



**DP WORLD CANOLA OIL TRANSLOAD
FACILITY - TRAFFIC IMPACT STUDY**

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DP WORLD CANOLA OIL TRANSLOAD FACILITY - TRAFFIC IMPACT STUDY

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1 Introduction

DP World Canada Inc. (DP World) is proposing to develop a canola oil transload facility (the Project) at DP World's Fraser Surrey Terminal (Figure 1) located at 11060 Elevator Road, Surrey, British Columbia (the site). The Project includes development of new marine infrastructure to support vessel mooring and loading at the existing Berth 10, and the development of canola storage facilities and supporting transfer infrastructure on a parcel of land within the leased DP World Fraser Surrey terminal area. The Project site is fully located on federal lands and waters managed by the Vancouver Fraser Port Authority (VFPA).

The Project is subject to a full application review under VFPA's Project Environmental Review (process intended to satisfy Section 82 of the *Impact Assessment Act*). DP World has prepared this Traffic Impact Study to support the PER Application submission (PER No 22-017).



Figure 1 – DP World Fraser Surrey Terminal Site Location



2 Background Information

Background information pertaining to the Project is provided in the following subsections:

- Study Area;
- Proposed Works; and
- Supporting Documents.

2.1 Study Area

The study area for the Traffic Impact Study is illustrated in **Figure 2**. It includes the Tannery Road / Timberland Road / Robson Road / Elevator Road corridor between Highway 17 and the DP World access gate at the end of Elevator Road. It is noted that the VFPA is planning to realign portions of Timberland Road and Robson Road in 2023 as per the drawings included in **Appendix A**. This matter will be discussed later in the report.

The two Highway 17 / Tannery Road interchange intersections are traffic signal controlled with protected only left turn movements onto the two on ramps. The Timberland Road / Pine Road intersection is signalized with no left turn signal phases during normal operations. There are specific turn phases that activate during rail pre-emption, but these will not be considered as part of this Traffic Impact Study.

All roads south and west of Pine Road essentially have single lanes in each direction with stop controls controlling traffic where applicable. There are intersections on Timberland Road located at Dock Road, Plywood Road and on Robson Road at Elevator Road. Elevator Road connects to Alaska Way and Gunderson Road. The previous connection between Elevator Road and Highway 17 is now closed.

There are a number of properties that have accesses on Timberland Road, Robson Road and Elevator Road within the study area including the following more significant sites:

- Transportation Management Services (TMS);
- Westran Intermodal;
- Mainland Sand and Gravel;
- Topco Pallet Recycling;
- Catalyst Paper Corporation;
- DP World Container Terminal;
- Surewood Forest Product; and
- Fraser Grain Terminal (FGT).



DP WORLD CANOLA OIL TRANSLOAD FACILITY - TRAFFIC IMPACT STUDY 2 Background Information

There is no existing public transit service within the study area. Pedestrian and cyclist facilities are minimal and are likely to see little usage given the industrial nature of the site.



Figure 2 – Study Area



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2 Background Information

There are 10 existing at-grade road / rail crossings located within the study area as shown in **Figure 3**.



Figure 3 – At Grade Road/Rail Crossing Locations



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2 Background Information

The ten at-grade rail crossings as numbered in **Figure 3** are described below:

1. Single track crossing of Pine Road west of Timberland Road. The crossing is gated with a traffic signal rail pre-emption system at the Timberland Road/Pine Road intersection.
2. Single track crossing of Timberland Road south of Manson Canal. The crossing is controlled with railway crossing and stop signs.
3. Single track crossing of Timberland Road serving Seaspan property. The crossing is controlled with railway crossing and stop signs.
4. Single track crossing of Timberland Road serving Seaspan property. The crossing is controlled with railway crossing and stop signs;
5. Single track crossing of Timberland Road serving Catalyst Paper Corporation. The crossing is controlled with railway crossing and stop signs.
6. Double track crossing of Timberland Road serving FSD Shed 6. The crossing is controlled with railway crossing and stop signs.
7. Single track crossing of Timberland Road serving DPW Container Yard. The crossing is controlled with railway crossing and stop signs.
8. Single track crossing of Robson Road at Plywood Road. The crossing is controlled with railway crossing and stop signs
9. Double track crossing of Robson Road at Elevator Road. The crossing is controlled with railway crossing signs.
10. Single track crossing of Elevator Road at Alaska Way. The crossing is uncontrolled.

2.2 Proposed Development

A conceptual layout of the Project is shown in **Figure 4**. Note that this drawing assumes the realignment of portions of Timberland Road and Robson Road as mentioned earlier. Specific elements of the proposed facilities are detailed below.

The Berth 10 expansion in-water and over-water components include:

- Construction of a concrete access trestle to the loading arm platform at berth 10
 - Access trestle from the upland terminal to the loading platform, suspended on three pile caps with a length of 67 m and width of 4 m, supported by approximately 19 x 1.2 m OD piles (15 piles in-water footprint 17 m²)
 - Selective tree topping, as required to provide safe clearance along the first 30 meters of the access trestle from terminal lands



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- Abutment excavation impacting approximately 80 m² of vegetated area abutting the existing operating terminal area well above the high-water mark
- Construction of a canola oil loading platform at berth 10
 - A concrete loading platform at berth 10 with a length of 26 m along the berth and a width of 14 m, suspended on approximately 21 X 1.2 m OD piles
- Construction of new catwalk connection between berth 9 and the berth 10 loading arm platform with a length of 23 m and a width of 1 m with no expected shading or in-water supports
- Removal of one existing mooring dolphin pile that is in conflict with the new loading platform

Additional ancillary infrastructure on the loading deck and platform above and outside the highwater mark at berth 10 will include:

- Articulating canola oil marine loading arm, with canola loading and recycle lines, sump tank and pressure recovery vessel
- Upgraded marine bollards, fenders, ladders and ship access gangway
- Fire water hydrant at the jetty area

Key components of the Project that are not in water or over water include:

- Development of a storage tank and rail offload area adjacent to Timberland Road, consisting of:
 - Rail receiving facilities including:
 - Two rail spurs from the existing intermodal yard branch
 - Railcar bottom offloading stations, unloading pumps, piping and control cables
 - 32 rail car unloading capacity
 - Storage tank area:
 - Three 15,000 MT capacity tanks (Approx. 37 m diameter, 18 m height to API 650 standard)
 - Tank foundations including required ground improvements
 - Vessel loading pumps including required piping and controls
 - Containment area including liners, precast walls and associated foundations
 - Fire water loop with approximately six hydrants



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2 Background Information

- Below grade canola oil transmission and recycle lines connecting the storage tanks to the marine trestle.
- A new canola oil operations building to support electrical distribution and a Motor Control Centre (MCC), a control room, and security center with breakroom, and critical spares storage.
- Ten parking spaces for site vehicles that will be accessed via the existing intermodal yard crossing.

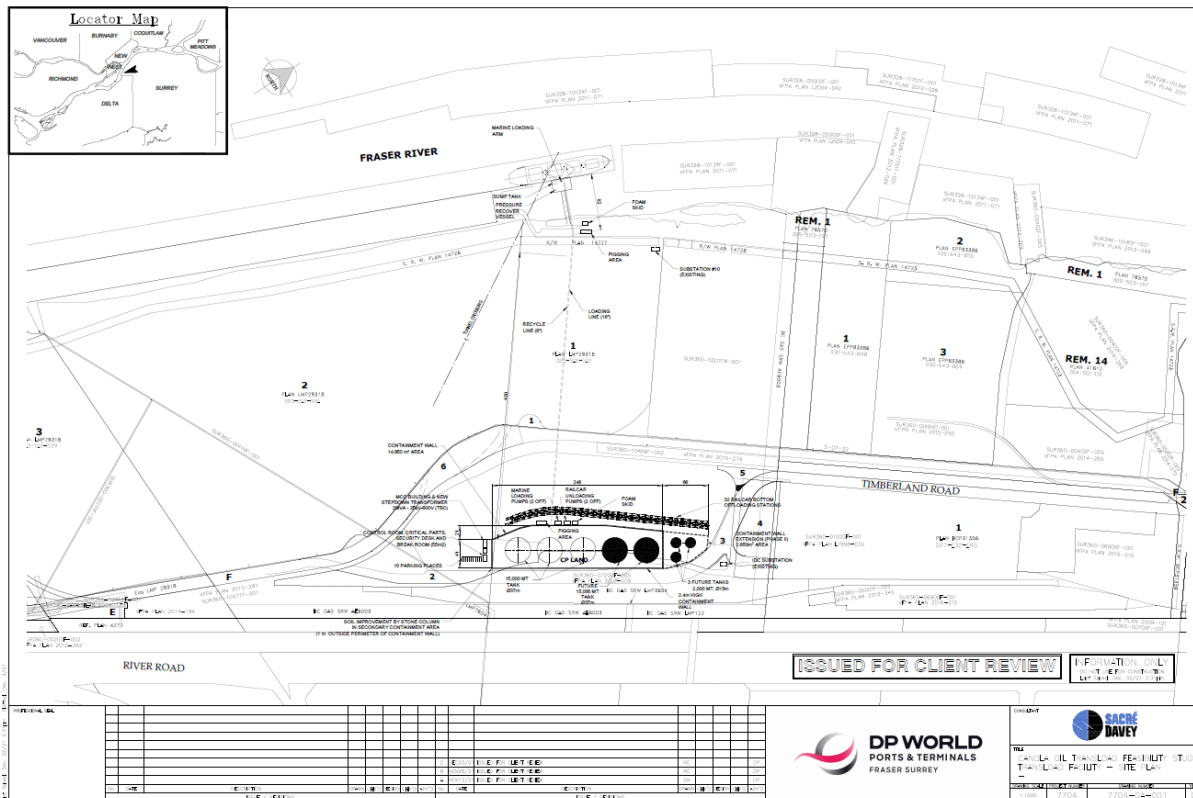


Figure 4 – Canola Oil Transload Facility Site Plan



2.3 Supporting Documents

The following documents and data were provided to Stantec by DP World:

- Two previous Traffic Impact Study reports prepared by Mott MacDonald related to the BHP Potash Export Facility titled “Traffic Impact Study BHP Potash Export Facility at Fraser Surrey Docks” dated June 2018 and July 2018. NOTE: The BHP facility is no longer planned but the reports were referenced as they provided 2017 pre-development traffic count data.
- WSP drawings (360-067-C-002 Rev E to C-007 Rev B) showing the revised alignment of Timberland Road/Robson Road scheduled for construction by Q1 2023. (See **Appendix A**)
- Sacre Davey drawings (7704-GA-001 Rev E included as **Figure 4**) showing the proposed Canola Oil Transload Facility – Site Plan scheduled for opening in September 2023.



3 Analysis Approach

The analysis approach for the Traffic Impact Study is detailed in the following subsections:

- Scenario Generation;
- Analysis Methodology;
- Performance Indicators; and
- Analysis Assumptions.

3.1 Scenario Generation

Five scenarios were evaluated as part of this study:

1. 2022 - Existing Conditions
2. 2023 - No Development Conditions
3. 2023 - With Development Conditions
4. 2030 - No Development Conditions
5. 2030 - With Development Conditions

Scenario 1 represents the existing conditions. Scenarios 2 and 4 represent the 2023 horizon year with and without the canola oil transload facility development, respectively. Scenarios 3 and 5 represent the 2030 horizon year with and without the canola oil transload facility development, respectively.

3.2 Analysis Methodology

Traffic data corresponding to the existing traffic conditions was aggregated from historical reports and processed. This data was then used to develop a traffic model of existing operating conditions in the weekday AM and PM peak hours using the Synchro (V11) software (Scenario 1). Future traffic volumes and movements were forecasted using the collected data, based on the proposed development plans and other assumptions (see Section 3.4). The forecasted traffic volume data was used to develop Synchro traffic models representing the future operating conditions (Scenario 2 to Scenario 5). Data from all of these models were extracted and assessed to conduct the Traffic Impact Study.



DP WORLD CANOLA OIL TRANSLOAD FACILITY - TRAFFIC IMPACT STUDY

3 Analysis Approach

The following intersections were analyzed as part of the Traffic Impact Study:

- Tannery Road Interchange (South);
- Tannery Road Interchange (North);
- Tannery Road / Pine Road;
- Timberland Road Y Junction;
- Robson Road / Plywood Road;
- Robson Road / Container Access; and
- Robson Road / Elevator Road.

In the subsequent discussion, intersection turning movements have been abbreviated so for example NBT = northbound through movement, SBL = southbound left turn movement, EBR = eastbound right turn movement, etc. The analysis generated a significant amount of data. To facilitate reading of this report, analysis results have been discussed briefly in the body of the report, with detailed output included in the following Appendices:

- Appendix B – AM and PM Peak Hour Traffic Volumes
- Appendix C – Synchro Output Summaries
- Appendix D – Synchro Output Plots

Two-way PM peak hour traffic volumes were also estimated at the 10 existing at-grade road / rail crossings located within the study area as shown previously in **Figure 3**. The traffic volumes were estimated using the same forecasted volumes that were used in the Synchro models, using the most applicable analysis intersection for each road / rail crossing. The rail / road crossings are listed in **Table 1** with the intersections used to generate the traffic volume estimates. It is expected that two at-grade road / rail crossings (item 6 and 7 in **Table 1**) will be eliminated starting in 2023 due to the realignment of Timberland Road. As such, the two-way PM peak hour volume at these two locations is assumed to be 0 in Scenario 2 to Scenario 5.



DP WORLD CANOLA OIL TRANSLOAD FACILITY - TRAFFIC IMPACT STUDY
3 Analysis Approach

Table 1 – At-Grade Road / Rail Crossing Traffic Volume Calculation Assumptions

At-Grade Road / Rail Crossing		Intersection Used
1	Single track crossing of Pine Road west of Timberland Road	Based on link volumes at Pine Road / Timberland Road
2	Single track crossing of Timberland Road south of Manson Canal	Based on volumes at Timberland Road Y Junction
3	Single track crossing of Timberland Road serving Seaspan	Based on volumes at Timberland Road Y Junction
4	Single track crossing of Timberland Road serving Seaspan	Based on volumes at Timberland Road Y Junction
5	Single track crossing of Timberland Road serving Catalyst Paper	Based on volumes at Timberland Road Y Junction
6	Double track crossing of Timberland Road serving FSD Shed 6	Based on volumes at Timberland Road / Container Terminal access*
7	Single track crossing of Timberland Road serving DPW Container Yard	Based on volumes at Timberland Road / Container Terminal access*
8	Single track crossing of Robson Road at Plywood Road	Based on link volumes at Robson Road / Plywood Road*
9	Double track crossing of Robson Road at Elevator Road	Based on link volumes at Robson Road / Elevator Road
10	Single track crossing of Elevator Road at Alaska Way	Based on link volumes at Elevator Road / Alaska Way

* At grade crossing to be removed from 2023 onward

Two-way daily traffic volumes at each of the 10 road / rail crossings were then estimated by factoring up the 2022 Existing Condition weekday PM peak hour volumes by a factor of 10.4. This factor was derived from the tube count data on Timberland Road at Catalyst Paper in the Mott MacDonald report which showed that the two-way weekday daily volumes were in the order of 2500 veh / day whereas the PM peak hour volume was approximately 240 veh / hr.

Information regarding existing and future rail activity at the at-grade road / rail crossings was not available at the time that this document was developed. These assumptions will be documented in this section when the information becomes available.



3.3 Performance Indicators

Intersection traffic operations were assessed for the AM and PM peak hours using the Synchro (V11) software and then reported in terms of the following performance indicators as per the HCM2000 methodology:

- **Volume-to-capacity (v/c) ratio** – the v/c ratio (or degree of saturation) indicates the amount of congestion for each lane group. For signalized intersections, the v/c ratio is calculated for each lane group, whereas for unsignalized intersections the v/c is calculated for each movement. For roundabouts, the v/c ratio is calculated for each approach. Typically, it is desirable to have v/c ratios < 0.85 in an urban environment.
- **Level of service (LOS)** – the LOS for a movement or an intersection overall is an indication of the delays due to the intersection controls. The LOS is derived by calculating the intersection or approach control delay and converting it to a letter between A and F. LOS A represents minimal delays and LOS F represents lengthy delays as per **Table 2** for signalized and unsignalized intersections. On an urban arterial, LOS D or better is generally considered desirable.

Table 2 – Delay and Level of Service Indicators

Signalized Intersection		Unsignalized Intersection	
Control Delay per Vehicle (s)	LOS	Control Delay per Vehicle (s)	LOS
≤10	A	≤10	A
>10 and ≤20	B	>10 and ≤15	B
>20 and ≤35	C	>15 and ≤25	C
>35 and ≤55	D	>25 and ≤35	D
>55 and ≤80	E	>35 and ≤50	E
>80	F	>50	F

In addition to the evaluation of intersection traffic operations, estimates of daily road traffic volumes at the at-grade road / rail crossings were also generated for each scenario. At the time of drafting this report, the number of daily train occupations of the crossings was not available. This information will be included in later updates to this report.

The analysis findings of the various Scenarios are documented in Section 4 to Section 8.



3.4 Analysis Assumptions

Other assumptions included in the traffic analysis are documented below:

- a) The realigned Timberland Road / Robson Road corridor (See **Appendix A**) will be constructed and open to traffic in June 2023 with the canola oil facility being opened in September 2023.
- b) Existing traffic signal timings as provided by the BC Ministry of Transportation and Infrastructure were used for the Tannery Road / Highway 17 interchange for the 2022 existing conditions analysis. The timings were however optimized for all future scenarios.
- c) Traffic signal timings for the Timberland Road / Pine Road intersection were not readily available so the existing traffic signal phasing was assumed and the timings were optimized in all scenarios.
- d) Stop controls at unsignalized intersections were assumed to be as per existing conditions or as indicated on the WSP Timberland Road realignment drawings.
- e) The weekday AM and PM peak hours were assumed to be 06:30 to 07:30am and 3:00 to 4:00 pm respectively based on the Mott MacDonald reports.
- f) The weekday AM and PM peak hour volumes were derived initially from the 2017 traffic count data in the Mott MacDonald reports and adjusted as needed to suit the Scenarios.
- g) At the minor intersections where no traffic count data was included in the Mott MacDonald report, the peak hour traffic volumes were copied from their Synchro plots. At the container terminal access, the Mott MacDonald traffic volumes were adjusted based on information from DP World that inbound / outbound truck volumes are currently approximately 17 trucks / hr per direction. The adjusted 2017 AM and PM peak hour traffic volumes are included in the plots in **Appendix B**.
- h) Truck percentage of total traffic volumes was estimated based on the 2017 traffic count data in the Mott MacDonald reports.
- i) Peak hour factors were estimated based on the 2017 traffic count data in the Mott MacDonald reports.
- j) Background traffic growth was estimated at 2% per annum which is typical of normal traffic growth in the BC Lower Mainland.
- k) Further developments within Fraser Surrey Docks are expected but these are currently unknown or unconfirmed. No significant expansions have occurred in the study area since 2018 based on information from DP World. As such, there has been no allowance made for major developments or changes in land use other than that at the subject canola oil development.
- l) DP World forecasts employee vehicle trip generation from the Canola Oil Transload Facility will be 10 workers/shift x 3 shifts. Shift changes are assumed to be during the AM and PM peak hours discussed previously, with 10 inbound vehicles and 10 outbound vehicles per shift change..
- m) DP World confirmed that all canola oil transportation will be by rail and sea, with no road-based transport of the product.



4 2022 Existing Conditions

The assumptions and findings pertaining to the 2022 Existing Conditions scenario are documented in this section.

4.1 Road Network

The 2022 road network reflected the existing road alignments, intersections and laning configurations.

4.2 Traffic Volumes

The 2022 Existing Condition AM and PM peak hour traffic volumes were estimated based on the adjusted Mott MacDonald 2017 volumes which were factored up by 2% compounded per annum (equivalent to multiplying the 2017 base volumes by 1.104). Please see **Appendix B** for peak hour traffic volumes.

4.3 Traffic Operations

The 2022 Existing Conditions AM and PM peak hour traffic operations were assessed using the Synchro program assuming:

- Existing road network
- 2022 Existing Conditions peak hour volumes
- Existing traffic signal timings at Tannery Interchange
- Optimized traffic signal timings at Timberland Road/ Pine Road intersection

Synchro analysis outputs are provided in **Appendix C and Appendix D**. No operational issues were observed except at the following locations and movements.

Tannery Road Interchange (South)

- **AM NBL / NBT** – these movements have a V/C ratio of 0.86.
- **PM NBR** –this movement has a V/C ratio of 0.91.
- **PM EBL** – this movement has an LOS of E.

Tannery Road / Pine Road

- **AM WBL / WBT / WBR** – these movements have a V/C ratio of 0.89.



4.4 Road / Rail Crossings

Two-way PM peak hour and daily traffic volumes at each of the 10 road / rail crossings were estimated according to the methodology described in Section 3.2. The 2022 two-way traffic volumes at the crossings are presented in **Table 3**.

Table 3 – 2022 Existing Conditions Traffic Volumes at Rail Crossings

Crossing		Two-Way PM Peak Hour Traffic Volume (veh/hr)	Estimated two-way Daily Traffic Volume (veh/day)	Number of daily rail occupations (occupations/day)
1	Single track crossing of Pine Road west of Timberland Road	108	1123	TBD
2	Single track crossing of Timberland Road south of Manson Canal	406	4222	TBD
3	Single track crossing of Timberland Road serving Seaspan	406	4222	TBD
4	Single track crossing of Timberland Road serving Seaspan	406	4222	TBD
5	Single track crossing of Timberland Road serving Catalyst Paper	406	4222	TBD
6	Double track crossing of Timberland Road serving FSD Shed 6.	298	3099	TBD
7	Single track crossing of Timberland Road serving DPW Container Yard	298	3099	TBD
8	Single track crossing of Robson Road at Plywood Road	248	2579	TBD
9	Double track crossing of Robson Road at Elevator Road	161	1674	TBD
10	Single track crossing of Elevator Road at Alaska Way	35	364	TBD



5 2023 No Development Conditions

The assumptions and findings pertaining to the 2023 No Development Conditions scenario are documented in this section.

5.1 Road Network

The road network assumed the realignment of Timberland Road as per the WSP drawings (**Appendix A**) would be in place.

5.2 Traffic Volumes

The 2022 Existing Condition AM and PM peak hour traffic volumes were first factored up by applying a 2% growth factor to estimate 2023 volumes. The resultant volumes were then manually reassigned to suit the realigned Timberland Road alignment to provide an estimate of 2023 No Development volumes (see **Appendix B**).

5.3 Traffic Operations

The 2023 No Development AM and PM peak hour traffic operations were assessed using the Synchro program assuming:

- Realigned Timberland Road road network
- 2023 No Development peak hour volumes
- Optimized traffic signal timings at Tannery Interchange
- Optimized traffic signal timings at Timberland Road / Pine Road intersection

Synchro analysis outputs are provided in **Appendix C** and **Appendix D**. No operational issues were observed except at the following locations and movements.

Tannery Road Interchange (South)

- **PM NBR** – this movement has a V/C ratio of 0.87.
- **PM EBL** – this movement has an LOS of E.

Tannery Road / Pine Road

- **AM WBL / WBT / WBR** – these movements have a V/C ratio of 0.91.
- **PM SBL** – this movement has a V/C ratio of 0.86



Timberland Road Y Junction

- **AM SBL / SBT / SBR** – these movements have a V/C ratio of 0.86.

5.4 Road / Rail Crossings

Two-way PM peak hour and daily traffic volumes at each of the 10 road / rail crossings were estimated according to the methodology described in Section 3.2. The 2023 No Development two-way traffic volumes at the crossings are presented in **Table 4**.

Table 4 – 2023 No Development Traffic Volumes at Rail Crossings

Crossing		Two-Way PM Peak Hour Traffic Volume (veh/hr)	Estimated two-way Daily Traffic Volume (veh/day)	Number of daily rail occupations (occupations/day)
1	Single track crossing of Pine Road west of Timberland Road	110	1144	TBD
2	Single track crossing of Timberland Road south of Manson Canal	114	1186	TBD
3	Single track crossing of Timberland Road serving Seaspan	114	1186	TBD
4	Single track crossing of Timberland Road serving Seaspan	114	1186	TBD
5	Single track crossing of Timberland Road serving Catalyst Paper	114	1186	TBD
6	Double track crossing of Timberland Road serving FSD Shed 6.	0	0	TBD
7	Single track crossing of Timberland Road serving DPW Container Yard	0	0	TBD
8	Single track crossing of Robson Road at Plywood Road	255	2652	TBD
9	Double track crossing of Robson Road at Elevator Road	165	1716	TBD
10	Single track crossing of Elevator Road at Alaska Way	35	364	TBD



6 2023 With Development Conditions

The assumptions and findings pertaining to the 2023 With Development Conditions scenario are documented in this section.

6.1 Road Network

The road network assumed the realignment of Timberland Road as per the WSP drawings (see **Appendix A**) would be in place. Access to the canola oil site will be via the DP World gate at the end of Elevator Road.

6.2 Site Trip Generation

DP World advised that canola oil transportation will be via rail or sea. Site trip generation during the peak hours is assumed to be from 10 workers per shift who are all assumed to drive private vehicles. Therefore, 10 veh / hr are assumed to enter/leave the site during the AM and PM peak hours. Workers will access the site via the DP World gate at the end of Elevator Road.

6.3 Traffic Volumes

The site generated traffic volumes were superimposed onto the 2023 No Development volumes to provide an estimate of 2023 With Development volumes. (See **Appendix B**)

6.4 Traffic Operations

The 2023 With Development AM and PM peak hour traffic operations were assessed using the Synchro program assuming:

- Realigned Timberland Road road network
- 2023 With Development peak hour volumes
- Optimized traffic signal timings at Tannery Interchange
- Optimized traffic signal timings at Timberland Road/ Pine Road intersection

Synchro analysis outputs are provided in **Appendix C** and **Appendix D**. No operational issues were observed except at the following locations and movements.

Tannery Road Interchange (South)

- **PM NBR** –this movement has a V/C ratio of 0.87.
- **PM EBL** – this movement has an LOS of E.



Tannery Road / Pine Road

- **AM SBT** – this movement has a V/C ratio of 0.87
- **AM WBL / WBT / WBR** – these movements have a V/C ratio of 0.91.
- **PM SBL** – this movement has a V/C ratio of 0.87

Timberland Road Y Junction

- **AM SBL / SBT / SBR** – these movements have a V/C ratio of 0.89.

6.5 Road / Rail Crossings

Two-way PM peak hour and daily traffic volumes at each of the 10 road / rail crossings were estimated according to the methodology described in Section 3.2. The 2023 With Development two-way traffic volumes at the crossings are presented in **Table 5**.

Table 5 – 2023 With Development Traffic Volumes at Rail Crossings

	Crossing	Two-Way PM Peak Hour Traffic Volume (veh/hr)	Estimated two-way Daily Traffic Volume (veh/day)	Number of daily rail occupations (occupations/day)
1	Single track crossing of Pine Road west of Timberland Road	110	1144	TBD
2	Single track crossing of Timberland Road south of Manson Canal	114	1186	TBD
3	Single track crossing of Timberland Road serving Seaspan	114	1186	TBD
4	Single track crossing of Timberland Road serving Seaspan	114	1186	TBD
5	Single track crossing of Timberland Road serving Catalyst Paper	114	1186	TBD
6	Double track crossing of Timberland Road serving FSD Shed 6.	0	0	TBD
7	Single track crossing of Timberland Road serving DPW Container Yard	0	0	TBD
8	Single track crossing of Robson Road at Plywood Road	275	2860	TBD
9	Double track crossing of Robson Road at Elevator Road	185	1924	TBD
10	Single track crossing of Elevator Road at Alaska Way	55	572	TBD



7 2030 No Development Conditions

The assumptions and findings pertaining to the 2030 No Development Conditions scenario are documented in this section.

7.1 Road Network

The road network assumed the realignment of Timberland Road as per the WSP drawings (**Appendix A**) would be in place.

7.2 Traffic Volumes

The 2023 No Development AM and PM peak hour traffic volumes were factored up by applying a 2% growth factor to estimate 2030 No Development volumes. (See **Appendix B**)

7.3 Traffic Operations

The 2030 No Development AM and PM peak hour traffic operations were assessed using the Synchro program assuming:

- Realigned Timberland Road road network
- 2030 No Development peak hour volumes
- Optimized traffic signal timings at Tannery Interchange
- Optimized traffic signal timings at Timberland Road/ Pine Road intersection

Synchro analysis outputs are provided in **Appendix C** and **Appendix D**. No operational issues were observed except at the following locations and movements.

Tannery Road Interchange (South)

- **PM NBR** – this movement has a V/C ratio of 0.95.
- **PM EBL** – this movement has an LOS of E.

Tannery Road Interchange (North)

- **AM WBL** – this movement has a V/C ratio of 0.87.

Tannery Road / Pine Road

- **AM SBT / SBL** – these movement have a V/C ratio of 0.93.
- **AM WBL / WBT / WBR** – these movements have a V/C ratio of 1.06 and an LOS of E.



**DP WORLD CANOLA OIL TRANSLOAD FACILITY - TRAFFIC IMPACT STUDY
7 2030 No Development Conditions**

- **AM EBL / EBT** – these movements have an LOS of E
- **PM SBL** – this movement has a V/C ratio of 0.93

Timberland Road Y Junction

- **AM SBL / SBT / SBR** – these movements have a V/C ratio of 1.00 and an LOS of F
- **PM NBT / NBR** – these movements have a V/C ratio of 0.86 and an LOS of E.

7.4 Road / Rail Crossings

Two-way PM peak hour and daily traffic volumes at each of the 10 road / rail crossings were estimated according to the methodology described in Section 3.2. The 2030 No Development two-way traffic volumes at the crossings are presented in **Table 6**.

Table 6 – 2030 No Development Traffic Volumes at Rail Crossings

Crossing		Two-Way PM Peak Hour Traffic Volume (veh/hr)	Estimated two-way Daily Traffic Volume (veh/day)	Number of daily rail occupations (occupations/day)
1	Single track crossing of Pine Road west of Timberland Road	127	1321	TBD
2	Single track crossing of Timberland Road south of Manson Canal	131	1362	TBD
3	Single track crossing of Timberland Road serving Seaspan	131	1362	TBD
4	Single track crossing of Timberland Road serving Seaspan	131	1362	TBD
5	Single track crossing of Timberland Road serving Catalyst Paper	131	1362	TBD
6	Double track crossing of Timberland Road serving FSD Shed 6.	0	0	TBD
7	Single track crossing of Timberland Road serving DPW Container Yard	0	0	TBD
8	Single track crossing of Robson Road at Plywood Road	291	3026	TBD
9	Double track crossing of Robson Road at Elevator Road	188	1955	TBD
10	Single track crossing of Elevator Road at Alaska Way	40	416	TBD



8 2030 With Development Conditions

The assumptions and findings pertaining to the 2030 With Development Conditions scenario are documented in this section.

8.1 Road Network

The road network assumed the realignment of Timberland Road as per the WSP drawings (**Appendix A**) would be in place. Access to the canola oil site will be via the DP World gate at the end of Elevator Road.

8.2 Traffic Volumes

The 2023 With Development volumes were inflated by 2% per annum to provide an estimate of 2030 With Development volumes. (See **Appendix B**)

8.3 Traffic Operations

The 2030 With Development AM and PM peak hour traffic operations were assessed using the Synchro program assuming:

- Realigned Timberland Road road network
- 2030 With Development peak hour volumes
- Optimized traffic signal timings at Tannery Interchange
- Optimized traffic signal timings at Timberland Road/ Pine Road intersection

Synchro analysis outputs are provided in **Appendix C** and **Appendix D**. No operational issues were observed except at the following locations and movements.

Tannery Road Interchange (South)

- **PM NBR** – this movement has a V/C ratio of 0.95.
- **PM EBL** – this movement has an LOS of E.

Tannery Road Interchange (North)

- **AM WBL** – this movement has a V/C ratio of 0.87.

Tannery Road / Pine Road

- **AM SBL / SBT** – these movement have a V/C ratio of 0.94 and 0.96, respectively
- **AM WBL / WBT / WBR** – these movements have a V/C ratio of 1.06 and an LOS of E.



**DP WORLD CANOLA OIL TRANSLOAD FACILITY - TRAFFIC IMPACT STUDY
8 2030 With Development Conditions**

- **AM EBL / EBT** – these movements have an LOS of E
- **PM SBL** – this movement has a V/C ratio of 0.95

Timberland Road Y Junction

- **AM SBL / SBT / SBR** – these movements have a V/C ratio of 1.03 and an LOS of F.
- **PM NBT / NBR** – these movements have a V/C ratio of 0.91 and an LOS of E.

8.4 Road / Rail Crossings

Two-way PM peak hour and daily traffic volumes at each of the 10 road / rail crossings were estimated according to the methodology described in Section 3.2. The 2030 With Development two-way traffic volumes at the crossings are presented in **Table 7**.

Table 7 – 2030 With Development Traffic Volumes at Rail Crossings

Crossing		Two-Way PM Peak Hour Traffic Volume (veh/hr)	Estimated two-way Daily Traffic Volume (veh/day)	Number of daily rail occupations (occupations/day)
1	Single track crossing of Pine Road west of Timberland Road	127	1321	TBD
2	Single track crossing of Timberland Road south of Manson Canal	131	1362	TBD
3	Single track crossing of Timberland Road serving Seaspan	131	1362	TBD
4	Single track crossing of Timberland Road serving Seaspan	131	1362	TBD
5	Single track crossing of Timberland Road serving Catalyst Paper	131	1362	TBD
6	Double track crossing of Timberland Road serving FSD Shed 6.	0	0	TBD
7	Single track crossing of Timberland Road serving DPW Container Yard	0	0	TBD
8	Single track crossing of Robson Road at Plywood Road	311	3234	TBD
9	Double track crossing of Robson Road at Elevator Road	208	2163	TBD
10	Single track crossing of Elevator Road at Alaska Way	60	624	TBD



9 Conclusions and Recommendations

According to the traffic analysis, a few traffic movements appear to be experiencing operational issues under 2022 existing conditions, as listed below:

- **Tannery Road / Highway 17 (S):** NBL / NBT / NBR / EBL
- **Tannery Road / Pine Road:** WBL / WBT / WBR

In the 2023 No Development Scenario, the analysis shows the following movements may experience operational issues:

- **Tannery Road / Highway 17 (S):** NBR / EBL
- **Tannery Road / Pine Road:** SBL / WBL / WBT / WBR
- **Timberland Road Y Junction:** SBL / SBT / SBR

In the 2030 No Development Scenario, the analysis shows the following movements may experience operational issues:

- **Tannery Road / Highway 17 (S):** NBR / EBL
- **Tannery Road / Highway 17 (N):** WBL
- **Tannery Road / Pine Road:** SBL / SBT / EBL / EBT / WBL / WBT / WBR
- **Timberland Road Y Junction:** SBL / SBT / SBR / NBT / NBR

As shown above, the existing signal timings at Tannery Road / Highway 17 (S) likely require optimization as the operations improved in 2023 after the signal timings were re-optimized. Traffic operations at the Tannery Road / Pine Road intersection appear to be deteriorating due to background traffic growth. Traffic operations at the Timberland Road Y junction also appears to deteriorating due to background traffic growth, though the realignment of Timberland Road may have had an affect as well.

The proposed development will generate minimal additional traffic (+10 veh / hr inbound / outbound during the peak hours) in the study area road network. This increase is very minor compared to the existing volumes and projected background growth. Reviewing the Synchro summaries in **Appendix C**, it is evident that there is very little change in traffic performance when the without / with development performance within the same year are compared. The Project itself is not expected to significantly affect traffic operations at any of the study intersections, and unlikely to trigger the need for mitigation measures.



APPENDIX

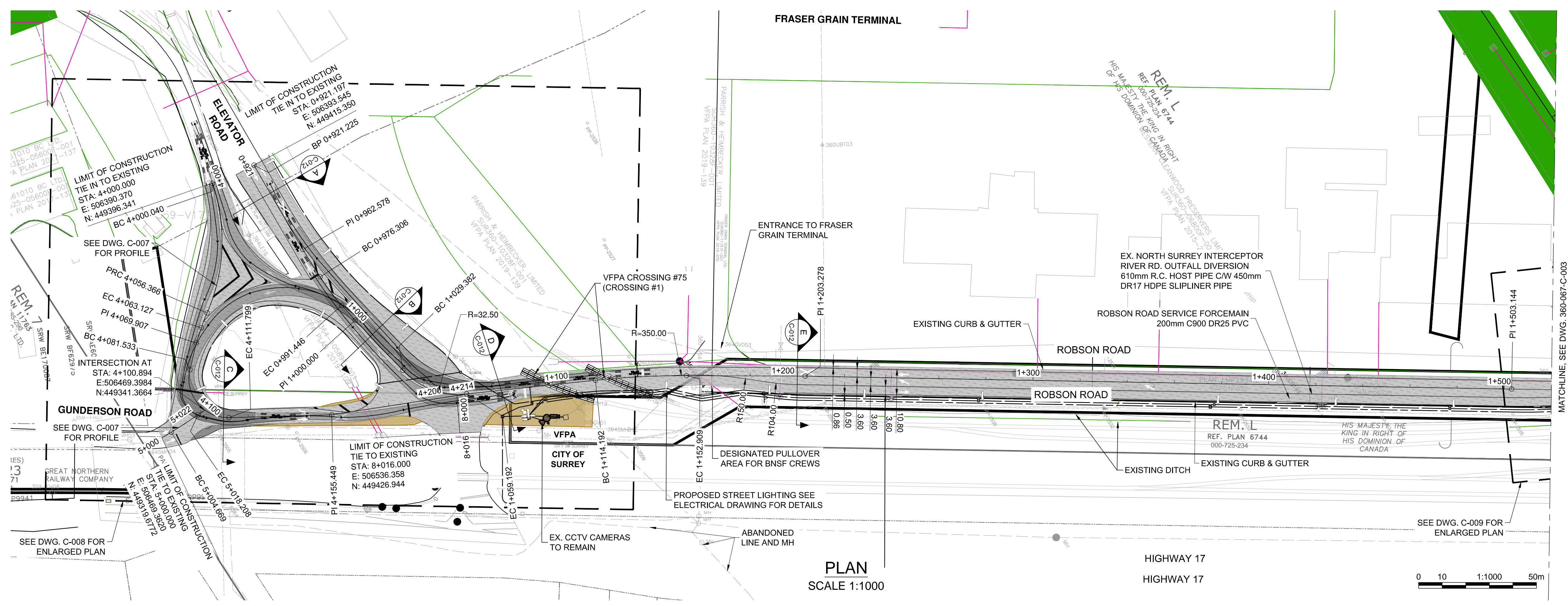


Appendix A Timberland Road Realignment Drawings

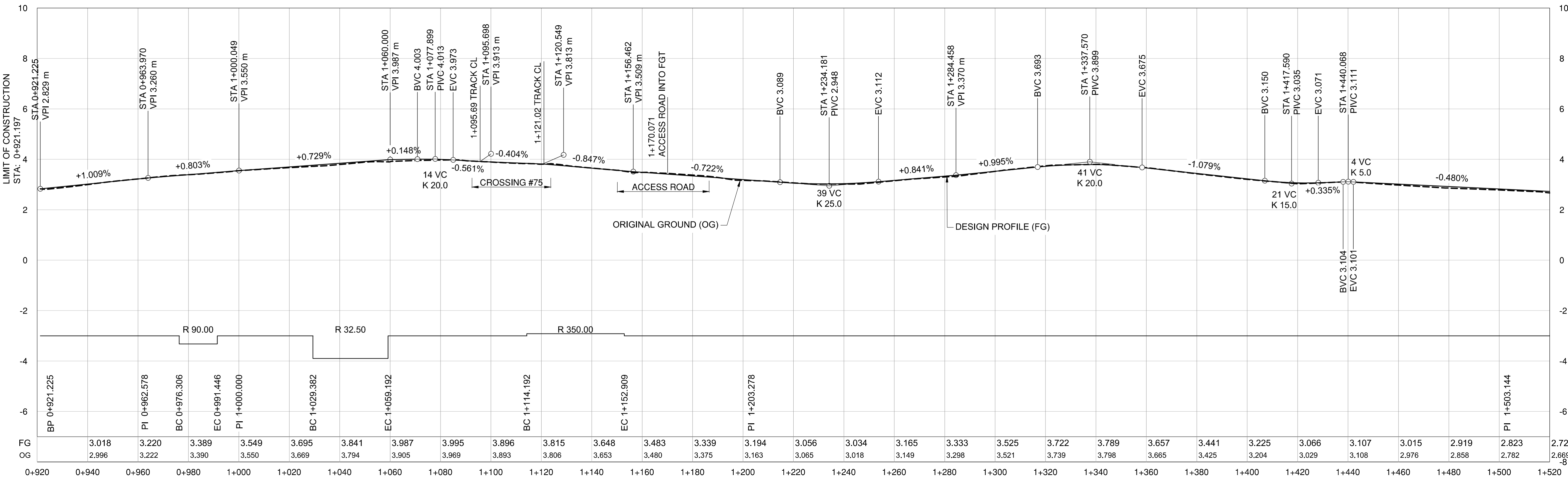
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ROBSON ROAD / ELEVATOR RD (INCLUDING ROUNDABOUT WITH GUNDERSON RD) NEW PAVEMENT CONSTRUCTION	40mm SUPERPAVE 12.5 70mm SUPERPAVE 19 90mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) 300mm GRANULAR SUBBASE (75mm MINUS)
REGRADE EX. GRAVEL	[Symbol]
PROPOSED CONCRETE	[Symbol]
CONCRETE ROADSIDE / MEDIAN BARRIER	[Symbol]
PROPOSED TUFF CURB & FLEXIBLE DELINEATORS	[Symbol]
PROPOSED FENCING	[Symbol]
EXISTING FENCING	[Symbol]
PROPOSED CURB	[Symbol]
PROPOSED GUTTER	[Symbol]
ROAD BUFFER	[Symbol]
PROPOSED SIDEWALK	[Symbol]
PROPERTY LINE	[Symbol]
LICENSE/EASEMENT LINE	[Symbol]
STORM & SEWER PIPE	[Symbol]
MAIN WATER PIPE	[Symbol]
EXISTING ROAD CENTERLINE	[Symbol]
EXISTING ROAD	[Symbol]
FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)	[Symbol]
EXISTING BOTTOM OF DITCH (FROM SURVEY)	[Symbol]
DRIVEWAY ACCESS	[Symbol]
SECTION MARKER	[Symbol]
PROPOSED LIGHT POLE	[Symbol]
PROPOSED POWER AND COMMUNICATIONS CONDUITS	[Symbol]



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D	2022/03/25	ISSUED FOR 90% DESIGN	RC	MJ
C	2021/11/15	ISSUED FOR 60% DESIGN	RC	MJ
B	2021/01/07	ISSUED FOR METRO VANCOUVER	KY	VT
A	2020/12/18	ISSUED FOR 30% DESIGN	IL	VT



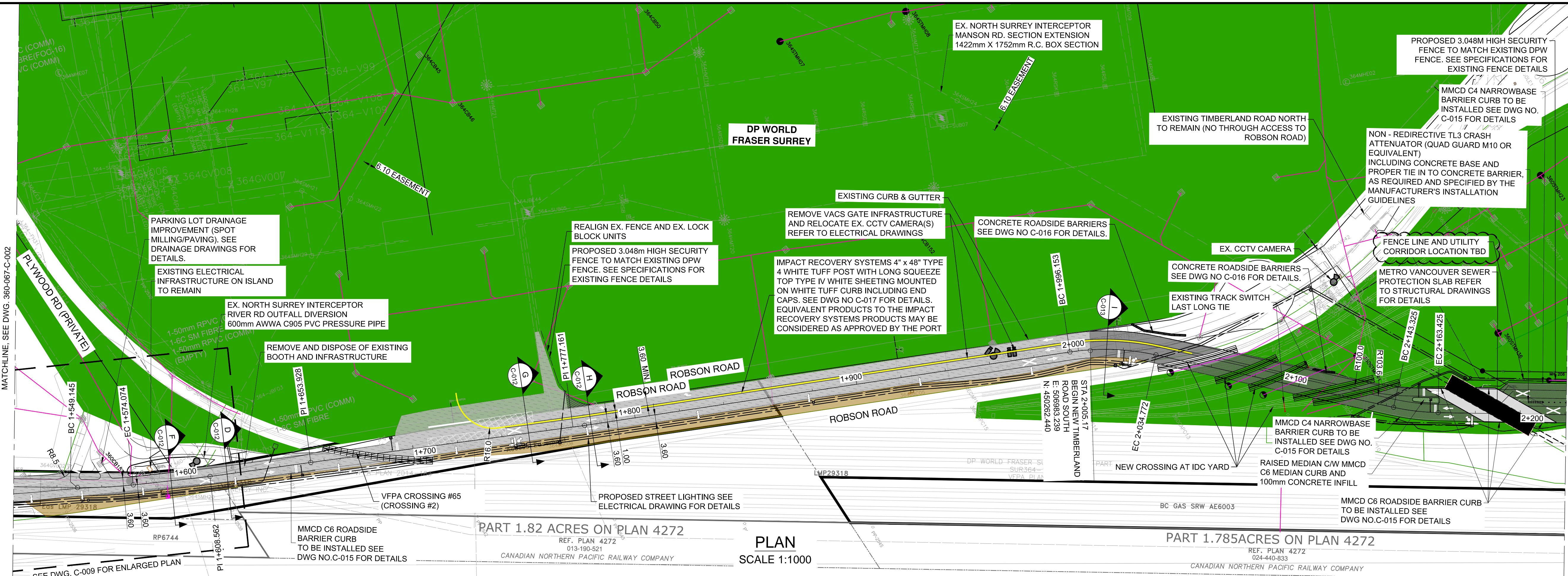
VANCOUVER FRASER PORT AUTHORITY
 ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
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PMV SITE	----

GREATER VANCOUVER GATEWAY 2030
 FSP TRANSPORTATION IMPROVEMENTS
 PLAN & PROFILE
 STA. 1+000.000 TO STA. 1+520.000

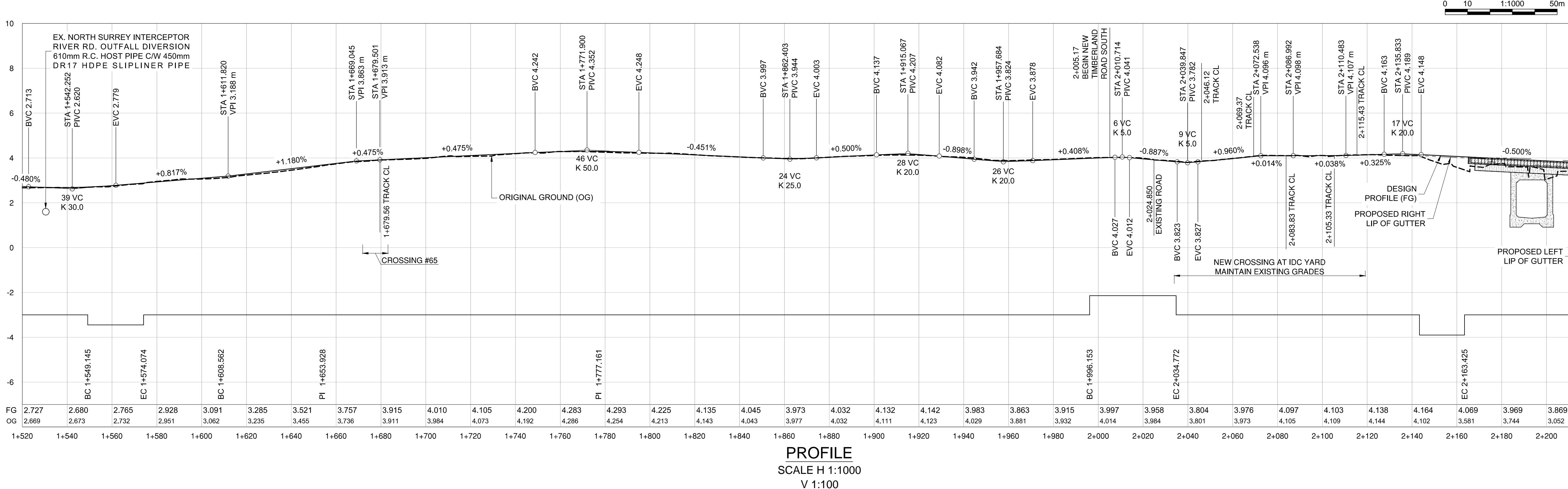
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 - 40mm SUPERPAVE 19
 - 80mm MILL
- ROBSON ROAD / ELEVATOR RD (INCLUDING ROUNDABOUT WITH GUNDERSON RD) NEW PAVEMENT CONSTRUCTION
 - 40mm SUPERPAVE 12.5
 - 70mm SUPERPAVE 19
 - 90mm SUPERPAVE 19
 - 300mm GRANULAR BASE (19mm MINUS)
 - 300mm GRANULAR SUBBASE (75mm MINUS)
- IDC YARD NEW PAVEMENT CONSTRUCTION
 - 50mm SUPERPAVE 12.5
 - 70mm SUPERPAVE 19
 - 50mm SUPERPAVE 19
 - 300mm GRANULAR BASE (19mm MINUS)
 - TRIAXIAL GEOGRID
 - 300mm GRANULAR SUBBASE (75mm MINUS)
- CONCRETE APPROACH SLAB
 - 50mm SUPERPAVE 12.5
 - 70mm SUPERPAVE 19
 - CONCRETE APPROACH SLAB
- REGRADE EX. GRAVEL
- PROPOSED CONCRETE
- CONCRETE ROADSIDE / MEDIAN BARRIER
- PROPOSED TUFF CURB & FLEXIBLE DELINEATORS
- PROPOSED FENCING
- EXISTING FENCING
- PROPOSED CURB
- PROPOSED GUTTER
- ROAD BUFFER
- PROPOSED SIDEWALK
- PROPERTY LINE
- LICENSE/EASEMENT LINE
- STORM & SEWER PIPE
- MAIN WATER PIPE
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- EXISTING ROAD
- FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)
- EXISTING BOTTOM OF DITCH (FROM SURVEY)
- DRIVEWAY ACCESS
- SECTION MARKER
- PROPOSED LIGHT POLE
- PROPOSED POWER AND COMMUNICATIONS CONDUITS



LEGEND

- REGRADE EX. GRAVEL
- PROPOSED CONCRETE
- CONCRETE ROADSIDE / MEDIAN BARRIER
- PROPOSED TUFF CURB & FLEXIBLE DELINEATORS
- PROPOSED FENCING
- EXISTING FENCING
- PROPOSED CURB
- PROPOSED GUTTER
- ROAD BUFFER
- PROPOSED SIDEWALK
- PROPERTY LINE
- LICENSE/EASEMENT LINE
- STORM & SEWER PIPE
- MAIN WATER PIPE
- EXISTING ROAD CENTERLINE
- EXISTING ROAD
- FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)
- EXISTING BOTTOM OF DITCH (FROM SURVEY)
- DRIVEWAY ACCESS
- SECTION MARKER
- PROPOSED LIGHT POLE
- PROPOSED POWER AND COMMUNICATIONS CONDUITS

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B	2021/01/07	ISSUED FOR METRO VANCOUVER	KY	VT
F	2022/05/13	ISSUED FOR 99% DESIGN	RC	MJ

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DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
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**GREATER VANCOUVER GATEWAY 2030
 FSPL TRANSPORTATION IMPROVEMENTS
 PLAN & PROFILE
 STA. 1+520.000 TO STA. 2+220.000**

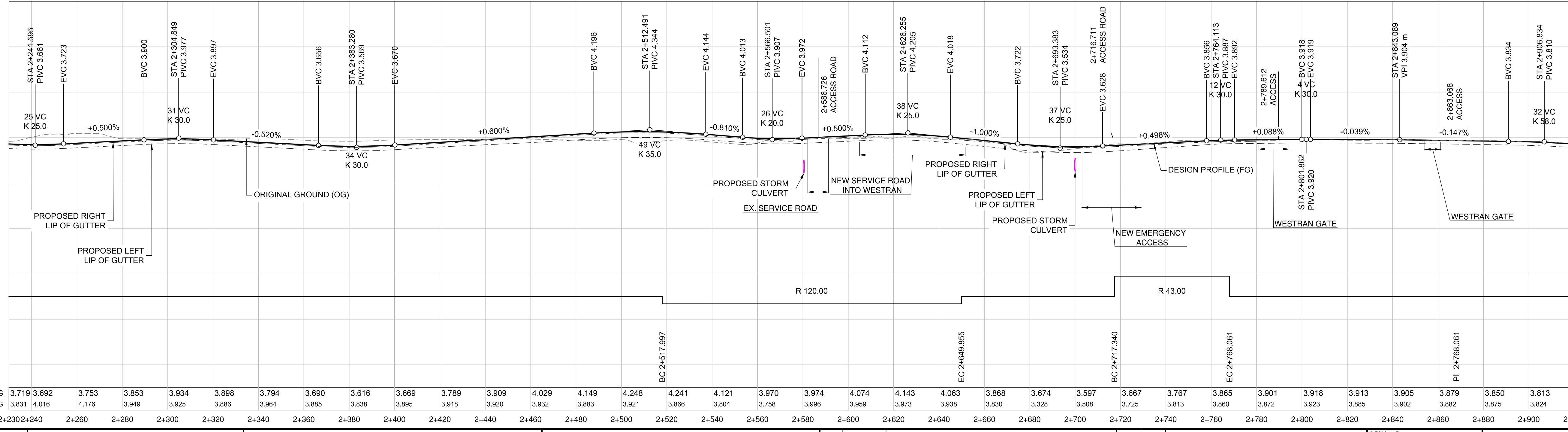
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TIMBERLAND RD S. & TIMBERLAND RD N. & WYE INTERSECTION NEW PAVEMENT CONSTRUCTION	50mm SUPERPAVE 12.5 90mm SUPERPAVE 19 90mm SUPERPAVE 19 70mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) 300mm GRANULAR SUBBASE (75mm MINUS)
BULB (TIMBERLAND N.) PAVEMENT REHABILITATION	50mm SUPERPAVE 12.5 90mm SUPERPAVE 19 70mm SUPERPAVE 19 REMOVE +/- 230mm OF EX. PAVEMENT STRUCTURE
BULB (TIMBERLAND N.) NEW PAVEMENT CONSTRUCTION	50mm SUPERPAVE 12.5 80mm SUPERPAVE 19 40mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) 300mm GRANULAR SUBBASE (75mm MINUS)
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PROPOSED CONCRETE	[Symbol]
CONCRETE ROADSIDE / MEDIAN BARRIER	[Symbol]
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PROPOSED CURB	[Symbol]
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LICENSE/EASEMENT LINE	[Symbol]
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PROPOSED LIGHT POLE	[Symbol]
PROPOSED POWER AND COMMUNICATIONS CONDUITS	[Symbol]

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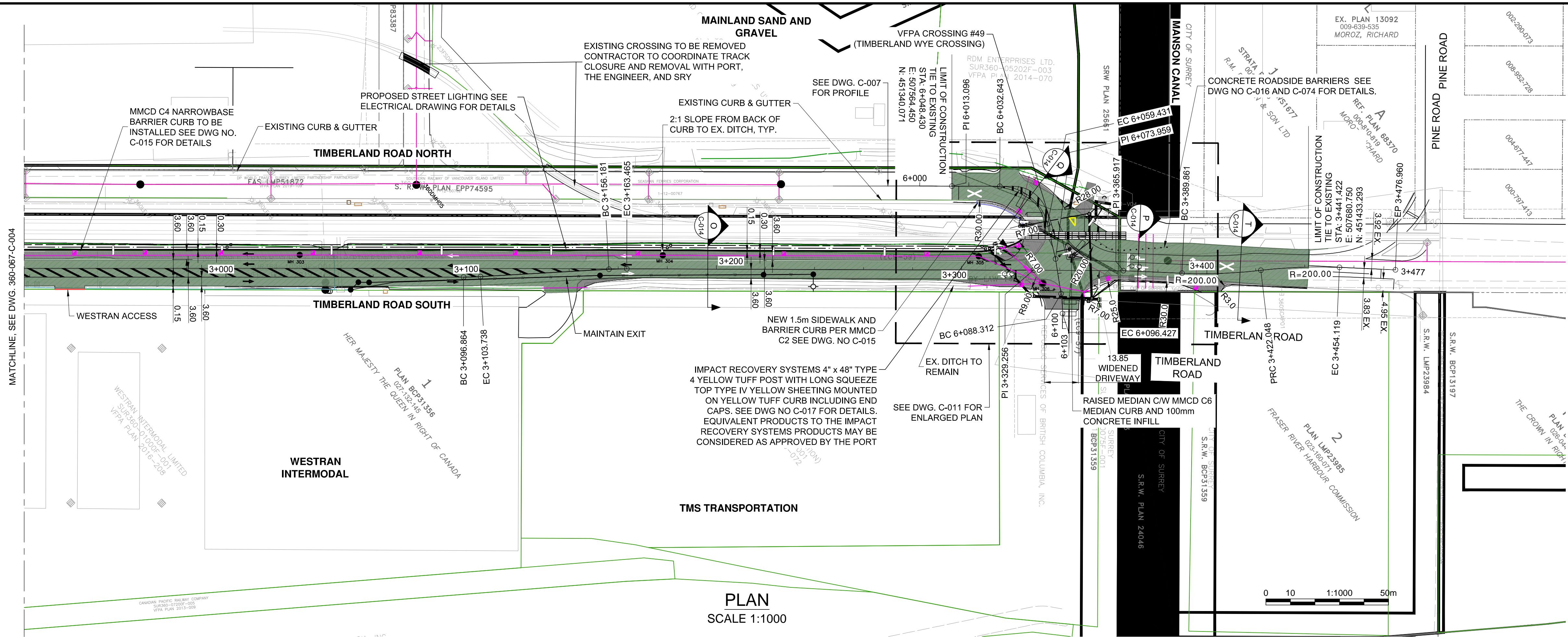


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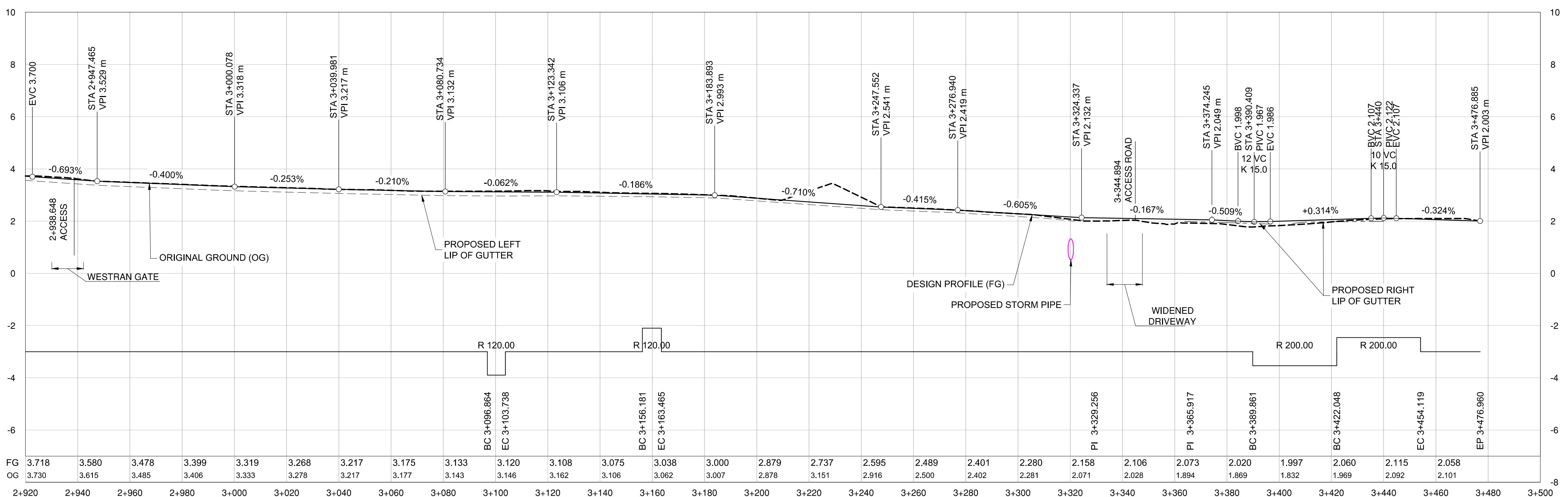
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PROFILE
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TIMBERLAND RD S. & TIMBERLAND RD N. & WYE INTERSECTION NEW PAVEMENT CONSTRUCTION	50mm SUPERPAVE 12.5 90mm SUPERPAVE 19 70mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) 300mm GRANULAR SUBBASE (75mm MINUS)
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REGRADE EX. GRAVEL	
PROPOSED CONCRETE	
CONCRETE ROADSIDE / MEDIAN BARRIER	
PROPOSED TUFF CURB & FLEXIBLE DELINEATORS	
PROPOSED FENCING	
EXISTING FENCING	
PROPOSED CURB	
PROPOSED GUTTER	
ROAD BUFFER	
PROPOSED SIDEWALK	
PROPERTY LINE	
LICENSE/EASEMENT LINE	
STORM & SEWER PIPE	
MAIN WATER PIPE	
EXISTING ROAD CENTERLINE	
EXISTING ROAD	
FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)	
EXISTING BOTTOM OF DITCH (FROM SURVEY)	
DRIVEWAY ACCESS	
SECTION MARKER	
PROPOSED LIGHT POLE	
PROPOSED POWER AND COMMUNICATIONS CONDUITS	

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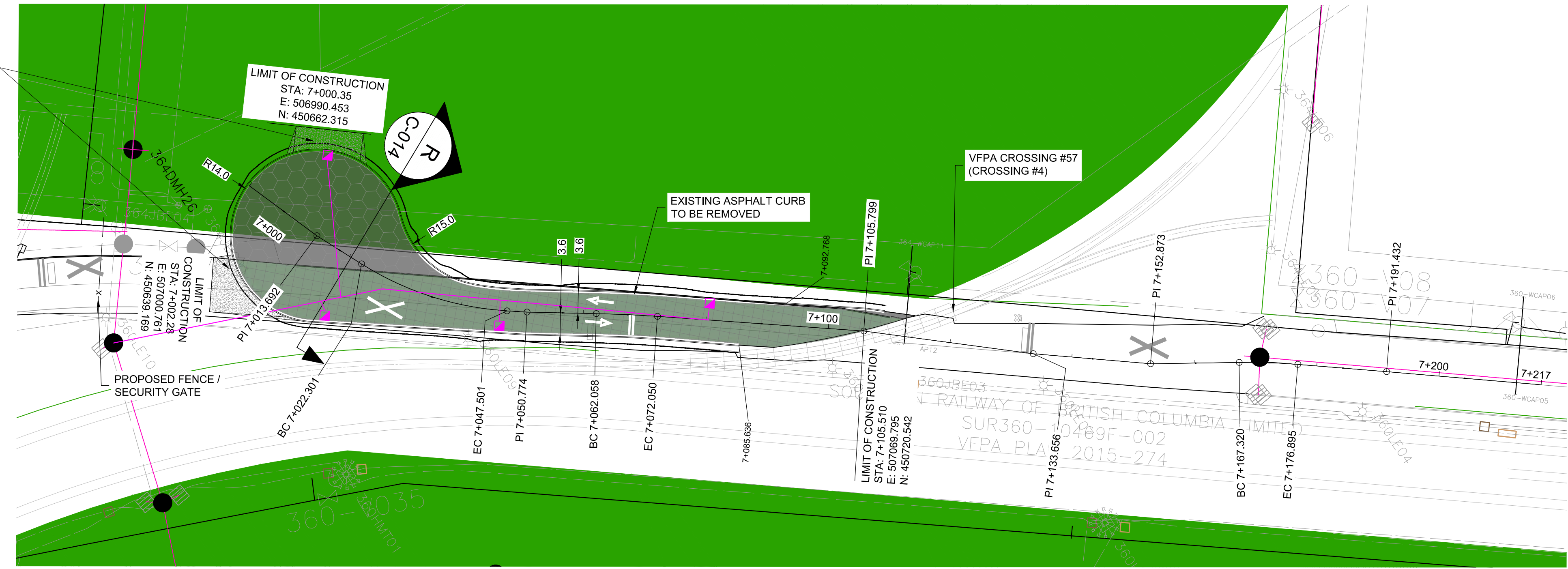
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ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
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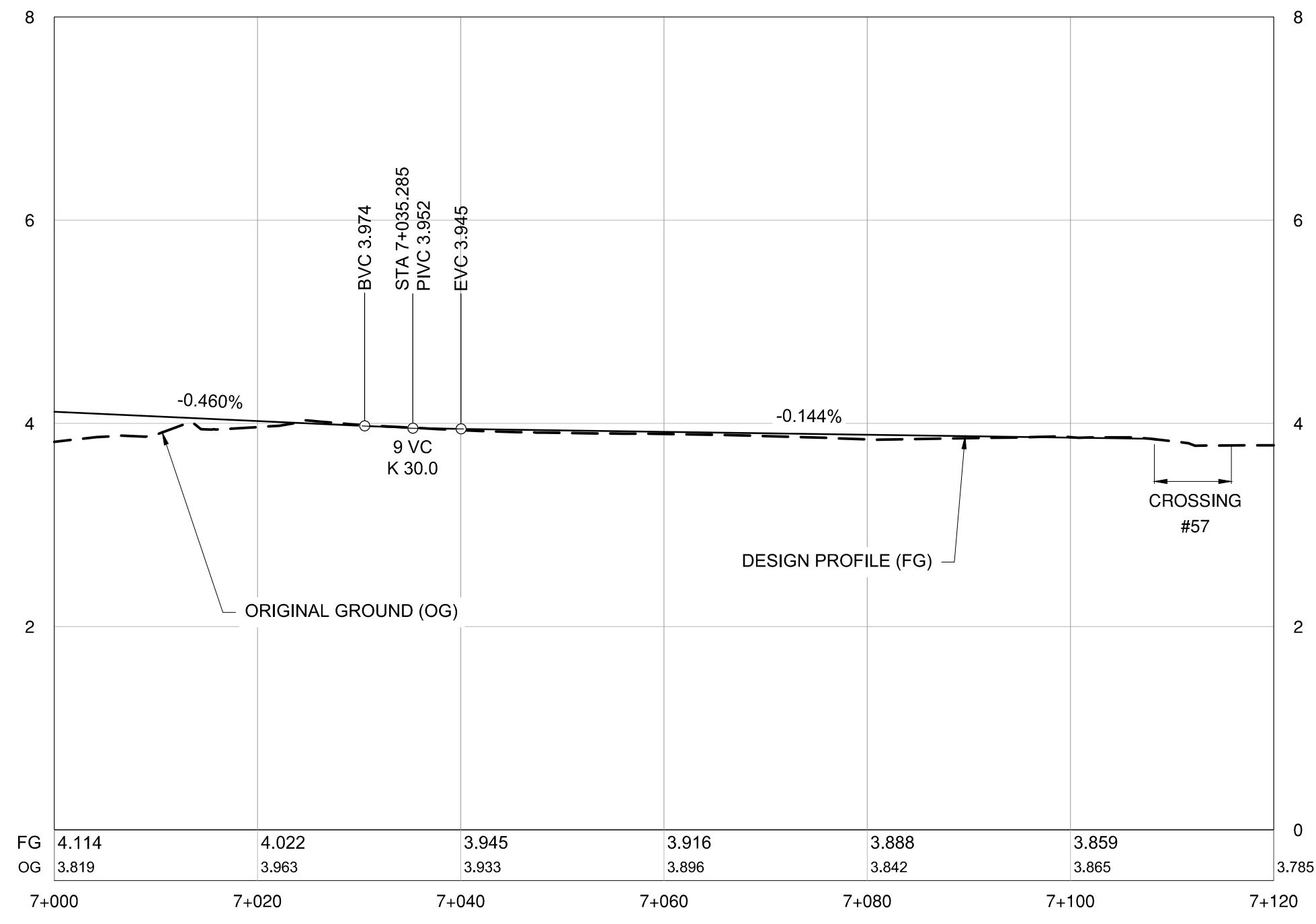
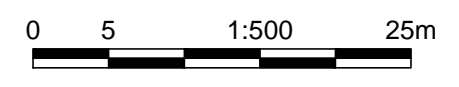
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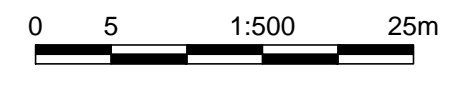
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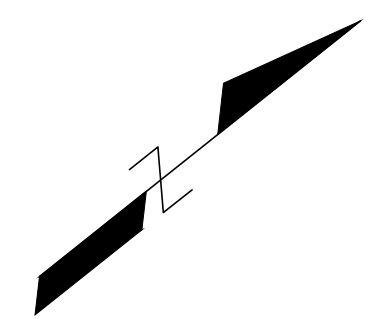


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BULB (TIMBERLAND N.) NEW PAVEMENT CONSTRUCTION		50mm SUPERPAVE 12.5 80mm SUPERPAVE 19 40mm SUPERPAVE 19 300mm GRANULAR BASE (19mm MINUS) 300mm GRANULAR SUBBASE (75mm MINUS)
REGRADE EX. GRAVEL		
PROPOSED CONCRETE		
CONCRETE ROADSIDE / MEDIAN BARRIER		
PROPOSED TUFF CURB & FLEXIBLE DELINEATORS		
PROPOSED FENCING		
EXISTING FENCING		
PROPOSED CURB		
PROPOSED GUTTER		
ROAD BUFFER		
PROPOSED SIDEWALK		
PROPERTY LINE		
LICENSE/EASEMENT LINE		
STORM & SEWER PIPE		
MAIN WATER PIPE		
EXISTING ROAD CENTERLINE		
EXISTING ROAD		
FINISHED GRADE OUTLINE (INCLUDING DITCH AND EMBANKMENT GRADING)		
EXISTING BOTTOM OF DITCH (FROM SURVEY)		
DRIVEWAY ACCESS		
SECTION MARKER		
PROPOSED LIGHT POLE		
PROPOSED POWER AND COMMUNICATIONS CONDUITS		



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B	2022/05/13	ISSUED FOR 99% DESIGN	RC	MJ
A	2022/03/25	ISSUED FOR 90% DESIGN	RC	MJ



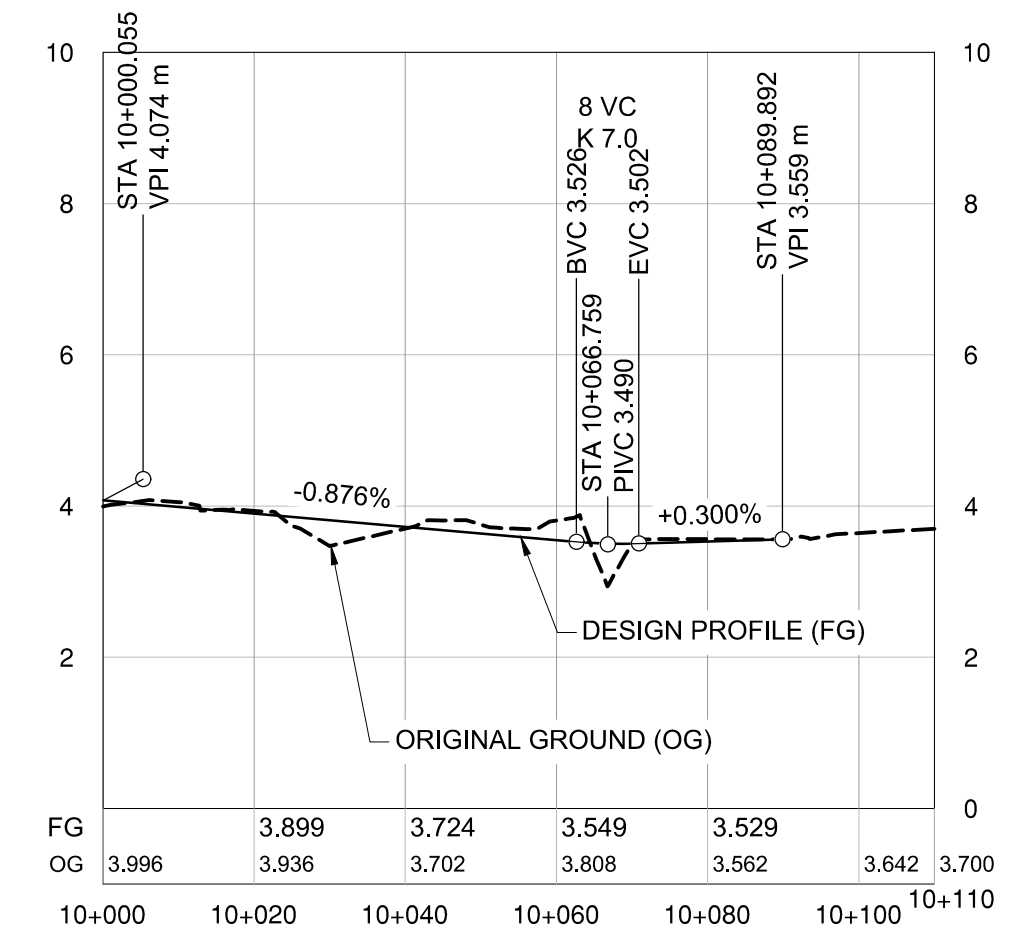
VANCOUVER FRASER PORT AUTHORITY
ENGINEERING DEPARTMENT

DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/03/25
SCALE	1:500
PMV SITE	----

GREATER VANCOUVER GATEWAY 2030
FSPL TRANSPORTATION IMPROVEMENTS
PLAN & PROFILE
CUL-DE-SAC

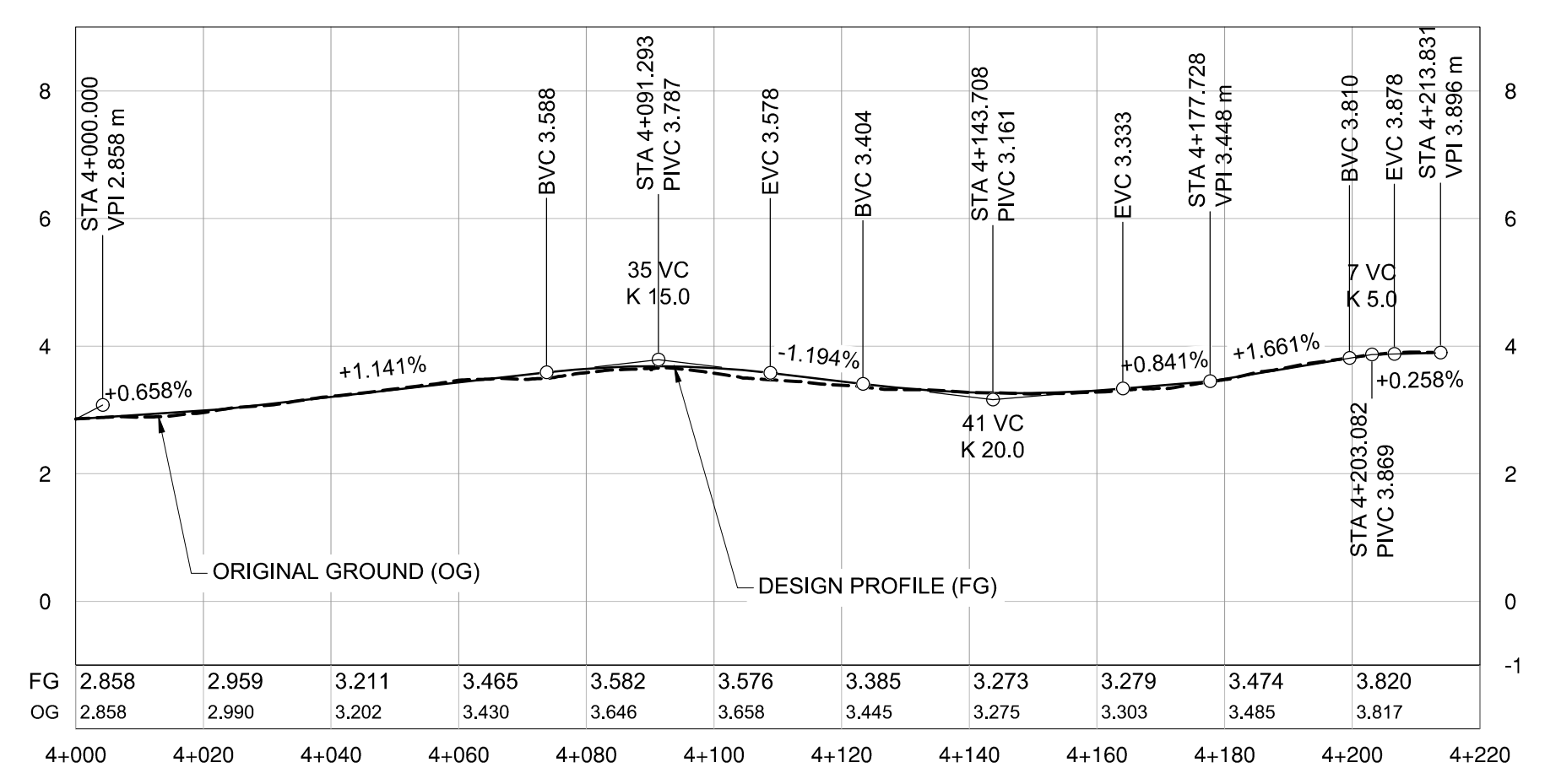
Ref.No.	REFERENCE
2	VFPA PROJECT NO. 360-067
1	WSP PROJECT NO. 20M-00758-00

SIZE	DWG.	360-067-C-006	SHEET	6 of 69	REV.	B
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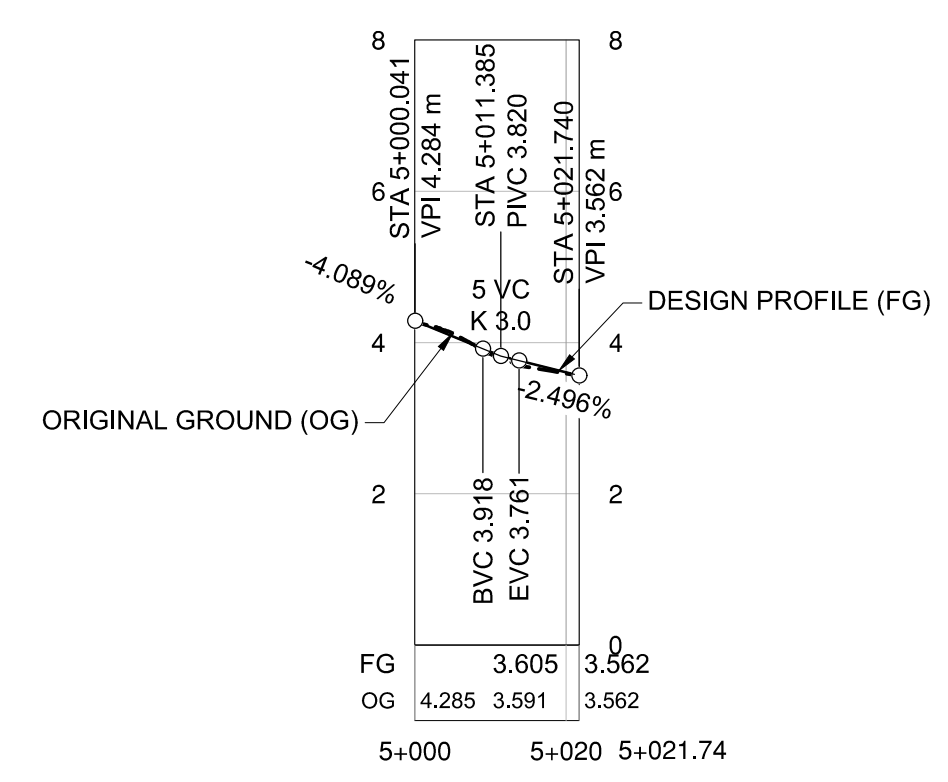
WESTERN BACK ACCESS
 FOR ROAD PLAN SEE DWG. C-003

PROFILE
 SCALE H 1:1000 V 1:100



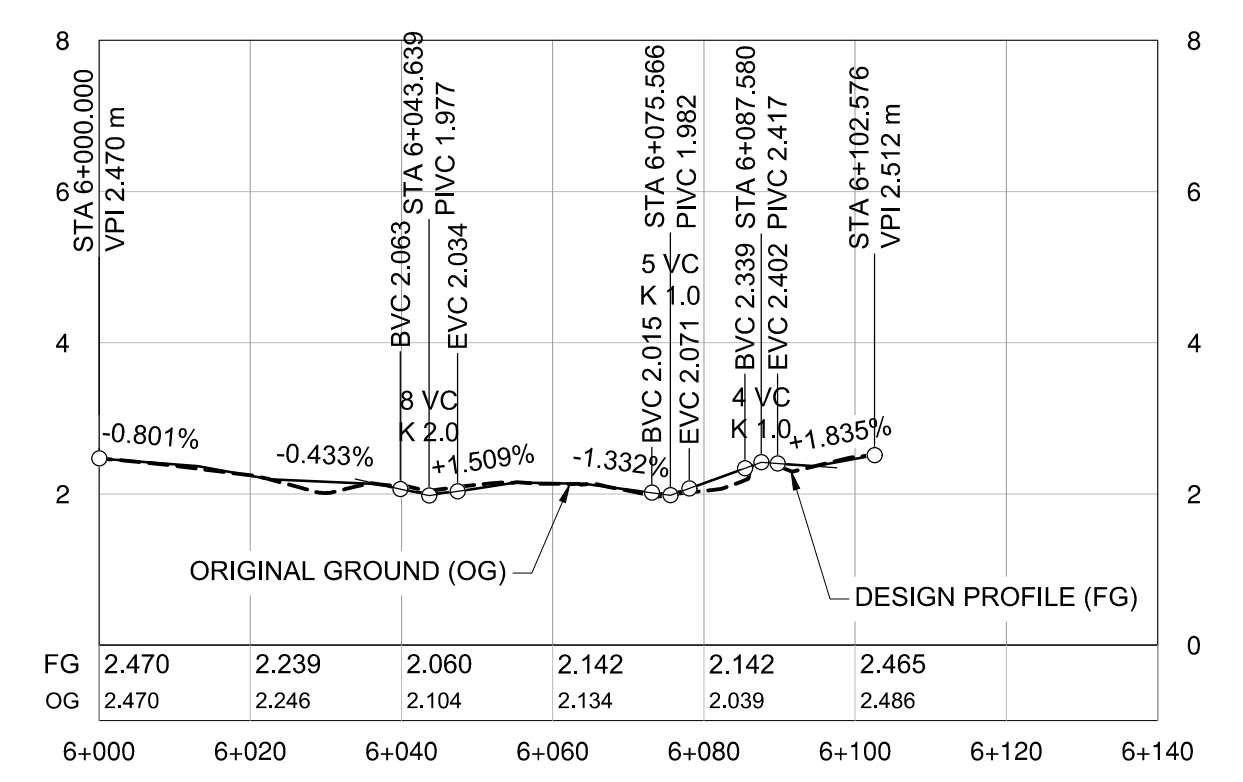
ELEVATOR SOUTH BOUND ROAD
 FOR ROAD PLAN SEE DWG. C-002

PROFILE
 SCALE H 1:1000 V 1:100



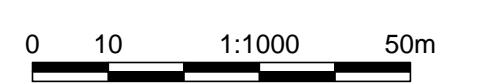
GUNDERSON ROAD
 FOR ROAD PLAN SEE DWG. C-002

PROFILE
 SCALE H 1:1000 V 1:100



WYE JUNCTION
 FOR ROAD PLAN SEE DWG. C-004

PROFILE
 SCALE H 1:1000 V 1:100



**NOT FOR
 CONSTRUCTION**
 March 25, 2022



No.	Date	REVISION	Dr'n	Ch'd
B	2022/05/13	ISSUED FOR 99% DESIGN	RC	MJ
A	2022/03/25	ISSUED FOR 90% DESIGN	RC	MJ



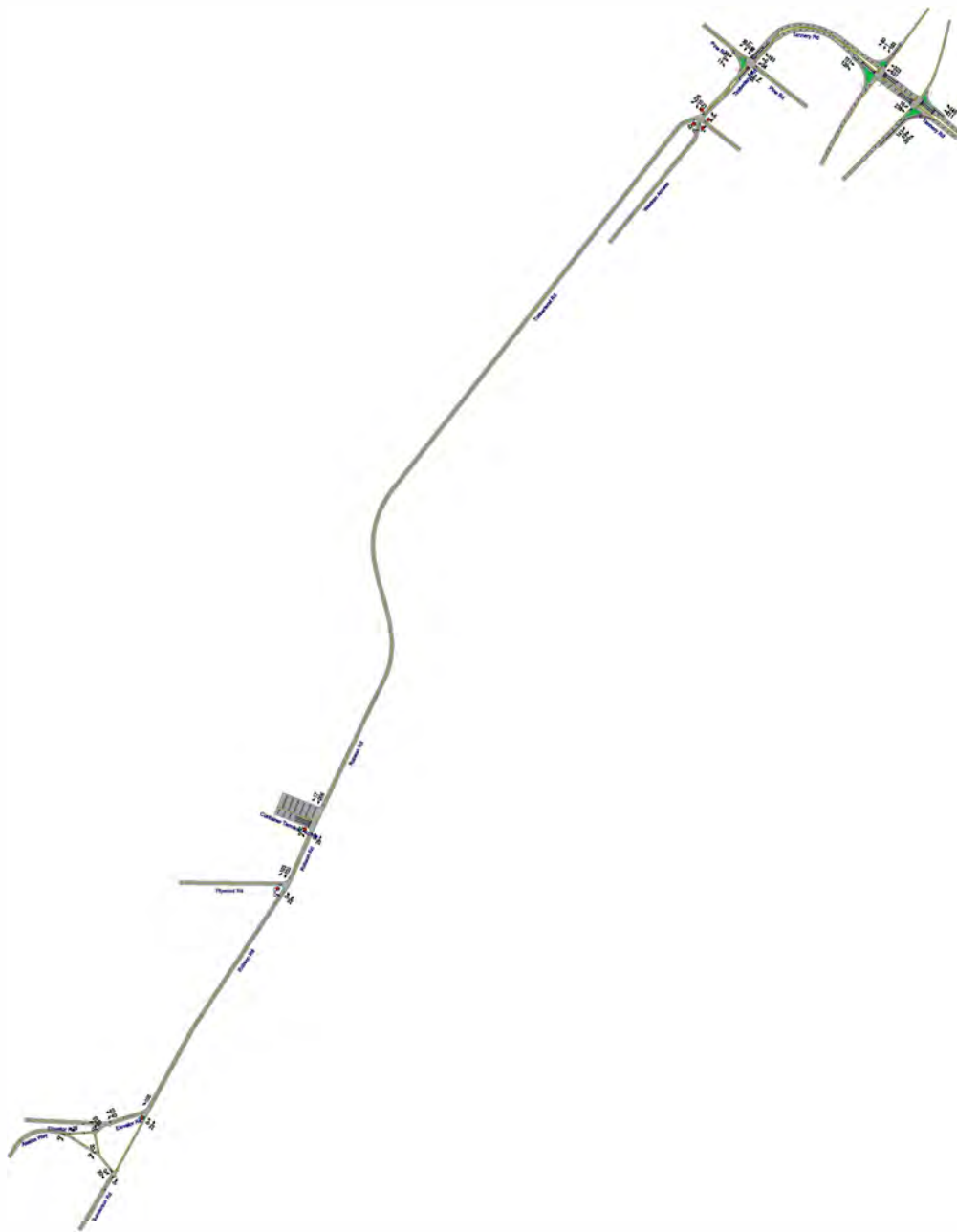
DESIGN BY	R.CHANG
DRAWN BY	I.LOZADA
APPROVED	M.JACKSON
DATE	2022/05/13
SCALE	1:1000
PMV SITE	----

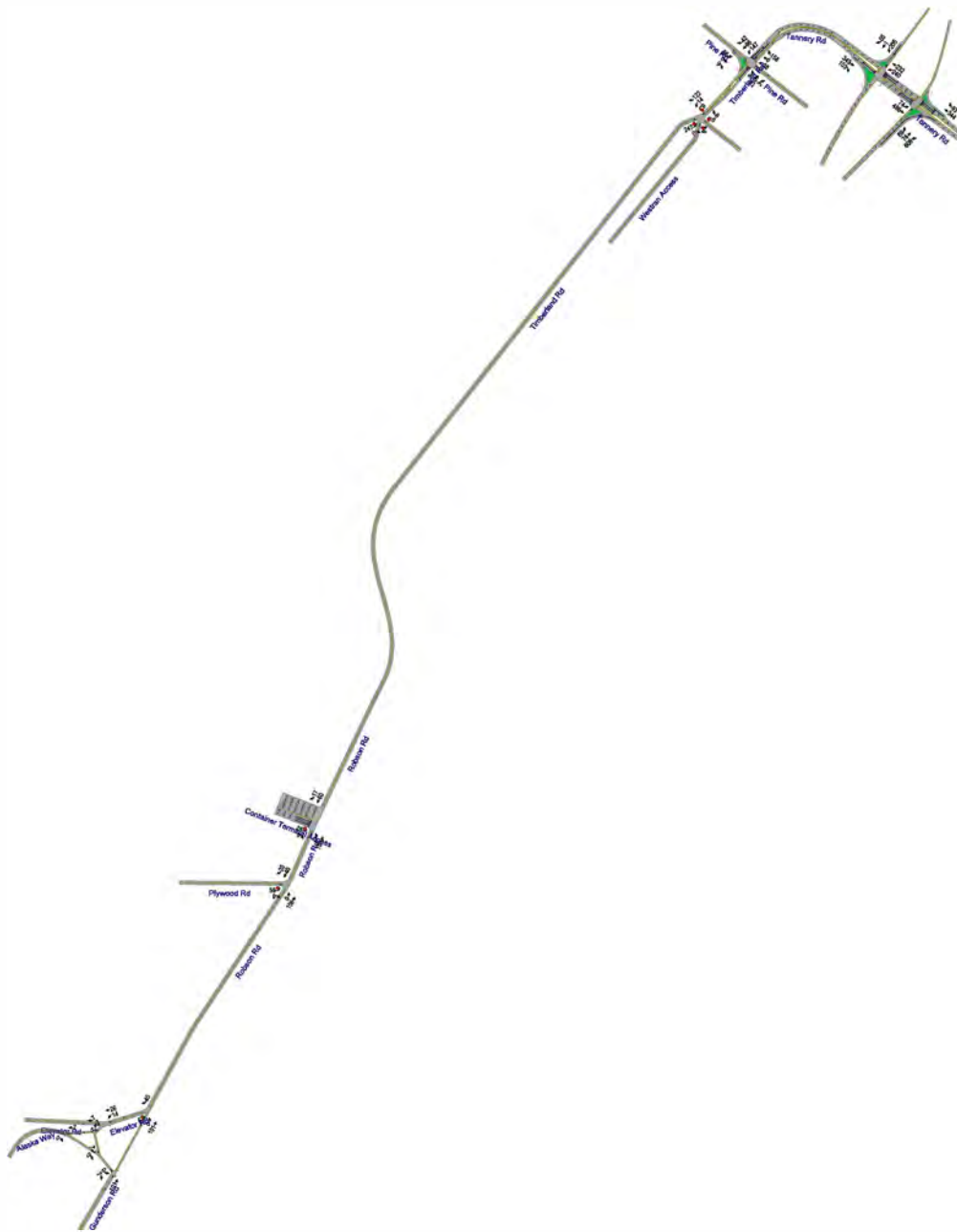
GREATER VANCOUVER GATEWAY 2030 FSPL TRANSPORTATION IMPROVEMENTS PROFILE FOR WESTRAN ACCESS, ELEVATOR SOUTH BOUND ROAD, GUNDERSON ROAD & WYE JUNCTION	
SIZE	DWG. 360-067-C-007
SHEET	7 of 69
REV.	B

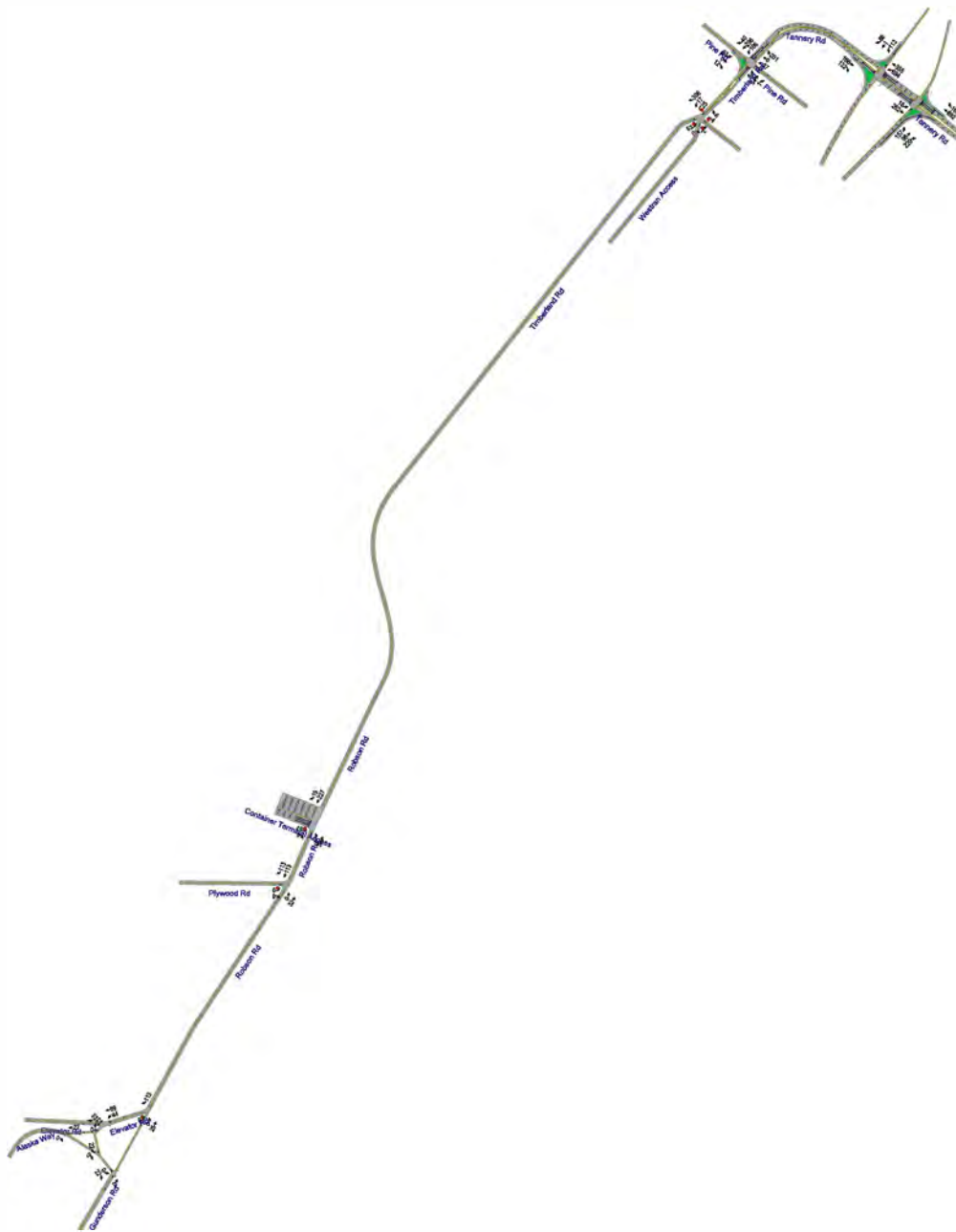
Ref.No.	REFERENCE
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1	WSP PROJECT NO. 20M-00758-00

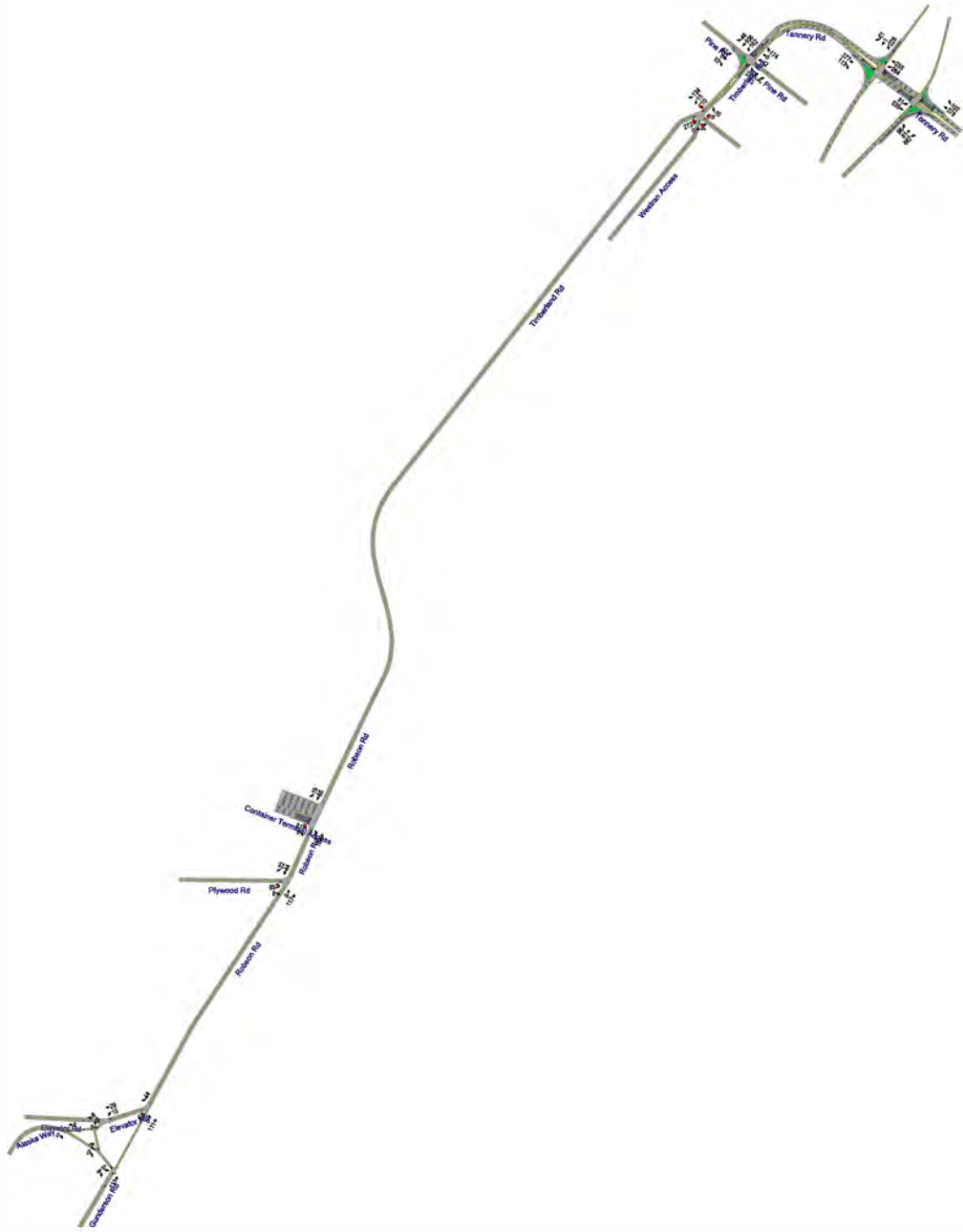
Appendix B AM and PM Peak Hour Traffic Volumes

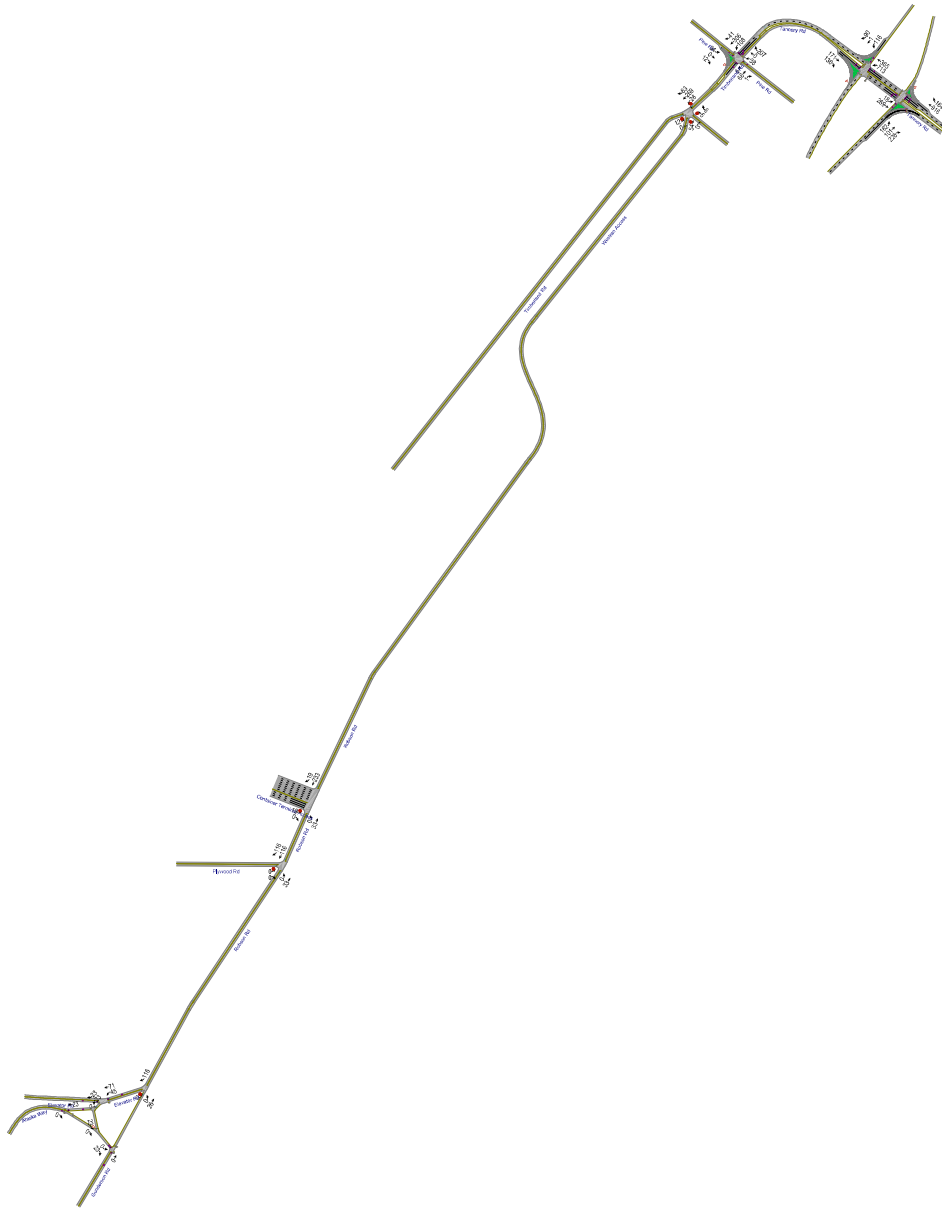


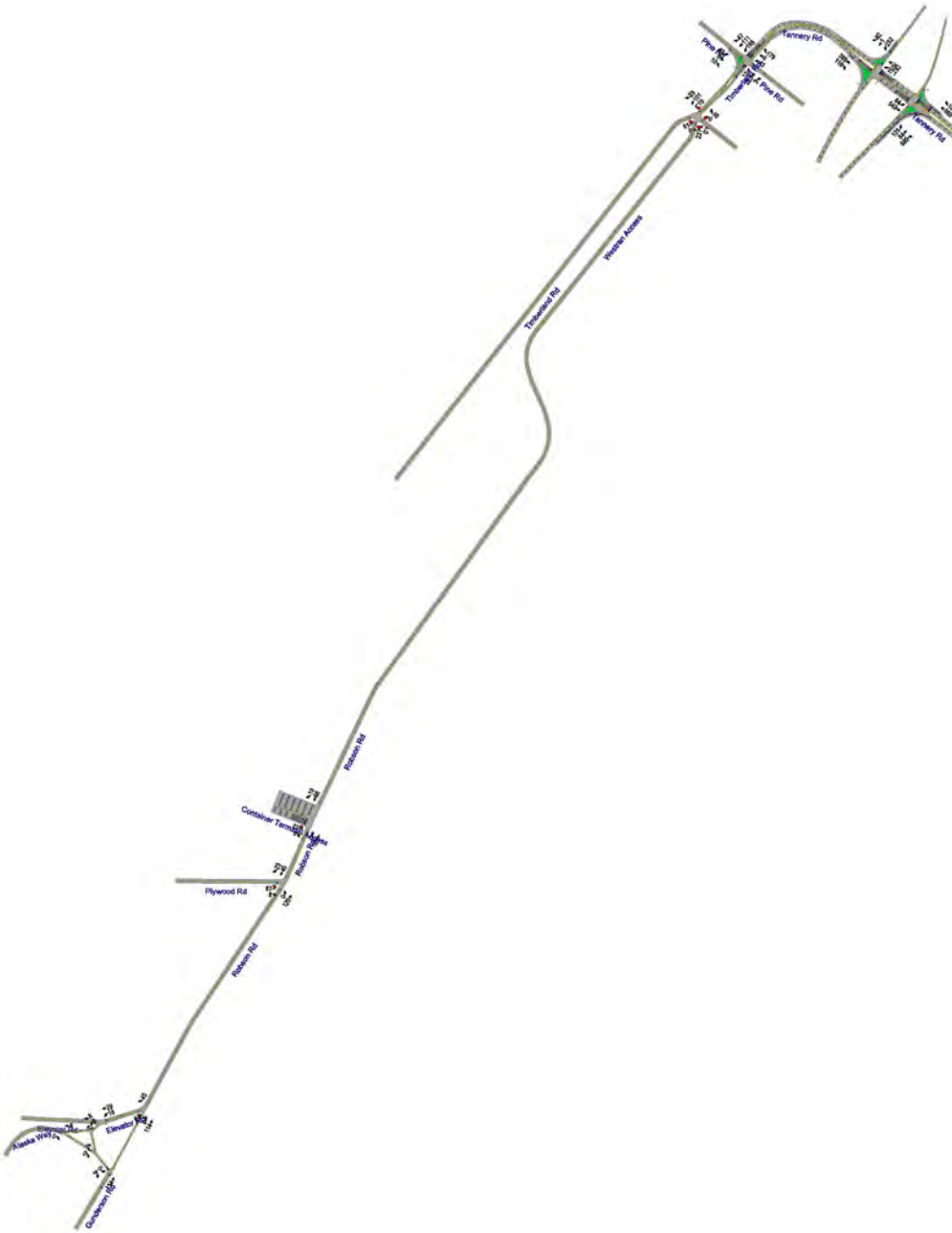


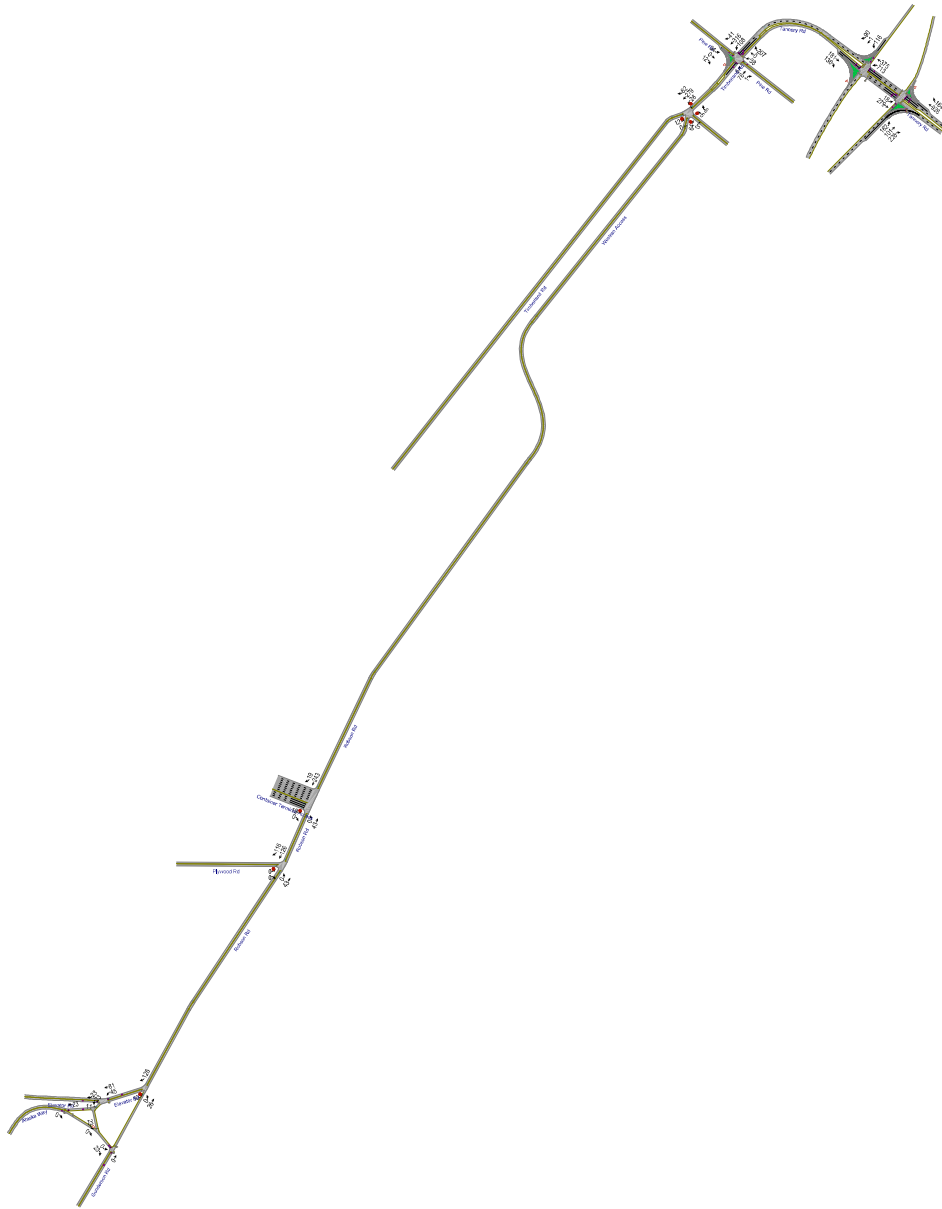


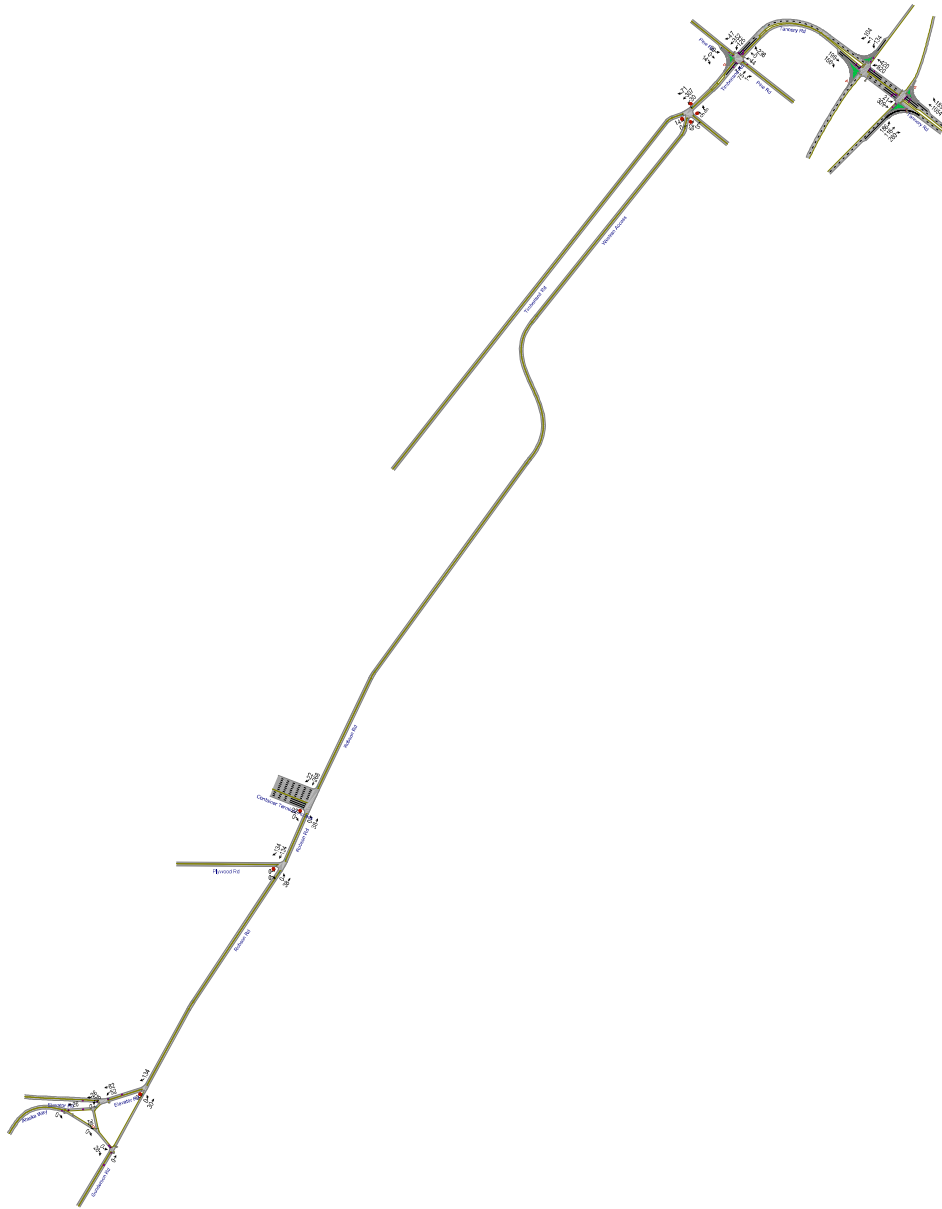


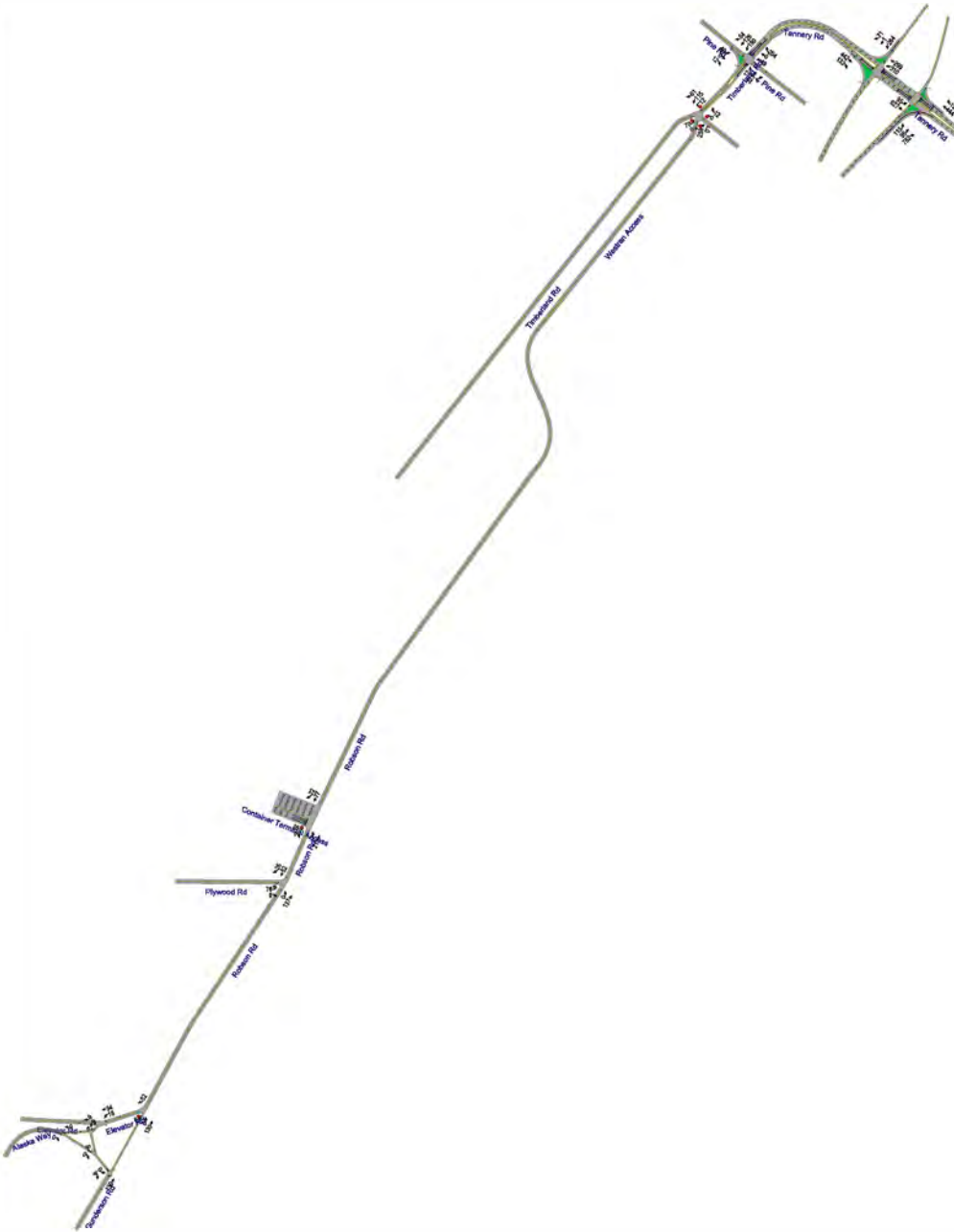


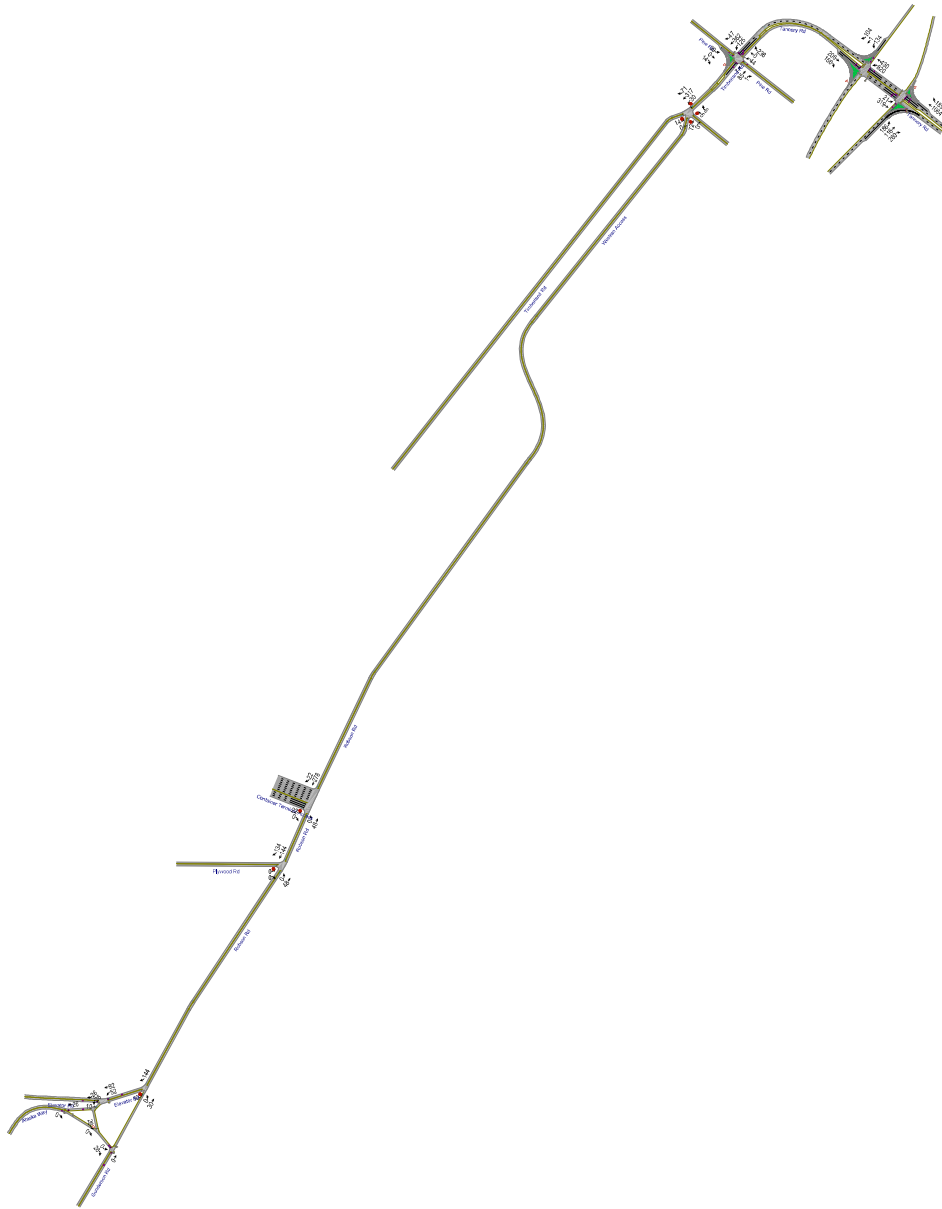


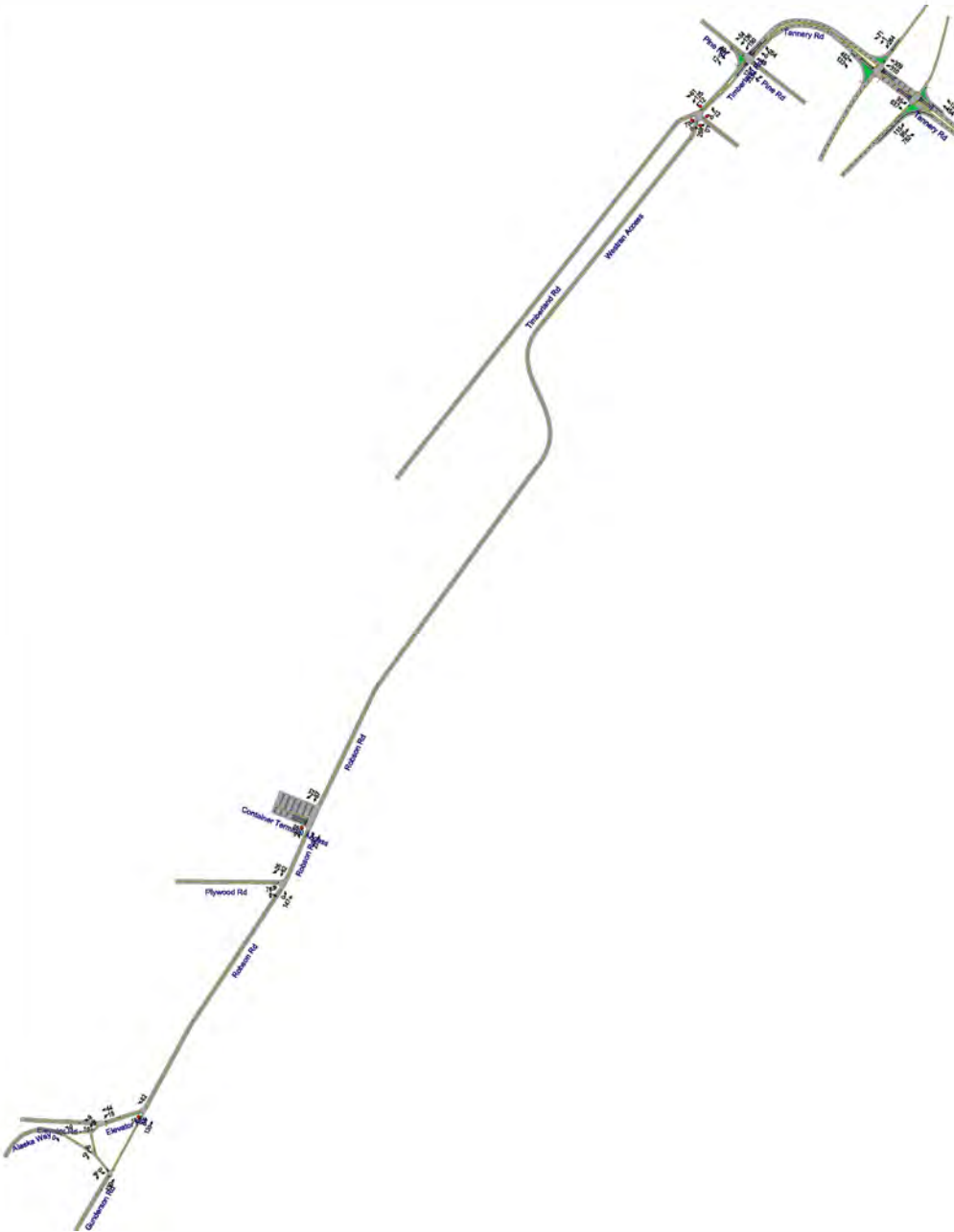












Appendix C Synchro Output Summaries



Synchro Analysis - Performance Summary

Hwy 17 SB On-Off Ramps & Tannery				Turning Movements													
Peak Hour	Case	Int. Delay (sec/veh)	Int. LOS		SBL	SBT	SBR	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR	
AM	2022	22.6	C	<i>v/c</i>	0.72	0.72	0.43					0.20	0.37	0.77	0.43		
				LOS	D	D	B					C	A	C	A		
	2023	24.1	C	<i>v/c</i>	0.67	0.67	0.41					0.21	0.38	0.83	0.45		
				LOS	D	D	A					C	A	D	B		
	2023 w/ Development	24.1	C	<i>v/c</i>	0.67	0.67	0.41					0.22	0.38	0.83	0.47		
				LOS	D	D	A					C	A	D	B		
	2030	31.1	C	<i>v/c</i>	0.74	0.74	0.44					0.27	0.46	0.87	0.52		
				LOS	D	D	A					C	A	D	B		
	2030 w/ Development	31.1	C	<i>v/c</i>	0.74	0.74	0.44					0.28	0.46	0.87	0.54		
				LOS	D	D	A					C	A	D	B		
PM	2022	21.3	C	<i>v/c</i>	0.75	0.75	0.26					0.36	0.31	0.58	0.36		
				LOS	D	D	A					B	A	D	B		
	2023	20.9	C	<i>v/c</i>	0.73	0.73	0.25					0.39	0.33	0.59	0.38		
				LOS	D	D	A					B	A	D	B		
	2023 w/ Development	21	C	<i>v/c</i>	0.73	0.73	0.25					0.40	0.33	0.59	0.40		
				LOS	D	D	A					B	A	D	B		
	2030	22.9	C	<i>v/c</i>	0.77	0.77	0.26					0.47	0.38	0.65	0.45		
				LOS	D	D	A					C	A	D	B		
	2030 w/ Development	23	C	<i>v/c</i>	0.77	0.77	0.26					0.48	0.38	0.65	0.46		
				LOS	D	D	A					C	A	D	B		

Notes: In red: LOS E or F, *v/c* > 0.85

Synchro Analysis - Performance Summary

Hwy 17 NB On-Off Ramps & Tannery				Turning Movements												
Peak Hour	Case	Int. Delay (sec/veh)	Int. LOS		SBL	SBT	SBR	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR
AM	2022	18.1	B	v/c				0.86	0.86	0.31	0.29	0.17			0.39	0.34
				LOS				D	D	A	D	A			B	A
	2023	16.6	B	v/c				0.77	0.77	0.29	0.28	0.19			0.42	0.36
				LOS				D	D	A	D	B			B	A
	2023 w/ Development	16.6	B	v/c				0.77	0.77	0.29	0.28	0.20			0.43	0.36
				LOS				D	D	A	D	B			B	A
	2030	19	B	v/c				0.82	0.82	0.31	0.34	0.23			0.54	0.43
				LOS				D	D	A	D	B			C	A
	2030 w/ Development	19	B	v/c				0.82	0.82	0.31	0.34	0.23			0.54	0.43
				LOS				D	D	A	D	B			C	A
PM	2022	27.2	C	v/c				0.43	0.43	0.91	0.70	0.44			0.38	0.26
				LOS				C	C	C	E	B			C	A
	2023	27.4	C	v/c				0.38	0.38	0.87	0.70	0.52			0.52	0.33
				LOS				B	B	C	E	C			C	A
	2023 w/ Development	27.7	C	v/c				0.38	0.38	0.87	0.70	0.53			0.53	0.33
				LOS				B	B	C	E	C			C	A
	2030	37.1	D	v/c				0.40	0.40	0.95	0.80	0.65			0.70	0.40
				LOS				B	B	D	E	D			D	A
	2030 w/ Development	38.3	D	v/c				0.40	0.40	0.95	0.80	0.66			0.72	0.40
				LOS				B	B	D	E	D			D	A

Notes: In red: LOS E or F, v/c > 0.85

Synchro Analysis - Performance Summary

Pine Rd & Tannery - Timberland				Turning Movements												
Peak Hour	Case	Int. Delay (sec/veh)	Int. LOS		SBL	SBT	SBR	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR
AM	2022	21.9	C	v/c	0.82	0.83	0.14	0.05	0.13	0.13	0.60	0.60	0.04	0.89	0.89	0.89
				LOS	C	C	A	A	A	A	D	D	A	B	B	B
	2023	24.2	C	v/c	0.84	0.84	0.15	0.05	0.13	0.13	0.64	0.64	0.05	0.91	0.91	0.91
				LOS	C	C	A	A	A	A	D	D	A	C	C	C
	2023 w/ Development	24.9	C	v/c	0.84	0.87	0.15	0.05	0.15	0.15	0.65	0.64	0.05	0.91	0.91	0.91
				LOS	C	C	A	A	A	A	D	D	A	C	C	C
	2030	47.2	D	v/c	0.93	0.93	0.16	0.06	0.14	0.14	0.83	0.83	0.05	1.06	1.06	1.06
				LOS	D	D	A	A	A	A	E	E	A	E	E	E
	2030 w/ Development	48.5	D	v/c	0.94	0.96	0.16	0.07	0.16	0.16	0.83	0.83	0.05	1.06	1.06	1.06
				LOS	D	D	A	A	A	A	E	E	A	E	E	E
PM	2022	15.8	B	v/c	0.85	0.31	0.12	0.04	0.46	0.46	0.18	0.18	0.04	0.64	0.64	0.64
				LOS	D	B	A	A	B	B	B	B	A	A	A	A
	2023	16.3	B	v/c	0.86	0.31	0.12	0.04	0.46	0.46	0.20	0.20	0.04	0.67	0.67	0.67
				LOS	D	B	A	A	B	B	B	B	A	B	B	B
	2023 w/ Development	16.9	B	v/c	0.87	0.33	0.12	0.04	0.47	0.47	0.20	0.20	0.04	0.68	0.68	0.68
				LOS	D	B	A	A	B	B	B	B	A	B	B	B
	2030	22.8	C	v/c	0.93	0.31	0.12	0.04	0.46	0.46	0.29	0.29	0.05	0.84	0.84	0.84
				LOS	D	B	A	A	B	B	B	B	A	C	C	C
	2030 w/ Development	23.5	C	v/c	0.95	0.33	0.12	0.04	0.47	0.47	0.30	0.30	0.05	0.84	0.84	0.84
				LOS	D	B	A	A	B	B	B	B	A	C	C	C

Notes: In red: LOS E or F, v/c > 0.85

Synchro Analysis - Performance Summary

Timberland Y South of Pine Rd				Turning Movements												
Peak Hour	Case	Int. Delay (sec/veh)	Int. LOS		SBL	SBT	SBR	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR
AM	2022	13.4	B	v/c	0.61	0.61	0.61		0.02	0.02	0.16				0.03	0.03
				LOS	B	B	B		A	A	B				A	A
	2023	24.9	C	v/c	0.86	0.86	0.86		0.39	0.39	0.04	0.04			0.04	0.04
				LOS	D	D	D		B	B	B	B			B	B
	2023 w/ Development	22.7	C	v/c	0.89	0.89	0.89		0.46	0.46	0.04	0.04			0.04	0.04
				LOS	D	D	D		C	C	B	B			B	B
	2030	33.3	D	v/c	1.00	1.00	1.00		0.46	0.46	0.04	0.04			0.04	0.04
				LOS	F	F	F		C	C	B	B			B	B
	2030 w/ Development	33.3	D	v/c	1.03	1.03	1.03		0.53	0.53	0.04	0.04			0.04	0.04
				LOS	F	F	F		C	C	B	B			B	B
PM	2022	20.1	C	v/c	0.46	0.46	0.46		0.04	0.04	0.78				0.03	0.03
				LOS	B	B	B		B	B	C				A	A
	2023	18.5	C	v/c	0.45	0.45	0.45		0.74	0.74	0.21	0.21			0.03	0.03
				LOS	B	B	B		C	C	B	B			A	A
	2023 w/ Development	18.5	C	v/c	0.48	0.48	0.48		0.78	0.78	0.22	0.22			0.03	0.03
				LOS	B	B	B		D	D	B	B			A	A
	2030	18.5	C	v/c	0.54	0.54	0.54		0.86	0.86	0.26	0.26			0.04	0.04
				LOS	C	C	C		E	E	B	B			A	A
	2030 w/ Development	18.5	C	v/c	0.57	0.57	0.57		0.91	0.91	0.26	0.26			0.04	0.04
				LOS	C	C	C		E	E	B	B			A	A

Notes: In red: LOS E or F, v/c > 0.85

Synchro Analysis - Performance Summary

Container Access / Robson Rd				Turning Movements												
Peak Hour	Case	Int. Delay (sec/veh)	Int. LOS		SBL	SBT	SBR	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR
AM	2022	0.8	A	<i>v/c</i>		0.18	0.18	0.00	0.00		0.02		0.02			
				LOS		A	A	A	A		B		B			
	2023	0.8	A	<i>v/c</i>		0.18	0.18	0.00	0.00		0.02		0.02			
				LOS		A	A	A	A		B		B			
	2023 w/ Development	0.8	A	<i>v/c</i>		0.19	0.19	0.00	0.00		0.02		0.02			
				LOS		A	A	A	A		B		B			
	2030	0.8	A	<i>v/c</i>		0.21	0.21	0.00	0.00		0.03		0.03			
				LOS		A	A	A	A		B		B			
	2030 w/ Development	0.8	A	<i>v/c</i>		0.22	0.22	0.00	0.00		0.03		0.03			
				LOS		A	A	A	A		B		B			
PM	2022	1.3	A	<i>v/c</i>		0.05	0.05	0.00	0.00		0.04		0.04			
				LOS		A	A	A	A		B		B			
	2023	1.3	A	<i>v/c</i>		0.06	0.06	0.00	0.00		0.04		0.04			
				LOS		A	A	A	A		B		B			
	2023 w/ Development	1.3	A	<i>v/c</i>		0.06	0.06	0.00	0.00		0.04		0.04			
				LOS		A	A	A	A		B		B			
	2030	1.4	A	<i>v/c</i>		0.06	0.06	0.00	0.00		0.05		0.05			
				LOS		A	A	A	A		B		B			
	2030 w/ Development	1.4	A	<i>v/c</i>		0.07	0.07	0.00	0.00		0.05		0.05			
				LOS		A	A	A	A		B		B			

Notes: In red: LOS E or F, v/c > 0.85

Synchro Analysis - Performance Summary

Plywood Rd / Robson Rd				Turning Movements												
Peak Hour	Case	Int. Delay (sec/veh)	Int. LOS		SBL	SBT	SBR	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR
AM	2022	0	A	<i>v/c</i>		0.16	0.16	0.00	0.00		-		-			
				LOS		A	A	A	A		-		-			
	2023	0	A	<i>v/c</i>		0.17	0.17	0.00	0.00		-		-			
				LOS		A	A	A	A		-		-			
	2023 w/ Development	0	A	<i>v/c</i>		0.17	0.17	0.00	0.00		-		-			
				LOS		A	A	A	A		-		-			
	2030	0	A	<i>v/c</i>		0.19	0.19	0.00	0.00		-		-			
				LOS		A	A	A	A		-		-			
	2030 w/ Development	0	A	<i>v/c</i>		0.20	0.20	0.00	0.00		-		-			
				LOS		A	A	A	A		-		-			
PM	2022	3	A	<i>v/c</i>		0.05	0.05	0.00	0.00		0.13		0.13			
				LOS		A	A	A	A		B		B			
	2023	3	A	<i>v/c</i>		0.05	0.05	0.00	0.00		0.13		0.13			
				LOS		A	A	A	A		B		B			
	2023 w/ Development	3	A	<i>v/c</i>		0.06	0.06	0.00	0.00		0.14		0.14			
				LOS		A	A	A	A		B		B			
	2030	3.2	A	<i>v/c</i>		0.06	0.06	0.00	0.00		0.16		0.16			
				LOS		A	A	A	A		B		B			
	2030 w/ Development	3.2	A	<i>v/c</i>		0.07	0.07	0.00	0.00		0.17		0.17			
				LOS		A	A	A	A		B		B			

Notes: In red: LOS E or F, v/c > 0.85

Synchro Analysis - Performance Summary

Elevator Rd / Robson Rd				Turning Movements												
Peak Hour	Case	Int. Delay (sec/veh)	Int. LOS		SBL	SBT	SBR	NBL	NBT	NBR	EBL	EBT	EBR	WBL	WBT	WBR
AM	2022	0	A	v/c			0.08	0.00	0.00		-					
				LOS			A	A	A		-					
	2023	0	A	v/c			0.08	0.00	0.00		-					
				LOS			A	A	A		-					
	2023 w/ Development	0	A	v/c			0.09	0.00	0.00		0.01					
				LOS			A	A	A		A					
	2030	0	A	v/c			0.10	0.00	0.00		-					
				LOS			A	A	A		-					
	2030 w/ Development	0	A	v/c			0.10	0.00	0.00		0.01					
				LOS			A	A	A		A					
PM	2022	0.3	A	v/c			0.03	0.00	0.00		0.01					
				LOS			A	A	A		A					
	2023	0.3	A	v/c			0.03	0.00	0.00		0.01					
				LOS			A	A	A		A					
	2023 w/ Development	0.3	A	v/c			0.04	0.00	0.00		0.03					
				LOS			A	A	A		A					
	2030	0.3	A	v/c			0.04	0.00	0.00		0.01					
				LOS			A	A	A		A					
	2030 w/ Development	0.3	A	v/c			0.05	0.00	0.00		0.03					
				LOS			A	A	A		B					

Notes: In red: LOS E or F, v/c > 0.85

Appendix D Synchro Output Plots



Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramps

06/10/2022

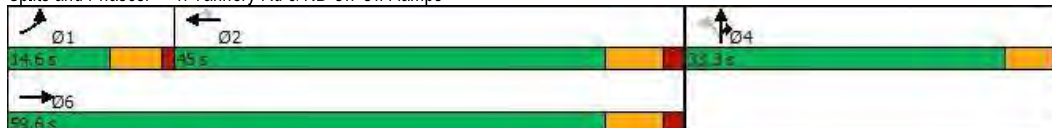


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗			↗	↗		↗	↗			
Traffic Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0
Future Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Friction							0.850			0.850		
Fit Protected	0.950								0.969			
Satd. Flow (prot)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Fit Permitted	0.950								0.969			
Satd. Flow (perm)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Satd. Flow (RTOR)							269					274
Adj. Flow (vph)	28	267	0	0	854	269	199	109	274	0	0	0
Lane Group Flow (vph)	28	267	0	0	854	269	0	308	274	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	1	6			2			4	4			
Permitted Phases						2	4					
Detector Phase	1	6			2	2	4	4	4			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	11.6	28.0			25.0	25.0	23.3	23.3	23.3			
Total Split (s)	14.6	59.6			45.0	45.0	33.3	33.3	33.3			
Total Split (%)	15.7%	64.2%			48.4%	48.4%	35.8%	35.8%	35.8%			
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3			
All-Red Time (s)	1.1	2.0			2.0	2.0	1.0	1.0	1.0			
Lost Time Adjust (s)	0.0	0.0			0.0	0.0			0.0			
Total Lost Time (s)	5.6	7.0			7.0	7.0			5.3			
Lead/Lag	Lead				Lag		Lag					
Lead-Lag Optimize?	Yes				Yes		Yes					
Recall Mode	None	Max			Max	Max	None	None	None			
Act Effct Green (s)	7.4	52.8			47.3	47.3		22.9	22.9			
Actuated g/C Ratio	0.08	0.60			0.54	0.54		0.26	0.26			
v/c Ratio	0.26	0.15			0.32	0.30		0.83	0.30			
Control Delay	45.4	8.8			14.0	3.3		50.4	4.1			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	45.4	8.8			14.0	3.3		50.4	4.1			
LOS	D	A			B	A		D	A			
Approach Delay	12.2								28.6			
Approach LOS	B								C			
Queue Length 50th (m)	4.6	10.0			24.6	0.0		48.9	0.0			
Queue Length 95th (m)	8.0	16.8			49.8	0.0		69.2	3.5			
Internal Link Dist (m)	63.8								180.4		150.3	
Turn Bay Length (m)					50.0				91.4			
Base Capacity (vph)	129	1810			2636	908		455	1044			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.22	0.15			0.32	0.30		0.68	0.26			

Intersection Summary

Cycle Length: 92.9
 Actuated Cycle Length: 88
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 16.5
 Intersection Capacity Utilization 48.2%
 Intersection LOS: B
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1: Tannery Rd & NB On-Off Ramps



Lanes, Volumes, Timings
2: Tannery Rd & SB On-Off Ramp

06/10/2022

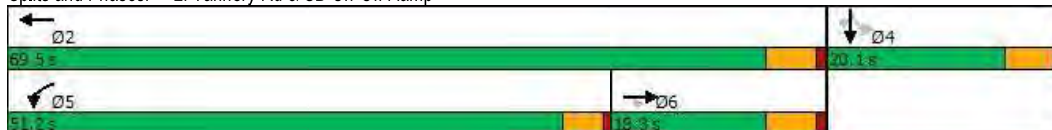


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Future Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Flt Protected				0.950							0.954	
Satd. Flow (prot)	0	2852	1338	2766	1575	0	0	0	0	0	1613	1328
Flt Permitted				0.950							0.954	
Satd. Flow (perm)	0	2852	1338	2766	1575	0	0	0	0	0	1613	1328
Satd. Flow (RTOR)			194									123
Adj. Flow (vph)	0	166	194	701	449	0	0	0	0	154	4	123
Lane Group Flow (vph)	0	166	194	701	449	0	0	0	0	0	158	123
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		18.3	18.3	51.2	69.5					20.1	20.1	20.1
Total Split (%)		20.4%	20.4%	57.1%	77.6%					22.4%	22.4%	22.4%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		30.9	30.9	29.1	64.3						12.6	12.6
Actuated g/C Ratio		0.35	0.35	0.33	0.74						0.14	0.14
v/c Ratio		0.16	0.32	0.76	0.39						0.68	0.41
Control Delay		22.8	5.8	31.3	5.7						50.6	11.1
Queue Delay		0.0	0.0	0.2	2.2						0.0	0.0
Total Delay		22.8	5.8	31.5	7.9						50.6	11.1
LOS		C	A	C	A						D	B
Approach Delay		13.6			22.3						33.3	
Approach LOS		B			C						C	
Queue Length 50th (m)		10.1	0.0	54.3	24.2						25.4	0.0
Queue Length 95th (m)		20.3	2.1	64.2	28.5						10.9	4.8
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		1011	599	1490	1159						277	330
Starvation Cap Reductn		0	0	247	552						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.16	0.32	0.56	0.74						0.57	0.37

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 87.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.76	
Intersection Signal Delay: 22.3	Intersection LOS: C
Intersection Capacity Utilization 48.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Tannery Rd & SB On-Off Ramp



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

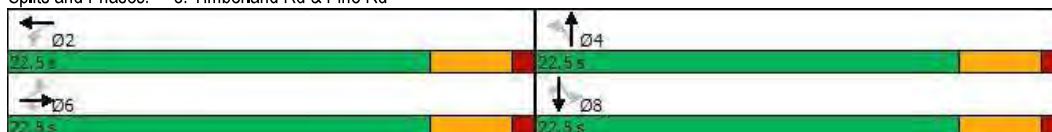


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
Future Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850		0.886			0.992				0.850
Fit Protected		0.950			0.992		0.950			0.950		
Satd. Flow (prot)	0	1014	1286	0	1688	0	1496	1616	0	1825	1353	1103
Fit Permitted		0.281			0.936		0.432			0.710		
Satd. Flow (perm)	0	300	1286	0	1593	0	680	1616	0	1364	1353	1103
Satd. Flow (RTOR)			36		718			4				60
Adj. Flow (vph)	60	0	22	136	0	732	10	68	4	384	387	60
Lane Group Flow (vph)	0	60	22	0	868	0	10	72	0	384	387	60
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	22.5	22.5	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%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.1	18.1		18.1		15.5	15.5		15.5	15.5	15.5
Actuated g/C Ratio		0.42	0.42		0.42		0.36	0.36		0.36	0.36	0.36
v/c Ratio		0.47	0.04		0.80		0.04	0.12		0.77	0.79	0.14
Control Delay		28.2	2.9		10.3		8.8	8.8		25.0	26.0	4.0
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		28.2	2.9		10.3		8.8	8.8		25.0	26.0	4.0
LOS		C	A		B		A	A		C	C	A
Approach Delay		21.4			10.3			8.8			23.9	
Approach LOS		C			B			A			C	
Queue Length 50th (m)		3.3	0.0		7.4		0.5	3.2		23.7	24.1	0.0
Queue Length 95th (m)		#16.8	0.5		#70.4		1.3	8.0		8.5	32.3	2.0
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		127	566		1089		288	687		578	573	502
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.47	0.04		0.80		0.03	0.10		0.66	0.68	0.12

Intersection Summary

Cycle Length: 45
 Actuated Cycle Length: 42.7
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.80
 Intersection Signal Delay: 16.8
 Intersection Capacity Utilization 42.9%
 Intersection LOS: B
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis

5: Timberland Y & S of Pine Rd

06/15/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	57	0	0	0	4	5	0	2	0	23	15	278
Future Volume (vph)	57	0	0	0	4	5	0	2	0	23	15	278
Peak Hour Factor	0.71	0.25	0.25	0.25	0.63	0.50	0.25	0.25	0.25	0.44	0.54	0.74
Hourly flow rate (vph)	80	0	0	0	6	10	0	8	0	52	28	376

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	80	16	8	456
Volume Left (vph)	80	0	0	52
Volume Right (vph)	0	10	0	376
Hadj (s)	1.34	1.32	1.70	0.10
Departure Headway (s)	6.4	6.5	6.4	4.3
Degree Utilization, x	0.14	0.03	0.01	0.55
Capacity (veh/h)	526	508	535	811
Control Delay (s)	10.4	9.7	9.5	12.5
Approach Delay (s)	10.4	9.7	9.5	12.5
Approach LOS	B	A	A	B

Intersection Summary			
Delay		12.1	
Level of Service		B	
Intersection Capacity Utilization	42.4%		ICU Level of Service A
Analysis Period (min)		15	

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramps

06/10/2022

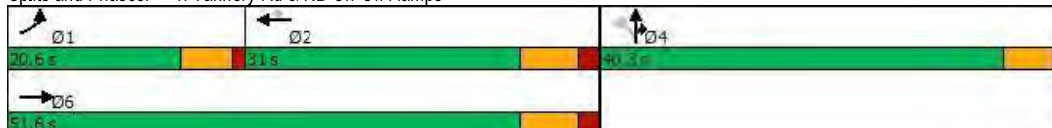


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗			↖	↗		↖	↗			
Traffic Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0
Future Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950							0.975				
Satd. Flow (prot)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0
Flt Permitted	0.950							0.975				
Satd. Flow (perm)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0
Satd. Flow (RTOR)						124			366			
Adj. Flow (vph)	117	615	0	0	459	124	99	93	1010	0	0	0
Lane Group Flow (vph)	117	615	0	0	459	124	0	192	1010	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	1	6			2			4	4			
Permitted Phases						2	4					
Detector Phase	1	6			2	2	4	4	4			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	11.6	28.0			19.0	19.0	23.3	23.3	23.3			
Total Split (s)	20.6	51.6			31.0	31.0	40.3	40.3	40.3			
Total Split (%)	22.4%	56.1%			33.7%	33.7%	43.9%	43.9%	43.9%			
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3			
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Max			Max	Max	None	None	None			
Act Effct Green (s)	11.9	44.9			30.2	30.2		28.3	28.3			
Actuated g/C Ratio	0.14	0.53			0.35	0.35		0.33	0.33			
v/c Ratio	0.65	0.38			0.28	0.21		0.44	0.87			
Control Delay	52.9	13.9			23.9	6.3		25.4	25.9			
Queue Delay	0.0	1.0			0.0	0.0		0.0	0.0			
Total Delay	52.9	14.9			23.9	6.3		25.4	25.9			
LOS	D	B			C	A		C	C			
Approach Delay		20.9			20.1			25.8				
Approach LOS		C			C			C				
Queue Length 50th (m)	18.5	31.1			21.7	0.0		24.2	57.9			
Queue Length 95th (m)	24.3	40.4			27.5	7.5		36.2	33.8			
Internal Link Dist (m)		63.8			81.9			180.4			150.3	
Turn Bay Length (m)						50.0			91.4			
Base Capacity (vph)	228	1637			1612	590		542	1353			
Starvation Cap Reductn	0	717			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.51	0.67			0.28	0.21		0.35	0.75			

Intersection Summary

Cycle Length: 91.9	
Actuated Cycle Length: 85.5	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 23.1	Intersection LOS: C
Intersection Capacity Utilization 44.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Tannery Rd & NB On-Off Ramps



Lanes, Volumes, Timings
 2: Tannery Rd & SB On-Off Ramp

06/10/2022

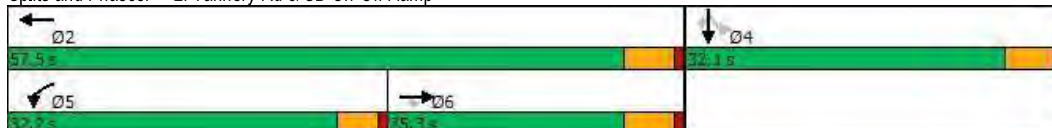


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Future Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Satd. Flow (RTOR)			206									92
Adj. Flow (vph)	0	377	206	255	331	0	0	0	0	233	4	92
Lane Group Flow (vph)	0	377	206	255	331	0	0	0	0	0	237	92
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		25.3	25.3	32.2	57.5					32.1	32.1	32.1
Total Split (%)		28.2%	28.2%	35.9%	64.2%					35.8%	35.8%	35.8%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		36.3	36.3	11.9	52.4						17.8	17.8
Actuated g/C Ratio		0.45	0.45	0.15	0.65						0.22	0.22
v/c Ratio		0.32	0.28	0.55	0.32						0.72	0.25
Control Delay		17.0	4.0	37.0	8.3						41.8	7.4
Queue Delay		0.0	0.0	0.0	1.4						0.0	0.0
Total Delay		17.0	4.0	37.0	9.7						41.8	7.4
LOS		B	A	D	A						D	A
Approach Delay		12.4			21.6						32.2	
Approach LOS		B			C						C	
Queue Length 50th (m)		18.6	0.0	18.8	19.5						33.7	0.0
Queue Length 95th (m)		36.9	0.0	31.3	30.8						12.8	2.8
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		1190	741	1091	1023						501	518
Starvation Cap Reductn		0	0	0	489						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.32	0.28	0.23	0.62						0.47	0.18

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 80.7	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.72	
Intersection Signal Delay: 20.4	Intersection LOS: C
Intersection Capacity Utilization 44.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Tannery Rd & SB On-Off Ramp



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

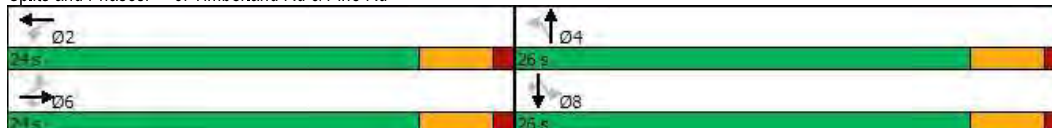


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Future Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850		0.902			0.998				0.850
Flt Protected		0.950			0.986		0.950			0.950		
Satd. Flow (prot)	0	1508	1338	0	1709	0	1534	1917	0	1825	1353	1103
Flt Permitted		0.477			0.899		0.663			0.512		
Satd. Flow (perm)	0	757	1338	0	1558	0	1070	1917	0	984	1353	1103
Satd. Flow (RTOR)			33		309			2				52
Adj. Flow (vph)	48	0	20	131	0	343	16	313	4	283	148	52
Lane Group Flow (vph)	0	48	20	0	474	0	16	317	0	283	148	52
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	24.0	24.0	24.0	24.0	24.0		26.0	26.0		26.0	26.0	26.0
Total Split (%)	48.0%	48.0%	48.0%	48.0%	48.0%		52.0%	52.0%		52.0%	52.0%	52.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		19.7	19.7		19.7		16.6	16.6		16.6	16.6	16.6
Actuated g/C Ratio		0.43	0.43		0.43		0.37	0.37		0.37	0.37	0.37
v/c Ratio		0.15	0.03		0.56		0.04	0.45		0.79	0.30	0.12
Control Delay		11.1	3.2		7.1		8.8	12.7		30.4	11.5	3.9
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		11.1	3.2		7.1		8.8	12.7		30.4	11.5	3.9
LOS		B	A		A		A	B		C	B	A
Approach Delay		8.7			7.1			12.5			21.8	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		2.3	0.0		8.2		0.8	17.9		18.9	7.9	0.0
Queue Length 95th (m)		2.0	0.3		0.0		2.0	28.0		17.6	11.8	3.7
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		329	600		852		512	919		471	648	555
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.15	0.03		0.56		0.03	0.34		0.60	0.23	0.09

Intersection Summary

Cycle Length: 50	
Actuated Cycle Length: 45.4	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 13.7	Intersection LOS: B
Intersection Capacity Utilization 51.2%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis

5: Timberland Y & S of Pine Rd

06/15/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	247	0	0	0	0	9	0	8	0	9	14	122
Future Volume (vph)	247	0	0	0	0	9	0	8	0	9	14	122
Peak Hour Factor	0.52	0.25	0.25	0.25	0.25	0.55	0.92	0.50	0.92	0.50	0.65	0.52
Hourly flow rate (vph)	475	0	0	0	0	16	0	16	0	18	22	235

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	475	16	16	275
Volume Left (vph)	475	0	0	18
Volume Right (vph)	0	16	0	235
Hadj (s)	0.52	-0.41	1.07	-0.04
Departure Headway (s)	5.3	5.0	6.8	5.3
Degree Utilization, x	0.70	0.02	0.03	0.40
Capacity (veh/h)	665	646	475	640
Control Delay (s)	19.4	8.1	10.0	11.8
Approach Delay (s)	19.4	8.1	10.0	11.8
Approach LOS	C	A	B	B

Intersection Summary

Delay	16.3
Level of Service	C
Intersection Capacity Utilization	42.4%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramps

06/10/2022

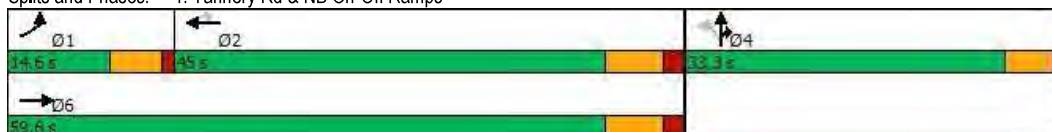


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗			↖	↗		↖	↗			
Traffic Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0
Future Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950							0.969				
Satd. Flow (prot)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Flt Permitted	0.950							0.969				
Satd. Flow (perm)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Satd. Flow (RTOR)						295			301			
Adj. Flow (vph)	31	294	0	0	939	295	218	119	301	0	0	0
Lane Group Flow (vph)	31	294	0	0	939	295	0	337	301	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	1	6			2			4	4			
Permitted Phases						2	4					
Detector Phase	1	6			2	2	4	4	4			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	11.6	28.0			25.0	25.0	23.3	23.3	23.3			
Total Split (s)	14.6	59.6			45.0	45.0	33.3	33.3	33.3			
Total Split (%)	15.7%	64.2%			48.4%	48.4%	35.8%	35.8%	35.8%			
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3			
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Max			Max	Max	None	None	None			
Act Effct Green (s)	7.5	52.7			44.6	44.6		24.5	24.5			
Actuated g/C Ratio	0.08	0.59			0.50	0.50		0.27	0.27			
v/c Ratio	0.29	0.17			0.38	0.34		0.87	0.32			
Control Delay	46.6	9.3			16.6	3.4		53.8	4.0			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	46.6	9.3			16.6	3.4		53.8	4.0			
LOS	D	A			B	A		D	A			
Approach Delay		12.8			13.4			30.3				
Approach LOS		B			B			C				
Queue Length 50th (m)	5.3	12.2			42.2	0.0		54.9	0.0			
Queue Length 95th (m)	8.6	18.4			55.4	0.0		#77.2	3.5			
Internal Link Dist (m)		63.8			81.9			180.4			150.3	
Turn Bay Length (m)						50.0			91.4			
Base Capacity (vph)	127	1777			2440	873		447	1048			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.24	0.17			0.38	0.34		0.75	0.29			

Intersection Summary

Cycle Length: 92.9
 Actuated Cycle Length: 89.5
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.87
 Intersection Signal Delay: 18.2
 Intersection Capacity Utilization 51.0%
 Intersection LOS: B
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 1: Tannery Rd & NB On-Off Ramps



Lanes, Volumes, Timings
2: Tannery Rd & SB On-Off Ramp

06/10/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Future Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850									0.850
Fit Protected				0.950							0.953	
Satd. Flow (prot)	0	2852	1338	2766	1575	0	0	0	0	0	1611	1328
Fit Permitted				0.950							0.953	
Satd. Flow (perm)	0	2852	1338	2766	1575	0	0	0	0	0	1611	1328
Satd. Flow (RTOR)			213									135
Adj. Flow (vph)	0	183	213	771	493	0	0	0	0	169	4	135
Lane Group Flow (vph)	0	183	213	771	493	0	0	0	0	0	173	135
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		18.3	18.3	51.2	69.5					20.1	20.1	20.1
Total Split (%)		20.4%	20.4%	57.1%	77.6%					22.4%	22.4%	22.4%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		28.2	28.2	31.8	64.2						13.2	13.2
Actuated g/C Ratio		0.32	0.32	0.36	0.73						0.15	0.15
v/c Ratio		0.20	0.37	0.77	0.43						0.72	0.43
Control Delay		25.2	6.4	29.9	6.3						52.9	10.9
Queue Delay		0.0	0.0	0.5	2.7						0.0	0.0
Total Delay		25.2	6.4	30.4	8.9						52.9	10.9
LOS		C	A	C	A						D	B
Approach Delay		15.1			22.0						34.5	
Approach LOS		B			C						C	
Queue Length 50th (m)		12.2	0.0	59.0	29.3						28.1	0.0
Queue Length 95th (m)		23.1	1.8	68.6	32.0						11.9	4.6
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		916	574	1481	1152						275	338
Starvation Cap Reductn		0	0	307	524						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.20	0.37	0.66	0.79						0.63	0.40

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 87.8	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.77	
Intersection Signal Delay: 22.6	Intersection LOS: C
Intersection Capacity Utilization 51.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Tannery Rd & SB On-Off Ramp



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

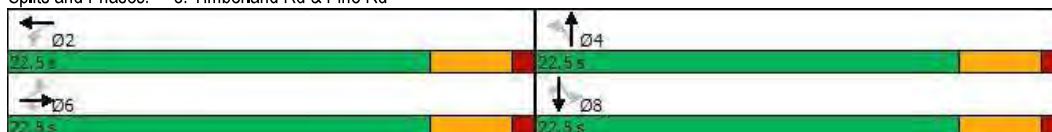


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕		↕	↕		↕	↕	↕
Traffic Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
Future Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850		0.886			0.992				0.850
Flt Protected		0.950			0.992		0.950			0.950		
Satd. Flow (prot)	0	1014	1286	0	1688	0	1496	1615	0	1825	1353	1103
Flt Permitted		0.250			0.933		0.392			0.706		
Satd. Flow (perm)	0	267	1286	0	1588	0	617	1615	0	1356	1353	1103
Satd. Flow (RTOR)			36		716			4				66
Adj. Flow (vph)	66	0	24	150	0	805	11	75	4	422	426	66
Lane Group Flow (vph)	0	66	24	0	955	0	11	79	0	422	426	66
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	22.5	22.5	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%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.1	18.1		18.1		16.5	16.5		16.5	16.5	16.5
Actuated g/C Ratio		0.42	0.42		0.42		0.38	0.38		0.38	0.38	0.38
v/c Ratio		0.60	0.04		0.89		0.05	0.13		0.82	0.83	0.14
Control Delay		41.3	3.2		17.1		9.0	8.9		28.8	29.7	3.9
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		41.3	3.2		17.1		9.0	8.9		28.8	29.7	3.9
LOS		D	A		B		A	A		C	C	A
Approach Delay		31.1			17.1			8.9			27.4	
Approach LOS		C			B			A			C	
Queue Length 50th (m)		3.9	0.0		12.5		0.5	3.5		27.1	27.7	0.0
Queue Length 95th (m)		#19.7	0.6		#88.6		1.4	8.7		9.3	36.4	2.1
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		110	553		1076		255	671		561	560	495
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.60	0.04		0.89		0.04	0.12		0.75	0.76	0.13

Intersection Summary

Cycle Length: 45
 Actuated Cycle Length: 43.6
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 22.0
 Intersection Capacity Utilization 45.6%
 Intersection LOS: C
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.


















Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis

5: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	57	0	0	0	4	5	0	2	0	23	15	278
Future Volume (vph)	57	0	0	0	4	5	0	2	0	23	15	278
Peak Hour Factor	0.71	0.25	0.25	0.25	0.63	0.50	0.25	0.25	0.25	0.44	0.54	0.74
Hourly flow rate (vph)	88	0	0	0	7	11	0	9	0	58	31	413
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	88	18	9	502								
Volume Left (vph)	88	0	0	58								
Volume Right (vph)	0	11	0	413								
Hadj (s)	1.34	1.33	1.70	0.10								
Departure Headway (s)	6.5	6.6	6.5	4.4								
Degree Utilization, x	0.16	0.03	0.02	0.61								
Capacity (veh/h)	513	494	525	803								
Control Delay (s)	10.7	9.9	9.6	14.0								
Approach Delay (s)	10.7	9.9	9.6	14.0								
Approach LOS	B	A	A	B								
Intersection Summary												
Delay			13.4									
Level of Service			B									
Intersection Capacity Utilization			44.6%	ICU Level of Service	A							
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramps

06/10/2022

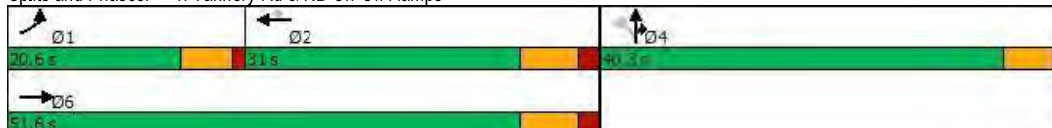


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↘	↗			↖	↗		↖	↗				
Traffic Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0	
Future Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00	
Friction	0.850						0.850						
Fit Protected	0.950						0.975						
Satd. Flow (prot)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0	
Fit Permitted	0.950						0.975						
Satd. Flow (perm)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0	
Satd. Flow (RTOR)							136	308					
Adj. Flow (vph)	129	677	0	0	505	136	109	102	1111	0	0	0	
Lane Group Flow (vph)	129	677	0	0	505	136	0	211	1111	0	0	0	
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot				
Protected Phases	1	6			2			4	4				
Permitted Phases						2	4						
Detector Phase	1	6			2	2	4	4	4				
Switch Phase													
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0				
Minimum Split (s)	11.6	28.0			19.0	19.0	23.3	23.3	23.3				
Total Split (s)	20.6	51.6			31.0	31.0	40.3	40.3	40.3				
Total Split (%)	22.4%	56.1%			33.7%	33.7%	43.9%	43.9%	43.9%				
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3				
All-Red Time (s)	1.1	2.0			2.0	2.0	1.0	1.0	1.0				
Lost Time Adjust (s)	0.0	0.0			0.0	0.0			0.0				
Total Lost Time (s)	5.6	7.0			7.0	7.0			5.3				
Lead/Lag	Lead				Lag		Lag						
Lead-Lag Optimize?	Yes				Yes		Yes						
Recall Mode	None	Max			Max	Max	None	None	None				
Act Effct Green (s)	12.8	44.7			26.3	26.3			32.8	32.8			
Actuated g/C Ratio	0.14	0.50			0.29	0.29			0.37	0.37			
v/c Ratio	0.70	0.44			0.38	0.26			0.44	0.92			
Control Delay	57.4	16.0			27.4	6.5			24.8	33.1			
Queue Delay	0.0	1.8			0.0	0.0			0.0	0.0			
Total Delay	57.4	17.8			27.4	6.5			24.8	33.1			
LOS	E	B			C	A			C	C			
Approach Delay	24.2		23.0				31.7						
Approach LOS	C		C				C						
Queue Length 50th (m)	21.6	39.7			26.9	0.0			27.0	78.3			
Queue Length 95th (m)	26.4	45.0			30.0	7.6			39.8	47.1			
Internal Link Dist (m)	63.8		81.9				180.4						
Turn Bay Length (m)							50.0	91.4					
Base Capacity (vph)	216	1551			1333	518			514	1265			
Starvation Cap Reductn	0	674			0	0			0	0			
Spillback Cap Reductn	0	0			0	0			0	0			
Storage Cap Reductn	0	0			0	0			0	0			
Reduced v/c Ratio	0.60	0.77			0.38	0.26			0.41	0.88			

Intersection Summary

Cycle Length: 91.9	
Actuated Cycle Length: 89.8	
Natural Cycle: 65	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 27.5	Intersection LOS: C
Intersection Capacity Utilization 48.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Tannery Rd & NB On-Off Ramps



Lanes, Volumes, Timings
2: Tannery Rd & SB On-Off Ramp

06/10/2022

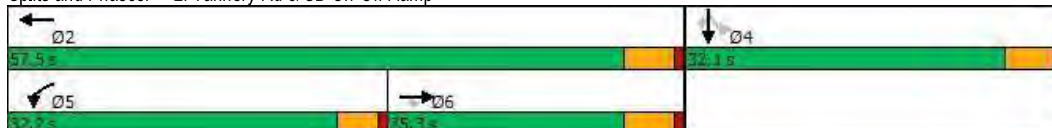


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Future Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850									0.850
Fit Protected				0.950							0.953	
Satd. Flow (prot)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Fit Permitted				0.950							0.953	
Satd. Flow (perm)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Satd. Flow (RTOR)			227									101
Adj. Flow (vph)	0	415	227	281	365	0	0	0	0	256	4	101
Lane Group Flow (vph)	0	415	227	281	365	0	0	0	0	0	260	101
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		25.3	25.3	32.2	57.5					32.1	32.1	32.1
Total Split (%)		28.2%	28.2%	35.9%	64.2%					35.8%	35.8%	35.8%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		35.5	35.5	12.7	52.4						19.0	19.0
Actuated g/C Ratio		0.43	0.43	0.16	0.64						0.23	0.23
v/c Ratio		0.36	0.31	0.58	0.36						0.75	0.26
Control Delay		18.7	4.2	37.5	9.2						43.1	7.1
Queue Delay		0.0	0.0	0.0	1.7						0.0	0.0
Total Delay		18.7	4.2	37.5	10.9						43.1	7.1
LOS		B	A	D	B						D	A
Approach Delay		13.6			22.5						33.0	
Approach LOS		B			C						C	
Queue Length 50th (m)		22.1	0.0	21.2	23.7						37.7	0.0
Queue Length 95th (m)		42.1	0.0	34.1	35.0						13.8	2.8
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		1147	734	1075	1008						494	518
Starvation Cap Reductn		0	0	0	467						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.36	0.31	0.26	0.67						0.53	0.19

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 81.9	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.75	
Intersection Signal Delay: 21.3	Intersection LOS: C
Intersection Capacity Utilization 48.3%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: Tannery Rd & SB On-Off Ramp



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

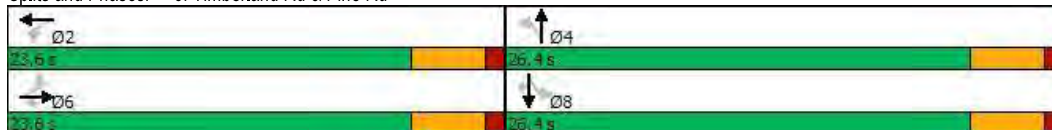


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Future Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850		0.902			0.998				0.850
Fit Protected		0.950			0.986		0.950			0.950		
Satd. Flow (prot)	0	1508	1338	0	1709	0	1534	1917	0	1825	1353	1103
Fit Permitted		0.439			0.894		0.654			0.484		
Satd. Flow (perm)	0	697	1338	0	1549	0	1056	1917	0	930	1353	1103
Satd. Flow (RTOR)			33		306			1				57
Adj. Flow (vph)	53	0	22	144	0	378	18	344	4	311	163	57
Lane Group Flow (vph)	0	53	22	0	522	0	18	348	0	311	163	57
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	23.6	23.6	23.6	23.6	23.6		26.4	26.4		26.4	26.4	26.4
Total Split (%)	47.2%	47.2%	47.2%	47.2%	47.2%		52.8%	52.8%		52.8%	52.8%	52.8%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		19.3	19.3		19.3		18.5	18.5		18.5	18.5	18.5
Actuated g/C Ratio		0.41	0.41		0.41		0.40	0.40		0.40	0.40	0.40
v/c Ratio		0.18	0.04		0.64		0.04	0.46		0.85	0.31	0.12
Control Delay		12.4	3.7		9.5		8.5	12.4		36.9	11.1	3.7
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		12.4	3.7		9.5		8.5	12.4		36.9	11.1	3.7
LOS		B	A		A		A	B		D	B	A
Approach Delay		9.8			9.5			12.2			25.4	
Approach LOS		A			A			B			C	
Queue Length 50th (m)		3.0	0.0		13.2		0.9	19.8		21.8	8.7	0.0
Queue Length 95th (m)		2.2	0.3		0.0		2.1	30.4		19.7	12.6	3.7
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		287	570		817		498	905		439	638	551
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.18	0.04		0.64		0.04	0.38		0.71	0.26	0.10

Intersection Summary

Cycle Length: 50	
Actuated Cycle Length: 46.8	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.85	
Intersection Signal Delay: 15.8	Intersection LOS: B
Intersection Capacity Utilization 54.6%	ICU Level of Service A
Analysis Period (min) 15	

















Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis

5: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Traffic Volume (vph)	247	0	0	0	0	9	0	8	0	9	14	122
Future Volume (vph)	247	0	0	0	0	9	0	8	0	9	14	122
Peak Hour Factor	0.52	0.25	0.25	0.25	0.25	0.55	0.92	0.50	0.92	0.50	0.65	0.52
Hourly flow rate (vph)	522	0	0	0	0	18	0	18	0	20	24	258
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	522	18	18	302								
Volume Left (vph)	522	0	0	20								
Volume Right (vph)	0	18	0	258								
Hadj (s)	0.52	-0.41	1.07	-0.04								
Departure Headway (s)	5.4	5.2	7.1	5.4								
Degree Utilization, x	0.78	0.03	0.04	0.46								
Capacity (veh/h)	654	613	467	621								
Control Delay (s)	24.9	8.4	10.3	12.9								
Approach Delay (s)	24.9	8.4	10.3	12.9								
Approach LOS	C	A	B	B								
Intersection Summary												
Delay				20.1								
Level of Service				C								
Intersection Capacity Utilization				44.7%	ICU Level of Service							A
Analysis Period (min)				15								

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022

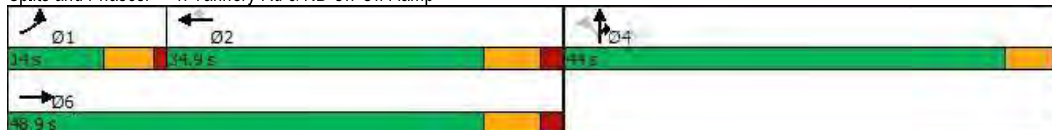


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗			↗	↗		↗	↗			
Traffic Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0
Future Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Friction							0.850			0.850		
Fit Protected	0.950						0.969					
Satd. Flow (prot)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Fit Permitted	0.950						0.969					
Satd. Flow (perm)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Satd. Flow (RTOR)							303			310		
Adj. Flow (vph)	32	302	0	0	965	303	224	123	310	0	0	0
Lane Group Flow (vph)	32	302	0	0	965	303	0	347	310	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	1	6			2			4	4			
Permitted Phases						2	4					
Detector Phase	1	6			2	2	4	4	4			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	11.6	28.0			25.0	25.0	23.3	23.3	23.3			
Total Split (s)	14.0	48.9			34.9	34.9	44.0	44.0	44.0			
Total Split (%)	15.1%	52.6%			37.6%	37.6%	47.4%	47.4%	47.4%			
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3			
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3			
Lead/Lag	Lead				Lag		Lag					
Lead-Lag Optimize?	Yes				Yes		Yes					
Recall Mode	None	Max			Max	Max	None	None	None			
Act Effct Green (s)	7.2	42.3			37.3	37.3		24.4	24.4			
Actuated g/C Ratio	0.09	0.53			0.47	0.47		0.31	0.31			
v/c Ratio	0.28	0.19			0.42	0.36		0.79	0.30			
Control Delay	42.7	11.5			17.8	4.3		38.1	3.0			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	42.7	11.5			17.8	4.3		38.1	3.0			
LOS	D	B			B	A		D	A			
Approach Delay		14.4			14.6			21.5				
Approach LOS		B			B			C				
Queue Length 50th (m)	4.5	11.2			27.9	0.0		46.7	0.0			
Queue Length 95th (m)	8.7	24.3			67.9	0.0		65.2	2.8			
Internal Link Dist (m)		63.8			81.9			180.4			150.3	
Turn Bay Length (m)						50.0			91.4			
Base Capacity (vph)	135	1612			2305	846		703	1482			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.24	0.19			0.42	0.36		0.49	0.21			

Intersection Summary

Cycle Length: 92.9	
Actuated Cycle Length: 79.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 51.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
 2: SB On-Off Ramp & Tannery Rd

06/10/2022

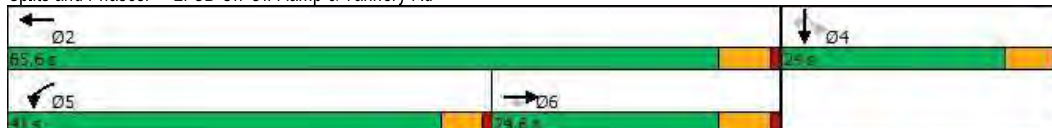


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Future Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Flt Protected				0.950							0.954	
Satd. Flow (prot)	0	2852	1338	2766	1575	0	0	0	0	0	1613	1328
Flt Permitted				0.950							0.954	
Satd. Flow (perm)	0	2852	1338	2766	1575	0	0	0	0	0	1613	1328
Satd. Flow (RTOR)			219									139
Adj. Flow (vph)	0	188	219	792	507	0	0	0	0	174	5	139
Lane Group Flow (vph)	0	188	219	792	507	0	0	0	0	0	179	139
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		24.6	24.6	41.0	65.6					24.0	24.0	24.0
Total Split (%)		27.5%	27.5%	45.8%	73.2%					26.8%	26.8%	26.8%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		26.8	26.8	29.3	60.4						14.2	14.2
Actuated g/C Ratio		0.32	0.32	0.34	0.71						0.17	0.17
v/c Ratio		0.21	0.38	0.83	0.45						0.67	0.41
Control Delay		25.1	6.5	33.6	7.4						45.5	9.6
Queue Delay		0.0	0.0	1.7	3.0						0.0	0.0
Total Delay		25.1	6.5	35.3	10.4						45.5	9.6
LOS		C	A	D	B						D	A
Approach Delay		15.1			25.6						29.8	
Approach LOS		B			C						C	
Queue Length 50th (m)		11.7	0.0	60.0	30.0						27.5	0.0
Queue Length 95th (m)		23.7	1.7	76.9	39.9						11.5	4.3
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		900	572	1199	1118						359	403
Starvation Cap Reductn		0	0	239	489						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.21	0.38	0.82	0.81						0.50	0.34

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 85	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 24.1	Intersection LOS: C
Intersection Capacity Utilization 51.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
Future Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
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
Friction			0.850		0.886			0.991				0.850
Fit Protected		0.950			0.992		0.950			0.950		
Satd. Flow (prot)	0	1014	1286	0	1688	0	1496	1616	0	1825	1353	1103
Fit Permitted		0.242			0.932		0.382			0.704		
Satd. Flow (perm)	0	258	1286	0	1586	0	602	1616	0	1352	1353	1103
Satd. Flow (RTOR)			36		716			5				68
Adj. Flow (vph)	68	0	25	154	0	827	11	77	5	434	437	68
Lane Group Flow (vph)	0	68	25	0	981	0	11	82	0	434	437	68
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	22.5	22.5	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%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.0	18.0		18.0		16.7	16.7		16.7	16.7	16.7
Actuated g/C Ratio		0.41	0.41		0.41		0.38	0.38		0.38	0.38	0.38
v/c Ratio		0.64	0.05		0.91		0.05	0.13		0.84	0.85	0.15
Control Delay		46.9	3.2		20.1		9.0	8.9		30.6	31.0	3.9
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		46.9	3.2		20.1		9.0	8.9		30.6	31.0	3.9
LOS		D	A		C		A	A		C	C	A
Approach Delay		35.2			20.1			8.9			28.8	
Approach LOS		D			C			A			C	
Queue Length 50th (m)		4.1	0.0		14.1		0.5	3.6		28.4	28.7	0.0
Queue Length 95th (m)		#20.5	0.6		#93.9		1.4	8.9		9.5	37.8	2.1
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		106	551		1074		247	668		556	557	494
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.64	0.05		0.91		0.04	0.12		0.78	0.78	0.14

Intersection Summary


















Cycle Length: 45
 Actuated Cycle Length: 43.8
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 24.2
 Intersection Capacity Utilization 46.4%
 Intersection LOS: C
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	0	0	0	5	6	0	54	0	26	269	63
Future Volume (vph)	12	0	0	0	5	6	0	54	0	26	269	63
Peak Hour Factor	0.71	0.25	0.25	0.25	0.63	0.50	0.25	0.25	0.25	0.44	0.54	0.74
Hourly flow rate (vph)	17	0	0	0	8	12	0	216	0	59	498	85
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	17	20	216	642								
Volume Left (vph)	17	0	0	59								
Volume Right (vph)	0	12	0	85								
Hadj (s)	1.34	1.34	1.70	0.43								
Departure Headway (s)	7.5	7.5	6.5	4.8								
Degree Utilization, x	0.04	0.04	0.39	0.86								
Capacity (veh/h)	453	450	541	742								
Control Delay (s)	10.8	10.9	13.6	29.5								
Approach Delay (s)	10.8	10.9	13.6	29.5								
Approach LOS	B	B	B	D								
Intersection Summary												
Delay				24.9								
Level of Service				C								
Intersection Capacity Utilization				40.1%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022

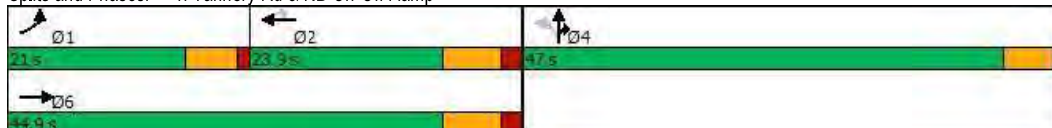


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↘	↗			↖	↗		↖	↗				
Traffic Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0	
Future Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00	
Friction	0.850						0.850						
Fit Protected	0.950						0.975						
Satd. Flow (prot)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0	
Fit Permitted	0.950						0.975						
Satd. Flow (perm)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0	
Satd. Flow (RTOR)							140	207					
Adj. Flow (vph)	133	695	0	0	518	140	112	105	1141	0	0	0	
Lane Group Flow (vph)	133	695	0	0	518	140	0	217	1141	0	0	0	
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot				
Protected Phases	1	6			2			4	4				
Permitted Phases						2	4						
Detector Phase	1	6			2	2	4	4	4				
Switch Phase													
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0				
Minimum Split (s)	11.6	28.0			19.0	19.0	23.3	23.3	23.3				
Total Split (s)	21.0	44.9			23.9	23.9	47.0	47.0	47.0				
Total Split (%)	22.9%	48.9%			26.0%	26.0%	51.1%	51.1%	51.1%				
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3				
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3				
Lead/Lag	Lead				Lag		Lag						
Lead-Lag Optimize?	Yes				Yes		Yes						
Recall Mode	None	Max			Max	Max	None	None	None				
Act Effct Green (s)	12.8	38.1			19.6	19.6		36.6	36.6				
Actuated g/C Ratio	0.15	0.44			0.23	0.23		0.42	0.42				
v/c Ratio	0.70	0.51			0.50	0.32		0.39	0.89				
Control Delay	55.9	20.3			33.3	8.3		19.5	28.7				
Queue Delay	0.0	2.1			0.0	0.0		0.0	0.0				
Total Delay	55.9	22.4			33.3	8.3		19.5	28.7				
LOS	E	C			C	A		B	C				
Approach Delay	27.8		28.0				27.2						
Approach LOS	C		C				C						
Queue Length 50th (m)	21.9	46.4			30.2	0.0		24.2	81.8				
Queue Length 95th (m)	27.0	53.8			34.3	8.7		35.5	51.6				
Internal Link Dist (m)	63.8		81.9				180.4						
Turn Bay Length (m)					50.0		91.4						
Base Capacity (vph)	229	1364			1027	433		634	1436				
Starvation Cap Reductn	0	502			0	0		0	0				
Spillback Cap Reductn	0	0			0	0		0	0				
Storage Cap Reductn	0	0			0	0		0	0				
Reduced v/c Ratio	0.58	0.81			0.50	0.32		0.34	0.79				

Intersection Summary

Cycle Length: 91.9
 Actuated Cycle Length: 87.1
 Natural Cycle: 65
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.89
 Intersection Signal Delay: 27.6
 Intersection Capacity Utilization 49.4%
 Intersection LOS: C
 ICU Level of Service A
 Analysis Period (min) 15

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
2: SB On-Off Ramp & Tannery Rd

06/10/2022

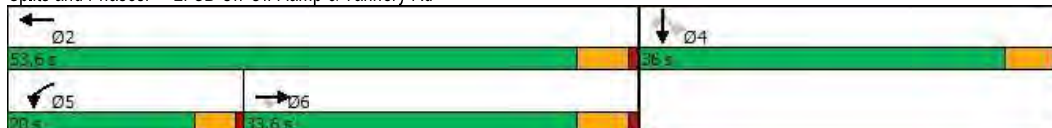


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Future Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Fit Protected				0.950							0.953	
Satd. Flow (prot)	0	2645	1396	3133	1575	0	0	0	0	0	1494	1361
Fit Permitted				0.950							0.953	
Satd. Flow (perm)	0	2645	1396	3133	1575	0	0	0	0	0	1494	1361
Satd. Flow (RTOR)			233									104
Adj. Flow (vph)	0	426	233	289	375	0	0	0	0	263	5	104
Lane Group Flow (vph)	0	426	233	289	375	0	0	0	0	0	268	104
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		33.6	33.6	20.0	53.6					36.0	36.0	36.0
Total Split (%)		37.5%	37.5%	22.3%	59.8%					40.2%	40.2%	40.2%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		32.1	32.1	12.2	48.5						18.9	18.9
Actuated g/C Ratio		0.41	0.41	0.16	0.62						0.24	0.24
v/c Ratio		0.39	0.33	0.59	0.38						0.74	0.25
Control Delay		19.3	4.4	36.3	9.8						39.8	6.6
Queue Delay		0.0	0.0	0.0	1.7						0.0	0.0
Total Delay		19.3	4.4	36.3	11.5						39.8	6.6
LOS		B	A	D	B						D	A
Approach Delay		14.0			22.3						30.5	
Approach LOS		B			C						C	
Queue Length 50th (m)		22.3	0.0	20.5	24.2						36.4	0.0
Queue Length 95th (m)		43.2	0.0	34.4	37.3						13.4	2.6
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		1091	713	638	981						595	605
Starvation Cap Reductn		0	0	0	429						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.39	0.33	0.45	0.68						0.45	0.17

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 77.9	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 20.9	Intersection LOS: C
Intersection Capacity Utilization 49.4%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

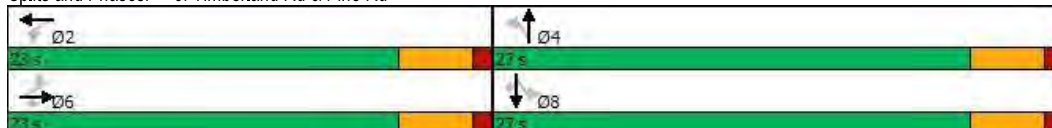


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Future Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850		0.902			0.998				0.850
Fit Protected		0.950			0.986		0.950			0.950		
Satd. Flow (prot)	0	1508	1338	0	1709	0	1534	1917	0	1825	1353	1103
Fit Permitted		0.428			0.892		0.651			0.478		
Satd. Flow (perm)	0	680	1338	0	1546	0	1051	1917	0	918	1353	1103
Satd. Flow (RTOR)			33		300			2				59
Adj. Flow (vph)	54	0	23	148	0	388	18	353	5	319	168	59
Lane Group Flow (vph)	0	54	23	0	536	0	18	358	0	319	168	59
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0		27.0	27.0		27.0	27.0	27.0
Total Split (%)	46.0%	46.0%	46.0%	46.0%	46.0%		54.0%	54.0%		54.0%	54.0%	54.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.7	18.7		18.7		18.9	18.9		18.9	18.9	18.9
Actuated g/C Ratio		0.40	0.40		0.40		0.40	0.40		0.40	0.40	0.40
v/c Ratio		0.20	0.04		0.67		0.04	0.46		0.86	0.31	0.12
Control Delay		13.1	3.9		11.1		8.1	11.9		37.3	10.7	3.5
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		13.1	3.9		11.1		8.1	11.9		37.3	10.7	3.5
LOS		B	A		B		A	B		D	B	A
Approach Delay		10.4			11.1			11.7			25.5	
Approach LOS		B			B			B			C	
Queue Length 50th (m)		3.2	0.0		15.0		0.8	19.9		22.2	8.7	0.0
Queue Length 95th (m)		2.2	0.4		0.0		2.0	30.4		19.8	12.6	3.7
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		271	554		798		510	933		446	657	566
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.20	0.04		0.67		0.04	0.38		0.72	0.26	0.10

Intersection Summary


















Cycle Length: 50	
Actuated Cycle Length: 46.7	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.86	
Intersection Signal Delay: 16.3	Intersection LOS: B
Intersection Capacity Utilization 55.6%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	61	0	0	0	0	10	0	227	0	10	101	53
Future Volume (vph)	61	0	0	0	0	10	0	227	0	10	101	53
Peak Hour Factor	0.52	0.25	0.25	0.25	0.25	0.55	0.92	0.50	0.92	0.50	0.65	0.52
Hourly flow rate (vph)	117	0	0	0	0	18	0	454	0	20	155	102
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	117	18	454	277								
Volume Left (vph)	117	0	0	20								
Volume Right (vph)	0	18	0	102								
Hadj (s)	0.52	-0.41	1.07	0.80								
Departure Headway (s)	6.6	5.9	5.9	5.9								
Degree Utilization, x	0.21	0.03	0.74	0.45								
Capacity (veh/h)	496	523	600	595								
Control Delay (s)	11.3	9.1	23.7	13.6								
Approach Delay (s)	11.3	9.1	23.7	13.6								
Approach LOS	B	A	C	B								
Intersection Summary												
Delay			18.5									
Level of Service			C									
Intersection Capacity Utilization			33.8%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022

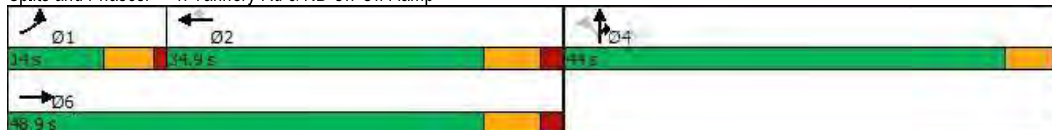


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↘	↗			↖	↗		↖	↗				
Traffic Volume (vph)	16	279	0	0	926	145	143	89	200	0	0	0	
Future Volume (vph)	16	279	0	0	926	145	143	89	200	0	0	0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00	
Friction							0.850			0.850			
Fit Protected	0.950								0.969				
Satd. Flow (prot)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0	
Fit Permitted	0.950								0.969				
Satd. Flow (perm)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0	
Satd. Flow (RTOR)							303			310			
Adj. Flow (vph)	32	313	0	0	975	303	224	123	310	0	0	0	
Lane Group Flow (vph)	32	313	0	0	975	303	0	347	310	0	0	0	
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot				
Protected Phases	1	6			2			4	4				
Permitted Phases						2	4						
Detector Phase	1	6			2	2	4	4	4				
Switch Phase													
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0				
Minimum Split (s)	11.6	28.0			25.0	25.0	23.3	23.3	23.3				
Total Split (s)	14.0	48.9			34.9	34.9	44.0	44.0	44.0				
Total Split (%)	15.1%	52.6%			37.6%	37.6%	47.4%	47.4%	47.4%				
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3				
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3				
Lead/Lag	Lead				Lag		Lag						
Lead-Lag Optimize?	Yes				Yes		Yes						
Recall Mode	None	Max			Max	Max	None	None	None				
Act Effct Green (s)	7.2	42.3			37.3	37.3		24.4	24.4				
Actuated g/C Ratio	0.09	0.53			0.47	0.47		0.31	0.31				
v/c Ratio	0.28	0.19			0.42	0.36		0.79	0.30				
Control Delay	42.7	11.5			17.9	4.3		38.1	3.0				
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0				
Total Delay	42.7	11.5			17.9	4.3		38.1	3.0				
LOS	D	B			B	A		D	A				
Approach Delay		14.4			14.7			21.5					
Approach LOS		B			B			C					
Queue Length 50th (m)	4.5	11.6			28.2	0.0		46.7	0.0				
Queue Length 95th (m)	8.7	25.2			68.6	0.0		65.2	2.8				
Internal Link Dist (m)		63.8			81.9			180.4			150.3		
Turn Bay Length (m)						50.0			91.4				
Base Capacity (vph)	135	1612			2305	846		703	1482				
Starvation Cap Reductn	0	0			0	0		0	0				
Spillback Cap Reductn	0	0			0	0		0	0				
Storage Cap Reductn	0	0			0	0		0	0				
Reduced v/c Ratio	0.24	0.19			0.42	0.36		0.49	0.21				

Intersection Summary

Cycle Length: 92.9	
Actuated Cycle Length: 79.2	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.79	
Intersection Signal Delay: 16.6	Intersection LOS: B
Intersection Capacity Utilization 52.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
 2: SB On-Off Ramp & Tannery Rd

06/10/2022

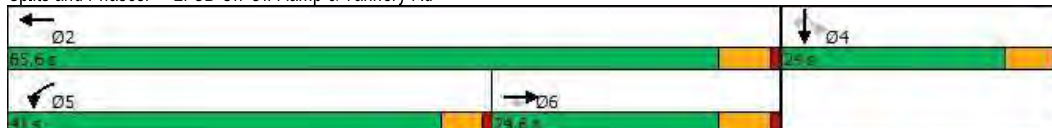


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	181	120	631	375	0	0	0	0	103	1	80
Future Volume (vph)	0	181	120	631	375	0	0	0	0	103	1	80
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850									0.850
Fit Protected				0.950							0.954	
Satd. Flow (prot)	0	2852	1338	2766	1575	0	0	0	0	0	1613	1328
Fit Permitted				0.950							0.954	
Satd. Flow (perm)	0	2852	1338	2766	1575	0	0	0	0	0	1613	1328
Satd. Flow (RTOR)			219									139
Adj. Flow (vph)	0	199	219	792	521	0	0	0	0	174	5	139
Lane Group Flow (vph)	0	199	219	792	521	0	0	0	0	0	179	139
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		24.6	24.6	41.0	65.6					24.0	24.0	24.0
Total Split (%)		27.5%	27.5%	45.8%	73.2%					26.8%	26.8%	26.8%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		26.8	26.8	29.3	60.4						14.2	14.2
Actuated g/C Ratio		0.32	0.32	0.34	0.71						0.17	0.17
v/c Ratio		0.22	0.38	0.83	0.47						0.67	0.41
Control Delay		25.2	6.5	33.6	7.6						45.5	9.6
Queue Delay		0.0	0.0	1.7	3.3						0.0	0.0
Total Delay		25.2	6.5	35.3	10.8						45.5	9.6
LOS		C	A	D	B						D	A
Approach Delay		15.4			25.6						29.8	
Approach LOS		B			C						C	
Queue Length 50th (m)		12.5	0.0	60.0	31.3						27.5	0.0
Queue Length 95th (m)		25.0	1.7	76.9	41.2						11.5	4.3
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		900	572	1199	1118						359	403
Starvation Cap Reductn		0	0	239	482						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.22	0.38	0.82	0.82						0.50	0.34

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 85	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 52.0%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

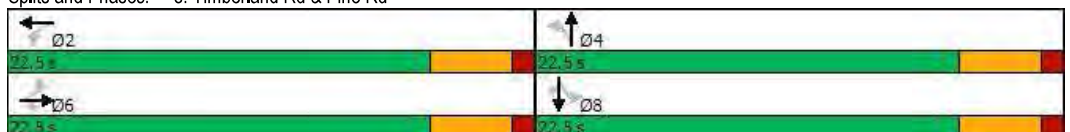


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↕		↕		↕	↕		↕	↕	↕
Traffic Volume (vph)	30	0	11	34	0	183	5	76	1	96	316	36
Future Volume (vph)	30	0	11	34	0	183	5	76	1	96	316	36
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850		0.886			0.992				0.850
Fit Protected		0.950			0.992		0.950			0.950		
Satd. Flow (prot)	0	1014	1286	0	1688	0	1496	1615	0	1825	1353	1103
Fit Permitted		0.241			0.932		0.368			0.696		
Satd. Flow (perm)	0	257	1286	0	1586	0	579	1615	0	1337	1353	1103
Satd. Flow (RTOR)			36		716			5				68
Adj. Flow (vph)	68	0	25	154	0	827	11	89	5	434	451	68
Lane Group Flow (vph)	0	68	25	0	981	0	11	94	0	434	451	68
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	22.5	22.5	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%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.0	18.0		18.0		16.9	16.9		16.9	16.9	16.9
Actuated g/C Ratio		0.41	0.41		0.41		0.38	0.38		0.38	0.38	0.38
v/c Ratio		0.65	0.05		0.91		0.05	0.15		0.84	0.87	0.15
Control Delay		48.3	3.2		20.3		9.0	9.1		31.1	33.4	3.9
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		48.3	3.2		20.3		9.0	9.1		31.1	33.4	3.9
LOS		D	A		C		A	A		C	C	A
Approach Delay		36.2			20.3			9.0			30.3	
Approach LOS		D			C			A			C	
Queue Length 50th (m)		4.1	0.0		14.1		0.5	4.2		28.6	30.1	0.0
Queue Length 95th (m)		#20.6	0.6		#93.9		1.4	9.9		9.6	39.2	2.1
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		105	549		1073		237	665		548	555	492
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.65	0.05		0.91		0.05	0.14		0.79	0.81	0.14

Intersection Summary


















Cycle Length: 45
 Actuated Cycle Length: 44
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.91
 Intersection Signal Delay: 24.9
 Intersection Capacity Utilization 46.9%
 Intersection LOS: C
 ICU Level of Service A
 Analysis Period (min) 15
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	Stop
Traffic Volume (vph)	12	0	0	0	5	6	0	64	0	26	279	62
Future Volume (vph)	12	0	0	0	5	6	0	64	0	26	279	62
Peak Hour Factor	0.71	0.25	0.25	0.25	0.63	0.50	0.25	0.25	0.25	0.44	0.54	0.74
Hourly flow rate (vph)	17	0	0	0	8	12	0	256	0	59	517	84
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	17	20	256	660								
Volume Left (vph)	17	0	0	59								
Volume Right (vph)	0	12	0	84								
Hadj (s)	1.34	1.34	1.70	0.43								
Departure Headway (s)	7.7	7.7	6.5	4.9								
Degree Utilization, x	0.04	0.04	0.46	0.89								
Capacity (veh/h)	444	443	539	660								
Control Delay (s)	11.0	11.0	15.1	34.5								
Approach Delay (s)	11.0	11.0	15.1	34.5								
Approach LOS	B	B	C	D								
Intersection Summary												
Delay				28.4								
Level of Service				D								
Intersection Capacity Utilization				40.6%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022

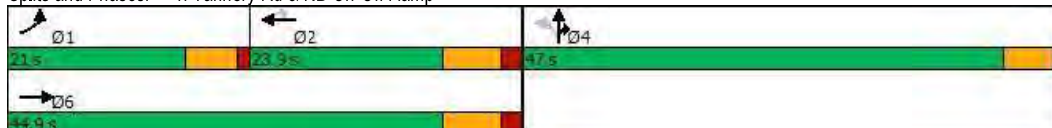


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗			↖	↗		↖	↗			
Traffic Volume (vph)	74	559	0	0	399	93	89	74	606	0	0	0
Future Volume (vph)	74	559	0	0	399	93	89	74	606	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Fr						0.850			0.850			
Flt Protected	0.950							0.975				
Satd. Flow (prot)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0
Flt Permitted	0.950							0.975				
Satd. Flow (perm)	1294	3120	0	0	4561	1445	0	1318	2763	0	0	0
Satd. Flow (RTOR)						140			198			
Adj. Flow (vph)	133	708	0	0	532	140	112	105	1141	0	0	0
Lane Group Flow (vph)	133	708	0	0	532	140	0	217	1141	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	1	6			2			4	4			
Permitted Phases						2	4					
Detector Phase	1	6			2	2	4	4	4			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	11.6	28.0			19.0	19.0	23.3	23.3	23.3			
Total Split (s)	21.0	44.9			23.9	23.9	47.0	47.0	47.0			
Total Split (%)	22.9%	48.9%			26.0%	26.0%	51.1%	51.1%	51.1%			
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3			
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Max			Max	Max	None	None	None			
Act Effct Green (s)	12.9	38.1			19.6	19.6		36.8	36.8			
Actuated g/C Ratio	0.15	0.44			0.22	0.22		0.42	0.42			
v/c Ratio	0.70	0.52			0.52	0.32		0.39	0.89			
Control Delay	56.0	20.6			33.6	8.3		19.5	29.0			
Queue Delay	0.0	2.3			0.0	0.0		0.0	0.0			
Total Delay	56.0	22.9			33.6	8.3		19.5	29.0			
LOS	E	C			C	A		B	C			
Approach Delay		28.1			28.4			27.5				
Approach LOS		C			C			C				
Queue Length 50th (m)	22.0	47.9			31.3	0.0		24.2	82.7			
Queue Length 95th (m)	27.0	55.1			35.2	8.7		35.5	52.3			
Internal Link Dist (m)		63.8			81.9			180.4			150.3	
Turn Bay Length (m)						50.0			91.4			
Base Capacity (vph)	229	1361			1024	432		632	1429			
Starvation Cap Reductn	0	498			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.58	0.82			0.52	0.32		0.34	0.80			

Intersection Summary

Cycle Length: 91.9	
Actuated Cycle Length: 87.3	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 27.9	Intersection LOS: C
Intersection Capacity Utilization 49.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
 2: SB On-Off Ramp & Tannery Rd

06/10/2022

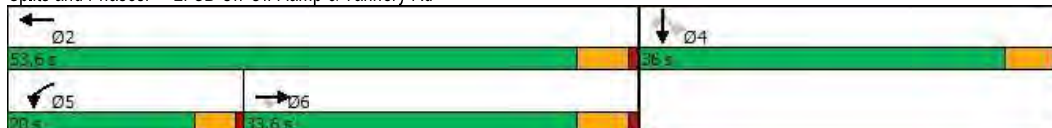


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	398	103	240	272	0	0	0	0	205	1	55
Future Volume (vph)	0	398	103	240	272	0	0	0	0	205	1	55
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Fit Protected				0.950							0.953	
Satd. Flow (prot)	0	2645	1396	3133	1575	0	0	0	0	0	1494	1361
Fit Permitted				0.950							0.953	
Satd. Flow (perm)	0	2645	1396	3133	1575	0	0	0	0	0	1494	1361
Satd. Flow (RTOR)			233									104
Adj. Flow (vph)	0	437	233	289	389	0	0	0	0	263	5	104
Lane Group Flow (vph)	0	437	233	289	389	0	0	0	0	0	268	104
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		33.6	33.6	20.0	53.6					36.0	36.0	36.0
Total Split (%)		37.5%	37.5%	22.3%	59.8%					40.2%	40.2%	40.2%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		32.1	32.1	12.2	48.5						18.9	18.9
Actuated g/C Ratio		0.41	0.41	0.16	0.62						0.24	0.24
v/c Ratio		0.40	0.33	0.59	0.40						0.74	0.25
Control Delay		19.5	4.4	36.3	10.0						39.8	6.6
Queue Delay		0.0	0.0	0.0	1.8						0.0	0.0
Total Delay		19.5	4.4	36.3	11.8						39.8	6.6
LOS		B	A	D	B						D	A
Approach Delay		14.2			22.3						30.5	
Approach LOS		B			C						C	
Queue Length 50th (m)		23.0	0.0	20.5	25.3						36.4	0.0
Queue Length 95th (m)		44.4	0.0	34.4	39.0						13.4	2.6
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		1091	713	638	981						595	605
Starvation Cap Reductn		0	0	0	424						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.40	0.33	0.45	0.70						0.45	0.17

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 77.9	
Natural Cycle: 45	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.74	
Intersection Signal Delay: 20.9	Intersection LOS: C
Intersection Capacity Utilization 49.7%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

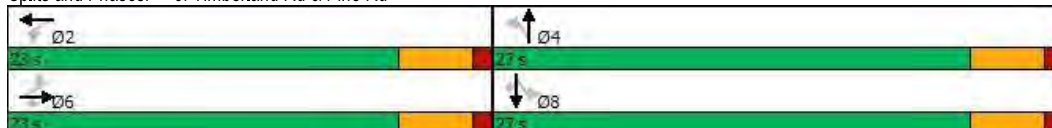


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	38	0	9	38	0	158	9	293	3	147	121	42
Future Volume (vph)	38	0	9	38	0	158	9	293	3	147	121	42
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850		0.902			0.998				0.850
Fit Protected		0.950			0.986		0.950			0.950		
Satd. Flow (prot)	0	1508	1338	0	1709	0	1534	1917	0	1825	1353	1103
Fit Permitted		0.426			0.891		0.642			0.465		
Satd. Flow (perm)	0	676	1338	0	1544	0	1036	1917	0	893	1353	1103
Satd. Flow (RTOR)			33		300			2				59
Adj. Flow (vph)	54	0	23	148	0	388	18	366	5	319	183	59
Lane Group Flow (vph)	0	54	23	0	536	0	18	371	0	319	183	59
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	23.0	23.0	23.0	23.0	23.0		27.0	27.0		27.0	27.0	27.0
Total Split (%)	46.0%	46.0%	46.0%	46.0%	46.0%		54.0%	54.0%		54.0%	54.0%	54.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.6	18.6		18.6		19.3	19.3		19.3	19.3	19.3
Actuated g/C Ratio		0.40	0.40		0.40		0.41	0.41		0.41	0.41	0.41
v/c Ratio		0.20	0.04		0.68		0.04	0.47		0.87	0.33	0.12
Control Delay		13.2	3.9		11.2		8.1	12.0		39.8	11.0	3.5
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		13.2	3.9		11.2		8.1	12.0		39.8	11.0	3.5
LOS		B	A		B		A	B		D	B	A
Approach Delay		10.4			11.2			11.9			26.6	
Approach LOS		B			B			B			C	
Queue Length 50th (m)		3.2	0.0		15.0		0.8	20.8		22.5	9.6	0.0
Queue Length 95th (m)		2.2	0.4		0.0		2.0	31.5		20.0	13.7	3.7
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		268	550		793		500	925		430	652	562
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.20	0.04		0.68		0.04	0.40		0.74	0.28	0.10

Intersection Summary


















Cycle Length: 50	
Actuated Cycle Length: 47	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 16.9	Intersection LOS: B
Intersection Capacity Utilization 56.1%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	61	0	0	0	0	10	0	237	0	10	111	53
Future Volume (vph)	61	0	0	0	0	10	0	237	0	10	111	53
Peak Hour Factor	0.52	0.25	0.25	0.25	0.25	0.55	0.92	0.50	0.92	0.50	0.65	0.52
Hourly flow rate (vph)	117	0	0	0	0	18	0	474	0	20	171	102
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	117	18	474	293								
Volume Left (vph)	117	0	0	20								
Volume Right (vph)	0	18	0	102								
Hadj (s)	0.52	-0.41	1.07	0.84								
Departure Headway (s)	6.7	6.0	5.9	5.9								
Degree Utilization, x	0.22	0.03	0.78	0.48								
Capacity (veh/h)	496	517	598	587								
Control Delay (s)	11.5	9.2	26.5	14.4								
Approach Delay (s)	11.5	9.2	26.5	14.4								
Approach LOS	B	A	D	B								
Intersection Summary												
Delay			20.3									
Level of Service			C									
Intersection Capacity Utilization			34.3%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↘	↗			↖	↗		↖	↗				
Traffic Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0	
Future Volume (vph)	16	238	0	0	811	145	143	89	200	0	0	0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00	
Friction							0.850			0.850			
Fit Protected	0.950								0.969				
Satd. Flow (prot)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0	
Fit Permitted	0.950								0.969				
Satd. Flow (perm)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0	
Satd. Flow (RTOR)							349			356			
Adj. Flow (vph)	36	348	0	0	1110	349	258	141	356	0	0	0	
Lane Group Flow (vph)	36	348	0	0	1110	349	0	399	356	0	0	0	
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot				
Protected Phases	1	6			2			4	4				
Permitted Phases							2	4					
Detector Phase	1	6			2	2	4	4	4				
Switch Phase													
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0				
Minimum Split (s)	11.6	28.0			25.0	25.0	23.3	23.3	23.3				
Total Split (s)	13.0	48.9			35.9	35.9	44.0	44.0	44.0				
Total Split (%)	14.0%	52.6%			38.6%	38.6%	47.4%	47.4%	47.4%				
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3				
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0			5.3	5.3			
Lead/Lag	Lead				Lag		Lag						
Lead-Lag Optimize?	Yes				Yes		Yes						
Recall Mode	None	Max			Max	Max	None	None	None				
Act Effct Green (s)	6.9	42.3			34.9	34.9			27.6	27.6			
Actuated g/C Ratio	0.08	0.51			0.42	0.42			0.34	0.34			
v/c Ratio	0.34	0.22			0.53	0.43			0.83	0.31			
Control Delay	47.6	12.9			21.9	4.6			40.7	2.8			
Queue Delay	0.0	0.0			0.0	0.0			0.0	0.0			
Total Delay	47.6	12.9			21.9	4.6			40.7	2.8			
LOS	D	B			C	A			D	A			
Approach Delay	16.2				17.8				22.8				
Approach LOS	B				B				C				
Queue Length 50th (m)	5.4	15.2			53.0	0.0			56.4	0.0			
Queue Length 95th (m)	9.6	28.5			79.8	0.0			77.2	2.6			
Internal Link Dist (m)	63.8				81.9				180.4		150.3		
Turn Bay Length (m)					50.0				91.4				
Base Capacity (vph)	114	1548			2080	819			676	1461			
Starvation Cap Reductn	0	0			0	0			0	0			
Spillback Cap Reductn	0	0			0	0			0	0			
Storage Cap Reductn	0	0			0	0			0	0			
Reduced v/c Ratio	0.32	0.22			0.53	0.43			0.59	0.24			

Intersection Summary

Cycle Length: 92.9
 Actuated Cycle Length: 82.3
 Natural Cycle: 60
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.83
 Intersection Signal Delay: 19.0
 Intersection Capacity Utilization 62.3%
 Intersection LOS: B
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
 2: SB On-Off Ramp & Tannery Rd

06/10/2022

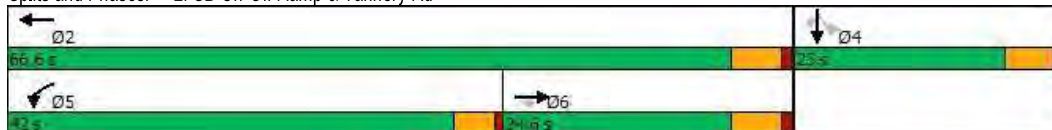


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Future Volume (vph)	0	151	120	631	323	0	0	0	0	103	1	80
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	2852	1338	2766	1575	0	0	0	0	0	1611	1328
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	2852	1338	2766	1575	0	0	0	0	0	1611	1328
Satd. Flow (RTOR)			252									160
Adj. Flow (vph)	0	216	252	911	583	0	0	0	0	200	5	160
Lane Group Flow (vph)	0	216	252	911	583	0	0	0	0	0	205	160
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		24.6	24.6	42.0	66.6					23.0	23.0	23.0
Total Split (%)		27.5%	27.5%	46.9%	74.3%					25.7%	25.7%	25.7%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		24.1	24.1	33.1	61.4						15.0	15.0
Actuated g/C Ratio		0.28	0.28	0.38	0.71						0.17	0.17
v/c Ratio		0.27	0.46	0.87	0.52						0.74	0.44
Control Delay		28.1	7.1	34.2	8.5						50.4	9.5
Queue Delay		0.0	0.0	15.0	4.8						0.0	0.0
Total Delay		28.1	7.1	49.2	13.3						50.4	9.5
LOS		C	A	D	B						D	A
Approach Delay		16.8			35.2						32.5	
Approach LOS		B			D						C	
Queue Length 50th (m)		15.4	0.0	70.1	40.4						32.6	0.0
Queue Length 95th (m)		26.8	1.0	91.5	45.9						13.1	4.3
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		793	553	1206	1114						332	401
Starvation Cap Reductn		0	0	295	450						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.27	0.46	1.00	0.88						0.62	0.40

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 86.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 31.1	Intersection LOS: C
Intersection Capacity Utilization 62.3%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

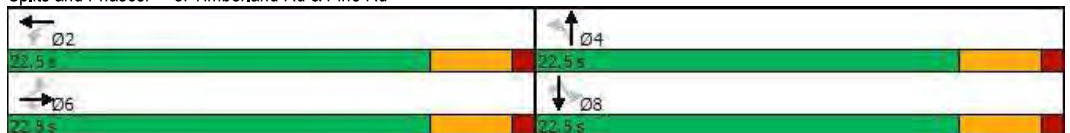


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔	↔		↔	↔	↔	↔		↔	↔	↔
Traffic Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
Future Volume (vph)	30	0	11	34	0	183	5	58	1	96	271	36
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850		0.886			0.992				0.850
Flt Protected		0.950			0.992		0.950			0.950		
Satd. Flow (prot)	0	1014	1286	0	1688	0	1496	1615	0	1825	1353	1103
Flt Permitted		0.222			0.928		0.319			0.696		
Satd. Flow (perm)	0	237	1286	0	1580	0	502	1615	0	1337	1353	1103
Satd. Flow (RTOR)			36		717			5				78
Adj. Flow (vph)	78	0	29	177	0	952	13	89	5	499	503	78
Lane Group Flow (vph)	0	78	29	0	1129	0	13	94	0	499	503	78
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	22.5	22.5	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%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.0	18.0		18.0		17.9	17.9		17.9	17.9	17.9
Actuated g/C Ratio		0.40	0.40		0.40		0.40	0.40		0.40	0.40	0.40
v/c Ratio		0.83	0.05		1.06		0.07	0.15		0.94	0.93	0.16
Control Delay		79.0	3.6		56.0		9.5	9.0		44.6	43.5	3.7
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		79.0	3.6		56.0		9.5	9.0		44.6	43.5	3.7
LOS		E	A		E		A	A		D	D	A
Approach Delay		58.6			56.0			9.1			41.1	
Approach LOS		E			E			A			D	
Queue Length 50th (m)		5.2	0.0		~63.3		0.6	4.2		35.4	35.5	0.0
Queue Length 95th (m)		#24.2	0.8		#123.6		1.6	9.9		10.9	#54.2	2.2
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		94	537		1063		201	651		536	543	489
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.83	0.05		1.06		0.06	0.14		0.93	0.93	0.16

Intersection Summary

Cycle Length: 45
 Actuated Cycle Length: 44.9
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 47.4
 Intersection Capacity Utilization 51.1%
 Intersection LOS: D
 ICU Level of Service A
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Sign Control		Stop			Stop			Stop			Stop	Stop
Traffic Volume (vph)	14	0	0	0	5	6	0	62	0	30	307	71
Future Volume (vph)	14	0	0	0	5	6	0	62	0	30	307	71
Peak Hour Factor	0.71	0.25	0.25	0.25	0.63	0.50	0.25	0.25	0.25	0.44	0.54	0.74
Hourly flow rate (vph)	20	0	0	0	8	12	0	248	0	68	569	96
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	20	20	248	733								
Volume Left (vph)	20	0	0	68								
Volume Right (vph)	0	12	0	96								
Hadj (s)	1.34	1.34	1.70	0.43								
Departure Headway (s)	7.9	7.9	6.6	4.9								
Degree Utilization, x	0.04	0.04	0.46	1.00								
Capacity (veh/h)	448	444	541	724								
Control Delay (s)	11.2	11.2	15.1	53.9								
Approach Delay (s)	11.2	11.2	15.1	53.9								
Approach LOS	B	B	C	F								
Intersection Summary												
Delay				42.8								
Level of Service				E								
Intersection Capacity Utilization				42.9%	ICU Level of Service	A						
Analysis Period (min)				15								

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022

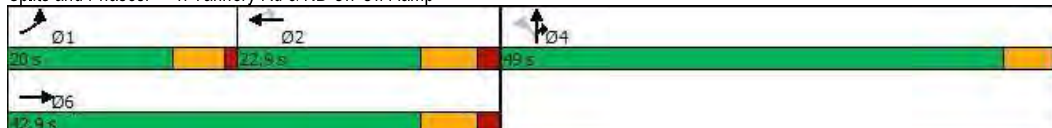


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↘	↗			↖	↗		↖	↗				
Traffic Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0	
Future Volume (vph)	74	486	0	0	344	93	89	74	606	0	0	0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00	
Friction	0.850						0.850						
Fit Protected	0.950						0.975						
Satd. Flow (prot)	1294	3120	0	0	4561	1445	0	1317	2763	0	0	0	
Fit Permitted	0.950						0.975						
Satd. Flow (perm)	1294	3120	0	0	4561	1445	0	1317	2763	0	0	0	
Satd. Flow (RTOR)							160	128					
Adj. Flow (vph)	152	794	0	0	592	160	128	119	1303	0	0	0	
Lane Group Flow (vph)	152	794	0	0	592	160	0	247	1303	0	0	0	
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot				
Protected Phases	1	6			2			4	4				
Permitted Phases						2	4						
Detector Phase	1	6			2	2	4	4	4				
Switch Phase													
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0				
Minimum Split (s)	11.6	28.0			19.0	19.0	23.3	23.3	23.3				
Total Split (s)	20.0	42.9			22.9	22.9	49.0	49.0	49.0				
Total Split (%)	21.8%	46.7%			24.9%	24.9%	53.3%	53.3%	53.3%				
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3				
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3				
Lead/Lag	Lead				Lag		Lag						
Lead-Lag Optimize?	Yes				Yes		Yes						
Recall Mode	None	Max			Max	Max	None	None	None				
Act Effct Green (s)	13.4	35.9			17.0	17.0		42.5	42.5				
Actuated g/C Ratio	0.15	0.40			0.19	0.19		0.47	0.47				
v/c Ratio	0.80	0.64			0.69	0.40		0.40	0.96				
Control Delay	67.8	25.4			40.1	9.0		18.1	38.0				
Queue Delay	0.0	12.5			0.0	0.0		0.0	0.0				
Total Delay	67.8	37.9			40.1	9.0		18.1	38.0				
LOS	E	D			D	A		B	D				
Approach Delay	42.7		33.4				34.8						
Approach LOS	D		C				C						
Queue Length 50th (m)	26.0	59.2			36.8	0.0		27.1	110.8				
Queue Length 95th (m)	30.8	65.5			39.7	9.0		38.8	68.3				
Internal Link Dist (m)	63.8		81.9				180.4						
Turn Bay Length (m)					50.0		91.4						
Base Capacity (vph)	205	1235			852	400		635	1397				
Starvation Cap Reductn	0	425			0	0		0	0				
Spillback Cap Reductn	0	0			0	0		0	0				
Storage Cap Reductn	0	0			0	0		0	0				
Reduced v/c Ratio	0.74	0.98			0.69	0.40		0.39	0.93				

Intersection Summary

Cycle Length: 91.9	
Actuated Cycle Length: 90.7	
Natural Cycle: 80	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.96	
Intersection Signal Delay: 36.8	Intersection LOS: D
Intersection Capacity Utilization 54.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
 2: SB On-Off Ramp & Tannery Rd

06/10/2022

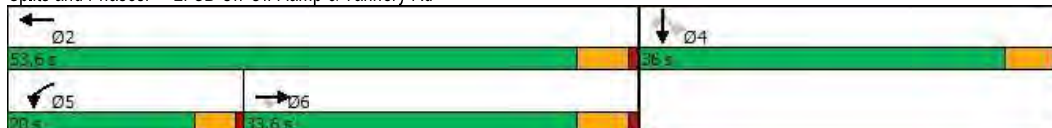


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Future Volume (vph)	0	343	103	240	232	0	0	0	0	205	1	55
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Fit Protected				0.950							0.953	
Satd. Flow (prot)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Fit Permitted				0.950							0.953	
Satd. Flow (perm)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Satd. Flow (RTOR)			266									118
Adj. Flow (vph)	0	486	266	329	428	0	0	0	0	301	5	118
Lane Group Flow (vph)	0	486	266	329	428	0	0	0	0	0	306	118
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		33.6	33.6	20.0	53.6					36.0	36.0	36.0
Total Split (%)		37.5%	37.5%	22.3%	59.8%					40.2%	40.2%	40.2%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		31.3	31.3	13.1	48.6						21.2	21.2
Actuated g/C Ratio		0.39	0.39	0.16	0.61						0.26	0.26
v/c Ratio		0.47	0.38	0.65	0.45						0.78	0.26
Control Delay		22.2	4.8	38.4	11.8						41.0	6.0
Queue Delay		0.0	0.0	0.0	2.7						0.0	0.0
Total Delay		22.2	4.8	38.4	14.5						41.0	6.0
LOS		C	A	D	B						D	A
Approach Delay		16.0			24.9						31.3	
Approach LOS		B			C						C	
Queue Length 50th (m)		28.5	0.0	24.2	31.8						42.9	0.0
Queue Length 95th (m)		52.3	0.0	40.4	47.1						14.8	2.4
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		1031	706	620	953						577	599
Starvation Cap Reductn		0	0	0	396						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.47	0.38	0.53	0.77						0.53	0.20

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 80.3	
Natural Cycle: 50	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 22.8	Intersection LOS: C
Intersection Capacity Utilization 54.9%	ICU Level of Service A
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

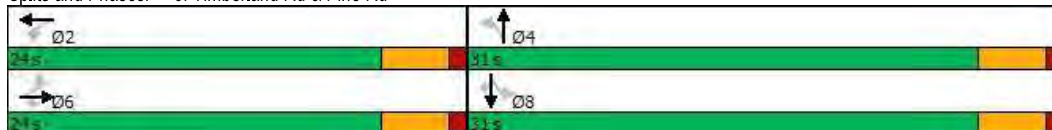


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Future Volume (vph)	38	0	9	38	0	158	9	250	3	147	98	42
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt			0.850		0.902			0.998				0.850
Flt Protected		0.950			0.986		0.950			0.950		
Satd. Flow (prot)	0	1508	1338	0	1709	0	1534	1917	0	1825	1353	1103
Flt Permitted		0.368			0.885		0.637			0.440		
Satd. Flow (perm)	0	584	1338	0	1534	0	1028	1917	0	845	1353	1103
Satd. Flow (RTOR)			30		266			2				67
Adj. Flow (vph)	62	0	26	169	0	443	21	403	5	365	192	67
Lane Group Flow (vph)	0	62	26	0	612	0	21	408	0	365	192	67
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	24.0	24.0	24.0	24.0	24.0		31.0	31.0		31.0	31.0	31.0
Total Split (%)	43.6%	43.6%	43.6%	43.6%	43.6%		56.4%	56.4%		56.4%	56.4%	56.4%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		19.6	19.6		19.6		24.8	24.8		24.8	24.8	24.8
Actuated g/C Ratio		0.37	0.37		0.37		0.46	0.46		0.46	0.46	0.46
v/c Ratio		0.29	0.05		0.84		0.04	0.46		0.93	0.31	0.12
Control Delay		17.4	5.2		22.4		7.9	11.6		49.3	10.4	3.1
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		17.4	5.2		22.4		7.9	11.6		49.3	10.4	3.1
LOS		B	A		C		A	B		D	B	A
Approach Delay		13.8			22.4			11.4			32.4	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		4.3	0.0		30.4		1.0	24.5		30.6	10.6	0.0
Queue Length 95th (m)		2.8	0.8		0.0		2.3	35.8		24.7	14.4	3.9
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		214	509		731		512	956		421	674	583
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.29	0.05		0.84		0.04	0.43		0.87	0.28	0.11

Intersection Summary


















Cycle Length: 55	
Actuated Cycle Length: 53.4	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.93	
Intersection Signal Delay: 22.8	Intersection LOS: C
Intersection Capacity Utilization 60.9%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	Stop
Traffic Volume (vph)	70	0	0	0	0	12	0	259	0	12	115	61
Future Volume (vph)	70	0	0	0	0	12	0	259	0	12	115	61
Peak Hour Factor	0.52	0.25	0.25	0.25	0.25	0.55	0.92	0.50	0.92	0.50	0.65	0.52
Hourly flow rate (vph)	135	0	0	0	0	22	0	518	0	24	177	117
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	135	22	518	318								
Volume Left (vph)	135	0	0	24								
Volume Right (vph)	0	22	0	117								
Hadj (s)	0.52	-0.41	1.07	0.80								
Departure Headway (s)	6.9	6.4	6.1	6.1								
Degree Utilization, x	0.26	0.04	0.87	0.54								
Capacity (veh/h)	491	503	587	570								
Control Delay (s)	12.3	9.6	37.1	16.1								
Approach Delay (s)	12.3	9.6	37.1	16.1								
Approach LOS	B	A	E	C								
Intersection Summary												
Delay			26.4									
Level of Service			D									
Intersection Capacity Utilization			37.3%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↘	↗			↖	↗		↖	↗			
Traffic Volume (vph)	16	319	0	0	1064	145	143	89	200	0	0	0
Future Volume (vph)	16	319	0	0	1064	145	143	89	200	0	0	0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00
Frts						0.850			0.850			
Flt Protected	0.950							0.969				
Satd. Flow (prot)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Flt Permitted	0.950							0.969				
Satd. Flow (perm)	1267	3017	0	0	4902	1458	0	1426	2686	0	0	0
Satd. Flow (RTOR)						349			356			
Adj. Flow (vph)	36	358	0	0	1120	349	258	141	356	0	0	0
Lane Group Flow (vph)	36	358	0	0	1120	349	0	399	356	0	0	0
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot			
Protected Phases	1	6			2			4	4			
Permitted Phases						2	4					
Detector Phase	1	6			2	2	4	4	4			
Switch Phase												
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0			
Minimum Split (s)	11.6	28.0			25.0	25.0	23.3	23.3	23.3			
Total Split (s)	13.0	48.9			35.9	35.9	44.0	44.0	44.0			
Total Split (%)	14.0%	52.6%			38.6%	38.6%	47.4%	47.4%	47.4%			
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3			
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3			
Lead/Lag	Lead				Lag	Lag						
Lead-Lag Optimize?	Yes				Yes	Yes						
Recall Mode	None	Max			Max	Max	None	None	None			
Act Effct Green (s)	6.9	42.3			34.9	34.9		27.6	27.6			
Actuated g/C Ratio	0.08	0.51			0.42	0.42		0.34	0.34			
v/c Ratio	0.34	0.23			0.54	0.43		0.83	0.31			
Control Delay	47.6	13.0			22.0	4.6		40.7	2.8			
Queue Delay	0.0	0.0			0.0	0.0		0.0	0.0			
Total Delay	47.6	13.0			22.0	4.6		40.7	2.8			
LOS	D	B			C	A		D	A			
Approach Delay		16.2			17.9			22.8				
Approach LOS		B			B			C				
Queue Length 50th (m)	5.4	15.6			53.6	0.0		56.4	0.0			
Queue Length 95th (m)	9.6	29.3			80.8	0.0		77.2	2.6			
Internal Link Dist (m)		63.8			81.9			180.4			150.3	
Turn Bay Length (m)						50.0			91.4			
Base Capacity (vph)	114	1548			2080	819		676	1461			
Starvation Cap Reductn	0	0			0	0		0	0			
Spillback Cap Reductn	0	0			0	0		0	0			
Storage Cap Reductn	0	0			0	0		0	0			
Reduced v/c Ratio	0.32	0.23			0.54	0.43		0.59	0.24			

Intersection Summary

Cycle Length: 92.9	
Actuated Cycle Length: 82.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.83	
Intersection Signal Delay: 19.0	Intersection LOS: B
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
 2: SB On-Off Ramp & Tannery Rd

06/10/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	206	120	631	430	0	0	0	0	103	1	80
Future Volume (vph)	0	206	120	631	430	0	0	0	0	103	1	80
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Flt Protected				0.950							0.953	
Satd. Flow (prot)	0	2852	1338	2766	1575	0	0	0	0	0	1611	1328
Flt Permitted				0.950							0.953	
Satd. Flow (perm)	0	2852	1338	2766	1575	0	0	0	0	0	1611	1328
Satd. Flow (RTOR)			252									160
Adj. Flow (vph)	0	226	252	911	597	0	0	0	0	200	5	160
Lane Group Flow (vph)	0	226	252	911	597	0	0	0	0	0	205	160
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		24.6	24.6	42.0	66.6					23.0	23.0	23.0
Total Split (%)		27.5%	27.5%	46.9%	74.3%					25.7%	25.7%	25.7%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		24.1	24.1	33.1	61.4						15.0	15.0
Actuated g/C Ratio		0.28	0.28	0.38	0.71						0.17	0.17
v/c Ratio		0.28	0.46	0.87	0.54						0.74	0.44
Control Delay		28.2	7.1	34.2	8.7						50.4	9.5
Queue Delay		0.0	0.0	15.0	5.3						0.0	0.0
Total Delay		28.2	7.1	49.2	13.9						50.4	9.5
LOS		C	A	D	B						D	A
Approach Delay		17.1			35.2						32.5	
Approach LOS		B			D						C	
Queue Length 50th (m)		16.2	0.0	70.1	42.0						32.6	0.0
Queue Length 95th (m)		28.0	1.0	91.5	47.3						13.1	4.3
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		793	553	1206	1114						332	401
Starvation Cap Reductn		0	0	295	443						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.28	0.46	1.00	0.89						0.62	0.40

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 86.8	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.87	
Intersection Signal Delay: 31.1	Intersection LOS: C
Intersection Capacity Utilization 62.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

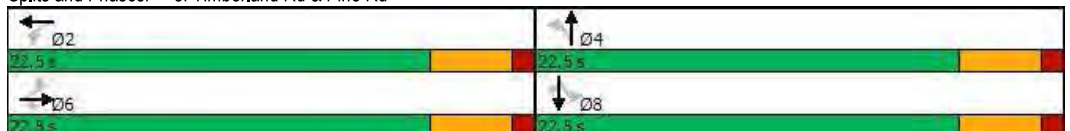


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	30	0	11	34	0	183	5	85	1	96	362	36
Future Volume (vph)	30	0	11	34	0	183	5	85	1	96	362	36
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850		0.886			0.993				0.850
Flt Protected		0.950			0.992		0.950			0.950		
Satd. Flow (prot)	0	1014	1286	0	1688	0	1496	1615	0	1825	1353	1103
Flt Permitted		0.222			0.928		0.305			0.689		
Satd. Flow (perm)	0	237	1286	0	1580	0	480	1615	0	1324	1353	1103
Satd. Flow (RTOR)			36		717			5				78
Adj. Flow (vph)	78	0	29	177	0	952	13	100	5	499	517	78
Lane Group Flow (vph)	0	78	29	0	1129	0	13	105	0	499	517	78
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	22.5	22.5	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%	50.0%	50.0%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		18.0	18.0		18.0		18.0	18.0		18.0	18.0	18.0
Actuated g/C Ratio		0.40	0.40		0.40		0.40	0.40		0.40	0.40	0.40
v/c Ratio		0.83	0.05		1.06		0.07	0.16		0.94	0.96	0.16
Control Delay		79.7	3.6		56.3		9.5	9.2		45.7	47.7	3.7
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		79.7	3.6		56.3		9.5	9.2		45.7	47.7	3.7
LOS		E	A		E		A	A		D	D	A
Approach Delay		59.1			56.3			9.2			43.6	
Approach LOS		E			E			A			D	
Queue Length 50th (m)		5.2	0.0		~63.3		0.6	4.7		35.6	37.2	0.0
Queue Length 95th (m)		#24.2	0.8		#123.6		1.6	10.9		10.9	#56.4	2.2
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		94	536		1062		192	649		529	541	488
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.83	0.05		1.06		0.07	0.16		0.94	0.96	0.16

Intersection Summary

Cycle Length: 45
 Actuated Cycle Length: 45
 Natural Cycle: 45
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 1.06
 Intersection Signal Delay: 48.5
 Intersection Capacity Utilization 51.6%
 ICU Level of Service A
 Analysis Period (min) 15
 ~ Volume exceeds capacity, queue is theoretically infinite.
 Queue shown is maximum after two cycles.
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	↔
Sign Control		Stop			Stop			Stop			Stop	Stop
Traffic Volume (vph)	14	0	0	0	5	6	0	72	0	30	317	71
Future Volume (vph)	14	0	0	0	5	6	0	72	0	30	317	71
Peak Hour Factor	0.71	0.25	0.25	0.25	0.63	0.50	0.25	0.25	0.25	0.44	0.54	0.74
Hourly flow rate (vph)	20	0	0	0	8	12	0	288	0	68	587	96
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	20	20	288	751								
Volume Left (vph)	20	0	0	68								
Volume Right (vph)	0	12	0	96								
Hadj (s)	1.34	1.34	1.70	0.43								
Departure Headway (s)	7.8	7.8	6.6	5.0								
Degree Utilization, x	0.04	0.04	0.53	1.03								
Capacity (veh/h)	441	437	542	718								
Control Delay (s)	11.2	11.2	16.7	64.1								
Approach Delay (s)	11.2	11.2	16.7	64.1								
Approach LOS	B	B	C	F								
Intersection Summary												
Delay			49.5									
Level of Service			E									
Intersection Capacity Utilization			43.4%		ICU Level of Service				A			
Analysis Period (min)			15									

Lanes, Volumes, Timings
1: Tannery Rd & NB On-Off Ramp

06/10/2022

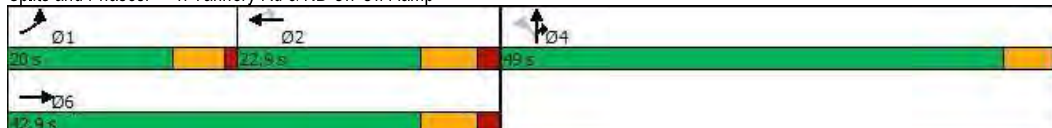


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↘	↗			↖	↗		↖	↗				
Traffic Volume (vph)	74	637	0	0	454	93	89	74	606	0	0	0	
Future Volume (vph)	74	637	0	0	454	93	89	74	606	0	0	0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91	1.00	1.00	1.00	0.88	1.00	1.00	1.00	
Friction	0.850						0.850						
Fit Protected	0.950						0.975						
Satd. Flow (prot)	1294	3120	0	0	4561	1445	0	1317	2763	0	0	0	
Fit Permitted	0.950						0.975						
Satd. Flow (perm)	1294	3120	0	0	4561	1445	0	1317	2763	0	0	0	
Satd. Flow (RTOR)							160	122					
Adj. Flow (vph)	152	806	0	0	605	160	128	119	1303	0	0	0	
Lane Group Flow (vph)	152	806	0	0	605	160	0	247	1303	0	0	0	
Turn Type	Prot	NA			NA	Perm	Perm	NA	Prot				
Protected Phases	1	6			2			4	4				
Permitted Phases						2	4						
Detector Phase	1	6			2	2	4	4	4				
Switch Phase													
Minimum Initial (s)	6.0	10.0			10.0	10.0	7.0	7.0	7.0				
Minimum Split (s)	11.6	28.0			19.0	19.0	23.3	23.3	23.3				
Total Split (s)	20.0	42.9			22.9	22.9	49.0	49.0	49.0				
Total Split (%)	21.8%	46.7%			24.9%	24.9%	53.3%	53.3%	53.3%				
Yellow Time (s)	4.5	5.0			5.0	5.0	4.3	4.3	4.3				
All-Red Time (s)	1.1	2.0			2.0	2.0	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)	5.6	7.0			7.0	7.0		5.3	5.3				
Lead/Lag	Lead				Lag		Lag						
Lead-Lag Optimize?	Yes				Yes		Yes						
Recall Mode	None	Max			Max	Max	None	None	None				
Act Effct Green (s)	13.4	35.9			17.0	17.0		42.6	42.6				
Actuated g/C Ratio	0.15	0.40			0.19	0.19		0.47	0.47				
v/c Ratio	0.80	0.65			0.71	0.40		0.40	0.96				
Control Delay	67.9	25.7			40.6	9.0		18.1	38.3				
Queue Delay	0.0	15.1			0.0	0.0		0.0	0.0				
Total Delay	67.9	40.8			40.6	9.0		18.1	38.3				
LOS	E	D			D	A		B	D				
Approach Delay	45.1		34.0				35.1						
Approach LOS	D		C				D						
Queue Length 50th (m)	26.0	60.4			37.7	0.0		27.1	111.4				
Queue Length 95th (m)	30.8	66.7			40.5	9.0		38.8	68.9				
Internal Link Dist (m)	63.8		81.9				180.4						
Turn Bay Length (m)					50.0		91.4						
Base Capacity (vph)	205	1234			851	399		634	1393				
Starvation Cap Reductn	0	423			0	0		0	0				
Spillback Cap Reductn	0	0			0	0		0	0				
Storage Cap Reductn	0	0			0	0		0	0				
Reduced v/c Ratio	0.74	0.99			0.71	0.40		0.39	0.94				

Intersection Summary

Cycle Length: 91.9
 Actuated Cycle Length: 90.8
 Natural Cycle: 80
 Control Type: Actuated-Uncoordinated
 Maximum v/c Ratio: 0.96
 Intersection Signal Delay: 37.8
 Intersection Capacity Utilization 55.2%
 Intersection LOS: D
 ICU Level of Service B
 Analysis Period (min) 15

Splits and Phases: 1: Tannery Rd & NB On-Off Ramp



Lanes, Volumes, Timings
 2: SB On-Off Ramp & Tannery Rd

06/10/2022

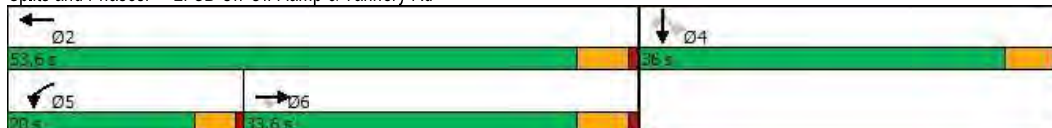


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↑↑	↑	↑↑	↑						↑	↑
Traffic Volume (vph)	0	452	103	240	309	0	0	0	0	205	1	55
Future Volume (vph)	0	452	103	240	309	0	0	0	0	205	1	55
Lane Util. Factor	1.00	0.95	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frts			0.850									0.850
Fit Protected				0.950							0.953	
Satd. Flow (prot)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Fit Permitted				0.950							0.953	
Satd. Flow (perm)	0	2645	1396	3133	1575	0	0	0	0	0	1493	1361
Satd. Flow (RTOR)			266									118
Adj. Flow (vph)	0	497	266	329	441	0	0	0	0	301	5	118
Lane Group Flow (vph)	0	497	266	329	441	0	0	0	0	0	306	118
Turn Type		NA	Perm	Prot	NA					Perm	NA	Perm
Protected Phases		6		5	2						4	
Permitted Phases			6							4		4
Detector Phase		6	6	5	2					4	4	4
Switch Phase												
Minimum Initial (s)		10.0	10.0	6.0	10.0					7.0	7.0	7.0
Minimum Split (s)		15.3	15.3	10.5	17.3					12.1	12.1	12.1
Total Split (s)		33.6	33.6	20.0	53.6					36.0	36.0	36.0
Total Split (%)		37.5%	37.5%	22.3%	59.8%					40.2%	40.2%	40.2%
Yellow Time (s)		4.3	4.3	3.5	4.3					4.1	4.1	4.1
All-Red Time (s)		1.0	1.0	0.7	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)		5.3	5.3	4.2	5.3						5.1	5.1
Lead/Lag		Lag	Lag	Lead								
Lead-Lag Optimize?												
Recall Mode		Max	Max	None	Max					None	None	None
Act Effct Green (s)		31.3	31.3	13.1	48.6						21.2	21.2
Actuated g/C Ratio		0.39	0.39	0.16	0.61						0.26	0.26
v/c Ratio		0.48	0.38	0.65	0.46						0.78	0.26
Control Delay		22.4	4.8	38.4	12.0						41.0	6.0
Queue Delay		0.0	0.0	0.0	2.9						0.0	0.0
Total Delay		22.4	4.8	38.4	14.9						41.0	6.0
LOS		C	A	D	B						D	A
Approach Delay		16.2			24.9						31.3	
Approach LOS		B			C						C	
Queue Length 50th (m)		29.3	0.0	24.2	33.1						42.9	0.0
Queue Length 95th (m)		53.6	0.0	40.4	48.7						14.8	2.4
Internal Link Dist (m)		81.8			63.8			185.9			132.2	
Turn Bay Length (m)			50.0									50.0
Base Capacity (vph)		1031	706	620	953						577	599
Starvation Cap Reductn		0	0	0	391						0	0
Spillback Cap Reductn		0	0	0	0						0	0
Storage Cap Reductn		0	0	0	0						0	0
Reduced v/c Ratio		0.48	0.38	0.53	0.78						0.53	0.20

Intersection Summary

Cycle Length: 89.6	
Actuated Cycle Length: 80.3	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.78	
Intersection Signal Delay: 22.9	Intersection LOS: C
Intersection Capacity Utilization 55.2%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 2: SB On-Off Ramp & Tannery Rd



Lanes, Volumes, Timings
3: Timberland Rd & Pine Rd

06/10/2022

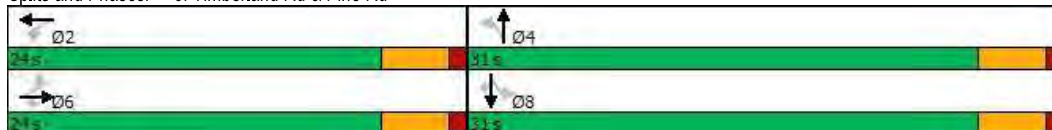


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗		↔		↖	↗		↖	↗	↖
Traffic Volume (vph)	38	0	9	38	0	158	9	333	3	147	136	42
Future Volume (vph)	38	0	9	38	0	158	9	333	3	147	136	42
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Friction			0.850		0.902			0.998				0.850
Fit Protected		0.950			0.986		0.950			0.950		
Satd. Flow (prot)	0	1508	1338	0	1709	0	1534	1917	0	1825	1353	1103
Fit Permitted		0.365			0.885		0.629			0.430		
Satd. Flow (perm)	0	580	1338	0	1534	0	1015	1917	0	826	1353	1103
Satd. Flow (RTOR)			30		266			2				67
Adj. Flow (vph)	62	0	26	169	0	443	21	416	5	365	206	67
Lane Group Flow (vph)	0	62	26	0	612	0	21	421	0	365	206	67
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2			4			8		8
Detector Phase	6	6	6	2	2		4	4		8	8	8
Switch Phase												
Minimum Initial (s)	5.0	5.0	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	22.5	22.5
Total Split (s)	24.0	24.0	24.0	24.0	24.0		31.0	31.0		31.0	31.0	31.0
Total Split (%)	43.6%	43.6%	43.6%	43.6%	43.6%		56.4%	56.4%		56.4%	56.4%	56.4%
Yellow Time (s)	3.5	3.5	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	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	Max	Max	Max	Max	Max		None	None		None	None	None
Act Effct Green (s)		19.5	19.5		19.5		25.1	25.1		25.1	25.1	25.1
Actuated g/C Ratio		0.36	0.36		0.36		0.47	0.47		0.47	0.47	0.47
v/c Ratio		0.30	0.05		0.84		0.04	0.47		0.95	0.33	0.12
Control Delay		17.6	5.2		22.8		7.9	11.7		52.7	10.6	3.1
Queue Delay		0.0	0.0		0.0		0.0	0.0		0.0	0.0	0.0
Total Delay		17.6	5.2		22.8		7.9	11.7		52.7	10.6	3.1
LOS		B	A		C		A	B		D	B	A
Approach Delay		13.9			22.8			11.5			33.9	
Approach LOS		B			C			B			C	
Queue Length 50th (m)		4.3	0.0		30.4		1.0	25.5		31.1	11.5	0.0
Queue Length 95th (m)		2.8	0.8		0.0		2.3	37.0		25.1	15.5	3.9
Internal Link Dist (m)		94.5			114.4			47.9			45.9	
Turn Bay Length (m)			25.0				30.0			50.0		
Base Capacity (vph)		210	505		727		502	948		408	668	579
Starvation Cap Reductn		0	0		0		0	0		0	0	0
Spillback Cap Reductn		0	0		0		0	0		0	0	0
Storage Cap Reductn		0	0		0		0	0		0	0	0
Reduced v/c Ratio		0.30	0.05		0.84		0.04	0.44		0.89	0.31	0.12

Intersection Summary


















Cycle Length: 55	
Actuated Cycle Length: 53.7	
Natural Cycle: 55	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.95	
Intersection Signal Delay: 23.5	Intersection LOS: C
Intersection Capacity Utilization 61.5%	ICU Level of Service B
Analysis Period (min) 15	

Splits and Phases: 3: Timberland Rd & Pine Rd



HCM Unsignalized Intersection Capacity Analysis
 4: Timberland Y & S of Pine Rd

06/15/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	70	0	0	0	0	12	0	269	0	12	125	61
Future Volume (vph)	70	0	0	0	0	12	0	269	0	12	125	61
Peak Hour Factor	0.52	0.25	0.25	0.25	0.25	0.55	0.92	0.50	0.92	0.50	0.65	0.52
Hourly flow rate (vph)	135	0	0	0	0	22	0	538	0	24	192	117
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	135	22	538	333								
Volume Left (vph)	135	0	0	24								
Volume Right (vph)	0	22	0	117								
Hadj (s)	0.52	-0.41	1.07	0.83								
Departure Headway (s)	7.0	6.5	6.1	6.2								
Degree Utilization, x	0.26	0.04	0.91	0.57								
Capacity (veh/h)	488	497	576	555								
Control Delay (s)	12.5	9.8	43.4	17.2								
Approach Delay (s)	12.5	9.8	43.4	17.2								
Approach LOS	B	A	E	C								
Intersection Summary												
Delay			30.1									
Level of Service			D									
Intersection Capacity Utilization			37.8%		ICU Level of Service				A			
Analysis Period (min)			15									