	14.2	7.6	1.2	4.6	169.3	1.4	1.4
LOS	D	D	F	B	A	A	A	F	A	A
Approach Delay	38.9	38.9	190.1	14.2	7.6	1.2	4.6	169.3	1.4	1.4
Approach LOS	D	D	F	F	A	A	A	F	F	F
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 150										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.32										
Intersection Signal Delay: 114.3										
Intersection Capacity Utilization 98.8%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis

10: Highway 37 & Tank Farm Road/Casey Road

<Total 2056> AM Peak Hour

03-11-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	27	55	135	90	10	24	478	85	31	1295
Future Volume (vph)	27	55	135	90	10	24	478	85	31	1295
Future Volume (vph)	27	55	135	90	10	24	478	85	31	1295
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.99	0.99	0.97	0.97	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1798	1798	1751	1751	1770	1770	1770	1770	1770	1770
Flt Permitted	0.83	0.83	0.79	0.79	0.08	0.08	0.08	0.08	0.08	0.08
Satd. Flow (perm)	1522	1522	1415	1415	156	156	156	156	156	156
Peak-hour factor, PHF	0.73	0.73	0.73	0.73	0.91	0.91	0.75	0.75	0.82	0.82
Adj. Flow (vph)	37	75	21	148	99	11	32	637	113	38
RTOR Reduction (vph)	0	9	0	0	3	0	0	0	0	0
Lane Group Flow (vph)	0	124	0	0	255	0	32	637	76	38
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	3%	2%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	213	213	198	198	104	1251	1053	466	1193	1063
v/s Ratio Prot	0.08	0.08	c0.18	c0.18	0.21	0.34	0.05	0.05	c0.89	0.03
v/s Ratio Perm	0.58	0.58	1.29	1.29	0.31	0.51	0.07	0.08	1.32	0.05
Uniform Delay, d1	28.7	28.7	30.6	30.6	4.8	5.8	4.0	4.1	11.7	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	4.0	162.9	162.9	3.3	0.6	0.1	0.3	151.5	0.1
Delay (s)	32.7	32.7	193.5	193.5	8.1	6.5	4.1	4.4	163.2	4.0
Level of Service	C	C	F	F	A	A	A	A	F	A
Approach Delay (s)	32.7	32.7	193.5	193.5	6.2	6.2	4.1	4.4	152.9	F
Approach LOS	C	C	F	F	A	A	A	A	F	F
Intersection Summary										
HCM 2000 Control Delay	110.9	110.9	HCM 2000 Level of Service	HCM 2000 Level of Service	F	F	F	F	F	F
HCM 2000 Volume to Capacity ratio	1.32	1.32	Sum of lost time (s)	Sum of lost time (s)	13.4	13.4	13.4	13.4	13.4	13.4
Actuated Cycle Length (s)	71.3	71.3	ICU Level of Service	ICU Level of Service	F	F	F	F	F	F
Intersection Capacity Utilization	98.8%	98.8%	Analysis Period (min)	Analysis Period (min)	15	15	15	15	15	15
Analysis Period (min)	15	15	c. Critical Lane Group	c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
11: Harmony Road & Proposed Site Access 2

<Total 2056> AM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	535	341	57	134	90
Future Volume (Veh/h)	84	535	341	57	134	90
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	582	371	62	146	98
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	433				1166	402
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	433				1166	402
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	92				26	85
cM capacity (veh/h)	1127				197	648
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	673	433	244			
Volume Left	91	0	146			
Volume Right	0	62	98			
cSH	1127	1700	273			
Volume to Capacity	0.08	0.25	0.89			
Queue Length 95th (m)	2.1	0.0	63.2			
Control Delay (s)	2.0	0.0	70.5			
Lane LOS	A	F	F			
Approach Delay (s)	2.0	0.0	70.5			
Approach LOS			F			
Intersection Summary						
Average Delay			13.8			
Intersection Capacity Utilization			77.1%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
12: Harmony Road & Proposed Site Access 3

<Total 2056> AM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	84	488	306	63	117	77
Future Volume (Veh/h)	84	488	306	63	117	77
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	91	530	333	68	127	84
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	401				1079	367
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	401				1079	367
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	92				43	88
cM capacity (veh/h)	1158				223	678
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	621	401	211			
Volume Left	91	0	127			
Volume Right	0	68	84			
cSH	1158	1700	304			
Volume to Capacity	0.08	0.24	0.69			
Queue Length 95th (m)	2.0	0.0	38.5			
Control Delay (s)	2.0	0.0	39.9			
Lane LOS	A	E	E			
Approach Delay (s)	2.0	0.0	39.9			
Approach LOS			E			
Intersection Summary						
Average Delay			7.8			
Intersection Capacity Utilization			71.5%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
13: Harmony Road & Proposed Site Access 4

HCM Unsignalized Intersection Capacity Analysis
14: Homan Road & Proposed Site Access 5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	543	367	22	43	29
Future Volume (Veh/h)	27	543	367	22	43	29
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	590	399	24	47	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			130			
pX platoon unblocked	1.00			1.00	1.00	
VC conflicting volume	423			1059	411	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	418			1057	406	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	97			81	95	
cM capacity (veh/h)	1136			242	642	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	619	423	79			
Volume Left	29	0	47			
Volume Right	0	24	32			
cSH	1136	1700	323			
Volume to Capacity	0.03	0.25	0.24			
Queue Length 95th (m)	0.6	0.0	7.5			
Control Delay (s)	0.7	0.0	19.7			
Lane LOS	A	C	C			
Approach Delay (s)	0.7	0.0	19.7			
Approach LOS		C	C			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			61.4%			
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	64	0	0	44	0	0
Future Volume (Veh/h)	64	0	0	44	0	0
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	0	0	48	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	24	24			48	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	24	24			48	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	992	1052			1559	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	70	48	0			
Volume Left	70	0	0			
Volume Right	0	48	0			
cSH	992	1700	1700			
Volume to Capacity	0.07	0.03	0.00			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	8.9	0.0	0.0			
Lane LOS	A	A	C			
Approach Delay (s)	8.9	0.0	0.0			
Approach LOS		A	C			
Intersection Summary						
Average Delay			5.3			
Intersection Capacity Utilization			13.5%			
Analysis Period (min)			15			

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	298.9	67.6	63.4	19.2	15.3	84.2	71.8
Average Queue (m)	267.9	32.2	22.0	11.1	5.6	47.5	46.7
95th Queue (m)	288.4	51.6	45.5	18.4	13.1	68.7	66.8
Link Distance (m)	460.8	539.5	539.5		617.0	617.0	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)				38.0	30.5		
Storage Blk Time (%)			1			14	
Queuing Penalty (veh)			2			2	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	LT	
Maximum Queue (m)	119.8	14.8	41.8	
Average Queue (m)	52.1	1.4	18.4	
95th Queue (m)	99.9	6.9	34.3	
Link Distance (m)	510.9	460.8	376.6	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	
Maximum Queue (m)	15.2	22.1	22.4	21.8
Average Queue (m)	0.5	3.4	11.7	10.9
95th Queue (m)	5.0	12.7	18.6	18.1
Link Distance (m)	510.9	962.1	215.8	332.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Harmony Road & Homan Road

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	22.6	37.6
Average Queue (m)	1.7	15.6
95th Queue (m)	10.9	29.1
Link Distance (m)	962.1	291.4
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	16.1	9.2
Average Queue (m)	4.6	5.5
95th Queue (m)	13.8	12.4
Link Distance (m)	902.5	551.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	46.2	59.0
Average Queue (m)	11.4	23.7
95th Queue (m)	30.5	40.5
Link Distance (m)	902.5	388.9
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 7: Harmony Public School & Harmony Road											
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB
Directions Served	TR	LTR	L	TR	L	TR	TR	LTR	L	TR	L
Maximum Queue (m)	100.4	45.5	231.4				110.5	71.2	2735.2	181.9	970.6
Average Queue (m)	62.4	15.9	126.6				108.8	33.5	157.2	186.2	18.9
95th Queue (m)	123.8	39.0	269.6				110.6	62.6	157.7	2952.2	108.6
Link Distance (m)	97.7	64.8	212.2				106.5	263.1	2731.8	954.8	
Upstream Blk Time (%)	6		37				54		9	98	
Queuing Penalty (veh)	42		0				318		45	0	
Storage Bay Dist (m)								79.5	82.0		
Storage Blk Time (%)								100		48	
Queuing Penalty (veh)								314		3	

Intersection: 8: Highway 37 & Harmony Road											
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB
Directions Served	LTR	LTR	L	TR	L	TR	LTR	LTR	L	TR	L
Maximum Queue (m)	110.5	71.2	157.5	2735.2	181.9	970.6					
Average Queue (m)	108.8	33.5	157.2	1866.2	18.9	964.3					
95th Queue (m)	110.6	62.6	157.7	2952.2	108.6	970.1					
Link Distance (m)	106.5	263.1	2731.8		954.8						
Upstream Blk Time (%)	54		9		98						
Queuing Penalty (veh)	318		45		0						
Storage Bay Dist (m)					82.0						
Storage Blk Time (%)					100						
Queuing Penalty (veh)					314						

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road											
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB
Directions Served	LTR	LTR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	55.3	78.7	181.6	472.9	153.0	7.0	224.5	159.0			
Average Queue (m)	23.2	42.0	7.6	69.4	12.6	2.1	102.0	20.3			
95th Queue (m)	44.3	66.6	61.2	269.4	74.7	6.9	179.7	96.5			
Link Distance (m)	437.7	564.0		780.7			2731.8				
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)					82.0						
Storage Blk Time (%)					13						
Queuing Penalty (veh)					9						

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road											
Movement	EB	WB	NB	EB	WB	NB	EB	WB	NB	EB	WB
Directions Served	LTR	LTR	L	TR	L	TR	L	TR	L	TR	L
Maximum Queue (m)	83.5	209.4	16.4	49.5	10.1	167.8	412.8	170.0			
Average Queue (m)	24.2	126.5	4.4	18.7	0.8	30.7	196.1	58.6			
95th Queue (m)	53.9	183.2	11.4	40.6	4.4	132.0	367.6	188.2			
Link Distance (m)	593.4	692.0		405.0			780.7				
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)				66.0		70.0	68.0				
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 11: Harmony Road & Proposed Site Access 2											
Movement	EB	SB									
Directions Served	LT	LR									
Maximum Queue (m)	98.6	113.8									
Average Queue (m)	19.3	39.9									
95th Queue (m)	61.5	79.4									
Link Distance (m)	470.1	145.5									
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)											
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 12: Harmony Road & Proposed Site Access 3											
Movement	EB	SB									
Directions Served	LT	LR									
Maximum Queue (m)	68.8	143.0									
Average Queue (m)	62.8	130.5									
95th Queue (m)	87.1	179.4									
Link Distance (m)	64.8	138.4									
Upstream Blk Time (%)	32	87									
Queuing Penalty (veh)	163	0									
Storage Bay Dist (m)											
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 13: Harmony Road & Proposed Site Access 4

Movement	EB	SB
Directions Served	LT LR	
Maximum Queue (m)	263.4	260.9
Average Queue (m)	261.3	155.9
95th Queue (m)	267.5	246.2
Link Distance (m)	259.1	288.0
Upstream Blk Time (%)	42	
Queuing Penalty (veh)	255	
Storage Bay Dist (m)		
Queuing Penalty (veh)		

Intersection: 14: Homan Road & Proposed Site Access 5

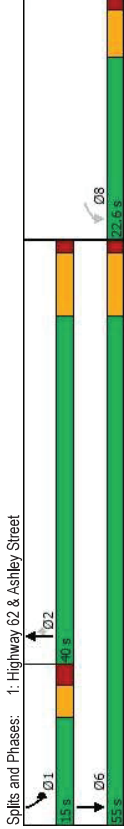
Movement	WB
Directions Served	LR
Maximum Queue (m)	20.3
Average Queue (m)	8.6
95th Queue (m)	16.4
Link Distance (m)	272.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 1209

1: Highway 62 & Ashley Street

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W
Traffic Volume (vph)	545	1781	888	21	952
Future Volume (vph)	545	1781	888	21	952
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag		Lag	Lag	Lead	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	42.7	42.7	7.3	47.8
Actuated g/C Ratio	0.22	0.55	0.55	0.09	0.62
v/c Ratio	2.16	1.13	1.03	0.14	0.51
Control Delay	555.6	85.4	49.5	34.2	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	555.6	85.4	49.5	34.2	9.4
LOS	F	F	D	C	A
Approach Delay	555.6	73.4			9.9
Approach LOS	F	E			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 150					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 2.16					
Intersection Signal Delay: 128.5					
Intersection Capacity Utilization 92.5%					
Analysis Period (min) 15					
Intersection LOS: F					
ICU Level of Service F					



HCM Signalized Intersection Capacity Analysis 1: Highway 62 & Ashley Street <Total 2056> PM Peak Hour 03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	545	40	1781	888	21	952
Future Volume (vph)	545	40	1781	888	21	952
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.95
Flt Protected	0.96	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1455	3195	1392	1770	3505	3505
Flt Permitted	0.96	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1455	3195	1392	1770	3505	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86	0.86
Adj. Flow (vph)	649	48	1979	987	24	1107
RTOR Reduction (vph)	3	0	0	206	0	0
Lane Group Flow (vph)	694	0	1979	781	24	1107
Heavy Vehicles (%)	25%	5%	13%	16%	2%	3%
Turn Type	Perm	Perm	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	17.0	42.7	42.7	3.1	50.8	
Effective Green, g (s)	17.0	42.7	42.7	3.1	50.8	
Actuated g/C Ratio	0.21	0.53	0.53	0.04	0.63	
Clearance Time (s)	5.6	7.2	7.2	5.0	7.2	
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5	
Lane Grp Cap (vph)	306	1692	737	68	2209	
v/s Ratio Prot		c0.62		0.01	c0.32	
v/s Ratio Perm	c0.48		0.56			
Uniform Delay, d1	2.27	1.17	1.06	0.35	0.50	
Progression Factor	31.8	18.9	18.9	37.8	8.1	
Incremental Delay, d2	1.00	1.00	1.00	1.00	1.00	
Delay (s)	580.7	83.1	50.1	3.1	0.8	
Level of Service	612.5	102.0	69.1	40.9	8.9	
Approach Delay (s)	F	F	E	D	A	
Approach LOS	F	F	F	F	A	
Intersection Summary						
HCM 2000 Control Delay			147.6		HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio			1.45			
Actuated Cycle Length (s)			80.6		Sum of lost time (s)	17.8
Intersection Capacity Utilization			92.5%		ICU Level of Service	F
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis 2: Ashley Street & Harmony Road <Total 2056> PM Peak Hour 03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	W	W	W	W
Traffic Volume (veh/h)	291	235	218	450	302	112
Future Volume (Veh/h)	291	235	218	450	302	112
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.89	0.89	0.80	0.80	0.85	0.85
Hourly flow rate (vph)	327	264	272	562	355	132
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			None			None
Median type						
Median storage (veh)						
Upstream signal (m)						
pX, platoon unblocked						
VC, conflicting volume	1395	553		834		
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	1395	553		834		
IC, single (s)	6.4	6.2		4.1		
IC, 2 stage (s)						
IF (s)	3.5	3.3		2.2		
p0 queue free %	0	50		56		
cM capacity (veh/h)	87	533		799		
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	591	834	487			
Volume Left	327	0	355			
Volume Right	264	562	0			
cSH	138	1700	799			
Volume to Capacity	4.27	0.49	0.44			
Queue Length 95th (m)	Err	0.0	18.4			
Control Delay (s)	Err	0.0	11.2			
Lane LOS	F	F	B			
Approach Delay (s)	Err	0.0	11.2			
Approach LOS	F					
Intersection Summary						
Average Delay			3093.6			
Intersection Capacity Utilization			102.2%		ICU Level of Service	G
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis 3: River Road & Harmony Road <Total 2056> PM Peak Hour 03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	17	697	65	19	481	8	124	7	58	33	15	7
Future Volume (Veh/h)	17	697	65	19	481	8	124	7	58	33	15	7
Sign Control		Free		Free		Free	Stop		Stop		Stop	
Grade		0%		0%		0%	0%		0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.69	0.51	0.51	0.51
Hourly flow rate (vph)	20	830	77	21	540	9	180	10	84	65	29	14
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked	549			907			1524	1500	868	1584	1534	544
VC conflicting volume												
VC1 stage 1 conf vol												
VC2 stage 2 conf vol	549			907			1524	1500	868	1584	1534	544
VCu unblocked vol	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC single (s)												
IC 2 stage (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			97			0	91	76	0	74	97
ICM capacity (veh/h)	1021			750			73	116	352	60	111	539
Direction_Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	927	570	274	108								
Volume Left	20	21	180	65								
Volume Right	77	9	84	14								
cSH	1021	750	98	79								
Volume to Capacity	0.02	0.03	2.80	1.37								
Queue Length 95th (m)	0.5	0.7	207.9	67.5								
Control Delay (s)	0.5	0.8	907.7	320.3								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.5	0.8	907.7	320.3								
Approach LOS		F	F	F								
Intersection Summary												
Average Delay			151.3							C		
Intersection Capacity Utilization			67.3%									
Analysis Period (min)			15									

HCM Unsignalized Intersection Capacity Analysis 4: Harmony Road & Homan Road <Total 2056> PM Peak Hour 03-11-2025

Movement	EBL	EBT	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (veh/h)	51	631	461	39	39	35	35
Future Volume (Veh/h)	51	631	461	39	39	35	35
Sign Control		Free	Free	Free	Stop		
Grade		0%	0%	0%	0%		
Peak Hour Factor	0.77	0.77	0.51	0.51	0.50	0.50	0.50
Hourly flow rate (vph)	66	819	904	76	78	70	70
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)			None				
Median type			None				
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked			980			1893	942
VC conflicting volume							
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	980					1893	942
IC single (s)	4.1					6.4	7.2
IC 2 stage (s)							
ICF (s)	2.2					3.5	4.2
p0 queue free %	91					0	67
ICM capacity (veh/h)	704					70	215
Direction_Lane #	EB 1	WB 1	SB 1				
Volume Total	885	980	148				
Volume Left	66	0	78				
Volume Right	0	76	70				
cSH	704	1700	102				
Volume to Capacity	0.09	0.58	1.45				
Queue Length 95th (m)	2.5	0.0	86.7				
Control Delay (s)	2.6	0.0	322.4				
Lane LOS	A	F	F				
Approach Delay (s)	2.6	0.0	322.4				
Approach LOS		F	F				
Intersection Summary							
Average Delay			24.8				
Intersection Capacity Utilization			77.0%			ICU Level of Service	D
Analysis Period (min)			15				

HCM Unsignalized Intersection Capacity Analysis
5: Plumpton & Harmony Road

<Total 2056> PM Peak Hour
03-11-2025

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	↰	↰	↰	↰	↰	↰	
Traffic Volume (veh/h)	707	7	27	488	11	39	
Future Volume (Veh/h)	707	7	27	488	11	39	
Sign Control	Free	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	0.67	
Hourly flow rate (vph)	873	9	31	561	16	58	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None			None			
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume		882			1500	878	
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol		882			1500	878	
IC single (s)		4.1			6.4	6.2	
IC 2 stage (s)							
IF (s)		2.2			3.5	3.3	
p0 queue free %		96			88	83	
cM capacity (veh/h)		767			129	347	
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	882	592	74				
Volume Left	0	31	16				
Volume Right	9	0	58				
cSH	1700	767	254				
Volume to Capacity	0.52	0.04	0.29				
Queue Length 95th (m)	0.0	1.0	9.4				
Control Delay (s)	0.0	1.1	24.9				
Lane LOS	A	C	C				
Approach Delay (s)	0.0	1.1	24.9				
Approach LOS		C					
Intersection Summary							
Average Delay			1.6				
Intersection Capacity Utilization		57.7%			ICU Level of Service	B	
Analysis Period (min)		15					

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2056> PM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		↰	↰	↰	↰	
Traffic Volume (veh/h)	159	509	400	134	110	
Future Volume (Veh/h)	159	509	400	134	110	
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.78	0.78	0.51	0.51	0.92	
Hourly flow rate (vph)	204	653	784	263	141	
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume		1047			1976	916
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol		1047			1976	916
IC single (s)		4.1			6.4	6.2
IC 2 stage (s)						
IF (s)		2.2			3.5	3.3
p0 queue free %		69			0	64
cM capacity (veh/h)		665			47	330
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	857	1047	261			
Volume Left	204	0	141			
Volume Right	0	263	120			
cSH	665	1700	78			
Volume to Capacity	0.31	0.62	3.35			
Queue Length 95th (m)	10.4	0.0	Err			
Control Delay (s)	7.9	0.0	Err			
Lane LOS	A	F	F			
Approach Delay (s)	7.9	0.0	Err			
Approach LOS		F				
Intersection Summary						
Average Delay			1208.6			
Intersection Capacity Utilization		88.7%		ICU Level of Service	E	
Analysis Period (min)		15				

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

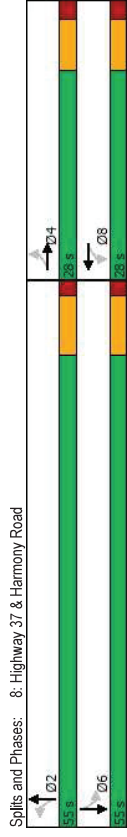
<Total 2056> PM Peak Hour
03-11-2025

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	EB	EB	WB	WB	NB	NB	
Traffic Volume (veh/h)	541	4	13	405	32	55	
Future Volume (Veh/h)	541	4	13	405	32	55	
Sign Control	Free	Free	Free	Stop	Stop	Stop	
Grade	0%	0%	0%	0%	0%	0%	
Peak Hour Factor	0.54	0.54	0.78	0.78	0.30	0.30	
Hourly flow rate (vph)	1002	7	17	519	107	183	
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)							
Median type	None						
Median storage (veh)							
Upstream signal (m)							
pK, platoon unblocked							
VC, conflicting volume							
VC1, stage 1 conf vol							
VC2, stage 2 conf vol							
VCu, unblocked vol							
IC, single (s)							
IC, 2 stage (s)							
p0 queue free %							
IF (s)							
CM capacity (veh/h)							
Direction, Lane #	EB 1	WB 1	NB 1				
Volume Total	1009	536	290				
Volume Left	0	17	107				
Volume Right	7	0	183				
cSH	1700	631	174				
Volume to Capacity	0.59	0.03	1.67				
Queue Length 95th (m)	0.0	0.7	159.5				
Control Delay (s)	0.0	0.8	370.3				
Lane LOS	A	A	F				
Approach Delay (s)	0.0	0.8	370.3				
Approach LOS	F	F	F				
Intersection Summary							
Average Delay			58.7				
Intersection Capacity Utilization			43.5%				
Analysis Period (min)			15				
ICU Level of Service			A				

Timings
8: Highway 37 & Harmony Road

<Total 2056> PM Peak Hour
03-11-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EB	EB	WB	WB	NB	NB	SB	SB
Traffic Volume (vph)	253	151	40	44	216	835	6	585
Future Volume (vph)	253	151	40	44	216	835	6	585
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases								
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase								
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57
Actuated g/C Ratio	1.90	0.46	3.26	3.26	1.28	1.28	0.10	1.08
Queue Delay	435.3	32.6	1060.6	154.9	11.8	11.8	71.0	71.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	435.3	32.6	1060.6	154.9	11.8	11.8	71.0	71.0
LOS	F	C	F	F	B	B	E	E
Approach Delay	435.3	32.6	329.2	70.6				
Approach LOS	F	C	F	F				
Intersection Summary								
Cycle Length: 83								
Actuated Cycle Length: 83								
Natural Cycle: 75								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 3.26								
Intersection Signal Delay: 260.4								
Intersection Capacity Utilization 131.1%								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis 8. Highway 37 & Harmony Road

<Total 2056> PM Peak Hour

03-11-2025

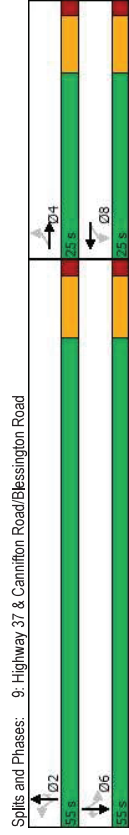
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	253	151	251	40	44	2	216	835	71	6	585	347
Future Volume (vph)	253	151	251	40	44	2	216	835	71	6	585	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.95	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.94
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695
Flt Permitted	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	1448	1448	1448	1448	1448	1448	1448	1448	1448	1448	1448	1448
Peak-hour factor, PHF	0.88	0.88	0.88	0.73	0.73	0.73	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	288	172	285	55	60	3	277	1071	91	7	665	394
RTOR Reduction (vph)	0	27	0	0	1	0	0	4	0	0	26	0
Lane Group Flow (vph)	0	718	0	0	117	0	277	1158	0	7	1033	0
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%	11%	25%	5%	10%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	366	256	85	905	905	0.73	0.73	0.73	0.73	73	958	0.62
v/s Ratio Prot	c0.50	0.11	c1.85	3.26	3.26	1.28	1.28	1.28	1.28	0.10	1.08	0.05
v/s Ratio Perm	1.96	0.46	0.46	17.8	17.8	17.8	17.8	17.8	17.8	8.1	17.8	0.05
Uniform Delay, d1	31.0	26.2	26.2	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	442.7	1.3	1.3	1046.2	134.4	2.6	52.7	52.7	52.7	2.6	52.7	52.7
Delay (s)	473.7	27.5	27.5	1064.0	152.2	10.7	70.5	70.5	70.5	10.7	70.5	70.5
Level of Service	F	C	C	F	F	F	B	B	B	E	E	E
Approach Delay (s)	473.7	27.5	27.5	327.7	327.7	327.7	70.1	70.1	70.1	70.1	70.1	70.1
Approach LOS	F	C	C	F	F	F	B	B	B	E	E	E
Intersection Summary												
HCM 2000 Control Delay	267.9											
HCM 2000 Volume to Capacity ratio	2.84											
Actuated Cycle Length (s)	83.0											
Intersection Capacity Utilization	131.1%											
Analysis Period (min)	15											
c. Critical Lane Group												

Timings 9. Highway 37 & Cannifton Road/Blessington Road

<Total 2056> PM Peak Hour

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Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	201	89	68	65	6	1008	194	31	709	73
Future Volume (vph)	201	89	68	65	6	1008	194	31	709	73
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6	6
Detector Phase	4	4	8	8	2	2	6	6	6	6
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Minimum Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	18.0	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59
v/c Ratio	1.56	1.56	1.56	1.56	0.61	0.61	0.61	0.61	0.61	0.61
Control Delay	294.5	37.0	37.0	37.0	7.8	151.7	2.0	25.5	20.4	2.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	294.5	37.0	37.0	37.0	7.8	151.7	2.0	25.5	20.4	2.0
LOS	F	D	D	D	A	F	A	C	C	A
Approach Delay	294.5	37.0	37.0	37.0	127.0	127.0	127.0	18.9	18.9	18.9
Approach LOS	F	D	D	D	F	F	F	B	B	B
Intersection Summary										
Cycle Length: 80										
Actuated Cycle Length: 80										
Natural Cycle: 150										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.56										
Intersection Signal Delay: 103.9										
Intersection Capacity Utilization 87.9%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
9: Highway 37 & Cannifton Road/Blessington Road

<Total 2056> PM Peak Hour
03-11-2025

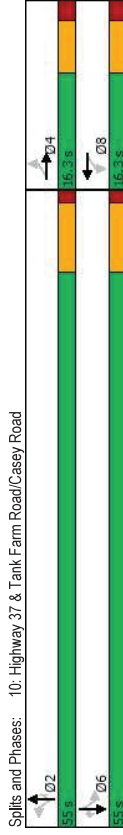
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	201	89	4	68	65	9	6	1008	194	31	709	73
Future Volume (vph)	201	89	4	68	65	9	6	1008	194	31	709	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	1.00	1.00	0.85	1.00	1.00	1.00	0.85	1.00	1.00
Flt Protected	0.97	0.98	0.98	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1721	1682	1682	1444	1610	1262	1770	1827	1553	1721	1682	1682
Flt Permitted	0.69	0.78	0.78	0.17	1.00	1.00	0.08	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1235	1348	1348	262	1610	1262	157	1827	1553	262	1610	1262
Peak-hour factor, PHF	0.68	0.68	0.68	0.76	0.76	0.76	0.83	0.83	0.83	0.81	0.81	0.81
Adj. Flow (vph)	296	131	6	89	86	12	7	1214	234	38	875	90
RTOR Reduction (vph)	0	1	0	0	3	0	0	95	0	0	37	37
Lane Group Flow (vph)	0	432	0	0	184	0	7	1214	139	38	875	53
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	18.0	18.0	18.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.22	0.22	0.22	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	277	303	303	155	953	747	93	1082	920	1082	920	920
v/s Ratio Prot	c0.35	0.14	0.14	0.03	0.03	0.11	0.24	0.48	0.03	0.48	0.03	0.03
v/s Ratio Perm	1.56	0.81	0.81	0.05	0.05	0.19	0.41	0.81	0.05	0.81	0.05	0.05
Uniform Delay, d1	31.0	27.8	27.8	6.8	6.8	6.8	7.5	8.8	6.8	7.5	8.8	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	289.1	3.4	3.4	0.5	0.5	0.5	0.5	12.8	0.5	12.8	6.5	0.1
Delay (s)	300.1	31.2	31.2	7.4	147.8	8.0	21.5	19.3	7.0	21.5	19.3	7.0
Level of Service	F	C	C	A	F	A	C	B	A	C	B	A
Approach Delay (s)	300.1	31.2	31.2	124.6	124.6	124.6	18.3	18.3	18.3	18.3	18.3	18.3
Approach LOS	F	C	C	F	F	F	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	105.0											
HCM 2000 Level of Service	F											
HCM 2000 Volume to Capacity ratio	1.35											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	87.9%											
Analysis Period (min)	15											
c. Critical Lane Group												



Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2056> PM Peak Hour
03-11-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	51	100	100	78	72	1101	96	19	697	27
Future Volume (vph)	51	100	100	78	72	1101	96	19	697	27
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	6	6	6	6
Permitted Phases	4	4	8	8	2	2	6	6	6	6
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Minimum Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Effct Green (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	1.24	1.24	1.24	1.24	0.31	0.31	0.31	0.31	0.31	0.31
Control Delay	170.1	170.1	170.1	170.1	8.1	103.3	1.1	10.6	11.6	0.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	170.1	170.1	170.1	170.1	8.1	103.3	1.1	10.6	11.6	0.9
LOS	F	F	F	F	A	F	A	B	B	A
Approach Delay	170.1	170.1	170.1	170.1	90.2	11.2	11.2	11.2	11.2	11.2
Approach LOS	F	F	F	F	F	B	B	B	B	B
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 150										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.65										
Intersection Signal Delay: 92.9										
Intersection Capacity Utilization 91.9%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
 10: Highway 37 & Tank Farm Road/Casey Road

HCM Unsignalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	51	100	57	100	78	23	72	1101	96	19	697	27
Future Volume (vph)	51	100	57	100	78	23	72	1101	96	19	697	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3			6.3			7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96			0.98			1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.99			0.98			0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1772			1747			1770	1863	1968	1770	1776	1583
Flt Permitted	0.84			0.51			0.25	1.00	1.00	0.08	1.00	1.00
Satd. Flow (perm)	1505			918			459	1863	1568	156	1776	1583
Peak-hour factor, PHF	0.73	0.73	0.73	0.91	0.91	0.91	0.75	0.75	0.75	0.82	0.82	0.82
Adj. Flow (vph)	70	137	78	110	86	25	96	1468	128	23	850	33
RTOR Reduction (vph)	0	19	0	0	6	0	0	0	42	0	0	11
Lane Group Flow (vph)	0	266	0	0	215	0	96	1468	86	23	850	22
Heavy Vehicles (%)	2%	2%	2%	7%	2%	2%	2%	2%	3%	2%	7%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4			8			2		2		6	
Permitted Phases												
Actuated Green, G (s)	10.0			10.0			47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0			10.0			47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14			0.14			0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3			6.3			7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0			3.0			4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	211			128			308	1251	1053	104	1193	1063
v/s Ratio Prot							c0.79				0.48	
v/s Ratio Perm	0.18			c0.23			0.21		0.05	0.15		0.01
v/c Ratio	1.26			1.68			0.31	1.17	0.08	0.22	0.71	0.02
Uniform Delay, d1	30.6			30.6			4.9	11.7	4.1	4.5	7.4	3.9
Progression Factor	1.00			1.00			1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	149.8			337.3			1.1	86.8	0.1	4.8	3.6	0.0
Delay (s)	180.4			368.0			6.0	98.5	4.1	9.4	11.0	3.9
Level of Service	F			F			A	F	A	A	B	A
Approach Delay (s)	180.4			368.0			86.1				10.7	
Approach LOS	F			F			F				B	
Intersection Summary												
HCM 2000 Control Delay	92.8 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	1.26											
Actuated Cycle Length (s)	71.3 Sum of lost time (s)											
Intersection Capacity Utilization	91.9% ICU Level of Service											
Analysis Period (min)	15											
c. Critical Lane Group												

Movement	EBL	EBT	EBT	WBT	WBR	SBL	SBR
Lane Configurations							
Traffic Volume (veh/h)	134	505	435	116	121	100	100
Future Volume (Veh/h)	134	505	435	116	121	100	100
Sign Control	Free	Free	Free	Free	Stop	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	146	549	473	126	132	109	109
Pedestrians							
Lane Width (m)							
Walking Speed (m/s)							
Percent Blockage							
Right turn flare (veh)		None					
Median type							
Median storage (veh)							
Upstream signal (m)							
pX platoon unblocked							
VC conflicting volume	599				1377	536	
VC1 stage 1 conf vol							
VC2 stage 2 conf vol							
VCu unblocked vol	599				1377	536	
IC single (s)	4.1				6.4	6.2	
IC 2 stage (s)	2.2				3.5	3.3	
IF (s)	2.2				3.5	3.3	
p0 queue free %	85				3	80	
cM capacity (veh/h)	978				136	545	
Direction, Lane #	EB 1	WB 1	SB 1				
Volume Total	695	599	241				
Volume Left	146	0	132				
Volume Right	0	126	109				
cSH	978	1700	206				
Volume to Capacity	0.15	0.35	1.17				
Queue Length 95th (m)	4.2	0.0	95.7				
Control Delay (s)	3.6	0.0	164.6				
Lane LOS	A	F	F				
Approach Delay (s)	3.6	0.0	164.6				
Approach LOS	F		F				
Intersection Summary							
Average Delay	27.5						
Intersection Capacity Utilization	86.8%						
ICU Level of Service	E						
Analysis Period (min)	15						

HCM Unsignalized Intersection Capacity Analysis
12: Harmony Road & Proposed Site Access 3

<Total 2056> PM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		W	
Traffic Volume (veh/h)	137	561	474	129	103	88
Future Volume (Veh/h)	137	561	474	129	103	88
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	149	610	515	140	112	96
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	655				1493	585
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	655				1493	585
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	84				2	81
cM capacity (veh/h)	932				114	511
Direction_Lane #	EB 1	WB 1	SB 1			
Volume Total	759	655	208			
Volume Left	149	0	112			
Volume Right	0	140	96			
cSH	932	1700	178			
Volume to Capacity	0.16	0.39	1.17			
Queue Length 95th (m)	4.5	0.0	87.4			
Control Delay (s)	3.8	0.0	173.7			
Lane LOS	A	F	F			
Approach Delay (s)	3.8	0.0	173.7			
Approach LOS		F	F			
Intersection Summary						
Average Delay			24.1			E
Intersection Capacity Utilization			91.0%			
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
13: Harmony Road & Proposed Site Access 4

<Total 2056> PM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		W	
Traffic Volume (veh/h)	40	624	563	49	39	32
Future Volume (Veh/h)	40	624	563	49	39	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	678	612	53	42	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)			130			
pX platoon unblocked	0.94				0.94	0.94
VC conflicting volume	665				1402	638
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	612				1396	584
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	95				70	93
cM capacity (veh/h)	909				139	481
Direction_Lane #	EB 1	WB 1	SB 1			
Volume Total	721	665	77			
Volume Left	43	0	42			
Volume Right	0	53	35			
cSH	909	1700	206			
Volume to Capacity	0.05	0.39	0.37			
Queue Length 95th (m)	1.2	0.0	13.0			
Control Delay (s)	1.2	0.0	32.6			
Lane LOS	A	D	D			
Approach Delay (s)	1.2	0.0	32.6			
Approach LOS		D	D			
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			76.4%			D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
14: Homan Road & Proposed Site Access 5

<Total 2056> PM Peak Hour
03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	63	0	0	79	0	0
Future Volume (Veh/h)	63	0	0	79	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	0	0	86	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	43	43			86	
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	43	43			86	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	968	1027			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	86	0			
Volume Left	68	0	0			
Volume Right	0	86	0			
cSH	968	1700	1700			
Volume to Capacity	0.07	0.05	0.00			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			15.0%		ICU Level of Service	A
Analysis Period (min)			15			

Queuing and Blocking Report
Trans-Plan

<Total 2056> PM Peak Hour
03-11-2025

Intersection: 1: Highway 62 & Ashley Street										
Movement	WB	NB	NB	SB	SB	SB	L	R	T	T
Directions Served	LR									
Maximum Queue (m)	295.6	549.8	555.3	119.5	15.6	42.8	41.7			
Average Queue (m)	262.4	256.6	329.2	104.5	6.5	26.9	24.3			
95th Queue (m)	282.9	455.2	590.1	159.8	15.2	40.6	39.3			
Link Distance (m)	460.8	539.5	539.5		617.0	617.0				
Upstream Blk Time (%)		1	2							
Queuing Penalty (veh)		0	0							
Storage Bay Dist (m)				38.0	30.5					
Storage Blk Time (%)				40	2	3				
Queuing Penalty (veh)				356	18	1				
Intersection: 2: Ashley Street & Harmony Road										
Movement	WB	NB	SB							
Directions Served	LR	TR	LT							
Maximum Queue (m)	516.2	15.4	96.0							
Average Queue (m)	513.5	5.8	41.2							
95th Queue (m)	516.1	13.4	76.8							
Link Distance (m)	510.9	460.8	376.6							
Upstream Blk Time (%)	66									
Queuing Penalty (veh)	406									
Storage Bay Dist (m)										
Storage Blk Time (%)										
Queuing Penalty (veh)										
Intersection: 3: River Road & Harmony Road										
Movement	EB	WB	NB	SB						
Directions Served	LTR	LTR	LTR	LTR						
Maximum Queue (m)	7.8	967.2	220.4	71.9						
Average Queue (m)	0.4	785.1	214.6	25.6						
95th Queue (m)	3.2	1189.2	228.4	59.5						
Link Distance (m)	510.9	962.1	215.8	332.3						
Upstream Blk Time (%)		23	92							
Queuing Penalty (veh)		114	0							
Storage Bay Dist (m)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 4: Harmony Road & Homan Road					
Movement	EB	WB	SB	EB	WB
Directions Served	LT	TR	LR		
Maximum Queue (m)	23.1	48.6	212.2		
Average Queue (m)	5.7	18.6	60.5		
95th Queue (m)	18.9	52.2	175.1		
Link Distance (m)	962.1	41.0	291.4		
Upstream Blk Time (%)	20				
Queuing Penalty (veh)	100				
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 5: Plumpton & Harmony Road					
Movement	WB	NB	WB	NB	WB
Directions Served	LT	LR			
Maximum Queue (m)	204.5	15.8			
Average Queue (m)	48.9	7.7			
95th Queue (m)	154.6	14.1			
Link Distance (m)	902.5	551.1			
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access					
Movement	EB	WB	SB	EB	WB
Directions Served	LT	TR	LR		
Maximum Queue (m)	47.2	6.8	103.0		
Average Queue (m)	21.3	0.2	39.3		
95th Queue (m)	41.0	2.2	75.7		
Link Distance (m)	902.5	470.1	388.9		
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 7: Harmony Public School & Harmony Road					
Movement	EB	NB	EB	NB	EB
Directions Served	TR	LR			
Maximum Queue (m)	102.4	216.8			
Average Queue (m)	94.3	145.4			
95th Queue (m)	123.1	280.2			
Link Distance (m)	97.7	212.2			
Upstream Blk Time (%)	27	46			
Queuing Penalty (veh)	170	0			
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 8: Highway 37 & Harmony Road					
Movement	EB	WB	NB	SB	EB
Directions Served	LTR	LTR	L	TR	L
Maximum Queue (m)	110.6	46.9	157.4	2736.5	181.7
Average Queue (m)	109.1	15.7	158.9	2686.2	18.3
95th Queue (m)	110.9	32.9	158.6	3009.5	108.2
Link Distance (m)	106.5	263.1	2731.8	954.8	
Upstream Blk Time (%)	57		26	11	
Queuing Penalty (veh)	377		317	0	
Storage Bay Dist (m)		79.5	82.0		
Storage Blk Time (%)		100		49	
Queuing Penalty (veh)		905		3	

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road					
Movement	EB	WB	NB	SB	EB
Directions Served	LTR	LTR	L	T	R
Maximum Queue (m)	312.2	104.7	181.8	785.3	153.0
Average Queue (m)	197.8	33.6	12.4	697.4	113.2
95th Queue (m)	335.8	73.9	87.1	1016.3	222.1
Link Distance (m)	437.7	564.0	780.7	2731.8	
Upstream Blk Time (%)			20	1	
Queuing Penalty (veh)			236	13	
Storage Bay Dist (m)		82.0	85.0	75.0	
Storage Blk Time (%)			89	0	
Queuing Penalty (veh)			177	0	

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road

Movement	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB	EB	WB	NB	SB
Directions Served	LTR	LTR	L	T	R	L	T	R	L	T	R	L	T	R	L	T
Maximum Queue (m)	237.6	402.5	166.0	416.9	167.0	7.9	91.0	17.0								
Average Queue (m)	115.1	326.3	66.5	332.9	72.5	2.2	37.4	1.8								
95th Queue (m)	198.6	430.8	199.7	568.5	208.8	7.7	77.4	7.7								
Link Distance (m)	593.4	692.0	405.0													
Upstream Blk Time (%)			72													
Queuing Penalty (veh)			0													
Storage Bay Dist (m)			66.0													
Storage Blk Time (%)			73													
Queuing Penalty (veh)			122													

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	WB	SB	EB	WB	SB
Directions Served	LT	TR	LR			
Maximum Queue (m)	357.3	6.6	149.1			
Average Queue (m)	120.5	0.2	94.6			
95th Queue (m)	312.2	2.2	172.1			
Link Distance (m)	470.1	97.7	145.5			
Upstream Blk Time (%)			31			
Queuing Penalty (veh)			0			
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	WB	SB	EB	WB	SB
Directions Served	LT	TR	LR			
Maximum Queue (m)	69.4	6.1	154.3			
Average Queue (m)	66.7	0.2	140.9			
95th Queue (m)	68.4	2.0	146.4			
Link Distance (m)	64.8	259.1	138.4			
Upstream Blk Time (%)			98			
Queuing Penalty (veh)			0			
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 13: Harmony Road & Proposed Site Access 4

Movement	EB	SB	EB	SB
Directions Served	LT	LR		
Maximum Queue (m)	263.8	287.3		
Average Queue (m)	262.5	261.4		
95th Queue (m)	264.0	307.1		
Link Distance (m)	259.1	268.0		
Upstream Blk Time (%)	47	83		
Queuing Penalty (veh)	310	0		
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 14: Homan Road & Proposed Site Access 5

Movement	WB	WB
Directions Served	LR	
Maximum Queue (m)	15.6	
Average Queue (m)	8.6	
95th Queue (m)	13.9	
Link Distance (m)	272.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 3903

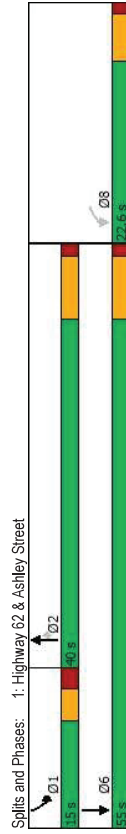
Timings

1: Highway 62 & Ashley Street

<Total 2056> Saturday Peak Hour

03-11-2025

	WBL	NBT	NBR	SBL	SBT
Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	WBL	NBT	NBR	SBL	SBT
Traffic Volume (vph)	463	1566	784	21	837
Future Volume (vph)	463	1566	784	21	837
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases	8	2	2	1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase	8	2	2	1	6
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	22.6	40.0	40.0	15.0	55.0
Total Split (%)	29.1%	51.5%	51.5%	19.3%	70.9%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	17.0	42.7	42.7	7.3	47.8
Actuated g/C Ratio	0.22	0.55	0.55	0.09	0.62
v/c Ratio	1.45	0.85	0.78	0.14	0.46
Control Delay	244.4	22.7	14.1	34.2	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	244.4	22.7	14.1	34.2	8.9
LOS	F	C	B	C	A
Approach Delay	244.4	19.9			9.5
Approach LOS	F	B			A
Intersection Summary					
Cycle Length: 77.6					
Actuated Cycle Length: 77.6					
Natural Cycle: 720					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 1.45					
Intersection Signal Delay: 47.7					
Intersection LOS: D					
Intersection Capacity Utilization 82.0%					
Analysis Period (min) 15					



HCM Signalized Intersection Capacity Analysis

1: Highway 62 & Ashley Street

<Total 2056> Saturday Peak Hour

03-11-2025

	WBL	WBR	NBT	NBR	SBL	SBT
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	463	40	1566	784	21	837
Future Volume (vph)	463	40	1566	784	21	837
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	7.2
Lane Util. Factor	1.00	0.95	1.00	1.00	1.00	0.95
Frt	0.99	1.00	0.85	1.00	1.00	1.00
Flt Protected	0.96	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1686	3539	1568	1770	3374	3374
Flt Permitted	0.96	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1686	3539	1568	1770	3374	3374
Peak-hour factor, PHF	0.93	0.93	0.95	0.95	0.87	0.87
Adj. Flow (vph)	498	43	1648	825	24	962
RTOR Reduction (vph)	4	0	0	207	0	0
Lane Group Flow (vph)	537	0	1648	618	24	962
Heavy Vehicles (%)	7%	2%	2%	3%	2%	7%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases	8		2	1	6	
Permitted Phases	8		2	2		
Actuated Green, G (s)	17.0		42.7	42.7	3.1	50.8
Effective Green, g (s)	17.0		42.7	42.7	3.1	50.8
Actuated g/C Ratio	0.21		0.53	0.53	0.04	0.63
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	355		1874	830	68	2126
v/s Ratio Prot	c0.32		c0.47	0.01	c0.29	
v/s Ratio Perm	1.51		0.88	0.74	0.35	0.45
Uniform Delay, d1	31.8		16.7	14.7	37.8	7.7
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	244.9		6.3	6.0	3.1	0.7
Delay (s)	276.7		23.0	20.7	40.9	8.4
Level of Service	F		C	C	D	A
Approach Delay (s)	276.7		22.2		9.2	
Approach LOS	F		C		A	
Intersection Summary						
HCM 2000 Control Delay			53.4		HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio			1.05			
Actuated Cycle Length (s)			80.6		Sum of lost time (s)	17.8
Intersection Capacity Utilization			82.0%		ICU Level of Service	E
Analysis Period (min)			15			
c. Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 2. Ashley Street & Harmony Road
 <Total 2056> Saturday Peak Hour
 03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	271	229	146	403	309	128
Future Volume (Veh/h)	271	229	146	403	309	128
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.88	0.88	0.90	0.90	0.80	0.80
Hourly flow rate (vph)	308	260	162	448	386	160
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	1318	386			610	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	1318	386			610	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	0	61			60	
cM capacity (veh/h)	104	662			969	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	568	610	546			
Volume Left	308	0	386			
Volume Right	260	448	0			
cSH	170	1700	969			
Volume to Capacity	3.34	0.36	0.40			
Queue Length 95th (m)	Err	0.0	15.5			
Control Delay (s)	Err	0.0	9.3			
Lane LOS	F	A	A			
Approach Delay (s)	Err	0.0	9.3			
Approach LOS	F					
Intersection Summary						
Average Delay			3297.3			F
Intersection Capacity Utilization			95.4%		ICU Level of Service	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 3. River Road & Harmony Road
 <Total 2056> Saturday Peak Hour
 03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4	4		4			4			4	4
Traffic Volume (veh/h)	26	684	50	61	338	14	93	10	60	26	7	7
Future Volume (Veh/h)	26	684	50	61	338	14	93	10	60	26	7	7
Sign Control		Free	Free		Free			Stop			Stop	Stop
Grade		0%	0%		0%			0%			0%	0%
Peak Hour Factor	0.86	0.86	0.86	0.80	0.80	0.80	0.72	0.72	0.72	0.39	0.39	0.39
Hourly flow rate (vph)	30	795	58	76	422	18	129	14	83	67	18	18
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type												
Median storage (veh)												
Upstream signal (m)												
pX platoon unblocked												
VC conflicting volume	440			853			1494	1476	824	1557	1496	431
VC1 stage 1 conf vol												
VC2 stage 2 conf vol												
VCu unblocked vol	440			853			1494	1476	824	1557	1496	431
IC single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
IC 2 stage (s)												
IF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			90			0	87	78	0	83	97
cM capacity (veh/h)	1120			786			78	111	373	58	108	624
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	883	516	226	103								
Volume Left	30	76	129	67								
Volume Right	58	18	83	18								
cSH	1120	786	113	77								
Volume to Capacity	0.03	0.10	2.00	1.34								
Queue Length 95th (m)	0.7	2.6	149.3	64.5								
Control Delay (s)	0.7	2.6	543.7	313.5								
Lane LOS	A	A	F	F								
Approach Delay (s)	0.7	2.6	543.7	313.5								
Approach LOS	F		F	F								
Intersection Summary												
Average Delay				90.9								
Intersection Capacity Utilization				63.4%						ICU Level of Service		B
Analysis Period (min)				15								

HCM Unsignalized Intersection Capacity Analysis
 4: Harmony Road & Homan Road

HCM Unsignalized Intersection Capacity Analysis
 5: Plumpton & Harmony Road

Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations		4	4	4	4	
Traffic Volume (veh/h)	52	569	395	36	40	40
Future Volume (Veh/h)	52	569	395	36	40	40
Sign Control		Free	Free	Stop	Stop	
Grade		0%	0%	0%	0%	
Peak Hour Factor	0.80	0.80	0.66	0.66	0.50	0.50
Hourly flow rate (vph)	65	711	598	55	80	80
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	653			1466	626	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	653			1466	626	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)	2.2			3.5	3.3	
p0 queue free %	93			39	83	
IF (s)	934			131	484	
CM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	776	653	160			
Volume Left	65	0	80			
Volume Right	0	55	80			
cSH	934	1700	206			
Volume to Capacity	0.07	0.38	0.78			
Queue Length 95th (m)	1.8	0.0	43.0			
Control Delay (s)	1.8	0.0	64.9			
Lane LOS	A		F			
Approach Delay (s)	1.8	0.0	64.9			
Approach LOS			F			
Intersection Summary						
Average Delay			7.4			
Intersection Capacity Utilization			70.5%		ICU Level of Service	C
Analysis Period (min)			15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	4	4	4	4	4	4
Traffic Volume (veh/h)	696	18	40	487	7	40
Future Volume (Veh/h)	696	18	40	487	7	40
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.91	0.91	0.74	0.74	0.50	0.50
Hourly flow rate (vph)	765	20	54	658	14	80
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None		None		
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol						
IC single (s)						
IC 2 stage (s)						
p0 queue free %						
IF (s)						
p0 capacity (veh/h)						
CM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	785	712	94			
Volume Left	0	54	14			
Volume Right	20	0	80			
cSH	1700	834	295			
Volume to Capacity	0.46	0.06	0.32			
Queue Length 95th (m)	0.0	1.7	10.7			
Control Delay (s)	0.0	1.7	22.8			
Lane LOS	A		C			
Approach Delay (s)	0.0	1.7	22.8			
Approach LOS			C			
Intersection Summary						
Average Delay			2.1			
Intersection Capacity Utilization			68.7%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

HCM Unsignalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2056> Saturday Peak Hour
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<Total 2056> Saturday Peak Hour
03-11-2025

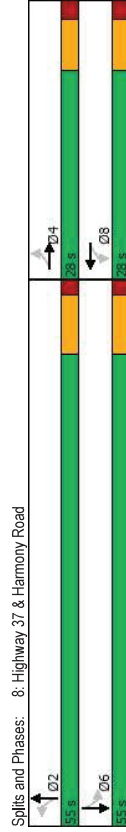
Movement	EBL	EBT	WBT	SBL	SBR	
Lane Configurations						
Traffic Volume (veh/h)	158	452	342	124	140	111
Future Volume (Veh/h)	158	452	342	124	140	111
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.60	0.60	0.70	0.70	0.92	0.92
Hourly flow rate (vph)	263	753	489	177	152	121
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	666			1856	578	
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	666			1856	578	
IC single (s)	4.1			6.4	6.2	
IC 2 stage (s)						
IF (s)	2.2			3.5	3.3	
p0 queue free %	72			0	77	
cM capacity (veh/h)	923			58	516	
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	1016	666	273			
Volume Left	263	0	152			
Volume Right	0	177	121			
cSH	923	1700	95			
Volume to Capacity	0.28	0.39	2.86			
Queue Length 95th (m)	9.4	0.0	208.9			
Control Delay (s)	6.7	0.0	934.5			
Lane LOS	A	F	F			
Approach Delay (s)	6.7	0.0	934.5			
Approach LOS	F		F			
Intersection Summary						
Average Delay			134.0			E
Intersection Capacity Utilization			82.6%			ICU Level of Service
Analysis Period (min)			15			

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	507	0	0	375	2	0
Future Volume (Veh/h)	507	0	0	375	2	0
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%	0%	0%	0%	0%	
Peak Hour Factor	0.58	0.58	0.74	0.74	0.92	0.92
Hourly flow rate (vph)	874	0	0	507	2	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None	None	None			
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked			874		1381	874
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol			874		1381	874
IC single (s)			4.1		6.4	6.2
IC 2 stage (s)						
IF (s)			2.2		3.5	3.3
p0 queue free %			100		99	100
cM capacity (veh/h)			772		159	349
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	874	507	2			
Volume Left	0	0	2			
Volume Right	0	0	0			
cSH	1700	772	159			
Volume to Capacity	0.51	0.00	0.01			
Queue Length 95th (m)	0.0	0.0	0.3			
Control Delay (s)	0.0	0.0	28.0			
Lane LOS		D	D			
Approach Delay (s)	0.0	0.0	28.0			
Approach LOS		D				
Intersection Summary						
Average Delay			0.0			
Intersection Capacity Utilization			36.7%			A
Analysis Period (min)			15			

Timings
8: Highway 37 & Harmony Road

<Total 2056> Saturday Peak Hour
03-11-2025

	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBT
Traffic Volume (vph)	220	129	35	56	210	433	434
Future Volume (vph)	220	129	35	56	210	433	434
Turn Type	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	4	8	8	2	2	6
Permitted Phases	4	4	8	8	2	2	6
Detector Phase	4	4	8	8	2	2	6
Switch Phase							
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	27.6	27.6	27.6
Total Split (s)	28.0	28.0	28.0	28.0	55.0	55.0	55.0
Total Split (%)	33.7%	33.7%	33.7%	33.7%	66.3%	66.3%	66.3%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6
Lead/Lag							
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max
Act Eff Green (s)	21.0	21.0	21.0	21.0	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.57	0.57	0.57
v/c Ratio	2.12	0.43	0.81	0.47	0.70	0.70	0.70
Control Delay	534.9	30.2	40.9	12.1	16.4	16.4	16.4
Queue Delay	534.9	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	534.9	30.2	40.9	12.1	16.4	16.4	16.4
LOS	F	C	D	B	B	B	B
Approach Delay	534.9	30.2	40.9	12.1	16.4	16.4	16.4
Approach LOS	F	C	C	C	B	B	B
Intersection Summary							
Cycle Length: 83							
Actuated Cycle Length: 83							
Natural Cycle: 150							
Control Type: Semi Act-Uncoord							
Maximum v/c Ratio: 2.12							
Intersection Signal Delay: 202.1							
Intersection Capacity Utilization 111.4%							
Analysis Period (min) 15							



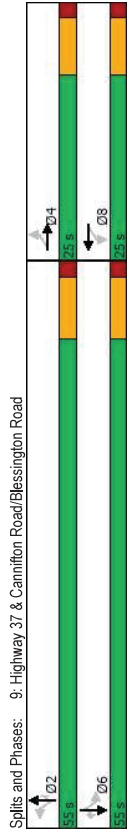
HCM Signalized Intersection Capacity Analysis
8: Highway 37 & Harmony Road

<Total 2056> Saturday Peak Hour
03-11-2025

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	220	129	244	35	56	6	210	433	35	0	434	210
Future Volume (vph)	220	129	244	35	56	6	210	433	35	0	434	210
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.94	0.98	0.98	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1727	1727	1727	1727	1727	1727	1770	1770	1770	1770	1770	1770
Flt Permitted	0.84	0.84	0.84	0.84	0.84	0.84	0.86	0.86	0.86	0.86	0.86	0.86
Satd. Flow (perm)	1481	1481	1481	1481	1481	1481	1505	1505	1505	1505	1505	1505
Peak-hour factor, PHF	0.69	0.69	0.69	0.74	0.74	0.74	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	319	187	354	47	76	8	221	456	37	0	488	236
RTOR Reduction (vph)	0	31	0	0	3	0	0	3	0	0	21	0
Lane Group Flow (vph)	0	829	0	0	128	0	221	490	0	0	703	0
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	47.4	47.4	47.4	47.4	47.4	47.4
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.57	0.57	0.57	0.57	0.57	0.57
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	374	374	374	304	304	304	271	1048	271	1048	1011	1011
v/s Ratio Prot	c0.56	c0.56	c0.56	0.11	0.11	0.11	c0.46	0.27	c0.46	0.27	0.40	0.40
v/s Ratio Perm	2.22	2.22	2.22	0.42	0.42	0.42	0.82	0.47	0.82	0.47	0.70	0.70
Uniform Delay, d1	31.0	31.0	31.0	25.9	25.9	25.9	14.3	10.4	14.3	10.4	12.7	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	556.5	556.5	556.5	0.9	0.9	0.9	23.0	1.5	23.0	1.5	3.9	3.9
Delay (s)	587.5	587.5	587.5	26.9	26.9	26.9	37.3	11.9	37.3	11.9	16.6	16.6
Level of Service	F	F	F	C	C	C	D	B	D	B	B	B
Approach Delay (s)	587.5	587.5	587.5	26.9	26.9	26.9	19.8	13.8	19.8	13.8	16.6	16.6
Approach LOS	F	F	F	C	C	C	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	220.2	220.2	220.2	HCM 2000 Level of Service	HCM 2000 Level of Service	HCM 2000 Level of Service	F	F	F	F	F	F
HCM 2000 Volume to Capacity ratio	1.24	1.24	1.24	Sum of lost time (s)	Sum of lost time (s)	Sum of lost time (s)	14.6	14.6	14.6	14.6	14.6	14.6
Actuated Cycle Length (s)	83.0	83.0	83.0	ICU Level of Service	ICU Level of Service	ICU Level of Service	H	H	H	H	H	H
Intersection Capacity Utilization	111.4%	111.4%	111.4%	Analysis Period (min)	Analysis Period (min)	Analysis Period (min)	15	15	15	15	15	15
c. Critical Lane Group												

Timings
9: Highway 37 & Cannifton Road/Blessington Road <Total 2056> Saturday Peak Hour 03-11-2025

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	153	68	54	50	4	836	151	27	607	67	
Traffic Volume (vph)	153	68	54	50	4	836	151	27	607	67	
Future Volume (vph)	153	68	54	50	4	836	151	27	607	67	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	4	4	8	8	2	2	2	2	6	6	
Permitted Phases	4	4	8	8	2	2	2	2	6	6	
Detector Phase	4	4	8	8	2	2	2	2	6	6	
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0	
Minimum Initial (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6	
Minimum Split (s)	25.0	25.0	25.0	25.0	55.0	55.0	55.0	55.0	55.0	55.0	
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	
Total Split (%)	31.3%	31.3%	31.3%	31.3%	68.8%	68.8%	68.8%	68.8%	68.8%	68.8%	
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9	
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Lead/Lag	None	None	None	None	Max	Max	Max	Max	Max	Max	
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max	Max	Max	
Recall Mode	17.0	17.0	47.4	47.4	47.4	47.4	47.4	47.4	47.4	47.4	
Act Eff Green (s)	0.22	0.22	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Actuated g/C Ratio	0.86	0.86	0.50	0.83	0.17	0.19	0.63	0.08	0.08	0.08	
v/c Ratio	58.6	32.7	7.0	21.5	1.7	11.0	13.9	2.1	2.1	2.1	
Control Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Queue Delay	58.6	32.7	7.0	21.5	1.7	11.0	13.9	2.1	2.1	2.1	
Total Delay	58.6	32.7	7.0	21.5	1.7	11.0	13.9	2.1	2.1	2.1	
LOS	E	C	A	C	A	C	A	B	B	A	
Approach Delay	58.6	32.7	18.4								
Approach LOS	E	C	B								
Intersection Summary											
Cycle Length: 80											
Actuated Cycle Length: 79											
Natural Cycle: 75											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.86											
Intersection Signal Delay: 21.8											
Intersection Capacity Utilization 74.3%											
Analysis Period (min) 15											



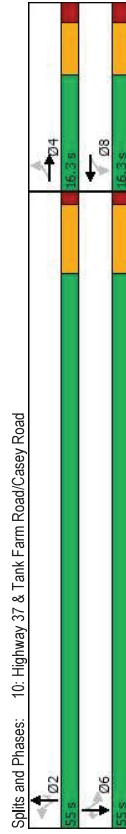
HCM Signalized Intersection Capacity Analysis
9: Highway 37 & Cannifton Road/Blessington Road <Total 2056> Saturday Peak Hour 03-11-2025

	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	153	68	4	54	9	4	836	151	27	607	
Traffic Volume (vph)	153	68	4	54	9	4	836	151	27	607	
Future Volume (vph)	153	68	4	54	9	4	836	151	27	607	
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.99	0.99	0.99	0.99	0.95	0.95	0.95	0.95	0.95	0.95	
Flt Protected	0.97	0.97	0.97	0.97	0.95	0.95	0.95	0.95	0.95	0.95	
Satd. Flow (prot)	1756	1756	1753	1753	1770	1770	1770	1770	1759	1759	
Flt Permitted	0.74	0.74	0.77	0.77	0.32	0.32	0.32	0.32	0.14	0.14	
Satd. Flow (perm)	1336	1336	1379	1379	588	588	588	588	269	269	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.76	0.76	0.76	0.90	0.91	0.91	
Adj. Flow (vph)	168	75	4	71	66	12	4	929	168	30	
RTOR Reduction (vph)	0	1	0	0	4	0	0	0	67	0	
Lane Group Flow (vph)	0	246	0	0	145	0	4	929	101	30	
Heavy Vehicles (%)	2%	10%	2%	3%	7%	2%	2%	2%	2%	8%	
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	
Protected Phases	4	4	8	8	2	2	2	2	6	6	
Permitted Phases	4	4	8	8	2	2	2	2	6	6	
Actuated Green, G (s)	17.0	17.0	17.0	17.0	47.4	47.4	47.4	47.4	47.4	47.4	
Effective Green, g (s)	17.0	17.0	17.0	17.0	47.4	47.4	47.4	47.4	47.4	47.4	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.60	0.60	0.60	0.60	0.60	0.60	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)	287	296	296	296	352	1117	949	161	1055	905	
v/s Ratio Prot	c0.18	0.11	0.11	0.11	0.01	0.01	0.06	0.11	0.03	0.03	
v/s Ratio Perm	0.86	0.49	0.49	0.49	0.01	0.83	0.11	0.19	0.63	0.05	
Uniform Delay, d1	29.8	27.2	27.2	27.2	6.4	12.6	6.8	7.1	10.2	6.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	21.5	21.5	1.3	1.3	0.1	7.3	0.2	2.5	2.9	0.1	
Delay (s)	51.4	28.5	28.5	28.5	6.4	19.9	7.0	9.7	13.1	6.6	
Level of Service	D	D	C	C	A	B	A	A	B	A	
Approach Delay (s)	51.4	28.5	28.5	28.5	17.9				12.3		
Approach LOS	D	D	C	C	B				B		
Intersection Summary											
HCM 2000 Control Delay	20.3										
HCM 2000 Volume to Capacity ratio	0.84										
Actuated Cycle Length (s)	79.0										
Intersection Capacity Utilization	74.3%										
Analysis Period (min)	15										
c. Critical Lane Group											

Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2056> Saturday Peak Hour
03-11-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	42	78	78	78	63	57	882	74	16	594
Future Volume (vph)	42	78	78	78	63	57	882	74	16	594
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Detector Phase	4	4	8	8	2	2	2	2	6	6
Switch Phase	4	4	8	8	2	2	2	2	6	6
Minimum Initial (s)	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Total Split (s)	16.3	16.3	16.3	16.3	55.0	55.0	55.0	55.0	55.0	55.0
Total Split (%)	22.9%	22.9%	22.9%	22.9%	77.1%	77.1%	77.1%	77.1%	77.1%	77.1%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?	None	None	None	None	None	None	None	None	Max	Max
Recall Mode	None	None	None	None	None	None	None	None	Max	Max
Act Eff Green (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.99	0.99	1.49	0.21	0.74	0.08	0.08	0.60	0.03	0.03
Control Delay	90.4	90.4	278.6	6.6	12.3	1.3	4.9	9.2	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.4	90.4	278.6	6.6	12.3	1.3	4.9	9.2	0.0	0.0
LOS	F	F	A	A	B	A	A	A	A	A
Approach Delay	90.4	90.4	278.6	11.2	8.8					
Approach LOS	F	F	B	B						
Intersection Summary										
Cycle Length: 71.3										
Actuated Cycle Length: 71.3										
Natural Cycle: 80										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 1.49										
Intersection Signal Delay: 47.0										
Intersection Capacity Utilization 74.5%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2056> Saturday Peak Hour
03-11-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	8	8	2	2	2	2	6	6
Traffic Volume (vph)	42	78	78	78	63	57	882	74	16	594
Future Volume (vph)	42	78	78	78	63	57	882	74	16	594
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Flt Protected	0.99	0.99	0.98	0.98	0.95	0.95	0.95	0.95	0.95	0.95
Satd. Flow (prot)	1743	1743	1745	1745	1228	1228	1455	1770	1743	1770
Flt Permitted	0.82	0.82	0.84	0.84	0.33	0.33	0.33	0.20	0.20	0.20
Satd. Flow (perm)	1445	1445	1445	1445	426	426	1455	377	1743	1770
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.64	0.64	0.95	0.95	0.84	0.84
Adj. Flow (vph)	56	104	59	122	98	28	60	928	78	19
RTOR Reduction (vph)	0	19	0	0	6	0	0	26	0	0
Lane Group Flow (vph)	0	200	0	0	242	0	60	928	52	19
Heavy Vehicles (%)	5%	4%	2%	4%	3%	13%	47%	2%	11%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Effective Green, g (s)	10.0	10.0	10.0	10.0	47.9	47.9	47.9	47.9	47.9	47.9
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	202	202	159	159	286	286	977	253	1170	786
v/s Ratio Prot	0.14	0.14	c0.21	c0.21	0.14	0.14	0.04	0.05	0.41	0.41
v/s Ratio Perm	0.99	0.99	1.52	1.52	0.21	0.21	0.74	0.05	0.08	0.02
Uniform Delay, d1	30.6	30.6	30.6	30.6	4.5	4.5	7.7	4.0	4.0	6.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	60.4	60.4	284.2	284.2	0.7	0.7	2.8	0.0	0.6	2.3
Delay (s)	91.0	91.0	294.8	294.8	5.2	5.2	10.5	4.0	4.6	8.8
Level of Service	F	F	F	F	A	A	B	A	A	A
Approach Delay (s)	91.0	91.0	294.8	294.8	9.7	9.7			8.5	
Approach LOS	F	F	F	F	A	A			A	
Intersection Summary										
HCM 2000 Control Delay										
HCM 2000 Volume to Capacity ratio										
Actuated Cycle Length (s)										
Intersection Capacity Utilization										
Analysis Period (min)										
c. Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
11: Harmony Road & Proposed Site Access 2

HCM Unsignalized Intersection Capacity Analysis
12: Harmony Road & Proposed Site Access 3

Movement	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (veh/h)	133	462	362	104	133
Future Volume (Veh/h)	133	462	362	104	133
Sign Control	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	145	502	393	113	145
Pedestrians					
Lane Width (m)					
Walking Speed (m/s)					
Percent Blockage					
Right turn flare (veh)					
Median type		None			
Median storage (veh)					
Upstream signal (m)					
pX platoon unblocked					
VC conflicting volume	506			1242	450
VC1 stage 1 conf vol					
VC2 stage 2 conf vol					
VCu unblocked vol	506			1242	450
IC single (s)	4.1			6.4	6.2
IC 2 stage (s)					
IF (s)	2.2			3.5	3.3
p0 queue free %	86			13	82
cM capacity (veh/h)	1059			167	610
Direction, Lane #	EB 1	WB 1	SB 1		
Volume Total	647	506	257		
Volume Left	145	0	145		
Volume Right	0	113	112		
cSH	1059	1700	244		
Volume to Capacity	0.14	0.30	1.05		
Queue Length 95th (m)	3.8	0.0	85.4		
Control Delay (s)	3.4	0.0	116.5		
Lane LOS	A	F	F		
Approach Delay (s)	3.4	0.0	116.5		
Approach LOS		F	F		
Intersection Summary					
Average Delay			22.8		
Intersection Capacity Utilization			80.7%		ICU Level of Service D
Analysis Period (min)			15		

Movement	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (veh/h)	139	470	353	114	116
Future Volume (Veh/h)	139	470	353	114	116
Sign Control	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	151	511	384	124	126
Pedestrians					
Lane Width (m)					
Walking Speed (m/s)					
Percent Blockage					
Right turn flare (veh)					
Median type		None			
Median storage (veh)					
Upstream signal (m)					
pX platoon unblocked					
VC conflicting volume	508			1259	446
VC1 stage 1 conf vol					
VC2 stage 2 conf vol					
VCu unblocked vol	508			1259	446
IC single (s)	4.1			6.4	6.2
IC 2 stage (s)					
IF (s)	2.2			3.5	3.3
p0 queue free %	86			22	84
cM capacity (veh/h)	1057			161	612
Direction, Lane #	EB 1	WB 1	SB 1		
Volume Total	662	508	224		
Volume Left	151	0	126		
Volume Right	0	124	98		
cSH	1057	1700	238		
Volume to Capacity	0.14	0.30	0.94		
Queue Length 95th (m)	4.0	0.0	66.6		
Control Delay (s)	3.5	0.0	87.8		
Lane LOS	A	F	F		
Approach Delay (s)	3.5	0.0	87.8		
Approach LOS		F	F		
Intersection Summary					
Average Delay			15.8		
Intersection Capacity Utilization			79.9%		ICU Level of Service D
Analysis Period (min)			15		

HCM Unsignalized Intersection Capacity Analysis
13: Harmony Road & Proposed Site Access 4

HCM Unsignalized Intersection Capacity Analysis
14: Homan Road & Proposed Site Access 5

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4		W	
Traffic Volume (veh/h)	42	543	433	42	42	34
Future Volume (Veh/h)	42	543	433	42	42	34
Sign Control	Free	Free	Free	Free	Stop	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	590	471	46	46	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)			130			
Upstream signal (m)	0.97				0.97	0.97
pX platoon unblocked	517				1176	494
VC conflicting volume						
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	482				1165	458
IC single (s)	4.1				6.4	6.2
IC 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	96				77	94
cM capacity (veh/h)	1043				198	582
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	636	517	83			
Volume Left	46	0	46			
Volume Right	0	46	37			
cSH	1043	1700	281			
Volume to Capacity	0.04	0.30	0.30			
Queue Length 95th (m)	1.1	0.0	9.6			
Control Delay (s)	1.2	0.0	23.1			
Lane LOS	A	C	C			
Approach Delay (s)	1.2	0.0	23.1			
Approach LOS		C	C			
Intersection Summary						
Average Delay			2.1			C
Intersection Capacity Utilization			70.6%			ICU Level of Service
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W				W	4
Traffic Volume (veh/h)	68	0	0	75	0	0
Future Volume (Veh/h)	68	0	0	75	0	0
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	74	0	0	82	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC conflicting volume	41	41			82	
VC1 stage 1 conf vol						
VC2 stage 2 conf vol						
VCu unblocked vol	41	41			82	
IC single (s)	6.4	6.2			4.1	
IC 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	92	100			100	
cM capacity (veh/h)	970	1030			1515	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	74	82	0			
Volume Left	74	0	0			
Volume Right	0	82	0			
cSH	970	1700	1700			
Volume to Capacity	0.08	0.05	0.00			
Queue Length 95th (m)	2.0	0.0	0.0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A	A				
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS		A				
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			15.1%			ICU Level of Service
Analysis Period (min)			15			A

Intersection: 1: Highway 62 & Ashley Street

Movement	WB	NB	NB	SB	SB	SB	T
Directions Served	LR	T	T	R	L	T	T
Maximum Queue (m)	297.8	115.1	125.9	117.5	15.6	53.2	49.1
Average Queue (m)	270.6	70.6	68.5	17.8	6.3	26.4	25.6
95th Queue (m)	289.7	106.8	111.3	51.8	14.4	43.6	43.7
Link Distance (m)	460.8	539.5	539.5		617.0	617.0	
Upstream Blk Time (%)							
Queuing Penalty (veh)							
Storage Bay Dist (m)			38.0		30.5		
Storage Blk Time (%)			18		0		4
Queuing Penalty (veh)			142		1		1

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	NB	SB	SB
Directions Served	LR	TR	LT	
Maximum Queue (m)	515.6	15.7	80.7	
Average Queue (m)	513.5	3.6	34.7	
95th Queue (m)	515.6	12.3	65.5	
Link Distance (m)	510.9	460.8	376.6	
Upstream Blk Time (%)	53			
Queuing Penalty (veh)	232			
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 3: River Road & Harmony Road

Movement	EB	WB	NB	SB	SB
Directions Served	LTR	LTR	LTR	LTR	
Maximum Queue (m)	8.5	402.9	226.2	16.2	
Average Queue (m)	0.5	198.9	209.1	6.4	
95th Queue (m)	3.7	355.9	254.8	13.9	
Link Distance (m)	510.9	962.1	215.8	332.3	
Upstream Blk Time (%)			87		
Queuing Penalty (veh)			0		
Storage Bay Dist (m)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Harmony Road & Homan Road

Movement	EB	SB	SB
Directions Served	LT	LR	
Maximum Queue (m)	52.5	23.1	
Average Queue (m)	9.3	11.8	
95th Queue (m)	28.7	19.1	
Link Distance (m)	962.1	291.4	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 5: Plumpton & Harmony Road

Movement	EB	WB	NB	NB
Directions Served	TR	LT	LR	
Maximum Queue (m)	10.1	49.1	23.3	
Average Queue (m)	0.3	12.1	11.1	
95th Queue (m)	3.3	35.4	18.9	
Link Distance (m)	41.0	902.5	551.1	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	WB	SB	SB
Directions Served	LT	TR	LR	
Maximum Queue (m)	84.1	6.7	65.4	
Average Queue (m)	25.5	0.2	31.1	
95th Queue (m)	54.9	2.2	54.4	
Link Distance (m)	902.5	470.1	388.9	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 7: Harmony Public School & Harmony Road									
Movement	EB	WB	NB	SB	EB	WB	NB	SB	
Directions Served	TR	LR							
Maximum Queue (m)	97.7	9.1							
Average Queue (m)	30.5	0.6							
95th Queue (m)	82.7	4.4							
Link Distance (m)	97.7	212.2							
Upstream Blk Time (%)	0								
Queuing Penalty (veh)	3								
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 8: Highway 37 & Harmony Road

Movement	EB	WB	NB	SB	EB	WB	NB	SB	
Directions Served	LTR	L	TR	TR					
Maximum Queue (m)	110.7	44.1	154.9	155.4	87.7				
Average Queue (m)	109.5	17.5	82.5	61.7	40.0				
95th Queue (m)	111.1	31.2	143.1	138.8	67.9				
Link Distance (m)	106.5	263.1		2731.8	954.8				
Upstream Blk Time (%)	52								
Queuing Penalty (veh)	303								
Storage Bay Dist (m)		79.5							
Storage Blk Time (%)		37	5	0					
Queuing Penalty (veh)		174	10	0					

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road

Movement	EB	WB	NB	SB	EB	WB	NB	SB	
Directions Served	LTR	L	T	R	L	T	R		
Maximum Queue (m)	64.4	39.9	5.8	92.5	13.7	19.7	2751.0	17.8	
Average Queue (m)	35.5	20.4	0.6	51.3	4.1	6.7	302.6	2.7	
95th Queue (m)	58.8	36.0	3.5	91.0	10.8	15.6	1645.9	8.9	
Link Distance (m)	437.7	564.0		780.7			2731.8		
Upstream Blk Time (%)							1		
Queuing Penalty (veh)							10		
Storage Bay Dist (m)		82.0				85.0	75.0	79.0	
Storage Blk Time (%)						1			
Queuing Penalty (veh)						2			

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road									
Movement	EB	WB	NB	SB	EB	WB	NB	SB	
Directions Served	LTR	L	T	R	L	T	R		
Maximum Queue (m)	64.8	66.0	44.0	76.0	9.3	15.0	96.3	18.9	
Average Queue (m)	31.9	33.5	9.9	41.2	0.7	4.1	28.2	1.9	
95th Queue (m)	55.8	57.0	29.2	69.1	3.9	11.6	62.3	9.0	
Link Distance (m)	593.4	692.0		405.0			780.7		
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		66.0		70.0	68.0			70.0	
Storage Blk Time (%)				1				0	
Queuing Penalty (veh)				1				0	

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	WB	SB						
Directions Served	LT	TR	LR						
Maximum Queue (m)	59.4	6.7	97.3						
Average Queue (m)	16.9	0.4	32.0						
95th Queue (m)	38.7	3.2	66.1						
Link Distance (m)	470.1	97.7	145.5						
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	WB	SB						
Directions Served	LT	LR							
Maximum Queue (m)	68.4	143.0							
Average Queue (m)	53.8	121.5							
95th Queue (m)	90.9	182.6							
Link Distance (m)	64.8	138.4							
Upstream Blk Time (%)	18	75							
Queuing Penalty (veh)	92	0							
Storage Bay Dist (m)									
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 13: Harmony Road & Proposed Site Access 4

Movement	EB	SB
	LT	LR
Directions Served		
Maximum Queue (m)	264.1	276.4
Average Queue (m)	258.2	222.0
95th Queue (m)	280.8	313.1
Link Distance (m)	259.1	268.0
Upstream Blk Time (%)	34	17
Queuing Penalty (veh)	200	0
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 14: Homan Road & Proposed Site Access 5

Movement	WB
	LR
Directions Served	
Maximum Queue (m)	16.2
Average Queue (m)	9.1
95th Queue (m)	15.3
Link Distance (m)	272.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 1171



Adjusted Future Total Conditions (2056)

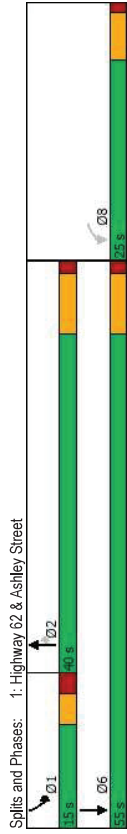
Timings

1: Highway 62 & Ashley Street

<Total 2056> AM Peak Hour

03-11-2025

	WBL	NBT	NBR	SBL	SBT
Lane Group					
Lane Configurations	WBL	NBT	NBR	SBL	SBT
Traffic Volume (vph)	568	692	365	14	1724
Future Volume (vph)	568	692	365	14	1724
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	25.0	40.0	40.0	15.0	55.0
Total Split (%)	31.3%	50.0%	50.0%	18.8%	68.8%
Yellow Time (s)	4.5	5.9	5.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Eff Green (s)	19.4	45.3	45.3	7.1	47.8
Actuated g/C Ratio	0.24	0.57	0.57	0.09	0.60
v/c Ratio	0.70	0.43	0.42	0.10	0.96
Control Delay	31.9	11.7	2.9	35.0	28.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	31.9	11.7	2.9	35.0	28.3
LOS	C	B	A	C	C
Approach Delay	31.9	8.7			28.4
Approach LOS	C	A			C
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 80					
Natural Cycle: 80					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.96					
Intersection Signal Delay: 23.1					
Intersection LOS: C					
Intersection Capacity Utilization 69.5%					
Analysis Period (min) 15					



HCM Signalized Intersection Capacity Analysis

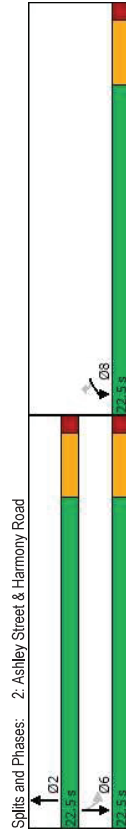
1: Highway 62 & Ashley Street

<Total 2056> AM Peak Hour

03-11-2025

	WBL	WBR	NBT	NBR	SBL	SBT
Movement						
Lane Configurations	WBL	WBR	NBT	NBR	SBL	SBT
Traffic Volume (vph)	568	19	692	365	14	1724
Future Volume (vph)	568	19	692	365	14	1724
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6		7.2	7.2	5.0	7.2
Lane Util. Factor	0.94		0.95	1.00	1.00	0.95
Frt	1.00		1.00	0.85	1.00	1.00
Flt Protected	0.95		1.00	1.00	0.95	1.00
Satd. Flow (prot)	4090		3195	1392	1770	3505
Flt Permitted	0.95		1.00	1.00	0.95	1.00
Satd. Flow (perm)	4090		3195	1392	1770	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86	0.86
Adj. Flow (vph)	676	23	769	406	16	2005
RTOR Reduction (vph)	5	0	0	187	0	0
Lane Group Flow (vph)	694	0	769	219	16	2005
Heavy Vehicles (%)	25%	5%	13%	16%	2%	3%
Turn Type	Perm	NA	Perm	Prot	NA	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	19.4		45.3	45.3	1.5	51.8
Effective Green, g (s)	19.4		45.3	45.3	1.5	51.8
Actuated g/C Ratio	0.23		0.54	0.54	0.02	0.62
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	944		1723	750	31	2161
v/s Ratio Prot			0.24		0.01	c0.57
v/s Ratio Perm	c0.17			0.16		
v/c Ratio	0.74		0.45	0.29	0.52	0.93
Uniform Delay, d1	29.9		11.7	10.6	40.9	14.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1		0.8	1.0	13.7	8.5
Delay (s)	35.0		12.6	11.6	54.6	22.9
Level of Service	D		B	B	D	C
Approach Delay (s)	35.0		12.2		23.2	
Approach LOS	D		B		C	
Intersection Summary						
HCM 2000 Control Delay			22.0			C
HCM 2000 Volume to Capacity ratio			0.94			
Actuated Cycle Length (s)			84.0			17.8
Intersection Capacity Utilization			69.5%			C
Analysis Period (min)			15			
c. Critical Lane Group						

Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	209	241	147	280	90
Future Volume (vph)	209	241	147	280	90
Turn Type	Prot	Perm	NA	Perm	NA
Protected Phases	8		2		6
Permitted Phases		8		6	
Detector Phase	8	8	2	6	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
Act Effd Green (s)	10.3	10.3	19.2	19.2	19.2
Actuated g/C Ratio	0.27	0.27	0.50	0.50	0.50
v/c Ratio	0.50	0.44	0.43	0.47	0.39
Control Delay	15.1	4.3	6.1	12.6	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	4.3	6.1	12.6	9.7
LOS	B	A	A	B	A
Approach Delay	9.3		6.1		11.1
Approach LOS	A		A		B
Intersection Summary					
Cycle Length: 45					
Actuated Cycle Length: 38.6					
Natural Cycle: 50					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.50					
Intersection Signal Delay: 8.9					
Intersection Capacity Utilization 51.6%					
Analysis Period (min) 15					
				Intersection LOS: A	
				ICU Level of Service A	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	209	241	147	178	280	90
Future Volume (vph)	209	241	147	178	280	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Flt	1.00	0.85	0.93	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	0.95	0.97
Satd. Flow (prot)	1770	1583	1725	1681	1723	
Satd. Flt Permitted	0.95	1.00	1.00	0.49	0.67	
Satd. Flow perm	1770	1583	1725	869	1191	
Peak-hour factor, PHF	0.89	0.89	0.80	0.80	0.85	0.85
Adj. Flow (vph)	235	271	184	222	329	106
RTOR Reduction (vph)	0	198	81	0	0	0
Lane Group Flow (vph)	235	73	326	0	204	231
Turn Type	Prot	Perm	NA	Perm	NA	NA
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	10.4	10.4	19.2	19.2	19.2	19.2
Effective Green, g (s)	10.4	10.4	19.2	19.2	19.2	19.2
Actuated g/C Ratio	0.27	0.27	0.50	0.50	0.50	0.50
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	476	426	858	432	592	
v/s Ratio Prot	c0.13		0.19			
v/s Ratio Perm	0.05			c0.23	0.19	
v/c Ratio	0.49	0.17	0.38	0.47	0.39	
Uniform Delay, d1	11.9	10.8	6.0	6.4	6.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.2	1.3	3.7	1.9	
Delay (s)	12.7	11.0	7.3	10.0	8.0	
Level of Service	B	B	A	B	A	
Approach Delay (s)	11.8		7.3		8.9	
Approach LOS	B		A		A	
Intersection Summary						
HCM 2000 Control Delay			9.5		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			38.6		Sum of lost time (s)	9.0
Intersection Capacity Utilization			51.6%		ICU Level of Service	A
Analysis Period (min)			15			
Critical Lane Group						

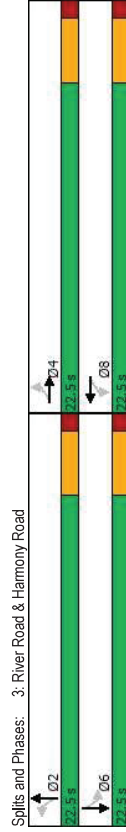
Timings

3: River Road & Harmony Road

<Total 2056> AM Peak Hour

03-11-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Traffic Volume (vph)	4	434	24	398	37	2	82	7
Future Volume (vph)	4	434	24	398	37	2	82	7
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	8	8	2	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Initial (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	16.2	16.2	16.2	16.2	18.1	18.1	18.1	18.1
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.42	0.42	0.42	0.42
v/c Ratio	0.02	0.82	0.16	0.65	0.16	0.16	0.35	0.35
Control Delay	8.5	24.4	11.4	16.1	6.5	6.5	11.1	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.5	24.4	11.4	16.1	6.5	6.5	11.1	11.1
LOS	A	C	B	B	A	A	B	B
Approach Delay	24.3	15.8	6.5	6.5	11.1	11.1	11.1	11.1
Approach LOS	C	B	A	A	B	B	B	B
Intersection Summary								
Cycle Length: 45								
Actuated Cycle Length: 43.3								
Natural Cycle: 30								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.82								
Intersection Signal Delay: 18.1								
Intersection Capacity Utilization 41.4%								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis

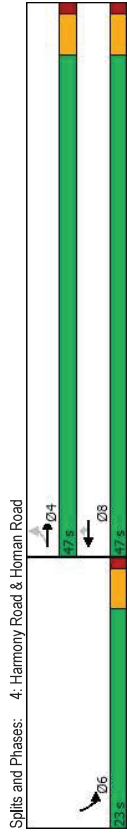
3: River Road & Harmony Road

<Total 2056> AM Peak Hour

03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBT
Traffic Volume (vph)	4	434	48	24	398	4	37	2	30	82	7	7
Future Volume (vph)	4	434	48	24	398	4	37	2	30	82	7	7
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	1.00	1.00	1.00	0.94	0.94	0.94	0.99	0.99	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.97	0.97	0.96	0.96	0.96
Satd. Flow (prot)	1770	1835	1770	1860	1770	1860	1708	1708	1708	1769	1769	1769
Flt Permitted	0.36	1.00	0.25	1.00	0.25	1.00	0.80	0.80	0.80	0.70	0.70	0.70
Satd. Flow (perm)	672	1835	460	1860	460	1860	1411	1411	1411	1284	1284	1284
Peak-hour factor, PHF	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.69	0.51	0.51	0.51
Adj. Flow (vph)	5	517	57	27	447	4	54	3	43	161	14	14
RTOR Reduction (vph)	0	9	0	0	1	0	0	25	0	0	6	0
Lane Group Flow (vph)	5	565	0	27	450	0	0	75	0	0	183	0
Turn Type	Perm	NA	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	16.2	16.2	16.2	16.2	16.2	16.2	18.1	18.1	18.1	18.1	18.1	18.1
Effective Green, g (s)	16.2	16.2	16.2	16.2	16.2	16.2	18.1	18.1	18.1	18.1	18.1	18.1
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37	0.42	0.42	0.42	0.42	0.42	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	251	686	172	695	695	589	589	589	589	536	536	536
v/s Ratio Prot	0.01	0.31	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.14	0.14	0.14
v/c Ratio	0.02	0.82	0.16	0.65	0.65	0.13	0.13	0.13	0.13	0.34	0.34	0.34
Uniform Delay, d1	8.5	12.3	9.0	11.2	11.2	7.7	7.7	7.7	7.7	8.6	8.6	8.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	7.9	0.4	2.1	2.1	0.4	0.4	0.4	0.4	1.7	1.7	1.7
Delay (s)	8.6	20.2	9.4	13.3	13.3	8.2	8.2	8.2	8.2	10.3	10.3	10.3
Level of Service	A	C	A	B	B	A	A	A	A	B	B	B
Approach Delay (s)	20.1	13.1	13.1	8.2	8.2	10.3	10.3	10.3	10.3	10.3	10.3	10.3
Approach LOS	C	B	B	A	A	B	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B									
HCM 2000 Volume to Capacity ratio	0.57											
Actuated Cycle Length (s)	43.3	Sum of lost time (s)	9.0									
Intersection Capacity Utilization	41.4%	ICU Level of Service	A									
Analysis Period (min)	15											
c Critical Lane Group												

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations	↰	→	→	↰	↰
Traffic Volume (vph)	32	506	417	17	41
Future Volume (vph)	32	506	417	17	41
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases	4	4	8	8	6
Permitted Phases	4	4	8	8	6
Detector Phase	4	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	47.0	47.0	47.0	47.0	23.0
Total Split (%)	67.1%	67.1%	67.1%	67.1%	32.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Max
Act Eff Green (s)	34.2	34.2	34.2	34.2	18.9
Actuated g/C Ratio	0.55	0.55	0.55	0.55	0.30
v/c Ratio	0.25	0.68	0.89	0.07	0.33
Control Delay	11.1	13.8	25.9	3.4	16.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	11.1	13.8	25.9	3.4	16.7
LOS	B	B	C	A	B
Approach Delay		13.6	25.1		16.7
Approach LOS		B	C		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 62.2					
Natural Cycle: 60					
Control Type: Semi-Act-Uncoord					
Maximum v/c Ratio: 0.89					
Intersection Signal Delay: 19.6					
Intersection LOS: B					
ICU Level of Service A					
Intersection Capacity Utilization 38.3%					
Analysis Period (min) 15					



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↰	→	→	↰	↰	↰
Traffic Volume (vph)	32	506	417	17	41	27
Future Volume (vph)	32	506	417	17	41	27
Initial Flow (vph)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	0.85	0.95	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	1759	1667	808	1239	
Flt Permitted	0.16	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	303	1759	1667	808	1239	
Peak-hour factor, PHF	0.77	0.77	0.51	0.51	0.50	0.50
Adj. Flow (vph)	42	657	818	33	82	54
RTOR Reduction (vph)	0	0	0	11	32	0
Lane Group Flow (vph)	42	657	818	22	104	0
Heavy Vehicles (%)	2%	8%	14%	100%	2%	100%
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	34.2	34.2	34.2	34.2	18.8	
Effective Green, g (s)	34.2	34.2	34.2	34.2	18.8	
Actuated g/C Ratio	0.55	0.55	0.55	0.55	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	167	970	919	445	375	
v/s Ratio Prot		0.37	0.49		0.08	
v/s Ratio Perm	0.14			0.03		
v/c Ratio	0.25	0.68	0.89	0.05	0.28	
Uniform Delay, d1	7.2	10.0	12.2	6.4	16.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	1.9	10.7	0.0	1.8	
Delay (s)	8.0	11.8	23.0	6.5	18.3	
Level of Service	A	B	C	A	B	
Approach Delay (s)		11.6	22.3		18.3	
Approach LOS		B	C		B	
Intersection Summary						
HCM 2000 Control Delay		17.6				B
HCM 2000 Volume to Capacity ratio		0.67				
Actuated Cycle Length (s)		62.0				9.0
Intersection Capacity Utilization		38.3%				A
Analysis Period (min)		15				
c. Critical Lane Group						

5: Plumptre & Harmony Road

HCM Unsignalized Intersection Capacity Analysis

<Total 2056> AM Peak Hour

03-11-2025

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	EB	EB	WB	WB	NB	NB
Traffic Volume (veh/h)	470	10	30	402	2	20
Future Volume (Veh/h)	470	10	30	402	2	20
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	0.67
Hourly flow rate (vph)	580	12	34	462	3	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (m)	61					
dx, platoon unblocked						
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
IC, single (s)						
IC, 2 stage (s)						
IC queue free %						
IC queue free (s)						
IC capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	592	496	33			
Volume Left	0	34	3			
Volume Right	12	0	30			
cSH	1700	954	486			
Volume to Capacity	0.35	0.04	0.07			
Queue Length 95th (m)	0.0	0.9	1.7			
Control Delay (s)	0.0	1.0	12.9			
Lane LOS	A	A	B			
Approach Delay (s)	0.0	1.0	12.9			
Approach LOS	B	B				
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			55.9%			
Analysis Period (min)			15			
ICU Level of Service			B			

6: Harmony Road & Black Bear Ridge Resort Access

Timings

<Total 2056> AM Peak Hour

03-11-2025

Lane Group	EBL	EBT	WBT	WBL	SBL
Lane Configurations	EB	EB	WB	WB	SB
Traffic Volume (vph)	96	477	364	66	141
Future Volume (vph)	96	477	364	66	141
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases					
Permitted Phases	4	4	8	8	6
Detector Phase	4	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	47.0	47.0	47.0	47.0	23.0
Total Split (%)	67.1%	67.1%	67.1%	67.1%	32.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Max
Act Effct Green (s)	28.8	28.8	28.8	19.0	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.33
g/C Ratio	0.61	0.75	0.84	0.15	0.43
Control Delay	25.3	17.0	21.7	2.3	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	17.0	21.7	2.3	17.2
LOS	C	B	C	A	B
Approach Delay		18.2	18.7		17.2
Approach LOS		B	B		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 57					
Natural Cycle: 60					
Control Type: Semi Act-Uncoordinated					
Maximum v/c Ratio: 0.84					
Intersection Signal Delay: 18.3					
Intersection Capacity Utilization 69.3%					
Analysis Period (min) 15					
ICU Level of Service C					



HCM Signalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

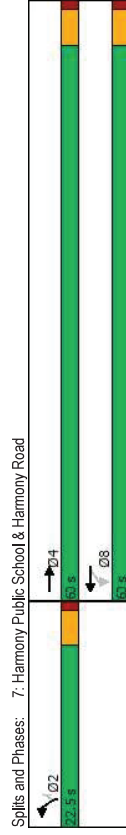
Timings
7: Harmony Public School & Harmony Road

<Total 2056> AM Peak Hour
03-11-2025

<Total 2056> AM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	96	477	364	66	141	97
Future Volume (vph)	96	477	364	66	141	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.95	0.95
Flt Protected	0.95	1.00	1.00	1.00	0.97	0.97
Satd. Flow (prot)	1681	1671	1681	1583	1710	1710
Flt Permitted	0.20	0.99	1.00	1.00	0.97	0.97
Satd. Flow (perm)	360	1649	1681	1583	1710	1710
Peak-hour factor, PHF	0.78	0.78	0.51	0.51	0.92	0.92
Adj. Flow (vph)	123	612	714	129	153	105
RTOR Reduction (vph)	0	0	0	55	32	0
Lane Group Flow (vph)	111	624	714	74	226	0
Heavy Vehicles (%)	2%	8%	13%	2%	2%	2%
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases	4	4	8	8	6	6
Permitted Phases	4	28.8	28.8	28.8	19.0	19.0
Act Effct Green, G (s)	28.8	28.8	28.8	28.8	19.0	19.0
Effective Green, g (s)	28.8	28.8	28.8	28.8	19.0	19.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.33	0.33
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	182	836	852	802	572	572
v/s Ratio Prot			c0.42		c0.13	
v/s Ratio Perm	0.31	0.38		0.05		
v/c Ratio	0.61	0.75	0.84	0.09	0.40	0.40
Uniform Delay, d1	10.0	11.1	12.0	7.2	14.5	14.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	3.7	7.2	0.1	2.0	2.0
Delay (s)	15.7	14.8	19.2	7.3	16.5	16.5
Level of Service	B	B	B	A	B	B
Approach Delay (s)		14.9	17.4	16.5		
Approach LOS		B	B	B		
Intersection Summary						
HCM 2000 Control Delay	16.3					
HCM 2000 Level of Service	B					
HCM 2000 Volume to Capacity ratio	0.66					
Actuated Cycle Length (s)	56.8					
Intersection Capacity Utilization	68.3%					
Sum of lost time (s)	9.0					
ICU Level of Service	C					
Analysis Period (min)	15					
c. Critical Lane Group						

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↖	↗	↖	↗	↖
Traffic Volume (vph)	418	121	302	71	93
Future Volume (vph)	418	121	302	71	93
Turn Type	NA	Perm	NA	Prot	Perm
Protected Phases	4	8	8	2	2
Permitted Phases	4	8	8	2	2
Detector Phase	4	8	8	2	2
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	60.0	60.0	60.0	22.5	22.5
Total Split (%)	72.7%	72.7%	72.7%	27.3%	27.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	27.3	27.3	27.3	19.1	19.1
Actuated g/C Ratio	0.49	0.49	0.49	0.34	0.34
v/c Ratio	0.63	0.93	0.44	0.47	0.51
Control Delay	10.2	68.4	9.7	24.0	9.7
Queue Delay	0.0	0.5	0.1	0.0	0.0
Total Delay	10.2	68.9	9.9	24.0	9.7
LOS	B	E	A	C	A
Approach Delay	10.2		26.7	15.9	
Approach LOS	B		C	B	
Intersection Summary					
Cycle Length: 82.5					
Actuated Cycle Length: 56					
Natural Cycle: 60					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.93					
Intersection Signal Delay: 16.0					
Intersection LOS: B					
Intersection Capacity Utilization 37.6%					
Analysis Period (min) 15					
ICU Level of Service A					



HCM Signalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

<Total 2056> AM Peak Hour
03-11-2025

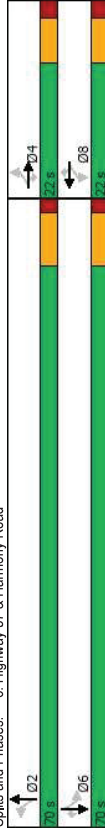
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	EBT	EBR	WBL	WBT	NBL	NBR	
Traffic Volume (vph)	418	122	121	302	71	93	
Future Volume (vph)	418	122	121	302	71	93	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	
Frt	0.97	1.00	1.00	1.00	1.00	0.85	
Flt Protected	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3151	1543	1810	1492	1324	1324	
Flt Permitted	1.00	0.21	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3151	344	1810	1492	1324	1324	
Peak-hour factor, PHF	0.54	0.54	0.78	0.78	0.30	0.30	
Adj. Flow (vph)	774	226	155	387	237	310	
RTOR Reduction (vph)	51	0	0	0	0	159	
Lane Group Flow (vph)	949	0	155	387	237	151	
Heavy Vehicles (%)	10%	13%	17%	5%	21%	22%	
Turn Type	NA	NA	Perm	NA	Prot	Perm	
Protected Phases	4			8	2		
Permitted Phases				8		2	
Actuated Green, G (s)	27.3	27.3	27.3	27.3	19.1	19.1	
Effective Green, g (s)	27.3	27.3	27.3	27.3	19.1	19.1	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.34	0.34	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	
Vehicle Grp Cap (vph)	1552	169	891	514	456		
v/s Ratio Prot	0.30		0.21	c0.16			
v/s Ratio Perm		c0.45			0.11		
v/c Ratio	0.61	0.92	0.43	0.46	0.33		
Uniform Delay, d1	10.2	13.0	9.1	14.1	13.4		
Progression Factor	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	0.7	45.5	0.3	3.0	1.9		
Delay (s)	10.9	58.5	9.4	17.1	15.4		
Level of Service	B	E	A	B	B		
Approach Delay (s)	10.9		23.4	16.1			
Approach LOS	B		C	B			
Intersection Summary							
HCM 2000 Control Delay		15.5		HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio		0.73					
Actuated Cycle Length (s)		55.4		Sum of lost time (s)		9.0	
Intersection Capacity Utilization		37.6%		ICU Level of Service		A	
Analysis Period (min)		15					
c. Critical Lane Group							

Timings
8: Highway 37 & Harmony Road

<Total 2056> AM Peak Hour
03-11-2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Traffic Volume (vph)	115	169	291	93	81	2	138	296	7	906	193
Future Volume (vph)	115	169	291	93	81	2	138	296	7	906	193
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA	Perm
Protected Phases		4			8			2		6	
Permitted Phases	4		4	8	8	8	2		6		6
Detector Phase	4	4	4	8	8	8	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6	27.6
Total Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	70.0	70.0	70.0	70.0	70.0
Total Split (%)	23.9%	23.9%	23.9%	23.9%	23.9%	23.9%	76.1%	76.1%	76.1%	76.1%	76.1%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	14.1	14.1	14.1	14.1	14.1	14.1	62.4	62.4	62.4	62.4	62.4
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.68	0.68	0.68	0.68	0.68
v/c Ratio	0.70	0.67	0.90	0.85	0.44	0.01	0.53	0.42	0.02	0.83	0.20
Control Delay	57.4	48.6	50.1	80.7	41.0	0.0	22.3	7.7	5.0	18.5	1.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.4	48.6	50.1	80.7	41.0	0.0	22.3	7.7	5.0	18.5	1.2
LOS	E	D	D	F	D	A	C	A	A	B	A
Approach Delay		51.1				61.4		9.9		15.4	
Approach LOS		D				E		A		B	
Intersection Summary											
Cycle Length: 92											
Actuated Cycle Length: 91.1											
Natural Cycle: 80											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.90											
Intersection Signal Delay: 26.8											
Intersection Capacity Utilization: 105.9%											
Analysis Period (min): 15											

Splits and Phases: 8: Highway 37 & Harmony Road



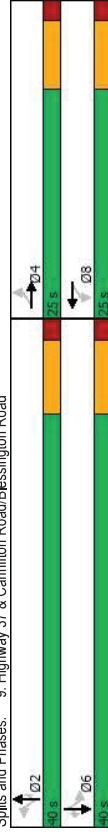
HCM Signalized Intersection Capacity Analysis

Timings
9: Highway 37 & Cannifton Road/Blessington Road
<Total 2056> AM Peak Hour
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HCM Signalized Intersection Capacity Analysis

Timings
9: Highway 37 & Cannifton Road/Blessington Road
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗	↗	↖	↖	↗	↖	↗	↖	↗	↖	↗
Lane Traffic Volume (vph)	115	169	291	93	81	2	138	296	18	7	906	193
Future Volume (vph)	115	169	291	93	81	2	138	296	18	7	906	193
Total Flow (vphpt)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	0.85
Fit	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	1.00	1.00	1.00	0.85
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1887	1863	1568	1736	1624	1583	1535	2922	1444	1810	1468	1887
Fit Permitted	0.69	1.00	1.00	0.54	1.00	1.00	0.15	0.57	0.46	1.00	1.00	0.46
Satd. Flow (perm)	1217	1863	1568	981	1624	1583	241	1692	704	1810	1468	1217
Peak-hour factor, PHF	0.88	0.88	0.88	0.73	0.73	0.73	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	131	192	331	127	111	3	177	379	23	8	1030	219
RTOR Reduction (vph)	0	0	125	0	0	3	0	3	0	0	69	0
Lane Group Flow (vph)	131	192	206	127	111	0	88	488	0	8	1030	150
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%	11%	25%	5%	10%
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4		8	8		2	2		6	6	
Permitted Phases	4		4	8	8	2				6		6
Actuated Green, G (s)	14.0	14.0	14.0	14.0	14.0	14.0	62.4	62.4	62.4	62.4	62.4	62.4
Effective Green, g (s)	14.0	14.0	14.0	14.0	14.0	14.0	62.4	62.4	62.4	62.4	62.4	62.4
Actuated g/O Ratio	0.15	0.15	0.15	0.15	0.15	0.15	0.89	0.89	0.89	0.89	0.89	0.89
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	187	286	241	150	249	243	165	1160	482	1241	1006	60.57
v/s Ratio Prot	0.10		c0.13	0.13	0.07		0.37	0.29	0.01	0.10		0.10
v/s Ratio Perm	0.70	0.67	0.85	0.85	0.45	0.00	0.53	0.42	0.02	0.83	0.15	0.15
w/c Ratio	36.5	36.3	37.5	37.5	35.0	32.6	7.1	6.3	4.5	10.4	5.0	5.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	11.2	6.1	24.2	33.3	1.3	0.0	11.8	1.1	0.1	6.5	0.3	0.3
Incremental Delay, d2	47.7	42.4	61.7	70.7	36.2	32.6	18.9	7.4	4.6	17.0	5.3	5.3
Delay (s)	D	D	E	E	D	C	B	A	A	B	A	A
Level of Service	D	D	E	E	D	C	B	A	A	B	A	A
Approach Delay (s)	53.3			54.4			9.2			14.8		
Approach LOS	D			D			A			B		
Intersection Summary												
HCM 2000 Control Delay	26.3			HCM 2000 Level of Service			C					
HCM 2000 Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	91.0			Sum of lost time (s)			14.6					
Intersection Capacity Utilization	105.9%			ICU Level of Service			G					
Analysis Period (min)	15											
Critical Lane Group	Critical Lane Group											



HCM Signalized Intersection Capacity Analysis
 9: Highway 37 & Canniford Road/Blessington Road

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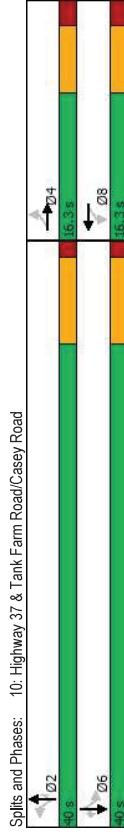
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	78	28	0	212	63	7	7	443	63	19	1177	139
Traffic Volume (vph)	78	28	0	212	63	7	7	443	63	19	1177	139
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Total Lost time (s)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	0.97	0.95	0.97	0.95	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1550	3145	1521	3062	1521	3062	3054	1262	3469	1553	3469	1553
Flt Permitted	0.60	0.71	0.69	0.76	0.69	0.76	0.92	1.00	0.94	1.00	0.94	1.00
Satd. Flow (perm)	981	2283	1100	2382	1100	2382	2821	1262	3265	1553	3265	1553
Peak-hour factor, PHF	0.68	0.68	0.68	0.76	0.76	0.76	0.83	0.83	0.83	0.81	0.81	0.81
Adj. Flow (vph)	115	41	0	279	83	9	8	534	76	23	1453	172
RTOR Reduction (vph)	0	0	0	5	0	0	0	35	0	0	79	0
Lane Group Flow (vph)	57	99	0	139	227	0	0	542	41	0	1476	93
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	8	8	2	2	6	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	6	6	6	6
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1	13.1	32.6	32.6	32.6	32.6	32.6	32.6
Effective Green, g (s)	13.1	13.1	13.1	13.1	13.1	13.1	32.6	32.6	32.6	32.6	32.6	32.6
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	213	495	238	517	517	517	1525	882	1765	839	1765	839
v/s Ratio Prot	0.06	0.04	0.13	0.10	0.10	0.10	0.19	0.03	0.45	0.06	0.45	0.06
v/s Ratio Perm	0.27	0.20	0.58	0.44	0.44	0.44	0.36	0.06	0.84	0.11	0.84	0.11
Uniform Delay, d1	19.6	19.3	21.2	20.4	20.4	20.4	7.9	6.6	11.6	6.8	11.6	6.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	3.6	0.6	0.6	0.6	0.6	0.2	4.9	0.3	4.9	0.3
Delay (s)	20.3	19.5	24.8	21.0	21.0	21.0	8.5	6.7	16.5	7.0	16.5	7.0
Level of Service	C	B	C	C	C	C	A	A	B	B	A	A
Approach Delay (s)	19.8	19.8	22.4	22.4	22.4	22.4	8.3	8.3	15.5	15.5	15.5	15.5
Approach LOS	B	B	C	C	C	C	A	A	B	B	A	A
Intersection Summary	Intersection LOS: B											
HCM 2000 Control Delay	15.1 HCM 2000 Level of Service											
HCM 2000 Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	60.3 Sum of lost time (s)											
Intersection Capacity Utilization	76.5% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group												



Timings
 10: Highway 37 & Tank Farm Road/Casey Road

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Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	78	28	0	212	63	7	7	443	63	19	1177	139
Traffic Volume (vph)	78	28	0	212	63	7	7	443	63	19	1177	139
Future Volume (vph)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	8	8	2	2	6	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	6	6	6	6
Detector Phase	4	4	8	8	8	8	2	2	6	6	6	6
Switch Phase	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	16.3	16.3	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Minimum Split (s)	16.3	16.3	16.3	16.3	16.3	16.3	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	29.0%	29.0%	29.0%	29.0%	29.0%	29.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.0	10.0	10.0	10.0	10.0	10.0	37.4	37.4	37.4	37.4	37.4	37.4
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.17	0.18	0.18	0.41	0.36	0.35	0.10	0.35	0.10	0.78	0.07	0.07
Control Delay	22.2	17.3	27.7	21.6	21.6	21.6	6.3	1.6	13.2	1.8	1.8	1.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	22.2	17.3	27.7	21.6	21.6	21.6	6.3	1.6	13.2	1.8	1.8	1.8
LOS	C	B	C	C	C	C	A	A	A	B	B	A
Approach Delay	18.5	18.5	23.5	23.5	23.5	23.5	5.6	5.6	12.7	12.7	12.7	12.7
Approach LOS	B	B	C	C	C	C	A	A	A	B	B	A
Intersection Summary	Intersection LOS: B											
Cycle Length: 56.3												
Actuated Cycle Length: 56												
Natural Cycle: 60												
Control Type: Semi Act-Uncoordinated												
Maximum v/c Ratio: 0.78												
Intersection Signal Delay: 12.0												
Intersection Capacity Utilization 79.6%												
Analysis Period (min) 15												



HCM Signalized Intersection Capacity Analysis
 10: Highway 37 & Tank Farm Road/Casey Road

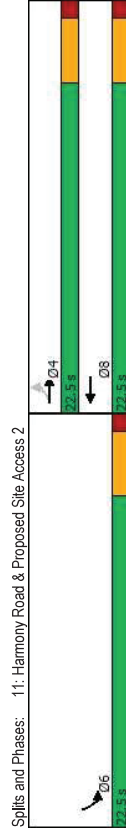
<Total 2056> AM Peak Hour
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	27	55	15	135	90	10	24	478	85	31	1295	59
Future Volume (vph)	27	55	15	135	90	10	24	478	85	31	1295	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	1.00	0.95	1.00
Frt	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	0.98	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1610	3277	1535	3236	3531	1583	3531	1583	3531	1583	3531	1583
Flt Permitted	0.64	0.93	0.69	0.82	0.82	1.00	0.82	1.00	0.82	1.00	0.92	1.00
Satd. Flow (perm)	1077	3063	1109	2693	2891	1568	2891	1568	3121	1563	3121	1563
Peak-hour factor, PHF	0.73	0.73	0.73	0.91	0.91	0.91	0.75	0.75	0.75	0.82	0.82	0.82
Adj. Flow (vph)	37	75	21	148	99	11	32	637	113	38	1579	72
RTOR Reduction (vph)	0	18	0	0	0	0	0	0	42	0	0	27
Lane Group Flow (vph)	33	82	0	81	168	0	0	669	71	0	1617	45
Heavy Vehicles (%)	2%	2%	2%	7%	2%	2%	2%	2%	3%	2%	7%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	8.0	8.0	8.0	8.0	8.0	36.0	36.0	36.0	36.0	36.0	36.0
Actuated Green, G (s)	8.0	8.0	8.0	8.0	8.0	8.0	36.0	36.0	36.0	36.0	36.0	36.0
Effective Green, g (s)	8.0	8.0	8.0	8.0	8.0	8.0	36.0	36.0	36.0	36.0	36.0	36.0
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.63	0.63	0.63	0.63	0.63	0.63
Clearance Time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	150	426	154	375	375	1813	983	983	1957	992	1957	992
v/s Ratio Prot	0.03	0.03	0.07	0.06	0.06	0.23	0.05	0.05	0.52	0.03	0.52	0.03
v/s Ratio Perm	0.22	0.19	0.53	0.45	0.45	0.37	0.07	0.07	0.83	0.05	0.83	0.05
Uniform Delay, d1	21.9	21.8	22.9	22.7	22.7	5.2	4.2	4.2	8.3	4.1	8.3	4.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.2	3.2	0.9	0.9	0.2	0.1	0.1	0.2	0.1	0.2	0.1
Delay (s)	22.7	22.1	26.2	23.5	23.5	5.4	4.2	4.2	12.4	4.2	12.4	4.2
Level of Service	C	C	C	C	C	A	A	A	B	A	B	A
Approach Delay (s)	22.2	22.2	24.4	24.4	24.4	5.3	4.2	4.2	12.1	4.2	12.1	4.2
Approach LOS	C	C	C	C	C	A	A	A	B	A	B	A
Intersection Summary												
HCM 2000 Control Delay	11.8											
HCM 2000 Level of Service	B											
HCM 2000 Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	57.4											
Intersection Capacity Utilization	78.5%											
Analysis Period (min)	15											
c. Critical Lane Group												

Timings
 11: Harmony Road & Proposed Site Access 2

<Total 2056> AM Peak Hour
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Lane Group	EBL	EBT	WBT	SBL
Lane Configurations	4	4	4	4
Traffic Volume (vph)	84	535	341	134
Future Volume (vph)	84	535	341	134
Turn Type	Perm	NA	NA	Prot
Protected Phases	4	4	8	6
Permitted Phases	4	4	8	6
Detector Phase	4	4	8	6
Switch Phase	4	4	8	6
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Max
Act Effct Green (s)	16.4	16.4	16.4	18.1
Actuated g/C Ratio	0.38	0.38	0.38	0.42
v/c Ratio	0.34	0.83	0.62	0.32
Control Delay	13.6	25.1	14.7	7.4
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	13.6	25.1	14.7	7.4
LOS	B	C	B	A
Approach Delay	23.6	14.7	7.4	
Approach LOS	C	B	A	
Intersection Summary				
Cycle Length: 45				
Actuated Cycle Length: 43.5				
Natural Cycle: 30				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.83				
Intersection Signal Delay: 17.8				
Intersection LOS: B				
Intersection Capacity Utilization 50.2%				
Analysis Period (min) 15				
ICU Level of Service A				



HCM Signalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

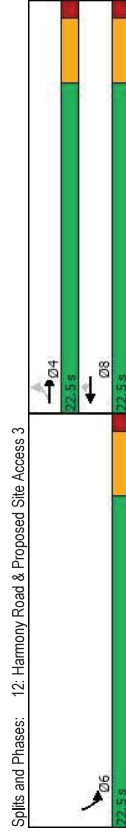
<Total 2056> AM Peak Hour
 03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	84	535	341	57	134	90
Future Volume (vph)	84	535	341	57	134	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.98	0.95	0.95	0.95
Flt Protected	0.95	1.00	1.00	0.97	0.97	0.97
Satd. Flow (prot)	1770	1863	1827	1711	1711	1711
Flt Permitted	0.38	1.00	1.00	0.97	0.97	0.97
Satd. Flow (perm)	714	1863	1827	1711	1711	1711
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	582	371	62	146	98
RTOR Reduction (vph)	0	0	14	0	52	0
Lane Group Flow (vph)	91	582	419	0	192	0
Turn Type	Perm	NA	NA	Prot	Prot	Prot
Protected Phases	4	4	8	6	6	6
Permitted Phases	4	4	8	6	6	6
Actuated Green, G (s)	16.4	16.4	16.4	18.1	18.1	18.1
Effective Green, g (s)	16.4	16.4	16.4	18.1	18.1	18.1
Actuated g/C Ratio	0.38	0.38	0.38	0.42	0.42	0.42
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	269	702	688	711	711	711
v/s Ratio Prot	0.13	0.31	0.23	c0.11	c0.11	c0.11
v/s Ratio Perm	0.34	0.83	0.61	0.27	0.27	0.27
Uniform Delay, d1	9.7	12.3	11.0	8.4	8.4	8.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	8.0	1.5	0.9	0.9	0.9
Delay (s)	10.4	20.3	12.5	9.3	9.3	9.3
Level of Service	B	C	B	A	A	A
Approach Delay (s)	19.0	12.5	9.3			
Approach LOS	B	B	A			
Intersection Summary						
HCM 2000 Control Delay						
HCM 2000 Volume to Capacity ratio			15.1	HCM 2000 Level of Service	B	
Actuated Cycle Length (s)			43.5	Sum of lost time (s)	9.0	
Intersection Capacity Utilization			50.2%	ICU Level of Service	A	
Analysis Period (min)			15			
c Critical Lane Group						

Timings
 12: Harmony Road & Proposed Site Access 3

<Total 2056> AM Peak Hour
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Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	84	488	305	63	117	117
Future Volume (vph)	84	488	305	63	117	117
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases	4	4	8	6	6	6
Permitted Phases	4	4	8	8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	Max	Max
Act Effct Green (s)	13.3	13.3	13.3	13.3	18.1	18.1
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.45	0.45
v/c Ratio	0.64	0.54	0.12	0.26	0.26	0.26
Control Delay	14.8	14.5	3.6	6.2	6.2	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.9	14.5	3.6	6.2	6.2	6.2
LOS	B	B	A	A	A	A
Approach Delay	14.9	12.7	6.2			
Approach LOS	B	B	A			
Intersection Summary						
Cycle Length: 45						
Actuated Cycle Length: 40.5						
Natural Cycle: 45						
Control Type: Semi Act-Uncoord						
Maximum v/c Ratio: 0.64						
Intersection Signal Delay: 12.7					Intersection LOS: B	
Intersection Capacity Utilization 54.5%					ICU Level of Service A	
Analysis Period (min) 15						



HCM Signalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

HCM Unsignalized Intersection Capacity Analysis
 13: Harmony Road & Proposed Site Access 4

<Total 2056> AM Peak Hour
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<Total 2056> AM Peak Hour
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Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4	4	4	4
Traffic Volume (vph)	84	488	306	63	117	77
Future Volume (vph)	84	488	306	63	117	77
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	0.95		
Flt Protected	0.99	1.00	1.00	0.97		
Satd. Flow (prot)	3513	1863	1583	1711		
Flt Permitted	0.83	1.00	1.00	0.97		
Satd. Flow (perm)	2928	1863	1583	1711		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	91	530	333	68	127	84
RTOR Reduction (vph)	0	0	0	46	46	0
Lane Group Flow (vph)	0	621	333	22	165	0
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)		13.4	13.4	13.4	18.1	
Effective Green, g (s)		13.4	13.4	13.4	18.1	
Actuated g/C Ratio		0.33	0.33	0.33	0.45	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		968	616	523	764	
v/s Ratio Prot			0.18		c0.10	
v/s Ratio Perm		c0.21		0.01		
v/c Ratio		0.64	0.54	0.04	0.22	
Uniform Delay, d1		11.5	11.0	9.2	6.9	
Progression Factor		1.00	1.00	1.00	1.00	
Incremental Delay, d2		1.5	1.0	0.0	0.6	
Delay (s)		13.0	12.0	9.2	7.5	
Level of Service		B	B	A	A	
Approach Delay (s)		13.0	11.5		7.5	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay			11.6		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.40			
Actuated Cycle Length (s)			40.5		Sum of lost time (s)	9.0
Intersection Capacity Utilization			54.5%		ICU Level of Service	A
Analysis Period (min)			15			
c Critical Lane Group						

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4	4	4	4	4
Traffic Volume (veh/h)	27	543	367	22	43	29
Future Volume (Veh/h)	27	543	367	22	43	29
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	590	399	24	47	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		None	None			
Median type						
Median storage (veh)						
Upstream signal (m)		276	130			
pX, platoon unblocked	0.98				0.80	0.98
VC, conflicting volume	423				1059	411
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	401				889	389
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	97				81	95
cM capacity (veh/h)	1134				243	646
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	619	423	79			
Volume Left	29	0	47			
Volume Right	0	24	32			
cSH	1134	1700	326			
Volume to Capacity	0.03	0.25	0.24			
Queue Length 95th (m)	0.6	0.0	7.5			
Control Delay (s)	0.7	0.0	19.6			
Lane LOS	A		C			
Approach Delay (s)	0.7	0.0	19.6			
Approach LOS			C			
Intersection Summary						
Average Delay			1.8			
Intersection Capacity Utilization			61.4%		ICU Level of Service	B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 14: Homan Road & Proposed Site Access 5

<Total 2056> AM Peak Hour

03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	64	0	0	44	0	0
Future Volume (Veh/h)	64	0	0	44	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	70	0	0	48	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked						
VC, conflicting volume	24	24				48
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	24	24				48
IC, single (s)	6.4	6.2				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	93	100				100
cM capacity (veh/h)	992	1052				1559
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	70	48	0			
Volume Left	70	0	0			
Volume Right	0	48	0			
cSH	992	1700	1700			
Volume to Capacity	0.07	0.03	0.00			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	8.9	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	8.9	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			5.3			
Intersection Capacity Utilization			13.5%			A
Analysis Period (min)			15			

Queuing and Blocking Report
 Trans-Plan

<Total 2056> AM Peak Hour

03-11-2025

Intersection: 1: Highway 62 & Ashley Street											
Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	L	L	LR	T	T	R	L	T	T	T	T
Maximum Queue (m)	55.5	63.0	62.8	66.9	51.3	24.6	15.6	83.4	94.6	83.4	94.6
Average Queue (m)	21.1	40.2	40.4	34.0	20.0	12.4	7.0	55.4	55.4	55.4	55.4
95th Queue (m)	48.1	59.8	58.1	56.2	43.7	20.3	14.5	82.2	86.2	82.2	86.2
Link Distance (m)		453.0	453.0	534.6	534.6			610.4	610.4		610.4
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	50.0					38.0	30.5				
Storage Blk Time (%)	0	3				1				17	
Queuing Penalty (veh)	0	5				3				2	

Intersection: 2: Ashley Street & Harmony Road											
Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	L	R	TR	L	L	LT					
Maximum Queue (m)	53.9	34.8	35.9	41.0	37.1						
Average Queue (m)	18.2	15.3	17.3	20.5	11.3						
95th Queue (m)	34.6	27.1	29.1	33.6	25.3						
Link Distance (m)		83.0	453.0	373.2	373.2						
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	30.0										
Storage Blk Time (%)	1	0									
Queuing Penalty (veh)	3	1									

Intersection: 3: River Road & Harmony Road											
Movement	EB	EB	B36	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	T	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	8.6	59.3	16.7	15.6	71.5	20.4	27.9				
Average Queue (m)	0.6	39.8	1.6	4.2	29.7	7.7	9.9				
95th Queue (m)	4.1	59.0	9.3	12.2	55.1	16.2	20.4				
Link Distance (m)		408.5	83.0		962.0	214.0	330.5				
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (m)	30.0				30.0						
Storage Blk Time (%)		11				7					
Queuing Penalty (veh)		0				2					

Intersection: 4: Harmony Road & Homan Road										
Movement	EB	EB	WB	WB	SB	SB	EB	EB	WB	WB
Directions Served	L	T	T	R	LR	LR				
Maximum Queue (m)	20.9	81.6	46.8	16.6	31.8	31.8				
Average Queue (m)	5.4	40.9	33.4	4.6	8.4	8.4				
95th Queue (m)	15.3	66.7	50.6	16.2	20.5	20.5				
Link Distance (m)		962.0	41.2		285.7					
Upstream Blk Time (%)			3							
Queuing Penalty (veh)			12							
Storage Bay Dist (m)	30.0			30.0						
Storage Blk Time (%)		11	10							
Queuing Penalty (veh)		4	2							

Intersection: 5: Plumpton & Harmony Road										
Movement	WB	NB	NB	WB	WB	SB	WB	NB	NB	WB
Directions Served	LT	LR								
Maximum Queue (m)	48.3	9.1								
Average Queue (m)	12.2	4.2								
95th Queue (m)	34.2	11.2								
Link Distance (m)		902.7	549.3							
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)										
Storage Blk Time (%)										
Queuing Penalty (veh)										

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access										
Movement	EB	EB	WB	WB	SB	SB	EB	EB	WB	WB
Directions Served	L	LT	T	R	LR	LR				
Maximum Queue (m)	79.7	110.4	75.0	77.5	44.6	44.6				
Average Queue (m)	11.4	62.5	34.8	8.6	18.6	18.6				
95th Queue (m)	34.4	92.7	61.9	31.4	39.6	39.6				
Link Distance (m)		902.7	466.0		382.6					
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)	30.0			30.0						
Storage Blk Time (%)		27	7							
Queuing Penalty (veh)		13	5							

Intersection: 7: Harmony Public School & Harmony Road										
Movement	EB	EB	WB	WB	NB	NB	EB	EB	WB	WB
Directions Served	T	TR	L	T	L	R				
Maximum Queue (m)	98.6	92.1	39.6	61.6	51.5	36.7				
Average Queue (m)	45.3	34.0	20.7	19.5	15.9	11.3				
95th Queue (m)	71.9	66.1	33.8	41.8	38.1	24.2				
Link Distance (m)		97.8	97.8	61.3	206.8	206.8				
Upstream Blk Time (%)		0	0	0	0					
Queuing Penalty (veh)		1	0	0						
Storage Bay Dist (m)			30.0							
Storage Blk Time (%)			3	1						
Queuing Penalty (veh)			9	1						

Intersection: 8: Highway 37 & Harmony Road										
Movement	EB	EB	EB	B38	WB	WB	NB	NB	NB	SB
Directions Served	L	T	R	T	L	T	L	LT	TR	L
Maximum Queue (m)	51.3	70.1	48.5	18.5	50.0	74.1	42.5	36.6	27.5	14.0
Average Queue (m)	29.0	38.8	28.0	0.8	32.8	28.6	27.3	15.8	10.0	0.5
95th Queue (m)	47.9	69.3	63.5	6.5	58.2	62.3	38.4	33.6	22.9	4.7
Link Distance (m)		48.5	48.5	35.6		257.0	2721.4	2721.4		950.1
Upstream Blk Time (%)		0	4	2						
Queuing Penalty (veh)		1	12	0			79.5		82.0	
Storage Bay Dist (m)			30.0		30.0		53	3		2
Storage Blk Time (%)			10	6						0
Queuing Penalty (veh)			29	10	43	3				

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road										
Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB
Directions Served	L	LT	TR	L	LT	TR	LT	T	R	T
Maximum Queue (m)	19.8	27.1	8.9	21.4	45.2	22.1	39.2	29.2	8.2	64.0
Average Queue (m)	4.3	12.7	1.4	10.6	23.8	5.4	12.2	10.4	1.1	37.6
95th Queue (m)	12.6	24.1	6.8	20.3	38.0	15.2	27.2	24.6	5.2	57.3
Link Distance (m)		432.2	432.2		560.2	560.2	768.1	768.1		2721.4
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (m)				50.0				85.0		79.0
Storage Blk Time (%)					0					
Queuing Penalty (veh)					0					

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road

Movement	EB	EB	EB	WB	WB	WB	LT	TR	LT	NB	NB	SB	SB	SB
Directions Served	L	LT	TR	L	TR	LR						R	LT	T
Maximum Queue (m)	2.4	18.0	14.6	25.3	28.3	29.2	37.2	31.9	0.6	84.8	93.4	11.8		
Average Queue (m)	0.3	7.8	5.1	10.3	16.3	9.6	12.3	5.0	0.0	34.8	39.0	2.4		
95th Queue (m)	1.6	16.1	14.5	20.7	25.4	20.3	28.3	20.6	0.2	63.8	72.6	7.8		
Link Distance (m)		585.3	585.3		691.3	691.3	394.3			768.1	768.1			
Upstream Blk Time (%)														
Queuing Penalty (veh)														
Storage Bay Dist (m)	50.0			50.0					70.0					70.0
Storage Blk Time (%)														0
Queuing Penalty (veh)														0

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	EB	WB	WB	SB
Directions Served	L	T	TR	LR	
Maximum Queue (m)	79.7	97.5	59.5	48.4	
Average Queue (m)	15.8	57.7	29.9	20.2	
95th Queue (m)	44.9	92.3	52.3	35.1	
Link Distance (m)		466.0	97.8	143.7	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	30.0				
Storage Blk Time (%)		25			
Queuing Penalty (veh)		21			

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	EB	WB	WB	SB
Directions Served	LT	T	T	R	LR
Maximum Queue (m)	72.6	63.9	47.7	16.5	29.3
Average Queue (m)	61.3	37.7	23.2	7.8	13.6
95th Queue (m)	78.1	79.5	41.4	15.8	23.9
Link Distance (m)	61.3	61.3	65.6		132.6
Upstream Blk Time (%)	23	2			
Queuing Penalty (veh)	38	5			
Storage Bay Dist (m)			30.0		
Storage Blk Time (%)			2		
Queuing Penalty (veh)			1		

Intersection: 13: Harmony Road & Proposed Site Access 4

Movement	EB	SB
Directions Served	LT	LR
Maximum Queue (m)	26.5	22.0
Average Queue (m)	3.6	11.6
95th Queue (m)	15.1	19.7
Link Distance (m)		176.9
Upstream Blk Time (%)		268.0
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 14: Homan Road & Proposed Site Access 5

Movement	WB
Directions Served	LR
Maximum Queue (m)	16.3
Average Queue (m)	8.1
95th Queue (m)	14.6
Link Distance (m)	272.3
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 247

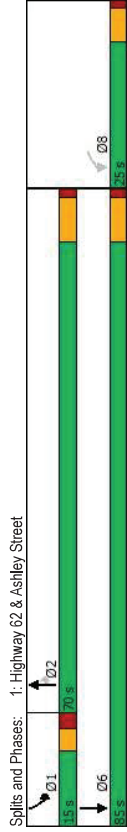
Timings

1: Highway 62 & Ashley Street

<Total 2056> PM Peak Hour

03-11-2025

Lane Group	WBL	NBT	NBR	SBL	SBT
Lane Configurations	WW	WW	WW	WW	WW
Traffic Volume (vph)	545	1781	888	21	952
Future Volume (vph)	545	1781	888	21	952
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases		2		1	6
Permitted Phases	8	2	2	1	6
Detector Phase	8	2	2	1	6
Switch Phase					
Minimum Initial (s)	10.0	20.0	20.0	7.0	20.0
Minimum Split (s)	22.6	32.2	32.2	12.0	27.2
Total Split (s)	25.0	70.0	70.0	15.0	85.0
Total Split (%)	22.7%	63.6%	63.6%	13.6%	77.3%
Yellow Time (s)	4.5	3.9	3.9	3.0	5.9
All-Red Time (s)	1.1	1.3	1.3	2.0	1.3
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0	7.2
Lead/Lag	Lag	Lag	Lag	Lead	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	None	Max
Act Effct Green (s)	19.4	72.4	72.4	7.6	77.8
Actuated g/C Ratio	0.18	0.66	0.66	0.07	0.71
v/c Ratio	0.95	0.94	0.93	0.20	0.45
Control Delay	68.4	28.9	27.5	51.9	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	68.4	28.9	27.5	51.9	7.6
LOS	E	C	C	D	A
Approach Delay	68.4	28.4			8.5
Approach LOS	E	C			A
Intersection Summary					
Cycle Length: 110					
Actuated Cycle Length: 110					
Natural Cycle: 120					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.95					
Intersection Signal Delay: 29.5					
Intersection LOS: C					
Intersection Capacity Utilization 71.1%					
Analysis Period (min) 15					



HCM Signalized Intersection Capacity Analysis

1: Highway 62 & Ashley Street

<Total 2056> PM Peak Hour

03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	WW	WW	WW	WW	WW	WW
Traffic Volume (vph)	545	40	1781	888	21	952
Future Volume (vph)	545	40	1781	888	21	952
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2	
Lane Util. Factor	0.94	0.95	1.00	1.00	0.95	
Frt	0.99	1.00	0.85	1.00	1.00	
Flt Protected	0.96		1.00	1.00	0.95	
Satd. Flow (prot)	4099		3195	1392	1770	3505
Flt Permitted	0.96		1.00	1.00	0.95	
Satd. Flow (perm)	4099		3195	1392	1770	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86	0.86
Adj. Flow (vph)	649	48	1979	987	24	1107
RTOR Reduction (vph)	8	0	0	149	0	0
Lane Group Flow (vph)	689	0	1979	838	24	1107
Heavy Vehicles (%)	25%	5%	13%	16%	2%	3%
Turn Type	Perm	Perm	NA	Perm	Prot	NA
Protected Phases			2		1	6
Permitted Phases	8			2		
Actuated Green, G (s)	19.4		72.4	72.4	3.4	80.8
Effective Green, g (s)	19.4		72.4	72.4	3.4	80.8
Actuated g/C Ratio	0.17		0.64	0.64	0.03	0.72
Clearance Time (s)	5.6		7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0		4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	703		2047	891	53	2506
v/s Ratio Prot			0.62		0.01	0.32
v/s Ratio Perm	0.17			0.60		
v/c Ratio	0.98		0.97	0.94	0.45	0.44
Uniform Delay, d1	46.6		19.2	18.3	53.9	6.7
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	29.3		13.5	18.8	6.0	0.6
Delay (s)	75.9		32.6	37.1	59.9	7.3
Level of Service	E		C	D	E	A
Approach Delay (s)	75.9		34.1		8.4	
Approach LOS	E		C		A	
Intersection Summary						
HCM 2000 Control Delay			34.1			
HCM 2000 Level of Service						C
HCM 2000 Volume to Capacity ratio			0.96			
Actuated Cycle Length (s)			113.0			
Sum of lost time (s)						17.8
Intersection Capacity Utilization			71.1%			
ICU Level of Service						C
Analysis Period (min)			15			
c. Critical Lane Group						

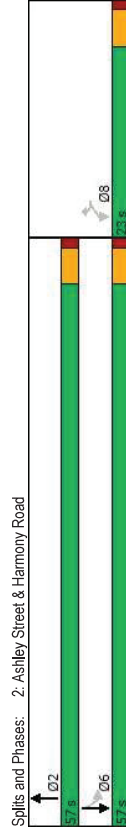
Timings
2: Ashley Street & Harmony Road

HCM Signalized Intersection Capacity Analysis
2: Ashley Street & Harmony Road

<Total 2056> PM Peak Hour
03-11-2025

<Total 2056> PM Peak Hour
03-11-2025

Lane Group	WBL	WBR	NBT	SBT
Lane Configurations	W	R	T	T
Traffic Volume (vph)	291	235	218	302
Future Volume (vph)	291	235	218	302
Turn Type	Perm	Perm	NA	Perm
Protected Phases			2	6
Permitted Phases	8	8	6	6
Detector Phase	8	8	2	6
Switch Phase				
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	57.0	57.0
Total Split (%)	28.8%	28.8%	71.3%	71.3%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	Max	Max
Act Eff Green (s)	17.2	17.2	52.6	52.6
Actuated g/C Ratio	0.22	0.22	0.67	0.67
v/c Ratio	0.85	0.48	0.69	0.82
Control Delay	50.8	6.8	8.9	38.3
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	50.8	6.8	8.9	38.3
LOS	D	A	A	D
Approach Delay	31.2	8.9	24.4	
Approach LOS	C	A	A	C
Intersection Summary				
Cycle Length: 80				
Actuated Cycle Length: 78.8				
Natural Cycle: 80				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.85				
Intersection Signal Delay: 19.7				Intersection LOS: B
Intersection Capacity Utilization 77.8%				ICU Level of Service D
Analysis Period (min) 15				



Movement	WBL	WBR	NBT	SBT
Lane Configurations	W	R	T	T
Traffic Volume (vph)	291	235	218	450
Future Volume (vph)	291	235	218	450
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	0.95
Frt	1.00	0.85	0.91	1.00
Flt Protected	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1770	1583	1693	1681
Flt Permitted	0.95	1.00	1.00	0.23
Satd. Flow (perm)	1770	1583	1693	406
Peak-hour factor, PHF	0.89	0.89	0.80	0.85
Adj. Flow (vph)	327	264	272	355
RTOR Reduction (vph)	0	206	90	0
Lane Group Flow (vph)	327	58	746	220
Turn Type	Perm	Perm	NA	Perm
Protected Phases			2	6
Permitted Phases	8	8		6
Actuated Green, G (s)	17.2	17.2	52.5	52.5
Effective Green, g (s)	17.2	17.2	52.5	52.5
Actuated g/C Ratio	0.22	0.22	0.67	0.67
Clearance Time (s)	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	386	345	1129	270
v/s Ratio Prot	c0.18	0.04	0.44	0.37
v/c Ratio	0.85	0.17	0.66	0.81
Uniform Delay, d1	29.5	24.9	7.8	9.6
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.7	0.2	3.0	23.0
Delay (s)	45.2	25.2	10.8	32.5
Level of Service	D	C	B	B
Approach Delay (s)	36.2	10.8		21.0
Approach LOS	D	B		C
Intersection Summary				
HCM 2000 Control Delay		21.3		HCM 2000 Level of Service C
HCM 2000 Volume to Capacity ratio		0.82		
Actuated Cycle Length (s)		78.7		Sum of lost time (s)
Intersection Capacity Utilization		77.8%		ICU Level of Service D
Analysis Period (min)		15		
c Critical Lane Group				

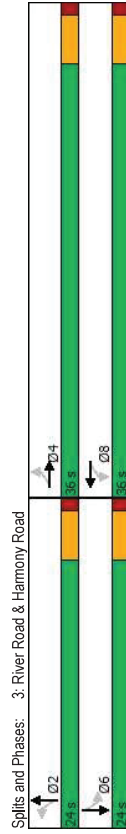
Timings

3: River Road & Harmony Road

<Total 2056> PM Peak Hour

03-11-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Traffic Volume (vph)	17	697	19	481	124	7	33	15
Future Volume (vph)	17	697	19	481	124	7	33	15
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	4	4	8	8	2	2	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?								
Recall Mode	None	None	None	None	Max	Max	Max	Max
Act Eff Green (s)	30.4	30.4	30.4	30.4	19.5	19.5	19.5	19.5
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.33	0.33	0.33	0.33
v/c Ratio	0.06	0.95	0.17	0.57	0.57	0.23	0.23	0.23
Control Delay	7.7	35.5	11.4	12.6	19.9	14.9	14.9	14.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.7	35.5	11.4	12.6	19.9	14.9	14.9	14.9
LOS	A	D	B	B	B	B	B	B
Approach Delay	34.9	34.9	12.6	12.6	19.9	14.9	14.9	14.9
Approach LOS	C	C	B	B	B	B	B	B
Intersection Summary								
Cycle Length: 60								
Actuated Cycle Length: 58.9								
Natural Cycle: 60								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.95								
Intersection Signal Delay: 24.8								
Intersection Capacity Utilization 61.5%								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis

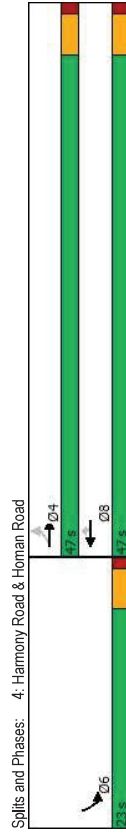
3: River Road & Harmony Road

<Total 2056> PM Peak Hour

03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	17	697	65	19	481	8	124	7	58	33	15	7
Future Volume (vph)	17	697	65	19	481	8	124	7	58	33	15	7
Initial Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	1.00	1.00	1.00	0.96	0.96	0.96	0.98	0.98	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.97	0.97	0.97	0.97	0.97	0.97
Satd. Flow (prot)	1770	1839	1770	1839	1770	1839	1770	1770	1770	1770	1770	1770
Flt Permitted	0.34	1.00	0.34	1.00	0.34	1.00	0.76	0.76	0.76	0.76	0.76	0.76
Satd. Flow (perm)	630	1839	630	1839	630	1839	1362	1362	1362	1362	1362	1362
Peak-hour factor, PHF	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.69	0.69	0.51	0.51	0.51
Adj. Flow (vph)	20	830	77	21	540	9	180	10	84	65	29	14
RTOR Reduction (vph)	0	6	0	0	1	0	0	0	26	0	0	9
Lane Group Flow (vph)	20	901	0	21	548	0	0	248	0	0	99	0
Turn Type	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA	Perm	NA	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	30.4	30.4	30.4	30.4	30.4	30.4	19.5	19.5	19.5	19.5	19.5	19.5
Effective Green, g (s)	30.4	30.4	30.4	30.4	30.4	30.4	19.5	19.5	19.5	19.5	19.5	19.5
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.33	0.33	0.33	0.33	0.33	0.33
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	325	949	325	126	958	126	450	450	450	460	460	460
v/s Ratio Prot	0.03	0.09	0.03	0.09	0.09	0.29	c0.18	c0.18	c0.18	0.07	0.07	0.07
v/c Ratio	0.06	0.95	0.06	0.17	0.57	0.57	0.55	0.55	0.55	0.22	0.22	0.22
Uniform Delay, d1	7.1	13.5	7.1	7.5	9.8	9.8	16.1	16.1	16.1	14.2	14.2	14.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	18.0	0.1	0.6	0.8	0.8	4.8	4.8	4.8	1.1	1.1	1.1
Delay (s)	7.2	31.5	7.2	8.2	10.6	10.6	20.9	20.9	20.9	15.3	15.3	15.3
Level of Service	A	C	A	B	B	B	C	C	C	B	B	B
Approach Delay (s)	31.0	31.0	31.0	10.5	10.5	10.5	20.9	20.9	20.9	15.3	15.3	15.3
Approach LOS	C	C	C	B	B	B	C	C	C	B	B	B
Intersection Summary												
HCM 2000 Control Delay				22.4	22.4	22.4	HCM 2000 Level of Service	C	C	C	C	C
HCM 2000 Volume to Capacity ratio				0.79	0.79	0.79						
Actuated Cycle Length (s)				58.9	58.9	58.9	Sum of lost time (s)	9.0	9.0	9.0	9.0	9.0
Intersection Capacity Utilization				61.5%	61.5%	61.5%	ICU Level of Service	B	B	B	B	B
Analysis Period (min)				15	15	15						
c Critical Lane Group												

Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations	51	631	461	39	39
Traffic Volume (vph)	51	631	461	39	39
Future Volume (vph)	51	631	461	39	39
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases	4	8	8	6	6
Permitted Phases	4	4	8	8	6
Detector Phase	4	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	47.0	47.0	47.0	47.0	23.0
Total Split (%)	67.1%	67.1%	67.1%	67.1%	32.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Max
Act Eff Green (s)	38.4	38.4	38.4	38.4	18.7
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.28
v/c Ratio	0.48	0.80	0.93	0.15	0.39
Control Delay	21.7	18.1	31.1	3.6	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.7	18.1	31.1	3.6	16.6
LOS	C	B	C	A	B
Approach Delay		18.4	29.0		16.6
Approach LOS		B	C		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 66.1					
Natural Cycle: 70					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.93					
Intersection Signal Delay: 23.4					
Intersection LOS: C					
Intersection Capacity Utilization 45.0%					
Analysis Period (min) 15					
ICU Level of Service A					



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	51	631	461	39	39	35
Traffic Volume (vph)	51	631	461	39	39	35
Future Volume (vph)	51	631	461	39	39	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.94	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1770	1759	1667	808	1168	
Flt Permitted	0.13	1.00	1.00	1.00	0.97	
Satd. Flow (perm)	239	1759	1667	808	1168	
Peak-hour factor, PHF	0.77	0.77	0.51	0.51	0.50	0.50
Adj. Flow (vph)	66	819	904	76	78	70
RTOR Reduction (vph)	0	0	0	22	45	0
Lane Group Flow (vph)	66	819	904	54	103	0
Heavy Vehicles (%)	2%	8%	14%	100%	2%	100%
Turn Type	Perm	NA	NA	Perm	Prot	
Protected Phases		4	8		6	
Permitted Phases		4		8		
Actuated Green, G (s)	38.4	38.4	38.4	38.4	18.7	
Effective Green, g (s)	38.4	38.4	38.4	38.4	18.7	
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.28	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	138	1021	968	469	330	
v/s Ratio Prot		0.47	0.54		0.09	
v/s Ratio Perm	0.28			0.07		
v/c Ratio	0.48	0.80	0.93	0.12	0.31	
Uniform Delay, d1	8.0	10.9	12.7	6.2	18.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.6	4.6	15.4	0.1	2.4	
Delay (s)	10.6	15.5	28.1	6.3	21.1	
Level of Service	B	B	C	A	C	
Approach Delay (s)		15.1	26.4		21.1	
Approach LOS		B	C		C	
Intersection Summary						
HCM 2000 Control Delay		21.0				C
HCM 2000 Volume to Capacity ratio		0.73				
Actuated Cycle Length (s)		66.1				9.0
Intersection Capacity Utilization		45.0%				A
Analysis Period (min)		15				
c. Critical Lane Group						

5: Plumpton & Harmony Road

HCM Unsignalized Intersection Capacity Analysis

<Total 2056> PM Peak Hour

03-11-2025

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	EB	EB	WB	WB	NB	NB
Traffic Volume (veh/h)	707	7	27	488	11	39
Future Volume (Veh/h)	707	7	27	488	11	39
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	0.67
Hourly flow rate (vph)	873	9	31	561	16	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)	None					
Median type						
Median storage (veh)						
Upstream signal (m)	61					
pK, platoon unblocked						
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
IC, single (s)						
IC, 2 stage (s)						
p0 queue free %						
p0 capacity (veh/h)						
CM capacity (veh/h)						
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	882	592	74			
Volume Left	0	31	16			
Volume Right	9	0	58			
cSH	1700	658	203			
Volume to Capacity	0.52	0.05	0.37			
Queue Length 95th (m)	0.0	1.2	12.6			
Control Delay (s)	0.0	1.3	32.6			
Lane LOS	A	A	D			
Approach Delay (s)	0.0	1.3	32.6			
Approach LOS	D	D	D			
Intersection Summary						
Average Delay			2.0			
Intersection Capacity Utilization			57.7%			
Analysis Period (min)			15			
ICU Level of Service			B			

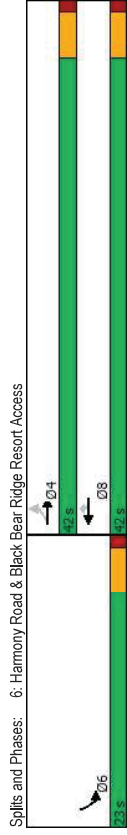
6: Harmony Road & Black Bear Ridge Resort Access

Timings

<Total 2056> PM Peak Hour

03-11-2025

Lane Group	EBL	EBT	WBT	WBL	SBL
Lane Configurations	EB	EB	WB	WB	SB
Traffic Volume (vph)	159	509	400	134	130
Future Volume (vph)	159	509	400	134	130
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases					
Permitted Phases	4	4	8	8	6
Detector Phase	4	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	42.0	42.0	42.0	42.0	23.0
Total Split (%)	64.6%	64.6%	64.6%	64.6%	35.4%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	None	Max
Act Effct Green (s)	35.3	35.3	35.3	35.3	18.6
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.30
v/c Ratio	0.79	0.98	0.83	0.27	0.48
Control Delay	43.9	44.9	21.2	2.6	17.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	43.9	44.9	21.2	2.6	17.5
LOS	D	D	C	A	B
Approach Delay					
Approach LOS					
Intersection Summary					
Cycle Length: 65					
Actuated Cycle Length: 62.9					
Natural Cycle: 65					
Control Type: Semi Act-Uncoordinated					
Maximum v/c Ratio: 0.98					
Intersection Signal Delay: 27.8					
Intersection Capacity Utilization 73.0%					
Analysis Period (min) 15					
ICU Level of Service D					



HCM Signalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

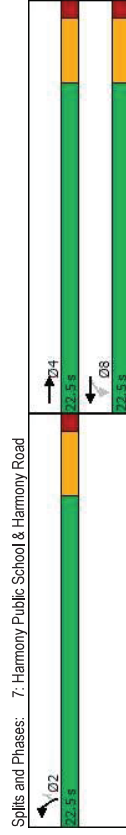
<Total 2056> PM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	159	509	400	134	130	110
Future Volume (vph)	159	509	400	134	130	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.94	
Flt Protected	0.95	1.00	1.00	1.00	0.97	
Satd. Flow (prot)	1681	1672	1681	1583	1701	
Flt Permitted	0.19	0.77	1.00	1.00	0.97	
Satd. Flow (perm)	342	1289	1681	1583	1701	
Peak-hour factor, PHF	0.78	0.78	0.51	0.51	0.92	0.92
Adj. Flow (vph)	204	653	784	263	141	120
RTOR Reduction (vph)	0	0	0	92	46	0
Lane Group Flow (vph)	151	706	784	171	215	0
Heavy Vehicles (%)	2%	8%	13%	2%	2%	2%
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	35.3	35.3	35.3	35.3	18.6	
Effective Green, g (s)	35.3	35.3	35.3	35.3	18.6	
Actuated g/C Ratio	0.56	0.56	0.56	0.56	0.30	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	191	723	943	888	502	
v/s Ratio Prot			0.47		c0.13	
v/s Ratio Perm	0.44	c0.55		0.11		
v/s Ratio	0.79	0.98	0.83	0.19	0.43	
Uniform Delay, d1	10.9	13.4	11.4	6.8	17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.6	27.4	6.3	0.1	2.6	
Delay (s)	30.5	40.8	17.7	6.9	20.5	
Level of Service	C	D	B	A	C	
Approach Delay (s)		39.0	15.0		20.5	
Approach LOS		D	B		C	
Intersection Summary						
HCM 2000 Control Delay			25.1		HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio			0.79			
Actuated Cycle Length (s)			62.9		Sum of lost time (s)	9.0
Intersection Capacity Utilization			73.0%		ICU Level of Service	D
Analysis Period (min)			15			
c. Critical Lane Group						

Timings
7: Harmony Public School & Harmony Road

<Total 2056> PM Peak Hour
03-11-2025

Lane Group	EBT	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔
Traffic Volume (vph)	541	13	405	32	55
Future Volume (vph)	541	13	405	32	55
Turn Type	NA	Perm	NA	Prot	Perm
Protected Phases		4		8	2
Permitted Phases	4		8		2
Detector Phase	4	8	8	2	2
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	17.0	17.0	17.0	18.0	18.0
Actuated g/C Ratio	0.39	0.39	0.39	0.41	0.41
v/c Ratio	0.80	0.12	0.74	0.18	0.33
Control Delay	18.0	10.9	20.1	9.7	9.5
Queue Delay	0.0	0.0	5.4	0.0	0.0
Total Delay	18.0	10.9	25.5	9.7	9.5
LOS	B	B	C	A	A
Approach Delay		18.0		25.0	9.6
Approach LOS		B		C	A
Intersection Summary					
Cycle Length: 45					
Actuated Cycle Length: 44					
Natural Cycle: 30					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.80					
Intersection Signal Delay: 18.7					Intersection LOS: B
Intersection Capacity Utilization 33.0%					ICU Level of Service A
Analysis Period (min) 15					



HCM Signalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

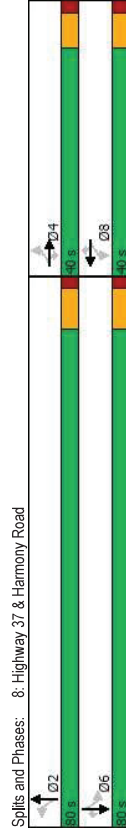
<Total 2056> PM Peak Hour
03-11-2025

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	EBT	EBR	WBL	WBT	NBL	NBR	
Traffic Volume (vph)	541	4	13	405	32	55	
Future Volume (vph)	541	4	13	405	32	55	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	1.00	1.00	0.85	
Flt Protected	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	3278	1543	1810	1492	1324	1324	
Flt Permitted	1.00	0.24	1.00	0.95	1.00	1.00	
Satd. Flow (perm)	3278	382	1810	1492	1324	1324	
Peak-hour factor, PHF	0.54	0.54	0.78	0.78	0.30	0.30	
Adj. Flow (vph)	1002	7	17	519	107	183	
RTOR Reduction (vph)	1	0	0	0	22	22	
Lane Group Flow (vph)	1008	0	17	519	107	161	
Heavy Vehicles (%)	10%	13%	17%	5%	21%	22%	
Turn Type	NA	NA	Prot	Prot	Perm	Perm	
Protected Phases	4		8	2	2		
Permitted Phases			8		2		
Actuated Green, G (s)	17.0	17.0	17.0	18.0	18.0		
Effective Green, g (s)	17.0	17.0	17.0	18.0	18.0		
Actuated g/C Ratio	0.39	0.39	0.39	0.41	0.41		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	1266	147	699	610	541		
v/s Ratio Prot	c0.31		0.29	0.07			
v/s Ratio Perm		0.04			c0.12		
v/c Ratio	0.80	0.12	0.74	0.18	0.30		
Uniform Delay, d1	12.0	8.7	11.6	8.3	8.7		
Progression Factor	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.6	0.4	4.3	0.6	1.4		
Delay (s)	15.5	9.0	15.9	8.9	10.2		
Level of Service	B	A	B	A	B		
Approach Delay (s)	15.5		15.7	9.7			
Approach LOS	B		B	A			
Intersection Summary							
HCM 2000 Control Delay		14.6				HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio		0.54					
Actuated Cycle Length (s)		44.0				Sum of lost time (s)	9.0
Intersection Capacity Utilization		33.0%				ICU Level of Service	A
Analysis Period (min)		15					
c. Critical Lane Group							

Timings
8: Highway 37 & Harmony Road

<Total 2056> PM Peak Hour
03-11-2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT	SBR
Traffic Volume (vph)	253	151	251	40	44	2	216	835	6	585	347
Future Volume (vph)	253	151	251	40	44	2	216	835	6	585	347
Turn Type	Perm	NA	Perm	NA	Perm	Perm	Perm	Perm	NA	Perm	Perm
Protected Phases		4			8		2		6		6
Permitted Phases	4	4	4	8	8	8	2	2	6	6	6
Detector Phase	4	4	4	8	8	8	2	2	6	6	6
Switch Phase											
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6	27.6
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	80.0	80.0	80.0	80.0	80.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	66.7%	66.7%	66.7%	66.7%	66.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6
Lead/Lag											
Lead-Lag Optimize?											
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max	Max
Act Effct Green (s)	29.3	29.3	29.3	29.3	29.3	29.3	72.5	72.5	72.5	72.5	72.5
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.62	0.62	0.62	0.62	0.62
v/c Ratio	0.90	0.37	0.48	0.20	0.15	0.01	0.61	0.93	0.05	0.59	0.37
Control Delay	72.5	38.0	8.7	35.8	34.2	0.0	24.8	34.1	11.0	16.5	2.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.5	38.0	8.7	35.8	34.2	0.0	24.8	34.1	11.0	16.5	2.1
LOS	E	D	A	D	C	A	C	C	B	B	A
Approach Delay							34.1				
Approach LOS							C				
Intersection Summary											
Cycle Length: 120											
Actuated Cycle Length: 116.5											
Natural Cycle: 90											
Control Type: Semi Act-Uncoord											
Maximum v/c Ratio: 0.93											
Intersection Signal Delay: 27.7											
Intersection Capacity Utilization 100.8%											
Analysis Period (min) 15											



HCM Signalized Intersection Capacity Analysis 8. Highway 37 & Harmony Road

Timings 9. Highway 37 & Cannifton Road/Blessington Road

03-11-2025

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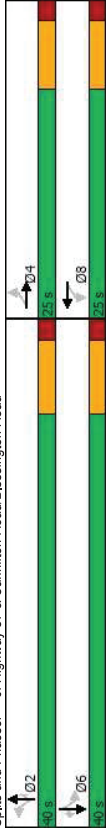
<Total 2056> PM Peak Hour

<Total 2056> PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	263	151	251	40	44	2	216	835	71	6	585	347
Future Volume (vph)	263	151	251	40	44	2	216	835	71	6	585	347
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.91	0.91	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1687	1863	1568	1736	1624	1583	1535	2899	1444	1810	1468	1468
Flt Permitted	0.72	1.00	1.00	0.60	1.00	1.00	0.31	0.74	0.15	1.00	1.00	1.00
Satd. Flow (perm)	1275	1863	1568	1096	1624	1583	499	2152	234	1810	1468	1468
Peak-hour factor, PHF	0.88	0.88	0.88	0.73	0.73	0.73	0.78	0.78	0.78	0.88	0.88	0.88
Adj. Flow (vph)	288	172	285	55	60	3	277	1071	91	7	665	394
RTOR Reduction (vph)	0	0	195	0	0	2	0	5	0	0	0	149
Lane Group Flow (vph)	288	172	90	55	60	1	188	1246	0	7	665	245
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%	11%	25%	5%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	29.3	29.3	29.3	29.3	29.3	29.3	72.5	72.5	72.5	72.5	72.5	72.5
Effective Green, g (s)	29.3	29.3	29.3	29.3	29.3	29.3	72.5	72.5	72.5	72.5	72.5	72.5
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.62	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	320	468	394	275	408	398	310	1340	145	1127	914	914
v/s Ratio Prot	0.09	0.09	0.09	0.04	0.04	0.04	0.38	0.38	0.03	0.37	0.37	0.37
v/s Ratio Perm	0.23	0.23	0.23	0.20	0.20	0.20	0.61	0.61	0.05	0.59	0.59	0.59
Uniform Delay, d1	42.1	35.9	34.6	34.3	33.8	32.6	13.3	19.7	8.5	13.1	9.9	9.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.7	0.5	0.3	0.4	0.2	0.0	8.5	12.7	0.6	2.3	0.7	0.7
Delay (s)	68.8	36.4	34.9	34.7	34.0	32.6	21.8	32.4	9.2	15.4	10.7	10.7
Level of Service	E	D	C	C	C	C	C	C	A	B	B	B
Approach Delay (s)	48.4	34.3	31.0	31.0	31.0	31.0	31.0	31.0	13.6	13.6	13.6	13.6
Approach LOS	D	C	C	C	C	C	C	C	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	29.5											
HCM 2000 Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	116.4											
Intersection Capacity Utilization	100.8%											
Analysis Period (min)	15											
c. Critical Lane Group												

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	201	89	68	65	6	1008	194	31	709	73
Future Volume (vph)	201	89	68	65	6	1008	194	31	709	73
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	25.0	25.0	25.0	25.0	27.6	27.6	27.6	27.6	27.6	27.6
Minimum Split (s)	25.0	25.0	25.0	25.0	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	38.5%	38.5%	38.5%	38.5%	61.5%	61.5%	61.5%	61.5%	61.5%	61.5%
Yellow Time (s)	5.4	5.4	5.4	5.4	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.6	1.6	1.6	1.6	1.7	1.7	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	Max	Max	Max	Max	Max	Max
Act Effct Green (s)	13.5	13.5	13.5	13.5	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.54	0.54	0.54	0.54	0.54	0.54
v/c Ratio	0.61	0.52	0.28	0.23	0.79	0.30	0.30	0.58	0.10	0.10
Control Delay	32.7	23.9	23.0	18.1	17.0	2.6	11.9	2.7	2.7	2.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	32.7	23.9	23.0	18.1	17.0	2.6	11.9	2.7	2.7	2.7
LOS	C	C	C	B	B	A	A	B	A	A
Approach Delay	26.9	19.6	14.7	11.1	11.1	11.1	11.1	11.1	11.1	11.1
Approach LOS	C	B	B	B	B	B	B	B	B	B
Intersection Summary										
Cycle Length: 65										
Actuated Cycle Length: 60.6										
Natural Cycle: 60										
Control Type: Semi Act-Uncoordinated										
Maximum v/c Ratio: 0.79										
Intersection Signal Delay: 15.6										
Intersection Capacity Utilization 71.5%										
Analysis Period (min) 15										

Splits and Phases: 9. Highway 37 & Cannifton Road/Blessington Road



HCM Signalized Intersection Capacity Analysis
9: Highway 37 & Cannifton Road/Blessington Road

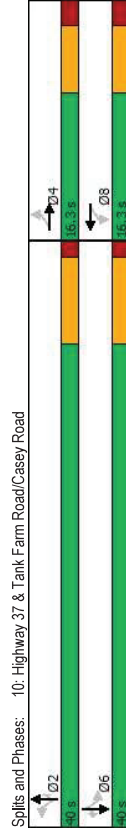
<Total 2056> PM Peak Hour
03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	201	89	4	68	65	9	6	1008	194	31	709	73
Future Volume (vph)	201	89	4	68	65	9	6	1008	194	31	709	73
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	1.00	0.95	1.00
Frt	1.00	1.00	1.00	1.00	0.99	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	0.97	0.95	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1550	3145	1521	3063	3057	1262	3057	1262	3057	1262	3057	1262
Flt Permitted	0.67	0.76	0.57	0.80	0.95	1.00	0.95	1.00	0.85	1.00	0.85	1.00
Satd. Flow (perm)	1086	2450	913	2482	2901	1262	2901	1262	2338	1553	2338	1553
Peak-hour factor, PHF	0.68	0.68	0.68	0.76	0.76	0.76	0.83	0.83	0.83	0.81	0.81	0.81
Adj. Flow (vph)	296	131	6	89	86	12	7	1214	234	38	875	90
RTOR Reduction (vph)	0	2	0	0	9	0	0	109	0	0	42	42
Lane Group Flow (vph)	148	283	0	57	121	0	0	1221	125	0	913	48
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	13.5	13.5	13.5	13.5	13.5	13.5	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	13.5	13.5	13.5	13.5	13.5	13.5	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	241	545	203	552	552	1555	676	676	1575	832	1575	832
v/s Ratio Prot	0.14	0.12	0.06	0.05	0.05	0.05	0.42	0.10	0.31	0.03	0.31	0.03
v/s Ratio Perm	0.61	0.52	0.28	0.22	0.22	0.22	0.79	0.19	0.58	0.06	0.58	0.06
Uniform Delay, d1	21.2	20.7	19.5	19.2	19.2	11.3	7.2	7.2	9.5	6.7	9.5	6.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.6	0.8	0.8	0.2	0.2	4.1	0.6	0.6	1.6	0.1	1.6	0.1
Delay (s)	25.8	21.5	20.3	19.4	19.4	15.3	7.8	7.8	11.0	6.9	11.0	6.9
Level of Service	C	C	C	B	B	B	A	A	B	B	A	A
Approach Delay (s)	23.0	23.0	19.7	19.7	19.7	14.1	14.1	14.1	10.6	10.6	10.6	10.6
Approach LOS	C	C	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM 2000 Control Delay	14.6											
HCM 2000 Level of Service	B											
HCM 2000 Volume to Capacity ratio	0.73											
Actuated Cycle Length (s)	60.6											
Sum of lost time (s)	14.6											
Intersection Capacity Utilization	71.5%											
ICU Level of Service	C											
Analysis Period (min)	15											
c. Critical Lane Group												

Timings
10: Highway 37 & Tank Farm Road/Casey Road

<Total 2056> PM Peak Hour
03-11-2025

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	51	100	100	78	72	1101	96	19	697	27
Future Volume (vph)	51	100	100	78	72	1101	96	19	697	27
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	6	6	6
Detector Phase	4	4	8	8	2	2	2	6	6	6
Switch Phase	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	16.3	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Minimum Split (s)	16.3	16.3	16.3	16.3	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	29.0%	29.0%	29.0%	29.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%
Yellow Time (s)	4.5	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	None	Max	Max	Max
Act Effct Green (s)	10.0	10.0	10.0	10.0	32.9	32.9	32.9	32.9	32.9	32.9
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.58	0.58	0.58	0.58	0.58	0.58
v/c Ratio	0.32	0.37	0.39	0.31	0.93	0.93	0.13	0.50	0.03	0.03
Control Delay	25.3	15.3	28.0	18.8	23.6	1.6	8.2	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.3	15.3	28.0	18.8	23.6	1.6	8.2	0.0	0.0	0.0
LOS	C	B	C	B	C	A	A	A	A	A
Approach Delay	17.5	17.5	21.7	22.0	7.9	7.9	7.9	7.9	7.9	7.9
Approach LOS	B	B	C	C	A	A	A	A	A	A
Intersection Summary										
Cycle Length: 56.3										
Actuated Cycle Length: 56.3										
Natural Cycle: 60										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.93										
Intersection Signal Delay: 17.4										
Intersection Capacity Utilization 91.3%										
Analysis Period (min) 15										



HCM Signalized Intersection Capacity Analysis
 10: Highway 37 & Tank Farm Road/Casey Road

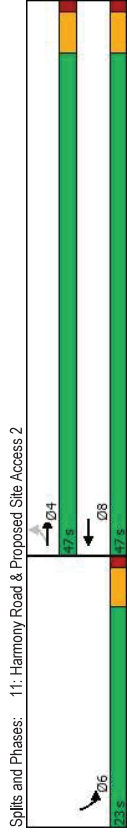
Timings
 11: Harmony Road & Proposed Site Access 2

<Total 2056> PM Peak Hour
 03-11-2025

<Total 2056> PM Peak Hour
 03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Traffic Volume (vph)	51	100	57	100	78	23	72	1101	96	19	697	27
Future Volume (vph)	51	100	57	100	78	23	72	1101	96	19	697	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	1.00	0.95	1.00	0.95
Flt	1.00	0.95	1.00	1.00	0.98	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	1.00	0.95	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1610	3206	1535	3219	3528	1568	3374	1583	3374	1583	3374	1583
Flt Permitted	0.65	0.94	0.61	0.80	0.81	1.00	0.88	1.00	0.88	1.00	0.88	1.00
Satd. Flow (perm)	1103	3020	981	2626	2872	1568	2958	1583	2958	1583	2958	1583
Peak-hour factor, PHF	0.73	0.73	0.73	0.91	0.91	0.91	0.75	0.75	0.75	0.82	0.82	0.82
Adj. Flow (vph)	70	137	78	110	86	25	96	1468	128	23	850	33
RTOR Reduction (vph)	0	64	0	0	21	0	0	53	0	0	14	0
Lane Group Flow (vph)	63	158	0	68	132	0	0	1564	75	0	873	19
Heavy Vehicles (%)	2%	2%	2%	7%	2%	2%	2%	2%	3%	2%	7%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.0	10.0	10.0	10.0	10.0	10.0	32.9	32.9	32.9	32.9	32.9	32.9
Effective Green, g (s)	10.0	10.0	10.0	10.0	10.0	10.0	32.9	32.9	32.9	32.9	32.9	32.9
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.58	0.58	0.58	0.58	0.58	0.58
Clearance Time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	195	536	174	466	466	1678	916	1728	925	1728	925	925
v/s Ratio Prot	0.06	0.05	0.07	0.05	0.05	0.54	0.05	0.30	0.01	0.30	0.01	0.01
v/s Ratio Perm	0.32	0.29	0.39	0.28	0.28	0.93	0.08	0.51	0.02	0.51	0.02	0.02
Uniform Delay, d1	20.2	20.1	20.5	20.1	20.1	10.7	5.1	6.9	4.9	6.9	4.9	4.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	0.3	1.5	0.3	0.3	10.2	0.1	1.1	0.0	1.1	0.0	0.0
Delay (s)	21.2	20.4	21.9	20.4	20.4	20.9	5.2	8.0	5.0	8.0	5.0	5.0
Level of Service	C	C	C	C	C	C	A	A	A	A	A	A
Approach Delay (s)	20.6	20.6	20.9	20.9	20.9	19.7	7.8	7.8	7.8	7.8	7.8	7.8
Approach LOS	C	C	C	C	C	B	A	A	A	A	A	A
Intersection Summary	HCM 2000 Level of Service											
HCM 2000 Control Delay	16.4											
HCM 2000 Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	56.3											
Intersection Capacity Utilization	91.3%											
Analysis Period (min)	15											
c. Critical Lane Group												

Lane Group	EBL	EBT	WBT	SBL
Lane Configurations	EBL	EBT	WBT	SBL
Traffic Volume (vph)	134	505	435	121
Future Volume (vph)	134	505	435	121
Turn Type	Perm	NA	NA	Prot
Protected Phases	4	4	8	6
Permitted Phases	4	4	8	6
Detector Phase	4	4	8	6
Switch Phase	4	4	8	6
Minimum Initial (s)	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5
Total Split (s)	47.0	47.0	47.0	23.0
Total Split (%)	67.1%	67.1%	67.1%	32.9%
Yellow Time (s)	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5
Lead/Lag				
Lead-Lag Optimize?				
Recall Mode	None	None	None	Max
Act Effct Green (s)	20.1	20.1	20.1	18.8
Actuated g/C Ratio	0.42	0.42	0.42	0.39
v/c Ratio	0.80	0.71	0.77	0.34
Control Delay	45.7	16.6	18.3	11.2
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	45.7	16.6	18.4	11.2
LOS	D	B	B	B
Approach Delay	22.7	18.4	11.2	
Approach LOS	C	B	B	
Intersection Summary				
Cycle Length: 70				
Actuated Cycle Length: 48				
Natural Cycle: 35				
Control Type: Semi Act-Uncoord				
Maximum v/c Ratio: 0.80				
Intersection Signal Delay: 19.2				
Intersection LOS: B				
Intersection Capacity Utilization 61.4%				
Analysis Period (min) 15				
ICU Level of Service B				



HCM Signalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

<Total 2056> PM Peak Hour
 03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	134	505	435	116	121	100
Future Volume (vph)	134	505	435	116	121	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.97	0.94	0.94	0.97
Flt Protected	0.95	1.00	1.00	0.97	0.97	0.97
Satd. Flow (prot)	1770	1863	1810	1702	1702	1702
Flt Permitted	0.23	1.00	1.00	0.97	0.97	0.97
Satd. Flow (perm)	436	1863	1810	1702	1702	1702
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	146	549	473	126	132	109
RTOR Reduction (vph)	0	0	20	0	35	0
Lane Group Flow (vph)	146	549	579	0	206	0
Turn Type	Perm	NA	NA	Prot	Prot	Prot
Protected Phases	4	4	8	6	6	6
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effd Green (s)	20.1	20.1	20.1	18.8	18.8	18.8
Effective Green, g (s)	20.1	20.1	20.1	18.8	18.8	18.8
Actuated g/C Ratio	0.42	0.42	0.42	0.39	0.39	0.39
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	182	781	759	668	668	668
v/s Ratio Prot	0.29	0.32	0.32	c0.12	c0.12	c0.12
v/s Ratio Perm	c0.33					
v/c Ratio	0.80	0.70	0.76	0.31	0.31	0.31
Uniform Delay, d1	12.2	11.4	11.9	10.1	10.1	10.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.9	2.9	4.6	1.2	1.2	1.2
Delay (s)	34.1	14.3	16.4	11.2	11.2	11.2
Level of Service	C	B	B	B	B	B
Approach Delay (s)	18.5	16.4	11.2			
Approach LOS	B	B	B			
Intersection Summary						
HCM 2000 Control Delay						
HCM 2000 Volume to Capacity ratio						
Actuated Cycle Length (s)						
Intersection Capacity Utilization						
Analysis Period (min)						
c Critical Lane Group						

Timings
 12: Harmony Road & Proposed Site Access 3

<Total 2056> PM Peak Hour
 03-11-2025

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	137	561	474	129	103	103
Future Volume (vph)	137	561	474	129	103	103
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases	4	4	8	6	6	6
Permitted Phases	4	4	8	8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	57.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	71.3%	71.3%	71.3%	71.3%	28.8%	28.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	None	None	None	None
Act Effd Green (s)	19.3	19.3	19.3	18.7	18.7	18.7
Actuated g/C Ratio	0.41	0.41	0.41	0.40	0.40	0.40
v/c Ratio	0.81	0.67	0.19	0.30	0.30	0.30
Control Delay	19.9	16.0	2.6	10.1	10.1	10.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	16.0	2.6	10.1	10.1	10.1
LOS	B	B	A	B	B	B
Approach Delay	19.9	13.2	10.1			
Approach LOS	B	B	B			
Intersection Summary						
Cycle Length: 80						
Actuated Cycle Length: 47.1						
Natural Cycle: 30						
Control Type: Semi Act-Uncoordinated						
Maximum v/c Ratio: 0.81						
Intersection Signal Delay: 15.9						
Intersection Capacity Utilization 66.8%						
Analysis Period (min) 15						



HCM Signalized Intersection Capacity Analysis
12: Harmony Road & Proposed Site Access 3

<Total 2056> PM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4A	A		W	W
Traffic Volume (vph)	137	561	474	129	103	88
Future Volume (vph)	137	561	474	129	103	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	0.94		
Flt Protected	0.99	1.00	1.00	0.97		
Satd. Flow (prot)	3505	1863	1583	1701		
Flt Permitted	0.64	1.00	1.00	0.97		
Satd. Flow (perm)	2281	1863	1583	1701		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	149	610	515	140	112	96
RTOR Reduction (vph)	0	0	0	83	30	0
Lane Group Flow (vph)	0	759	515	57	178	0
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	
Permitted Phases	4		8			
Actuated Green, G (s)		19.3	19.3	19.3	18.7	
Effective Green, g (s)		19.3	19.3	19.3	18.7	
Actuated g/C Ratio		0.41	0.41	0.41	0.40	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		936	785	650	676	
v/s Ratio Prot			0.28		c0.10	
v/s Ratio Perm		c0.33		0.04		
v/c Ratio		0.81	0.67	0.09	0.26	
Uniform Delay, d1		12.2	11.3	8.5	9.5	
Progression Factor		1.00	1.00	1.00	1.00	
Incremental Delay, d2		5.4	2.3	0.1	0.9	
Delay (s)		17.6	13.6	8.5	10.5	
Level of Service		B	B	A	B	
Approach Delay (s)		17.6	12.5		10.5	
Approach LOS		B	B		B	
Intersection Summary						
HCM 2000 Control Delay			14.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.54			
Actuated Cycle Length (s)			47.0		Sum of lost time (s)	9.0
Intersection Capacity Utilization			66.5%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
13: Harmony Road & Proposed Site Access 4

<Total 2056> PM Peak Hour
03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4A	A		W	W
Traffic Volume (veh/h)	40	624	563	49	39	32
Future Volume (Veh/h)	40	624	563	49	39	32
Sign Control		Free	Free		Stop	Stop
Grade		0%	0%		0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	678	612	53	42	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		None	None			
Median type						
Median storage (veh)						
Upstream signal (m)		276	130			
pK, platoon unblocked	0.98				0.74	0.98
VC, conflicting volume	665				1402	638
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	644				1295	617
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	95				67	93
cM capacity (veh/h)	918				126	478
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	721	665	77			
Volume Left	43	0	42			
Volume Right	0	53	35			
cSH	918	1700	190			
Volume to Capacity	0.05	0.39	0.41			
Queue Length 95th (m)	1.2	0.0	14.5			
Control Delay (s)	1.2	0.0	36.3			
Lane LOS	A		E			
Approach Delay (s)	1.2	0.0	36.3			
Approach LOS			E			
Intersection Summary						
Average Delay			2.5			
Intersection Capacity Utilization			76.4%		ICU Level of Service	D
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
14: Homan Road & Proposed Site Access 5

<Total 2056> PM Peak Hour
03-11-2025

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	63	0	0	79	0	0
Future Volume (Veh/h)	63	0	0	79	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	68	0	0	86	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	43	43			86	
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	43	43			86	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	93	100			100	
cM capacity (veh/h)	968	1027			1510	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	68	86	0			
Volume Left	68	0	0			
Volume Right	0	86	0			
cSH	968	1700	1700			
Volume to Capacity	0.07	0.05	0.00			
Queue Length 95th (m)	1.8	0.0	0.0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			4.0			
Intersection Capacity Utilization			15.0%			A
Analysis Period (min)			15			

Queuing and Blocking Report
Trans-Plan

<Total 2056> PM Peak Hour
03-11-2025

Intersection: 1: Highway 62 & Ashley Street												
Movement	WB	WB	WB	WB	NB	NB	SB	SB	SB	SB	SB	SB
Directions Served	L	L	LR	LR	T	T	R	R	L	L	T	T
Maximum Queue (m)	79.7	88.2	77.1	539.2	545.0	119.5	15.3	53.7	53.9	53.9	53.9	53.9
Average Queue (m)	37.2	53.5	50.5	113.2	154.3	49.0	6.1	29.0	21.9	21.9	21.9	21.9
95th Queue (m)	61.0	78.9	69.4	261.7	411.3	116.5	14.3	46.0	38.7	38.7	38.7	38.7
Link Distance (m)		453.0	453.0	534.6	534.6		610.4	610.4	610.4	610.4	610.4	610.4
Upstream Blk Time (%)				1	0							
Queuing Penalty (veh)				0	0							
Storage Bay Dist (m)	50.0					38.0	30.5					
Storage Blk Time (%)	0	8			21	1	4					
Queuing Penalty (veh)	1	15			183	10	1					
Intersection: 2: Ashley Street & Harmony Road												
Movement	WB	WB	WB	NB	SB	SB	SB	SB	SB	SB	SB	SB
Directions Served	L	R	TR	L	L	LT						
Maximum Queue (m)	65.9	71.7	63.1	72.6	52.1							
Average Queue (m)	46.8	21.1	37.2	32.7	9.9							
95th Queue (m)	65.7	44.7	59.6	56.7	28.6							
Link Distance (m)		83.0	453.0	373.2	373.2							
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	30.0											
Storage Blk Time (%)	27	1										
Queuing Penalty (veh)	64	3										
Intersection: 3: River Road & Harmony Road												
Movement	EB	EB	B36	WB	WB	NB	SB	SB	SB	SB	SB	SB
Directions Served	L	TR	T	L	TR	L	LTR					
Maximum Queue (m)	15.3	194.5	95.1	98.4	14.9	72.2	41.4	22.0				
Average Queue (m)	2.6	79.9	18.6	12.9	6.5	40.6	20.0	6.1				
95th Queue (m)	9.6	159.9	72.1	67.4	14.4	67.2	38.1	16.7				
Link Distance (m)		408.5	83.0	83.0	962.0	214.0	330.5					
Upstream Blk Time (%)			1	1								
Queuing Penalty (veh)			3	4								
Storage Bay Dist (m)	30.0			30.0								
Storage Blk Time (%)		27			10							
Queuing Penalty (veh)		5		2								

Intersection: 4: Harmony Road & Homan Road

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	T	T	R	R	LR
Maximum Queue (m)	59.9	87.6	47.0	28.7	65.2	
Average Queue (m)	16.2	53.9	34.9	6.3	13.6	
95th Queue (m)	49.0	82.1	49.1	20.5	34.3	
Link Distance (m)		962.0	41.2		285.7	
Upstream Blk Time (%)			3			
Queuing Penalty (veh)			17			
Storage Bay Dist (m)	30.0		30.0			
Storage Blk Time (%)		17	9	0		
Queuing Penalty (veh)		9	4	0		

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB	NB
Directions Served	LT	LR	
Maximum Queue (m)	63.5	28.3	
Average Queue (m)	13.7	9.5	
95th Queue (m)	37.6	20.8	
Link Distance (m)		902.7	549.3
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	EB	WB	WB	SB	SB
Directions Served	L	LT	T	R	R	LR
Maximum Queue (m)	79.9	123.8	64.5	23.1	56.7	
Average Queue (m)	16.8	60.7	35.2	11.0	23.0	
95th Queue (m)	38.8	95.9	58.3	18.3	45.5	
Link Distance (m)		902.7	466.0		382.6	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	30.0			30.0		
Storage Blk Time (%)		0	28	10		
Queuing Penalty (veh)		1	22	13		

Intersection: 7: Harmony Public School & Harmony Road

Movement	EB	EB	WB	WB	NB	NB
Directions Served	T	TR	L	T	L	R
Maximum Queue (m)	108.0	110.2	16.7	68.6	30.5	41.3
Average Queue (m)	94.1	87.5	2.7	41.6	5.5	7.9
95th Queue (m)	124.5	128.4	10.5	71.7	18.4	23.7
Link Distance (m)		97.8	97.8	61.3	206.8	206.8
Upstream Blk Time (%)		24	6	2		
Queuing Penalty (veh)		76	17	13		
Storage Bay Dist (m)			30.0			
Storage Blk Time (%)				13		
Queuing Penalty (veh)				2		

Intersection: 8: Highway 37 & Harmony Road

Movement	EB	EB	EB	B38	B38	WB	WB	NB	NB	SB	SB
Directions Served	L	T	R	T	T	L	T	L	LT	TR	L
Maximum Queue (m)	70.1	70.0	48.4	24.0	6.4	16.8	33.6	123.0	127.4	121.6	9.8
Average Queue (m)	58.4	30.1	9.4	3.6	0.2	5.3	11.2	51.2	59.9	56.0	0.7
95th Queue (m)	78.7	52.7	40.3	15.0	2.1	11.7	28.3	99.5	112.8	106.8	4.5
Link Distance (m)		48.5	48.5	35.6	35.6		257.0		2721.4	2721.4	950.1
Upstream Blk Time (%)		23	1	0							
Queuing Penalty (veh)		75	4	0							
Storage Bay Dist (m)			30.0			30.0					82.0
Storage Blk Time (%)		8	0				1	8	12		0
Queuing Penalty (veh)		20	0	0			0	44	13		0

Intersection: 8: Highway 37 & Harmony Road

Movement	SB	SB
Directions Served		R
Maximum Queue (m)		51.2
Average Queue (m)		10.1
95th Queue (m)		27.0
Link Distance (m)		950.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	L	LT	TR	L	LT	TR	LT	TR	T	R	LT	T
Directions Served												
Maximum Queue (m)	45.0	51.8	37.4	8.4	27.4	19.1	77.1	83.5	32.1	50.6	46.4	10.6
Average Queue (m)	9.7	27.5	5.8	2.5	12.7	3.6	35.4	26.4	7.1	26.3	24.6	2.3
95th Queue (m)	22.5	42.7	17.9	8.1	22.4	12.6	67.9	60.1	18.8	43.4	44.3	6.8
Link Distance (m)		432.2	432.2		550.2	550.2	768.1	768.1		2721.4	2721.4	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0			50.0					85.0			79.0
Storage Blk Time (%)	0	0						0				
Queuing Penalty (veh)	0	0						0				

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	L	LT	TR	L	LT	TR	LT	TR	T	R	LT	T
Directions Served												
Maximum Queue (m)	8.8	18.9	22.4	34.8	25.9	21.8	50.3	53.6	0.2	47.7	51.7	15.2
Average Queue (m)	1.2	10.9	11.8	5.8	14.6	9.6	27.9	22.0	0.0	20.2	19.2	2.5
95th Queue (m)	4.0	18.1	20.1	17.9	22.5	20.2	49.2	47.0	0.1	38.1	38.0	8.4
Link Distance (m)		585.3	585.3		691.3	691.3	394.3	394.3		768.1	768.1	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0			50.0					70.0			70.0
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	EB	WB	WB	SB
	L	T	TR	LR	
Directions Served					
Maximum Queue (m)	80.0	449.6	76.6	120.3	
Average Queue (m)	51.7	236.1	43.1	39.4	
95th Queue (m)	101.9	444.5	68.8	77.4	
Link Distance (m)		466.0	97.8	143.7	
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (m)	30.0				
Storage Blk Time (%)	7	65			
Queuing Penalty (veh)	33	87			

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	EB	WB	WB	SB	SB
	LT	T	TR	R	LR	
Directions Served						
Maximum Queue (m)	70.0	74.5	78.7	28.0	51.6	
Average Queue (m)	64.0	45.0	32.9	7.4	22.8	
95th Queue (m)	67.9	82.2	55.6	18.7	38.9	
Link Distance (m)		61.3	61.3	65.6	132.6	
Upstream Blk Time (%)		26	5	0		
Queuing Penalty (veh)		77	16	3		
Storage Bay Dist (m)				30.0		
Storage Blk Time (%)			9	0		
Queuing Penalty (veh)			11	0		

Intersection: 13: Harmony Road & Proposed Site Access 4

Movement	EB	WB	B38	B38	SB	SB
	LT	TR	T		LR	
Directions Served						
Maximum Queue (m)	51.4	13.1	16.9	18.2	28.6	
Average Queue (m)	12.8	0.4	0.6	1.1	12.7	
95th Queue (m)	41.9	4.3	5.6	8.2	24.5	
Link Distance (m)		176.9	35.6	48.5	268.0	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

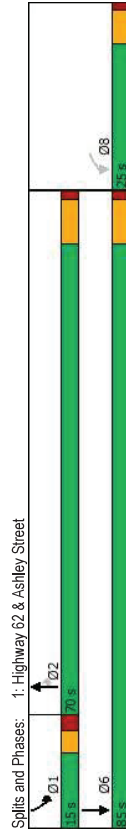
Intersection: 14: Homan Road & Proposed Site Access 5

Movement	WB	
	LR	
Directions Served		
Maximum Queue (m)	14.9	
Average Queue (m)	9.3	
95th Queue (m)	12.9	
Link Distance (m)	272.3	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

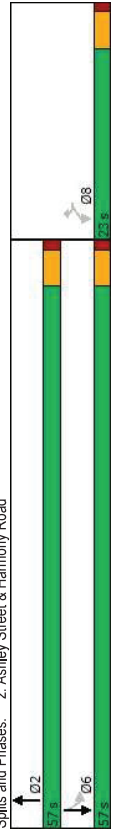
Network wide Queuing Penalty: 845

	WBL	NBT	NBR	SBT
Lane Group	WBL	NBT	NBR	SBT
Lane Configurations	463	1566	784	21
Traffic Volume (vph)	463	1566	784	21
Future Volume (vph)	463	1566	784	21
Turn Type	Perm	NA	Perm	Prot
Protected Phases	8	2	2	1
Permitted Phases	8	2	2	1
Detector Phase	8	2	2	1
Switch Phase	8	2	2	1
Minimum Initial (s)	10.0	20.0	20.0	7.0
Minimum Split (s)	22.6	32.2	32.2	12.0
Total Split (s)	25.0	70.0	70.0	15.0
Total Split (%)	22.7%	63.6%	63.6%	13.6%
Yellow Time (s)	4.5	5.9	5.9	3.0
All-Red Time (s)	1.1	1.3	1.3	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.6	7.2	7.2	5.0
Lead/Lag	Lag	Lag	Lag	Lead
Lead-Lag Optimize?	Yes	Yes	Yes	Yes
Recall Mode	Max	Max	Max	Max
Act Effct Green (s)	19.4	72.4	72.4	7.6
Actuated g/C Ratio	0.18	0.66	0.66	0.07
v/c Ratio	0.82	0.83	0.82	0.20
Control Delay	52.9	20.2	16.2	51.9
Queue Delay	0.0	0.0	0.0	0.0
Total Delay	52.9	20.2	16.2	51.9
LOS	D	C	B	D
Approach Delay	52.9	18.8		8.2
Approach LOS	D	B		A
Intersection Summary				
Cycle Length: 110				
Actuated Cycle Length: 110				
Natural Cycle: 90				
Control Type: Semi Act-Uncoordinated				
Maximum v/c Ratio: 0.83				
Intersection Signal Delay: 21.2				
Intersection Capacity Utilization 64.5%				
Analysis Period (min) 15				



	WBL	WBR	NBT	NBR	SBT
Movement	WBL	WBR	NBT	NBR	SBT
Lane Configurations	463	40	1566	784	21
Traffic Volume (vph)	463	40	1566	784	21
Future Volume (vph)	463	40	1566	784	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900
Total Lost time (s)	5.6	7.2	7.2	5.0	7.2
Lane Util. Factor	0.94	0.95	1.00	1.00	0.95
Frt	0.99	1.00	0.85	1.00	1.00
Flt Protected	0.96	1.00	1.00	0.95	1.00
Satd. Flow (prot)	4101	3195	1392	1770	3505
Flt Permitted	0.96	1.00	1.00	0.95	1.00
Satd. Flow (perm)	4101	3195	1392	1770	3505
Peak-hour factor, PHF	0.84	0.84	0.90	0.90	0.86
Adj. Flow (vph)	551	48	1740	871	24
RTOR Reduction (vph)	10	0	0	150	0
Lane Group Flow (vph)	589	0	1740	721	24
Heavy Vehicles (%)	25%	5%	13%	16%	2%
Turn Type	Perm	NA	Perm	Prot	NA
Protected Phases	2	2	1	6	6
Permitted Phases	8			2	
Actuated Green, G (s)	19.4	72.4	72.4	3.4	80.8
Effective Green, g (s)	19.4	72.4	72.4	3.4	80.8
Actuated g/C Ratio	0.17	0.64	0.64	0.03	0.72
Clearance Time (s)	5.6	7.2	7.2	5.0	7.2
Vehicle Extension (s)	3.0	4.5	4.5	3.0	4.5
Lane Grp Cap (vph)	704	2047	891	53	2506
v/s Ratio Prot	c0.14		c0.54	0.01	c0.28
v/s Ratio Perm	0.84		0.85	0.81	0.45
Uniform Delay, d1	45.3	16.0	15.2	53.9	6.4
Progression Factor	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.4	4.7	7.9	6.0	0.5
Delay (s)	56.6	20.7	23.0	59.9	6.8
Level of Service	E	C	C	E	A
Approach Delay (s)	56.6		21.5		8.1
Approach LOS	E		C		A
Intersection Summary					
HCM 2000 Control Delay			23.3		
HCM 2000 Volume to Capacity ratio			0.84		
Actuated Cycle Length (s)			113.0		
Intersection Capacity Utilization			64.5%		
Analysis Period (min)			15		
c. Critical Lane Group					

Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	271	229	146	309	128
Future Volume (vph)	271	229	146	309	128
Turn Type	Perm	Perm	NA	Perm	NA
Protected Phases			2		6
Permitted Phases	8	8		6	
Detector Phase	8	8	2	6	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	23.0	23.0	57.0	57.0	57.0
Total Split (%)	28.8%	28.8%	71.3%	71.3%	71.3%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
Act Effct Green (s)	16.7	16.7	52.6	52.6	52.6
Actuated g/c Ratio	0.21	0.21	0.67	0.67	0.67
v/c Ratio	0.81	0.48	0.55	0.64	0.42
Control Delay	46.9	6.9	4.9	17.9	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	46.9	6.9	4.9	17.9	8.7
LOS	D	A	A	B	A
Approach Delay	28.6		4.9		13.0
Approach LOS	C		A		B
Intersection Summary					
Cycle Length: 80					
Actuated Cycle Length: 78.3					
Natural Cycle: 70					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.81					
Intersection Signal Delay: 14.8					
Intersection Capacity Utilization 70.7%					
Analysis Period (min) 15					
				Intersection LOS: B	
				ICU Level of Service C	



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	271	229	146	403	309	128
Future Volume (vph)	271	229	146	403	309	128
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt	1.00	0.85	0.90	1.00	1.00	1.00
Flt Protected	0.95	1.00	1.00	0.95	0.98	0.98
Satd. Flow (prot)	1770	1583	1678	1681	1731	1731
Flt Permitted	0.95	1.00	1.00	0.32	0.55	0.55
Satd. Flow (perm)	1770	1583	1678	560	977	977
Peak-hour factor, PHF	0.89	0.89	0.80	0.80	0.85	0.85
Adj. Flow (vph)	304	257	182	504	364	151
RTOR Reduction (vph)	0	202	118	0	0	0
Lane Group Flow (vph)	304	55	569	0	240	275
Turn Type	Perm	Perm	NA	Perm	NA	NA
Protected Phases			2		6	
Permitted Phases	8	8			6	6
Actuated Green, G (s)	16.7	16.7	52.6	52.6	52.6	52.6
Effective Green, g (s)	16.7	16.7	52.6	52.6	52.6	52.6
Actuated g/C Ratio	0.21	0.21	0.67	0.67	0.67	0.67
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	377	337	1127	376	656	
v/s Ratio Prot			0.34			
v/c Ratio Perm	0.17	0.03		0.43	0.28	
v/c Ratio	0.81	0.16	0.50	0.64	0.42	
Uniform Delay, d1	29.3	25.1	6.4	7.4	5.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.9	0.2	1.6	8.0	2.0	
Delay (s)	41.2	25.3	8.0	15.4	7.8	
Level of Service	D	C	A	B	A	
Approach Delay (s)	33.9		8.0		11.4	
Approach LOS	C		A		B	
Intersection Summary						
HCM 2000 Control Delay			17.2		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.68			
Actuated Cycle Length (s)			78.3		Sum of lost time (s)	9.0
Intersection Capacity Utilization			70.7%		ICU Level of Service	C
Analysis Period (min)			15			
Critical Lane Group						

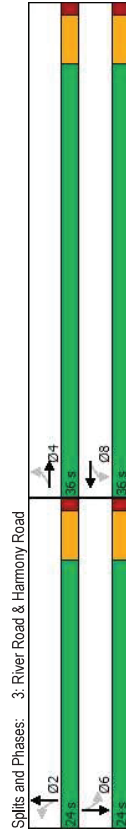
Timings

3: River Road & Harmony Road

<Total 2056> Saturday Peak Hour

03-11-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Traffic Volume (vph)	26	684	61	338	93	10	26	7
Future Volume (vph)	26	684	61	338	93	10	26	7
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Detector Phase	4	4	8	8	2	2	6	6
Switch Phase	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Initial (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Minimum Split (s)	36.0	36.0	36.0	36.0	24.0	24.0	24.0	24.0
Total Split (%)	60.0%	60.0%	60.0%	60.0%	40.0%	40.0%	40.0%	40.0%
Total Split (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Yellow Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
All-Red Time (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Lost Time Adjust (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag								
Lead-Lag Optimize?	None	None	None	None	Max	Max	Max	Max
Recall Mode	29.7	29.7	29.7	29.7	19.6	19.6	19.6	19.6
Act Eff Green (s)	0.51	0.51	0.51	0.51	0.34	0.34	0.34	0.34
Actuated g/C Ratio	0.07	0.93	0.54	0.42	0.47	0.17	0.17	0.17
v/c Ratio	7.6	31.5	30.1	10.3	16.2	13.6	13.6	13.6
Control Delay	0.0	0.0	0.0	0.0	16.2	13.6	13.6	13.6
Queue Delay	7.6	31.5	30.1	10.3	16.2	13.6	13.6	13.6
Total Delay	7.6	31.5	30.1	10.3	16.2	13.6	13.6	13.6
LOS	A	C	C	B	B	B	B	B
Approach Delay	30.6	30.6	13.2	16.2	16.2	13.6	13.6	13.6
Approach LOS	C	C	B	B	B	B	B	B
Intersection Summary								
Cycle Length: 60								
Actuated Cycle Length: 58.3								
Natural Cycle: 60								
Control Type: Semi Act-Uncoord								
Maximum v/c Ratio: 0.93								
Intersection Signal Delay: 23.0								
Intersection LOS: C								
Intersection Capacity Utilization 65.0%								
ICU Level of Service C								
Analysis Period (min) 15								



HCM Signalized Intersection Capacity Analysis

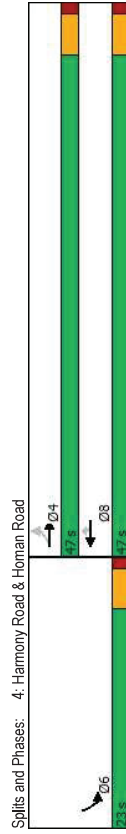
3: River Road & Harmony Road

<Total 2056> Saturday Peak Hour

03-11-2025

Movement	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Traffic Volume (vph)	26	684	50	61	338	14	93	10
Future Volume (vph)	26	684	50	61	338	14	93	10
Initial Flow (vph)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	0.95	0.95	0.98	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.97	0.97	0.97	0.97
Satd. Flow (prot)	1770	1844	1770	1851	1721	1721	1761	1761
Flt Permitted	0.46	1.00	0.13	1.00	0.78	0.78	0.75	0.75
Satd. Flow (perm)	866	1844	251	1851	1385	1385	1361	1361
Peak-hour factor, PHF	0.84	0.84	0.84	0.89	0.89	0.89	0.69	0.51
Adj. Flow (vph)	31	814	60	69	380	16	135	14
RTOR Reduction (vph)	0	4	0	0	2	0	35	0
Lane Group Flow (vph)	31	870	0	69	394	0	201	0
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	8	8	2	2	6	6
Permitted Phases	4	4	8	8	2	2	6	6
Actuated Green, G (s)	29.7	29.7	29.7	29.7	19.6	19.6	19.6	19.6
Effective Green, g (s)	29.7	29.7	29.7	29.7	19.6	19.6	19.6	19.6
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.34	0.34	0.34	0.34
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	441	839	127	942	465	465	457	457
v/s Ratio Prot	0.04	0.28	0.28	0.21	0.15	0.15	0.05	0.05
v/c Ratio	0.07	0.93	0.54	0.42	0.43	0.43	0.15	0.15
Uniform Delay, d1	7.3	13.3	9.7	8.9	15.0	15.0	13.5	13.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	14.6	4.7	0.3	2.9	2.9	0.7	0.7
Delay (s)	7.3	27.8	14.4	9.2	18.0	18.0	14.2	14.2
Level of Service	A	C	B	A	B	B	B	B
Approach Delay (s)	27.1	27.1	10.0	10.0	18.0	18.0	14.2	14.2
Approach LOS	C	C	A	A	B	B	B	B
Intersection Summary								
HCM 2000 Control Delay	20.5	20.5	HCM 2000 Level of Service	C	C	C	C	C
HCM 2000 Volume to Capacity ratio	0.73	0.73						
Actuated Cycle Length (s)	58.3	58.3	Sum of lost time (s)	9.0	9.0	9.0	9.0	9.0
Intersection Capacity Utilization	65.0%	65.0%	ICU Level of Service	C	C	C	C	C
Analysis Period (min)	15	15						
c Critical Lane Group								

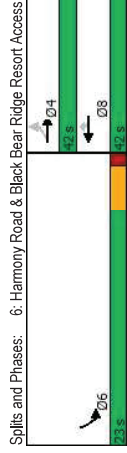
Lane Group	EBL	EBT	WBT	WBR	SBL
Lane Configurations	EBL	EBT	WBT	WBR	SBL
Traffic Volume (vph)	52	569	395	36	40
Future Volume (vph)	52	569	395	36	40
Turn Type	Perm	NA	NA	Perm	Prot
Protected Phases	4	4	8	8	6
Permitted Phases	4	4	8	8	6
Detector Phase	4	4	8	8	6
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	47.0	47.0	47.0	47.0	23.0
Total Split (%)	67.1%	67.1%	67.1%	67.1%	32.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?	None	None	None	None	Max
Recall Mode					
Act Eff Green (s)	32.0	32.0	32.0	32.0	18.9
Act Effective g/C Ratio	0.53	0.53	0.53	0.53	0.31
v/c Ratio	0.38	0.79	0.87	0.16	0.39
Control Delay	14.7	17.9	24.1	3.3	15.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	17.9	24.1	3.3	15.3
LOS	B	B	C	A	B
Approach Delay		17.6	22.3		15.3
Approach LOS		B	C		B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 60.1					
Natural Cycle: 60					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.87					
Intersection Signal Delay: 19.6					
Intersection LOS: B					
Intersection Capacity Utilization 42.1%					
ICU Level of Service A					
Analysis Period (min) 15					



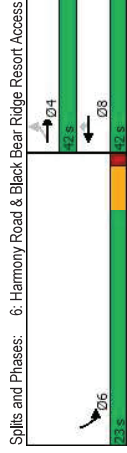
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	EBL	EBT	WBT	WBR	SBL	SBR
Traffic Volume (vph)	52	569	395	36	40	40
Future Volume (vph)	52	569	395	36	40	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	0.85	0.93	
Flt Protected	0.95	1.00	1.00	1.00	0.98	
Satd. Flow (prot)	1770	1759	1667	808	1145	
Flt Permitted	0.18	1.00	1.00	1.00	0.98	
Satd. Flow (perm)	334	1759	1667	808	1145	
Peak-hour factor, PHF	0.77	0.77	0.51	0.51	0.50	0.50
Adj. Flow (vph)	68	739	775	71	80	80
RTOR Reduction (vph)	0	0	0	27	48	0
Lane Group Flow (vph)	68	739	775	44	112	0
Heavy Vehicles (%)	2%	8%	14%	100%	2%	100%
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)	32.0	32.0	32.0	32.0	18.9	
Effective Green, g (s)	32.0	32.0	32.0	32.0	18.9	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.32	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	178	939	890	431	361	
v/s Ratio Prot		0.42	c0.47		c0.10	
v/s Ratio Perm	0.20			0.06		
v/c Ratio	0.38	0.79	0.87	0.10	0.31	
Uniform Delay, d1	8.2	11.2	12.1	6.9	15.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	4.4	9.3	0.1	2.2	
Delay (s)	9.5	15.6	21.5	7.0	17.8	
Level of Service	A	B	C	A	B	
Approach Delay (s)		15.1	20.2		17.8	
Approach LOS		B	C		B	
Intersection Summary						
HCM 2000 Control Delay		17.7				B
HCM 2000 Volume to Capacity ratio		0.66				
Actuated Cycle Length (s)		95.9				9.0
Intersection Capacity Utilization		42.1%				A
Analysis Period (min)		15				
c. Critical Lane Group						



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	696	18	40	487	7	40
Future Volume (Veh/h)	696	18	40	487	7	40
Sign Control	Free	Free	Free	Stop	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.81	0.81	0.87	0.87	0.67	0.67
Hourly flow rate (vph)	859	22	46	560	10	60
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (m)	61					
pX, platoon unblocked		0.65			0.65	0.65
vC, conflicting volume		881			1522	870
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vC3, unblocked vol		547			1534	530
IC, single (s)		4.1			6.4	6.2
IC, 2 stage (s)						
IF (s)		2.2			3.5	3.3
p0 queue free %		93			87	83
cM capacity (veh/h)		664			77	357
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total	881	606	70			
Volume Left	0	46	10			
Volume Right	22	0	60			
cSH	1700	664	235			
Volume to Capacity	0.52	0.07	0.30			
Queue Length 95th (m)	0.0	1.8	9.6			
Control Delay (s)	0.0	1.9	26.6			
Lane LOS	A	A	D			
Approach Delay (s)	0.0	1.9	26.6			
Approach LOS		D				
Intersection Summary						
Average Delay	1.9					
Intersection Capacity Utilization	68.7%			ICU Level of Service		
Analysis Period (min)	15			C		



Comprehensive Traffic Signal Performance Report - Q3 2023									
Lane Group	EBL	EBT	WBT	WBR	SBL	Signal Timing & Control			
Lane Configurations						Signal Cycle: 90s			
Traffic Volume (vph)	158	452	342	124	140	Cycle Length: 65s			
Future Volume (vph)	158	452	342	124	140	Actuated Cycle Length: 54.5s			
Turn Type	Perm	NA	NA	Perm	Prot	Natural Cycle: 60s			
Protected Phases	4	4	8	8	6	Control Type: Semi Act-Uncoord			
Permitted Phases	4	4	8	8	6	Maximum v/c Ratio: 0.90			
Detector Phase	4	4	8	8	6	Intersection Signal Delay: 21.7s			
Switch Phase						Intersection Capacity Utilization: 67.6%			
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	Analysis Period (min): 15			
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5				
Total Split (s)	42.0	42.0	42.0	42.0	23.0				
Total Split (%)	64.6%	64.6%	64.6%	64.6%	35.4%				
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5				
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0				
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0				
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5				
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	Max				
Act Effct Green (s)	26.4	26.4	26.4	26.4	18.9				
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.35				
v/c Ratio	0.90	0.83	0.82	0.28	0.43				
Control Delay	59.7	22.2	21.1	2.3	15.2				
Queue Delay	0.0	0.0	0.0	0.0	0.0				
Total Delay	59.7	22.2	21.1	2.3	15.2				
LOS	E	C	C	A	B				
Approach Delay									
Approach LOS									
Intersection Summary									
Cycle Length: 65									
Actuated Cycle Length: 54.5									
Natural Cycle: 60									
Control Type: Semi Act-Uncoord									
Maximum v/c Ratio: 0.90									
Intersection Signal Delay: 21.7						Intersection LOS: C			
Intersection Capacity Utilization: 67.6%						ICU Level of Service: C			
Analysis Period (min): 15									



HCM Signalized Intersection Capacity Analysis
6: Harmony Road & Black Bear Ridge Resort Access

<Total 2056> Saturday Peak Hour
03-11-2025

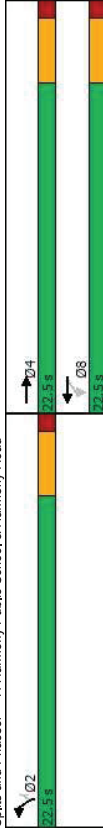
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	188	452	342	124	140	111
Traffic Volume (vph)	168	452	342	124	140	111
Future Volume (vph)	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.5	4.5	4.5	4.5	4.5	4.5
Total Lost time (s)	0.95	0.95	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	0.85	0.94	0.97
Flt Protected	0.95	1.00	1.00	1.00	0.97	0.97
Satd. Flow (prot)	1681	1672	1681	1583	1704	1704
Flt Permitted	0.22	0.91	1.00	1.00	0.97	0.97
Satd. Flow (perm)	395	1524	1681	1583	1704	1704
Peak-hour factor, PHF	0.78	0.78	0.51	0.51	0.92	0.92
Adj. Flow (vph)	203	579	671	243	152	121
RTOR Reduction (vph)	0	0	0	115	40	0
Lane Group Flow (vph)	171	611	671	128	233	0
Heavy Vehicles (%)	2%	8%	13%	2%	2%	2%
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases	4	4	8	8	6	6
Permitted Phases	4	26.5	26.5	26.5	18.9	18.9
Act Effct Green, G (s)	26.5	26.5	26.5	26.5	18.9	18.9
Effective Green, g (s)	26.5	26.5	26.5	26.5	18.9	18.9
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.35	0.35
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	192	742	818	771	592	592
v/s Ratio Prot	c0.43	0.40	0.40	0.08	c0.14	c0.14
v/s Ratio Perm	0.89	0.82	0.82	0.17	0.39	0.39
Uniform Delay, d1	12.6	11.9	11.9	7.8	13.4	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.2	7.4	6.6	0.1	2.0	2.0
Delay (s)	48.9	19.3	18.5	7.9	15.4	15.4
Level of Service	D	B	B	A	B	B
Approach Delay (s)	25.8	15.7	15.4			
Approach LOS	C	B	B			
Intersection Summary						
HCM 2000 Control Delay	19.7	HCM 2000 Level of Service				
HCM 2000 Volume to Capacity ratio	0.68	B				
Actuated Cycle Length (s)	54.4	Sum of lost time (s)				
Intersection Capacity Utilization	67.6%	ICU Level of Service				
Analysis Period (min)	15	C				
c. Critical Lane Group						

Timings
7: Harmony Public School & Harmony Road

<Total 2056> Saturday Peak Hour
03-11-2025

Lane Group	EBT	WBT	NBL
Lane Configurations	188	375	2
Traffic Volume (vph)	507	375	2
Future Volume (vph)	507	375	2
Turn Type	NA	NA	Prot
Protected Phases	4	8	2
Permitted Phases	4	8	2
Detector Phase	4	8	2
Switch Phase			
Minimum Initial (s)	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5
Total Split (s)	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5
Lead/Lag			
Lead-Lag Optimize?			
Recall Mode	None	None	Max
Act Effct Green (s)	16.3	16.3	18.1
Actuated g/C Ratio	0.38	0.38	0.42
v/c Ratio	0.76	0.71	0.01
Control Delay	16.5	18.2	8.5
Queue Delay	0.0	2.8	0.0
Total Delay	16.5	21.0	8.5
LOS	B	C	A
Approach Delay	16.5	21.0	8.5
Approach LOS	B	C	A
Intersection Summary			
Cycle Length: 45			
Actuated Cycle Length: 43.4			
Natural Cycle: 45			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 18.0			Intersection LOS: B
Intersection Capacity Utilization 31.4%			ICU Level of Service A
Analysis Period (min) 15			

Splits and Phases: 7: Harmony Public School & Harmony Road



HCM Signalized Intersection Capacity Analysis
7: Harmony Public School & Harmony Road

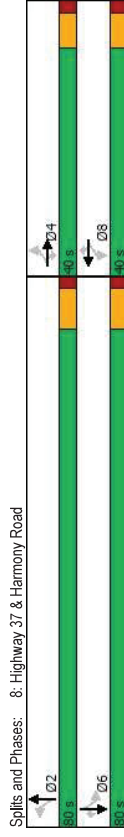
<Total 2056> Saturday Peak Hour
03-11-2025

Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	EBT	EBR	WBL	WBT	NBL	NBR	
Traffic Volume (vph)	507	0	0	375	2	0	
Future Volume (vph)	507	0	0	375	2	0	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	0.95				
Satd. Flow (prot)	3282		1810	1492			
Flt Permitted	1.00	1.00	0.95				
Satd. Flow (perm)	3282		1810	1492			
Peak-hour factor, PHF	0.54	0.54	0.78	0.78	0.30	0.30	
Adj. Flow (vph)	939	0	0	481	7	0	
RTOR Reduction (vph)	0	0	0	0	0	0	
Lane Group Flow (vph)	939	0	0	481	7	0	
Heavy Vehicles (%)	10%	13%	17%	5%	21%	22%	
Turn Type	NA	NA	Perm	NA	Prot	Perm	
Protected Phases	4			8	2		
Permitted Phases				8		2	
Actuated Green, G (s)	16.3			16.3	18.1		
Effective Green, g (s)	16.3			16.3	18.1		
Actuated g/C Ratio	0.38			0.38	0.42		
Clearance Time (s)	4.5			4.5	4.5		
Vehicle Extension (s)	3.0			3.0	3.0		
Lane Grp Cap (vph)	1232			679	622		
v/s Ratio Prot	c0.29			0.27	c0.00		
v/s Ratio Perm							
v/c Ratio	0.76			0.71	0.01		
Uniform Delay, d1	11.9			11.5	7.4		
Progression Factor	1.00			1.00	1.00		
Incremental Delay, d2	2.8			3.4	0.0		
Delay (s)	14.7			14.9	7.4		
Level of Service	B			B	A		
Approach Delay (s)	14.7			14.9	7.4		
Approach LOS	B			B	A		
Intersection Summary							
HCM 2000 Control Delay				14.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio				0.37			
Actuated Cycle Length (s)				43.4		Sum of lost time (s)	9.0
Intersection Capacity Utilization				31.4%		ICU Level of Service	A
Analysis Period (min)				15			
c. Critical Lane Group							

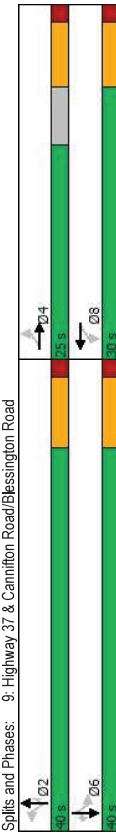
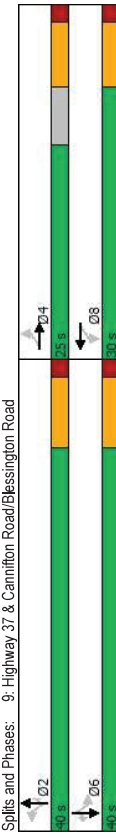
Timings
8: Highway 37 & Harmony Road

<Total 2056> Saturday Peak Hour
03-11-2025

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBT	SBR
Traffic Volume (vph)	220	129	244	35	56	6	210	433	434	210
Future Volume (vph)	220	129	244	35	56	6	210	433	434	210
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA	NA	Perm
Protected Phases										
Permitted Phases	4	4	4	8	8	8	2	2	6	6
Detector Phase	4	4	4	8	8	8	2	2	6	6
Switch Phase										
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	10.0	20.0	20.0	20.0	20.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	27.6	27.6	27.6	27.6
Total Split (s)	40.0	40.0	40.0	40.0	40.0	40.0	80.0	80.0	80.0	80.0
Total Split (%)	33.3%	33.3%	33.3%	33.3%	33.3%	33.3%	66.7%	66.7%	66.7%	66.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.9	5.9	5.9	5.9
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	1.7	1.7	1.7	1.7
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6
Lead/Lag										
Lead-Lag Optimize?										
Recall Mode	None	None	None	None	None	None	Max	Max	Max	Max
Act Effct Green (s)	26.9	26.9	26.9	26.9	26.9	26.9	72.6	72.6	72.6	72.6
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.64	0.64	0.64	0.64
v/c Ratio	0.85	0.34	0.48	0.17	0.20	0.02	0.40	0.48	0.43	0.23
Control Delay	66.7	37.8	6.9	35.5	35.6	0.2	14.9	12.9	12.7	1.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	66.7	37.8	6.9	35.5	35.6	0.2	14.9	12.9	12.7	1.9
LOS	E	D	A	D	D	A	B	B	B	A
Approach Delay										
Approach LOS										
Intersection Summary										
Cycle Length: 120										
Actuated Cycle Length: 114.1										
Natural Cycle: 60										
Control Type: Semi Act-Uncoord										
Maximum v/c Ratio: 0.85										
Intersection Signal Delay: 19.4										
Intersection Capacity Utilization 84.4%										
Analysis Period (min) 15										



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	220	129	244	35	56	6	210	433	35	0	434	210	
Future Volume (vph)	220	129	244	35	56	6	210	433	35	0	434	210	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Lane Util. Factor	1.00	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99	1.00	0.85	1.00	
Ft Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	0.99	1.00	1.00	1.00	0.95	
Sat'd. Flow (prot)	1687	1863	1568	1736	1624	1583	1535	2910	1810	1468	1810	1468	
Flt Permitted	0.71	1.00	1.00	0.64	1.00	1.00	0.43	0.77	1.00	1.00	1.00	1.00	
Sat'd. Flow (perm)	1255	1863	1568	1178	1624	1583	694	2264	1810	1468	1810	1468	
Peak-hour factor, PHF	0.88	0.88	0.88	0.73	0.73	0.73	0.78	0.78	0.78	0.88	0.88	0.88	
Adj. Flow (vph)	250	147	277	48	77	8	269	555	45	0	493	239	
RTOR Reduction (vph)	0	0	212	0	0	6	0	4	0	0	87	0	
Lane Group Flow (vph)	250	147	65	48	77	2	178	687	0	0	493	152	
Heavy Vehicles (%)	7%	2%	3%	4%	17%	2%	7%	19%	11%	25%	5%	10%	
Turn Type	Perm	NA	Perm	Perm	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	
Protected Phases	4	4	4	8	8	8	2	2	6	6	6	6	
Permitted Phases	4	26.9	26.9	26.9	26.9	26.9	72.6	72.6	72.6	72.6	72.6	72.6	
Actuated Green, G (s)	26.9	26.9	26.9	26.9	26.9	26.9	72.6	72.6	72.6	72.6	72.6	72.6	
Effective Green, g (s)	26.9	26.9	26.9	26.9	26.9	26.9	72.6	72.6	72.6	72.6	72.6	72.6	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.64	0.64	0.64	0.64	0.64	0.64	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)	295	439	369	277	382	373	441	1440	1151	934	1151	934	
v/s Ratio Prot	0.08				0.05				0.27				
v/s Ratio Perm	c0.20	0.04	0.04	0.04	0.00	0.00	0.26	c0.30	0.10	0.10	0.10	0.10	
v/c Ratio	0.85	0.33	0.18	0.17	0.20	0.01	0.40	0.48	0.43	0.16	0.43	0.16	
Uniform Factor, d1	41.6	36.2	34.8	34.7	35.0	33.4	10.2	10.8	10.4	8.4	10.4	8.4	
Progression Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.6	0.5	0.2	0.3	0.3	0.0	2.7	1.1	1.2	0.4	1.2	0.4	
Delay (s)	61.3	36.6	35.0	35.0	35.2	33.4	12.9	12.0	11.5	8.8	11.5	8.8	
Level of Service	E	D	D	D	D	C	B	B	B	A	B	A	
Approach Delay (s)	45.1			35.1			12.2		10.6				
Approach LOS	D			D			B		B				
Intersection Summary													
HCN 2000 Control Delay	22.2						HCN 2000 Level of Service						C
HCN 2000 Volume to Capacity ratio	0.58												
Actuated Cycle Length (s)	114.1						Sum of lost time (s)						14.6
Intersection Capacity Utilization	84.4%						ICU Level of Service						E
Analysis Period (min)	15												
Critical Lane Group													

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HCM Signalized Intersection Capacity Analysis
 9: Highway 37 & Cannifton Road/Blessington Road

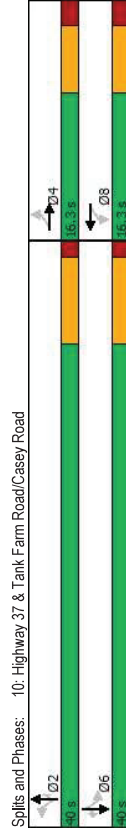
<Total 2056> Saturday Peak Hour
 03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	153	68	4	54	50	9	4	836	151	27	607	67
Future Volume (vph)	153	68	4	54	50	9	4	836	151	27	607	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	1.00	0.95	1.00
Frt	1.00	1.00	1.00	1.00	0.98	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Flt Protected	0.95	0.97	0.95	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1550	3143	1521	3049	3058	1262	3058	1262	3058	1262	3058	1262
Flt Permitted	0.68	0.77	0.61	0.82	0.95	1.00	0.87	1.00	0.87	1.00	0.87	1.00
Satd. Flow (perm)	1116	2493	975	2539	2508	1262	3034	1553	3034	1553	3034	1553
Peak-hour factor, PHF	0.68	0.68	0.68	0.76	0.76	0.76	0.83	0.83	0.83	0.81	0.81	0.81
Adj. Flow (vph)	225	100	6	71	66	12	5	1007	182	33	749	83
RTOR Reduction (vph)	0	3	0	0	0	0	0	82	0	0	37	0
Lane Group Flow (vph)	112	216	0	46	93	0	0	1012	100	0	782	46
Heavy Vehicles (%)	6%	8%	2%	8%	10%	15%	25%	18%	28%	2%	4%	4%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	12.2	12.2	12.2	12.2	12.2	12.2	32.9	32.9	32.9	32.9	32.9	32.9
Effective Green, g (s)	12.2	12.2	12.2	12.2	12.2	12.2	32.9	32.9	32.9	32.9	32.9	32.9
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.55	0.55	0.55	0.55	0.55	0.55
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.6	7.6	7.6	7.6	7.6	7.6
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	228	509	199	518	518	1602	695	1672	855	1672	855	855
v/s Ratio Prot	c0.10	0.09	0.05	0.04	0.05	0.04	c0.35	0.08	0.26	0.03	0.26	0.03
v/s Ratio Perm	0.49	0.42	0.23	0.18	0.23	0.18	0.63	0.14	0.47	0.05	0.47	0.05
Uniform Delay, d1	21.0	20.7	19.8	19.6	19.8	19.6	9.2	6.5	8.1	6.2	8.1	6.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.6	0.6	0.2	0.6	0.2	1.9	0.4	0.9	0.1	0.9	0.1
Delay (s)	22.7	21.3	20.4	19.8	20.4	19.8	11.1	7.0	9.0	6.3	9.0	6.3
Level of Service	C	C	C	B	B	B	A	A	A	A	A	A
Approach Delay (s)	21.7	21.7	21.7	20.0	20.0	20.0	10.5	8.8	8.8	8.8	8.8	8.8
Approach LOS	C	C	C	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	11.9											
HCM 2000 Volume to Capacity ratio	0.59											
Actuated Cycle Length (s)	59.7											
Intersection Capacity Utilization	66.7%											
Analysis Period (min)	15											
c. Critical Lane Group												

Timings
 10: Highway 37 & Tank Farm Road/Casey Road

<Total 2056> Saturday Peak Hour
 03-11-2025

Lane Group	EBL	EBT	WBL	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	42	78	78	63	57	882	74	16	594
Future Volume (vph)	42	78	78	63	57	882	74	16	594
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	4	4	8	2	2	2	6	6	6
Permitted Phases	4	4	8	2	2	2	6	6	6
Detector Phase	4	4	8	2	2	2	6	6	6
Switch Phase	10.0	10.0	10.0	20.0	20.0	20.0	20.0	20.0	20.0
Minimum Initial (s)	16.3	16.3	16.3	27.1	27.1	27.1	27.1	27.1	27.1
Minimum Split (s)	16.3	16.3	16.3	40.0	40.0	40.0	40.0	40.0	40.0
Total Split (%)	29.0%	29.0%	29.0%	71.0%	71.0%	71.0%	71.0%	71.0%	71.0%
Yellow Time (s)	4.5	4.5	4.5	5.9	5.9	5.9	5.9	5.9	5.9
All-Red Time (s)	1.8	1.8	1.8	1.2	1.2	1.2	1.2	1.2	1.2
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	None	Max	Max	Max
Act Effct Green (s)	10.0	10.0	10.0	37.4	37.4	37.4	37.4	37.4	37.4
Actuated g/C Ratio	0.18	0.18	0.18	0.67	0.67	0.67	0.67	0.67	0.67
v/c Ratio	0.26	0.29	0.29	0.63	0.63	0.63	0.37	0.03	0.03
Control Delay	23.7	15.0	25.0	9.3	1.7	6.4	0.0	0.0	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.7	15.0	25.0	18.5	9.3	1.7	6.4	0.0	0.0
LOS	C	B	C	A	A	A	A	A	A
Approach Delay	17.1	17.1	20.5	8.7	6.2	6.2	6.2	6.2	6.2
Approach LOS	B	B	C	A	A	A	A	A	A
Intersection Summary									
Cycle Length: 56.3									
Actuated Cycle Length: 56									
Natural Cycle: 35									
Control Type: Semi Act-Uncoord									
Maximum v/c Ratio: 0.63									
Intersection Signal Delay: 9.5									
Intersection Capacity Utilization 81.9%									
Analysis Period (min) 15									



HCM Signalized Intersection Capacity Analysis
 10: Highway 37 & Tank Farm Road/Casey Road

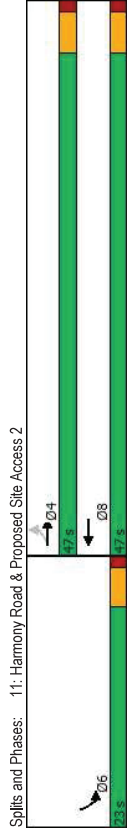
Timings
 11: Harmony Road & Proposed Site Access 2

<Total 2056> Saturday Peak Hour
 03-11-2025

<Total 2056> Saturday Peak Hour
 03-11-2025

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Traffic Volume (vph)	42	78	44	78	63	18	57	882	74	16	594	22
Future Volume (vph)	42	78	44	78	63	18	57	882	74	16	594	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	1.00	0.95	1.00	0.95	1.00
Frt	1.00	0.95	1.00	1.00	0.98	1.00	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1610	3208	1535	3221	3529	1568	3374	1583	3374	1583	3374	1583
Flt Permitted	0.67	0.94	0.64	0.83	0.85	1.00	0.90	1.00	0.90	1.00	0.90	1.00
Satd. Flow (perm)	1139	3015	1031	2703	3002	1568	3043	1583	3043	1583	3043	1583
Peak-hour factor, PHF	0.73	0.73	0.73	0.91	0.91	0.91	0.75	0.75	0.75	0.82	0.82	0.82
Adj. Flow (vph)	58	107	60	86	69	20	76	1176	99	20	724	27
RTOR Reduction (vph)	0	52	0	0	17	0	0	37	0	0	0	10
Lane Group Flow (vph)	52	121	0	54	104	0	0	1252	62	0	744	17
Heavy Vehicles (%)	2%	2%	2%	7%	2%	2%	2%	2%	3%	2%	7%	2%
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm	Perm	NA	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	8.0	8.0	8.0	8.0	8.0	36.0	36.0	36.0	36.0	36.0	36.0
Actuated Green, G (s)	8.0	8.0	8.0	8.0	8.0	8.0	36.0	36.0	36.0	36.0	36.0	36.0
Effective Green, g (s)	8.0	8.0	8.0	8.0	8.0	8.0	36.0	36.0	36.0	36.0	36.0	36.0
Actuated g/C Ratio	0.14	0.14	0.14	0.14	0.14	0.14	0.63	0.63	0.63	0.63	0.63	0.63
Clearance Time (s)	6.3	6.3	6.3	6.3	6.3	6.3	7.1	7.1	7.1	7.1	7.1	7.1
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	4.8	4.8	4.8	4.8	4.8	4.8
Lane Grp Cap (vph)	138	420	143	376	376	1882	983	983	1908	992	1908	992
v/s Ratio Prot	0.05	0.04	c0.05	0.04	0.04	c0.04	0.04	0.04	0.24	0.01	0.24	0.01
v/s Ratio Perm	0.33	0.29	0.38	0.28	0.28	0.67	0.06	0.06	0.39	0.02	0.39	0.02
Uniform Delay, d1	22.3	22.1	22.4	22.1	22.1	6.8	4.2	4.2	5.3	4.0	5.3	4.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.4	1.7	0.4	0.4	1.1	0.1	0.1	0.6	0.0	0.6	0.0
Delay (s)	23.5	22.5	24.1	22.5	22.5	8.0	4.2	4.2	5.9	4.1	5.9	4.1
Level of Service	C	C	C	C	C	A	A	A	A	A	A	A
Approach Delay (s)	22.8	22.8	23.0	23.0	23.0	7.7	7.7	7.7	5.8	5.8	7.7	5.8
Approach LOS	C	C	C	C	C	A	A	A	A	A	A	A
Intersection Summary												
HCM 2000 Control Delay	9.5											
HCM 2000 Level of Service	A											
HCM 2000 Volume to Capacity ratio	0.61											
Actuated Cycle Length (s)	57.4											
Intersection Capacity Utilization	81.9%											
Analysis Period (min)	15											
c. Critical Lane Group												

Lane Group	EBL	EBT	EBT	WBT	SBL
Lane Configurations	4	4	4	4	4
Traffic Volume (vph)	133	462	362	133	133
Future Volume (vph)	133	462	362	133	133
Turn Type	Perm	NA	NA	Prot	Prot
Protected Phases	4	4	4	8	6
Permitted Phases	4	4	4	8	6
Detector Phase	4	4	4	8	6
Switch Phase	4	4	4	8	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5
Total Split (s)	47.0	47.0	47.0	47.0	23.0
Total Split (%)	67.1%	67.1%	67.1%	32.9%	32.9%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	None	Max	Max
Act Effct Green (s)	17.4	17.4	17.4	18.7	18.7
Actuated g/C Ratio	0.38	0.38	0.38	0.41	0.41
v/c Ratio	0.67	0.70	0.70	0.35	0.35
Control Delay	27.6	17.3	16.4	10.2	10.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	27.6	17.3	16.4	10.2	10.2
LOS	C	B	B	B	B
Approach Delay	19.6	16.4	16.4	10.2	10.2
Approach LOS	B	B	B	B	B
Intersection Summary					
Cycle Length: 70					
Actuated Cycle Length: 45.2					
Natural Cycle: 30					
Control Type: Semi Act-Uncoord					
Maximum v/c Ratio: 0.70					
Intersection Signal Delay: 16.7					
Intersection LOS: B					
Intersection Capacity Utilization 57.7%					
Analysis Period (min) 15					
ICU Level of Service B					



HCM Signalized Intersection Capacity Analysis
 11: Harmony Road & Proposed Site Access 2

<Total 2056> Saturday Peak Hour
 03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	133	462	362	104	133	103
Future Volume (vph)	133	462	362	104	133	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.97	0.94	0.94	0.97
Flt Protected	0.95	1.00	1.00	0.97	0.97	0.97
Satd. Flow (prot)	1770	1863	1807	1705	1705	1705
Flt Permitted	0.30	1.00	1.00	0.97	0.97	0.97
Satd. Flow (perm)	566	1863	1807	1705	1705	1705
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	145	502	393	113	145	112
RTOR Reduction (vph)	0	0	23	0	32	0
Lane Group Flow (vph)	145	502	483	0	225	0
Turn Type	Perm	NA	NA	Prot	Prot	Prot
Protected Phases	4	4	8	6	6	6
Lead-Lag Optimize?	None	None	None	None	None	None
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	17.4	17.4	17.4	18.7	18.7	18.7
Effective Green, g (s)	17.4	17.4	17.4	18.7	18.7	18.7
Actuated g/C Ratio	0.39	0.39	0.39	0.41	0.41	0.41
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	218	718	687	706	706	706
v/s Ratio Prot	0.27	0.27	0.27	0.13	0.13	0.13
v/s Ratio Perm	0.26	0.70	0.69	0.32	0.32	0.32
Uniform Delay, d1	11.4	11.6	11.6	8.9	8.9	8.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	3.0	3.0	1.2	1.2	1.2
Delay (s)	18.9	14.6	14.6	10.1	10.1	10.1
Level of Service	B	B	B	B	B	B
Approach Delay (s)	15.6	14.6	10.1	10.1	10.1	10.1
Approach LOS	B	B	B	B	B	B
Intersection Summary						
HCM 2000 Control Delay	14.2					
HCM 2000 Volume to Capacity ratio	0.50					
Actuated Cycle Length (s)	45.1					
Sum of lost time (s)	9.0					
Intersection Capacity Utilization	57.7%					
Analysis Period (min)	15					
c Critical Lane Group						

Timings
 12: Harmony Road & Proposed Site Access 3

<Total 2056> Saturday Peak Hour
 03-11-2025

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Traffic Volume (vph)	139	470	353	114	116	116
Future Volume (vph)	139	470	353	114	116	116
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases	4	4	8	6	6	6
Permitted Phases	4	4	8	8	6	6
Detector Phase	4	4	8	8	6	6
Switch Phase	4	4	8	8	6	6
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	57.0	57.0	57.0	57.0	57.0	57.0
Total Split (%)	71.3%	71.3%	71.3%	71.3%	28.8%	28.8%
Yellow Time (s)	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag	4.5	4.5	4.5	4.5	4.5	4.5
Lead-Lag Optimize?	None	None	None	None	None	None
Recall Mode	None	None	None	None	None	None
Act Effct Green (s)	16.1	16.1	16.1	18.7	18.7	18.7
Actuated g/C Ratio	0.37	0.37	0.37	0.43	0.43	0.43
v/c Ratio	0.72	0.56	0.19	0.30	0.30	0.30
Control Delay	16.7	14.3	3.0	8.9	8.9	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.7	14.3	3.0	8.9	8.9	8.9
LOS	B	B	A	A	A	A
Approach Delay	16.7	11.6	8.9	8.9	8.9	8.9
Approach LOS	B	B	A	A	A	A
Intersection Summary						
Cycle Length: 80						
Actuated Cycle Length: 43.8						
Natural Cycle: 45						
Control Type: Semi Act-Uncoord						
Maximum v/c Ratio: 0.72						
Intersection Signal Delay: 13.6						
Intersection Capacity Utilization 58.8%						
Analysis Period (min) 15						



HCM Signalized Intersection Capacity Analysis
 12: Harmony Road & Proposed Site Access 3

<Total 2056> Saturday Peak Hour
 03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4A	4A	4A	4A	4A
Traffic Volume (vph)	139	470	353	114	116	90
Future Volume (vph)	139	470	353	114	116	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	4.5
Lane Util. Factor	0.95	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	0.94		
Flt Protected	0.99	1.00	1.00	0.97		
Satd. Flow (prot)	3499	1863	1583	1705		
Flt Permitted	0.71	1.00	1.00	0.97		
Satd. Flow (perm)	2511	1863	1583	1705		
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	151	511	384	124	126	98
RTOR Reduction (vph)	0	0	0	78	26	0
Lane Group Flow (vph)	0	662	384	46	198	0
Turn Type	Perm	NA	NA	Perm	Prot	Prot
Protected Phases		4	8		6	
Permitted Phases	4			8		
Actuated Green, G (s)		16.1	16.1	16.1	18.6	
Effective Green, g (s)		16.1	16.1	16.1	18.6	
Actuated g/C Ratio		0.37	0.37	0.37	0.43	
Clearance Time (s)		4.5	4.5	4.5	4.5	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		925	686	583	725	
v/s Ratio Prot			0.21		c0.12	
v/s Ratio		c0.26		0.03		
v/c Ratio		0.72	0.56	0.08	0.27	
Uniform Delay, d1		11.8	11.0	9.0	8.2	
Progression Factor		1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.7	1.0	0.1	0.9	
Delay (s)		14.5	12.0	9.0	9.1	
Level of Service		B	B	A	A	
Approach Delay (s)		14.5	11.3		9.1	
Approach LOS		B	B		A	
Intersection Summary						
HCM 2000 Control Delay			12.4		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			43.7		Sum of lost time (s)	9.0
Intersection Capacity Utilization			58.5%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

HCM Unsignalized Intersection Capacity Analysis
 13: Harmony Road & Proposed Site Access 4

<Total 2056> Saturday Peak Hour
 03-11-2025

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		4A	4A	4A	4A	4A
Traffic Volume (veh/h)	42	543	433	42	42	34
Future Volume (veh/h)	42	543	433	42	42	34
Sign Control		Free	Free	Free	Stop	Stop
Grade		0%	0%	0%	0%	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	590	471	46	46	37
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		None	None			
Median type						
Median storage (veh)						
Upstream signal (m)		276	130			
pX, platoon unblocked	0.98				0.80	0.98
VC, conflicting volume	517				1176	494
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	496				1034	472
IC, single (s)	4.1				6.4	6.2
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	96				77	94
cM capacity (veh/h)	1045				196	579
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	636	517	83			
Volume Left	46	0	46			
Volume Right	0	46	37			
cSH	1045	1700	278			
Volume to Capacity	0.04	0.30	0.30			
Queue Length 95th (m)	1.1	0.0	9.7			
Control Delay (s)	1.2	0.0	23.3			
Lane LOS	A		C			
Approach Delay (s)	1.2	0.0	23.3			
Approach LOS			C			
Intersection Summary						
Average Delay			2.2			
Intersection Capacity Utilization			70.6%		ICU Level of Service	C
Analysis Period (min)			15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		P			4
Traffic Volume (veh/h)	68	0	0	75	0	0
Future Volume (Veh/h)	68	0	0	75	0	0
Sign Control	Stop		Free		Free	
Grade	0%		0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	74	0	0	82	0	0
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						
pX platoon unblocked	41	41			82	
VC, conflicting volume						
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCu, unblocked vol	41	41			82	
IC, single (s)	6.4	6.2			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	92	100			100	
cM capacity (veh/h)	970	1030			1515	
Direction, Lane #	WB 1	NB 1	SB 1			
Volume Total	74	82	0			
Volume Left	74	0	0			
Volume Right	0	82	0			
cSH	970	1700	1700			
Volume to Capacity	0.08	0.05	0.00			
Queue Length 95th (m)	2.0	0.0	0.0			
Control Delay (s)	9.0	0.0	0.0			
Lane LOS	A					
Approach Delay (s)	9.0	0.0	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			4.3			
Intersection Capacity Utilization			15.1%			A
Analysis Period (min)			15			

Movement	WB	WB	WB	NB	NB	SB	SB	SB	SB
Directions Served	L	L	LR	T	T	R	L	T	T
Maximum Queue (m)	79.7	93.2	66.9	140.4	137.5	117.5	22.1	47.5	46.2
Average Queue (m)	30.3	43.3	42.6	71.4	61.7	24.3	5.8	24.1	15.1
95th Queue (m)	58.2	68.0	61.4	119.6	103.9	61.0	15.6	39.7	32.6
Link Distance (m)									
Upstream Blk Time (%)			453.0	453.0	534.6		610.4	610.4	
Queueing Penalty (veh)									
Storage Bay Dist (m)			50.0			38.0	30.5		
Storage Blk Time (%)			0	5		12	0	2	
Queueing Penalty (veh)			0	8		92	3	0	

Intersection: 2: Ashley Street & Harmony Road

Movement	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	R	TR	L	L	LT	
Maximum Queue (m)	74.5	83.4	60.5	53.0	50.9		
Average Queue (m)	40.0	27.1	25.9	24.6	13.7		
95th Queue (m)	61.7	59.6	46.6	44.5	36.8		
Link Distance (m)			83.0	453.0	373.2		
Upstream Blk Time (%)			0				
Queueing Penalty (veh)			1				
Storage Bay Dist (m)			30.0				
Storage Blk Time (%)			22	3			
Queueing Penalty (veh)			51	8			

Intersection: 3: River Road & Harmony Road

Movement	EB	EB	B36	WB	WB	NB	SB
Directions Served	L	TR	T	L	TR	L	L
Maximum Queue (m)	19.7	101.4	66.6	16.8	29.0	54.0	35.3
Average Queue (m)	4.4	59.7	10.3	1.1	13.0	30.4	15.7
95th Queue (m)	13.4	95.5	45.7	7.8	24.6	49.9	27.4
Link Distance (m)			408.5	83.0	83.0	962.0	214.0
Upstream Blk Time (%)							330.5
Queueing Penalty (veh)							
Storage Bay Dist (m)					30.0		
Storage Blk Time (%)					19	1	6
Queueing Penalty (veh)					5	3	3

Intersection: 4: Harmony Road & Homan Road									
Movement	EB	EB	WB	WB	SB	EB	EB	WB	WB
Directions Served	L	T	R	T	LR				
Maximum Queue (m)	59.6	90.8	41.8	23.6	53.2				
Average Queue (m)	9.6	45.8	29.9	7.0	16.2				
95th Queue (m)	26.3	77.5	47.4	20.6	35.0				
Link Distance (m)		962.0	41.2		285.7				
Upstream Blk Time (%)				1					
Queuing Penalty (veh)				6					
Storage Bay Dist (m)		30.0		30.0					
Storage Blk Time (%)		13		6					
Queuing Penalty (veh)		7		2					

Intersection: 5: Plumpton & Harmony Road

Movement	WB	NB	WB	NB
Directions Served	LT	LR		
Maximum Queue (m)	48.0	15.8		
Average Queue (m)	11.8	6.8		
95th Queue (m)	35.0	14.2		
Link Distance (m)		902.7		549.3
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 6: Harmony Road & Black Bear Ridge Resort Access

Movement	EB	EB	WB	WB	SB	EB	EB	WB	WB
Directions Served	L	LT	T	R	LR				
Maximum Queue (m)	79.9	103.9	71.2	20.5	63.9				
Average Queue (m)	20.0	59.2	32.0	9.5	23.8				
95th Queue (m)	48.8	99.5	57.1	18.4	45.9				
Link Distance (m)		902.7		466.0	382.6				
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		30.0		30.0					
Storage Blk Time (%)		1		26	6				
Queuing Penalty (veh)		7		21	7				

Intersection: 7: Harmony Public School & Harmony Road									
Movement	EB	EB	WB	WB	SB	EB	EB	WB	WB
Directions Served	T	TR	T						
Maximum Queue (m)	90.6	56.8	61.3						
Average Queue (m)	44.7	16.3	35.3						
95th Queue (m)	74.3	44.6	53.6						
Link Distance (m)		97.8	97.8	61.3					
Upstream Blk Time (%)				0					
Queuing Penalty (veh)				1					
Storage Bay Dist (m)									
Storage Blk Time (%)				9					
Queuing Penalty (veh)				0					

Intersection: 8: Highway 37 & Harmony Road

Movement	EB	EB	WB	WB	NB	NB	WB	WB	SB
Directions Served	L	T	R	L	LT	TR	L	LT	R
Maximum Queue (m)	68.6	65.7	48.4	16.9	48.4	55.8	47.4	57.1	58.5
Average Queue (m)	40.3	26.8	9.4	5.2	13.9	23.0	15.4	18.4	23.8
95th Queue (m)	61.9	51.3	40.4	13.1	34.9	43.5	31.9	41.7	49.4
Link Distance (m)		48.5	48.5		257.0		2721.4	2721.4	950.1
Upstream Blk Time (%)		7	1	0					
Queuing Penalty (veh)		21	2	0					
Storage Bay Dist (m)			30.0	30.0		79.5			
Storage Blk Time (%)		7		2					
Queuing Penalty (veh)		17		1					

Intersection: 9: Highway 37 & Cannifton Road/Blessington Road

Movement	EB	EB	WB	WB	NB	NB	WB	WB	SB
Directions Served	L	LT	TR	L	LT	TR	L	LT	R
Maximum Queue (m)	19.0	32.4	21.2	8.2	21.0	15.4	48.6	54.3	58.5
Average Queue (m)	6.8	19.9	5.3	2.5	11.1	2.2	22.7	19.6	17.7
95th Queue (m)	16.3	29.3	15.4	8.3	20.9	8.6	45.2	43.3	41.0
Link Distance (m)		432.2	432.2		560.2	560.2	768.1	768.1	2721.4
Upstream Blk Time (%)									
Queuing Penalty (veh)									
Storage Bay Dist (m)		50.0		50.0					79.0
Storage Blk Time (%)									
Queuing Penalty (veh)									

Intersection: 10: Highway 37 & Tank Farm Road/Casey Road

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
	L	LT	TR	L	LT	TR	LT	T	R	LT	T	R
Directions Served	8.8	22.5	24.9	13.1	26.3	15.1	43.0	37.3	3.3	41.8	40.0	5.1
Maximum Queue (m)	0.8	9.0	9.0	3.7	12.7	5.8	21.1	10.5	0.1	15.9	14.5	0.9
Average Queue (m)	3.6	16.1	17.6	10.4	22.9	13.9	36.8	26.6	1.1	33.1	30.0	3.9
95th Queue (m)												
Link Distance (m)		585.3	585.3		691.3	691.3	394.3	394.3		768.1	768.1	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	50.0			50.0					70.0			70.0
Storage Blk Time (%)												
Queuing Penalty (veh)												

Intersection: 11: Harmony Road & Proposed Site Access 2

Movement	EB	EB	WB	WB	SB	SB
	L	T	TR	LR		
Directions Served	79.7	108.3	79.2	35.2		
Maximum Queue (m)	20.5	40.5	40.4	20.2		
Average Queue (m)	42.9	71.1	66.1	34.8		
95th Queue (m)						
Link Distance (m)		466.0	97.8	143.7		
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (m)	30.0					
Storage Blk Time (%)	1	9				
Queuing Penalty (veh)	5	13				

Intersection: 12: Harmony Road & Proposed Site Access 3

Movement	EB	EB	WB	WB	SB	SB
	LT	T	T	R	LR	
Directions Served	68.9	59.4	54.2	21.7	51.0	
Maximum Queue (m)	51.6	7.8	25.7	8.8	22.8	
Average Queue (m)	72.7	31.4	45.9	18.3	45.3	
95th Queue (m)						
Link Distance (m)	61.3	61.3	65.6		132.6	
Upstream Blk Time (%)	3	0				
Queuing Penalty (veh)	7	0				
Storage Bay Dist (m)			30.0			
Storage Blk Time (%)			3			
Queuing Penalty (veh)			4			

Intersection: 13: Harmony Road & Proposed Site Access 4

Movement	EB	WB	SB	SB
	LT	TR	LR	
Directions Served	28.6	14.8	30.6	
Maximum Queue (m)	7.0	0.8	11.6	
Average Queue (m)	20.6	5.8	21.1	
95th Queue (m)				
Link Distance (m)		176.9	35.6	268.0
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 14: Homan Road & Proposed Site Access 5

Movement	WB	WB	SB	SB
Directions Served				
Maximum Queue (m)		16.0		
Average Queue (m)		8.8		
95th Queue (m)		13.1		
Link Distance (m)		272.3		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Network Summary

Network wide Queuing Penalty: 295



APPENDIX D

Level of Service Definitions

LEVEL OF SERVICE ANALYSIS AT SIGNALIZED INTERSECTIONS

To assist in clarifying the arithmetic analysis associated with traffic engineering, it is often useful to refer to “Level of Service”. The term Level of Service implies a qualitative measure of traffic flow at an intersection. It is dependent upon vehicle delay and vehicle queue lengths at the approaches. Specifically, Level of Service criteria are stated in terms of the average stopped delay per vehicle for a 15-minute analysis period. The following table describes the characteristics of each level:

<u>Level of Service</u>	<u>Features</u>	<u>Stopped Delay per Vehicle (sec)</u>
A	At this level of service, almost no signal phase is fully utilized by traffic. Very seldom does a vehicle wait longer than one red indication. The approach appears open, turning movements are easily made and drivers have freedom of operation.	≤ 5.0
B	At this level, an occasional signal phase is fully utilized and many phases approach full use. Many drivers begin to feel somewhat restricted within platoons of vehicles approaching the intersection.	$> 5.0 \text{ and } \leq 15.0$
C	At this level, the operation is stable though with more frequent fully utilized signal phases. Drivers feel more restricted and occasionally may have to wait more than one red signal indication, and queues may develop behind turning vehicles. This level is normally employed in urban intersection design.	$> 15.0 \text{ and } \leq 25.0$
D	At this level, the motorist experiences increasing restriction and instability of flow. There are substantial delays to approaching vehicles during short peaks within the peak period, but there are enough cycles with lower demand to permit occasional clearance of developing queues and prevent excessive backups.	$> 25.0 \text{ and } \leq 40.0$
E	At this level, capacity is reached. There are long queues of vehicles waiting upstream of the intersection and delays to vehicles may extend to several signal cycles.	$> 40.0 \text{ and } \leq 60.0$
F	At this level, saturation occurs, with vehicle demand exceeding the available capacity.	> 60.0



APPENDIX E

Left Turn Lane Warrant Analysis Graph

Table 14 - Year 2046, Left Turn Warrant Justification, Ashley Street and Highway 62, East Leg

AT-GRADE INTERSECTIONS

APPENDIX A

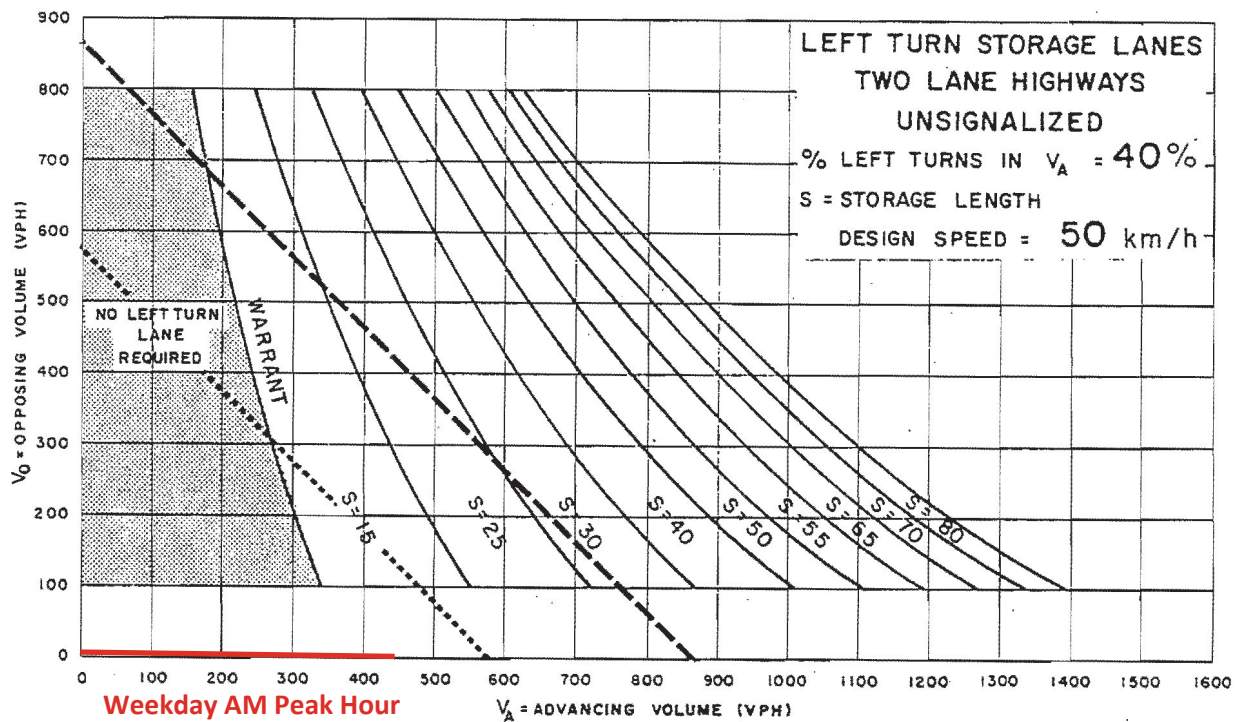
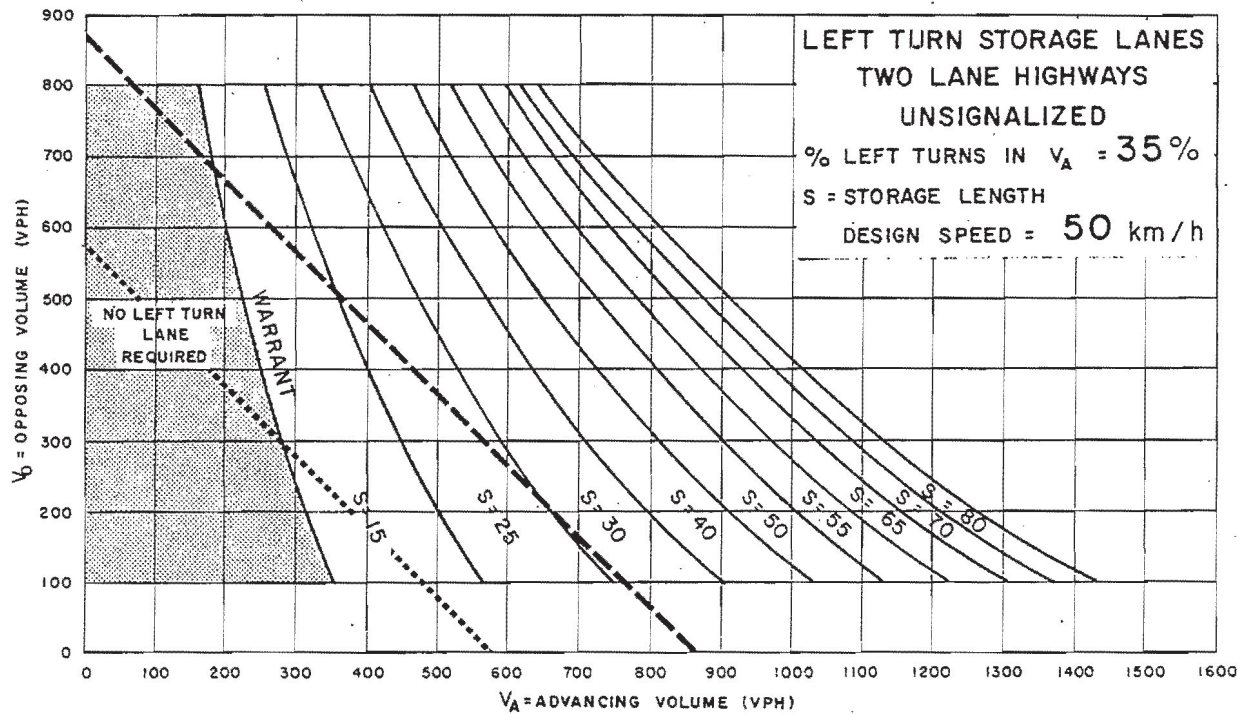
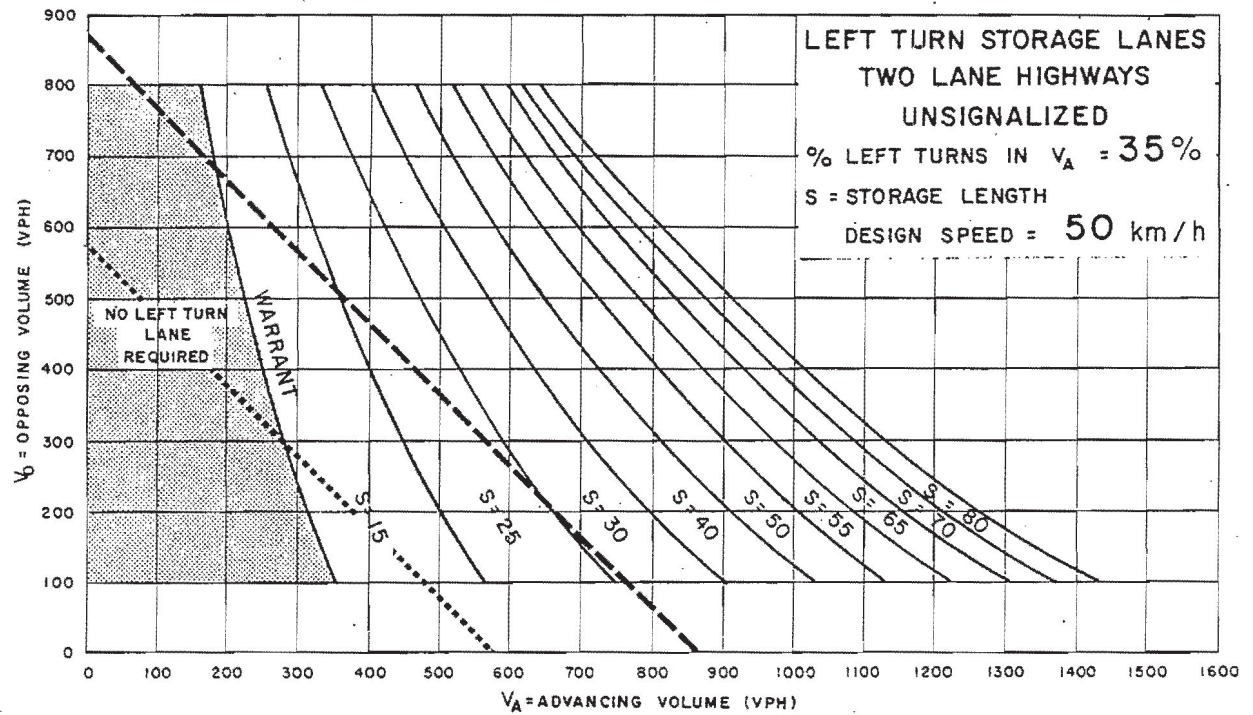


Figure EA-5

Table 14 - Year-2046, Left Turn Warrant Justification, Ashley Street and Highway 62, East Leg

AT-GRADE INTERSECTIONS

APPENDIX A



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

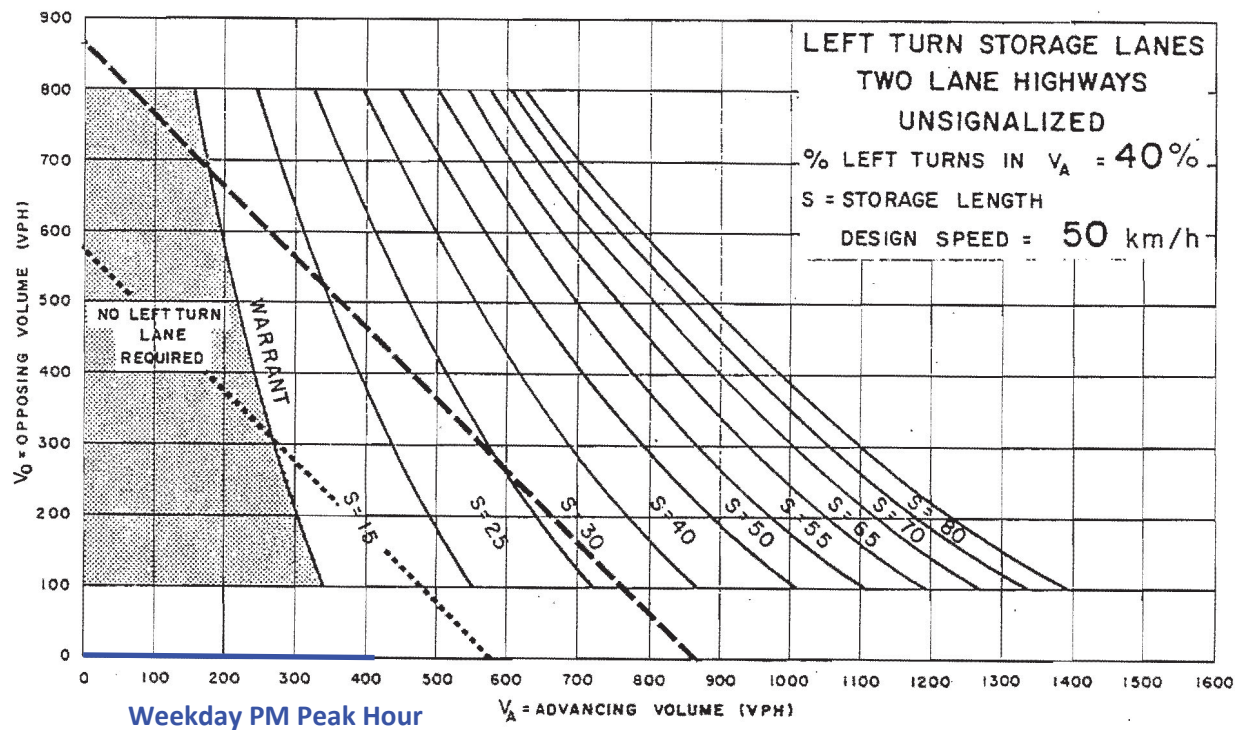
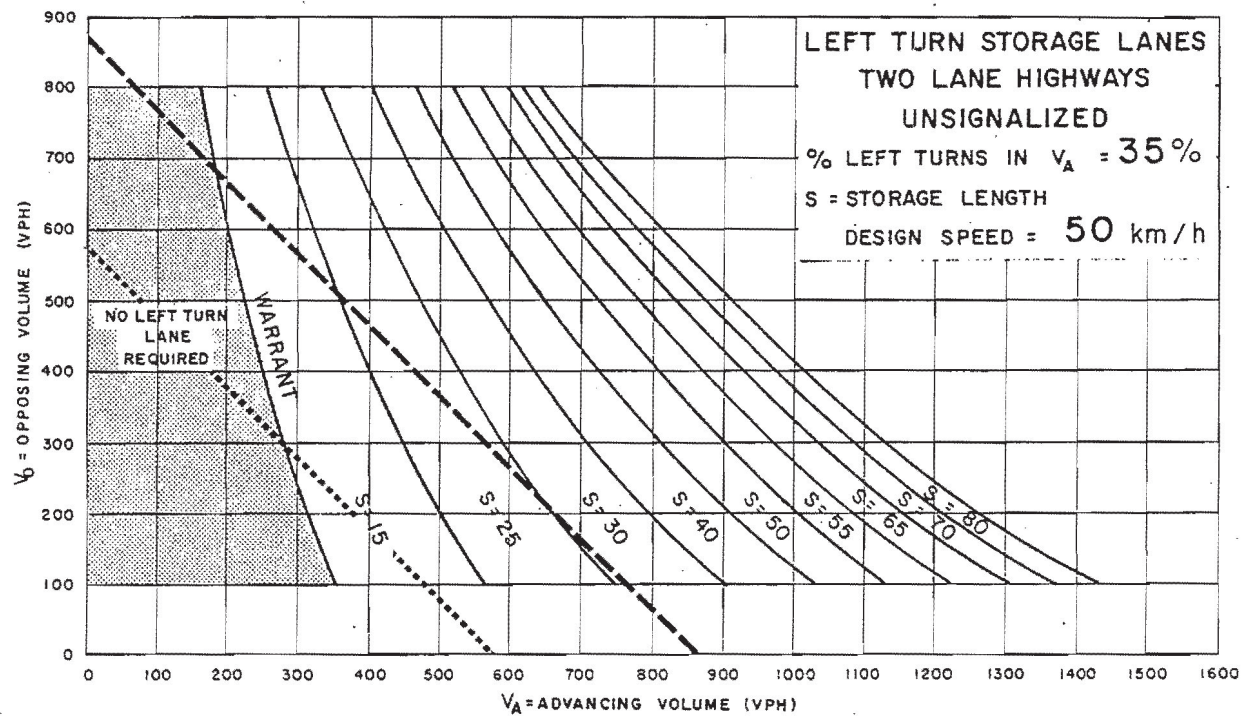


Figure EA-5



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

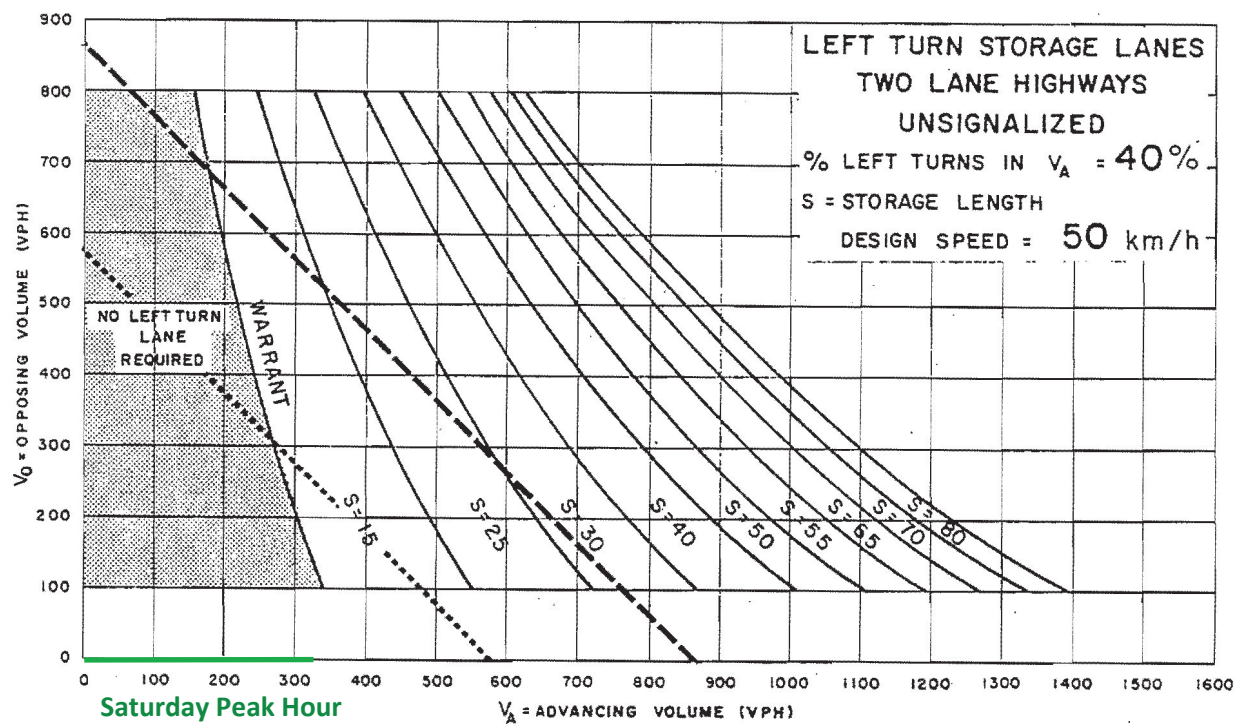


Figure EA-5

Table 15 - Year 2046, Left Turn Warrant Justification, Ashley Street and Harmony Road, East Leg

AT-GRADE INTERSECTIONS

APPENDIX A

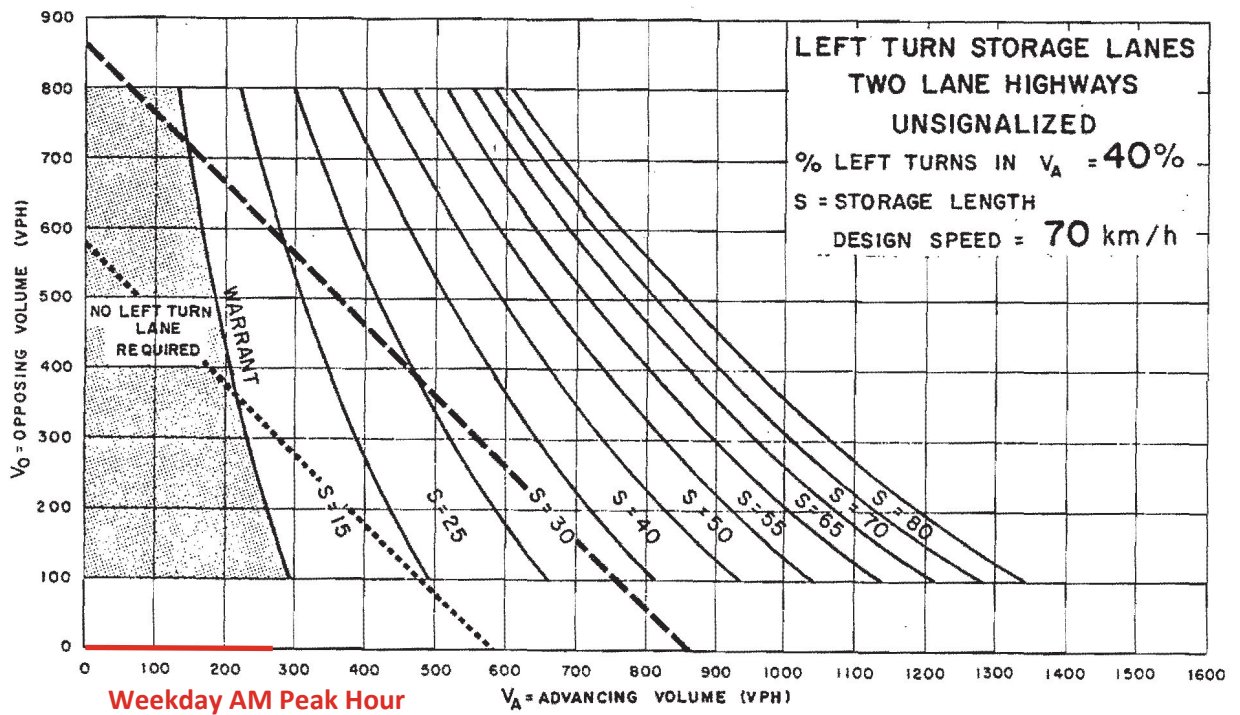
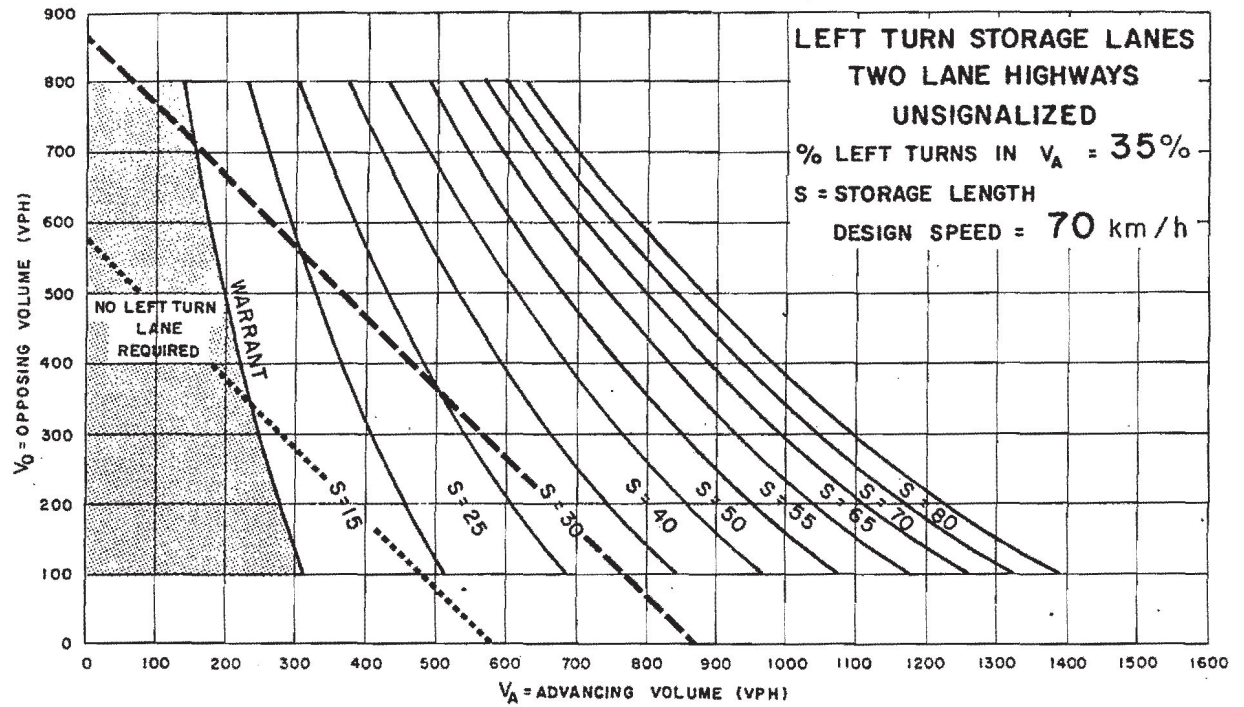


Figure EA-13

Table 15 - Year 2046, Left Turn Warrant Justification, Ashley Street and Harmony Road, East Leg

AT-GRADE INTERSECTIONS

APPENDIX A

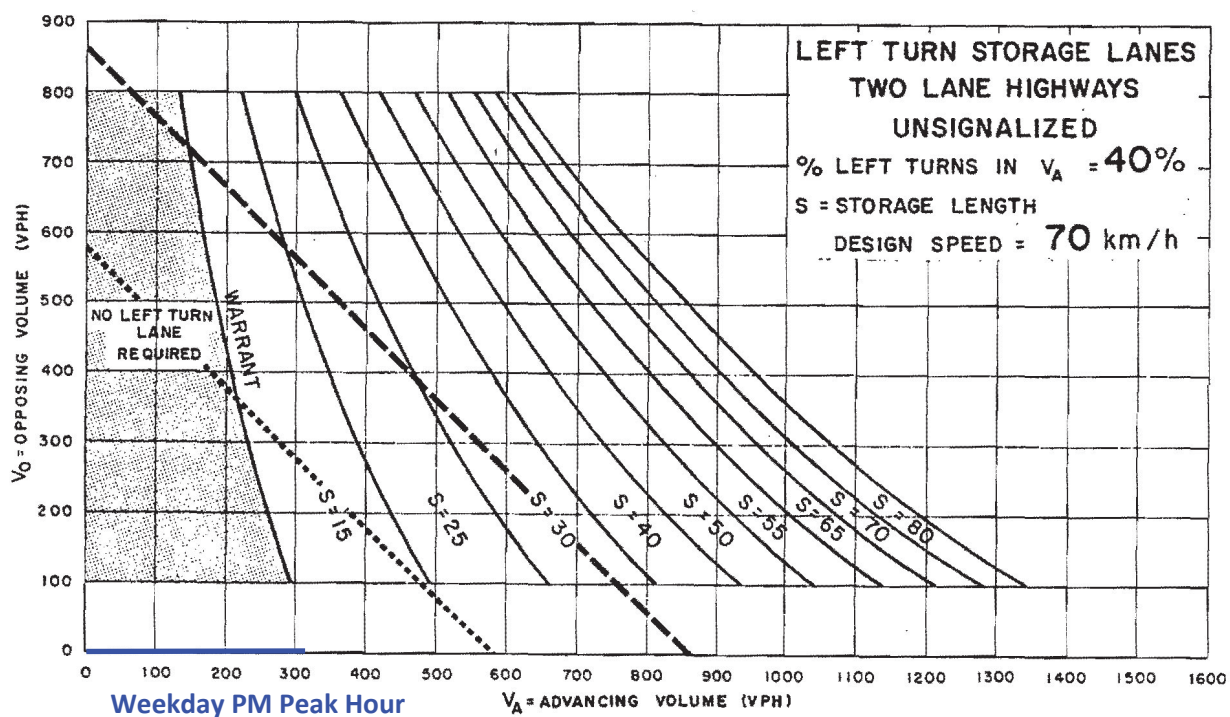
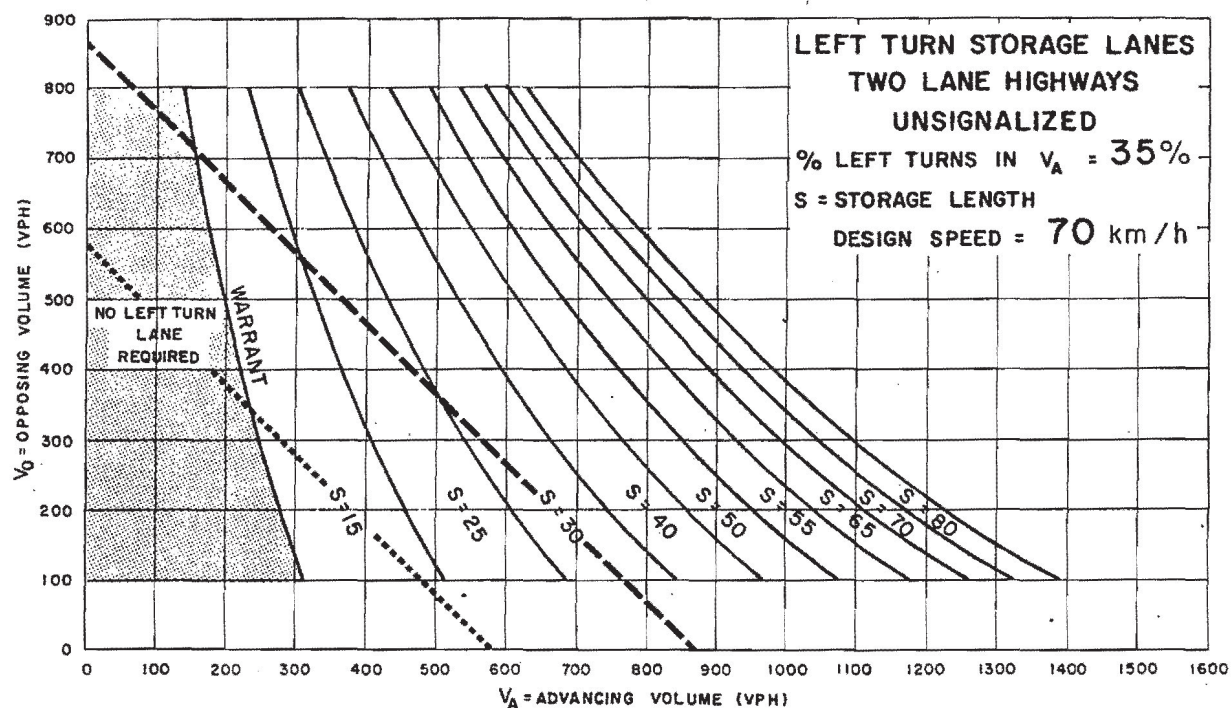
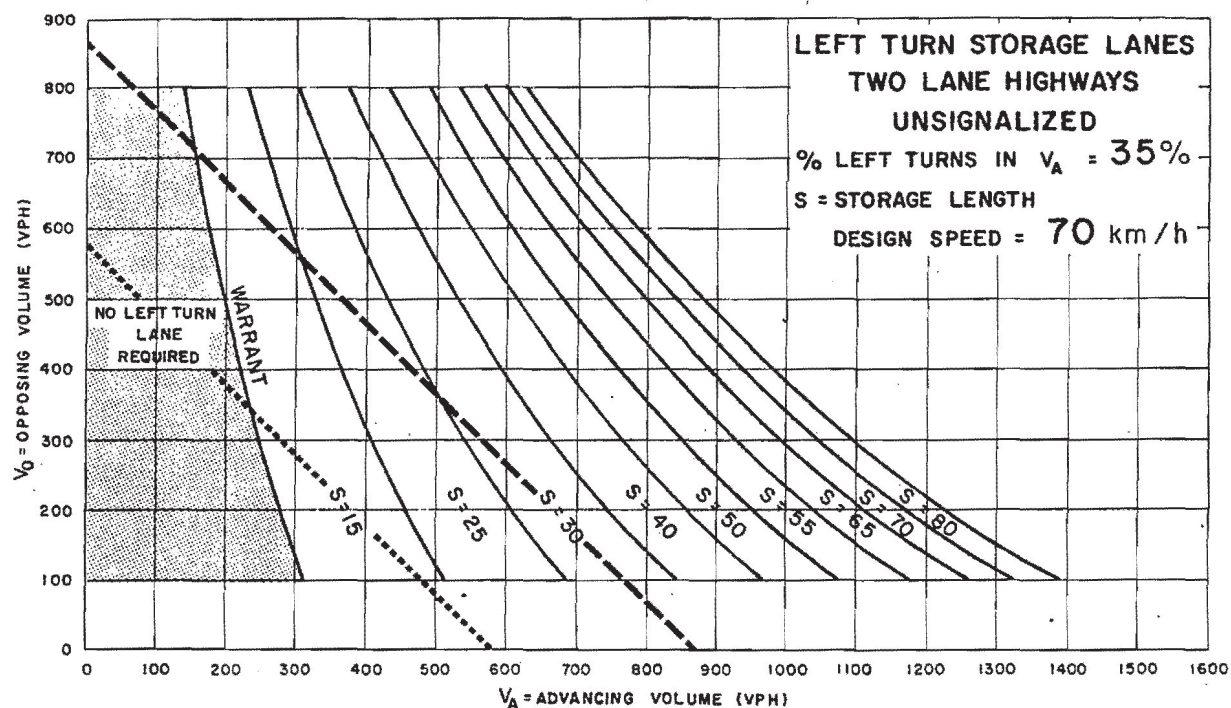


Figure EA-13

Table 15 - Year 2046, Left Turn Warrant Justification, Ashley Street and Harmony Road, East Leg

AT-GRADE INTERSECTIONS

APPENDIX A



----- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

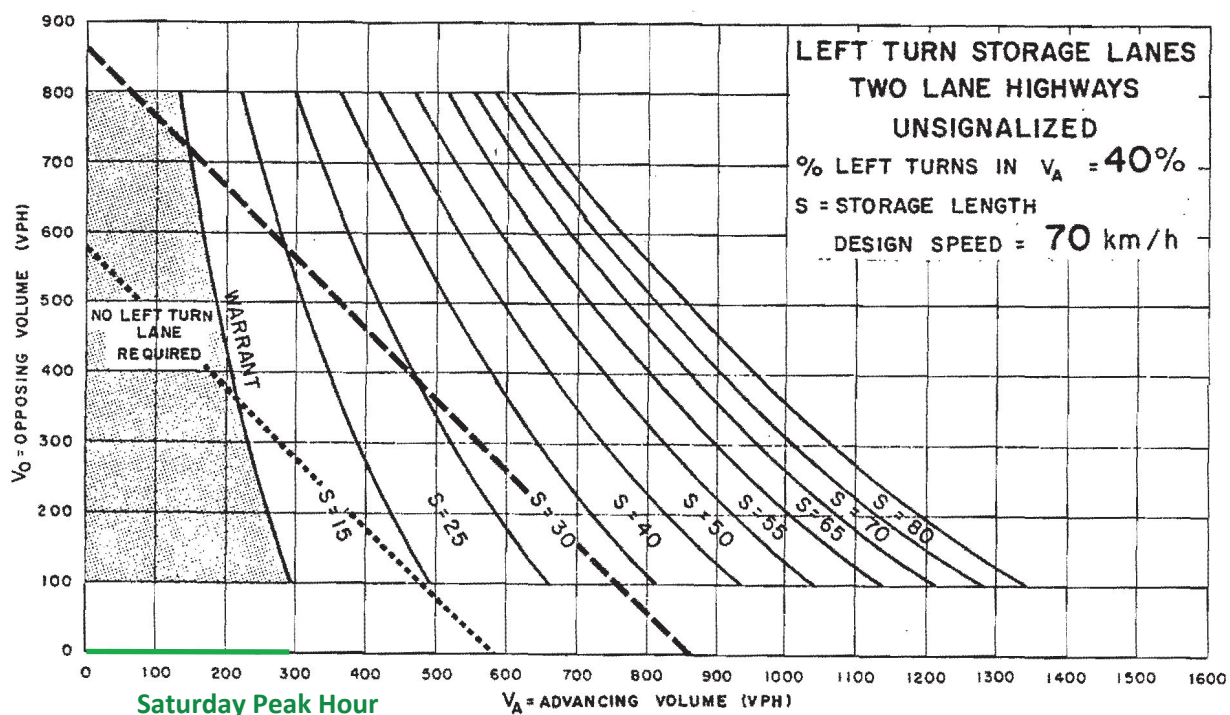


Figure EA-13

Table 16 - Year 2046, Left Turn Warrant Justification, Harmony Road at Existing Black Bear Ridge Site Access, North Leg

AT-GRADE INTERSECTIONS

APPENDIX A

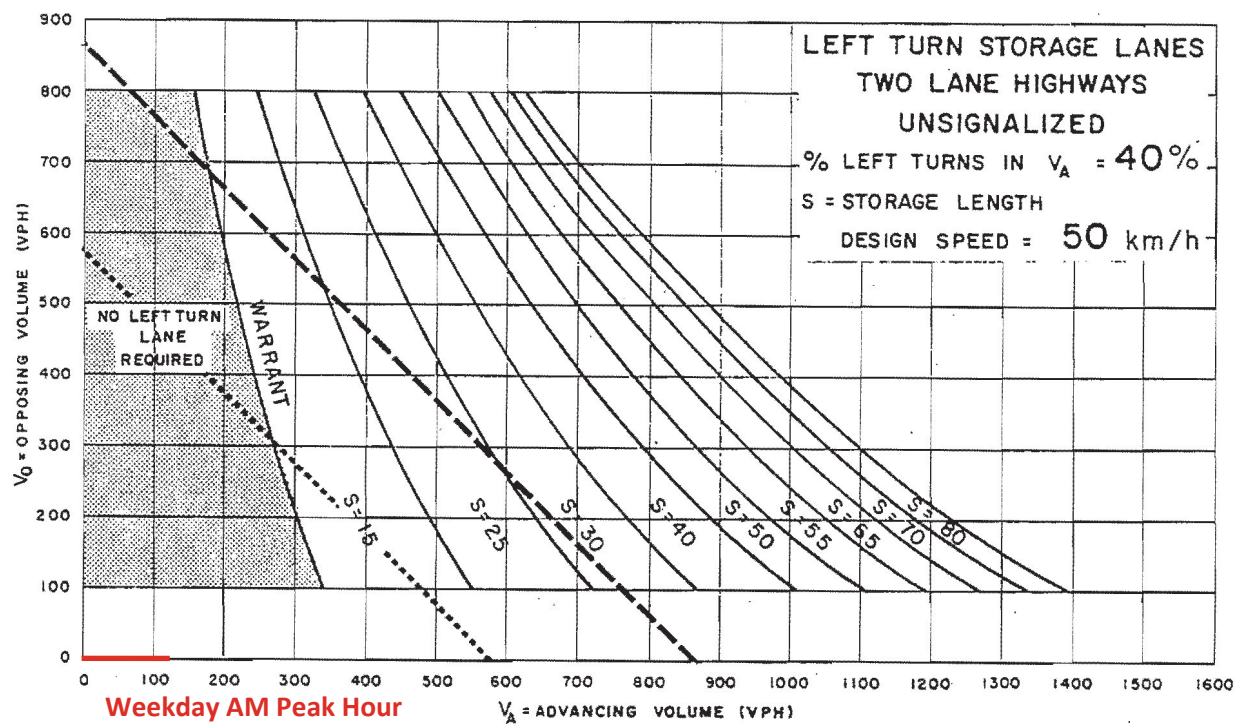
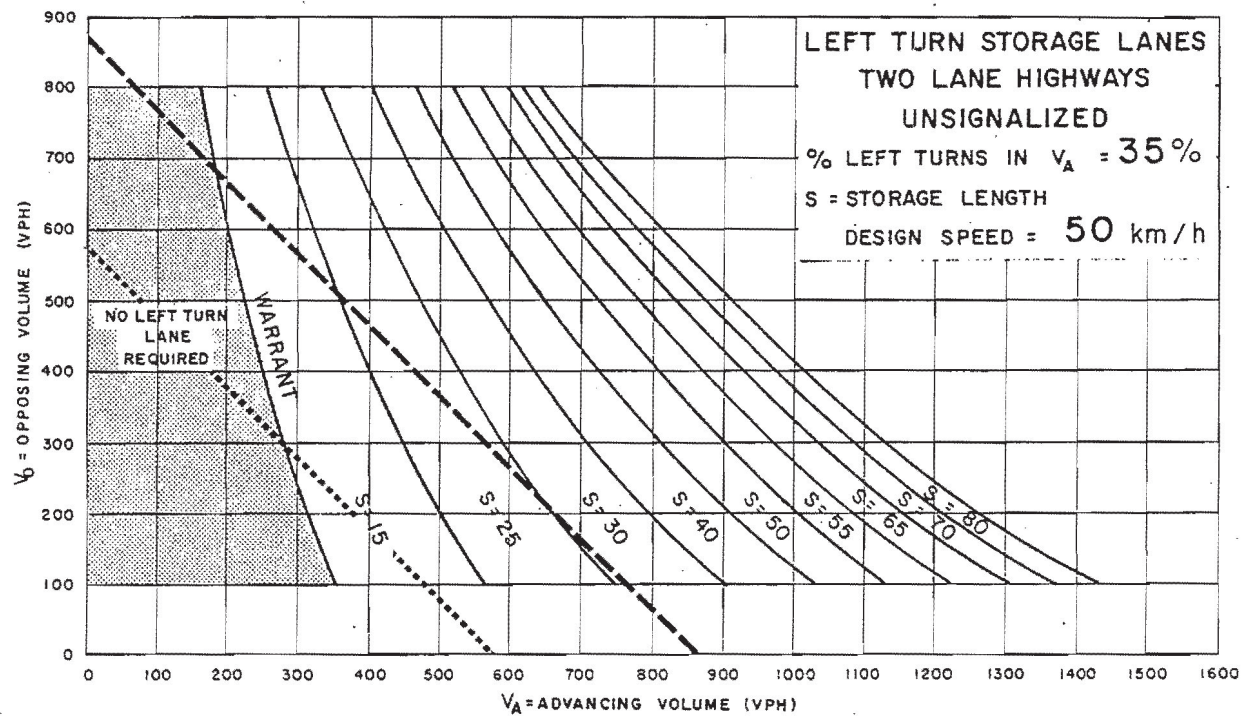
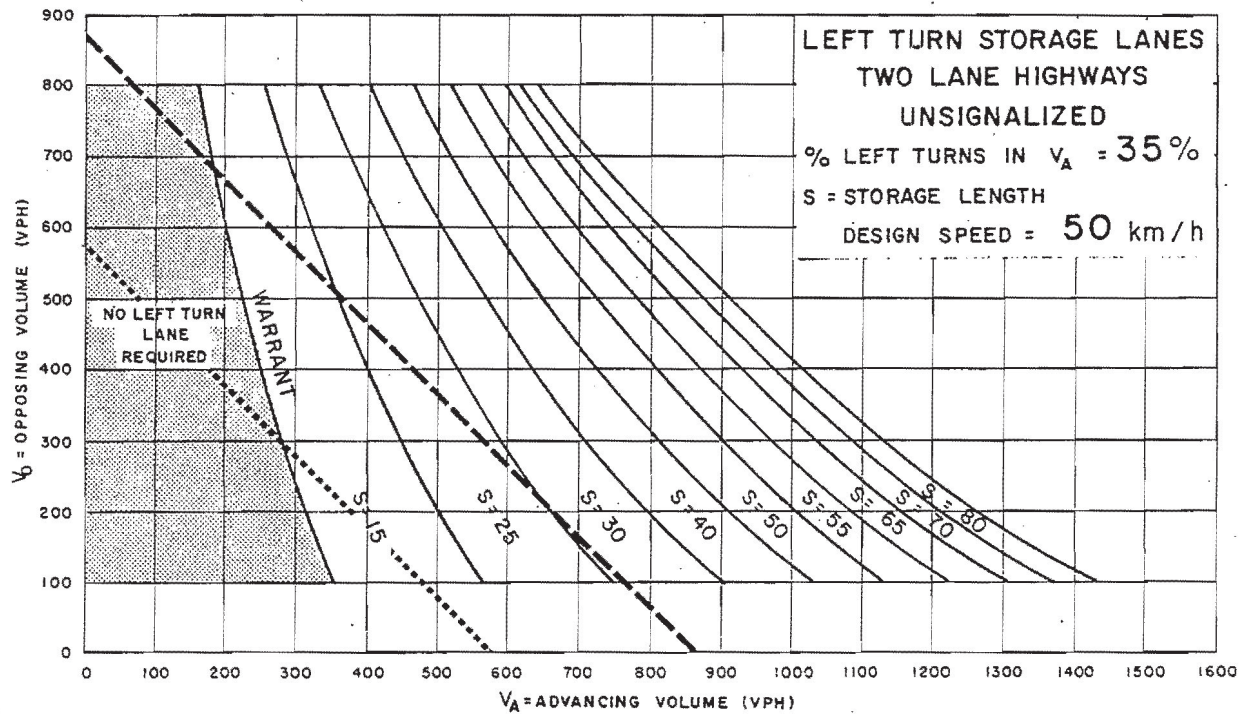


Figure EA-5

Table 16 - Year 2046, Left Turn Warrant Justification, Harmony Road at Existing Black Bear Ridge Site Access, North Leg

AT-GRADE INTERSECTIONS

APPENDIX A



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

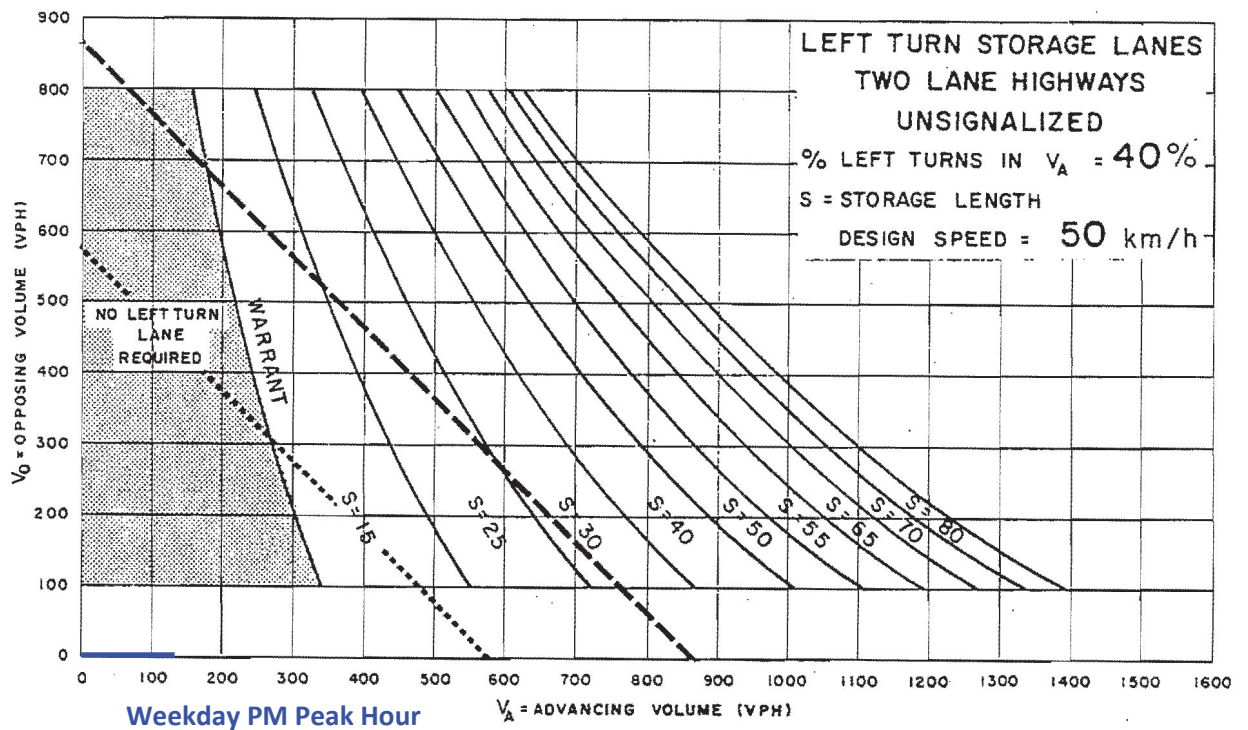


Figure EA-5

Table 16 - Year 2046, Left Turn Warrant Justification, Harmony Road at Existing Black Bear Ridge Site Access, North Leg

AT-GRADE INTERSECTIONS

APPENDIX A

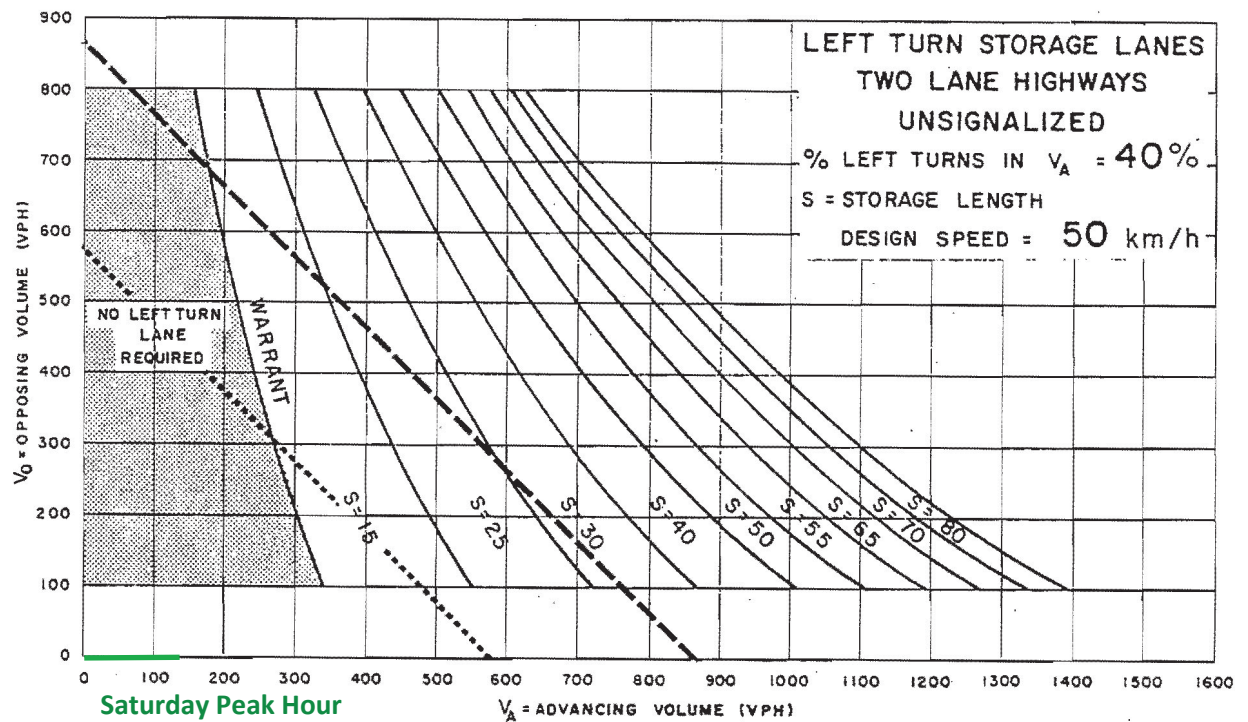
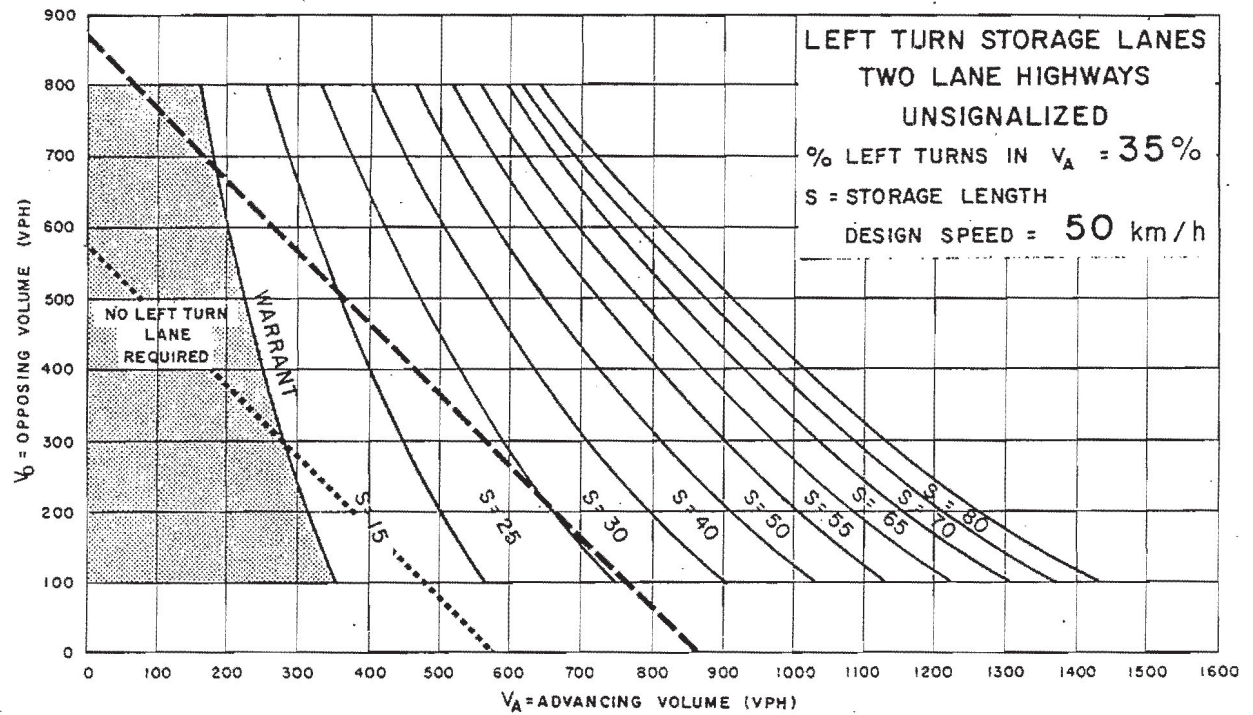
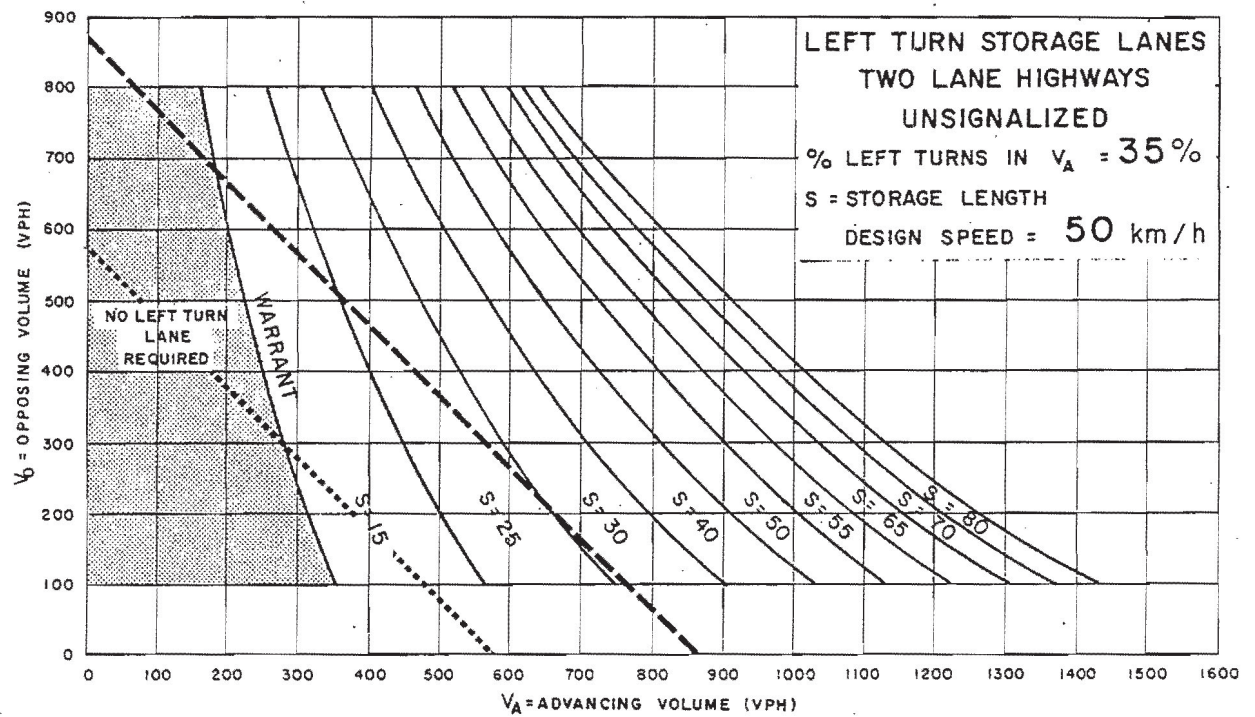


Figure EA-5

Table 17 - Year 2046, Left Turn Warrant Justification, Harmony Road at Harmony Public School Access, South Leg

AT-GRADE INTERSECTIONS

APPENDIX A



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL
AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN
"FREE FLOW" URBAN AREAS

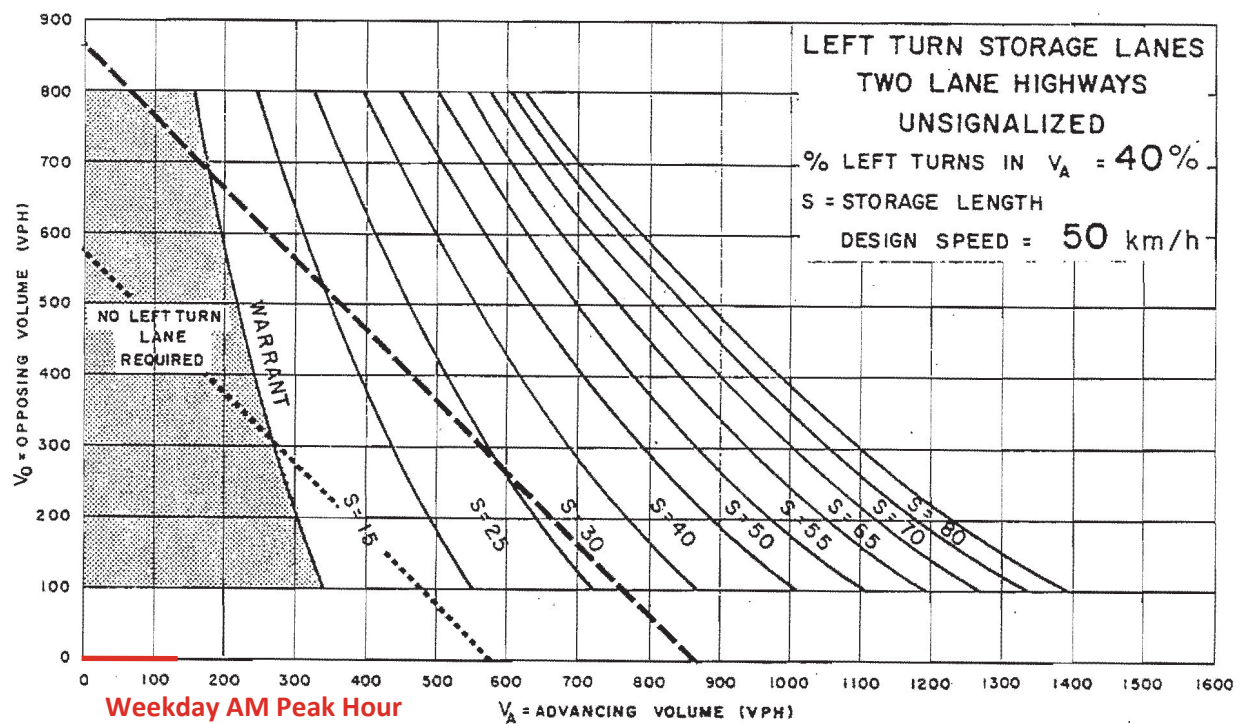
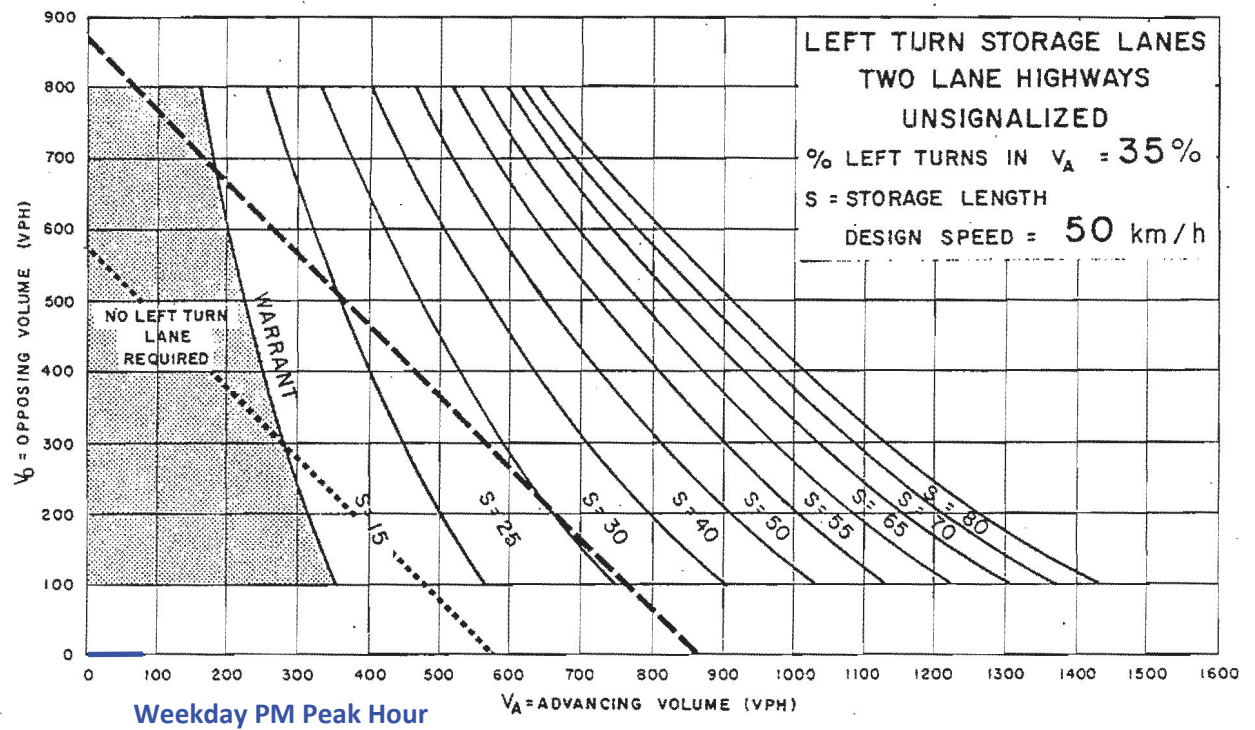


Figure EA-5

Table 17 - Year 2046, Left Turn Warrant Justification, Harmony Road at Harmony Public School Access, South Leg

AT-GRADE INTERSECTIONS

APPENDIX A



- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW
- TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

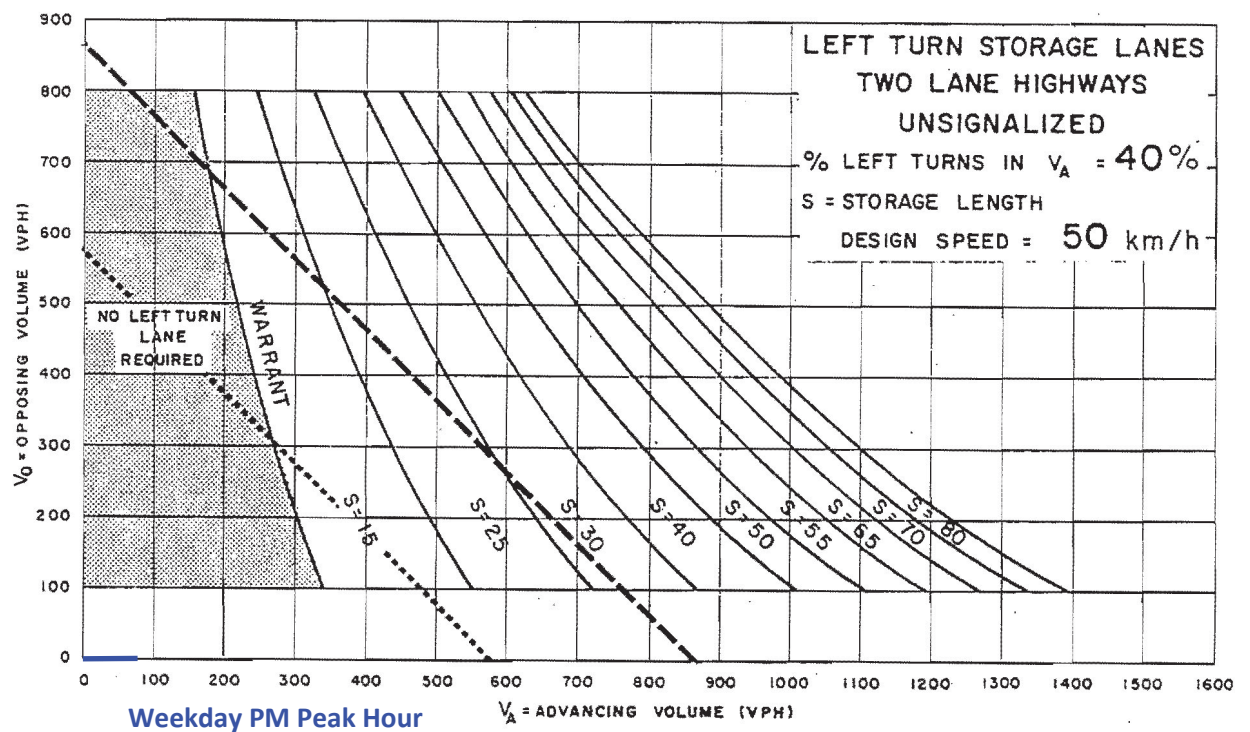
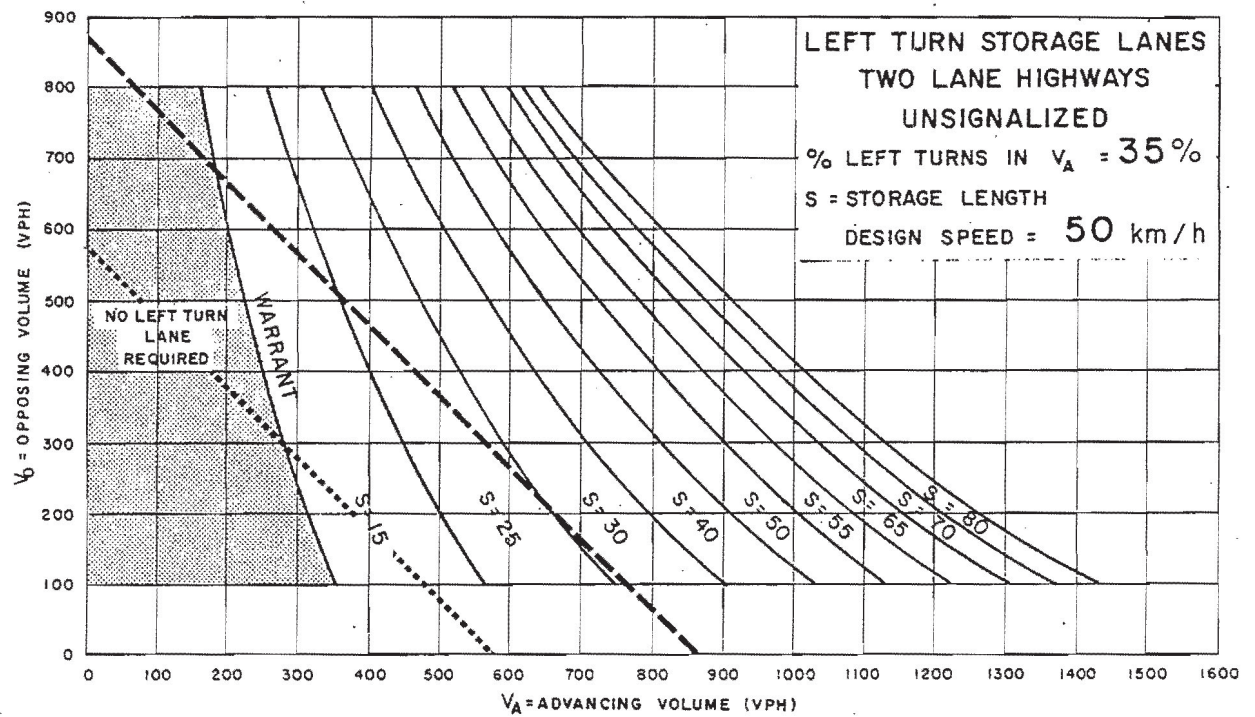


Figure EA-5

Table 17 - Year 2046, Left Turn Warrant Justification, Harmony Road at Harmony Public School Access, South Leg

AT-GRADE INTERSECTIONS

APPENDIX A



--- TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

..... TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

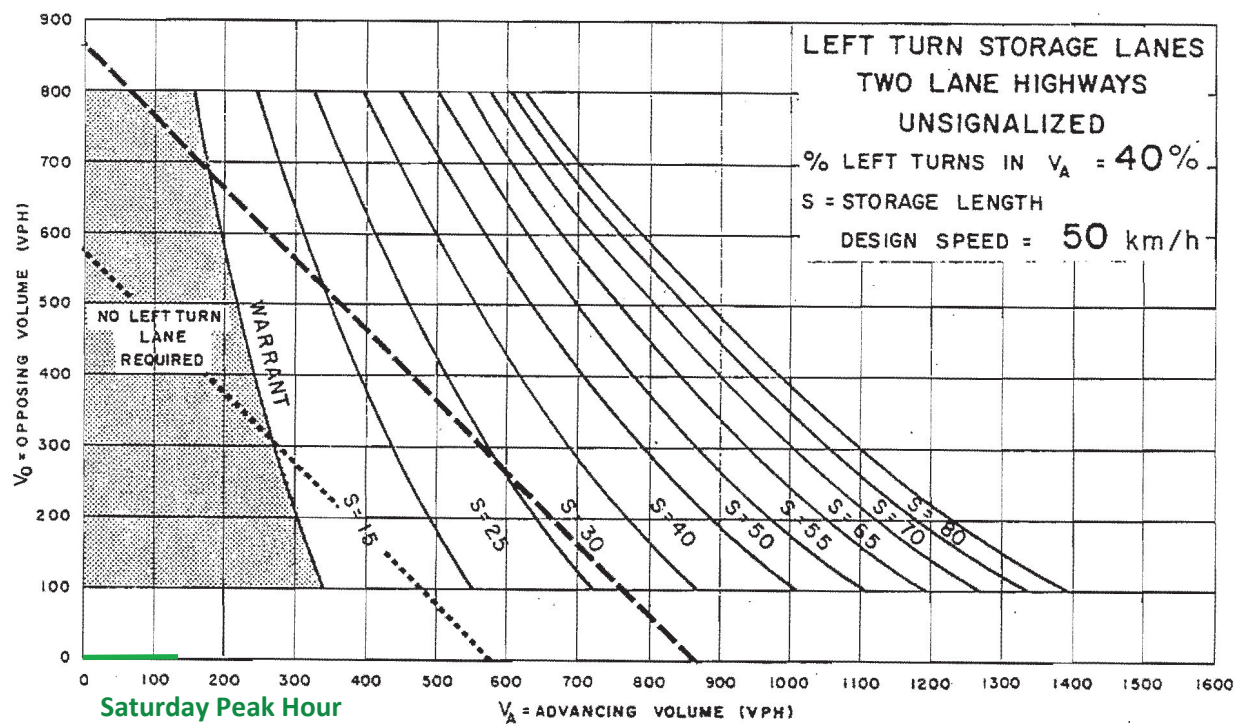


Figure EA-5



APPENDIX F

Sightline Survey Results

Sight Distance Survey Report

Perspective: Turning Vehicle Driver's View
Location: Black Bear Ridge Golf Club Access on Harmony Road, Belleville
Date: December 1, 2024

Number of Lanes: 1 in each direction
Posted Speed Limit: 40 km/h
Design Speed: 50 km/h

Access to Black Bear Ridge Golf Club on Harmony Road									
Setback: 3m Back from Harmony Road Threshold, Distant Object Height: 0.60m									
Looking Left (East) for Right Turn					Looking Right (West) for Left Turn				
Available Sight Distance	Reason	Criteria	Required Sight Distance (m)	Req. Met? (Y / N)	Available Sight Distance	Reason	Criteria	Required Sight Distance (m)	Req. Met? (Y / N)
240m	hill top	SSD	65	Y	>300m	hill top	SSD	65	Y
		ISD R turn	95	Y			ISD L turn	105	Y



Note: Referenced Table 9.9.4 ISD Left Turn from Stop; and Table 9.9.6 ISD Right Turn from Stop, from TAC 2017 for sight distance requirements
Driver eye height: 1.08m Distant Object height: 0.60m

Table 9.9.4: Design Intersection Sight Distance – Case B1, Left Turn From Stop

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	41.7	45
30	35	62.6	65
40	50	83.4	85
50	65	104.3	105
60	85	125.1	130
70	105	146.0	150
80	130	166.8	170
90	160	187.7	190
100	185	208.5	210
110	220	229.4	230
120	250	250.2	255
130	285	271.1	275

Note: Intersection sight distance shown is for a stopped passenger car to turn left onto a two-lane highway with no median and grades 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

Sight distance design for left turns at divided-highway intersections should consider multiple design vehicles and median width. If the design vehicle used to determine sight distance for a divided-highway intersection is larger than a passenger car, then sight distance for left turns will need to be checked for that selected design vehicle and for smaller design vehicles as well. If the divided-highway median is wide enough to store the design vehicle with a clearance to the through lanes of approximately 1 m at both ends of the vehicle, no separate analysis for the departure sight triangle for left turns is needed on the minor-road approach for the near roadway to the left. In most cases, the departure sight triangle for right turns (case B2) will provide sufficient sight distance for a passenger car to cross the near roadway to reach the median. Possible exceptions are addressed in the discussion of case B3.

Table 9.9.6: Design Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver

Design Speed (km/h)	Stopping Sight Distance (m)	Intersection Sight Distance for Passenger Cars	
		Calculated (m)	Design (m)
20	20	36.1	40
30	35	54.2	55
40	50	72.3	75
50	65	90.4	95
60	85	108.4	110
70	105	126.5	130
80	130	144.6	145
90	160	162.6	165
100	185	180.7	185
110	220	198.8	200
120	250	216.8	220
130	285	234.9	235

Note: Intersection sight distance shown is for a stopped passenger car to turn right onto or to cross a two-lane highway with no median and with grades of 3% or less. For other conditions, the time gap should be adjusted and the sight distance recalculated.

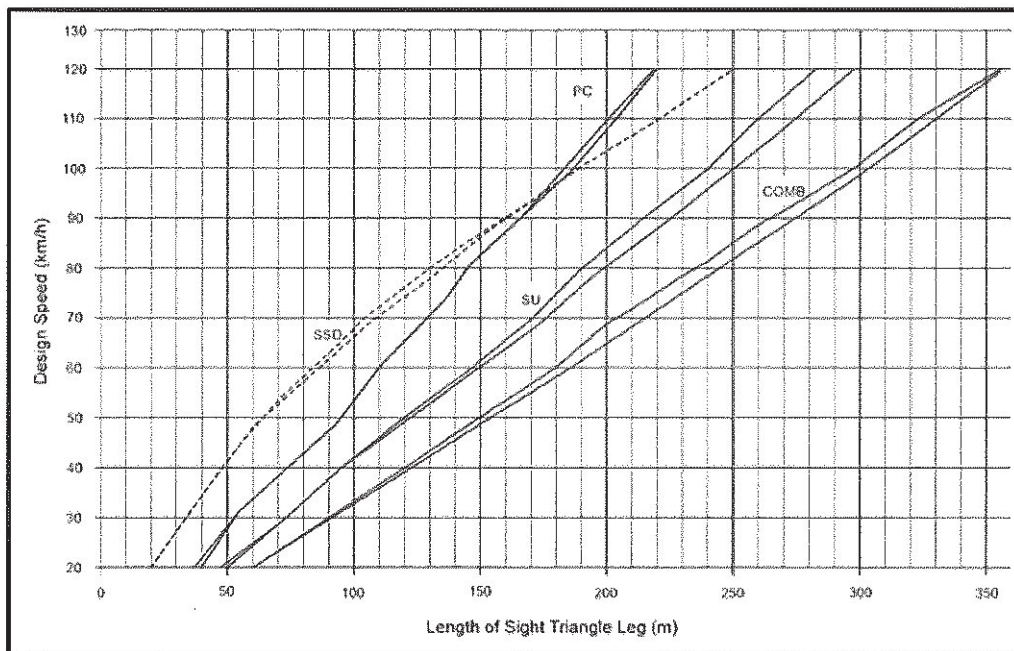


Figure 9.9.5: Intersection Sight Distance – Case B2, Right Turn from Stop, and Case B3, Crossing Maneuver (Calculated and Design Values Plotted)



APPENDIX G

Signal Warrant Analysis

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

GO TO Justification:

Intersection: Ashley Street at Harmony Road

Count Date: Typical Summer Weekday of 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	☒	☐
	B Crossing Volume	100	%	☒	☐
2. Delay to Cross Traffic	A Main Road	100	%	☒	☐
	B Crossing Road	100	%	☒	☐
3. Combination	A Justificaton 1	100	%	☒	☐
	B Justification 2	100	%	☒	☐
4. 4-Hr Volume		100	%	☒	☐

5. Collision Experience	0	%	☐	☒
-------------------------	---	---	--------------------------	-------------------------------------

6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Ashley Street at Harmony Road

Count Date: Typical Summer Weekday of 2024

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
	☒	☐	☐	☐												
1A	480	720	600	900	1,145	1,018	959	903	1,607	1,697	1,790	1,815				
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
1B	180	255	180	255	450	400	377	355	467	492	519	526				
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
Free Flow					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes	☒	No	☐
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
2A	☒	☐	☐	☐												
	480	720	600	900	695	618	582	548	1,140	1,205	1,271	1,289				
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
2B	50	75	50	75	209	186	175	165	258	272	287	291				
	COMPLIANCE %				100	100	100	100	100	100	100	100			800	100
Free Flow Signal Justification 2:					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☒	No	☐
					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	15:00	1,140	467	89	100 %	100 %
	16:00	1,205	492	80	100 %	
	17:00	1,271	519	80	100 %	
	18:00	1,289	526	80	100 %	

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

GO TO Justification:

Intersection: River Road North at Harmony Road

Count Date: Typical Summer Weekday of 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	☒	☐
	B Crossing Volume	100	%	☒	☐
2. Delay to Cross Traffic	A Main Road	100	%	☒	☐
	B Crossing Road	100	%	☒	☐
3. Combination	A Justificaton 1	100	%	☒	☐
	B Justification 2	100	%	☒	☐
4. 4-Hr Volume		75	%	☐	☒

5. Collision Experience	0	%	☐	☒
-------------------------	---	---	--------------------------	-------------------------------------

6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: River Road North at Harmony Road

Count Date: Typical Summer Weekday of 2024

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percentage		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
1A	☒	☐	☐	☐	480	720	600	900	1,077	1,045	991	936	1,381	1,456	1,531	1,475
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
	120	170	120	170	165	160	152	143	221	232	244	236				
1B	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
Free Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐ Yes ☒	No ☐ No ☐		

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percentage		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
2A	☒	☐	☐	☐	480	720	600	900	912	885	839	793	1,160	1,224	1,287	1,239
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
	50	75	50	75	126	122	116	109	156	163	172	166				
2B	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
Free Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☒	No	☐
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	15:00	1,160	170	86	100 %	75 %
	16:00	1,224	52	80	65 %	
	17:00	1,287	55	80	69 %	
	18:00	1,239	53	80	66 %	

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

GO TO Justification:

Intersection: Homan Road at Harmony Road

Count Date: November 28, 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	☐	☒
	B Crossing Volume	35	%	☐	☒
2. Delay to Cross Traffic	A Main Road	100	%	☐	☒
	B Crossing Road	71	%	☐	☒
3. Combination	A Justificaton 1	35	%	☐	☒
	B Justification 2	71	%	☐	☒
4. 4-Hr Volume		72	%	☐	☒

5. Collision Experience	0	%	☐	☒
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6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Homan Road at Harmony Road

Count Date: November 28, 2024

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00		
1A	☒	☐	☐	☐										
	480	720	600	900	701	1,040	988	939	1,133	1,197	1,256	809	800	100
	COMPLIANCE %				100	100	100	100	100	100	100	100		
1B	180	255	180	255	46	68	65	62	68	72	74	49	280	35
	COMPLIANCE %				26	38	36	34	38	40	41	27		
Free Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐ Yes ☐	No ☒ No ☒

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
2A	☒	☐	☐	☐												
	480	720	600	900	655	972	923	877	1,065	1,125	1,182	760	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
2B	50	75	50	75	28	41	39	37	36	38	39	26	568	71		
	COMPLIANCE %				56	82	78	74	72	76	78	52				
Free Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☐	No	☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☐	No	☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒	NOT JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	8:30	972	68	124	55 %	72 %
	15:00	1,065	68	103	66 %	
	16:00	1,125	72	92	78 %	
	17:00	1,182	74	83	89 %	

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V ₈		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

GO TO Justification:

Intersection: Existing Black Bear Ridge Site Access at Harmony Rd Count Date: November 28, 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	☐	☒
	B Crossing Volume	96	%	☐	☒
2. Delay to Cross Traffic	A Main Road	100	%	☒	☐
	B Crossing Road	100	%	☒	☐
3. Combination	A Justificaton 1	96	%	☒	☐
	B Justification 2	100	%	☒	☐
4. 4-Hr Volume		100	%	☒	☐

5. Collision Experience	0	%	☐	☒
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6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Existing Black Bear Ridge Site Access at Harmony Road Count Date: November 28, 2024

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
	☒	☐	☐	☐												
1A	480	720	600	900	750	1,241	1,179	1,120	1,300	1,373	1,442	936				
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
1B	180	255	180	255	144	238	226	215	216	229	240	157				
	COMPLIANCE %				80	100	100	100	100	100	100	87	767	96		
Free Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐ Yes ☒		No ☒ No ☐	

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
2A	☒	☐	☐	☐												
	480	720	600	900	606	1,003	953	905	1,084	1,144	1,202	779				
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100		
2B	50	75	50	75	85	141	134	127	117	124	130	85				
	COMPLIANCE %				100	100	100	100	100	100	100	100			800	100
Free Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☒	No	☐
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	8:30	1,003	238	116	100 %	100 %
	15:00	1,084	216	99	100 %	
	16:00	1,144	229	89	100 %	
	17:00	1,202	240	80	100 %	

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

GO TO Justification:

Intersection: Harmony Public School at Harmony Road

Count Date: November 28, 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	☐	☒
	B Crossing Volume	59	%	☐	☒
2. Delay to Cross Traffic	A Main Road	100	%	☐	☒
	B Crossing Road	75	%	☐	☒
3. Combination	A Justificaton 1	59	%	☐	☒
	B Justification 2	75	%	☐	☒
4. 4-Hr Volume		25	%	☐	☒

5. Collision Experience	0	%	☐	☒
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6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Harmony Public School at Harmony Road

Count Date: November 28, 2024

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
	☒	☐	☐	☐												
1A	480	720	600	900	586	1,127	1,070	1,011	947	998	1,050	638	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
1B	180	255	180	255	85	164	155	144	79	83	87	53	472	59		
	COMPLIANCE %				47	91	86	80	44	46	48	29				
Free Flow					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes	☐	No	☒
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes	☐	No	☒

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
	☒	☐	☐	☐												
2A	480	720	600	900	501	963	915	867	868	915	963	585	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
2B	50	75	50	75	37	71	67	60	29	31	32	20	598	75		
	COMPLIANCE %				74	100	100	100	58	62	64	40				
Free Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☐	No	☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☐	No	☒

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☐	NO ☒	YES ☐	NO ☒
Justification 2	Delay Cross Traffic	YES ☐	NO ☒	NOT JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	8:30	963	164	126	100 %	25 %
	9:30	915	0	138	0 %	
	16:00	915	0	138	0 %	
	17:00	963	0	126	0 %	

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

GO TO Justification:

Intersection: Proposed Site Access 2 at Harmony Road

Count Date: November 28, 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	☐	☒
	B Crossing Volume	94	%	☐	☒
2. Delay to Cross Traffic	A Main Road	100	%	☒	☐
	B Crossing Road	100	%	☒	☐
3. Combination	A Justificaton 1	94	%	☒	☐
	B Justification 2	100	%	☒	☐
4. 4-Hr Volume		100	%	☒	☐

5. Collision Experience	0	%	☐	☒
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6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Proposed Site Access 2 at Harmony Road

Count Date: November 28, 2024

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00		
	☒	☐	☐	☐										
1A	480	720	600	900	741	1,227	1,166	1,107	1,283	1,354	1,423	923	800	100
	COMPLIANCE %				100	100	100	100	100	100	100	100		
1B	180	255	180	255	135	224	213	202	199	210	221	144	755	94
	COMPLIANCE %				75	100	100	100	100	100	100	80		
Free Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours Lesser of 1A or 1B at least 80% fulfilled each of 8 hours					Yes ☐ Yes ☒			No ☒ No ☐	

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
	☒	☐	☐	☐												
2A	480	720	600	900	606	1,003	953	905	1,084	1,144	1,202	779	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
2B	50	75	50	75	81	134	127	121	109	115	121	79	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
Free Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes	☒	No	☐
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	8:30	1,003	224	116	100 %	100 %
	15:00	1,084	199	99	100 %	
	16:00	1,144	210	89	100 %	
	17:00	1,202	221	80	100 %	

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet

Analysis Sheet

Proposed Collision

GO TO Justification:

Intersection: Proposed Site Access 3 at Harmony Road

Count Date: November 28, 2024

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	100	%	☐	☒
	B Crossing Volume	92	%	☐	☒
2. Delay to Cross Traffic	A Main Road	100	%	☒	☐
	B Crossing Road	100	%	☒	☐
3. Combination	A Justificaton 1	92	%	☒	☐
	B Justification 2	100	%	☒	☐
4. 4-Hr Volume		100	%	☒	☐

5. Collision Experience	0	%	☐	☒
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6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Proposed Site Access 3 at Harmony Road

Count Date: November 28, 2024

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00		
	☒	☐	☐	☐										
1A	480	720	600	900	726	1,157	1,099	1,041	1,041	1,097	1,154	795	800	100
	COMPLIANCE %				100	100	100	100	100	100	100	100		
1B	180	255	180	255	121	194	184	174	173	182	191	132	733	92
	COMPLIANCE %				67	100	100	97	96	100	100	73		
Free Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐ Yes ☒	No ☐ No ☒

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:30	8:30	9:30	10:30	15:00	16:00	17:00	18:00				
2A	☒	☐	☐	☐												
	480	720	600	900	605	963	915	867	868	915	963	663	800	100		
	COMPLIANCE %				100	100	100	100	100	100	100	100				
2B	50	75	50	75	73	117	111	105	93	98	103	71				
	COMPLIANCE %				100	100	100	100	100	100	100	100			800	100
	Free Flow					Both 2A and 2B 100% fulfilled each of 8 hours								Yes		
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimum Vehicle Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	8:30	963	194	126	100 %	100 %
	9:30	915	184	138	100 %	
	16:00	915	182	138	100 %	
	17:00	963	191	126	100 %	

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440					
	1440 - 2600					
	2601 - 7000	Not Justified				
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			