Rec'd 20180919
6410-20 / CV RGS Amendment
RGS 1C 17
A. Mullaly

RIVERWOOD RESIDENTIAL DEVELOPMENT

TRANSPORTATION ASSESSMENT

FINAL REPORT

Prepared For:	**3L Developments Inc.**
Prepared By:	**Bunt & Associates Engineering Ltd**
File Number:	**5804.04**
Date of Issue:	**October 30, 2009**

Table of Contents

Exhibits

Appendix

1. Introduction

3L Developments Inc. is proposing to rezone the subject property on Duncan Bay Main Road (DBM Road) in the Comox Valley from the Rural 20 (RU20) district into a Residential Subdivision consisting of 600 properties across 400 acres. Bunt & Associates has been commissioned by 3L Developments Inc. to provide traffic and transportation advice to support their rezoning application to develop the Riverwood Residential development. This report provides an overview of the potential off-site transportation impacts of the proposed development, as well as potential strategies to reduce the auto-dependence of the development in keeping with the principals of sustainability.

This report has been set out in the following manner:

- Section 2 describes the existing conditions in the study area and establishes the general scope for the planned study network;
- Section 3 outlines relevant municipal, regional and provincial transportation plans and policies that need to be considered in the context of the site development;
- Section 4 provides information on the proposal for the site development;
- Section 5 outlines the methodology for predicting the vehicle trip generation by the subdivision, using data that is consistent with the characteristics of the development design and the planned infrastructure and initiatives to support it. It also examines the likely trip distribution, including the potential for internal, linked and diverted trips
- Section 6 will assess the effect of the development traffic on the study road network, it will identify locations where off-site improvements are considered appropriate to support the site redevelopment;
- Section 7 outlines potential sustainable transportation measures for the site;
- Section 8 sets out the conclusions and recommendations of the study.

2. Existing Conditions

This section will review the existing conditions by describing the site layout, surrounding land uses, the site's current zoning, and the local road network and transportation movements.

2.1 Site Location & Existing Land Uses

The site location is illustrated on **Exhibit 1** in the context of the local road network. The site covers approximately 400 acres of rural land and is bounded by rural properties to the north, Browns River to the east, the Puntledge River to the south, and the Inland Island Highway (Highway 19) to the west. The site is divided by the Duncan Bay Main Road / Comox Logging Co. Road (referred throughout as DBM Road) which runs from north to south through the middle of the site and from which site access will be provided.

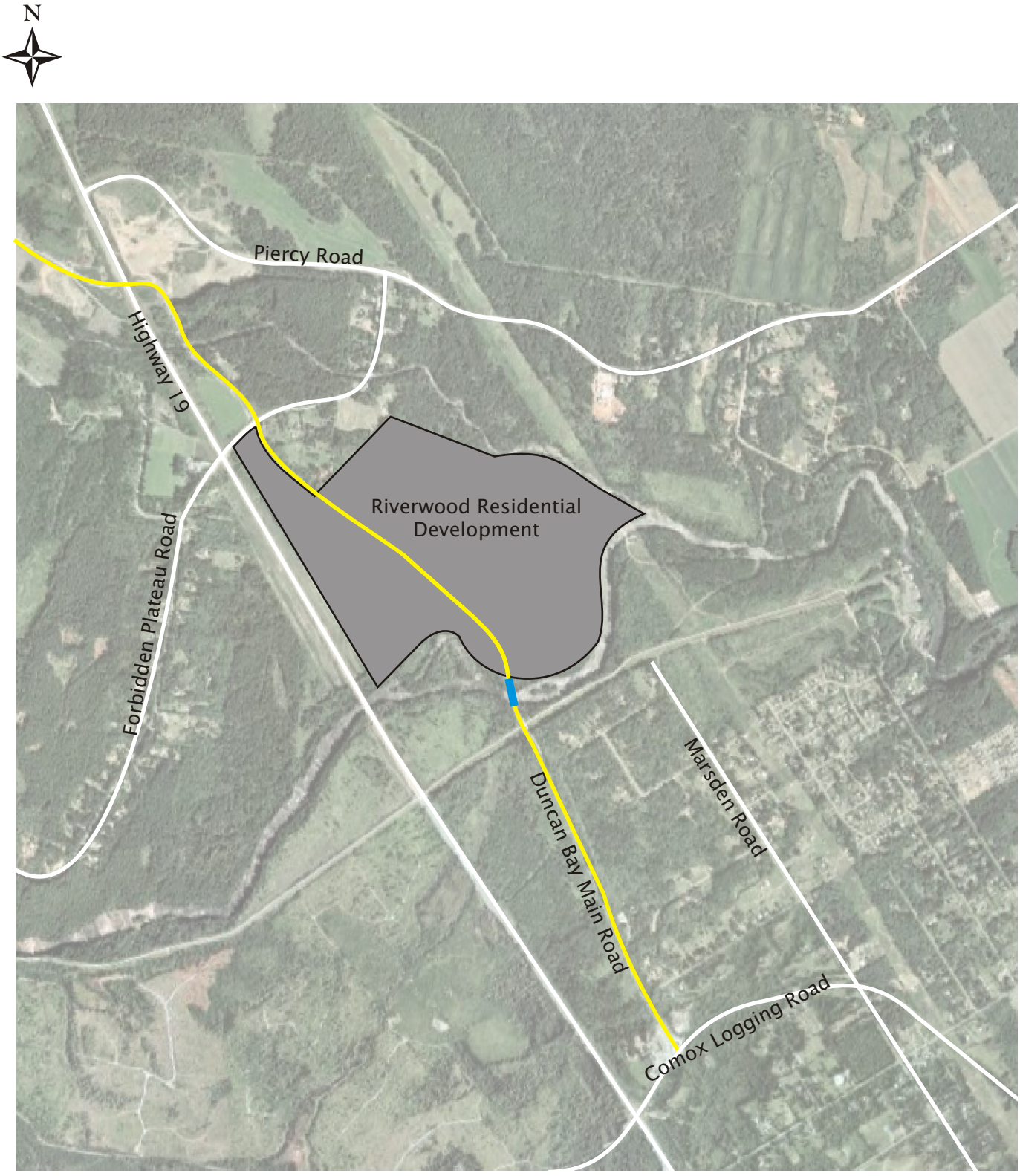
2.2 Current Zoning

The development site is subject to a rezoning application. At present, the site is zoned RU20 Rural. While the southern area of the site bordering on the Puntledge River is not zoned as a park, it is currently used as a recreational area by those accessing the river and existing trails along the north side of the river.

2.3 Existing Road Network

Highway 19 is a limited access Arterial Highway that runs parallel to the Island Highway (Highway 19A) from Parkville to Campbell River. Highway 19 is a four-lane divided facility with a mix of grade separated interchanges and at-grade signals that provide an alternative and more direct route along the eastern coast line than the Old Island Highway.

To access the site from the north, vehicles are required to take exit 127 from Highway 19 at Piercy Road, turn right onto Forbidden Plateau Road before turning left onto DBM Road to access the site. The intersection of the Highway 19 and Piercy Road is a signalized T-intersection with separate right turn lanes on all approaches. On the Highway 19 approaches to the intersection the posted speed limit is 90km/hr and on Piercy Road the speed limit of 70km/hr. Pedestrian crossing facilities are provided at the intersection; however pedestrians are not permitted to walk along the highway and sidewalks are not



N.T.S. 5804-04

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

Location of the site and Northern Access

Riverwood Residential Development, Courtenay

Exhibit 1

provided on any of the approaches. Road condition, pavement marking and signage are currently of a high standard.

Piercy Road is a Rural Collector road providing access from Highway 19 into the northern part of downtown Courtenay. Forbidden Plateau Road is a Rural Local road providing access to adjacent residential properties as well as industrial, agricultural and forestry block properties located south and west of its intersection with DBM Road.

The intersection of Piercy Road and Forbidden Plateau Road is a stop controlled intersection, with priority afforded to Piercy Road. A 30m long left turn bay is provided on the westbound approach on Piercy Road and 30m right and left turn bays are provided on the Forbidden Plateau Road approach. The posted speed limit on both roads in this location is 60km/hr and paved shoulders are also provided on both roads. While the road pavement at the intersection is currently in good condition; however the pavement markings are very faded on the northbound approach, as shown in **Exhibit 2**. During the site visit, it was observed that this intersection is used by a significant number of heavy vehicles turning to and from Forbidden Plateau Road, including oversize loads. On the day of the site visit the sight distance from a car stopped at the stop bar looking west to approaching traffic on Piercy Road was measured and it was noted that a row of pine trees on the southern side of Piercy Road, just west of the intersection limited the available sight distance for vehicles exiting Forbidden Plateau Road. In keeping with the rural environment, pedestrian facilities are not provided at this intersection.

Exhibit 2 – Faded road markings on Forbidden Plateau Road approach to Piercy Road

The intersection of Forbidden Plateau Road and DBM Road is stop sign controlled with priority afforded to traffic on Forbidden Plateau Road. The intersection is elevated via fill from the surrounding rural properties in order to tie-in with the Forbidden Plateau Road overpass of Highway 19, some 200m west of the intersection. As a result, there are no shoulders provided on DBM Road and there is Concrete Roadside Barrier provided to protect a residential property in the southeast quadrant of the intersection. The elevation of the intersection assists with good sight distances from all approaches. The pavement is currently in good condition; however the pavement markings are worn on Forbidden Plateau Road and not provided on DBM Road, as shown in **Exhibit 3**. During the site visit, it was observed that this intersection is also used by a large number of heavy vehicles as well as cyclists.

Exhibit 3 – No road markings on DBM Road northbound approach to Forbidden Plateau Road

DBM Road is a Ministry of Forests road for several hundred metres south of its intersection with Forbidden Plateau Road, then becomes a private road which runs through the site from Forbidden Plateau Road to the private one lane bridge crossing the Puntledge River. Although it is a private road, DBM Road is currently available for use by the public and it was observed during the site visit that the route is well used by both vehicular and cycling traffic. Once the site is redeveloped, it is proposed to make the section of DBM Road between Forbidden Plateau Road to just north of the one-lane bridge over the Puntledge River a public road. South of the one-lane bridge, the DMB Road continues through private property and across a private gravel industrial yard, used as the headquaters for a logging operation, to the intersection of Comox Logging Road. This gravel yard begins 150m north of the intersection, and where the two roads meet is about 50m wide. There is no positive guidance to drivers through this gravel yard.

The intersection of Comox Logging Road and Marsden Road is stop sign controlled with priority afforded to traffic on Comox Logging Road. The pavement is currently in good condition, but markings at this intersection are very faded. Unsealed shoulders are provided on all approaches and the posted speed limit is 60km/hr.

To access the site from the south (if the private section of DBM Road is available) vehicles would take exit 117 from Highway 19 at the Comox Valley Parkway interchange. This interchange is about 8km south of the site and the most direct route from this exit point is left onto Cumberland Road, left onto Marsden Road, left onto Comox Logging Road and right onto DBM Road. The route travels through forestry and agricultural land along these minor roads and is shown in the context of the wider road network in **Exhibit 4**.

The most convenient route to the southern part of Downtown Courtenay from the site is to travel south of the site on DBM Road via Comox Logging Road, onto Lake Trail Road, Pidcock Avenue and Cumberland Road. The most convenient route to Comox is north along DBM Road to Piercy Road, via Forbidden Plateau Road. At the end of Piercy Road vehicles turn right onto Dove Creek Road, cross a signalized one lane bridge, and follow Headquarters Road and Vanier Drive to Veterans Memorial Parkway. The Parkway then becomes Lenwick Road and Guthrie Road, before intersecting Anderton Road in Comox.

2.4 Study Road Network

The study area for the traffic impact assessment was agreed with the Ministry of Transportation and Infrastructure (MoTI) as follows:

Signalized Intersections:

- Highway 19 and Piercy Road

Unsignalized Intersections:

- Piercy Road and Forbidden Plateau Road
- Forbidden Plateau Road and DBM Road
- Comox Logging Road and Marsden Road

The laning and form of traffic control at these key intersections are shown in **Exhibit 5**.

Given the development will be primarily residential, the peak periods for the traffic impact assessment were agreed to be the weekday morning, weekday afternoon and the Saturday midday peak hours.

One Lane Bridge
Existing Private Road

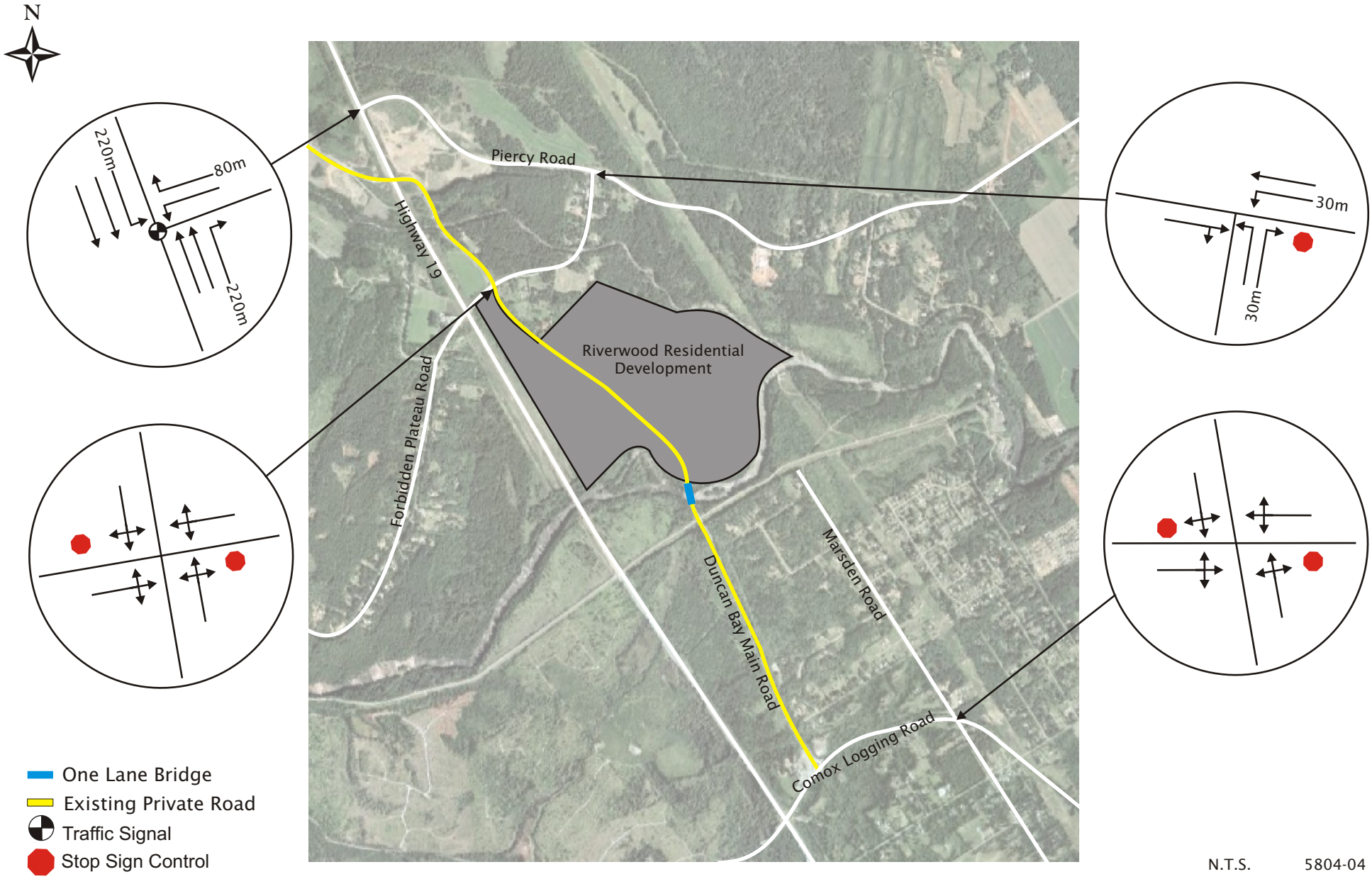
N.T.S. 5804-04

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

Location of the site and Southern Access

Riverwood Residential Development, Courtenay

Exhibit 4



N.T.S. 5804-04

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

Intersection Layouts

Riverwood Residential Development, Courtenay

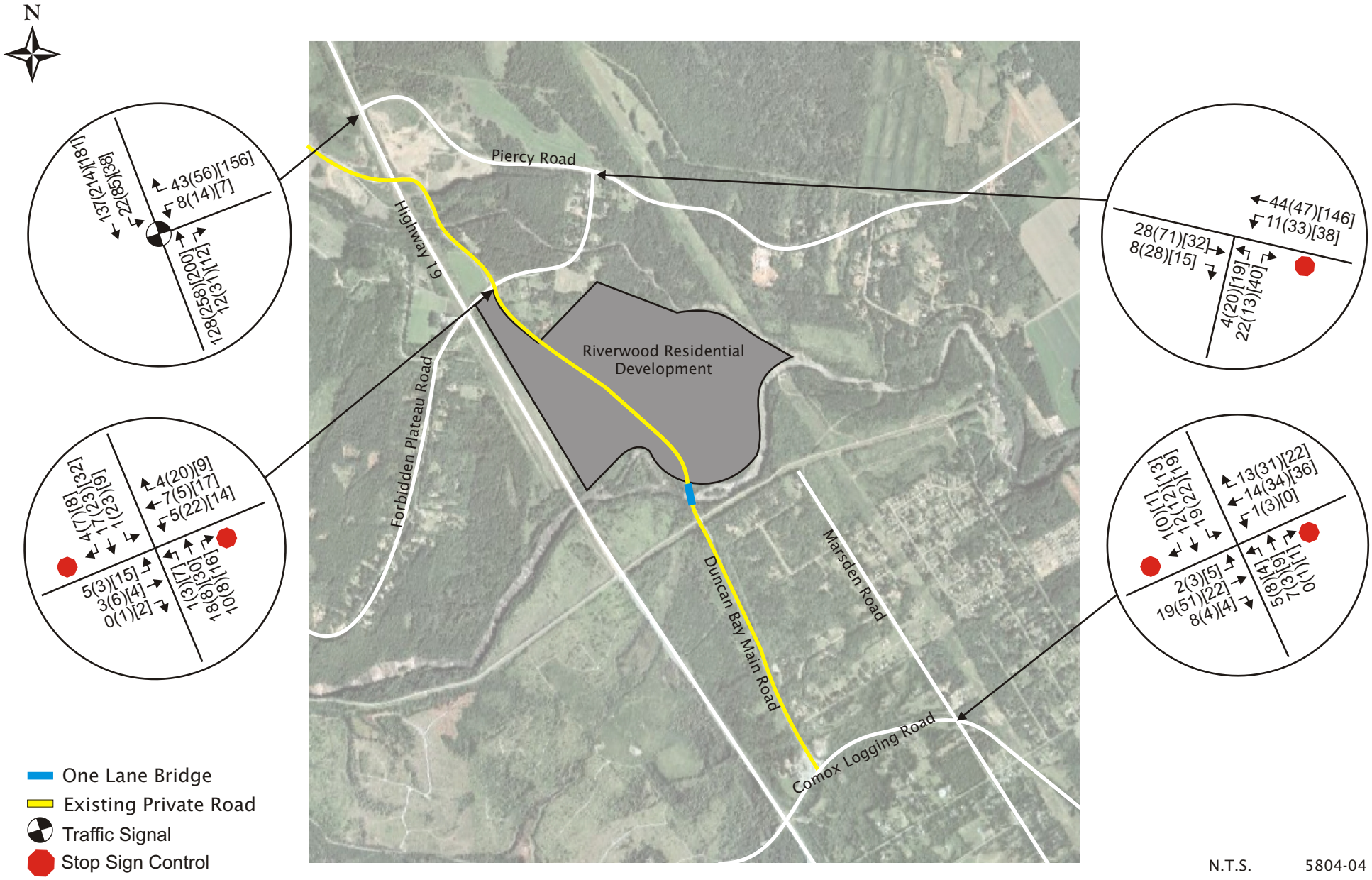
Exhibit
5

2.5 Existing Traffic Volumes & Operations

As no recent traffic data were available for the study area intersections, traffic surveys were conducted in mid September 2009 to document the existing traffic movements in the study network for the peak periods identified. **Exhibit 6** illustrates the peak hour volumes from the three design periods. The observed traffic counts are presented in **Appendix A** on the Ministry of Transportation Vehicle Turning Movement Survey summary sheets.

As shown in **Exhibit 6**, the weekday afternoon period was found to have the highest traffic flows, with volumes on Highway 19 in the order of 620vph. On the local roads traffic volumes were lower with Piercy Road recording around 170vph, Forbidden Plateau Road recording 90vph, DBM Road recording 70vph and Marsden Road recording 30vph in the weekday afternoon peak period.

Heavy vehicle traffic volumes were also collected as part of the traffic survey, with the results shown in **Exhibit 7** for the peak periods surveyed. As shown a number of heavy vehicles travel through the intersections surveyed, with a peak of around 40 heavy vehicles recorded in the peak hour on HW19 at the intersection with Piercy Road.



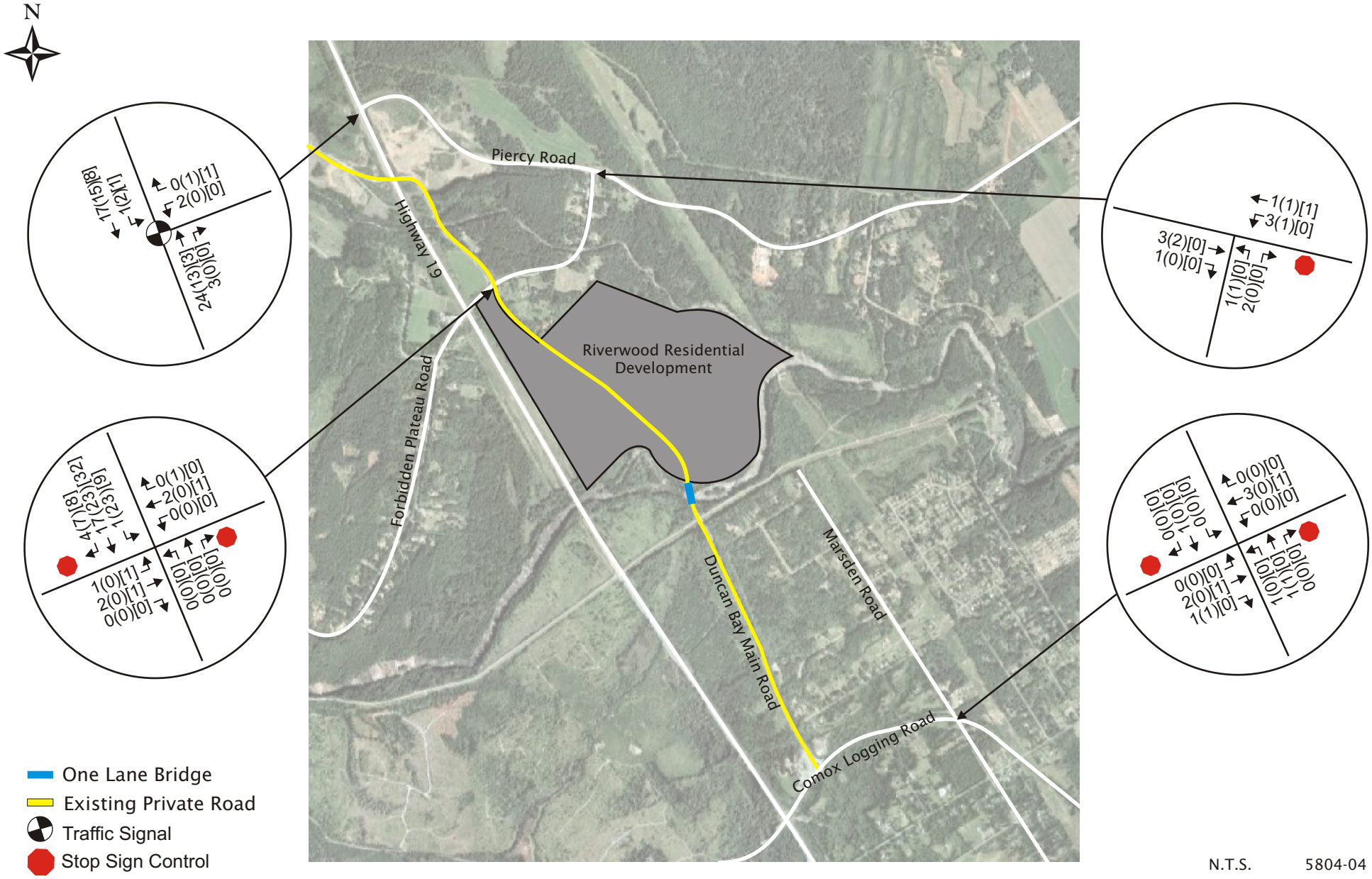
N.T.S. 5804-04

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

Existing Total Traffic Volumes

Riverwood Residential Development, Courtenay

Exhibit 6



N.T.S. 5804-04

Existing Heavy Vehicle Volumes

Riverwood Residential Development, Courtenay

Exhibit 7

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

3. Current Transportation Plans & Infrastructure Change

3.1 Provincial Plans

As part of this study, discussion with MoTI District staff confirmed that MoTI has no plans for any roadway or traffic control improvements associated with roadways in the study area.

3.2 Regional Plans & Polices

Both the Regional Growth Strategy (RGS) and the Comox Valley Sustainability Strategy (CVSS) are currently being drafted. At this stage it is envisioned that a preliminary draft of the RGS will be available in January 2010, with a final draft by July 2010. A final draft for the CVSS was issued in July 2009. Both these documents provide a good indication of the direction of both land use and transportation plans and policies in the area of the site; each of these plans aim to introduce a number of transportation changes in the Comox valley to reduce the reliance upon the private automobile.

This section will first describe the policies identified in the RGS and the CVSS. Brief descriptions will then be provided for each of the transportation infrastructure schemes identified above.

Regional Growth Strategy

The document "Understanding Our Choices" was prepared in June 2009 to provide the foundation from which the RGS is to be developed. Therefore, this document outlines the role of the RSG, describes the trends and issues and then raises points for discussion. This document provides a good overview of how the region currently operates and with regards to transport it outlines the key infrastructure elements in the Comox Valley.

Further to this, the document suggests "Points for Discussion" and identifies proper land use planning, management of development at highway exits, support transit-first development, encourage transportation demand management, evaluate intelligent transportation systems and advocate cycle lanes on all major regional roads as policy ideas for consideration.

Comox Valley Sustainability Strategy

The CVSS provides a series of goals that are addressed with objectives, targets and actions. With respect to transportation these goals are primarily focused on reducing the reliance upon private vehicles with the draft goals outlined as follows:

- Reduce the need for single occupant vehicles;
- Promote high-efficiency, low emission, and no-emission vehicles and alternative fuels; and,
- Implement transportation programs that increase walking, cycling and transit use.

The proposed Riverwood Residential development aims to address these goals. Section 7 below offers some options for implementing sustainable transportation measures for the development.

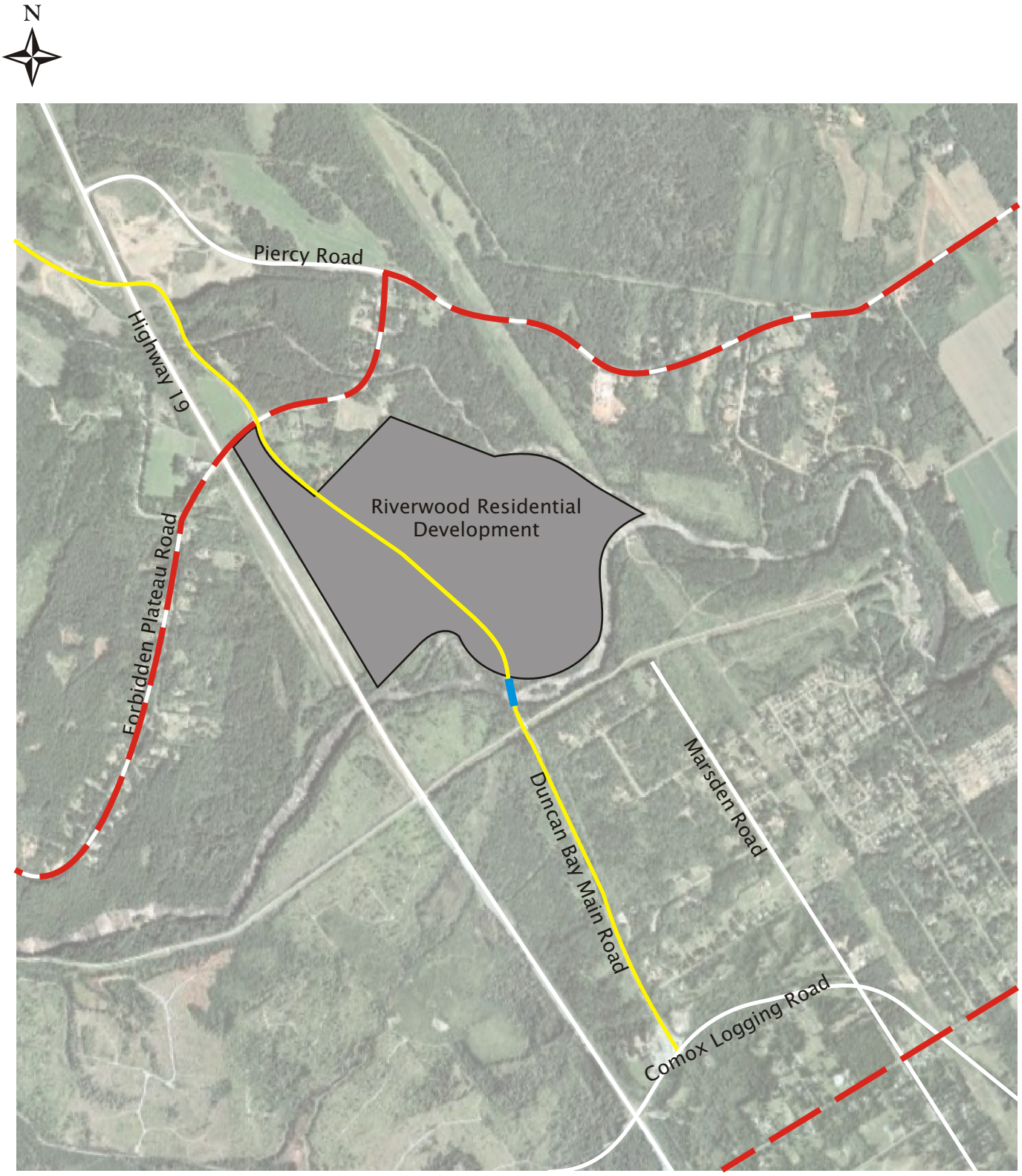
The Comox Valley Regional District currently has Cycleway and Greenway Plans that will be reviewed as part of the CVSS. Exerts from the Cycleway map is shown in **Exhibit 8** and the Greenway map is shown in **Exhibit 9**. A cycleway is shown following Forbidden Plateau Road and continues along Piercy Road, to the north of the site. This cycleway intersects with Dove Creek Road and then heads south into Courtenay. To the south of the site a cycleway follows Lake Trail Road and this also takes cyclists into Courtenay.

The Regional District Greenway plan shows the various greenway trails and roads. Within the study area a greenway is shown running parallel to the Highway, along Piercy Road, adjacent to a section of Forbidden Plateau Road and adjacent to both the Brown's River and Puntledge River. In addition to these, a trail is shown running adjacent to DBM Road from the one lane bridge to Comox Logging Road. Given that there are Greenway trails to the north and south of the proposed site, it is recommended that the possibility of connecting up these greenways be considered as part of the improvements to DBM Road.

3.3 Municipal Plans

The site lies outside of the boundary of the cities of Courtenay and Comox so municipal improvement plans will only indirectly impact the site. Courtenay and Comox have plans to connect Piercy Road directly with Veterans Memorial Parkway via a river crossing, which would make a more direct northern connection between Highway 19 and Comox. However, the timing of this improvement is unknown. The impact of this new connection will be to make Piercy Road more attractive as an access to Highway 19, so traffic volumes are expected to increase. In this study, background traffic growth scenarios have been selected

which, in our view, would address the range of volumes anticipated on Piercy Road if the connection to Veteran's Memorial Parkway was completed within the study time horizons.



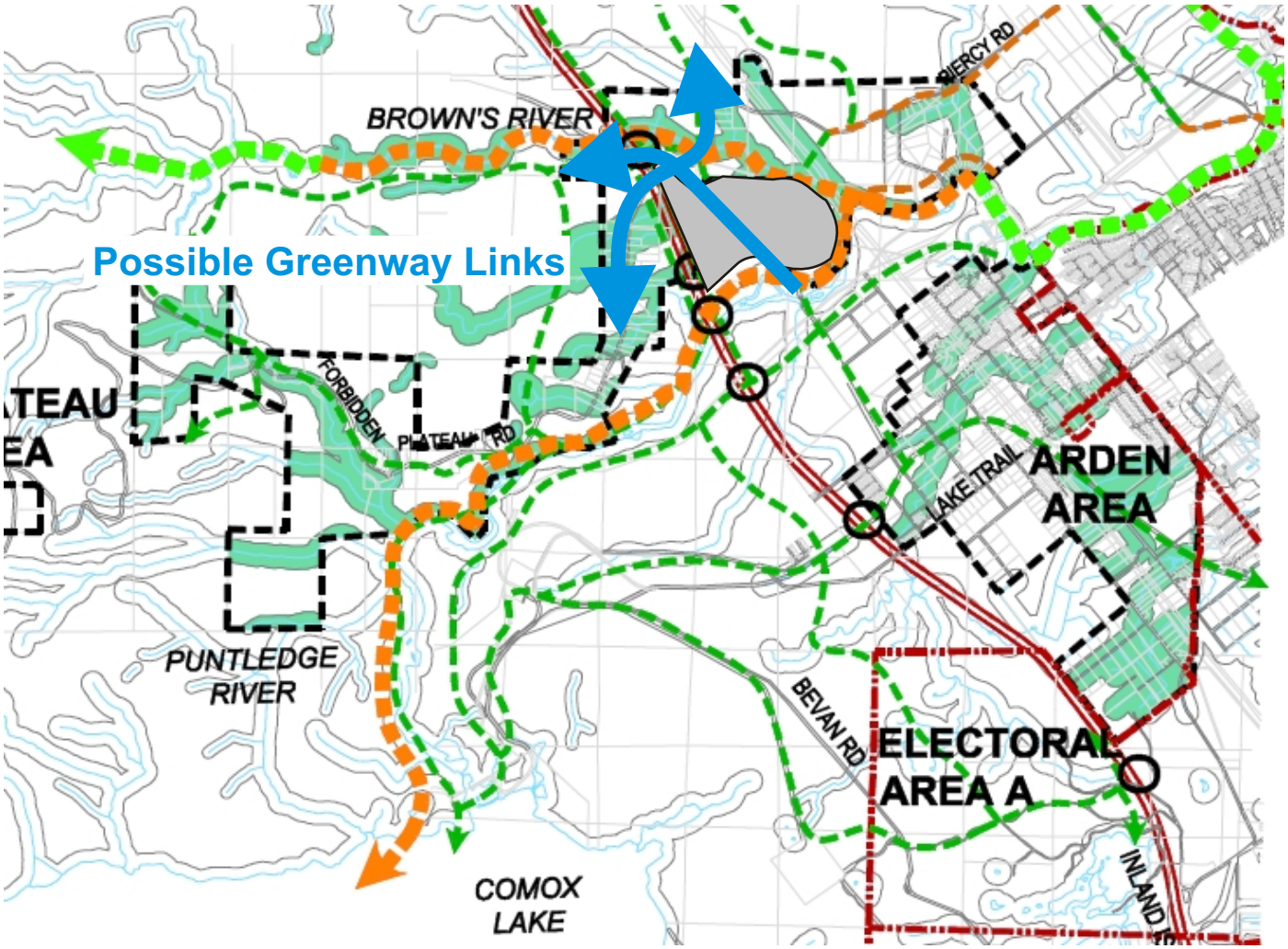
N.T.S. 5804-04

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

Cycle Network

Riverwood Residential Development, Courtenay

Exhibit 8



Source: Map #6: Area C Greenway Plan, Regional District of Comx-Strathcona Electoral Area C N.T.S. 5804-04

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

Proposed Greenway Network

Riverwood Residential Development, Courtenay

Exhibit 9

4. Development Plan

3L Developments Inc. is proposing to rezone the property on DBM Road from the Rural 20 (RU20) district into a Residential Subdivision consisting of 600 properties across 400 acres.

It is anticipated that the development will be developed in phases, with the first phase of 60 homes being completed by 2012 and all remaining phases with 540 homes and some neighbourhood retail completed by 2022. The planned uses and areas for the development are summarized in **Table 4.1** below.

Table 4-1: Proposed Development Content

Land Use	Number / Area
Residential – Single Family Residence	450 house
Residential – Patio Homes, Carriage Homes	150 houses
Neighbourhood Retail	n/a*

Note that the amount of neighbourhood retail development is not yet known although it will is intended to be relatively small scale; therefore for the purposes of this analysis, no retail has been assumed to be present. This is a conservative approach, as the presence of some local retail opportunities would reduce the vehicle trip generation of the site development, without adding vehicle trips from those originating outside of the site development.

5. Traffic Forecasts

This section provides estimates of the number of vehicle trips that could potentially be generated by the proposed development given, a range of development scenarios. It will also outline the key assumptions applied in determining the site-generated trips and how these are distributed on the road network.

5.1 Site Trip Generation

The proposed residential development is planned to provide mainly single family residential properties with some smaller townhouses also available.

In order to determine the likely trip generation rate of the site both the MoTI rates and the ITE rates have been reviewed for comparison. The rates obtained from ITE assume 75% of trips are from single family properties, and 25% are from townhouses (representing the smaller Patio Homes and Carriage Homes). This distinction within residential properties was not available from the MoTI data and as a result all trips have been conservatively assigned a single family residential trip rate. **Table 5-1** sets out the MoTI generation rates for the proposed Riverwood Residential Development. It should be noted that MoTI do not provide a trip generation rate for the Saturday midday peak period.

Table 5-1: MoTI Trip Generation Rates for the Proposed Development

Land Use	Weekday Morning			Weekday Afternoon		
	In	Out	Total	In	Out	Total
Single Family residential	0.26	0.74	1.00	0.77	0.43	1.20

By comparison the ITE trip generation rates are outlined below in **Table 5-2**.

Table 5-2 ITE Trip Generation Rates for the Proposed Development

Land Use	Weekday Morning			Weekday Afternoon			Saturday Midday		
	In	Out	Total	In	Out	Total	In	Out	Total
Single Family Residential	0.19	0.56	0.75	0.64	0.37	1.01	0.49	0.44	0.93
Townhouse Residential (Patio Homes, Carriage Homes)	0.07	0.37	0.44	0.35	0.17	0.52	0.25	0.22	0.47

As shown in **Table 5-2**, the ITE rates for a single family residential property are lower than the MoTI rates, and as expected the ITE townhouse rate representing the Patio and Carriage Homes is lower again. In the analysis to follow both the MoTI and ITE rates have been applied and compared to determine the number of trips generated by the site. As expected the number of trips generated was much higher when the MoTI rate was applied.

5.2 Site Vehicle Trip Summary & Distribution

The number of trips generated by the development was estimated and is summarized by phase in the tables below. Once again the analysis has been carried out using both the MoTI rates and the ITE rates. These results are outlined in **Tables 5-3 and 5-4**.

Table 5-3: MoTI Trip Generation Levels for the Proposed Development

Phase	Total Number of properties	Weekday Morning			Weekday Afternoon		
		In	Out	Total	In	Out	Total
Phase 1 (2012)	60	16	44	60	46	26	72
Phase 2* (2022)	600	156	444	600	461	259	720

Table 5-4 ITE Trip Generation Levels for the Proposed Development

Phase	Total Number of Properties	Weekday Morning			Weekday Afternoon			Saturday Midday		
		In	Out	Total	In	Out	Total	In	Out	Total
Phase 1 (2012)	60	9	29	39	32	19	50	25	22	47
Phase 2* (2022)	600	90	293	384	321	148	506	247	218	466

*Phase 2 is the full development

The ITE trip generation results shown in **Table 5-4** have also been reduced by 5% to account for internal trips within the development due to the presence of the neighbourhood commercial shops and the surrounding parks, which would be attractive for some walking or cycling trips.

As **Tables 5-3 and 5-4** demonstrate, the proposed development will generate between of 720 and 506 trips (two-way) during the afternoon peak period and between 600 and 384 trips during the morning peak period.

Trip distribution of the residential development has been assigned according to two different scenarios. The first scenario assumes that all development traffic must enter and exit the site from the north, as would be the case if the private road to the south of the site is closed to public use. The second scenario assumes that 60% of traffic will enter and exit the site from the north and 40% from the south. This second scenario is in keeping with the existing traffic patterns in the area and assumes that the private road is used by residents to travel south of the site. **Tables 5-5 and 5-6** show the predicted traffic distribution patterns for the two scenarios during the peak periods.

Table 5-5: Predicted Traffic Distribution Pattern – 100% North

Street	Weekday Morning		Weekday Afternoon		Saturday Midday	
	In	Out	In	Out	In	Out
Piercy Road (east)	85%	85%	85%	85%	68%	68%
Highway 19 (north)	10%	13%	11%	12%	24%	30%
Highway 19 (south)	5%	2%	4%	3%	8%	2%
Comox Logging Road (east)	0%	0%	0%	0%	0%	0%
Marsden Road (south)	0%	0%	0%	0%	0%	0%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

Table 5-6: Predicted Traffic Distribution Pattern – 60% North, 40% South

Street	Weekday Morning		Weekday Afternoon		Saturday Midday	
	In	Out	In	Out	In	Out
Piercy Road (east)	51%	51%	51%	51%	41%	41%
Highway 19 (north)	6%	8%	7%	7%	14%	18%
Highway 19 (south)	3%	1%	2%	2%	5%	1%
Comox Logging Road (east)	30%	30%	30%	30%	30%	30%
Marsden Road (south)	10%	10%	10%	10%	10%	10%
Total	**100%**	**100%**	**100%**	**100%**	**100%**	**100%**

5.3 Site Traffic Assignment

Flow diagrams of site traffic have been produced to cover each step of the analysis for the two trip generation scenarios and the two trip distribution patterns. These flow diagrams are included in **Appendix B**.

5.4 Traffic Forecast Scenarios

For the purposes of the transportation assessment, two background growth rate scenarios were considered. The first scenario assumes a background growth rate of 2% on Highway 19 and Piercy Road, and a 1% growth rate on all other roads. The second scenario assumes a background growth rate of 4% on Highway 19 and Piercy Road, and a 2% growth rate on all other roads. The first scenario reflects average historical growth on Highway 19 near Piercy, according to MoTI data, and the second scenario reflects peak directional growth in the same location.

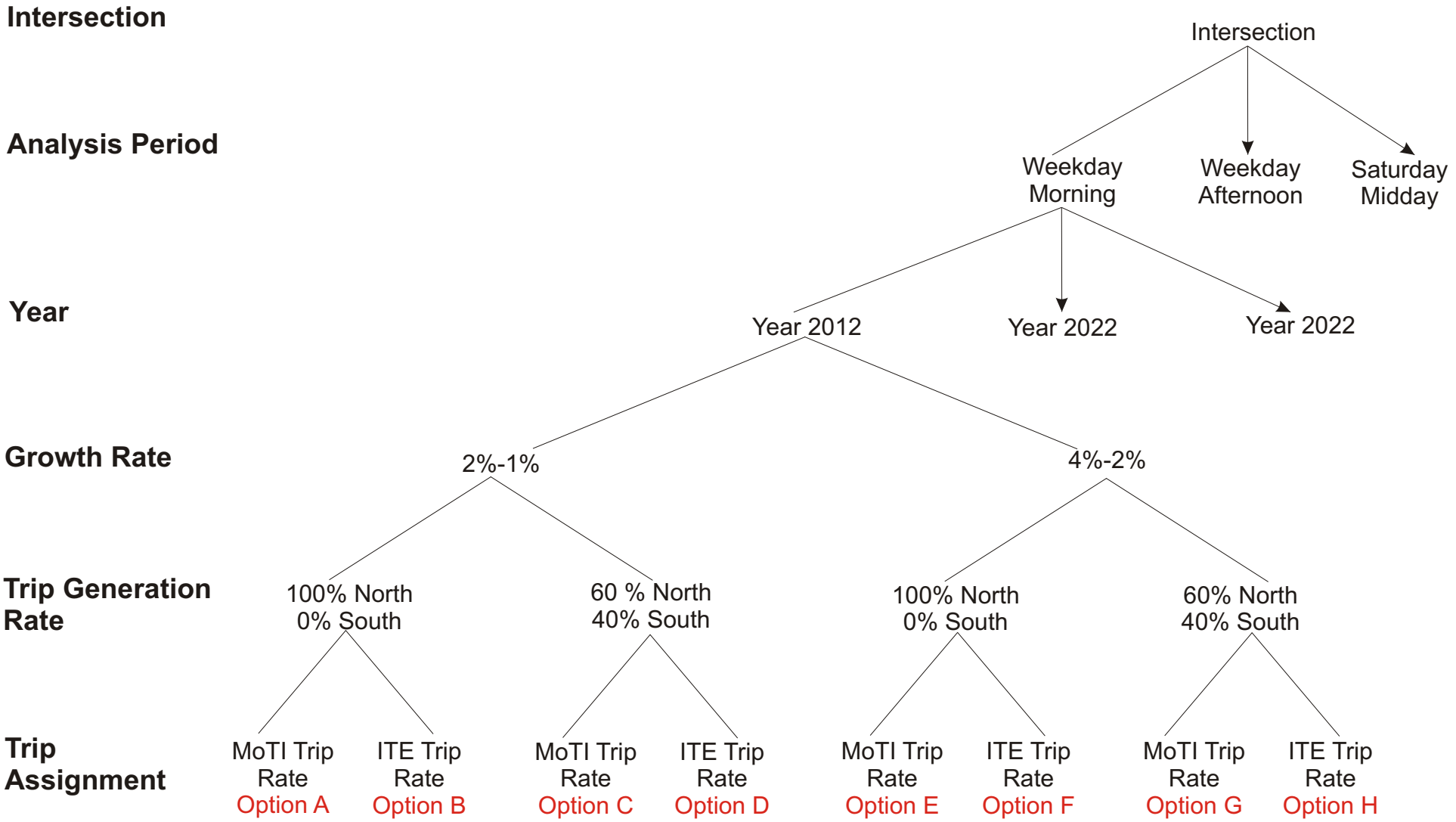
Each intersection in the study area has been assessed under the various scenarios and the resulting options are shown in **Exhibit 10**. These options have been analysed for each peak period, year and intersection and are summarised as follows:

Option A: this has a growth rate of 2% on Highway19 and Piercy Road and a growth rate of 1% on all other roads, 100% of traffic travel to and from the north and the MoTI trip generation rate has been used.

Option B: this has a growth rate of 2% on Highway 19 and Piercy Road and a growth rate of 1% on all other roads, 100% of traffic travel to and from the north and the ITE trip generation rate has been used.

Option C: this has a growth rate of 2% on Highway 19 and Piercy Road and a growth rate of 1% on all other roads, 60% of traffic travel north, 40% of traffic travel south and the MoTI trip generation rate has been used.

Option D: this has a growth rate of 2% on Highway 19 and Piercy Road and a growth rate of 1% on all other roads, 60% of traffic travel north, 40% of traffic travel south and the ITE trip generation rate has been used.



5804-04

bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

Analysis Forecast Options

Riverwood Residential Development, Courtenay

Exhibit
10

Option E: this has a growth rate of 4% on Highway 19 and Piercy Road and a growth rate of 2% on all other roads, 100% of traffic travel to and from the north and the MoTI trip generation rate has been used.

Option F: this has a growth rate of 4% on Highway 19 and Piercy Road and a growth rate of 2% on all other roads, 100% of traffic travel to and from the north and the ITE trip generation rate has been used.

Option G: this has a growth rate of 4% on Highway 19 and Piercy Road and a growth rate of 2% on all other roads, 60% of traffic travel north, 40% of traffic travel south and the MoTI trip generation rate has been used.

Option H: this has a growth rate of 4% on Highway 19 and Piercy Road and a growth rate of 2% on all other roads, 60% of traffic travel north, 40% of traffic travel south and the ITE trip generation rate has been used.

6. Traffic Operations with Site Developed

This section provides an assessment of the off-site impacts of the development traffic within the local road network and it draws upon the traffic surveys presented in Section 2, along with the trip generation and distribution figures outlined in Section 5.

This assessment considers the operation of the road network on Opening Day in 2012 (phase 1), Build-Out in 2022 (phase 2) and Build-Out plus 10 years in 2032 for both the three peak periods. A summary of the capacity analysis for the intersections in the study network is presented in tabular format.

The traffic operations at the study intersections were evaluated using Trafficware's Synchro 6.0 traffic analysis model. This model uses Highway Capacity Manual (HCM) procedures to assess the Volume to Capacity ratio (v/c) and the corresponding delay-based traffic Level of Service (LOS) at the each of the intersections on the study network. For the Level of Service indicator, the following summarize the range of delays (in seconds per vehicle) for signalized and unsignalized intersections:

- For signalized intersection, the Level of Service ranging from LOS 'A' conditions with minimal delay (< 10 sec per vehicle) through to LOS 'E' 'near capacity' conditions (> 55 sec to ≤ 80 sec per vehicle) and LOS 'F' 'over-saturated' conditions (> 80 sec per vehicle).
- For unsignalized intersection, the Level of Service ranging from LOS 'A' conditions with minimal delay (< 10 sec per vehicle) through to LOS 'E' 'near capacity' conditions (> 35 sec to ≤ 50 sec per vehicle) and LOS 'F' 'over-saturated' conditions (> 50 sec per vehicle).

For the purposes of this analysis, we have assumed that the following performance thresholds would trigger the need for off-site improvements to support the site development:

- V/C ratios greater than 0.85; and,
- LOS D or worse.

6.1 Intersection of Highway 19 and Piercy Road

The Volume to Capacity (v/c) ratio and the Level of Service (LOS) for the intersection of Highway 19 and Piercy Road has been reported in **Table 6-1** for the various scenarios. The signal timing of this intersection has been modelled with the existing signal timing and phasing information as provided by the MoTI.

Table 6-1: Highway 19 / Piercy Road Intersection Operations Summary

Year	Option	Morning Peak		Afternoon Peak		Saturday Peak	
		V/C	LOS	V/C	LOS	V/C	LOS
2012	A	0.24	A	0.25	A		
	B	0.24	A	0.25	A	0.47	A
	C	0.23	A	0.25	A		
	D	0.23	A	0.25	A	0.46	A
	E	0.25	A	0.26	A		
	F	0.24	A	0.26	A	0.48	A
	G	0.24	A	0.26	A		
	H	0.24	A	0.26	A	0.48	A
2022	A	0.38	A	0.34	A		
	B	0.34	A	0.32	A	0.57	A
	C	0.34	A	0.32	A		
	D	0.31	A	0.30	A	0.54	A
	E	0.40	A	0.37	A		
	F	0.37	A	0.36	A	0.62	A
	G	0.36	A	0.35	A		
	H	0.34	A	0.34	A	0.60	A
2032	A	0.40	A	0.36	A		
	B	0.36	A	0.35	A	0.61	A
	C	0.36	A	0.34	A		
	D	0.33	A	0.33	A	0.59	A
	E	0.45	A	0.50	A		
	F	0.42	A	0.47	A	0.76	A
	G	0.42	A	0.47	A		
	H	0.40	A	0.45	A	0.72	A

The intersection of Highway 19 and Piercy Road recorded a maximum volume to capacity ratio of 0.76 during the Saturday midday peak period. As shown the intersection maintains a level of service of A across all time periods and options. Option E is found to represent the worst case scenario at this intersection when the growth rate is 4%, all traffic enters and exit the site from the north and the MoTI trip generation rate is used. Even under this scenario the intersection operates well and as a result no capacity or traffic control improvements are required at this intersection to support the site development.

6.2 Intersection of Piercy Road and Forbidden Plateau Road

The Volume to Capacity (v/c) ratio and the Level of Service (LOS) for the critical movement at the intersection of Piercy Road and Forbidden Plateau Road has been reported in **Table 6-2** for the various scenarios.

Table 6-2: Piercy Road / Forbidden Plateau Road Operational Analysis Summary

Year	Option	Weekday Morning			Weekday Afternoon			Saturday Midday		
		Critical move-ment	v/c	LOS	Critical move-ment	v/c	LOS	Critical move-ment	v/c	LOS
2012	A	NBL	0.06	A	EBT	0.07	A			
	B	NBL	0.05	A	EBT	0.07	A	NBL	0.10	A
	C	NBL	0.05	A	EBT	0.07	A			
	D	NBL	0.04	A	EBT	0.07	A	NBL	0.10	A
	E	NBL	0.06	A	EBT	0.08	A			
	F	NBL	0.05	A	EBT	0.07	A	NBL	0.10	A
	G	NBL	0.05	A	EBT	0.07	A			
	H	NBL	0.04	A	EBT	0.07	A	NBL	0.10	A
2022	A	NBL	0.43	B	NBL	0.49	C			
	B	NBL	0.29	A	WBL	0.25	A	NBL	0.32	B
	C	NBL	0.27	B	WBL	0.22	A			
	D	NBL	0.19	A	WBL	0.16	A	NBL	0.17	B
	E	NBL	0.45	B	NBL	0.56	C			
	F	NBL	0.30	B	NBL	0.29	C	NBL	0.39	C
	G	NBL	0.28	B	WBL	0.23	A			
	H	NBL	0.19	A	WBL	0.18	A	NBL	0.21	B
2032	A	NBL	0.44	B	NBL	0.56	C			
	B	NBL	0.30	B	NBL	0.28	B	NBL	0.38	C
	C	NBL	0.28	B	WBL	0.23	A			
	D	NBL	0.19	A	WBL	0.17	A	NBL	0.20	B
	E	NBL	0.47	B	NBL	0.88	E			
	F	NBL	0.32	B	NBL	0.43	C	NBL	0.59	C
	G	NBL	0.30	B	NBL	0.34	B			
	H	NBL	0.21	A	NBL	0.22	B	NBL	0.31	B

The critical approach to this intersection is the north bound left turn movement on Forbidden Plateau Road, which is required to stop and yield to traffic on Piercy Road. This movement is expected to operate at LOS C or better under all scenarios and all horizon years, except for Scenario E in 2031. In this case, the northbound left turn is expected to operate with a weekday peak hour volume to capacity ratio of 0.88 and a level of service E in 2032, under Option E. This same movement had a 95th percentile queue length of 67m (around 10 vehicles) in this scenario. When the intersection is modelled with just the background traffic flow and with no development traffic it is found to operate with a LOS B on the worst approach (northbound left turn movement) and a volume to capacity ratio of 0.07. Therefore, it is concluded that the site development traffic is responsible for the significant increase in delay and decrease in capacity.

We have estimated that by 2024, the northbound left turn movement under Option E drops below the desired level of service threshold of LOS D in 2024 when the volume to capacity ratio is 0.63; therefore, it is also concluded that some kind of off-site improvement is required under Option E by the year 2024 to meet operational targets.

To improve the level of service at this intersection to meet the performance threshold targets, both a roundabout and traffic signals have been considered for implementation at this intersection. A TAC Signal Warrant Analysis was completed for this intersection and the results are attached as **Appendix C**. The analysis found that a traffic signal would not be warranted at the intersection of Forbidden Plateau Road and Piercy Road in 2032 under the worst case traffic forecast scenario of Option E.

The operation of the roundabout has also been reviewed and was analysed using Sidra Intersection software. The Volume to Capacity (v/c) ratio and the Level of Service (LOS) for the intersection in 2032 is shown in **Table 6-3**.

Table 6-3: Piercy Road / Forbidden Plateau Road Roundabout

Year	Option	Morning Peak		Afternoon Peak		Saturday Peak	
		V/C	LOS	V/C	LOS	V/C	LOS
2032	A	0.32	A	0.35	B		
	B	0.22	A	0.27	B	0.33	A
	C	0.20	A	0.24	B		
	D	0.14	A	0.20	A	0.27	A
	E	0.33	A	0.40	B		
	F	0.23	A	0.32	B	0.44	A
	G	0.28	A	0.29	B		
	H	0.15	A	0.24	A	0.38	A

As shown in **Table 6-3** the introduction of a roundabout at this intersection will reduce the volume to capacity ratio and improve the level of service from an E to a B (assuming one circulating lane and one approach lane on each leg). Queue lengths on the critical northbound left turn are also reduced from 67m to 14m.

Based on the above analysis, we would conclude that under Option E, a roundabout would be the preferred off-site improvement to support the site development and that this roundabout should be in place by 2024. However, we are also of the opinion that the Option E forecast assumptions are unrealistically conservative:

- a 4% annual growth rate per year, extended through 20 years, is a very high level of growth sustained for a considerable period of time. Historical growth of traffic in the area has, on average, been closer to 2%;
- The MoTI trip rates were developed from studies conducted many years ago and are unrealistically high compared to other sources. We have been advised by MoTI staff from the Lower Mainland District that the MoTI has actually abandoned use of these rates as they are considered too high;
- The MoTI rates do not reflect the significant portion of patio homes or carriage houses, which will be smaller than the single family homes and therefore are expected to generate less vehicle trips;
- The site trip generation calculations do not include the effect of the retail component on the site, nor the adjacent recreational facilities, which could both serve to reduce vehicle trip generation;
- The site trip distribution assumes 100% of all traffic originates to and from the north. This results in a high volume turning left from Forbidden Plateau Road to Piercy

Road; this forecast would be very unrealistic if the private road to the south of the site remains open.

For these reasons, it is our opinion that the site development will not require any off-site roadway capacity or traffic control improvements at this intersection to support the additional traffic generated by the site development.

Option D is the most realistic option and under this scenario westbound left turn (the worst approach) queues reach 1 vehicle. Therefore it is concluded that the existing intersection layout can accommodate this level of traffic. However, several improvements to the existing layout are recommended.

To improve the sight distance from Forbidden Plateau Road to the west it recommended that the trees planted along the fence line of the property at 3976 Forbidden Plateau Road be removed. It was also noted that the stop bar on the Forbidden Plateau Road approach is set back from the intersection and as a result vehicles move forward over the line to gain better sight distance. It is our opinion that the stop line not be moved to ensure that the turning path of westbound left turning heavy vehicles does not cross into the northbound approach lanes.

In addition, it is recommended that the pavement markings on the northbound approach and the westbound left turn bay be repainted as they have been worn away.

6.3 Intersection of Forbidden Plateau Road and Duncan Bay Main Road

The Volume to Capacity (v/c) ratio and the Level of Service (LOS) for the critical movement at the intersection of Forbidden Plateau Road and DBM Road has been reported in **Table 6-4** for the various scenarios. For the purposes of this summary, it is assumed that Duncan Bay Main Road runs north-south and Forbidden Plateau runs east-west.

Table 6-4: Forbidden Plateau Road / Duncan Bay Main Road Operational Analysis Summary

Year	Option	Weekday Morning			Weekday Afternoon			Saturday Midday		
		Critical move-ment	v/c	LOS	Critical move-ment	v/c	LOS	Critical move-ment	v/c	LOS
2012	A	NBL	0.08	A	SBL	0.02	B			
	B	NBL	0.07	A	SBL	0.02	B	SBL	0.07	B
	C	NBL	0.06	A	SBL	0.01	B			
	D	NBL	0.05	A	NBL	0.07	A	SBL	0.07	B
	E	NBL	0.08	A	SBL	0.02	B			
	F	NBL	0.07	A	SBL	0.02	B	SBL	0.08	B
	G	NBL	0.06	A	SBL	0.02	B			
	H	NBL	0.05	A	NBL	0.07	A	SBL	0.07	B
2022	A	NBL	0.50	B	SBL	0.11	E			
	B	NBL	0.34	B	SBL	0.06	C	SBL	0.20	C
	C	NBL	0.32	B	SBL	0.05	C			
	D	NBL	0.22	B	SBL	0.03	C	NBL	0.24	B
	E	NBL	0.51	B	SBL	0.14	E			
	F	NBL	0.35	B	SBL	0.07	D	SBL	0.24	C
	G	NBL	0.32	B	SBL	0.06	C			
	H	SBL	0.04	B	SBL	0.04	C	NBL	0.26	B
2032	A	NBL	0.51	B	SBL	0.14	E			
	B	NBL	0.35	B	SBL	0.07	C	SBL	0.23	C
	C	NBL	0.32	B	SBL	0.06	C			
	D	SBL	0.04	B	SBL	0.04	C	NBL	0.26	B
	E	NBL	0.23	B	SBL	0.19	F			
	F	NBL	0.36	B	SBL	0.09	D	SBL	0.31	C
	G	NBL	0.34	B	SBL	0.07	C			
	H	SBL	0.06	B	SBL	0.05	C	NBL	0.30	B

As shown in the table above the critical movement for this intersection is the southbound left turn movement during the weekday afternoon peak hour of traffic. There is no development traffic associated with this movement; that is, all of the southbound left turn traffic is background traffic that would be present regardless of whether the Riverwood project proceeded, or not. Therefore, it is concluded that the Riverwood project would not generate the need for any roadway or traffic control improvements to address this problem.

It is important to note that while the delays associated with this movement are relatively high for some forecast scenarios resulting in LOS D-F, the volume impacted is very low, at 5 vehicles per hour. This very low level of traffic demand would not, in our view, justify any kind of roadway capacity or traffic control improvement.

From the site visit undertaken in August it was noted that existing pavement markings at this intersection are significantly faded and repainting is recommended on all approaches, regardless of whether the site redevelops.

6.4 Intersection of Comox Logging Road and Marsden Road

The Volume to Capacity (v/c) ratio and the Level of Service (LOS) for the critical movement at the intersection of Comox Logging Road and Marsden Road has been reported in **Table 6-5** for the various scenarios.

Table 6-5: Comox Logging Road / Marsden Road

Year	Option	Weekday Morning			Weekday Afternoon			Saturday Midday		
		Critical move-ment	v/c	LOS	Critical movement	v/c	LOS	Critical move-ment	v/c	LOS
2012	A	SBL	0.04	A	SBL	0.05	A			
	B	SBL	0.04	A	SBL	0.05	A	SBL	0.04	A
	C	SBL	0.04	A	SBL	0.05	A			
	D	SBL	0.04	A	SBL	0.05	A	SBL	0.04	A
	E	SBL	0.04	A	SBL	0.05	A			
	F	SBL	0.04	A	SBL	0.05	A	SBL	0.05	A
	G	SBL	0.04	A	SBL	0.05	A			
	H	SBL	0.04	A	SBL	0.05	A	SBL	0.05	A
2022	A	SBL	0.05	A	SBL	0.05	A			
	B	SBL	0.05	A	SBL	0.05	A	SBL	0.05	A
	C	SBL	0.06	B	NBL	0.12	B			
	D	SBL	0.06	B	NBL	0.08	B	NBL	0.07	B
	E	SBL	0.05	A	SBL	0.06	B			
	F	SBL	0.05	A	SBL	0.06	B	SBL	0.06	A
	G	SBL	0.07	B	NBL	0.13	B			
	H	SBL	0.06	B	NBL	0.09	B	SBL	0.07	B
2032	A	SBL	0.05	A	SBL	0.06	A			
	B	SBL	0.05	A	SBL	0.06	A	SBL	0.05	A
	C	SBL	0.07	B	NBL	0.12	B			
	D	SBL	0.06	B	NBL	0.09	B	SBL	0.07	B
	E	SBL	0.07	A	SBL	0.08	B			
	F	SBL	0.07	A	SBL	0.08	B	SBL	0.07	A
	G	SBL	0.09	B	NBL	0.14	B			
	H	SBL	0.08	B	SBL	0.11	B	SBL	0.09	B

The intersection of Comox Logging Road and Marsden Road will continue to operate with a low volume to capacity ratio with the additional traffic from the development. The critical northbound left turn movement was found to have a maximum 95th percentile queue length

of 3.8m (less than one vehicle) in the weekday afternoon peak period, for 2032 Option G, which can easily be accommodated on this approach.

6.5 Summary of Traffic Impact

If the private road to the south of the site remains open, then no off-site roadway capacity or traffic control improvements on public roads will be required to support the site redevelopment, although sight distance (tree removal) and pavement marking improvements are recommended at Piercy Road & Forbidden Plateau Road, and pavement marking improvements are recommended at Forbidden Plateau Road and DBM Road. If site traffic is permitted to use the private portion of DBM Road to the south, then some positive guidance to drivers through the private gravel works yard is recommended for safety reasons; this could include paving a road surface, signage and pavement markings.

If the private road to the south of the site is closed to the public, in all forecast scenarios but one, no off-site improvements other than those noted above at Piercy Road & Forbidden Plateau Road and at Forbidden Plateau Road and DBM Road will be necessary. Only if traffic grows on Piercy Road at about 4% per year and the site generates over 720 vehicles per hour during the weekday PM Peak Hour will there be a need to address northbound left turn delays at Piercy Road & Forbidden Plateau Road by about 2024. Traffic signals will not be warranted, but a roundabout may be an effective solution to traffic operations and reduce delays.

However, it is our opinion that the latter scenario is highly unlikely: 4% growth for 20 years is extremely high, MoTI trip rates are considered inappropriately high for this site and the trip generation estimates do not reflect the mixed use nature of the site and adjacent recreational opportunities which would generate more walking trips. In our opinion, the most likely forecast scenario is one with 2% growth for 20 years, with ITE trip rates and with the private road remaining open. In our view, the likelihood of the private road being closed is not high, given its significant level of use by the community.

7. Sustainable Transportation Measures

The Comox Valley Sustainability Strategy (CVSS) provides a series of goals that are addressed with objectives, targets and actions. With respect to transportation, these goals are primarily focused on reducing the reliance upon private vehicles with the draft goals outlined below:

- Reduce the need for single occupant vehicles;
- Promote high-efficiency, low emission and no-emission vehicles and alternative fuels;
- Implement transportation programs that increase walking, cycling and transit use.

To support site planning, Bunt & Associates has researched sustainable transportation measures that could be applicable to this site. The measures identified herein are based on best practices from other developments in British Columbia and across North America (some of which originated in Europe). The measures selected are specifically intended to maximize the sustainable elements of the Riverwood neighbourhood based on its scale, mix, and location. They have three primary objectives:

- Minimize automobile use (number and length of trips)
- Optimize transportation choice
- Reduce vehicle ownership

Strategy 1: Encourage Walking

Walking trips can be encouraged through a number of design aspects of the development, including:

- Centrally located services (convenience shopping, daycare, etc.) to reduce the need to travel out of the neighbourhood;
- Walkable access to a variety of transportation or community services;
- Traffic calmed streets with achieve 20-30 km/h operating speeds;
- An extensive, inviting, and safe network of sidewalks and trails within the neighbourhood and connecting to destinations outside of the neighbourhood with good lighting, signage and way finding maps; and
- Pedestrian-permeable and/or small development blocks.

Approximately half of the development land is dedicated as park land to ensure continued public access to the Puntledge River and Browns River Trail systems and other natural amenities of the area.

Strategy 2: Encourage Cycling

Cycling trips for transportation (not recreational) purposes can be encouraged through a number of design aspects of the development by incorporating the following features:

- New cycling facilities (on-street bike lanes, multi-use paved pathways within the street right-of-way, or off-street paved multi-use pathways to/from key travel destinations);
- Convenient connections to the existing and planned future cycling network;
- Way-finding and signage;
- Short term (bike racks) and long term (bike rooms, bike cages) parking located near neighbourhood services and transit hubs, and within multi-family developments;
- A charging station for electric bikes and scooters located near neighbourhood services.

Besides site design elements, developers can also support cycling through a "free bike" program with the sale of every home or provide seed money for a community bike share program.

The Comox Valley Cycling Task Force is working to develop a comprehensive cycling strategy. Its goal is to improve cycling access in the Comox Valley, both recreationally and for commuting, and to improve safe travel for all members of the public and safe access to regional bikeways. The Task Force focuses on education, recreation, and transportation. The developer could work with the Task Force, along with the Regional District, to identify and fund key cycling projects which would benefit cycling in the study area as a whole.

Strategy 3: Provide Transit to Key Destinations

Currently, there is no transit service to the proposed development area and we understand that discussions with BC Transit staff indicate that such service is unlikely given the development's lack of proximity to existing urban services and relative small population. However, the developer could provide a community shuttle van and operating funds for a private transit service to take residents into downtown Courtenay and Comox for work, shopping and personal business trips. This could be an on-demand or regularly scheduled service, originating out of the central area, which could become a transportation hub focussed around community services.

If community demand for transit use increases and ultimately could justify the investment in public transit services, a program could be implemented similar to that for residents in the Cape Lazo/Point Holmes area and the Huband Road/Seal Bay area, who have Community Bus service. This service is available three times a day, Monday to Friday. Passengers are bussed to key exchange points where they can then transfer to and from regular Comox Valley Transit trips.

Strategy 4: Encourage Car Pooling

A carpool consists of two or more people sharing a ride in a vehicle to travel to a common destination. Ride sharing may involve one person who does all the driving, with riders volunteering to pay for a share of fuel and operating costs. Drivers can also rotate with any kind of mutually acceptable cost sharing agreement.

At Riverwood, the developer could include a community amenity space in the central transportation hub that includes a "Ride Share Board" and/or internet access that would allow residents to match to other residents when making regular trips.

Strategy 5: Encourage Car Sharing

Car-sharing in BC and Canada is growing exponentially as more and more people become aware of the benefits it brings. In particular, it provides a low cost and flexible alternative to private vehicle ownership, while developers benefit by being able to reduce parking requirements and therefore achieving cost savings (for example, in the Lower Mainland the cities of Vancouver and Burnaby now allow reductions in parking supply if car-share stalls, and agreements with car-share providers are provided by developers).

Typically, 1 car-share vehicle can support somewhere between 150 and 200 units if at least one person per unit is a member of the car-share program. Vehicles are purchased by the developer ($25,000 to $35,000 depending on the model) and maintained by the car-share operator (Cooperative Auto Network, Car Share Co-op, Zip Car; all operating in BC). Members must pay a fee to join (typically, about $500 which is refundable if a member leaves the program) and then must pay for use of the vehicle by the hour or day. Members pre-book vehicles over the phone or through the internet. Best practice suggests that vehicles should be located in publically accessible and visible locations and preferably be located close to the community facilities.

In the case of Riverwood, the neighbourhood could potentially support two car-share vehicles, which should be centrally located in the development. However, as the

neighbourhood is primarily single family and patio/carriage homes, it is unlikely a parking supply reduction could be justified for these individual properties as they do not share parking supply. It is recommended that the developer contact the three car share operators and determine whether Riverwood would meet their criteria for provision of car share vehicles; it may be that the development is too small or not sufficiently dense to be a good candidate.

Strategy 6: Discourage Excessive Parking Supply

Excessive parking provision can undermine sustainability provisions and negatively impact walkable and cycling-friendly urban design. In single family development without lanes, providing one garage space per unit plus space for one additional vehicle in the driveway should be sufficient, with on-street parking supporting any resident or visitor vehicle overflow. Also, providing on-street parking on only one side of the street is usually more than sufficient for single family neighbourhoods. For single family homes with rear lanes there is more on-street supply available as there are no driveways present, so again, one-car garages should be sufficient. This approach encourages on-street parking which has been proved to reduce vehicle speeds, thereby creating a more pedestrian and cycle friendly neighbourhood.

For "pod" townhouse development with minimal street frontage that could be used for on-street parking, a maximum of 1.2 stalls per unit on-site should be provided. On-site visitor parking should be pooled rather than spread over the development site and should be a maximum of 10% of the total number of townhouse units. For street-oriented townhouse development, rear lanes with one car garages should be used and on-street parking should be provided on both sides of the street to support both resident overflow and visitor parking.

Strategy 7: Eliminate Trips

The impetus behind electronic or e-transport is to eliminate the need to make particular trips altogether, in particular shopping, education, and commuter trips. From a development perspective, high-speed internet should form a key requirement for the development and it should be something delivered to each unit at time of purchase. Those who can work from home should be encouraged to do so. The developer could also establish a neighbourhood work centre equipped with video and phone conferencing facilities.

8. Conclusions & Recommendations

The following key points summarise the findings of the Traffic Assessment for the proposed Riverwood Residential Development in Courtenay:

1. Existing traffic volumes in the study area are relatively low, except on Highway 19.

2. Existing traffic operations in the study area are good, at LOS B or better, with no queuing problems.

3. Existing pavement markings at Piercy Road & Forbidden Plateau Road are faded.

4. There is an existing sight distance obstruction for northbound drivers at Piercy Road & Forbidden Plateau Road; it appears an adjacent home owner has planted trees which block drivers' views to eastbound traffic approaching the intersection. Drivers are forced to cross the northbound stop bar in order to see oncoming traffic.

5. The first phase of development, planned to be completed by 2012, will be 60 homes and is expected to generate 39 to 60 vph in the Weekday AM Peak Hour; 50 to 72 vph in the Weekday PM Peak Hour and 47 vph in the Saturday Mid-day Peak Hour. In our view, the lower end of the range of trip generation is more likely, as the MoTI trip rates are considered too conservative for this development..

6. By build-out in 2022, the additional 540 homes and neighbourhood retail is expected to generate, in total, 384 to 600 vph in the Weekday AM Peak Hour, 506 to 720 vph in the Weekday PM Peak Hour and 466 vph in the Saturday Mid-Day Peak Hour. Again, the lower end of the range of trip generation is considered to be more likely for this development.

7. If the private road to the south of the site remains open, then no off-site roadway capacity or traffic control improvements on public roads will be required to support the site redevelopment, although sight distance (removal of trees) and pavement marking improvements are recommended at Piercy Road & Forbidden Plateau Road, and pavement marking improvements are recommended at Forbidden Plateau Road and DBM Road. If site traffic is permitted to use the private portion of DBM Road to the south, then some positive guidance to drivers through the private gravel works yard is recommended for safety reasons; this could include paving a road surface, signage and pavement markings.

8. If the private road to the south of the site is closed to the public, in all forecast scenarios but one, no off-site improvements other than those noted above at Piercy Road & Forbidden Plateau Road and at Forbidden Plateau Road and DBM Road will be necessary. Only if traffic grows on Piercy Road at about 4% per year and the site generates over 720 vehicles per hour during the weekday PM Peak Hour will there be a need to address northbound left turn delays at Piercy Road & Forbidden Plateau Road by about 2024. Traffic signals will not be warranted, but a roundabout may be an effective solution to traffic operations and reduce delays. However, it is our opinion that the latter scenario is highly unlikely: 4% growth for 20 years is extremely high, MoTI trip rates are considered inappropriately high for this site and the trip generation estimates do not reflect the mixed use nature of the site and adjacent recreational opportunities which would generate more walking trips.

9. Various measures can be pursued by the developer to support regional goals for sustainability, which are outlined in Section 7.

Appendix A – MoT Turning Movement Summary Sheets

VEHICLE TURNING MOVEMENT SURVEY
Ministry of Transportation & Highways
South Coast Region

Major Route: HW 19
Minor Route: Piercy Road
Municipality: Comox Valley Regional District
Filename: MoT - HW19 & Piercy Site Code: 00000

Date: Sept 18, 2009
Day-of-week: Friday

Speed Limit Major Rte: 90
Speed Limit Minor Rte: 70

East/West Route: Piercy Road
Intersection Type: 5 ---> 3-leg east approach
Signalized (y/n?): Yes
Weather: dry and sunny

	Lanes								Bus Stop		Bus
	TLR	R	(ch)	TR	T	TL	L	Grade	Near	Far	Bay
North Approach					2		1				
South Approach		1			2						
West Approach		1					1				
East Approach											

note: (ch) - channelized A: parallel lane B: taper

	Start	Duration
A.M. Shift	07:30	3.25
Noon Shift	11:00	2.00
P.M. Shift	15:00	3.00
	Total	8.25

Note: duration: decimal hours
start time: 24 hr clock (15 min increments)

Comments: _____

Notes: North Approach - vehicles approaching intersection from the north
15x4 - 15 min volume (from max 15 minute period [+] in peak hour period [*]) x 4
Pedestrians - N indicates pedestrians crossing north approach (east/west)

Survey Data

Location: HW 19 @ Piercy Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0				
07:45	4	37	0	0	31	3	0	0	0	4	0	7	86				
08:00	8	28	0	0	36	1	0	0	0	2	0	10	85				
08:15	2	42	0	0	30	6	0	0	0	0	0	6	86				
08:30	5	25	0	0	29	2	0	0	0	3	0	8	72				
08:45	10	37	0	0	26	1	0	0	0	2	0	13	89				
09:00	5	33	0	0	43	3	0	0	0	3	0	16	103				
09:15	3	43	0	0	33	3	0	0	0	3	0	3	88				
09:30	9	34	0	0	33	4	0	0	0	3	0	4	87 *				
09:45	8	42	0	0	31	3	0	0	0	2	0	10	96 +				
10:00	8	49	0	0	27	0	0	0	0	3	0	9	96 +				
10:15	10	41	0	0	31	1	0	0	0	3	0	10	96 +				
Total	72	411	0	0	350	27	0	0	0	28	0	96	984	0	0	0	0
Pk Hr	35	166	0	0	122	8	0	0	0	11	0	33	375 *	0	0	0	0
15x4	40	164	0	0	124	4	0	0	0	12	0	40	384 +	0	0	0	0
11:00													0				
11:15													0				
11:30													0				
11:45													0				
12:00													0 +				
12:15													0 +				
12:30													0 +				
12:45													0 +				
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
15:00	20	55	0	0	37	3	0	0	0	5	0	3	123				
15:15	13	46	0	0	40	2	0	0	0	0	0	10	111				
15:30	21	63	0	0	59	4	0	0	0	12	0	9	168				
15:45	18	67	0	0	50	1	0	0	0	1	0	10	147				
16:00	20	63	0	0	53	6	0	0	0	1	0	9	152				
16:15	22	50	0	0	71	11	0	0	0	4	0	11	169 +				
16:30	17	44	0	0	71	5	0	0	0	8	0	19	164 *				
16:45	20	54	0	0	61	11	0	0	0	0	0	14	160 *				
17:00	26	66	0	0	55	4	0	0	0	2	0	12	165 *				
17:15	12	57	0	0	43	6	0	0	0	1	0	11	130				
17:30	21	44	0	0	56	8	0	0	0	1	0	8	138				
17:45	18	38	0	0	54	3	0	0	0	2	0	7	122				
Total	228	647	0	0	650	64	0	0	0	37	0	123	1749	0	0	0	0
Pk Hr	85	214	0	0	258	31	0	0	0	14	0	56	658 *	0	0	0	0
15x4	88	200	0	0	284	44	0	0	0	16	0	44	676 +	0	0	0	0

AM Peak Period

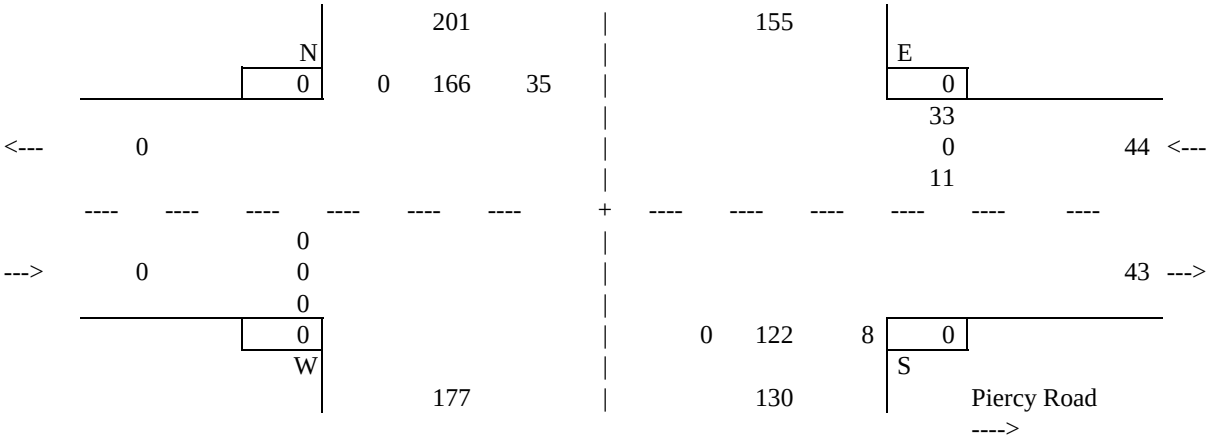
Location: HW 19 @ Piercy Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	4	37	0	0	31	3	0	0	0	4	0	7	86	0	0	0	0
08:00	8	28	0	0	36	1	0	0	0	2	0	10	85	0	0	0	0
08:15	2	42	0	0	30	6	0	0	0	0	0	6	86	0	0	0	0
08:30	5	25	0	0	29	2	0	0	0	3	0	8	72	0	0	0	0
08:45	10	37	0	0	26	1	0	0	0	2	0	13	89	0	0	0	0
09:00	5	33	0	0	43	3	0	0	0	3	0	16	103	0	0	0	0
09:15	3	43	0	0	33	3	0	0	0	3	0	3	88	0	0	0	0
09:30	9	34	0	0	33	4	0	0	0	3	0	4	87 *	0	0	0	0
09:45	8	42	0	0	31	3	0	0	0	2	0	10	96 +	0	0	0	0
10:00	8	49	0	0	27	0	0	0	0	3	0	9	96 +	0	0	0	0
10:15	10	41	0	0	31	1	0	0	0	3	0	10	96 +	0	0	0	0
Total	72	411	0	0	350	27	0	0	0	28	0	96	984	0	0	0	0
Pk Hr	35	166	0	0	122	8	0	0	0	11	0	33	375 *	0	0	0	0
15x4	40	164	0	0	124	4	0	0	0	12	0	40	384 +	0	0	0	0
Avg Hr	22	126	0	0	108	8	0	0	0	9	0	30	303	0	0	0	0

Peak Hour	09:30
Peak 15min	10:15
North approach PHF	0.99
South approach PHF	1.02
West approach PHF	n/a
East approach PHF	0.85

N
^
,

AM Peak Hour Volumes



Noon Peak Period

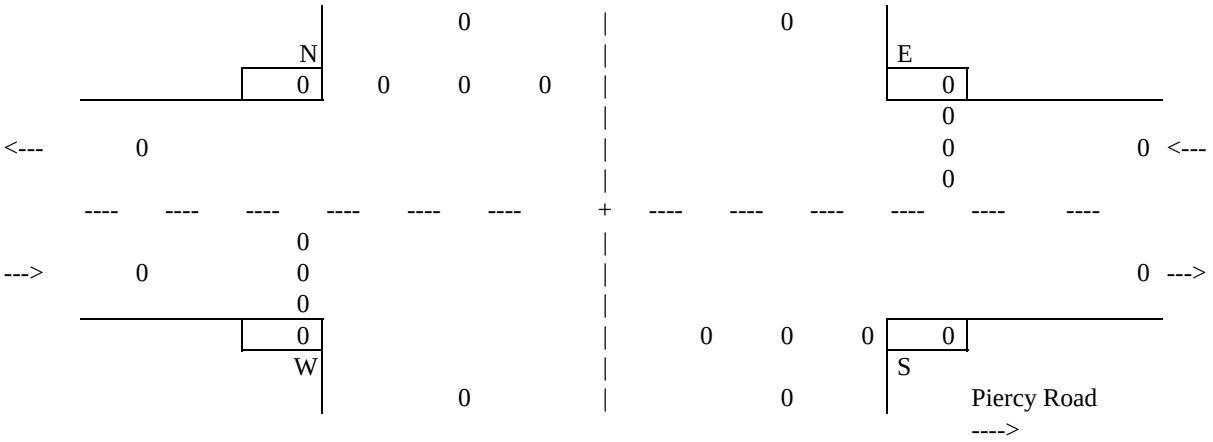
Location: HW 19 @ Piercy Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Avg Hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour	12:00
Peak 15min	12:45
North Leg PHF	#DIV/0!
South Leg PHF	#DIV/0!
West Leg PHF	n/a
East Leg PHF	#DIV/0!

N
^
,

Noon Peak Hour Volumes



PM Peak Period

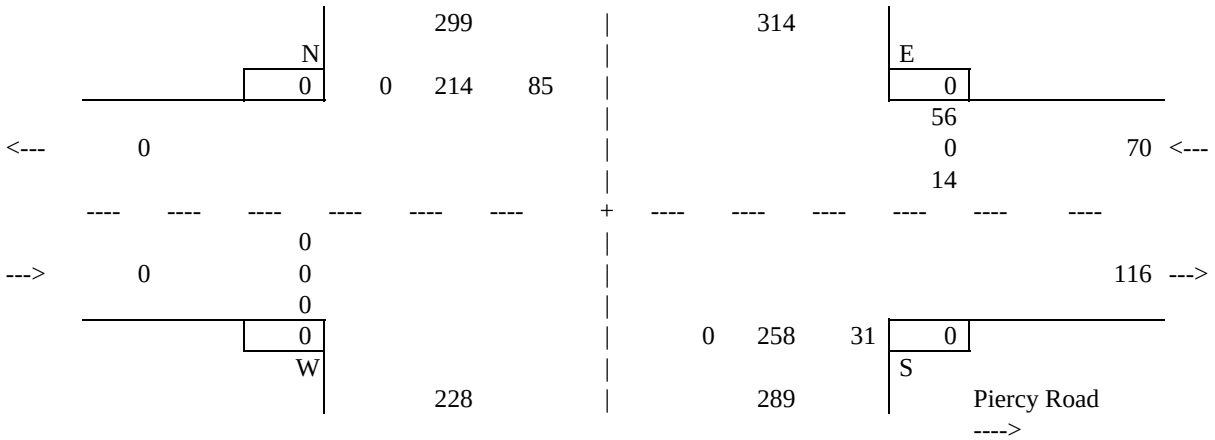
Location: HW 19 @ Piercy Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
15:00	20	55	0	0	37	3	0	0	0	5	0	3	123	0	0	0	0
15:15	13	46	0	0	40	2	0	0	0	0	0	10	111	0	0	0	0
15:30	21	63	0	0	59	4	0	0	0	12	0	9	168	0	0	0	0
15:45	18	67	0	0	50	1	0	0	0	1	0	10	147	0	0	0	0
16:00	20	63	0	0	53	6	0	0	0	1	0	9	152	0	0	0	0
16:15	22	50	0	0	71	11	0	0	0	4	0	11	169 +	0	0	0	0
16:30	17	44	0	0	71	5	0	0	0	8	0	19	164 *	0	0	0	0
16:45	20	54	0	0	61	11	0	0	0	0	0	14	160 *	0	0	0	0
17:00	26	66	0	0	55	4	0	0	0	2	0	12	165 *	0	0	0	0
17:15	12	57	0	0	43	6	0	0	0	1	0	11	130	0	0	0	0
17:30	21	44	0	0	56	8	0	0	0	1	0	8	138	0	0	0	0
17:45	18	38	0	0	54	3	0	0	0	2	0	7	122	0	0	0	0
Total	228	647	0	0	650	64	0	0	0	37	0	123	1749	0	0	0	0
Pk Hr	85	214	0	0	258	31	0	0	0	14	0	56	658 *	0	0	0	0
15x4	88	200	0	0	284	44	0	0	0	16	0	44	676 +	0	0	0	0
Avg Hr	76	216	0	0	217	21	0	0	0	12	0	41	583	0	0	0	0

Peak Hour	16:15
Peak 15min	16:15
North Leg PHF	1.04
South Leg PHF	0.88
West Leg PHF	n/a
East Leg PHF	1.17

N
^
,

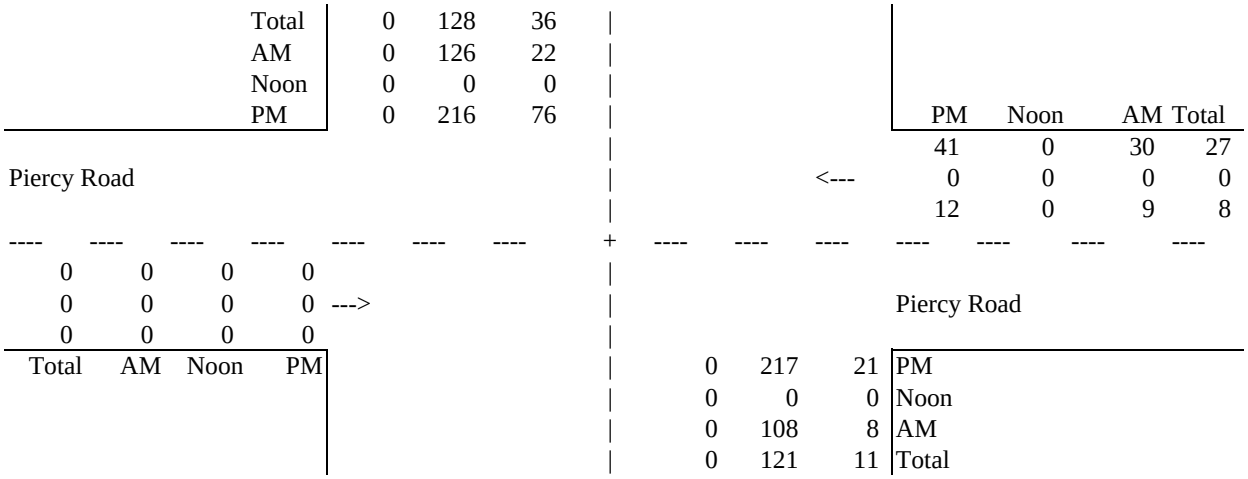
PM Peak Hour Volumes



Average Hour Period Location: HW 19 @ Piercy Road
Sept 18, 2009

	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
Survey																	
Total	300	1058	0	0	1000	91	0	0	0	65	0	219	2733	0	0	0	0
Hours	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Avg Hr	36	128	0	0	121	11	0	0	0	8	0	27	331	0	0	0	0
AM Period																	
Total	72	411	0	0	350	27	0	0	0	28	0	96	984	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	22	126	0	0	108	8	0	0	0	9	0	30	303	0	0	0	0
Noon Period																	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hours	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Avg Hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM Period																	
Total	228	647	0	0	650	64	0	0	0	37	0	123	1749	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	76	216	0	0	217	21	0	0	0	12	0	41	583	0	0	0	0

Average Hour Volumes



VEHICLE TURNING MOVEMENT SURVEY
Ministry of Transportation & Highways
South Coast Region

Major Route: Piercy Road
Minor Route: Forbidden Plateau Road
Municipality: Comox valley Regional District
Filename: MoT Intersection Count templ Site Code: 00000

Date: September 18,2009
Day-of-week: Friday

Speed Limit Major Rte: 70 km/hr
Speed Limit Minor Rte: 60

East/West Route: Piercy Road
Intersection Type: 3 ---> 3-leg south approach
Signalized (y/n?): No
Weather: Dry and Sunny

	Lanes								Bus Stop		Bus
	TLR	R	(ch)	TR	T	TL	L	Grade	Near	Far	Bay
North Approach											
South Approach	0	1	0	0	0	0	1				
West Approach	0	0	0	1	0	0	0				
East Approach	0	0	0	0	1	0	1				

note: (ch) - channelized A: parallel lane B: taper

	Start	Duration
A.M. Shift	07:30	3.00
Noon Shift	11:00	2.00
P.M. Shift	15:00	3.00
	Total	8.00

Note: duration: decimal hours
start time: 24 hr clock (15 min increments)

Comments: _____

Notes: North Approach - vehicles approaching intersection from the north
15x4 - 15 min volume (from max 15 minute period [+] in peak hour period [*]) x 4
Pedestrians - N indicates pedestrians crossing north approach (east/west)

Survey Data

Location: Piercy Road @ Forbidden Plateau Road
Date: September 18,2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	6	0	7	0	4	2	8	11	0	38	0	0	0	0
08:00	0	0	0	1	0	7	0	7	1	1	8	0	25	0	0	0	0
08:15	0	0	0	1	0	7	0	8	2	0	5	0	23	0	0	0	0
08:30	0	0	0	0	0	2	0	4	0	4	9	0	19	0	0	0	0
08:45	0	0	0	2	0	7	0	6	2	6	13	0	36 *	0	0	0	0
09:00	0	0	0	1	0	6	0	10	4	1	17	0	39 +	0	0	0	0
09:15	0	0	0	2	0	1	0	2	3	4	5	0	17 *	0	0	0	0
09:30	0	0	0	4	0	3	0	8	3	5	3	0	26 *	0	0	0	0
09:45	0	0	0	3	0	8	0	7	1	7	8	0	34	0	0	0	0
10:00	0	0	0	1	0	7	0	9	0	4	13	0	34	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	21	0	55	0	65	18	40	92	0	291	0	0	0	0
Pk Hr	0	0	0	9	0	17	0	26	12	16	38	0	118 *	0	0	0	0
15x4	0	0	0	4	0	24	0	40	16	4	68	0	156 +	0	0	0	0
11:00													0				
11:15													0				
11:30													0				
11:45													0				
12:00													0 +				
12:15													0 +				
12:30													0 +				
12:45													0 +				
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
15:00	0	0	0	1	0	12	0	19	1	3	10	0	46	0	0	0	0
15:15	0	0	0	3	0	6	0	12	5	8	7	0	41	0	0	0	0
15:30	0	0	0	4	0	15	0	16	5	8	17	0	65	0	0	0	0
15:45	0	0	0	3	0	5	0	13	6	2	11	0	40	0	0	0	0
16:00	0	0	0	3	0	3	0	16	8	8	5	0	43	0	0	0	0
16:15	0	0	0	3	0	4	0	19	6	7	10	0	49	0	0	0	0
16:30	0	0	0	8	0	1	0	20	7	10	3	0	49 *	0	0	0	0
16:45	0	0	0	4	0	5	0	17	7	12	17	0	62 +	0	0	0	0
17:00	0	0	0	5	0	3	0	15	8	4	7	0	42 *	0	0	0	0
17:15	0	0	0	1	0	8	0	15	8	8	12	0	52 *	0	0	0	0
17:30	0	0	0	3	0	8	0	16	5	5	9	0	46	0	0	0	0
17:45	0	0	0	4	0	5	0	19	3	9	7	0	47	0	0	0	0
Total	0	0	0	42	0	75	0	197	69	84	115	0	582	0	0	0	0
Pk Hr	0	0	0	18	0	17	0	67	30	34	39	0	205 *	0	0	0	0
15x4	0	0	0	16	0	20	0	68	28	48	68	0	248 +	0	0	0	0

AM Peak Period

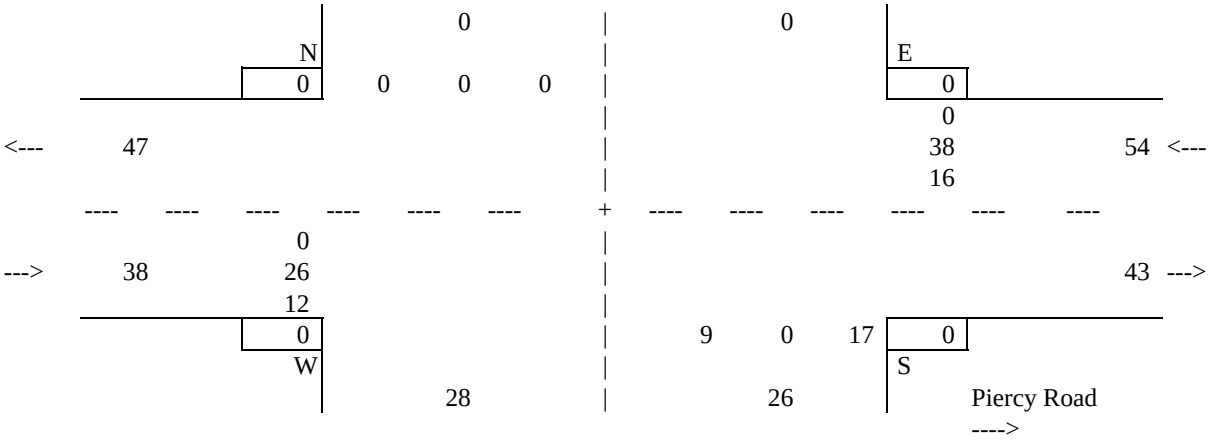
Location: Piercy Road @ Forbidden Plateau Road
Date: September 18,2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	6	0	7	0	4	2	8	11	0	38	0	0	0	0
08:00	0	0	0	1	0	7	0	7	1	1	8	0	25	0	0	0	0
08:15	0	0	0	1	0	7	0	8	2	0	5	0	23	0	0	0	0
08:30	0	0	0	0	0	2	0	4	0	4	9	0	19	0	0	0	0
08:45	0	0	0	2	0	7	0	6	2	6	13	0	36 *	0	0	0	0
09:00	0	0	0	1	0	6	0	10	4	1	17	0	39 +	0	0	0	0
09:15	0	0	0	2	0	1	0	2	3	4	5	0	17 *	0	0	0	0
09:30	0	0	0	4	0	3	0	8	3	5	3	0	26 *	0	0	0	0
09:45	0	0	0	3	0	8	0	7	1	7	8	0	34	0	0	0	0
10:00	0	0	0	1	0	7	0	9	0	4	13	0	34	0	0	0	0
10:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	21	0	55	0	65	18	40	92	0	291	0	0	0	0
Pk Hr	0	0	0	9	0	17	0	26	12	16	38	0	118 *	0	0	0	0
15x4	0	0	0	4	0	24	0	40	16	4	68	0	156 +	0	0	0	0
Avg Hr	0	0	0	7	0	18	0	22	6	13	31	0	97	0	0	0	0

Peak Hour	08:45
Peak 15min	09:00
North approach PHF	n/a
South approach PHF	0.93
West approach PHF	0.68
East approach PHF	0.75

N
^
,

AM Peak Hour Volumes



Noon Peak Period

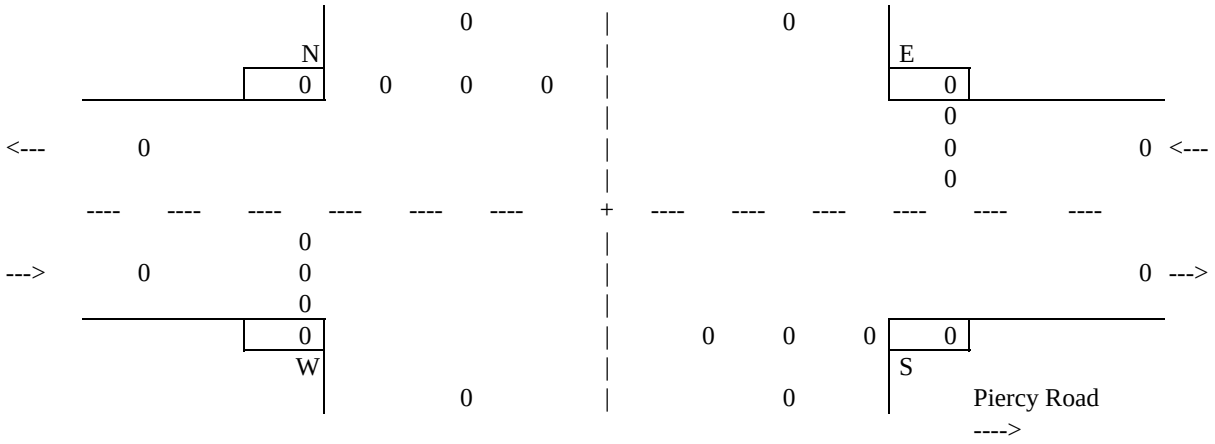
Location: Piercy Road @ Forbidden Plateau Road
Date: September 18,2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Avg Hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

N
^
,

Peak Hour	12:00
Peak 15min	12:45
North Leg PHF	n/a
South Leg PHF	#DIV/0!
West Leg PHF	#DIV/0!
East Leg PHF	#DIV/0!

Noon Peak Hour Volumes



PM Peak Period

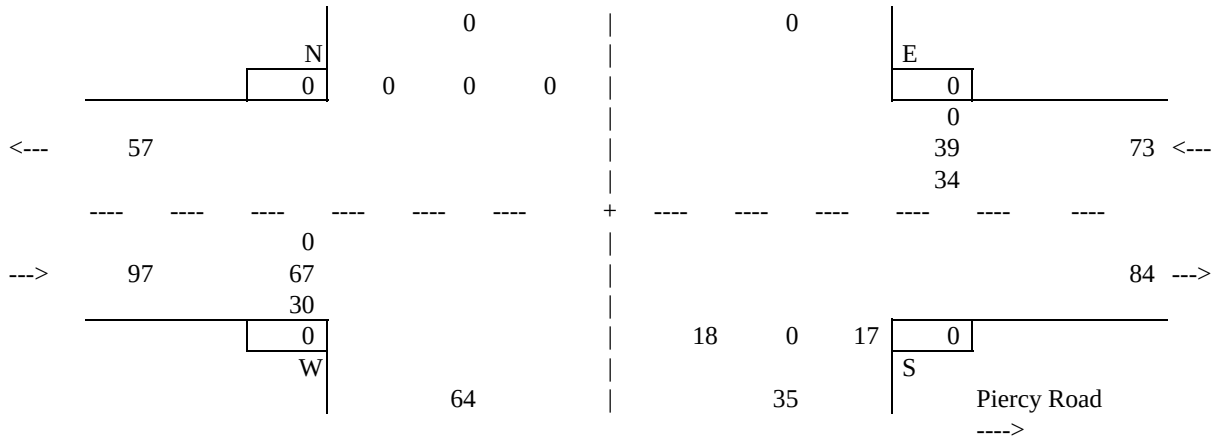
Location: Piercy Road @ Forbidden Plateau Road
Date: September 18,2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
15:00	0	0	0	1	0	12	0	19	1	3	10	0	46	0	0	0	0
15:15	0	0	0	3	0	6	0	12	5	8	7	0	41	0	0	0	0
15:30	0	0	0	4	0	15	0	16	5	8	17	0	65	0	0	0	0
15:45	0	0	0	3	0	5	0	13	6	2	11	0	40	0	0	0	0
16:00	0	0	0	3	0	3	0	16	8	8	5	0	43	0	0	0	0
16:15	0	0	0	3	0	4	0	19	6	7	10	0	49	0	0	0	0
16:30	0	0	0	8	0	1	0	20	7	10	3	0	49 *	0	0	0	0
16:45	0	0	0	4	0	5	0	17	7	12	17	0	62 +	0	0	0	0
17:00	0	0	0	5	0	3	0	15	8	4	7	0	42 *	0	0	0	0
17:15	0	0	0	1	0	8	0	15	8	8	12	0	52 *	0	0	0	0
17:30	0	0	0	3	0	8	0	16	5	5	9	0	46	0	0	0	0
17:45	0	0	0	4	0	5	0	19	3	9	7	0	47	0	0	0	0
Total	0	0	0	42	0	75	0	197	69	84	115	0	582	0	0	0	0
Pk Hr	0	0	0	18	0	17	0	67	30	34	39	0	205 *	0	0	0	0
15x4	0	0	0	16	0	20	0	68	28	48	68	0	248 +	0	0	0	0
Avg Hr	0	0	0	14	0	25	0	66	23	28	38	0	194	0	0	0	0

Peak Hour	16:30
Peak 15min	16:45
North Leg PHF	n/a
South Leg PHF	0.97
West Leg PHF	1.01
East Leg PHF	0.63

N
^
,

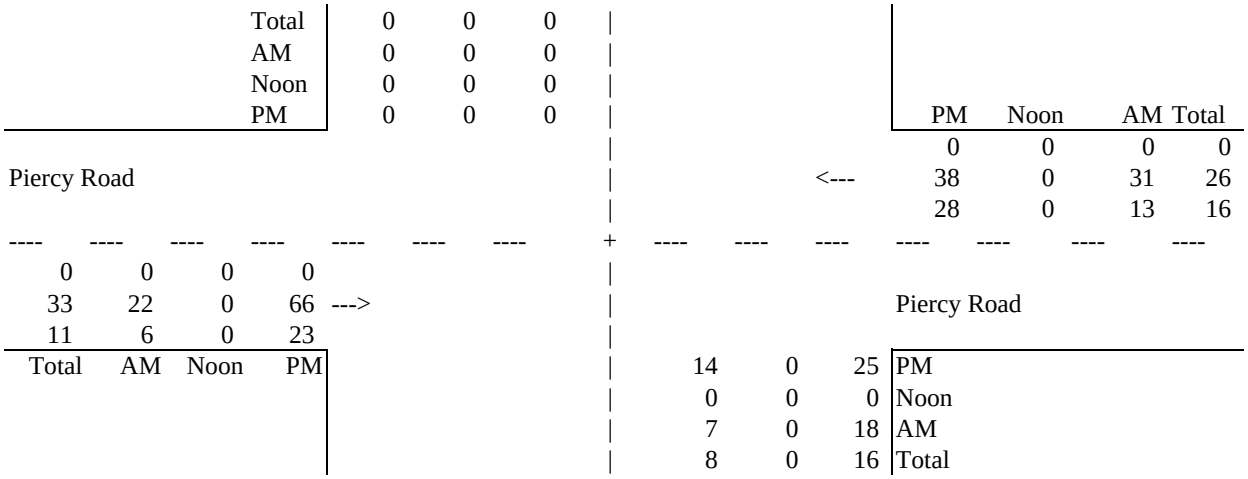
PM Peak Hour Volumes



Average Hour Period Location: Piercy Road @ Forbidden Plateau Road
September 18,2009

	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
Survey																	
Total	0	0	0	63	0	130	0	262	87	124	207	0	873	0	0	0	0
Hours	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Avg Hr	0	0	0	8	0	16	0	33	11	16	26	0	109	0	0	0	0
AM Period																	
Total	0	0	0	21	0	55	0	65	18	40	92	0	291	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	0	0	0	7	0	18	0	22	6	13	31	0	97	0	0	0	0
Noon Period																	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hours	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Avg Hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM Period																	
Total	0	0	0	42	0	75	0	197	69	84	115	0	582	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	0	0	0	14	0	25	0	66	23	28	38	0	194	0	0	0	0

Average Hour Volumes



VEHICLE TURNING MOVEMENT SURVEY
Ministry of Transportation & Highways
South Coast Region

Major Route: Forbidden Plateau Road
Minor Route: Duncan Bay Main Road
Municipality: Comox Valley Regional District
Filename: MoT - FP & DBM Site Code: 00000

Date: Sept 18, 2009
Day-of-week: Friday

Speed Limit Major Rte: 60
Speed Limit Minor Rte: 60

East/West Route: Forbidden Plateau Road
Intersection Type: 1 ---> 4-leg
Signalized (y/n?): No
Weather: dry and sunny

	Lanes								Bus Stop		Bus
	TLR	R	(ch)	TR	T	TL	L	Grade	Near	Far	Bay
North Approach	1										
South Approach	1										
West Approach	1										
East Approach	1										

note: (ch) - channelized A: parallel lane B: taper

	Start	Duration
A.M. Shift	07:30	2.75
Noon Shift	11:00	2.00
P.M. Shift	15:00	3.00
	Total	7.75

Note: duration: decimal hours
start time: 24 hr clock (15 min increments)

Comments: _____

Notes: North Approach - vehicles approaching intersection from the north
15x4 - 15 min volume (from max 15 minute period [+] in peak hour period [*]) x 4
Pedestrians - N indicates pedestrians crossing north approach (east/west)

Survey Data

Location: Forbidden Plateau Road @ Duncan Bay Main Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0				
07:45	0	11	2	0	3	2	2	1	0	1	1	2	25				
08:00	0	2	0	0	10	4	1	1	0	4	5	0	27				
08:15	1	1	1	1	3	2	0	1	0	0	0	1	11				
08:30	0	3	1	0	2	2	2	0	0	0	1	1	12				
08:45	1	3	1	0	7	2	0	2	0	1	0	1	18				
09:00	1	1	0	0	3	0	1	3	0	0	2	1	12				
09:15	0	6	2	0	2	1	0	2	1	1	2	2	19 *				
09:30	2	5	1	0	4	2	2	1	0	3	3	2	25 +				
09:45	0	2	3	0	6	0	3	1	0	3	1	0	19 *				
10:00	1	1	0	0	1	3	2	2	1	2	5	3	21 *				
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0				
Total	6	35	11	1	41	18	13	14	2	15	20	13	189	0	0	0	0
Pk Hr	3	14	6	0	13	6	7	6	2	9	11	7	84 *	0	0	0	0
15x4	8	20	4	0	16	8	8	4	0	12	12	8	100 +	0	0	0	0
11:00													0				
11:15													0				
11:30													0				
11:45													0				
12:00													0 +				
12:15													0 +				
12:30													0 +				
12:45													0 +				
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
15:00	1	4	1	0	2	1	1	2	1	1	1	3	18				
15:15	6	5	2	0	9	5	1	3	0	4	5	7	47				
15:30	6	4	2	0	10	2	3	3	0	3	0	4	37				
15:45	5	4	0	1	2	3	0	1	0	1	1	2	20				
16:00	5	11	0	0	2	5	1	2	1	1	1	2	31				
16:15	5	4	0	0	2	3	1	0	0	3	1	6	25				
16:30	7	7	5	1	2	2	1	1	0	7	3	6	42 +				
16:45	5	8	1	1	1	3	1	3	0	8	0	3	34 *				
17:00	6	4	1	1	3	0	0	2	1	4	1	5	28 *				
17:15	7	8	0	0	5	1	1	2	2	4	1	3	34 *				
17:30	5	3	1	0	5	2	1	0	0	3	0	2	22				
17:45	2	8	0	0	2	1	0	2	0	7	0	6	28				
Total	60	70	13	4	45	28	11	21	5	46	14	49	366	0	0	0	0
Pk Hr	25	27	7	3	11	6	3	8	3	23	5	17	138 *	0	0	0	0
15x4	28	28	20	4	8	8	4	4	0	28	12	24	168 +	0	0	0	0

AM Peak Period

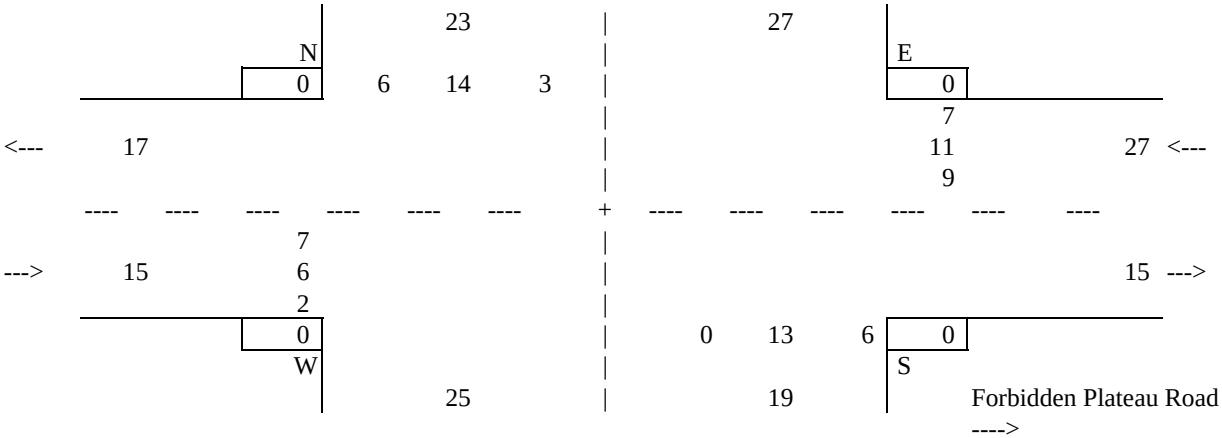
Location: Forbidden Plateau Road @ Duncan Bay Main Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	11	2	0	3	2	2	1	0	1	1	2	25	0	0	0	0
08:00	0	2	0	0	10	4	1	1	0	4	5	0	27	0	0	0	0
08:15	1	1	1	1	3	2	0	1	0	0	0	1	11	0	0	0	0
08:30	0	3	1	0	2	2	2	0	0	0	1	1	12	0	0	0	0
08:45	1	3	1	0	7	2	0	2	0	1	0	1	18	0	0	0	0
09:00	1	1	0	0	3	0	1	3	0	0	2	1	12	0	0	0	0
09:15	0	6	2	0	2	1	0	2	1	1	2	2	19 *	0	0	0	0
09:30	2	5	1	0	4	2	2	1	0	3	3	2	25 +	0	0	0	0
09:45	0	2	3	0	6	0	3	1	0	3	1	0	19 *	0	0	0	0
10:00	1	1	0	0	1	3	2	2	1	2	5	3	21 *	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	6	35	11	1	41	18	13	14	2	15	20	13	189	0	0	0	0
Pk Hr	3	14	6	0	13	6	7	6	2	9	11	7	84 *	0	0	0	0
15x4	8	20	4	0	16	8	8	4	0	12	12	8	100 +	0	0	0	0
Avg Hr	2	13	4	0	15	7	5	5	1	5	7	5	69	0	0	0	0

Peak Hour	09:15
Peak 15min	09:30
North approach PHF	0.72
South approach PHF	0.79
West approach PHF	1.25
East approach PHF	0.84

N
^
,

AM Peak Hour Volumes



Noon Peak Period

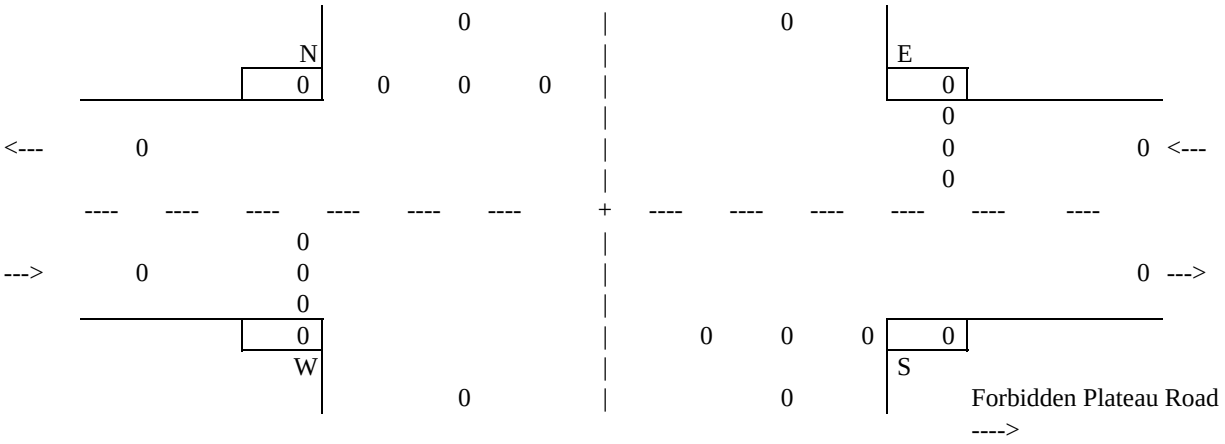
Location: Forbidden Plateau Road @ Duncan Bay Main Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
11:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
12:00	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:15	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:30	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
12:45	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Avg Hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Peak Hour	12:00
Peak 15min	12:45
North Leg PHF	#DIV/0!
South Leg PHF	#DIV/0!
West Leg PHF	#DIV/0!
East Leg PHF	#DIV/0!

N
^
,

Noon Peak Hour Volumes



PM Peak Period

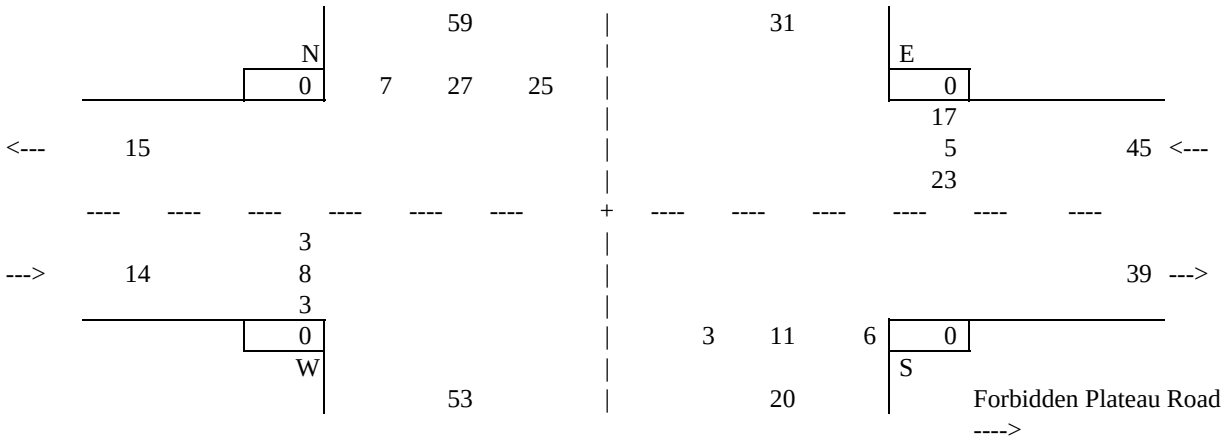
Location: Forbidden Plateau Road @ Duncan Bay Main Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
15:00	1	4	1	0	2	1	1	2	1	1	1	3	18	0	0	0	0
15:15	6	5	2	0	9	5	1	3	0	4	5	7	47	0	0	0	0
15:30	6	4	2	0	10	2	3	3	0	3	0	4	37	0	0	0	0
15:45	5	4	0	1	2	3	0	1	0	1	1	2	20	0	0	0	0
16:00	5	11	0	0	2	5	1	2	1	1	1	2	31	0	0	0	0
16:15	5	4	0	0	2	3	1	0	0	3	1	6	25	0	0	0	0
16:30	7	7	5	1	2	2	1	1	0	7	3	6	42 +	0	0	0	0
16:45	5	8	1	1	1	3	1	3	0	8	0	3	34 *	0	0	0	0
17:00	6	4	1	1	3	0	0	2	1	4	1	5	28 *	0	0	0	0
17:15	7	8	0	0	5	1	1	2	2	4	1	3	34 *	0	0	0	0
17:30	5	3	1	0	5	2	1	0	0	3	0	2	22	0	0	0	0
17:45	2	8	0	0	2	1	0	2	0	7	0	6	28	0	0	0	0
Total	60	70	13	4	45	28	11	21	5	46	14	49	366	0	0	0	0
Pk Hr	25	27	7	3	11	6	3	8	3	23	5	17	138 *	0	0	0	0
15x4	28	28	20	4	8	8	4	4	0	28	12	24	168 +	0	0	0	0
Avg Hr	20	23	4	1	15	9	4	7	2	15	5	16	122	0	0	0	0

Peak Hour	16:30
Peak 15min	16:30
North Leg PHF	0.78
South Leg PHF	1.00
West Leg PHF	1.75
East Leg PHF	0.70

N
^
,

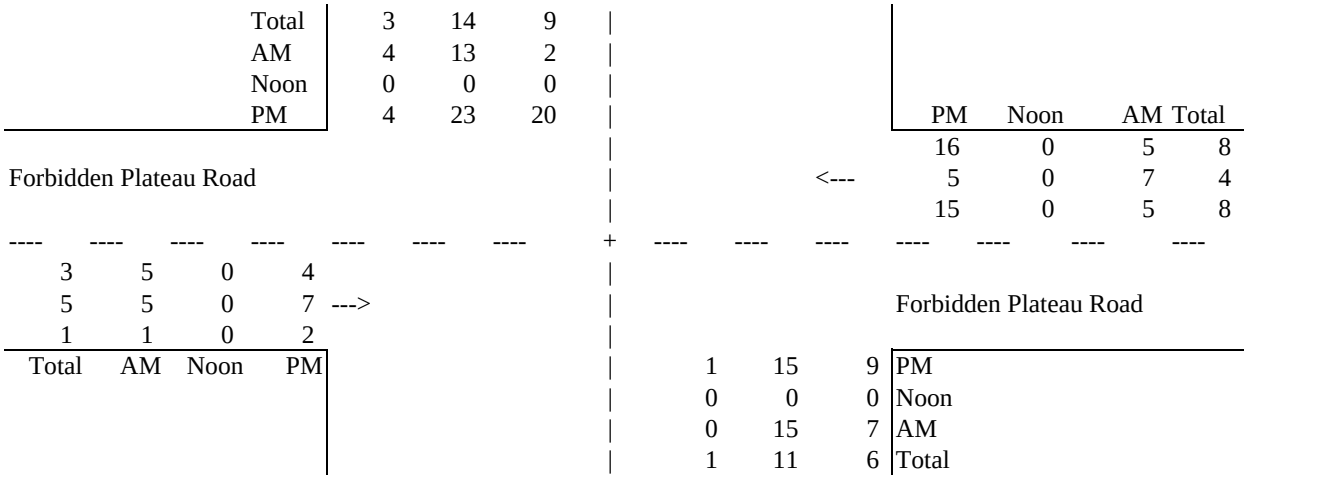
PM Peak Hour Volumes



Average Hour Period Location: Forbidden Plateau Road @ Duncan Bay Main Road
Sept 18, 2009

	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
Survey																	
Total	66	105	24	5	86	46	24	35	7	61	34	62	555	0	0	0	0
Hours	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Avg Hr	9	14	3	1	11	6	3	5	1	8	4	8	72	0	0	0	0
AM Period																	
Total	6	35	11	1	41	18	13	14	2	15	20	13	189	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	2	13	4	0	15	7	5	5	1	5	7	5	69	0	0	0	0
Noon Period																	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hours	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Avg Hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM Period																	
Total	60	70	13	4	45	28	11	21	5	46	14	49	366	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	20	23	4	1	15	9	4	7	2	15	5	16	122	0	0	0	0

Average Hour Volumes



VEHICLE TURNING MOVEMENT SURVEY
Ministry of Transportation & Highways
South Coast Region

Major Route: Comox Logging Road
Minor Route: Marsden Road
Municipality: Comox Valley Regional District
Filename: MoT - Comox & marsden Site Code: 00000

Date: Sept 18, 2009
Day-of-week: Friday

Speed Limit Major Rte: 50
Speed Limit Minor Rte: 50 km/hr

East/West Route: Comox Logging Road
Intersection Type: 1 ---> 4-leg
Signalized (y/n?): No
Weather: dry and sunny

	Lanes								Bus Stop		Bus
	TLR	R	(ch)	TR	T	TL	L	Grade	Near	Far	Bay
North Approach	1										
South Approach	1										
West Approach	1										
East Approach	1										

note: (ch) - channelized A: parallel lane B: taper

	Start	Duration
A.M. Shift	07:30	3.25
Noon Shift	11:00	0.00
P.M. Shift	15:00	3.00
	Total	6.25

Note: duration: decimal hours
start time: 24 hr clock (15 min increments)

Comments: _____

Notes: North Approach - vehicles approaching intersection from the north
15x4 - 15 min volume (from max 15 minute period [+] in peak hour period [*]) x 4
Pedestrians - N indicates pedestrians crossing north approach (east/west)

Survey Data

Location: Comox Logging Road @ Marsden Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0				
07:45	1	1	1	0	3	1	2	4	0	1	4	0	18				
08:00	7	4	2	0	2	3	0	1	2	1	0	0	22				
08:15	7	6	1	0	5	3	1	2	0	0	4	1	30 +				
08:30	8	2	0	0	1	4	0	0	0	2	4	2	23 *				
08:45	2	2	0	0	6	3	4	0	0	0	5	2	24 *				
09:00	2	2	0	1	2	3	0	5	0	0	6	3	24 *				
09:15	1	2	0	0	2	2	2	1	0	0	6	1	17				
09:30	6	2	0	0	6	1	3	1	0	2	2	2	25				
09:45	2	2	0	2	4	3	2	1	0	0	5	0	21				
10:00	4	1	0	0	7	2	2	3	0	0	3	0	22				
10:15	3	5	1	0	5	3	1	2	1	0	4	3	28				
Total	43	29	5	3	43	28	17	20	3	6	43	14	254	0	0	0	0
Pk Hr	19	12	1	1	14	13	5	7	0	2	19	8	101 *	0	0	0	0
15x4	28	24	4	0	20	12	4	8	0	0	16	4	120 +	0	0	0	0
n/a													0				
n/a													0				
n/a													0				
n/a													0				
n/a													0 +				
n/a													0 +				
n/a													0 +				
n/a													0 +				
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0				
15:15	0	1	0	0	4	4	0	2	1	0	9	3	24				
15:30	5	6	1	1	3	4	0	2	0	2	7	10	41				
15:45	4	0	0	0	5	3	1	2	0	1	9	2	27				
16:00	2	2	0	0	3	5	1	0	0	0	12	2	27				
16:15	10	7	0	0	10	7	1	1	0	1	9	0	46 +				
16:30	4	1	0	1	14	10	2	1	0	0	12	1	46 +				
16:45	3	2	0	2	6	10	2	0	1	2	14	1	43 *				
17:00	5	2	0	0	4	4	3	1	0	0	16	2	37 *				
17:15	0	1	0	0	10	7	2	0	0	0	8	1	29				
17:30	3	2	1	0	6	7	4	1	0	1	10	1	36				
17:45	6	1	0	0	0	4	2	4	0	0	8	0	25				
Total	42	25	2	4	65	65	18	14	2	7	114	23	381	0	0	0	0
Pk Hr	22	12	0	3	34	31	8	3	1	3	51	4	172 *	0	0	0	0
15x4	16	4	0	4	56	40	8	4	0	0	48	4	184 +	0	0	0	0

AM Peak Period

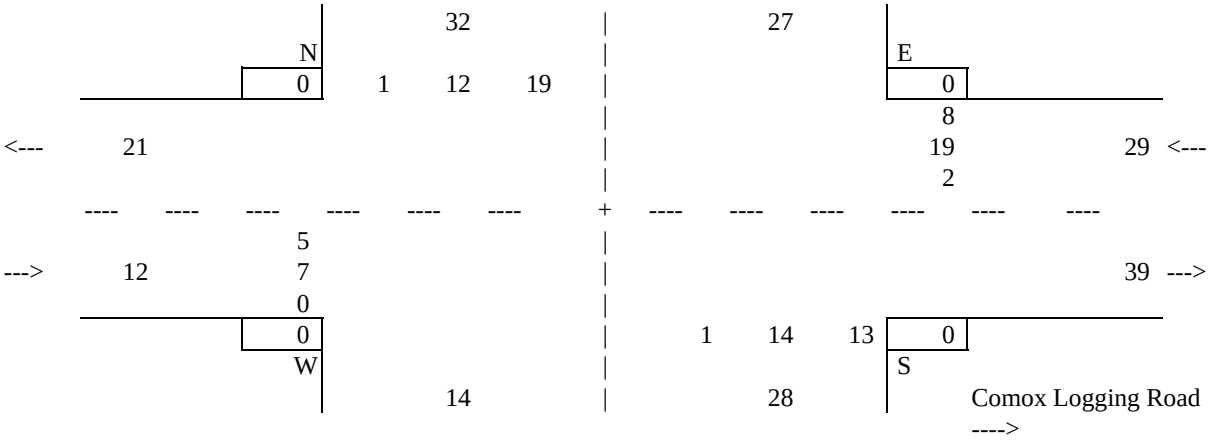
Location: Comox Logging Road @ Marsden Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	1	1	1	0	3	1	2	4	0	1	4	0	18	0	0	0	0
08:00	7	4	2	0	2	3	0	1	2	1	0	0	22	0	0	0	0
08:15	7	6	1	0	5	3	1	2	0	0	4	1	30 +	0	0	0	0
08:30	8	2	0	0	1	4	0	0	0	2	4	2	23 *	0	0	0	0
08:45	2	2	0	0	6	3	4	0	0	0	5	2	24 *	0	0	0	0
09:00	2	2	0	1	2	3	0	5	0	0	6	3	24 *	0	0	0	0
09:15	1	2	0	0	2	2	2	1	0	0	6	1	17	0	0	0	0
09:30	6	2	0	0	6	1	3	1	0	2	2	2	25	0	0	0	0
09:45	2	2	0	2	4	3	2	1	0	0	5	0	21	0	0	0	0
10:00	4	1	0	0	7	2	2	3	0	0	3	0	22	0	0	0	0
10:15	3	5	1	0	5	3	1	2	1	0	4	3	28	0	0	0	0
Total	43	29	5	3	43	28	17	20	3	6	43	14	254	0	0	0	0
Pk Hr	19	12	1	1	14	13	5	7	0	2	19	8	101 *	0	0	0	0
15x4	28	24	4	0	20	12	4	8	0	0	16	4	120 +	0	0	0	0
Avg Hr	13	9	2	1	13	9	5	6	1	2	13	4	78	0	0	0	0

Peak Hour	08:15
Peak 15min	08:15
North approach PHF	0.57
South approach PHF	0.88
West approach PHF	1.00
East approach PHF	1.45

N
^
,

AM Peak Hour Volumes



Noon Peak Period

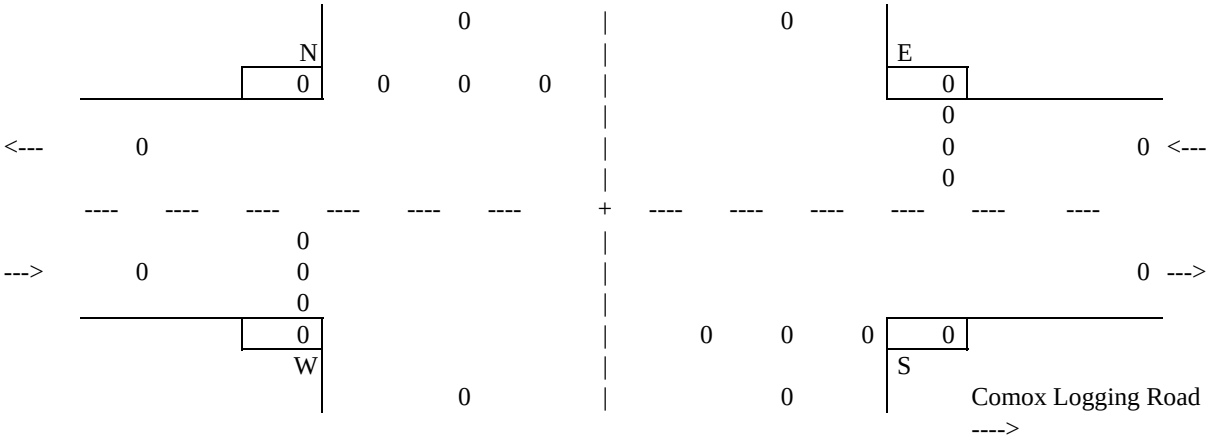
Location: Comox Logging Road @ Marsden Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
n/a	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pk Hr	0	0	0	0	0	0	0	0	0	0	0	0	0 *	0	0	0	0
15x4	0	0	0	0	0	0	0	0	0	0	0	0	0 +	0	0	0	0
Avg Hr	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#####	#DIV/0!	#####	#####	#####	#####

Peak Hour	n/a
Peak 15min	n/a
North Leg PHF	#DIV/0!
South Leg PHF	#DIV/0!
West Leg PHF	#DIV/0!
East Leg PHF	#DIV/0!

N
^
,

Noon Peak Hour Volumes



PM Peak Period

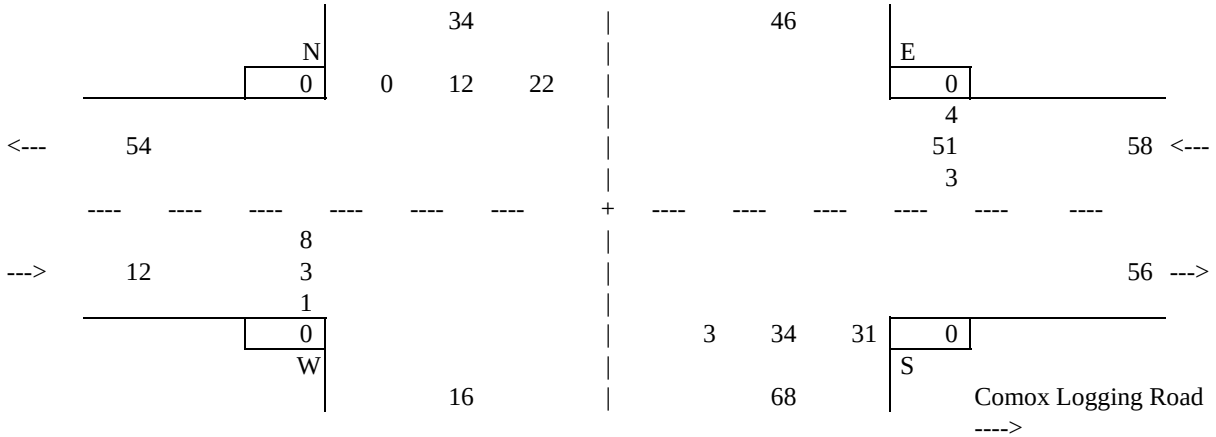
Location: Comox Logging Road @ Marsden Road
Date: Sept 18, 2009

Time	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
Period	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
15:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:15	0	1	0	0	4	4	0	2	1	0	9	3	24	0	0	0	0
15:30	5	6	1	1	3	4	0	2	0	2	7	10	41	0	0	0	0
15:45	4	0	0	0	5	3	1	2	0	1	9	2	27	0	0	0	0
16:00	2	2	0	0	3	5	1	0	0	0	12	2	27	0	0	0	0
16:15	10	7	0	0	10	7	1	1	0	1	9	0	46 +	0	0	0	0
16:30	4	1	0	1	14	10	2	1	0	0	12	1	46 +	0	0	0	0
16:45	3	2	0	2	6	10	2	0	1	2	14	1	43 *	0	0	0	0
17:00	5	2	0	0	4	4	3	1	0	0	16	2	37 *	0	0	0	0
17:15	0	1	0	0	10	7	2	0	0	0	8	1	29	0	0	0	0
17:30	3	2	1	0	6	7	4	1	0	1	10	1	36	0	0	0	0
17:45	6	1	0	0	0	4	2	4	0	0	8	0	25	0	0	0	0
Total	42	25	2	4	65	65	18	14	2	7	114	23	381	0	0	0	0
Pk Hr	22	12	0	3	34	31	8	3	1	3	51	4	172 *	0	0	0	0
15x4	16	4	0	4	56	40	8	4	0	0	48	4	184 +	0	0	0	0
Avg Hr	14	8	1	1	22	22	6	5	1	2	38	8	127	0	0	0	0

Peak Hour	16:15
Peak 15min	16:30
North Leg PHF	1.70
South Leg PHF	0.68
West Leg PHF	1.00
East Leg PHF	1.12

N
^
,

PM Peak Hour Volumes

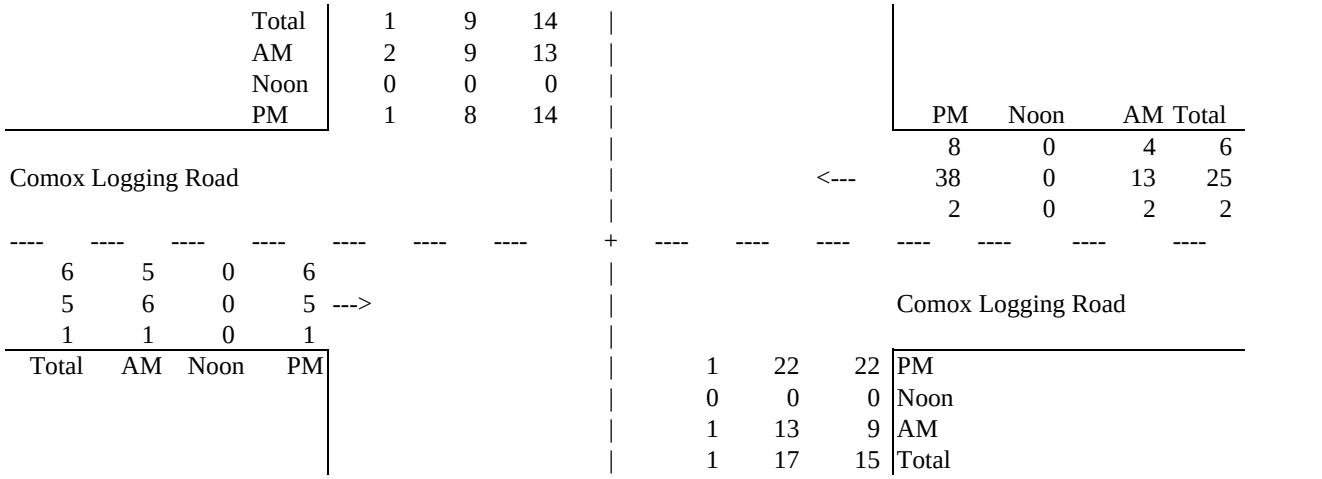


Average Hour Period Location: Comox Logging Road @ Marsden Road

Sept 18, 2009

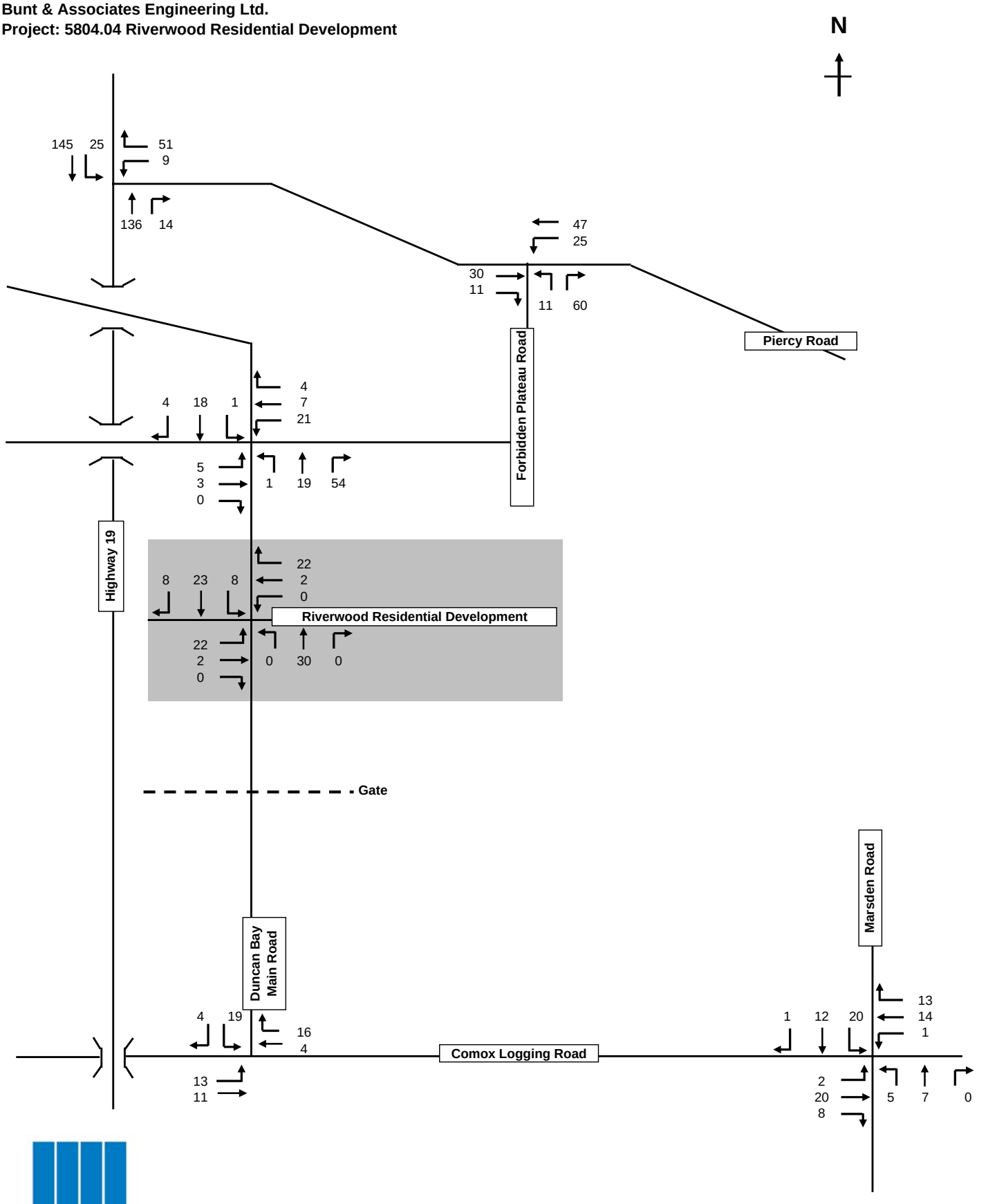
	NORTH Approach			SOUTH Approach			WEST Approach			EAST Approach			Total	Pedestrians			
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Volume	N	S	W	E
Survey																	
Total	85	54	7	7	108	93	35	34	5	13	157	37	635	0	0	0	0
Hours	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
Avg Hr	14	9	1	1	17	15	6	5	1	2	25	6	102	0	0	0	0
AM Period																	
Total	43	29	5	3	43	28	17	20	3	6	43	14	254	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	13	9	2	1	13	9	5	6	1	2	13	4	78	0	0	0	0
Noon Period																	
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hours	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Avg Hr	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PM Period																	
Total	42	25	2	4	65	65	18	14	2	7	114	23	381	0	0	0	0
Hours	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
Avg Hr	14	8	1	1	22	22	6	5	1	2	38	8	127	0	0	0	0

Average Hour Volumes



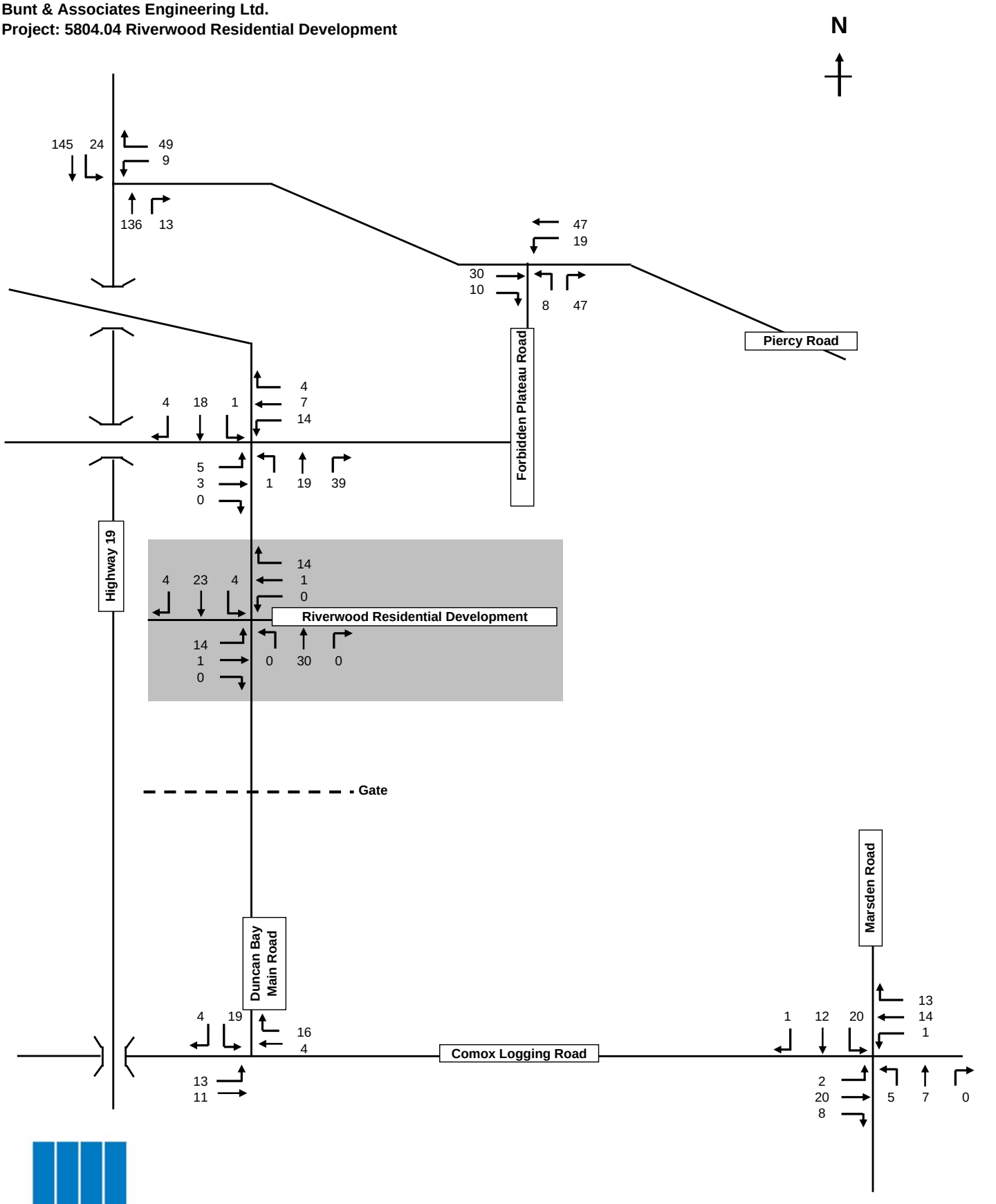
Appendix B – Future Traffic Flow Diagrams

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
AM Peak
8:15am-9:15am
Option A (AM peak Period, Year 2012, Growth rate 2% -1%, 100% north, Trip Gen with MoT rate)

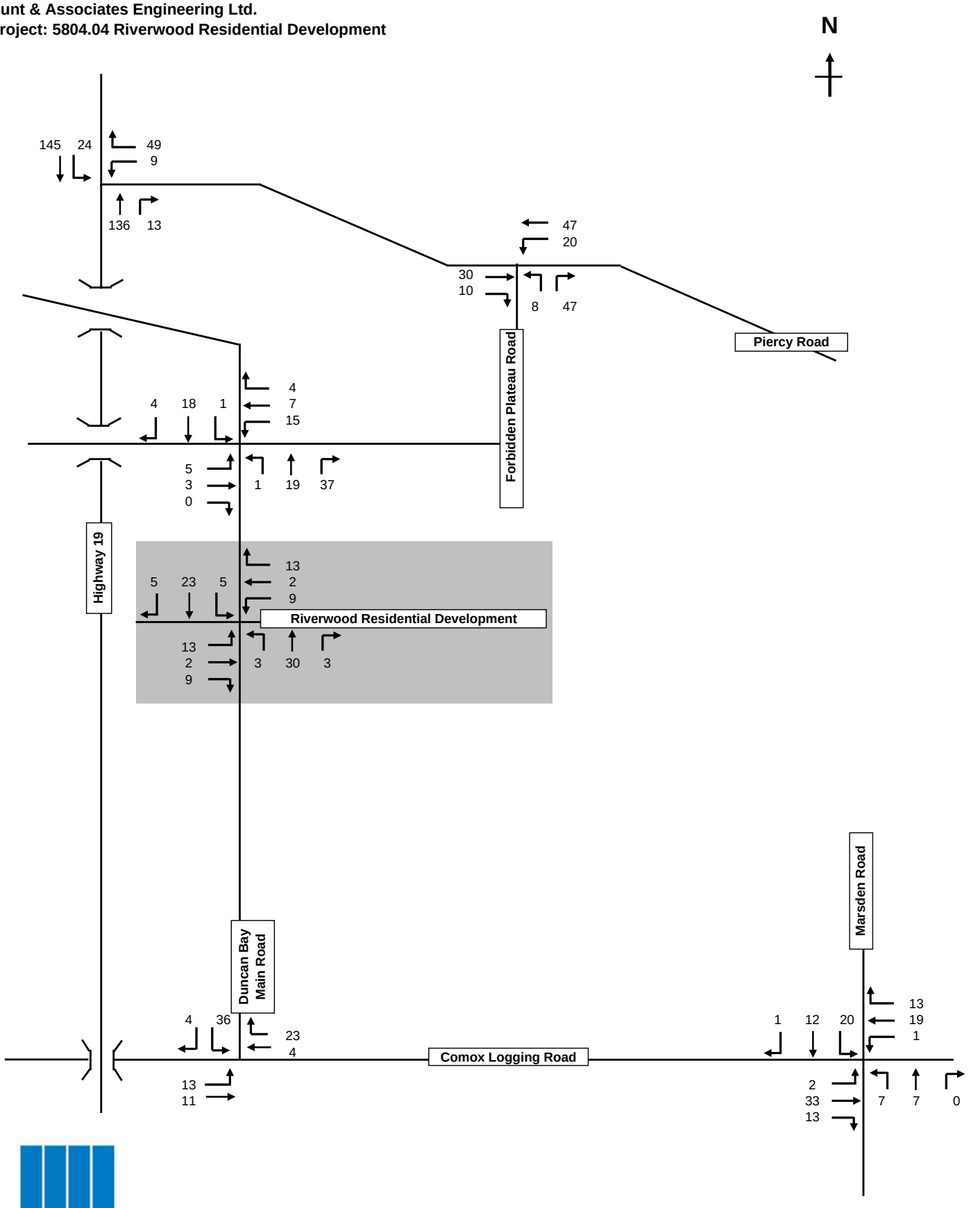
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
AM Peak
8:15am-9:15am

Option B (AM Peak Period, Year 2012, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

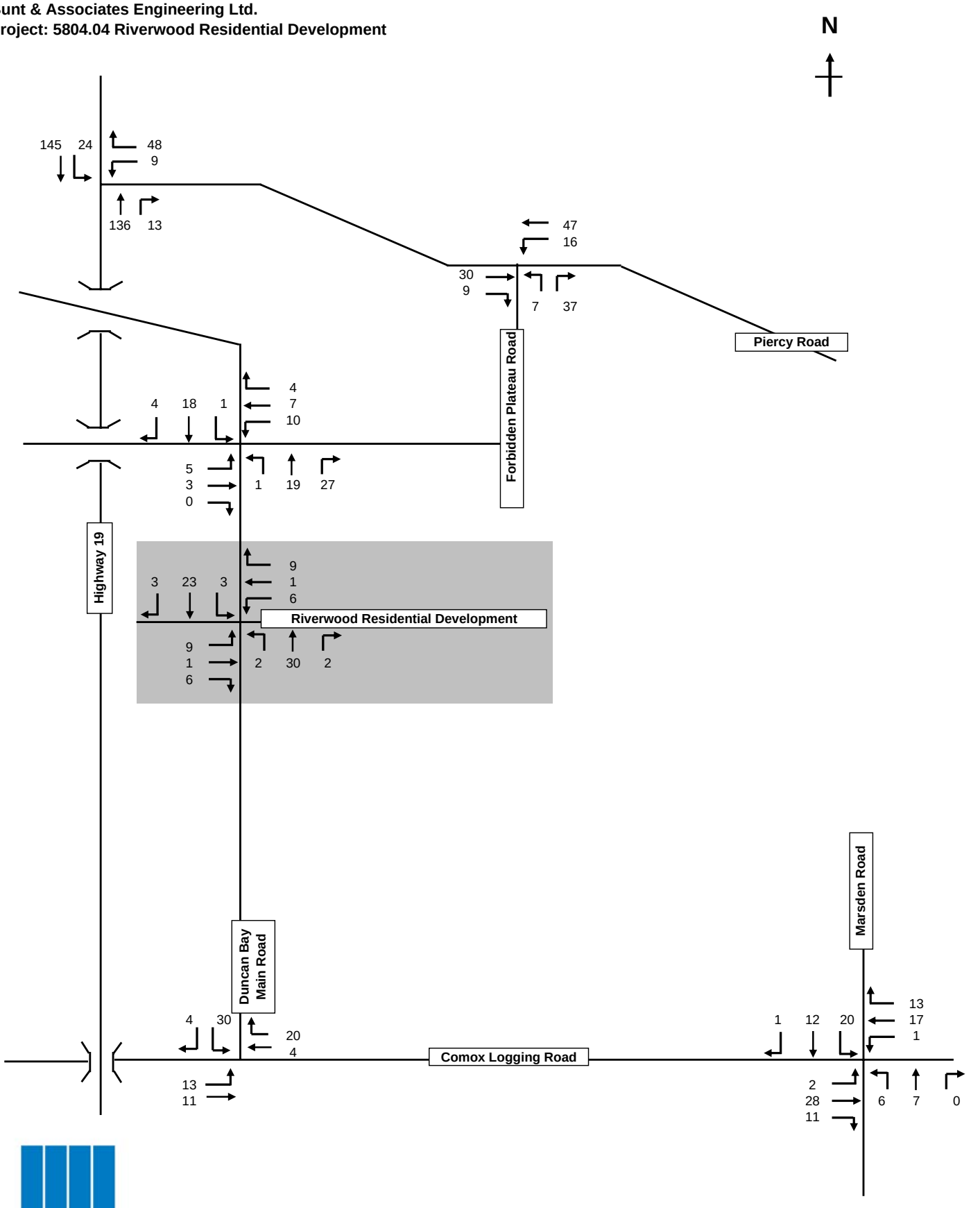
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

2012
AM Peak
8:15am-9:15am
Option C (AM Peak Period, Year 2012, Growth rate 2% -1%, 60% north, Trip Gen with MoT rate)

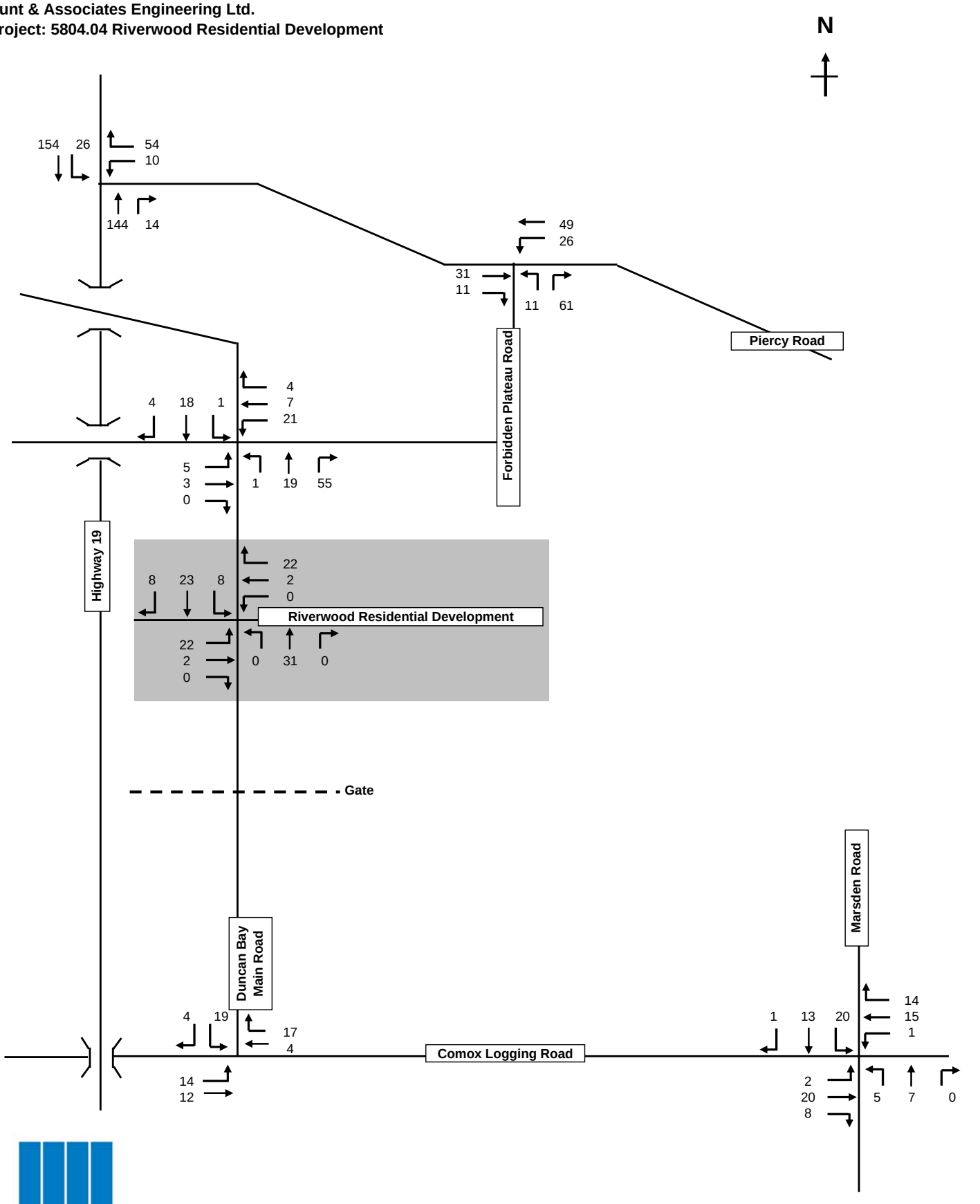
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
AM Peak
8:15am-9:15am

Option D (AM Peak Period, Year 2012, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

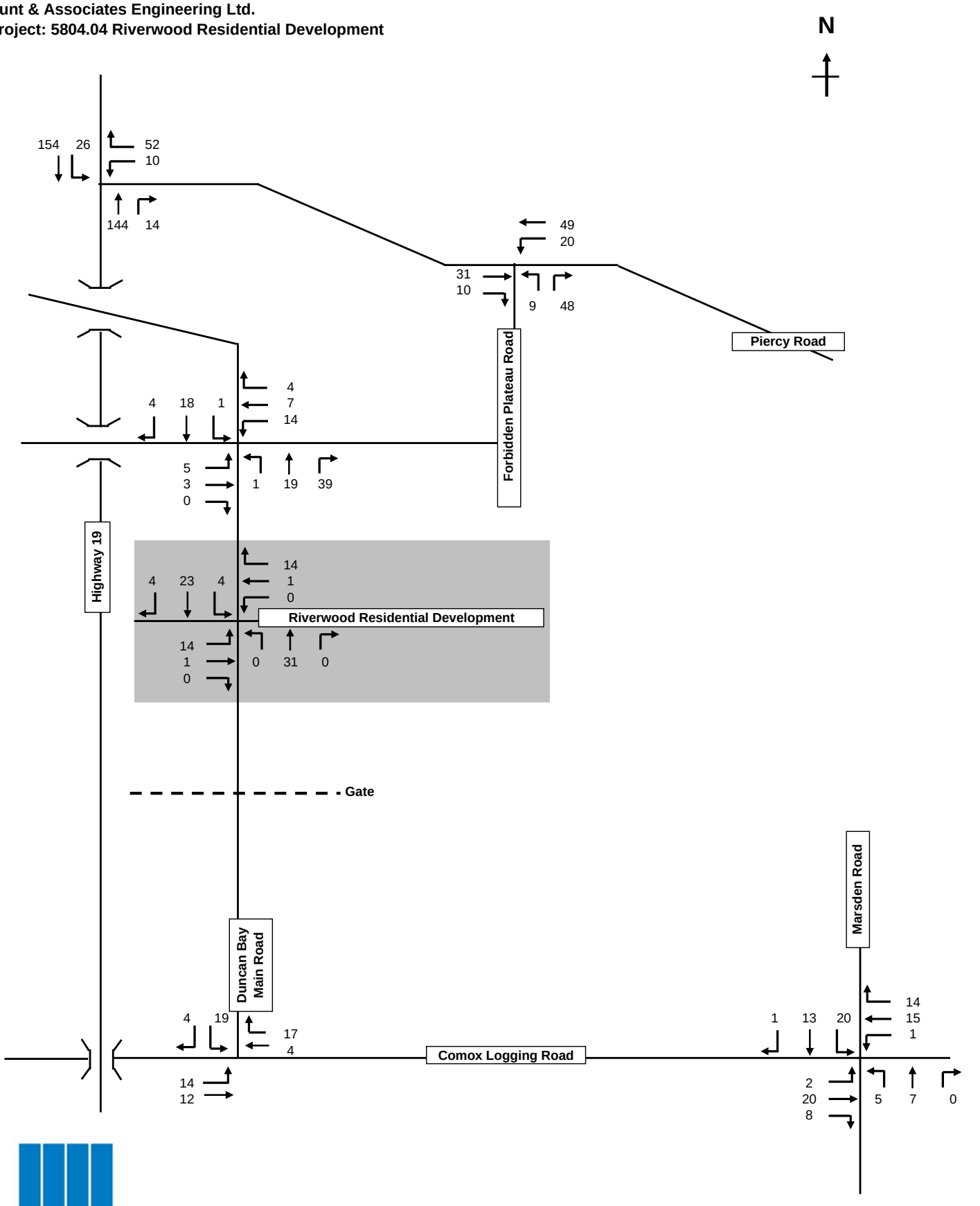
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
AM Peak
8:15am-9:15am

Option E (AM Peak Period, Year 2012, Growth rate 4% -2%, 100% north, Trip Gen with MoT rate)

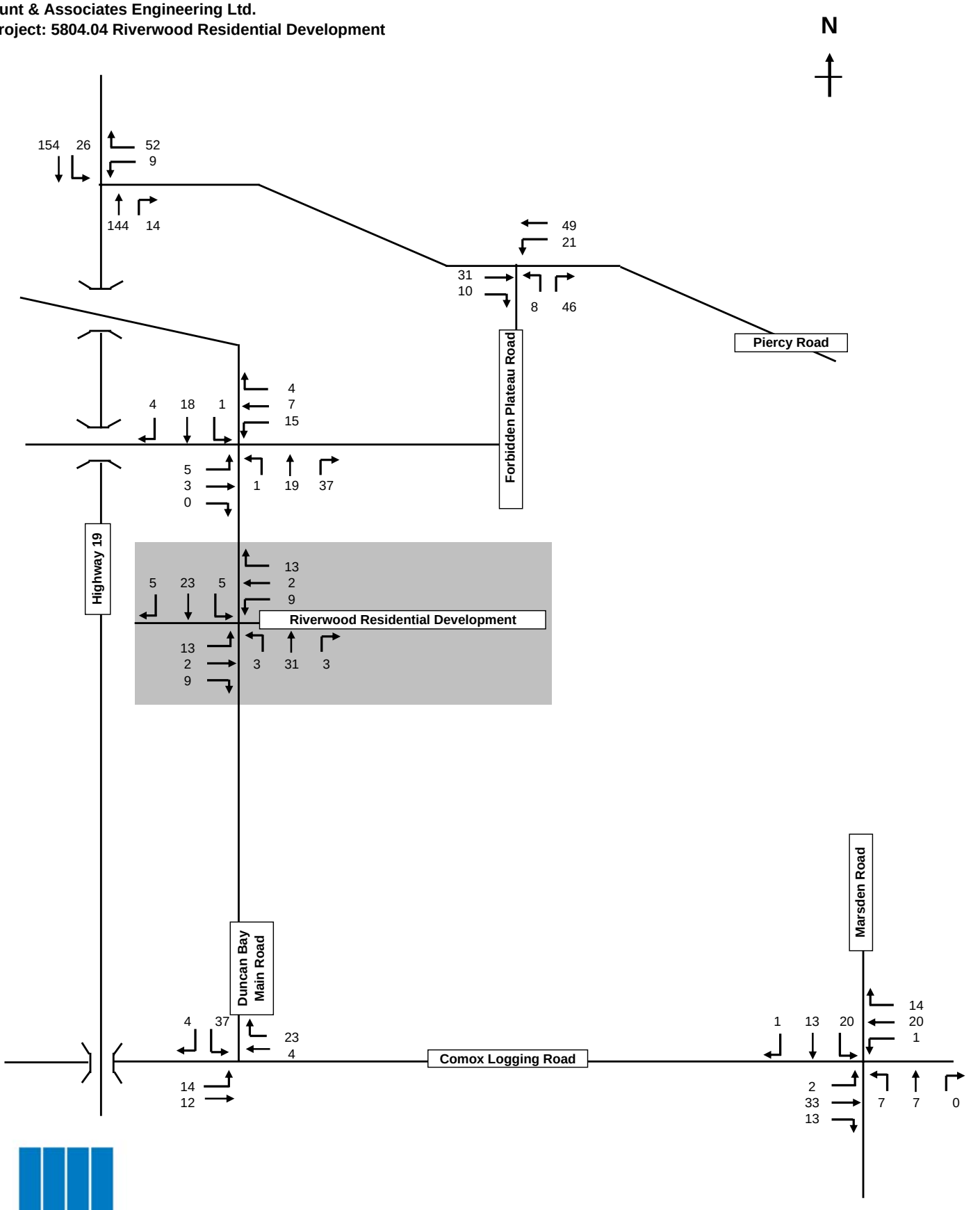
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

2012
AM Peak
8:15am-9:15am
Option F (AM Peak Period, Year 2012, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

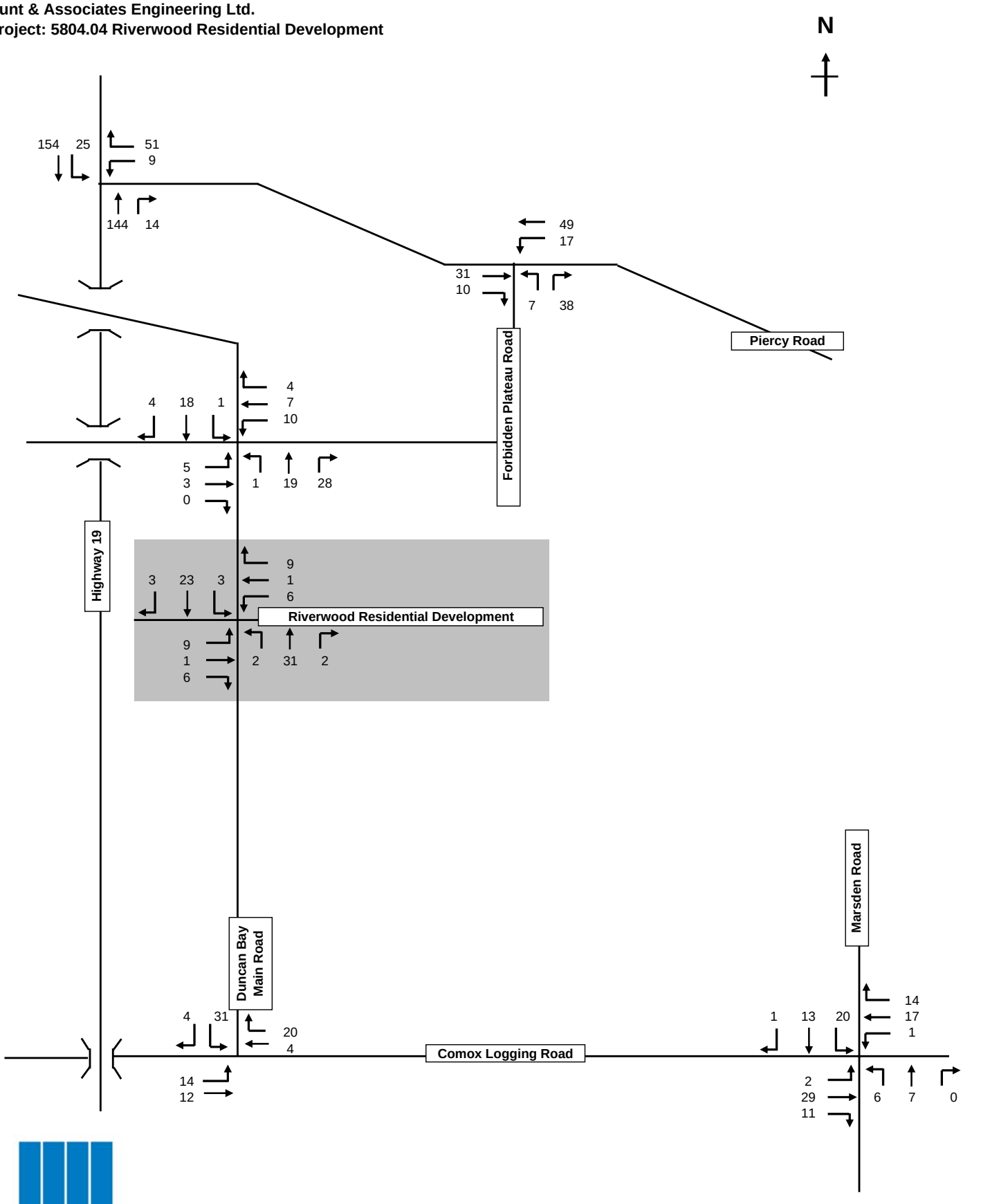
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
AM Peak
8:15am-9:15am

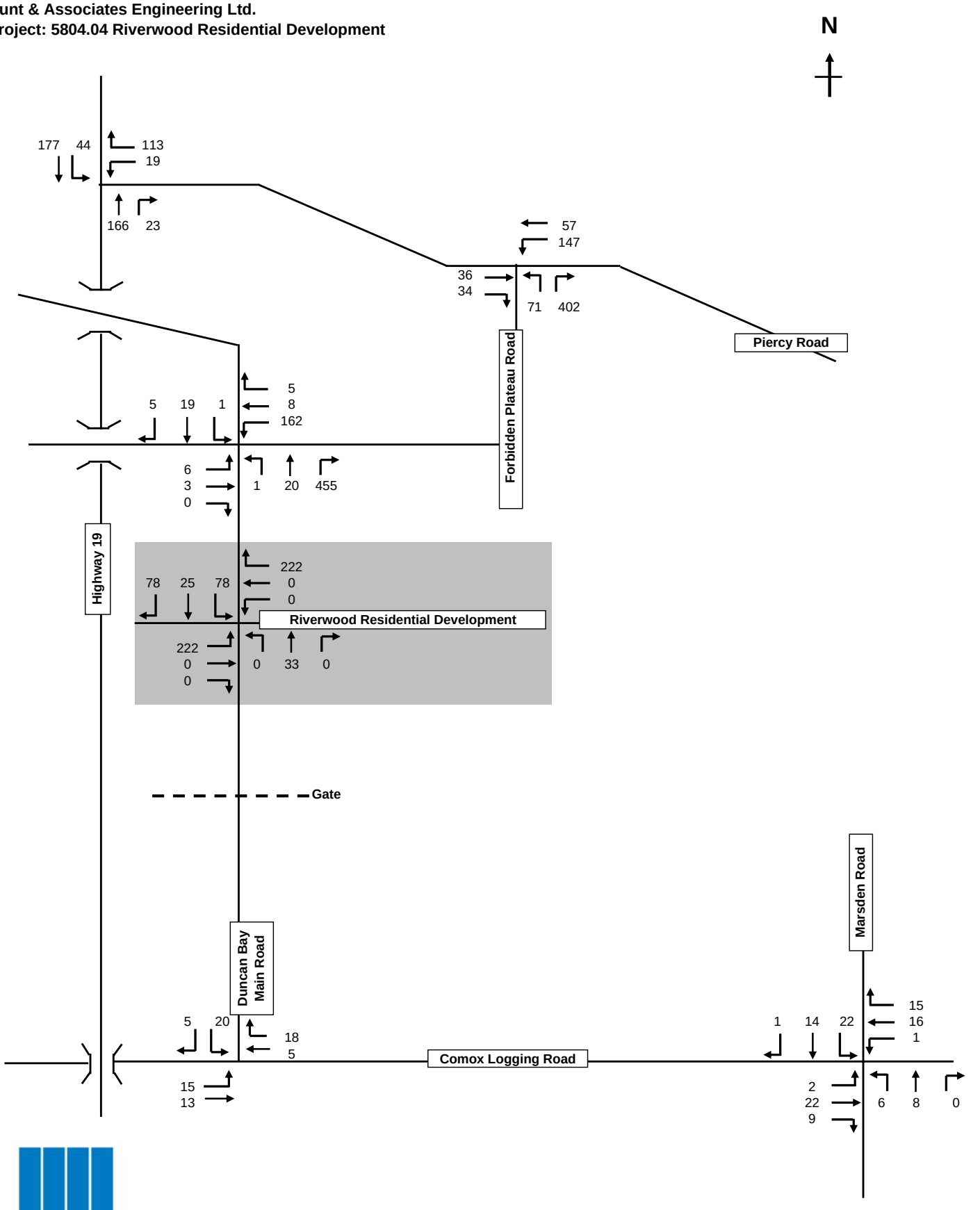
Option G (AM Peak Period, Year 2012, Growth rate 4% -2%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
AM Peak
8:15am-9:15am
Option H (AM Peak Period, Year 2012, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

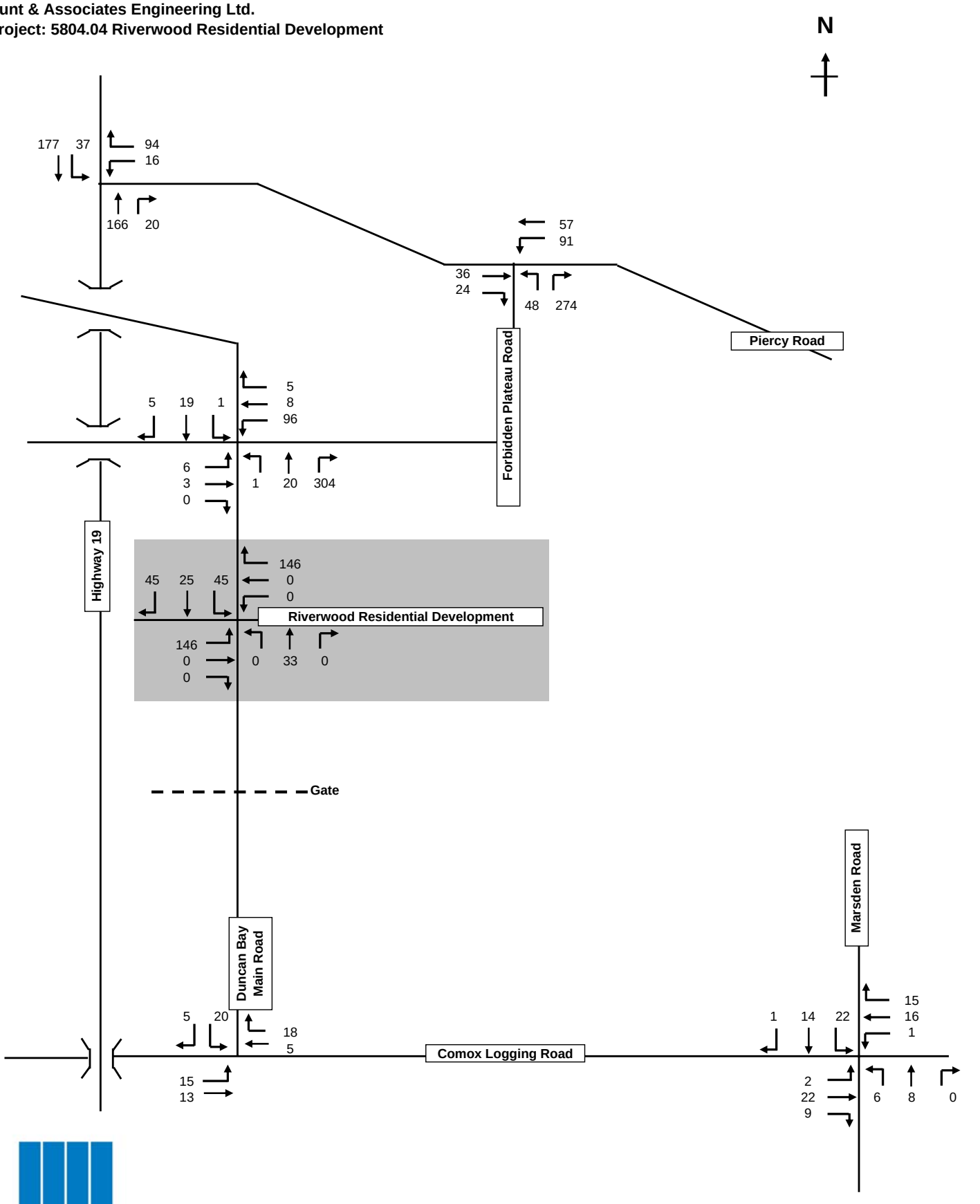
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
AM Peak
8:15am-9:15am

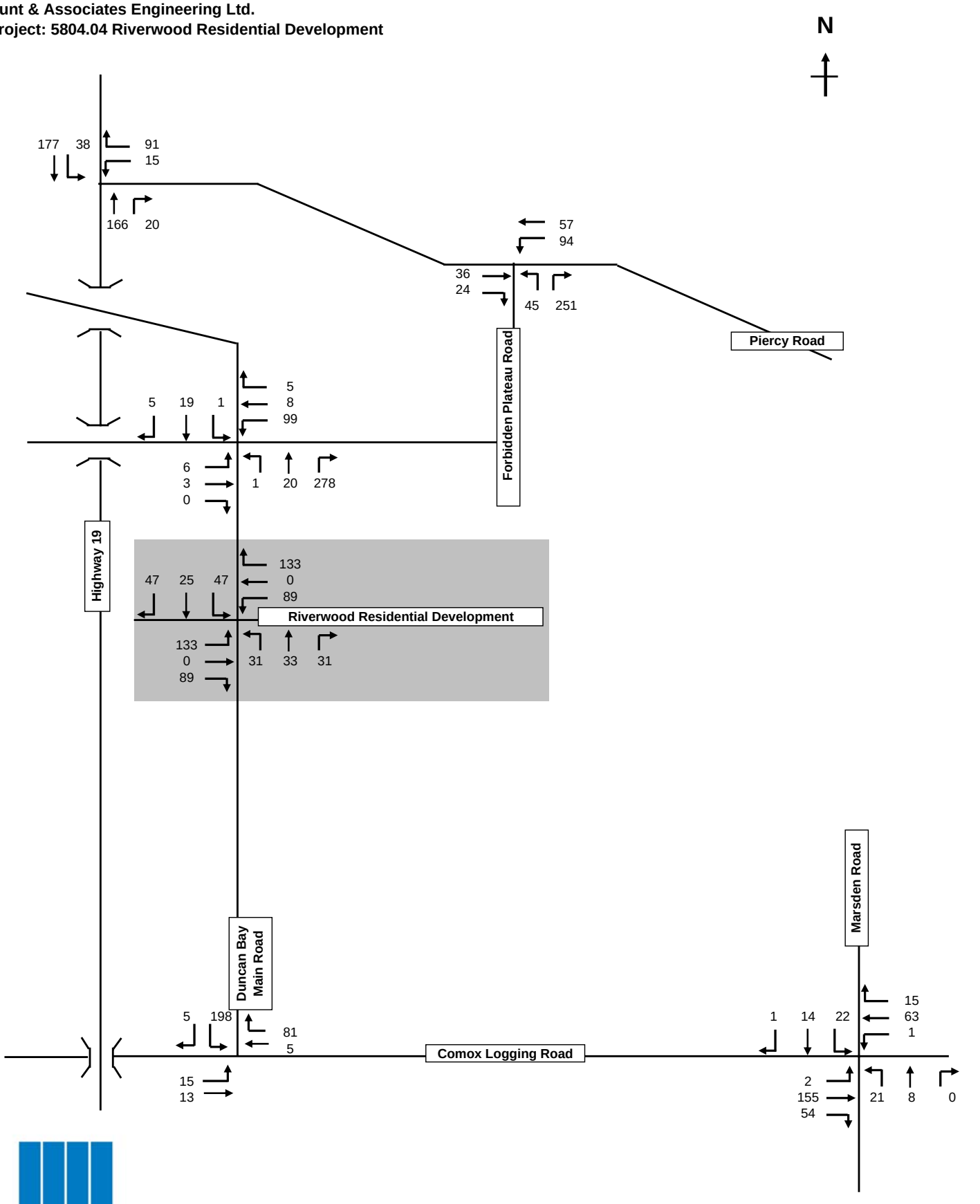
Option A (AM peak Period, Year 2022, Growth rate 2% -1%, 100% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



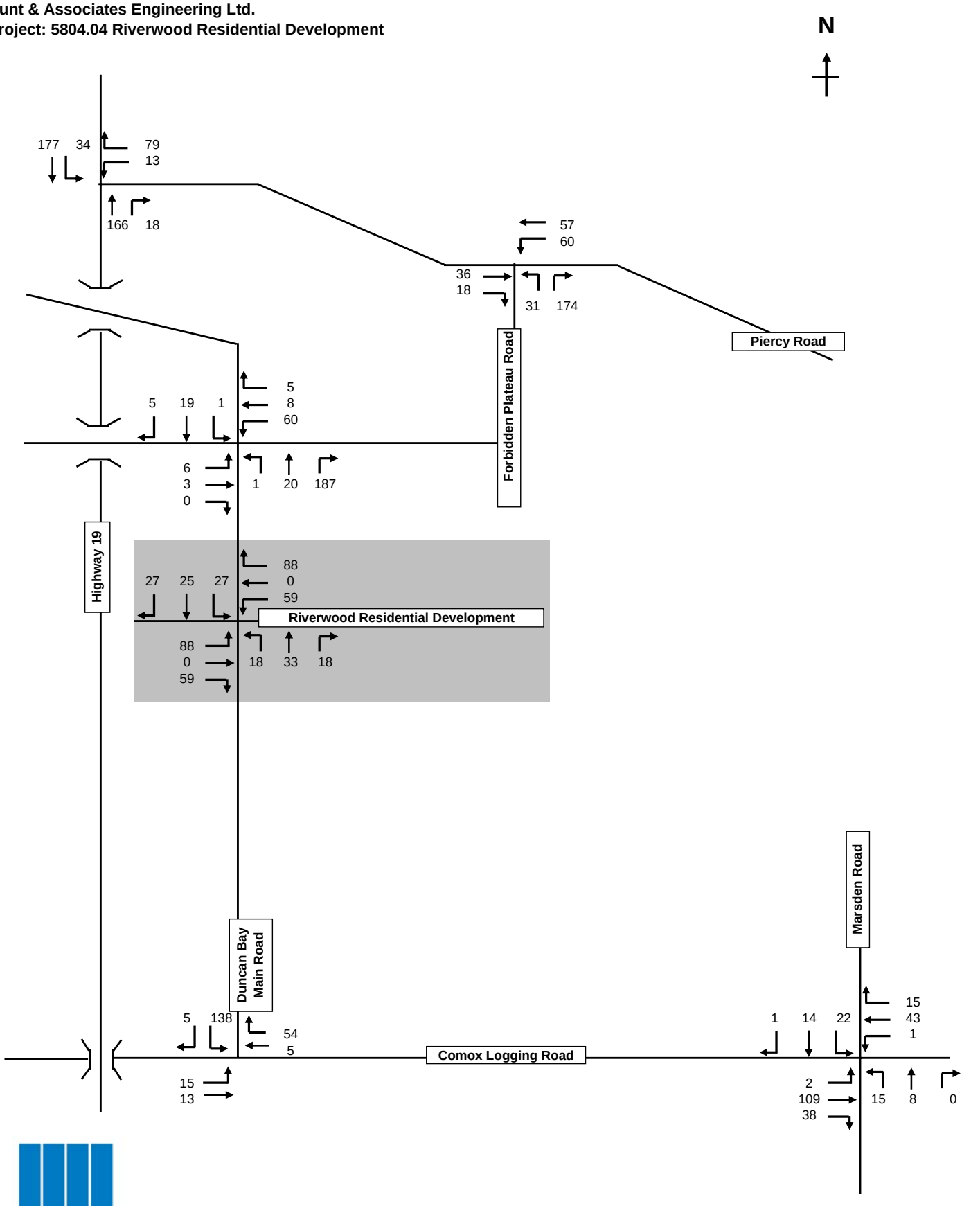
2022
AM Peak
8:15am-9:15am
Option B (AM Peak Period, Year 2022, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
AM Peak
8:15am-9:15am
Option C (AM Peak Period, Year 2022, Growth rate 2% -1%, 60% north, Trip Gen with MoT rate)

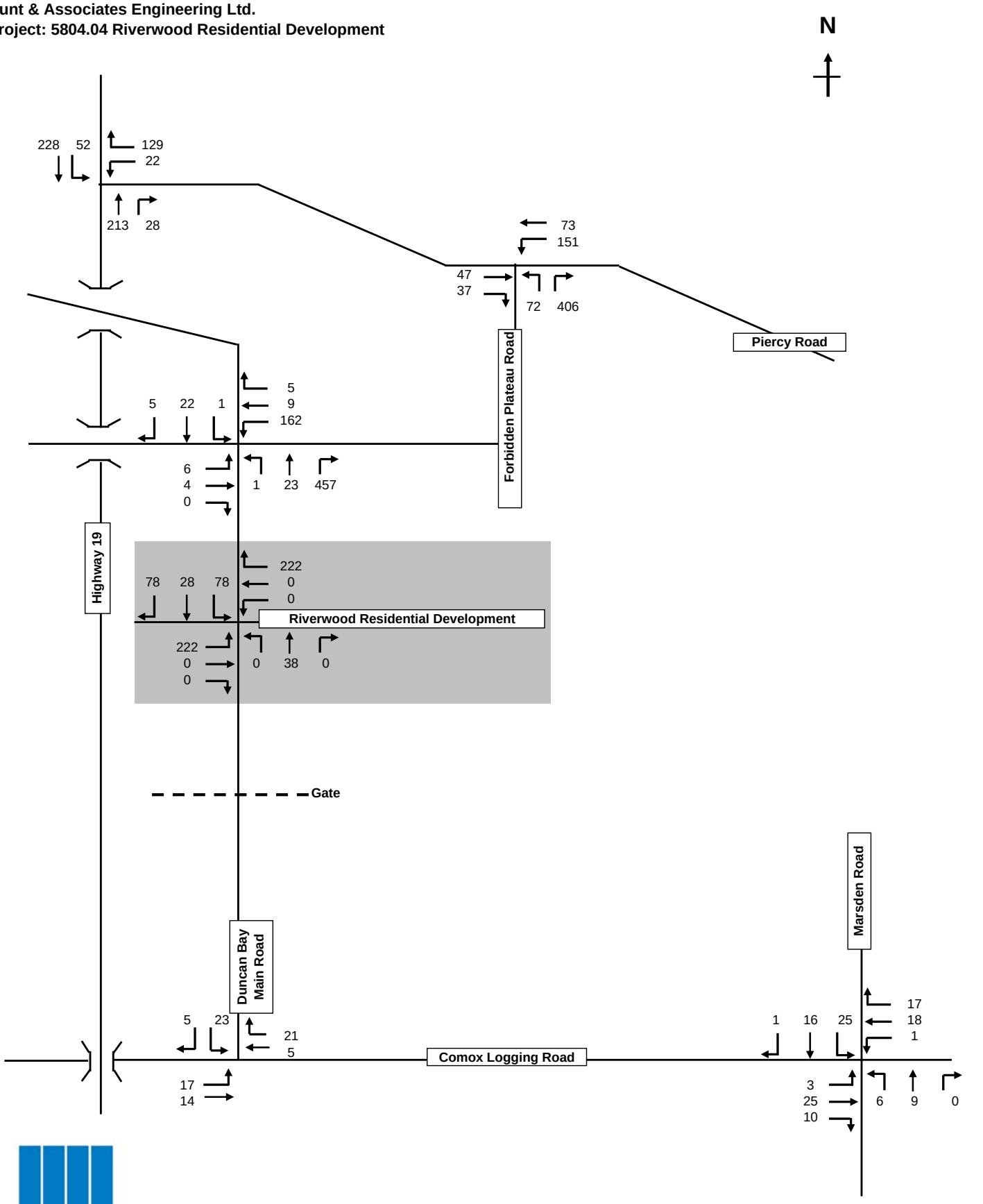
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
AM Peak
8:15am-9:15am

Option D (AM Peak Period, Year 2022, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

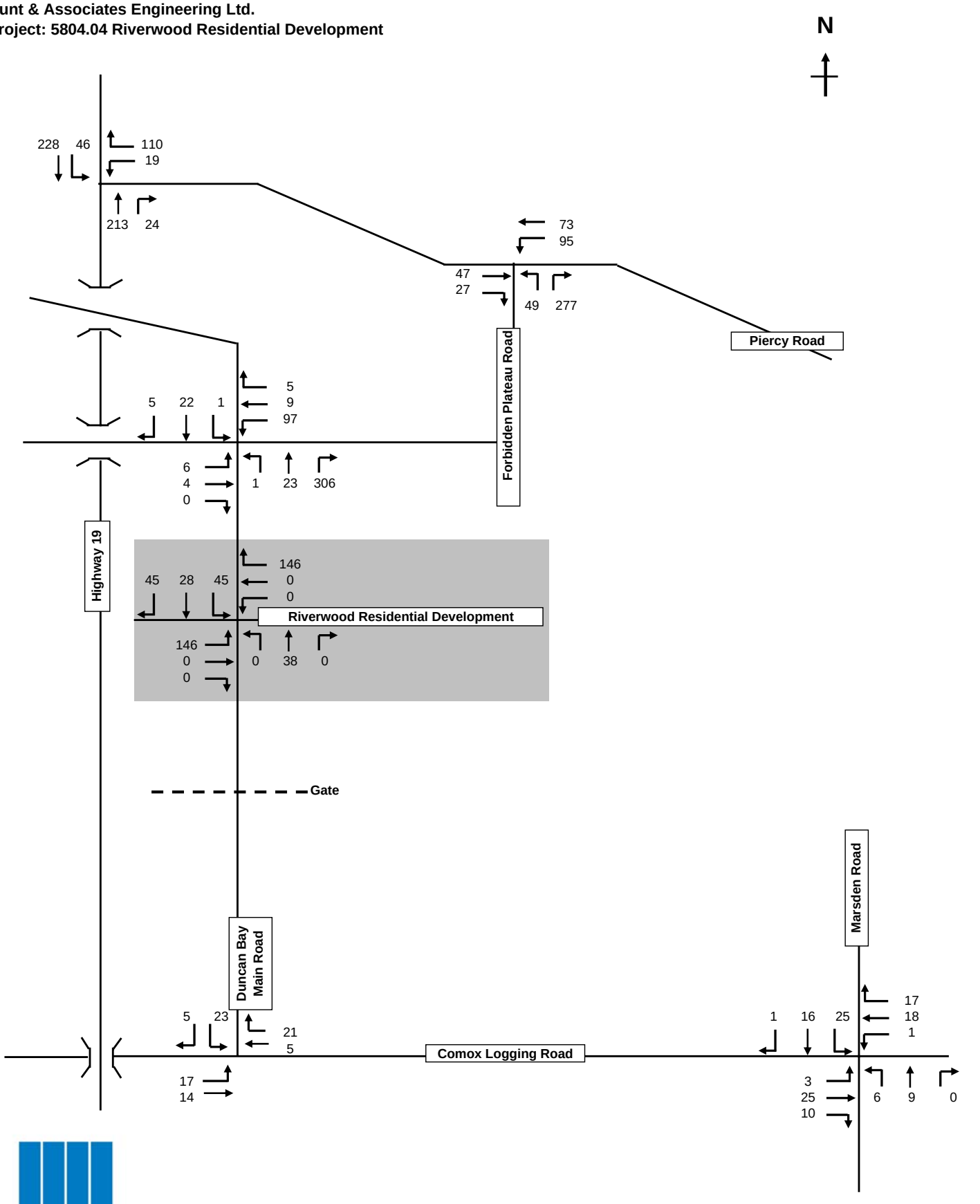
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
AM Peak
8:15am-9:15am

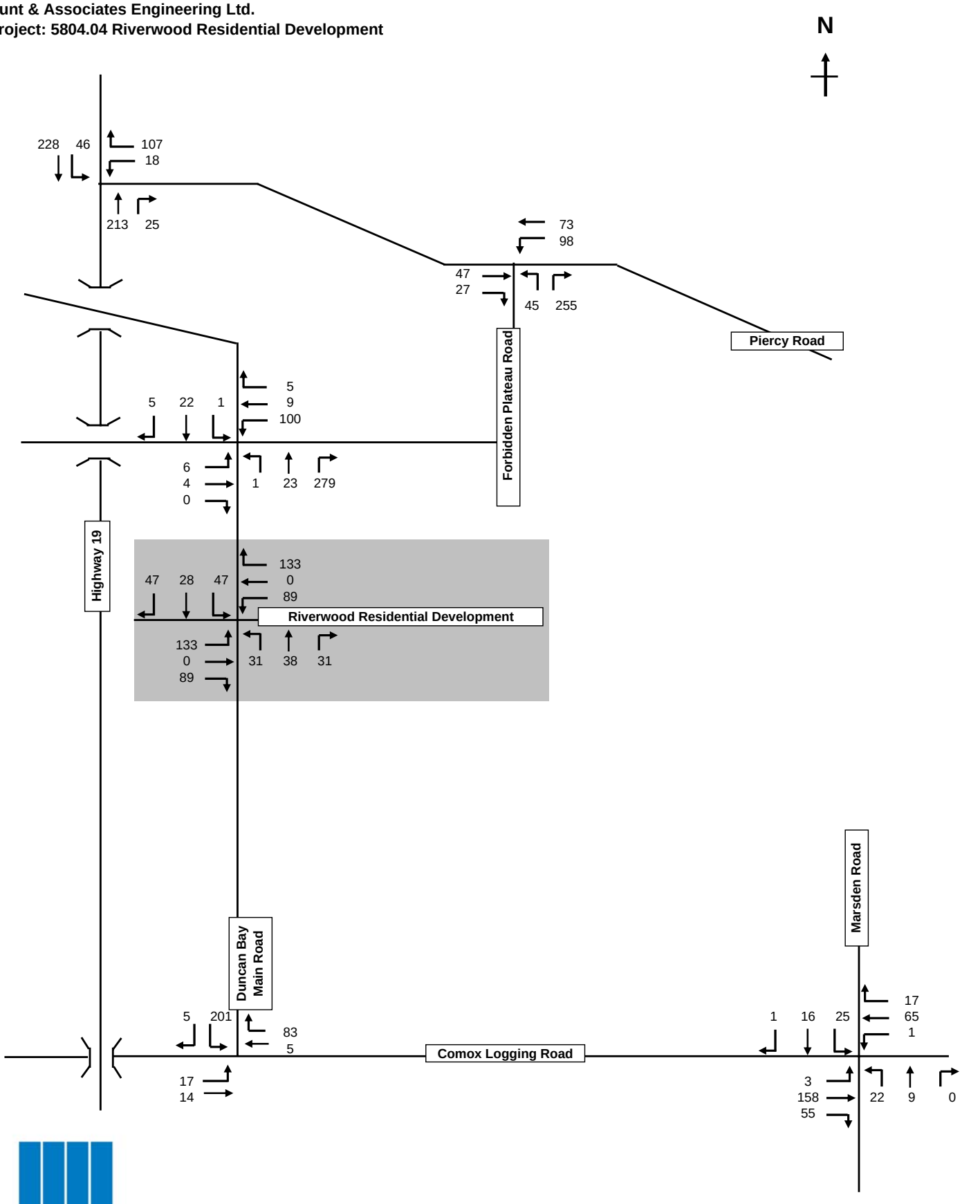
Option E (AM Peak Period, Year 2022, Growth rate 4% -2%, 100% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
AM Peak
8:15am-9:15am
Option F (AM Peak Period, Year 2022, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

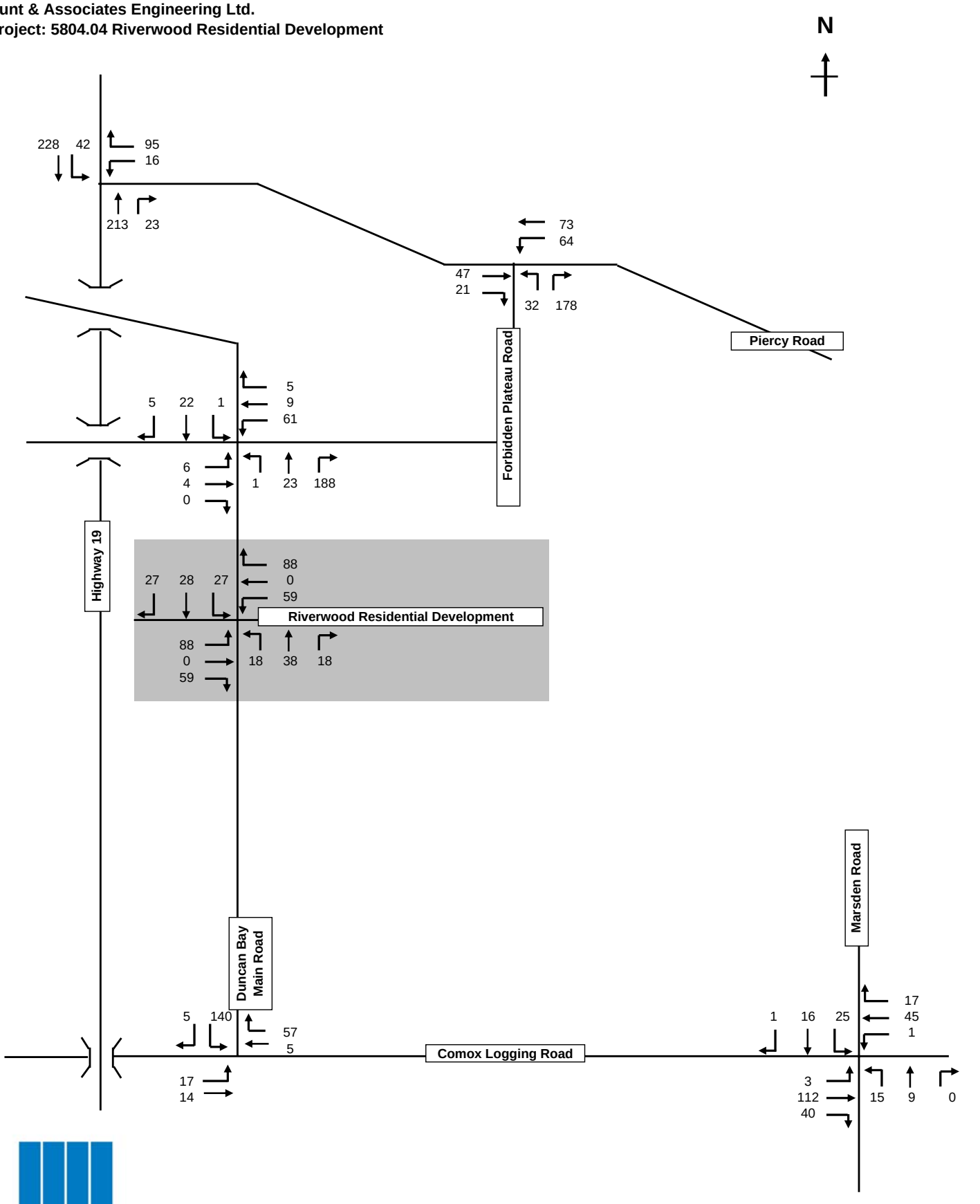
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
AM Peak
8:15am-9:15am

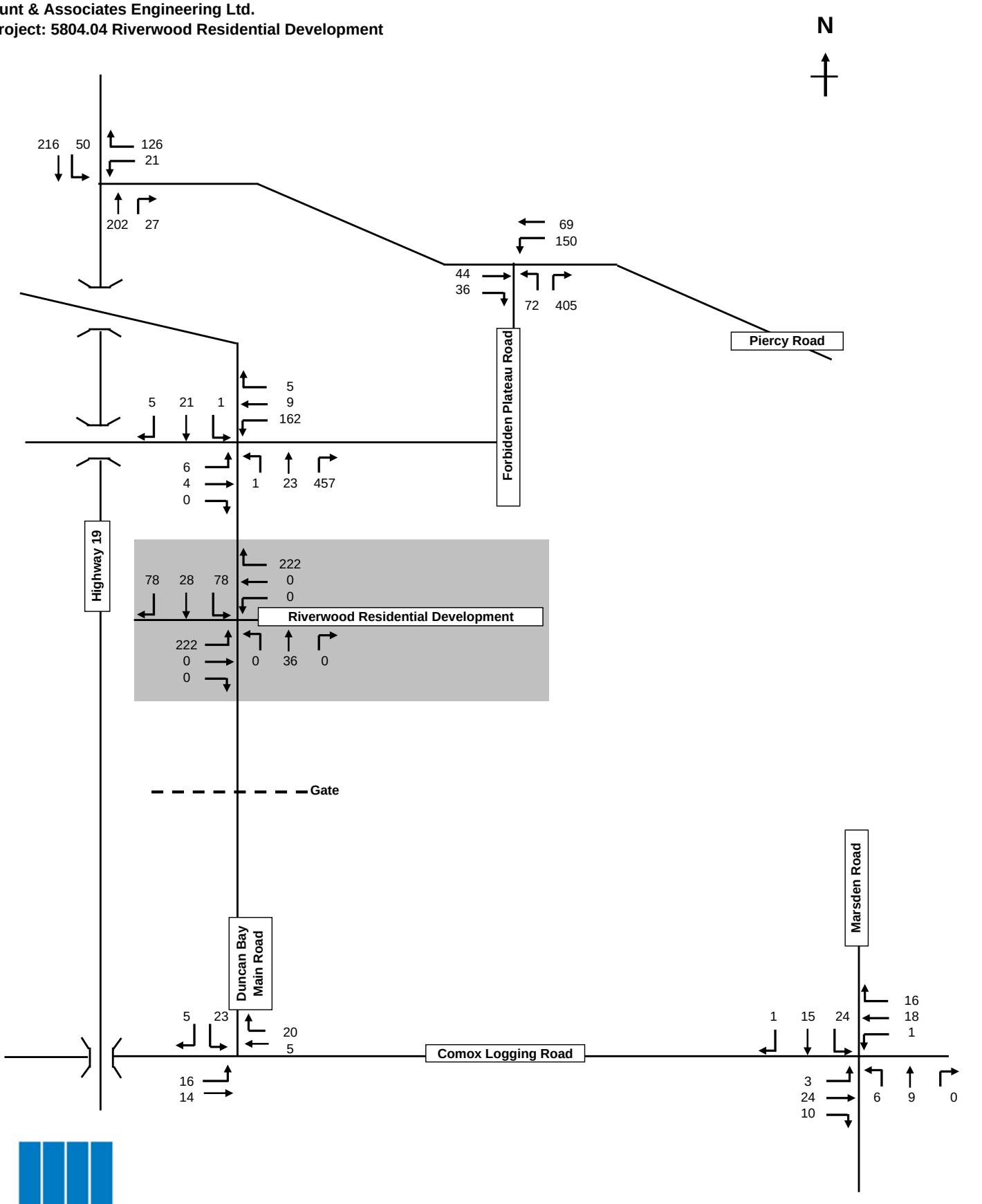
Option G (AM Peak Period, Year 2022, Growth rate 4% -2%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



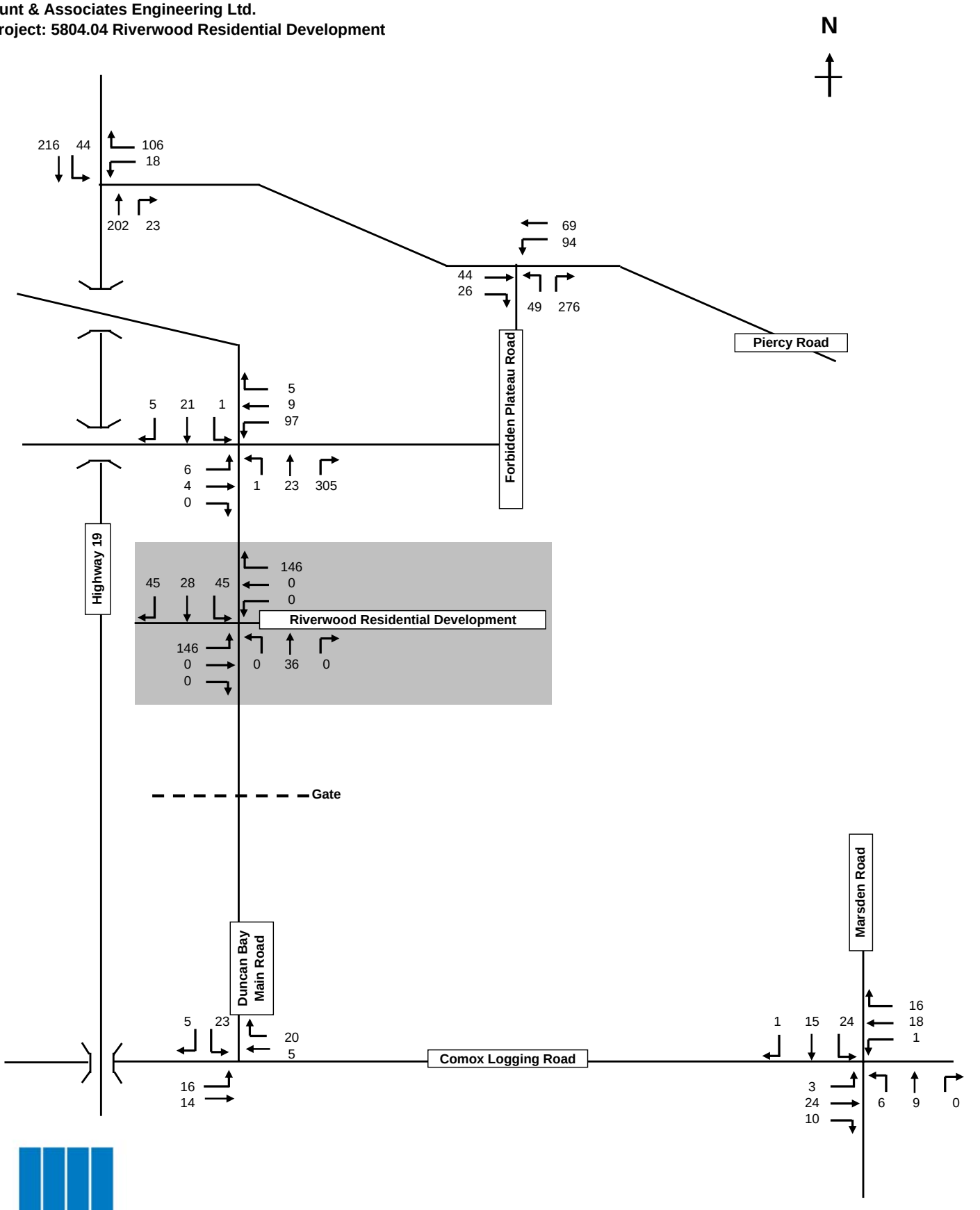
2022
AM Peak
8:15am-9:15am
Option H (AM Peak Period, Year 2022, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
AM Peak
8:15am-9:15am
Option A (AM peak Period, Year 2032, Growth rate 2% -1%, 100% north, Trip Gen with MoT rate)

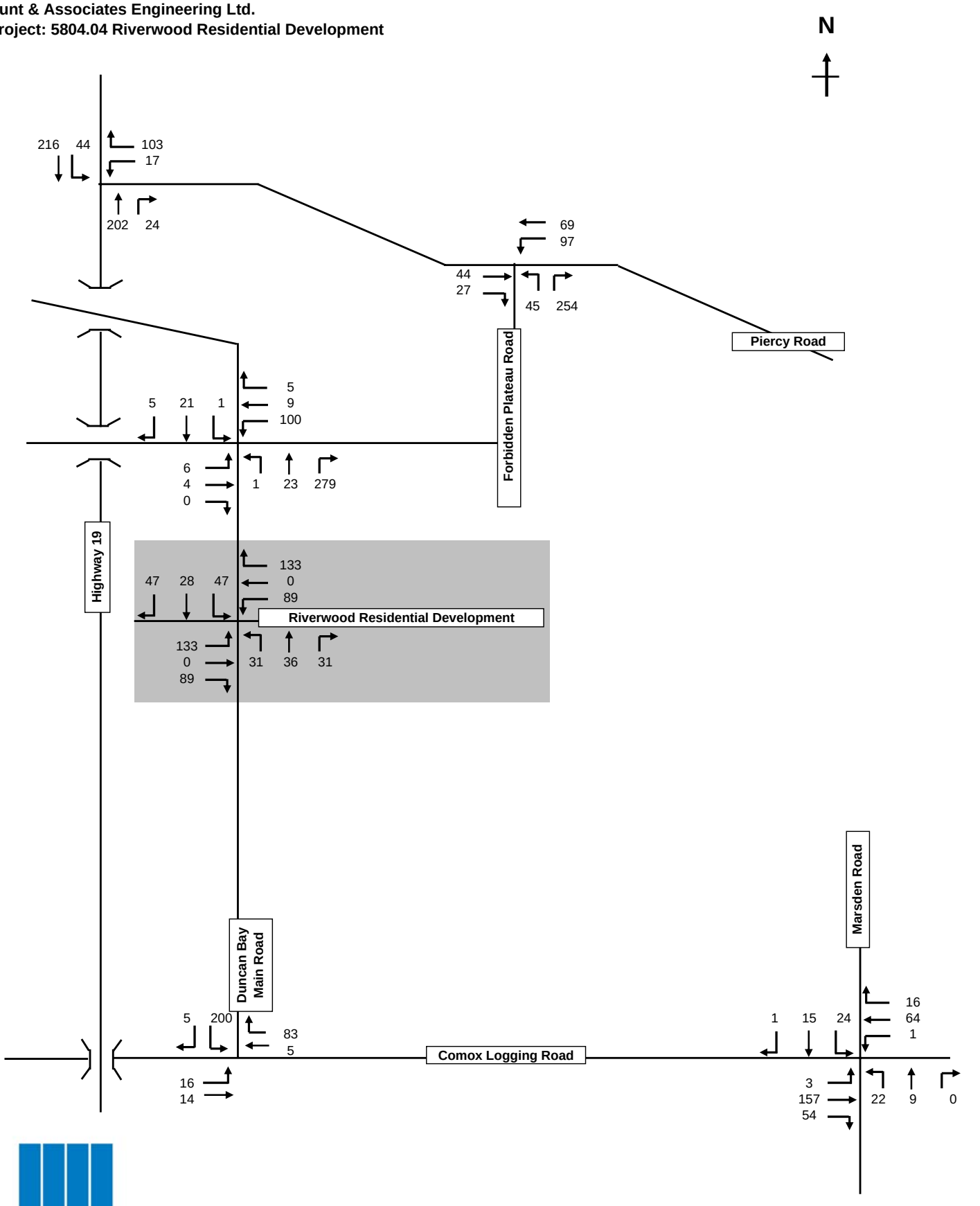
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
AM Peak
8:15am-9:15am

Option B (AM Peak Period, Year 2032, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

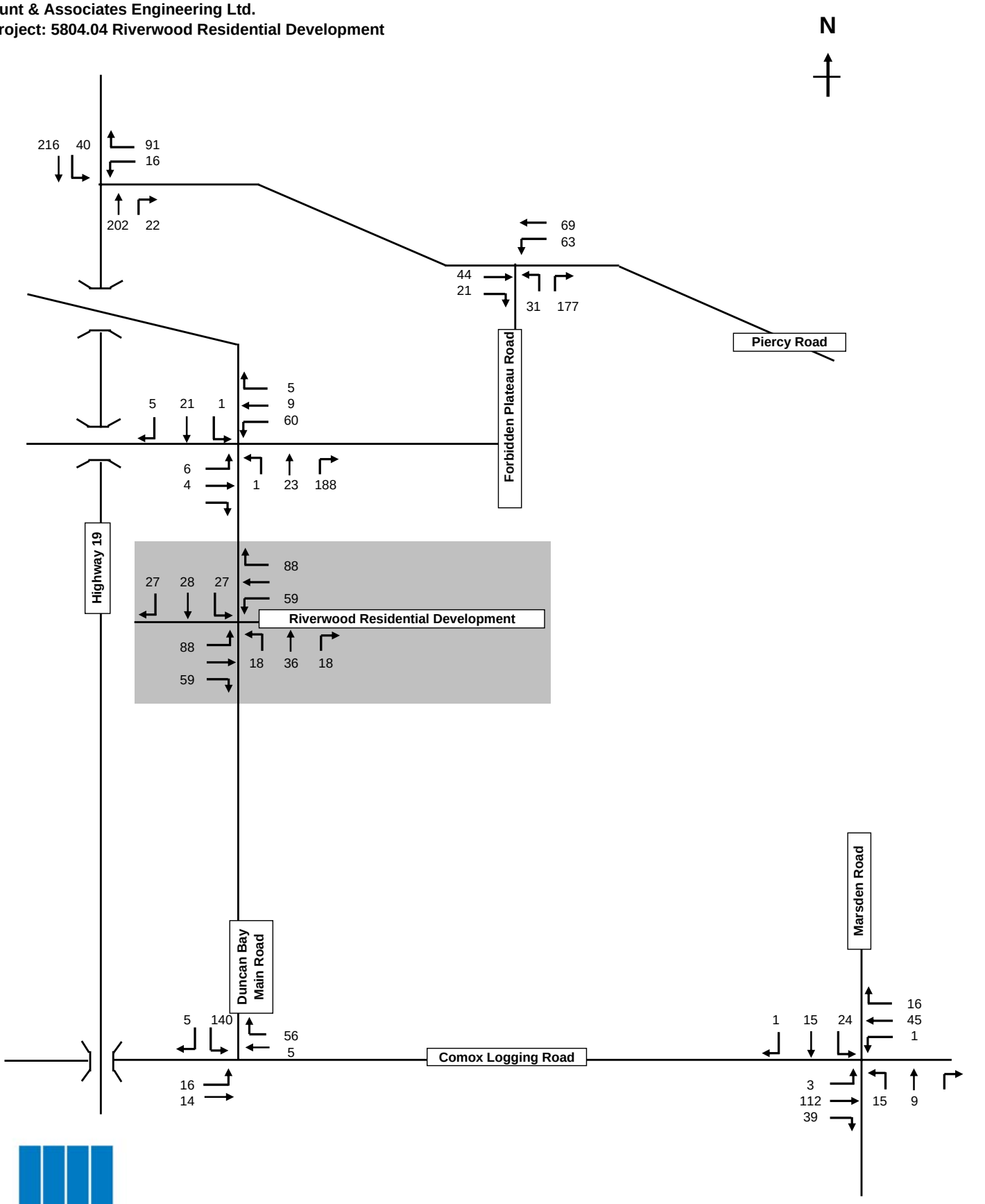
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
AM Peak
8:15am-9:15am

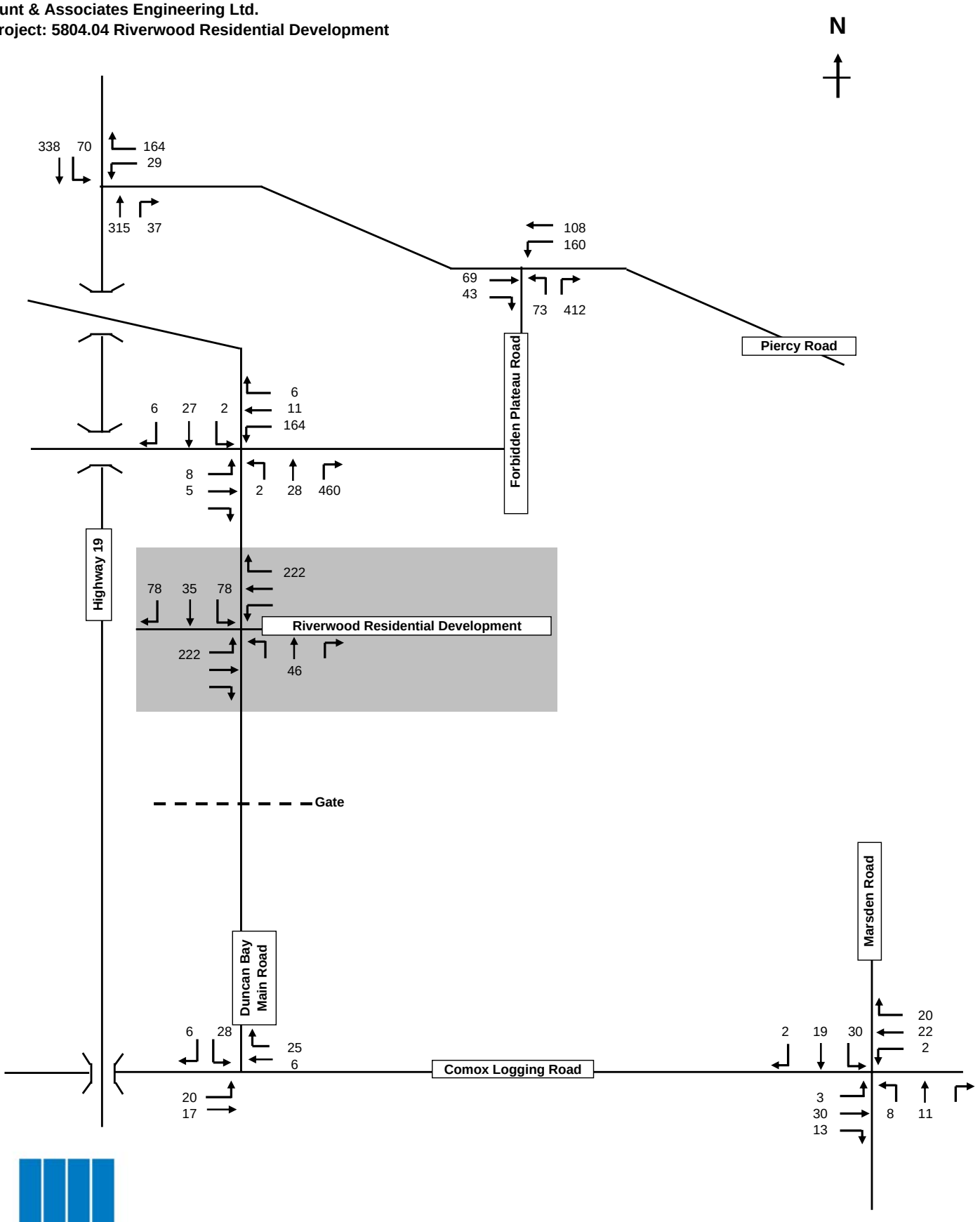
Option C (AM Peak Period, Year 2032, Growth rate 2% -1%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
AM Peak
8:15am-9:15am
Option D (AM Peak Period, Year 2032, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

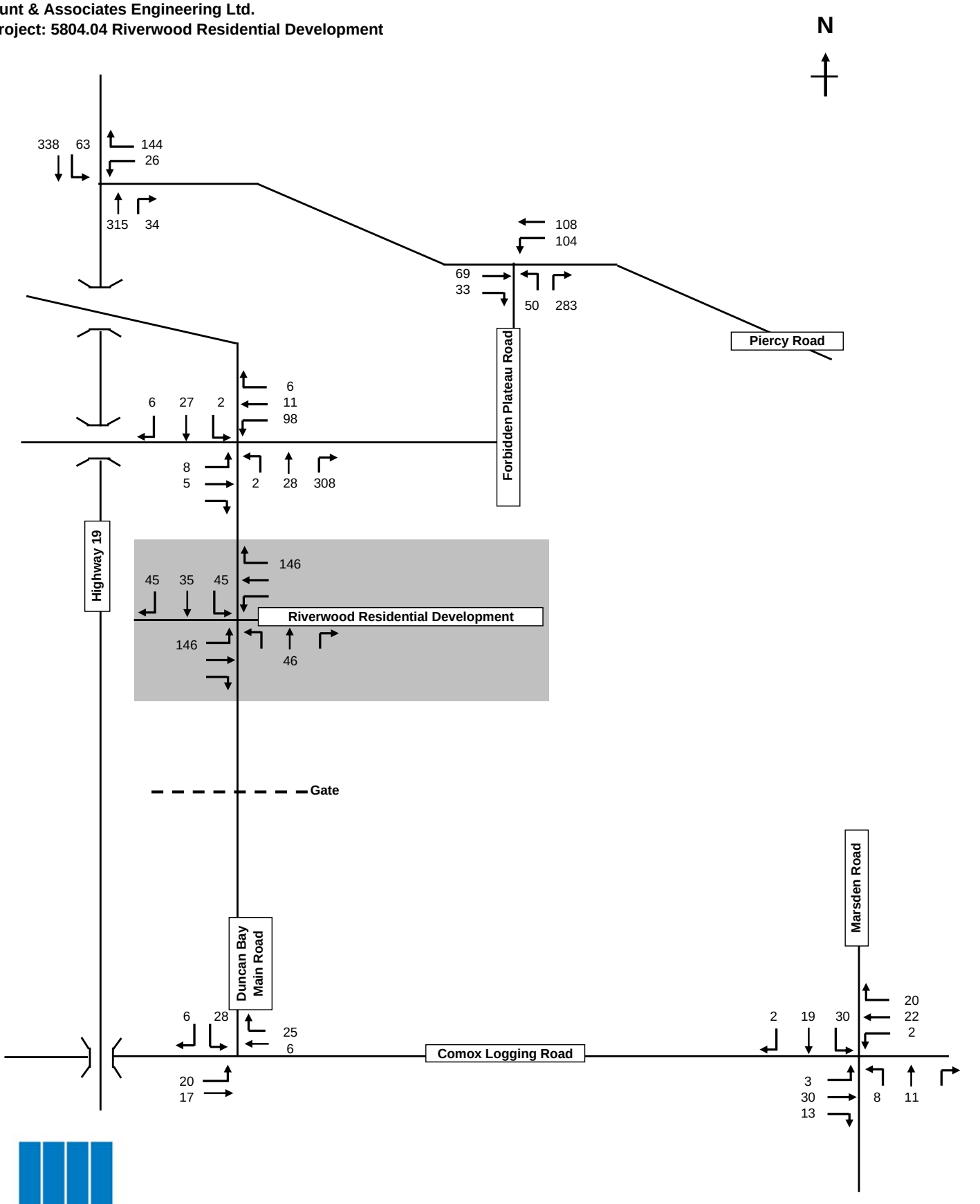
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
AM Peak
8:15am-9:15am

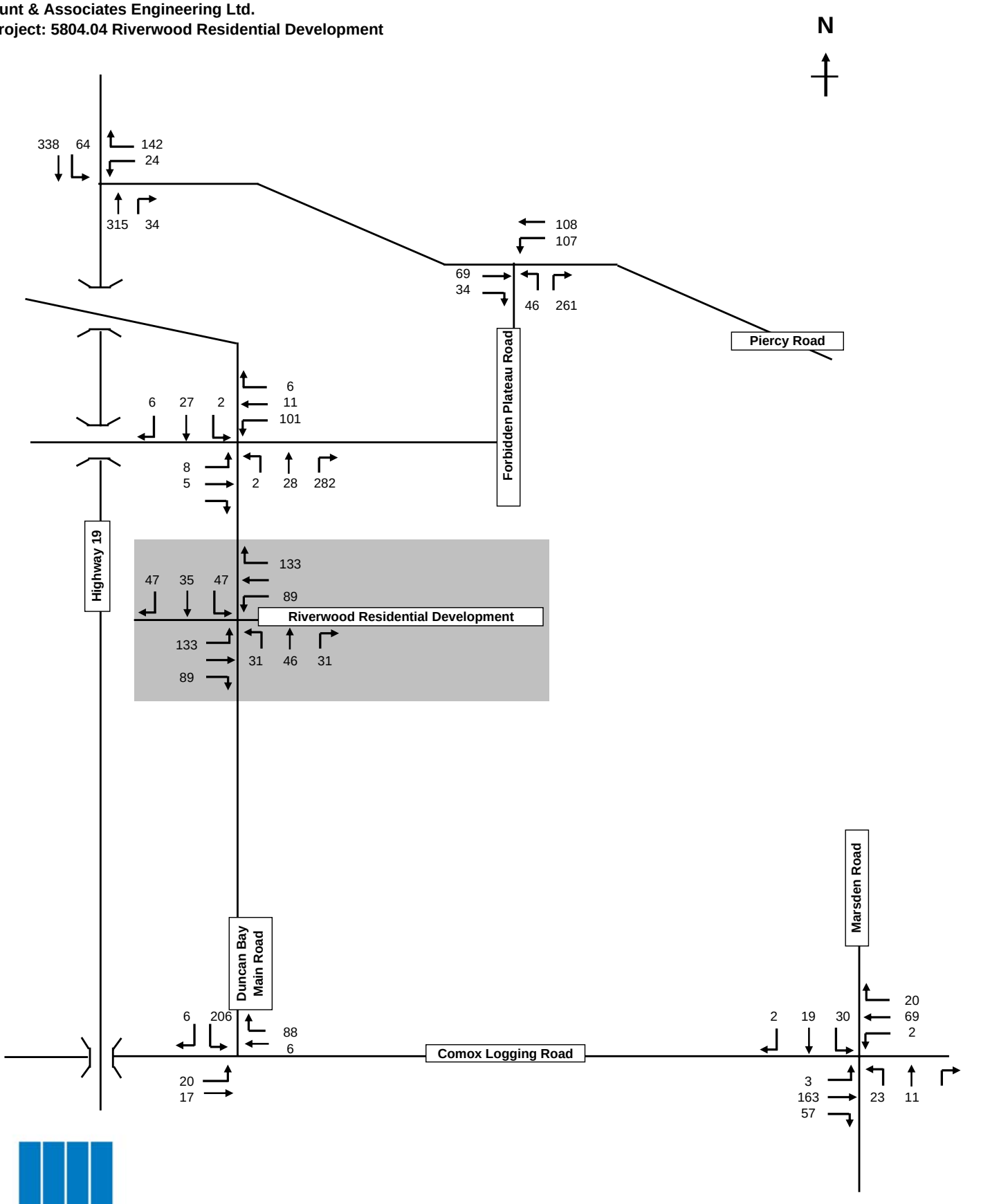
Option E (AM Peak Period, Year 2032, Growth rate 4% -2%, 100% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



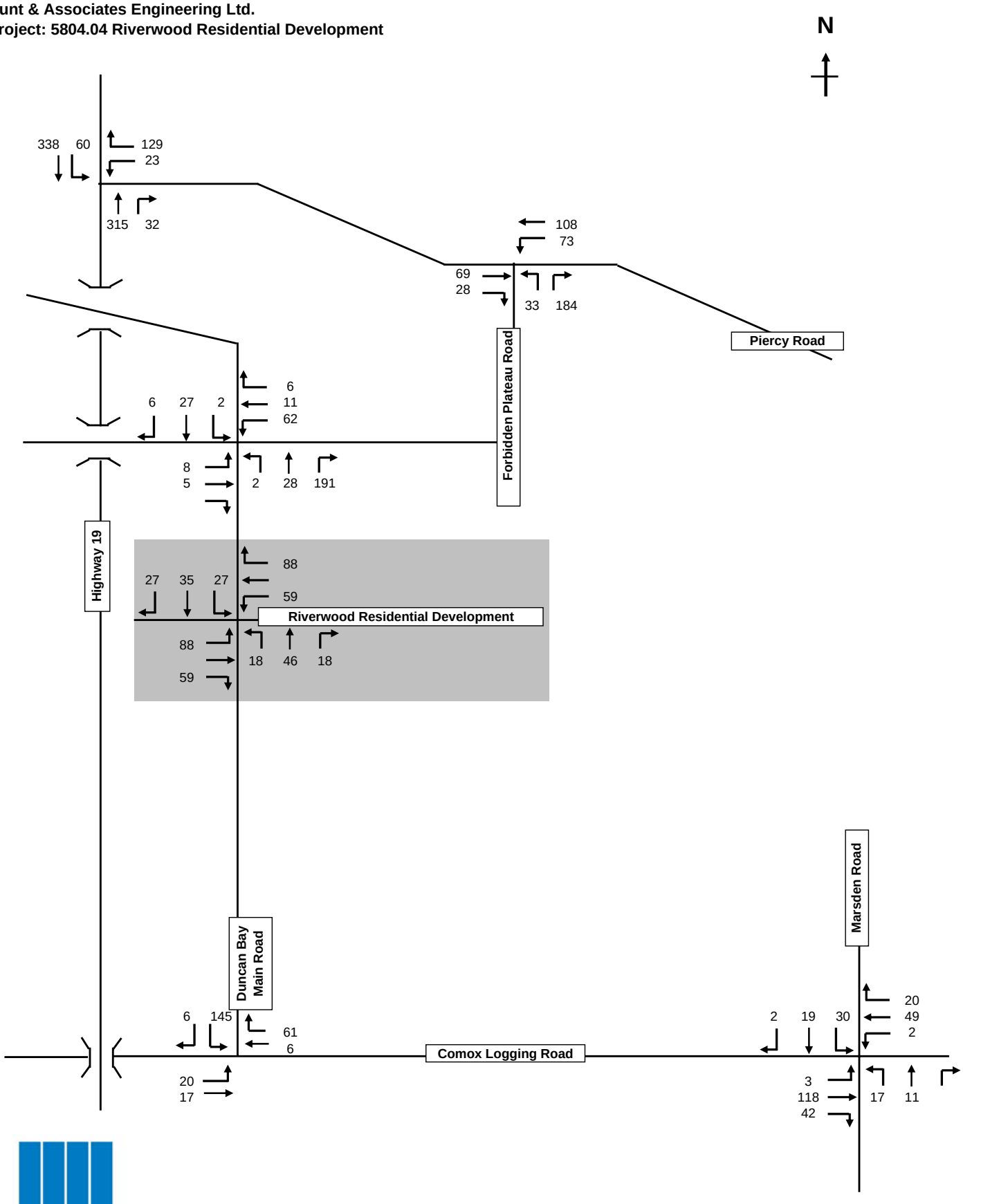
2032
AM Peak
8:15am-9:15am
Option F (AM Peak Period, Year 2032, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



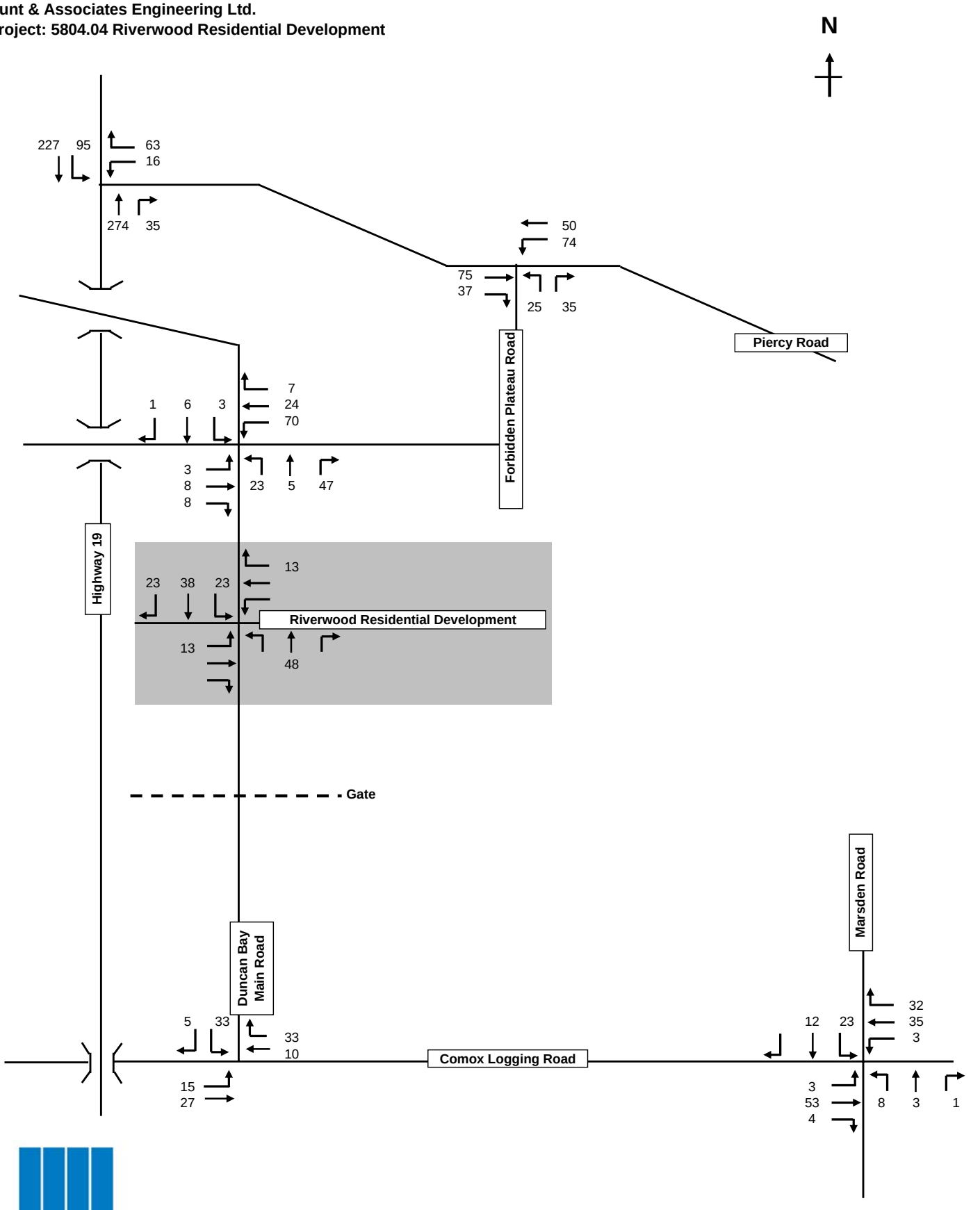
2032
AM Peak
8:15am-9:15am
Option G (AM Peak Period, Year 2032, Growth rate 4% -2%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
AM Peak
8:15am-9:15am
Option H (AM Peak Period, Year 2032, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

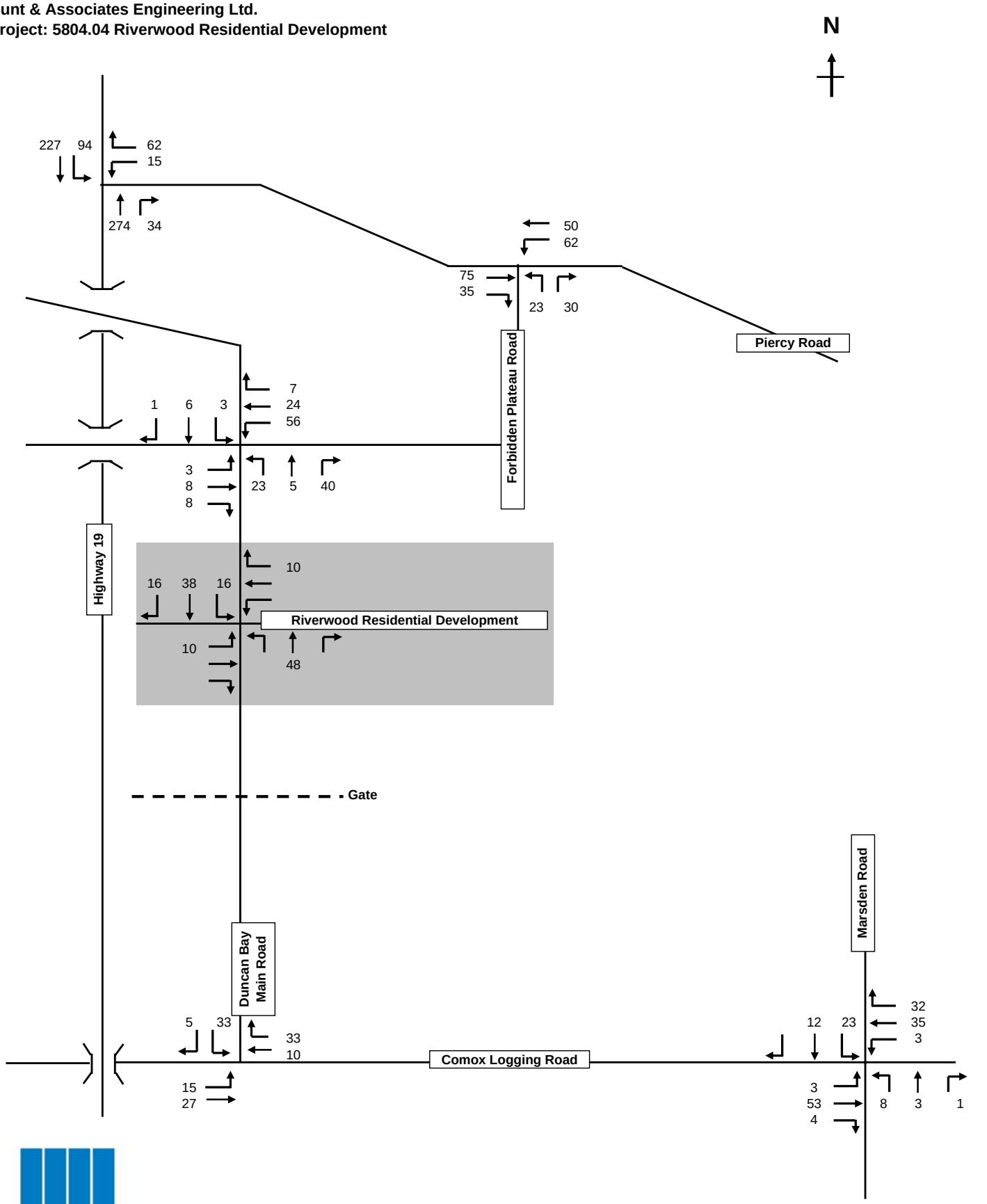
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
PM Peak
4:15pm-5:15pm

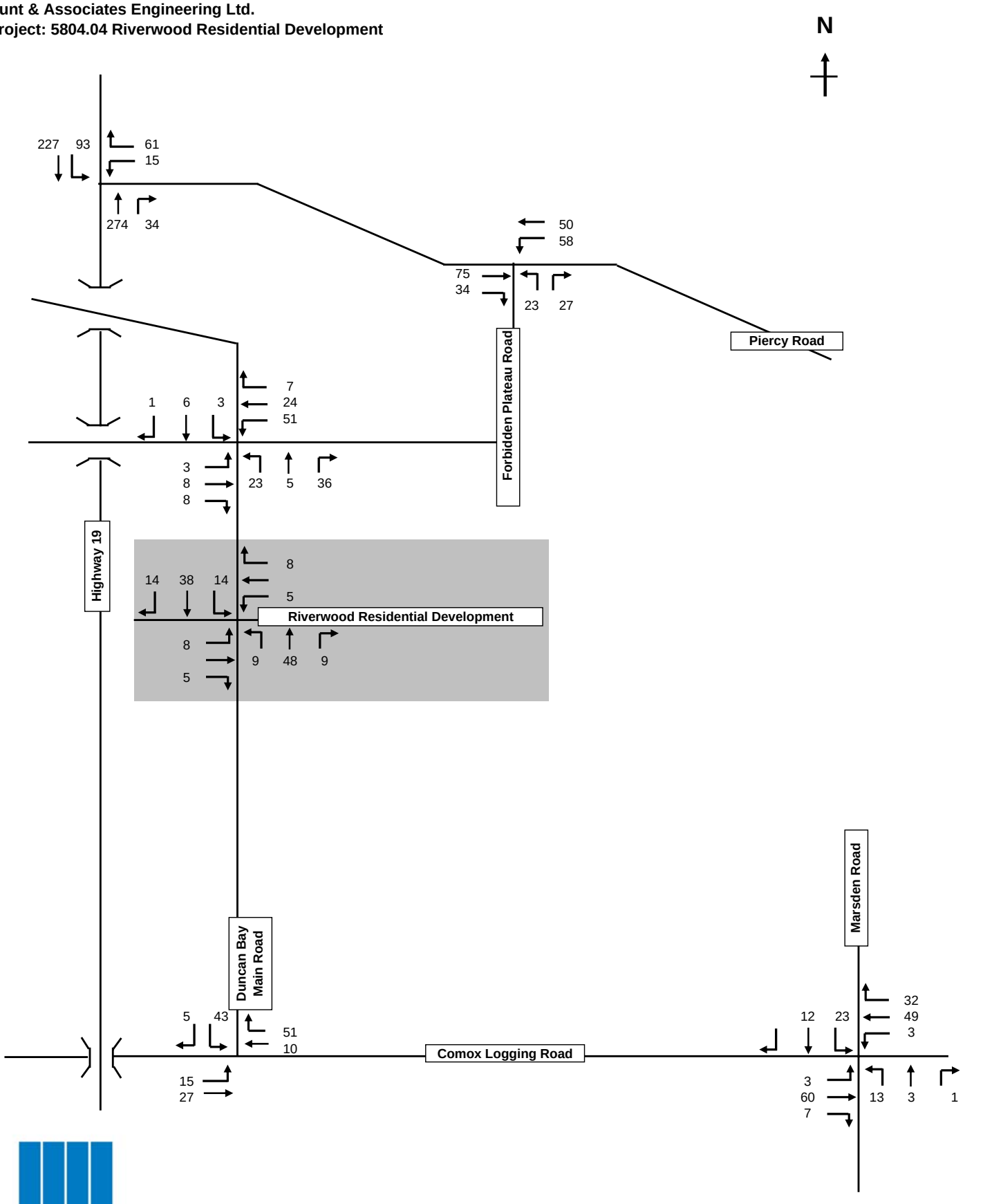
Option A (PM peak Period, Year 2012, Growth rate 2% -1%, 100% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



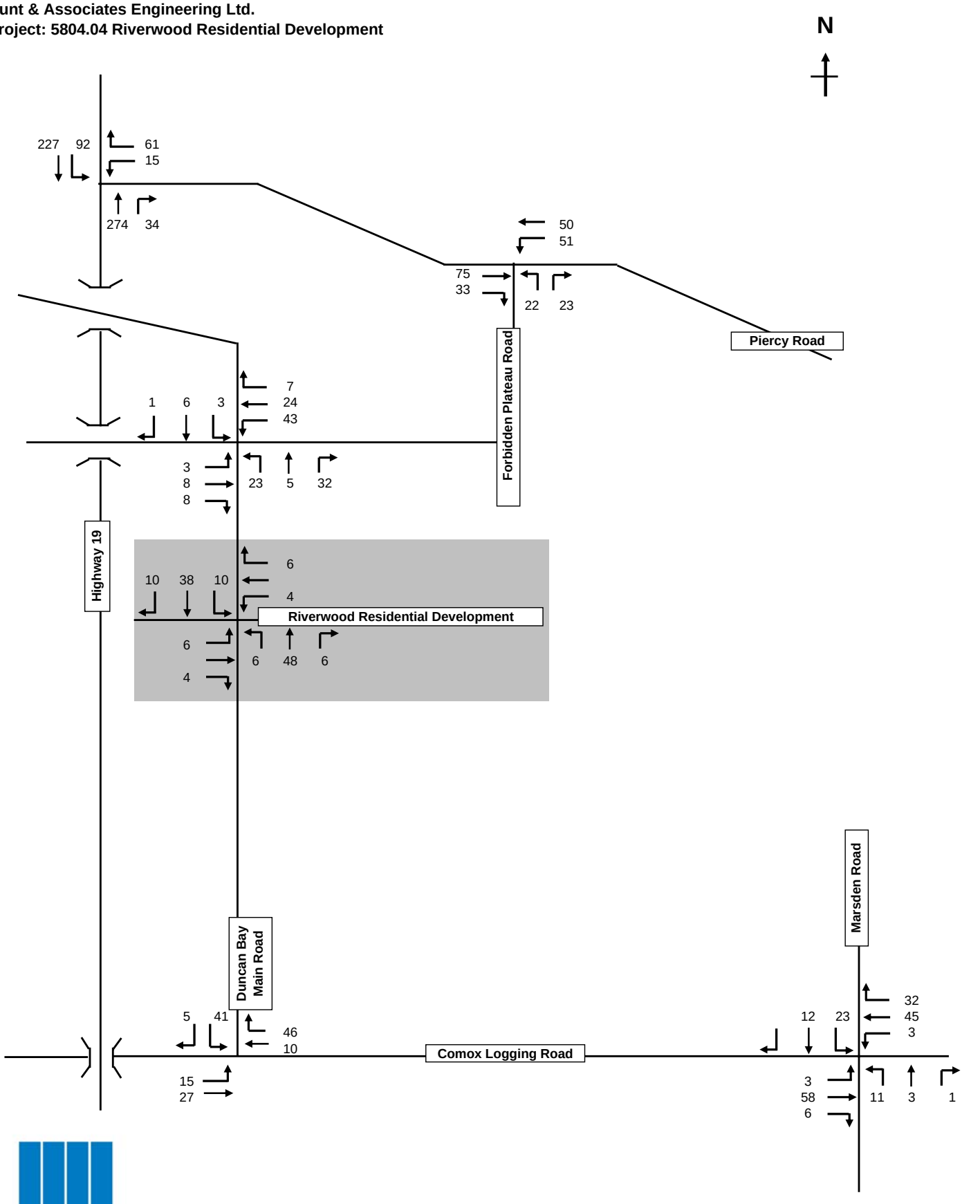
2012
PM Peak
4:15pm-5:15pm
Option B (PM Peak Period, Year 2012, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



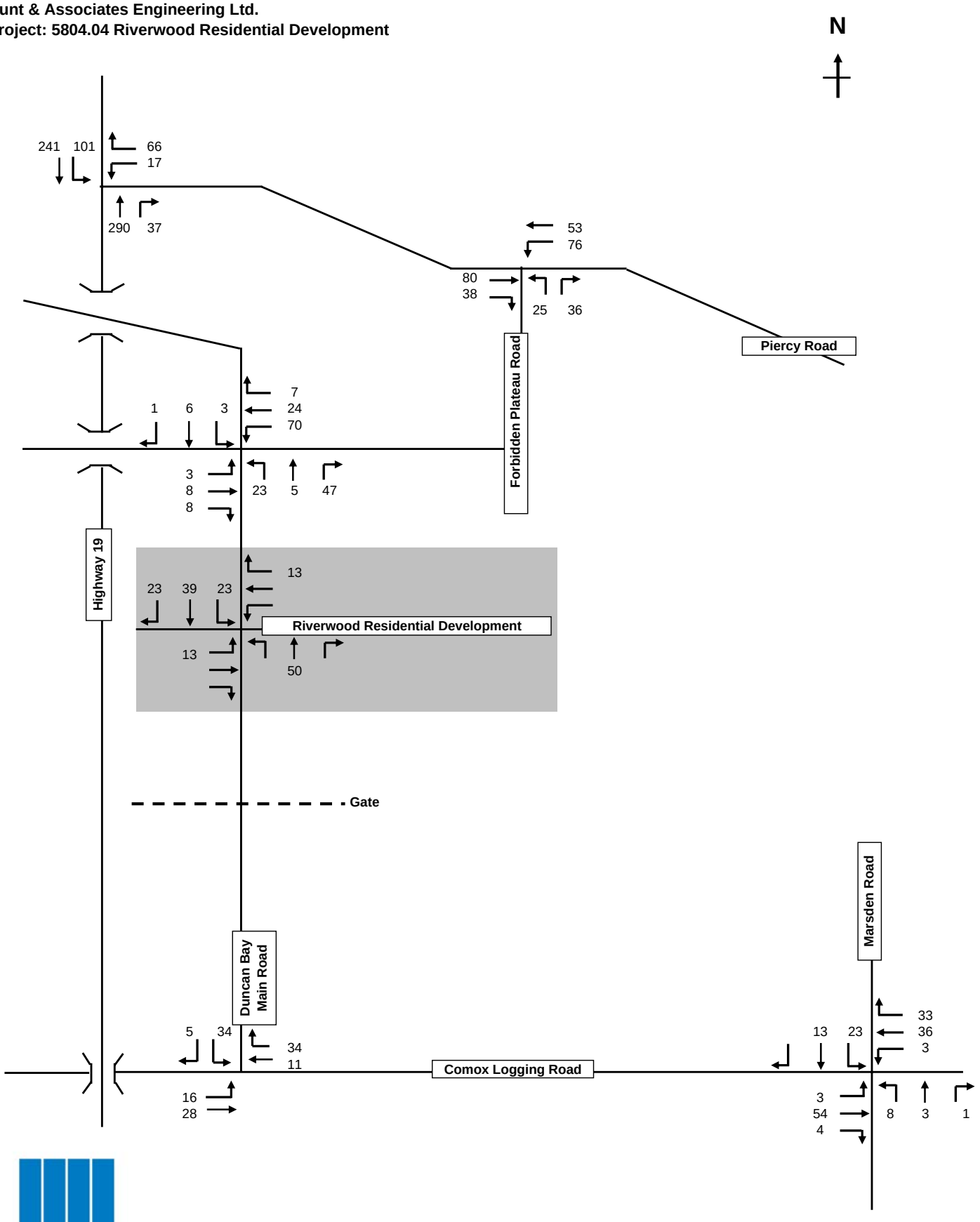
2012
PM Peak
4:15pm-5:15pm
Option C (PM Peak Period, Year 2012, Growth rate 2% -1%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
PM Peak
4:15pm-5:15pm
Option D (PM Peak Period, Year 2012, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

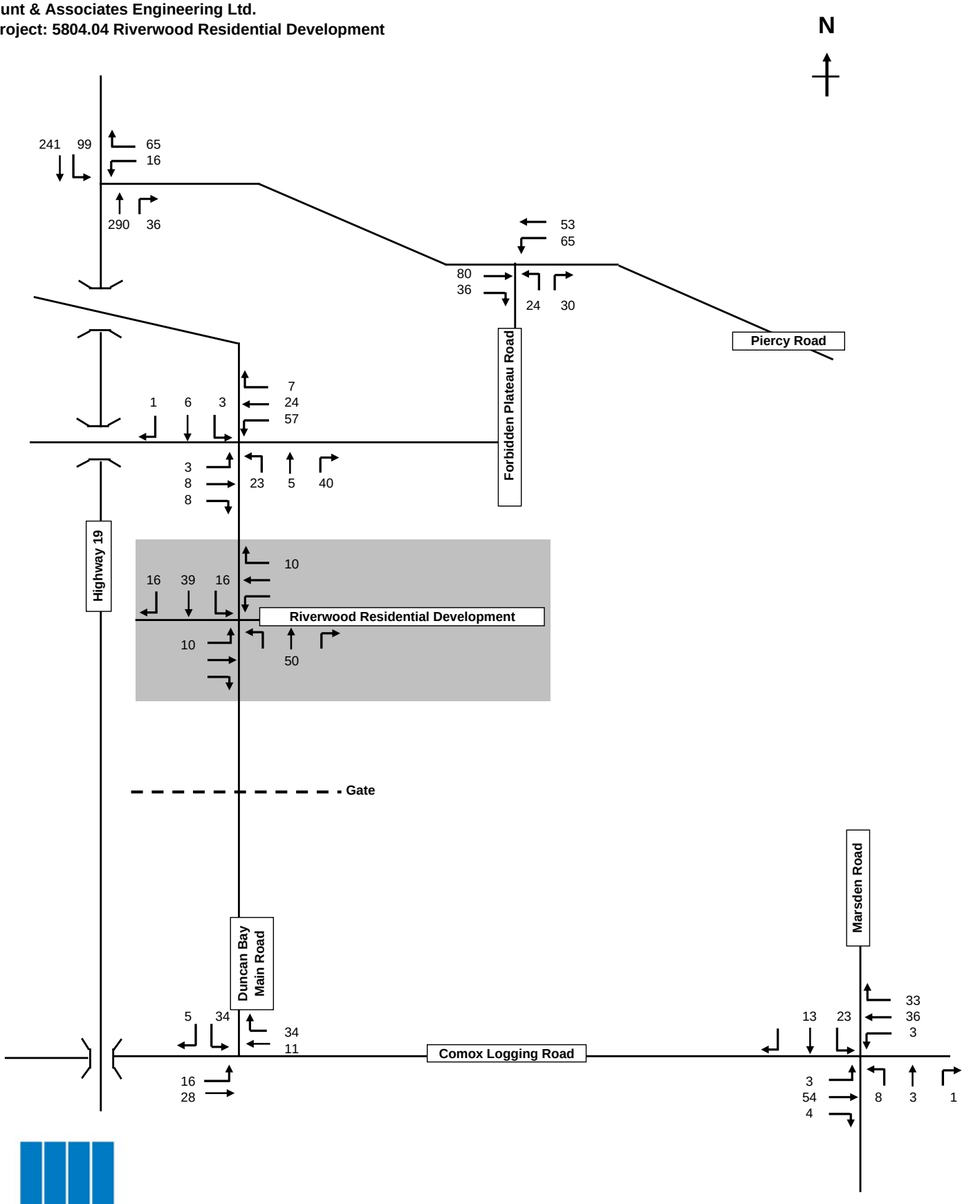
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
PM Peak
4:15pm-5:15pm

Option E (PM Peak Period, Year 2012, Growth rate 4% -2%, 100% north, Trip Gen with MoT rate)

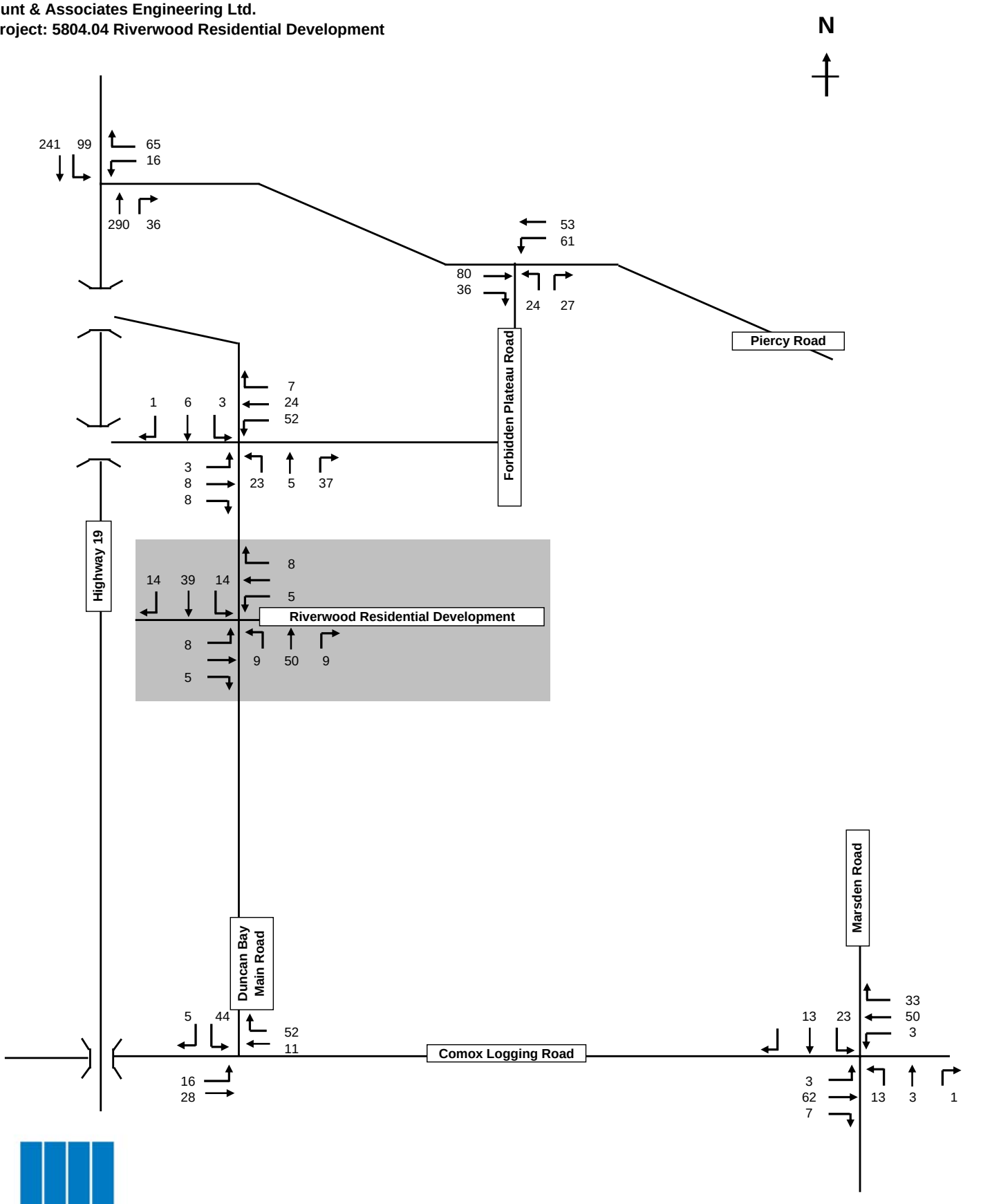
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
PM Peak
4:15pm-5:15pm

Option F (PM Peak Period, Year 2012, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

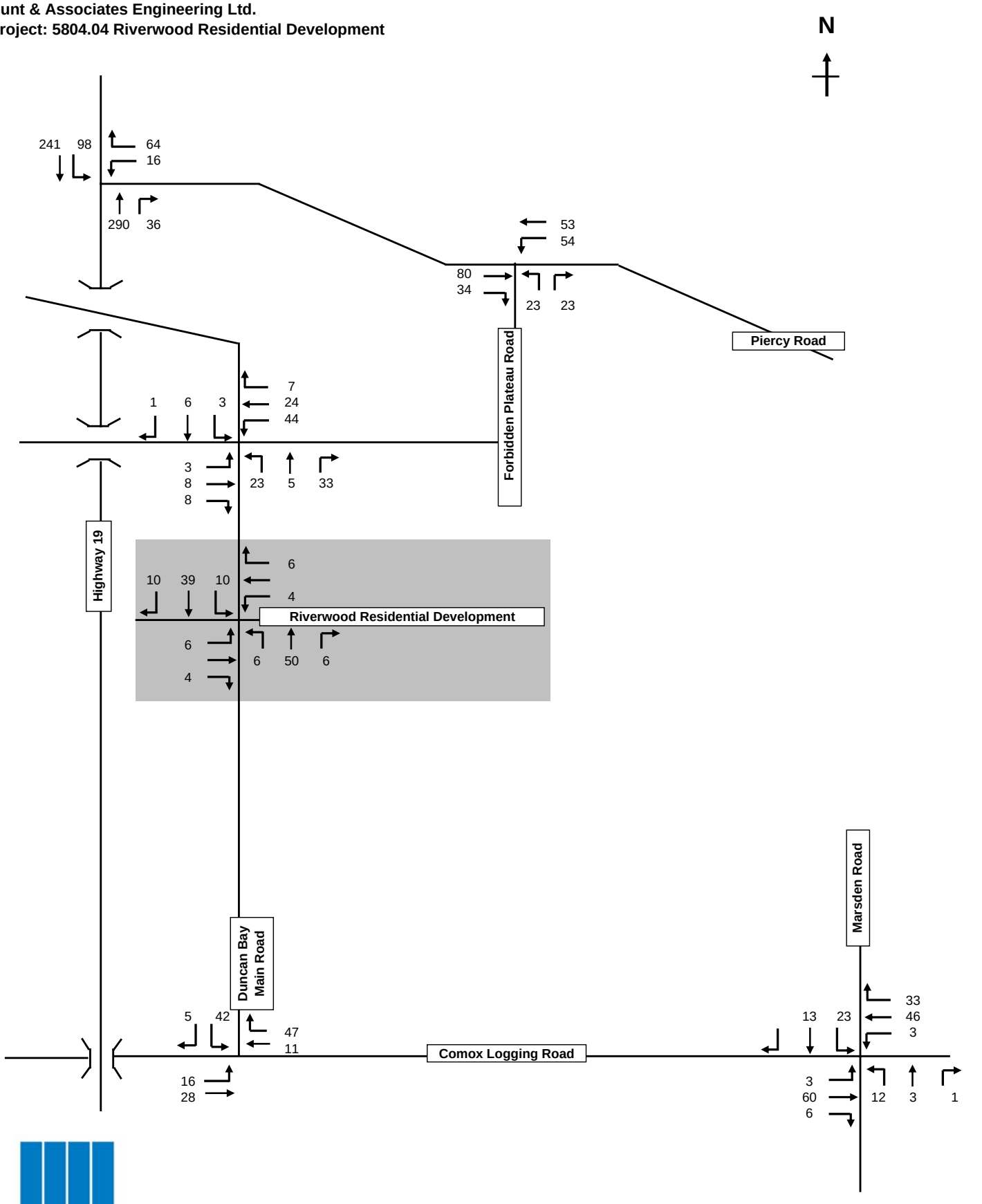
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
PM Peak
4:15pm-5:15pm

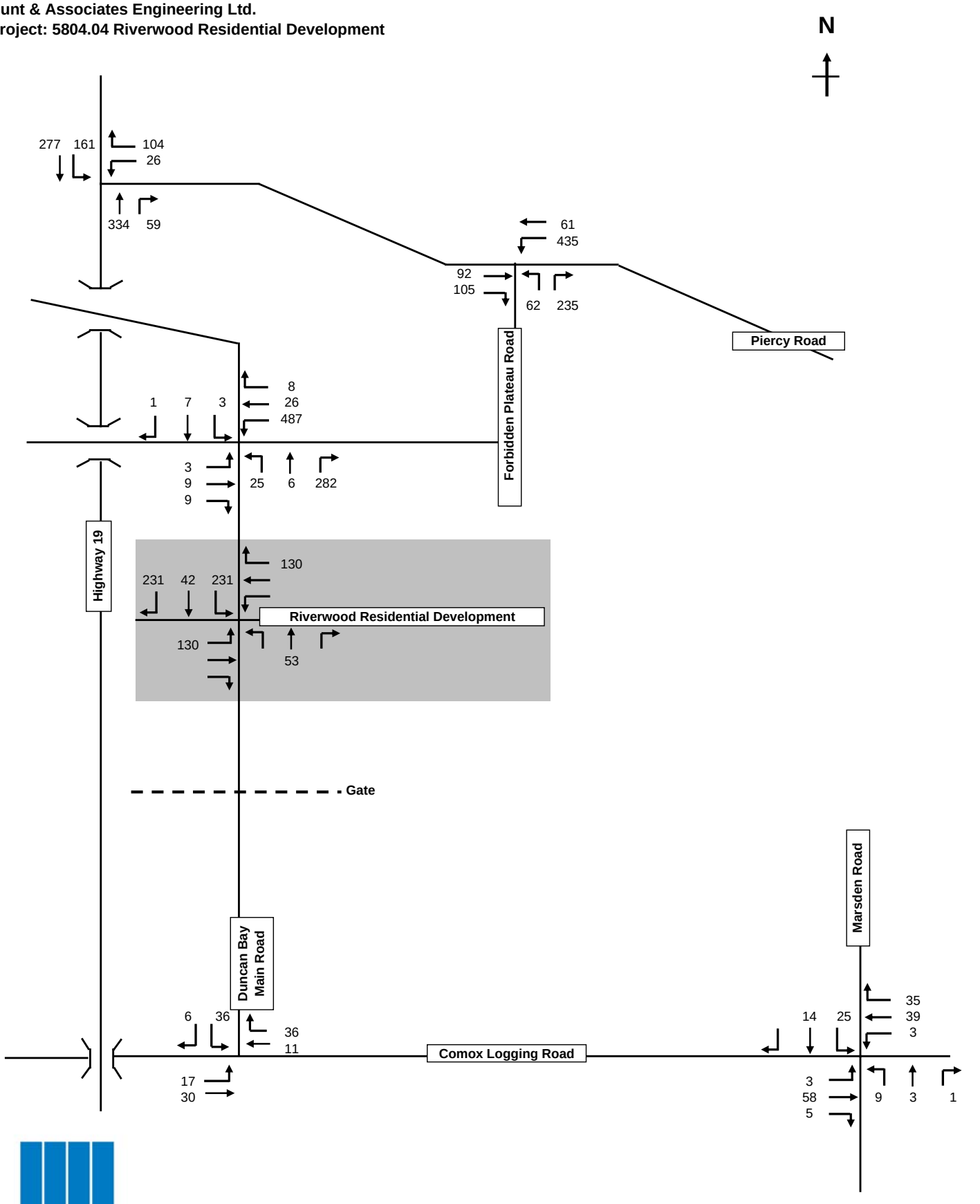
Option G (PM Peak Period, Year 2012, Growth rate 4% -2%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2012
PM Peak
4:15pm-5:15pm
Option H (PM Peak Period, Year 2012, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

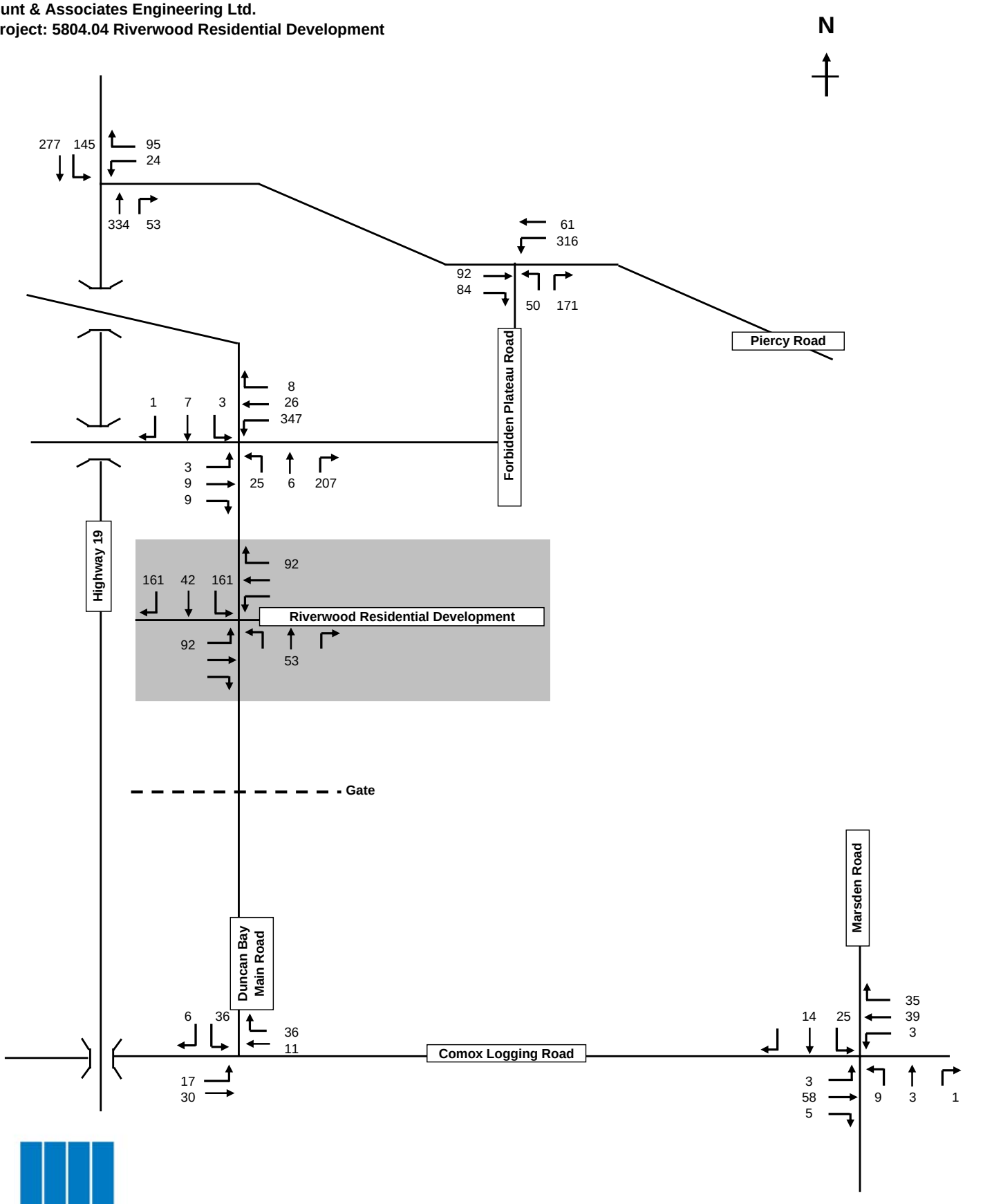
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
PM Peak
4:15pm-5:15pm

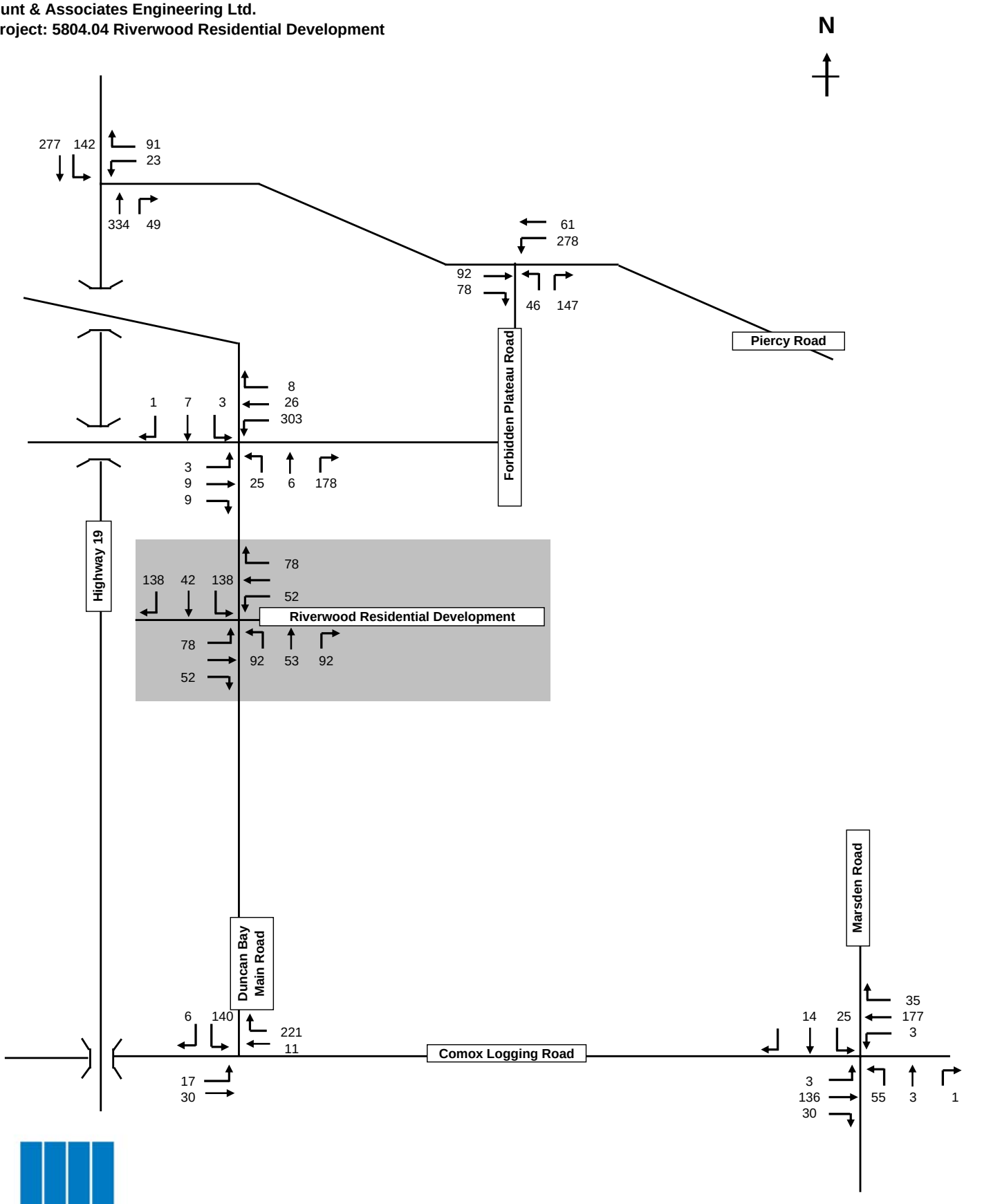
Option A (PM peak Period, Year 2022, Growth rate 2% -1%, 100% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



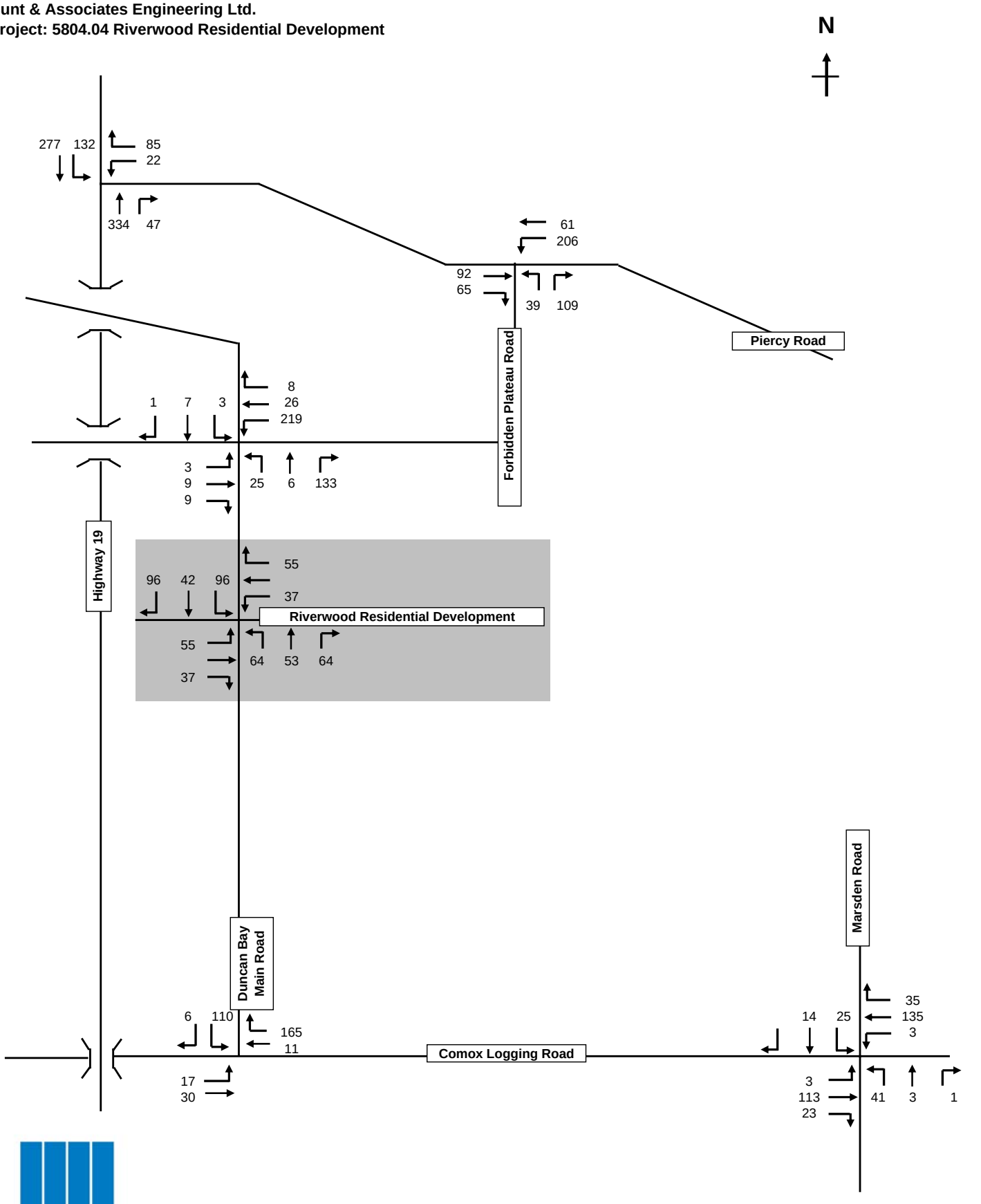
2022
PM Peak
4:15pm-5:15pm
Option B (PM Peak Period, Year 2022, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



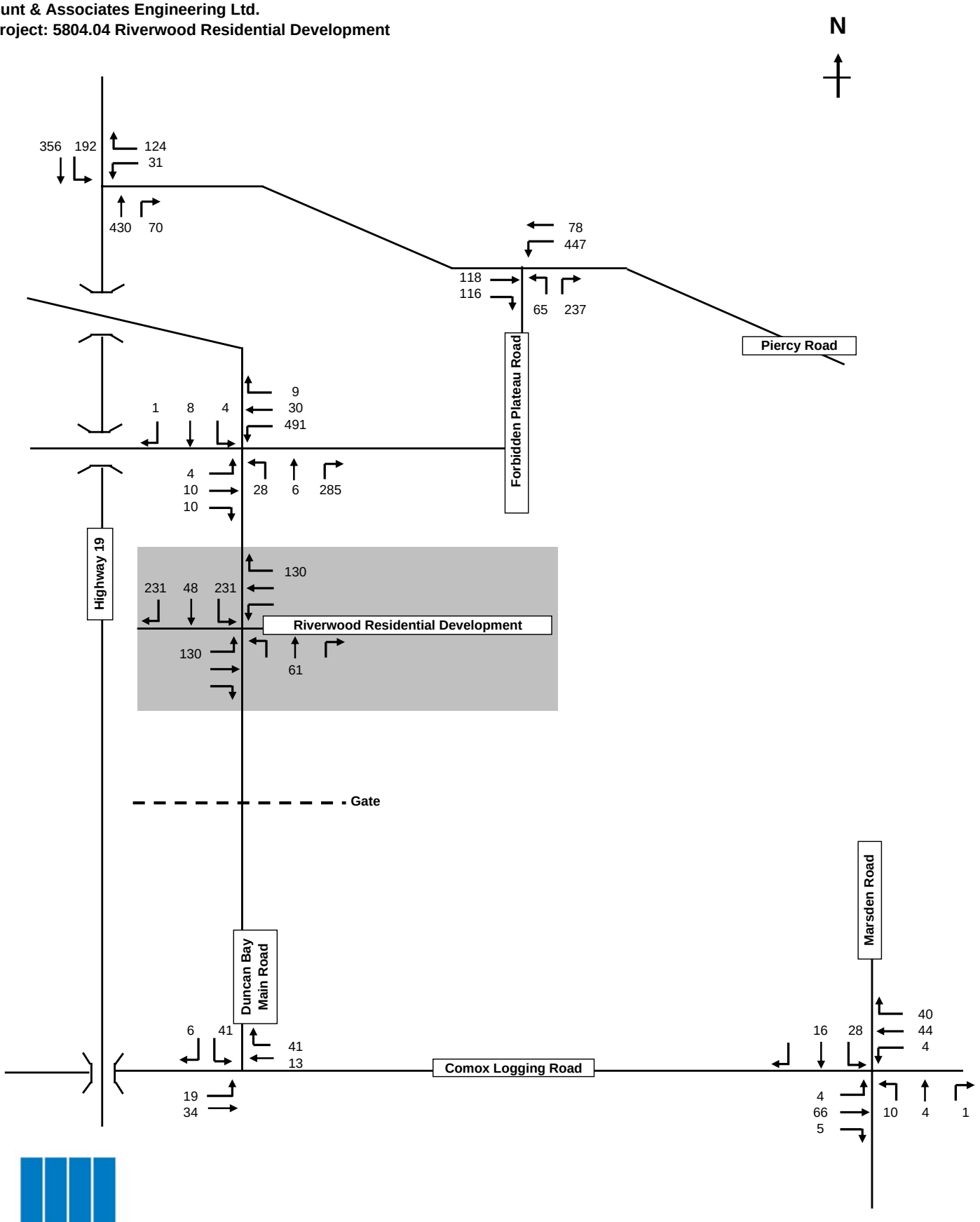
2022
PM Peak
4:15pm-5:15pm
Option C (PM Peak Period, Year 2022, Growth rate 2% -1%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
PM Peak
4:15pm-5:15pm
Option D (PM Peak Period, Year 2022, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

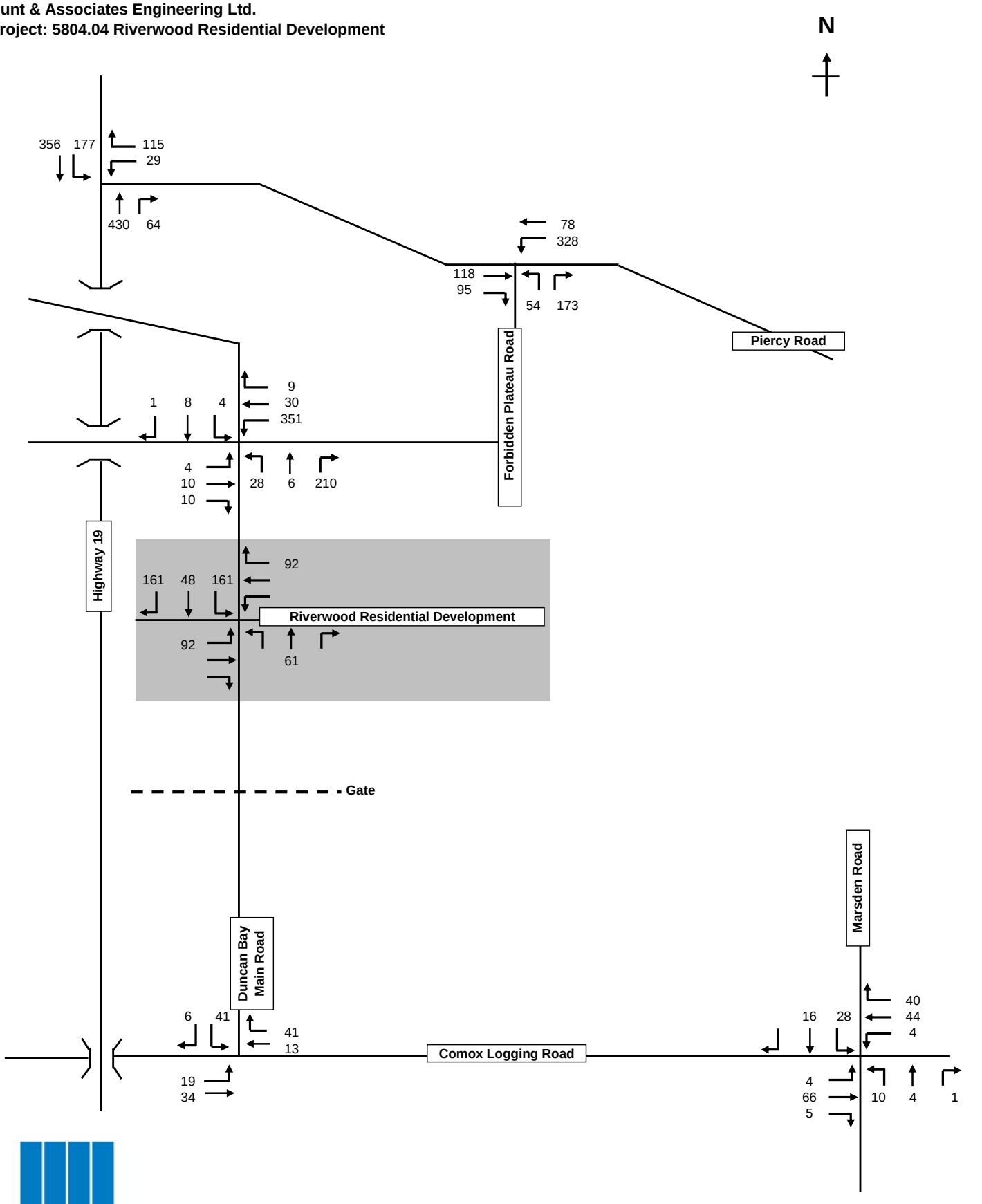
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
PM Peak
4:15pm-5:15pm

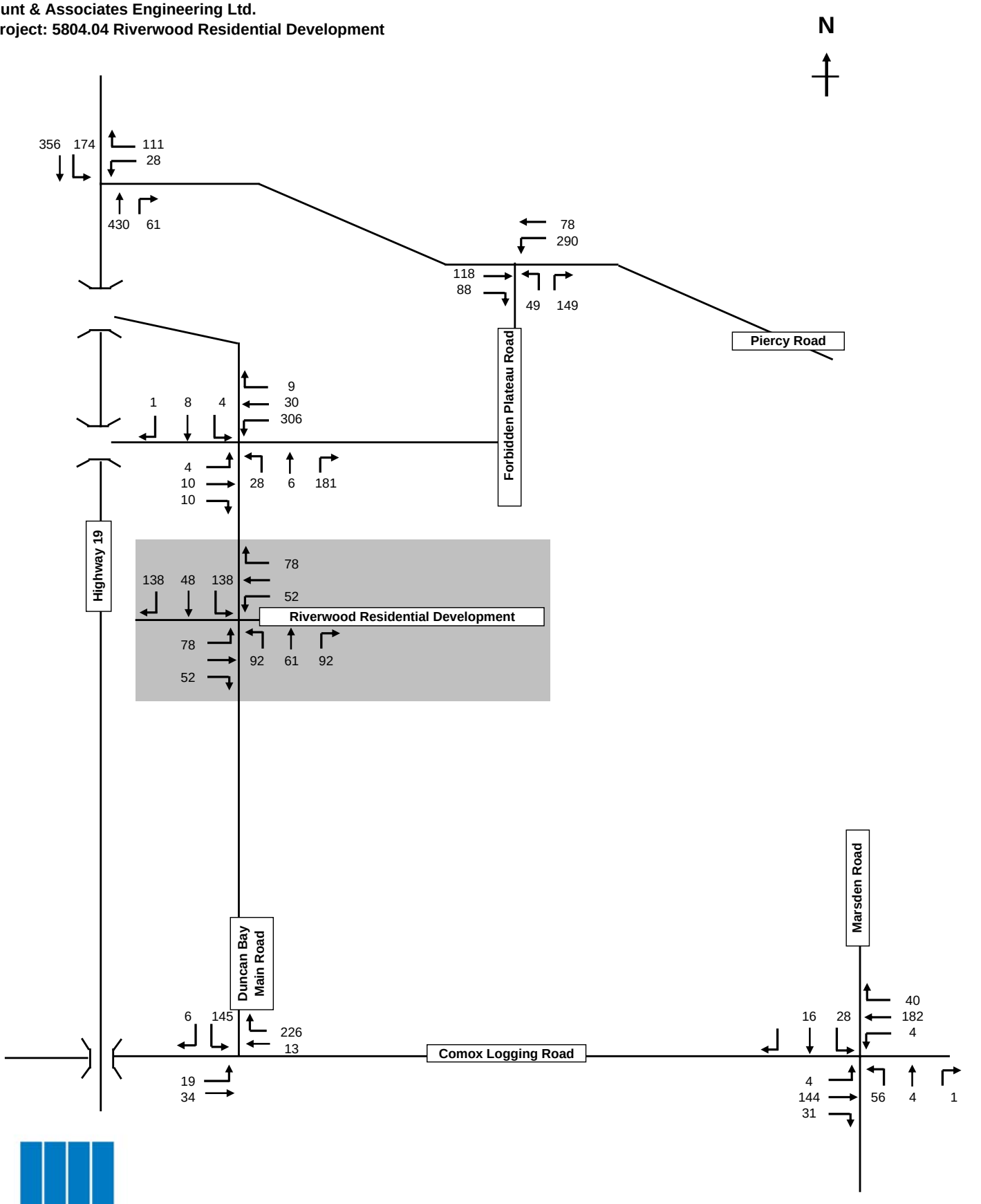
Option E (PM Peak Period, Year 2022, Growth rate 4% -2%, 100% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
PM Peak
4:15pm-5:15pm
Option F (PM Peak Period, Year 2022, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

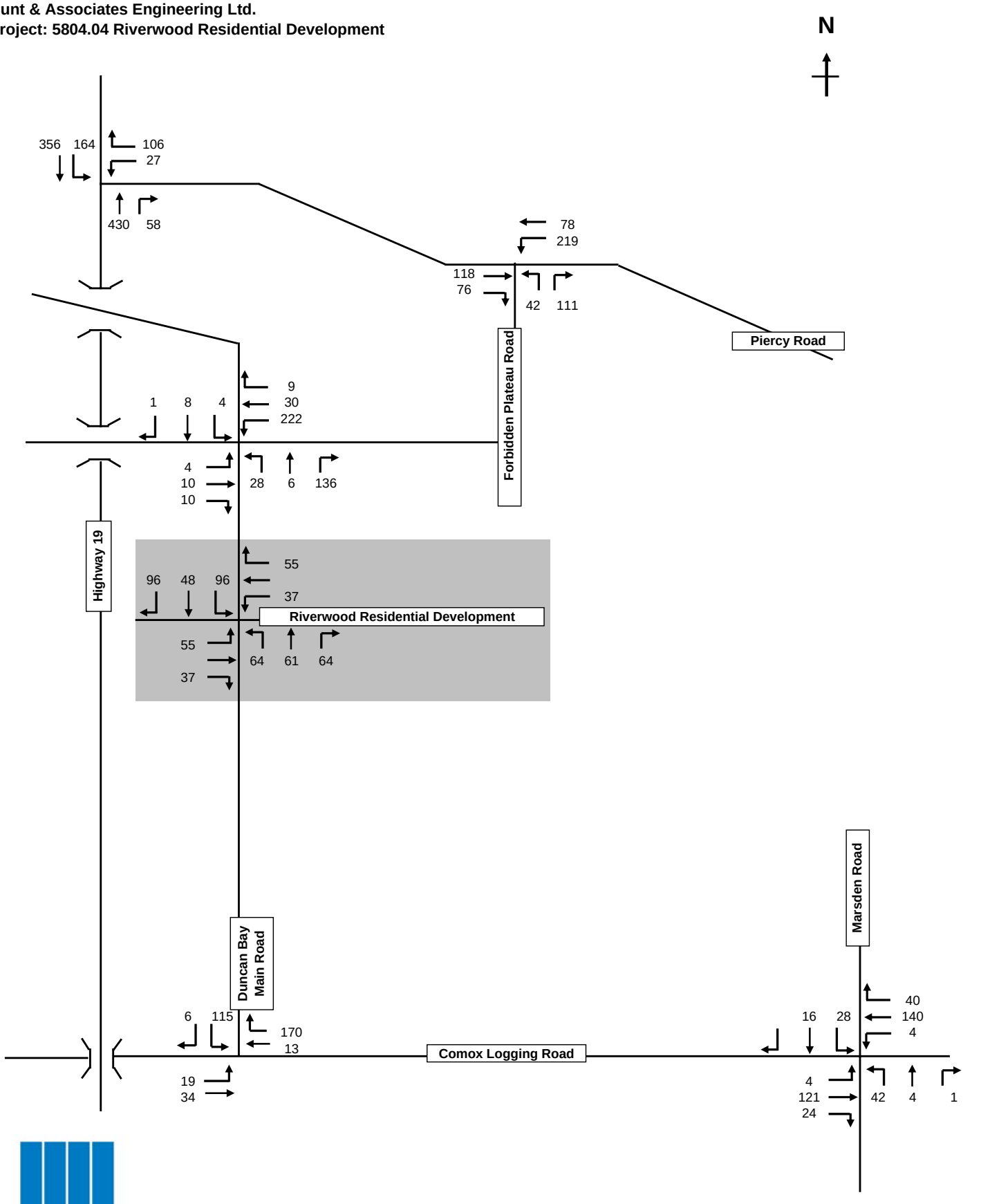
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
PM Peak
4:15pm-5:15pm

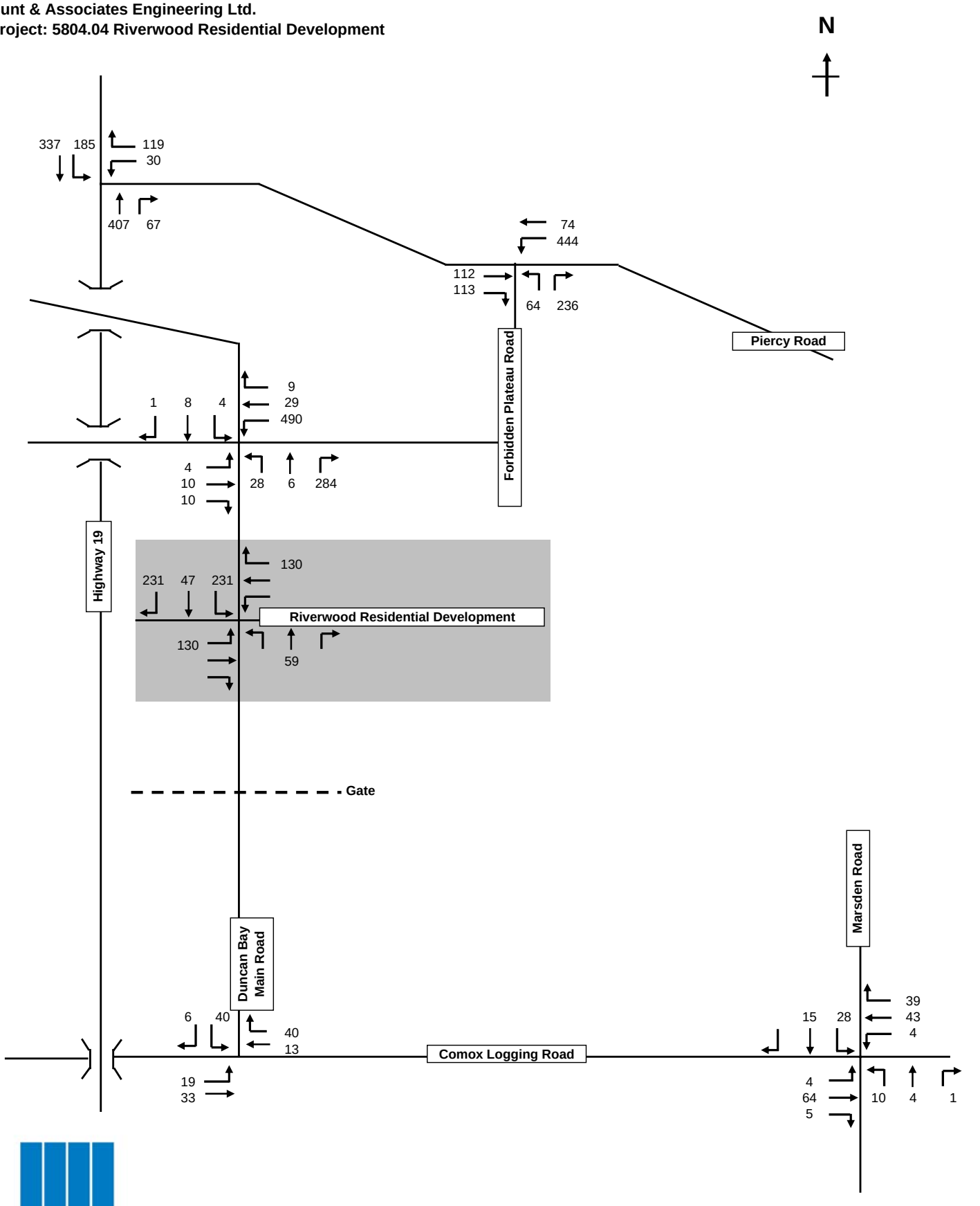
Option G (PM Peak Period, Year 2022, Growth rate 4% -2%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
PM Peak
4:15pm-5:15pm
Option H (PM Peak Period, Year 2022, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development

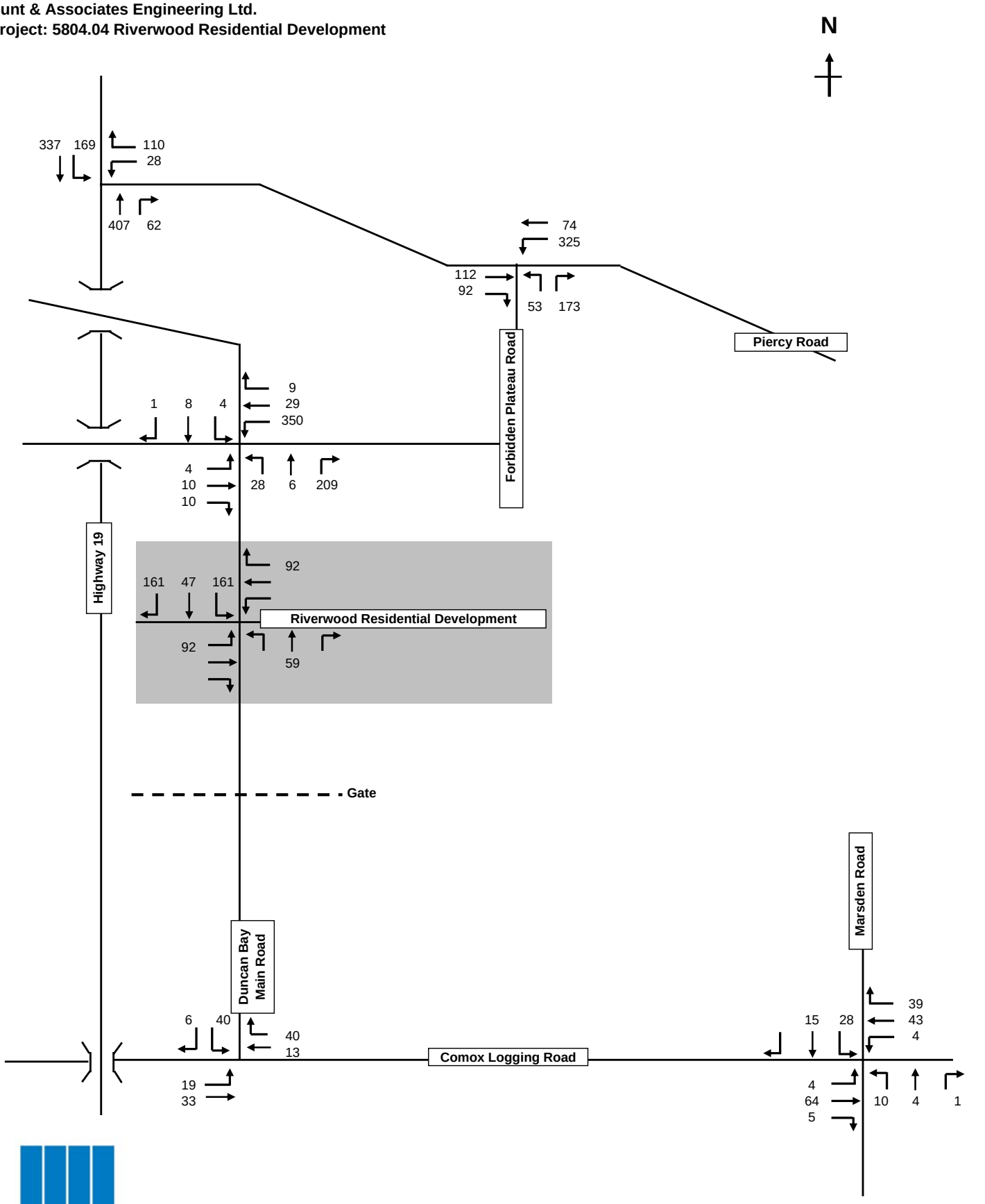


bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

2032
PM Peak
4:15pm-5:15pm

Option A (PM peak Period, Year 2032, Growth rate 2% -1%, 100% north, Trip Gen with MoT rate)

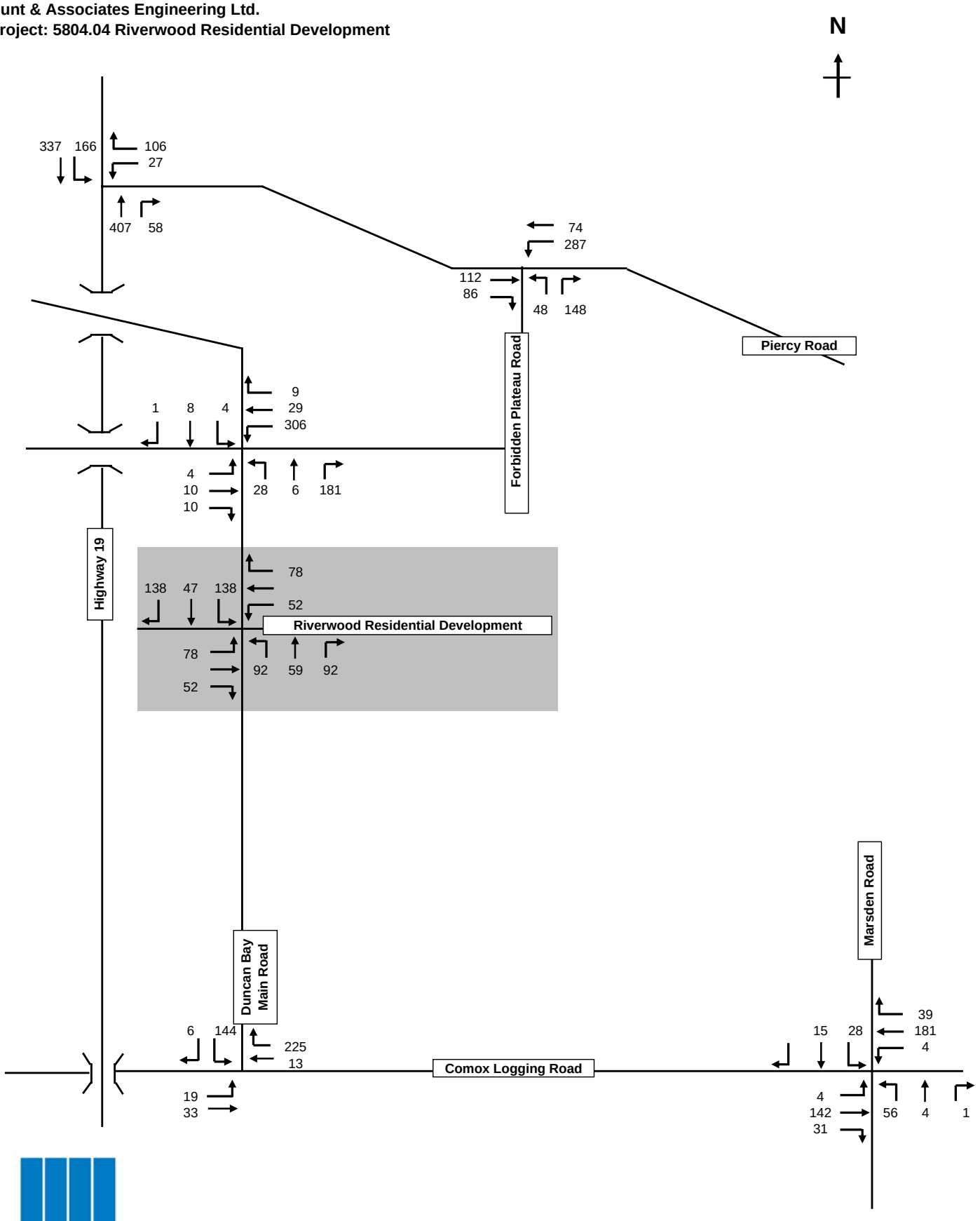
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

2032
PM Peak
4:15pm-5:15pm
Option B (PM Peak Period, Year 2032, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

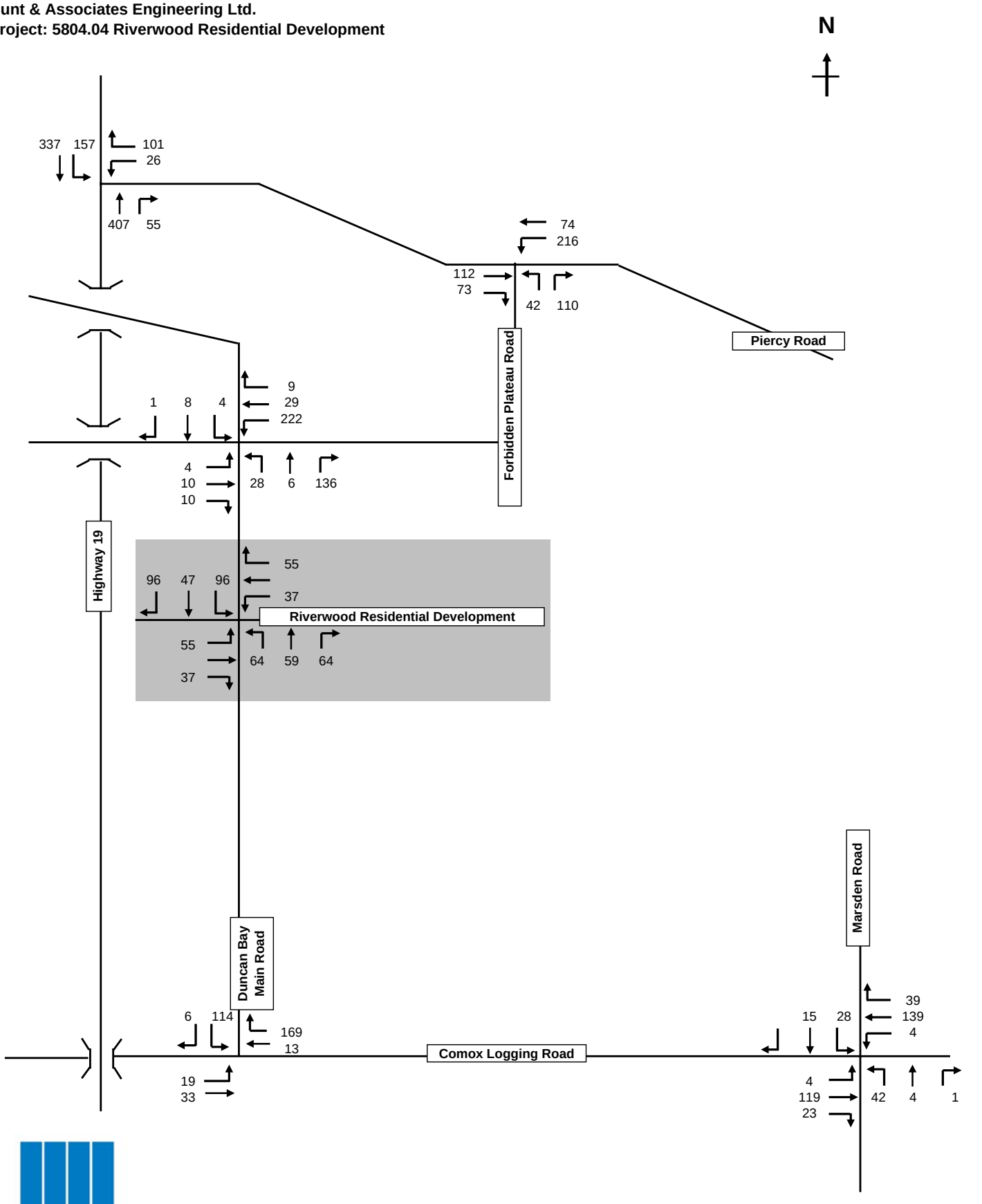
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
PM Peak
4:15pm-5:15pm

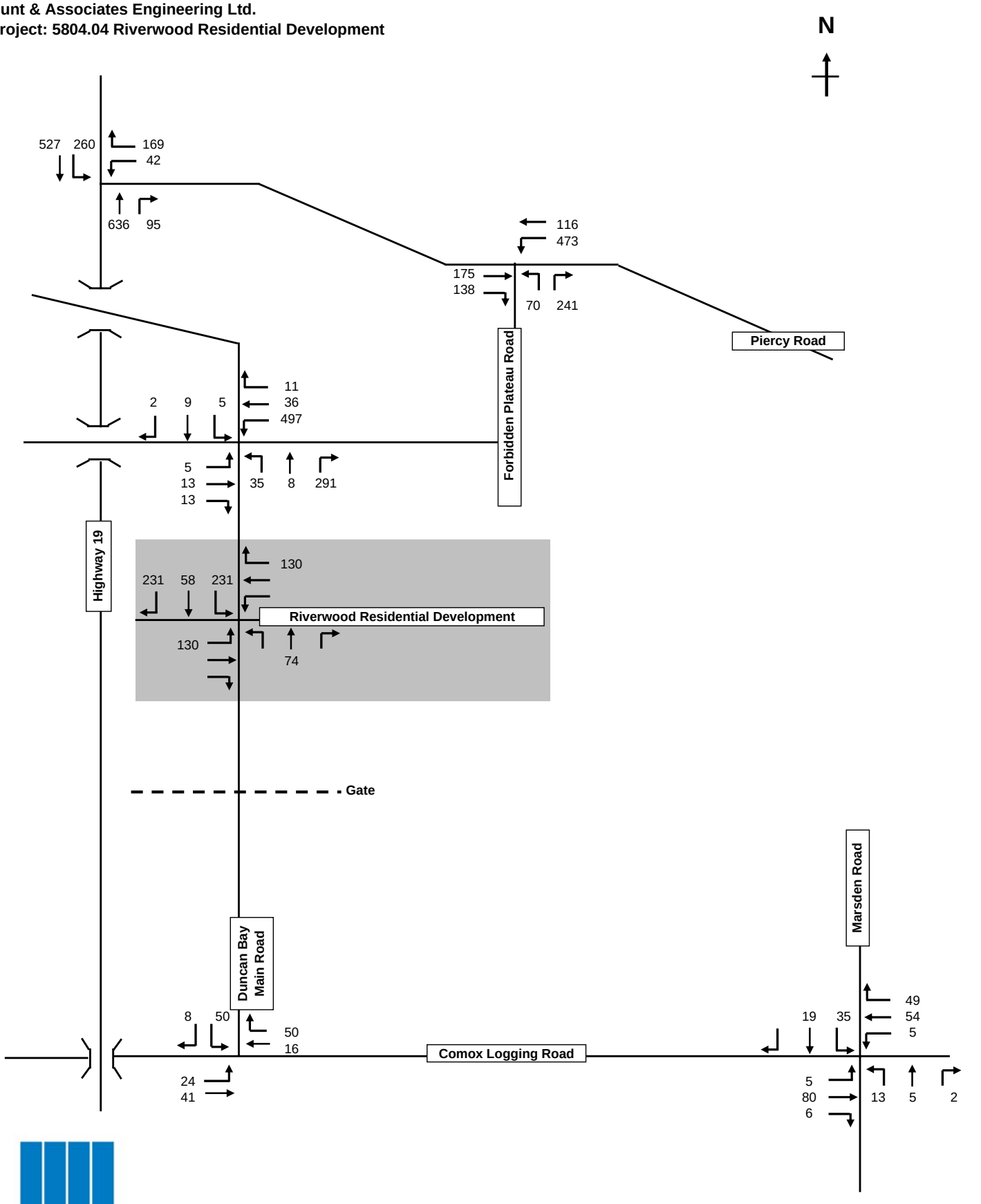
Option C (PM Peak Period, Year 2032, Growth rate 2% -1%, 60% north, Trip Gen with MoT rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
PM Peak
4:15pm-5:15pm
Option D (PM Peak Period, Year 2032, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

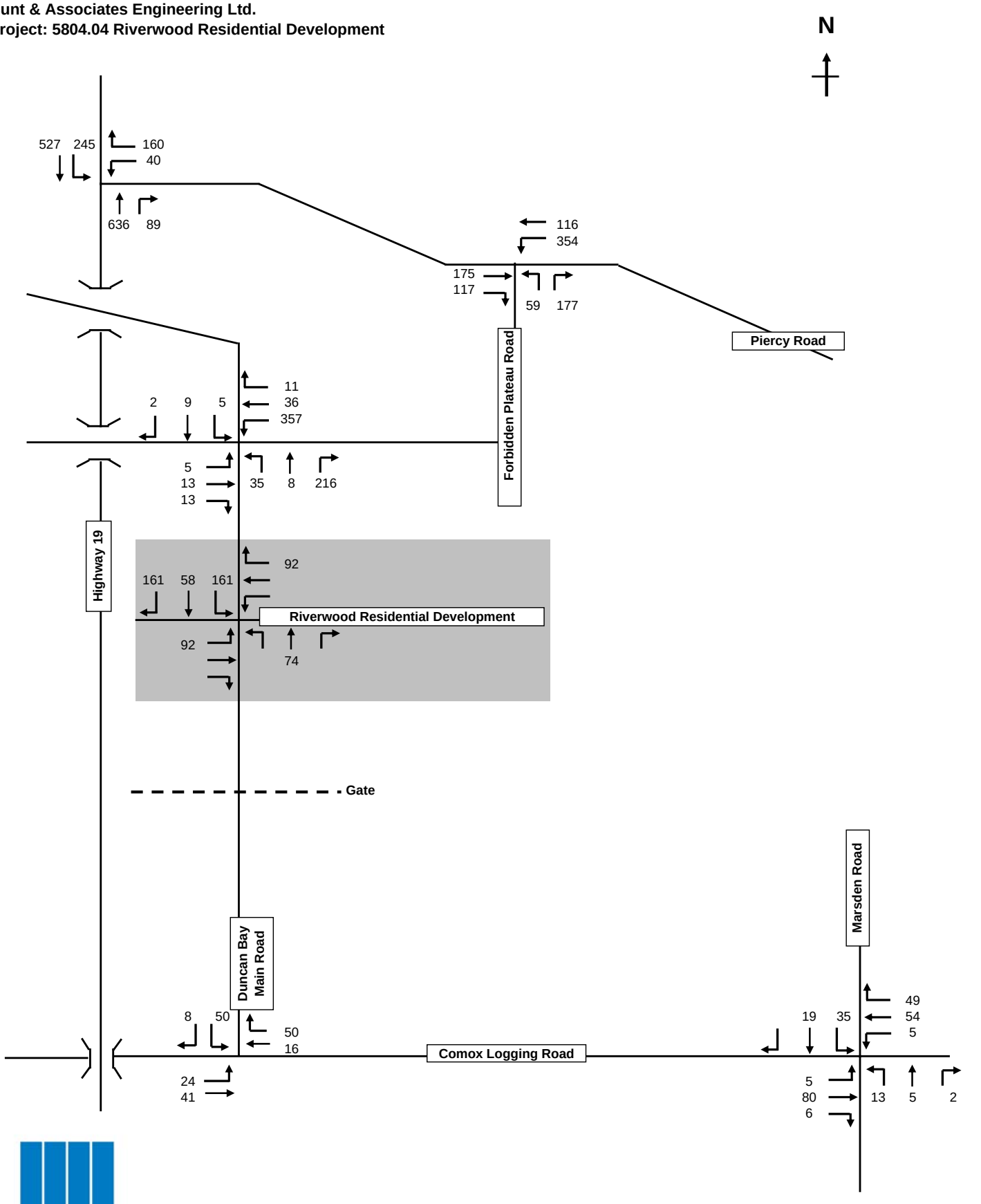
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
PM Peak
4:15pm-5:15pm

Option E (PM Peak Period, Year 2032, Growth rate 4% -2%, 100% north, Trip Gen with MoT rate)

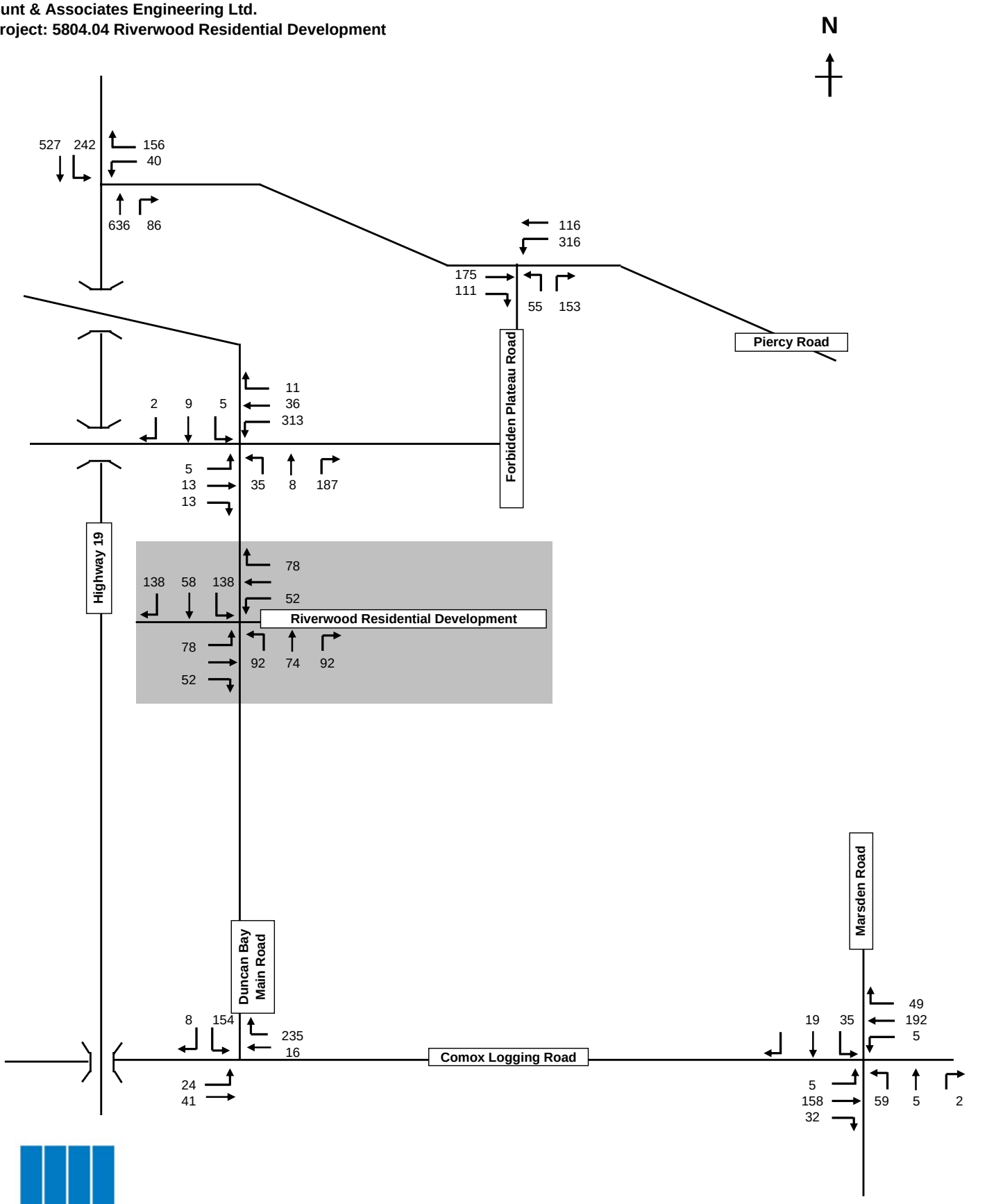
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
PM Peak
4:15pm-5:15pm

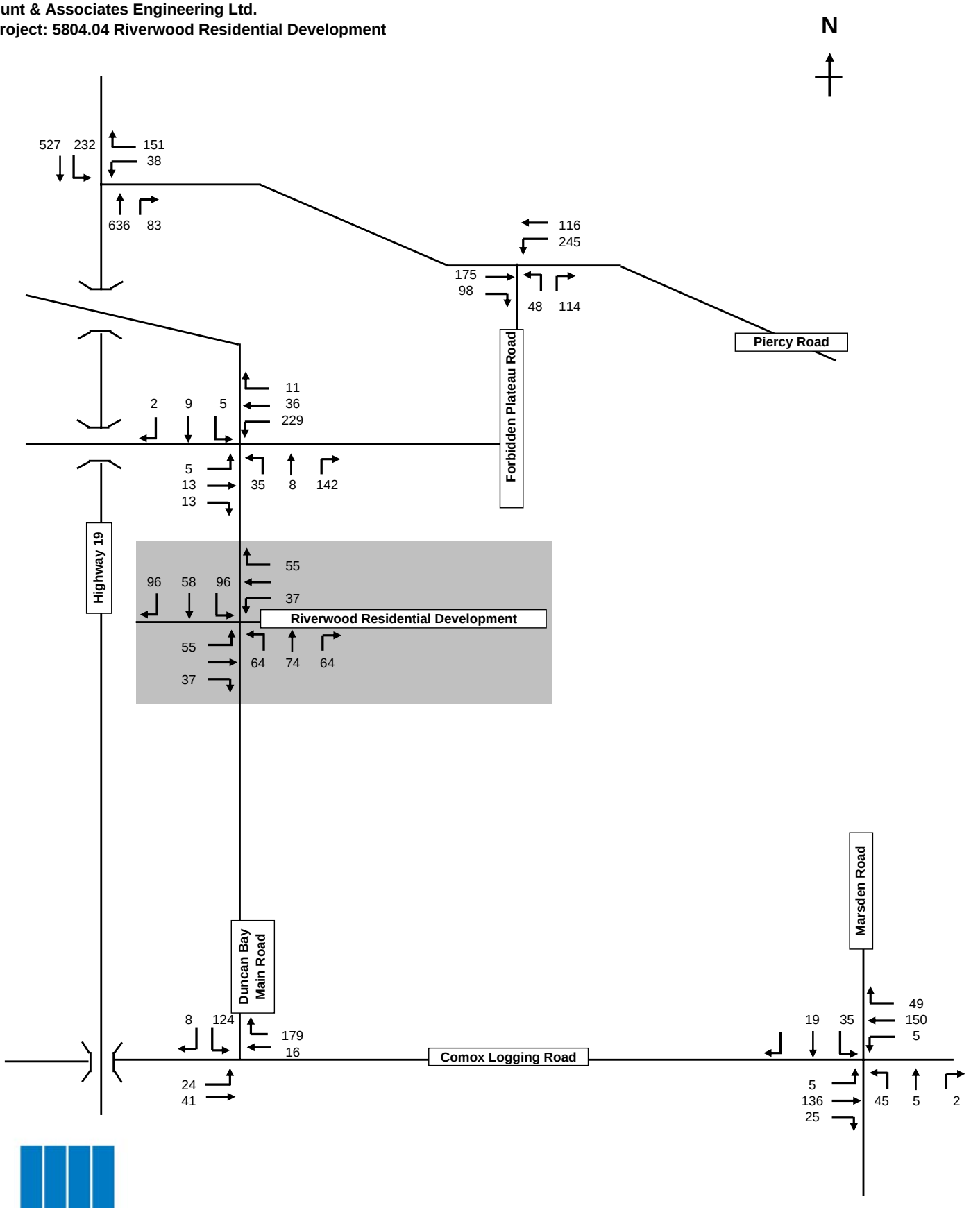
Option F (PM Peak Period, Year 2032, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
PM Peak
4:15pm-5:15pm
Option G (PM Peak Period, Year 2032, Growth rate 4% -2%, 60% north, Trip Gen with MoT rate)

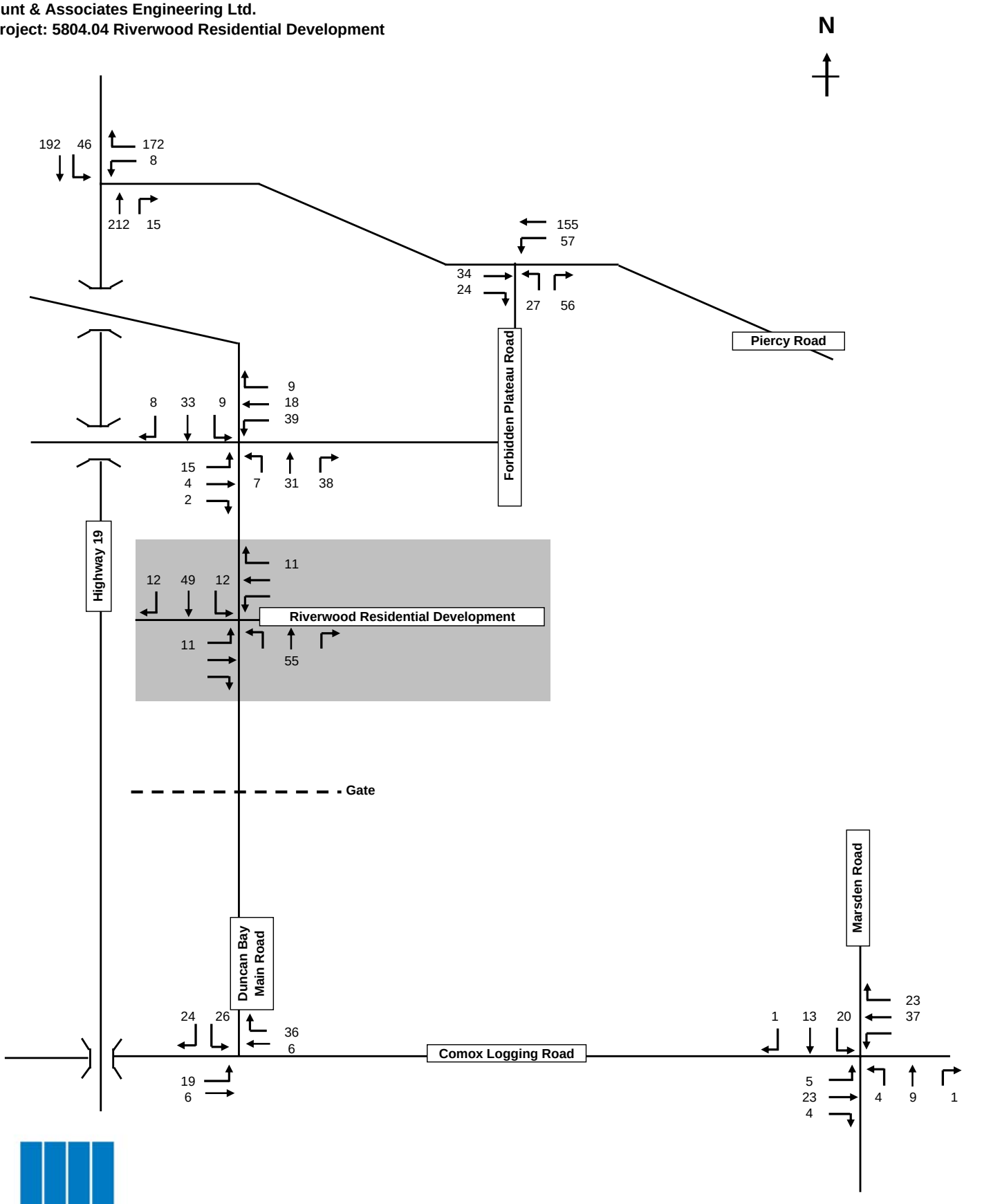
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

2032
PM Peak
4:15pm-5:15pm
Option H (PM Peak Period, Year 2032, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

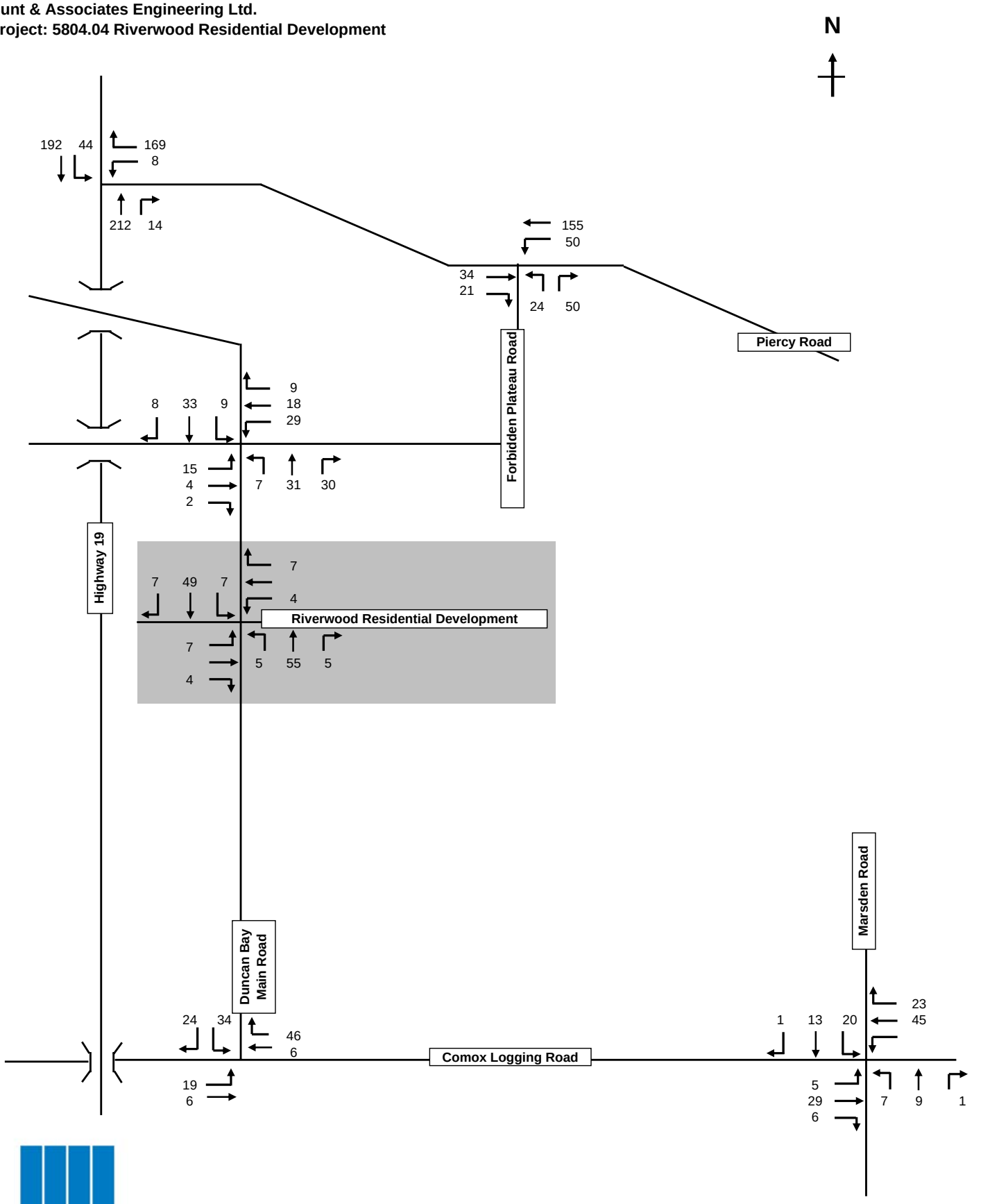
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



bunt & associates
TRANSPORTATION PLANNERS AND ENGINEERS

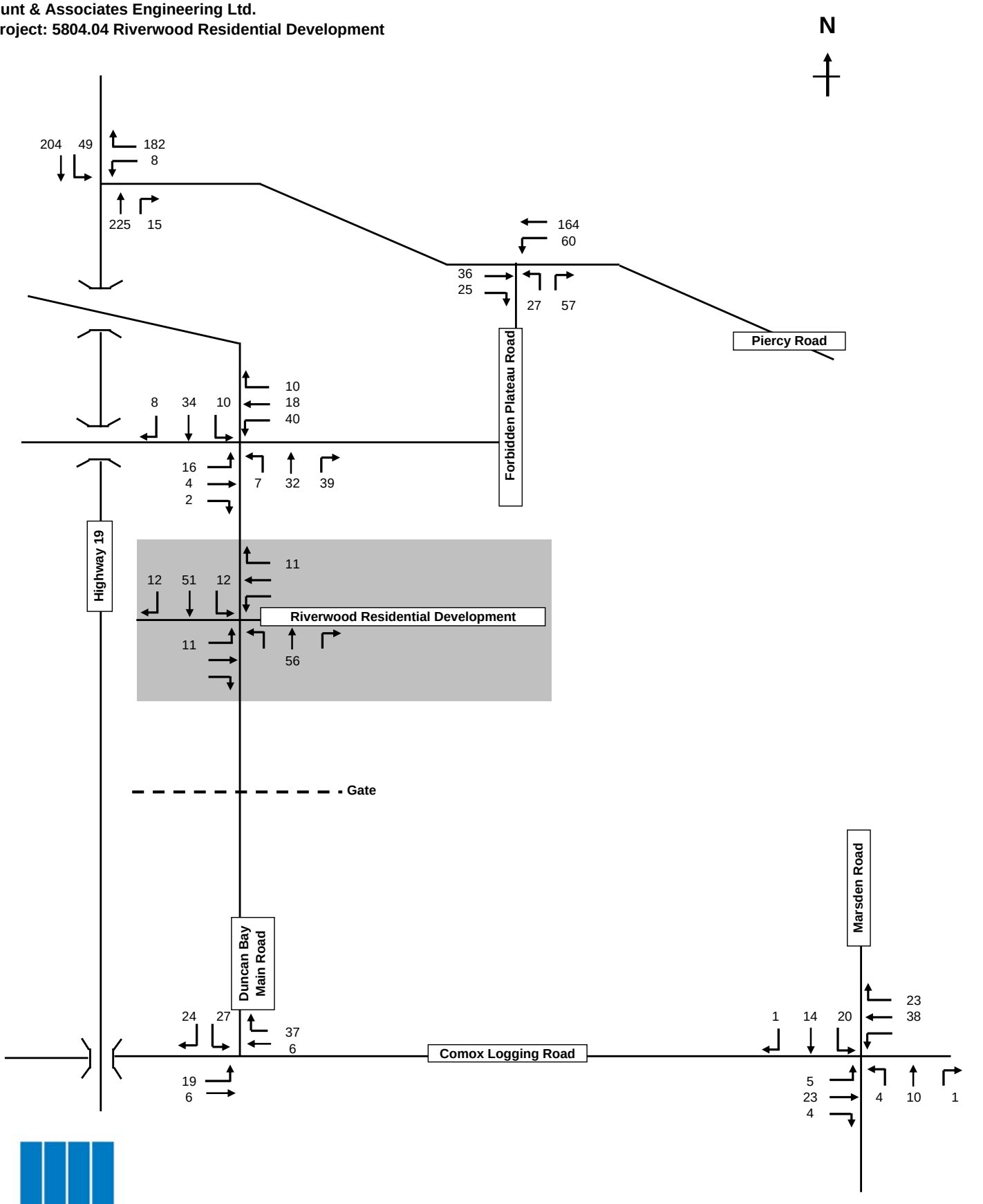
2012
Sat Peak
11:45am-12:45pm
Option B (AM Peak Period, Year 2012, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



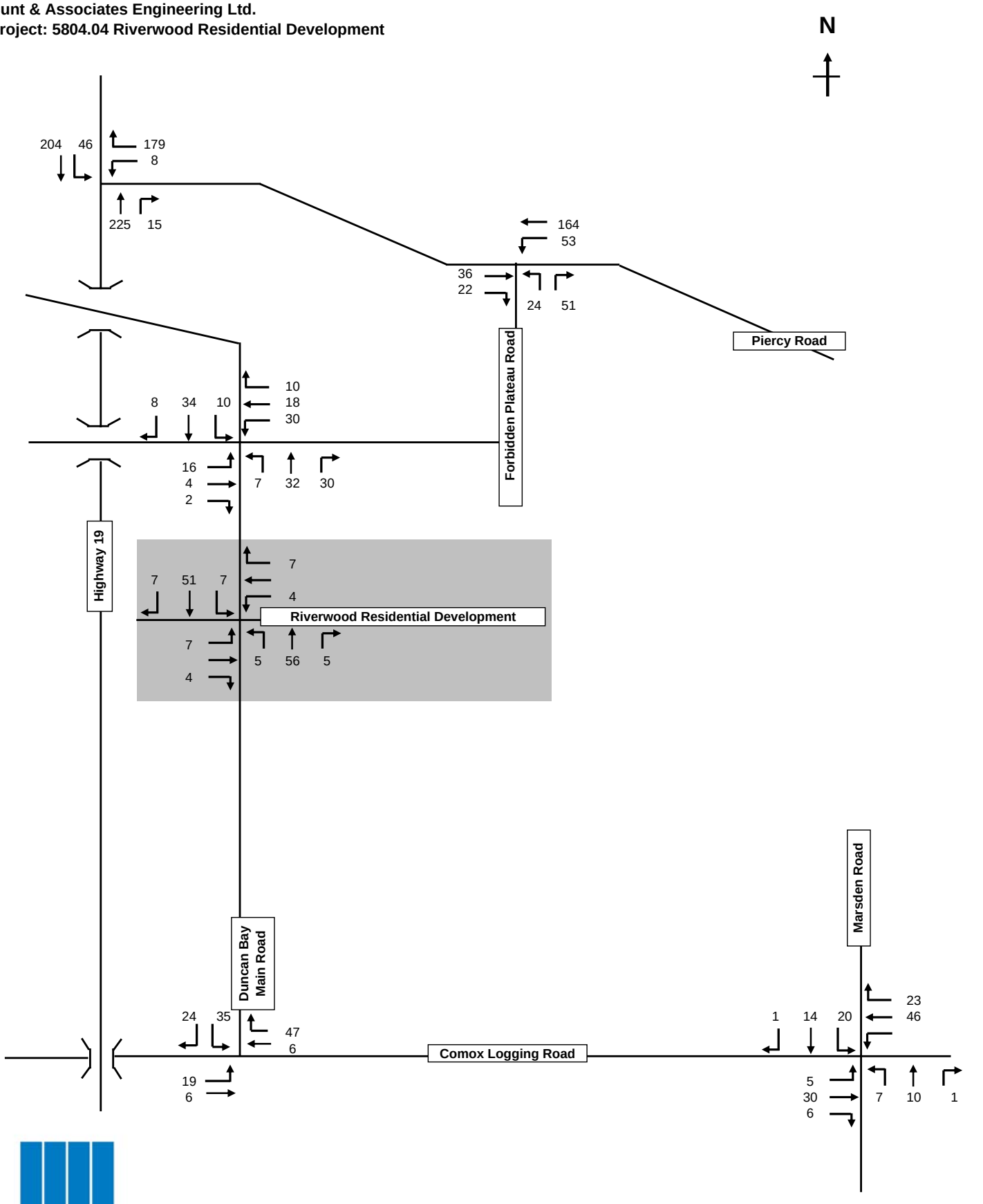
2012
Sat Peak
11:45am-12:45pm
Option D (AM Peak Period, Year 2012, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



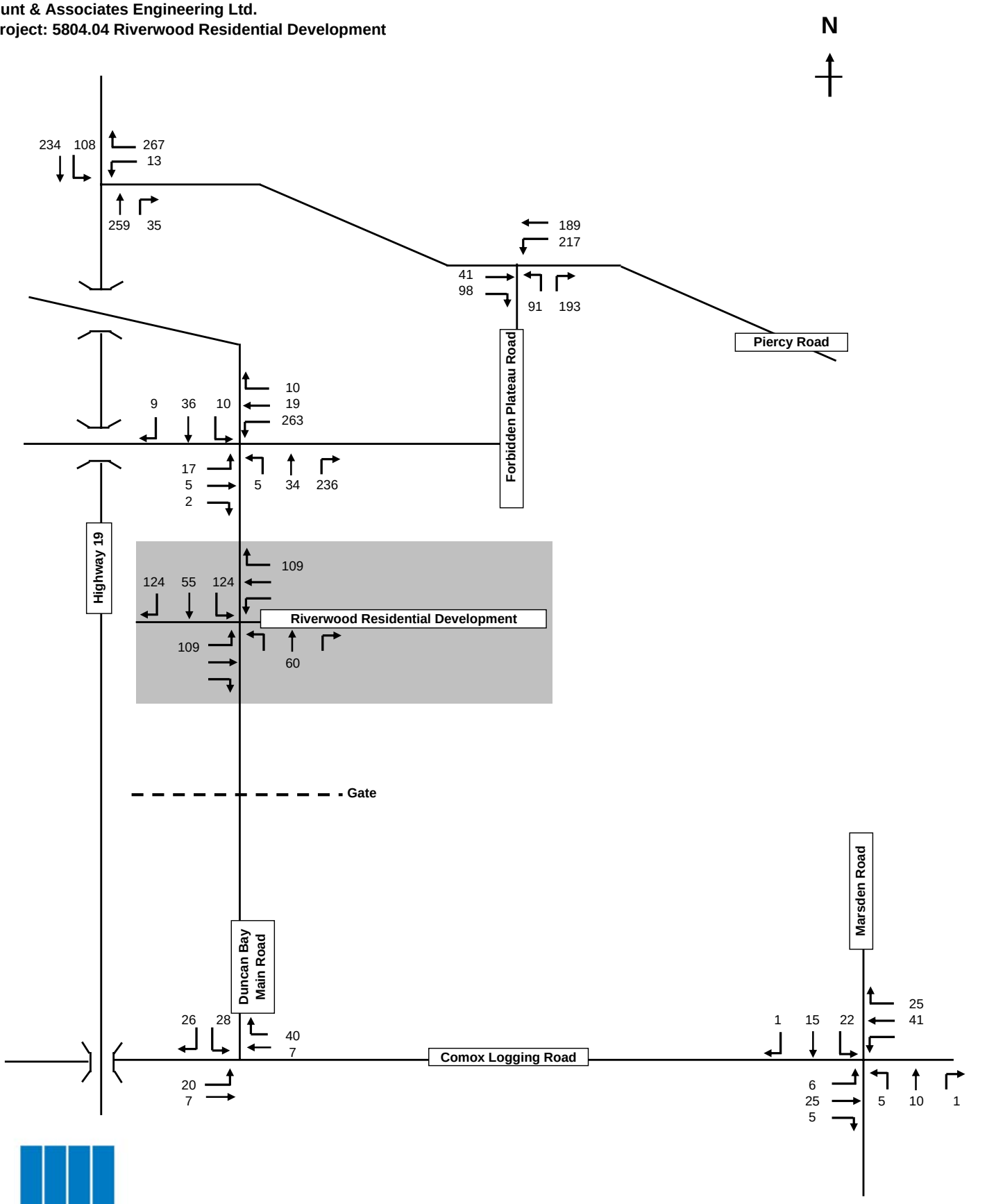
2012
Sat Peak
11:45am-12:45pm
Option F (AM Peak Period, Year 2012, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



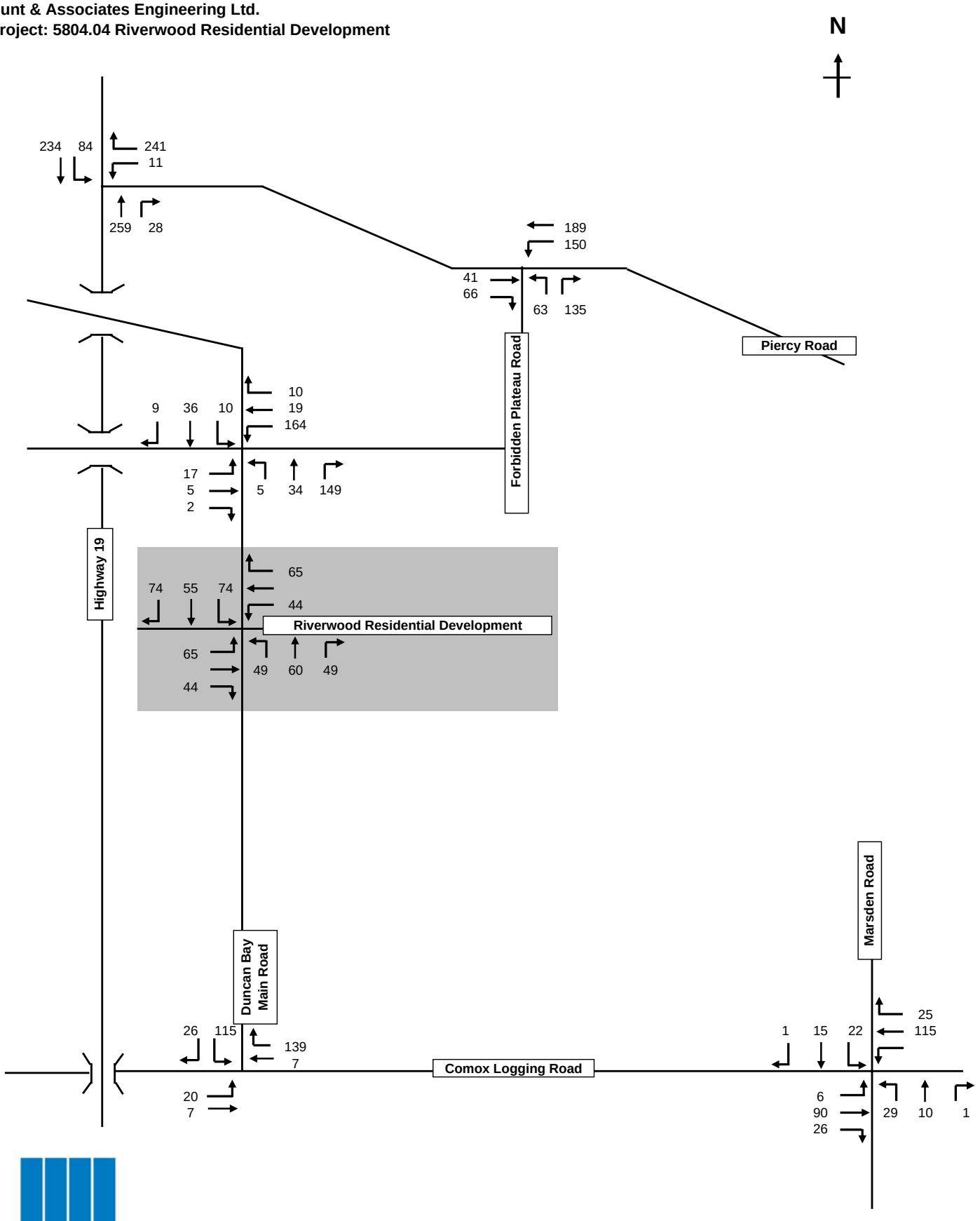
2012
Sat Peak
11:45am-12:45pm
Option H (AM Peak Period, Year 2012, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



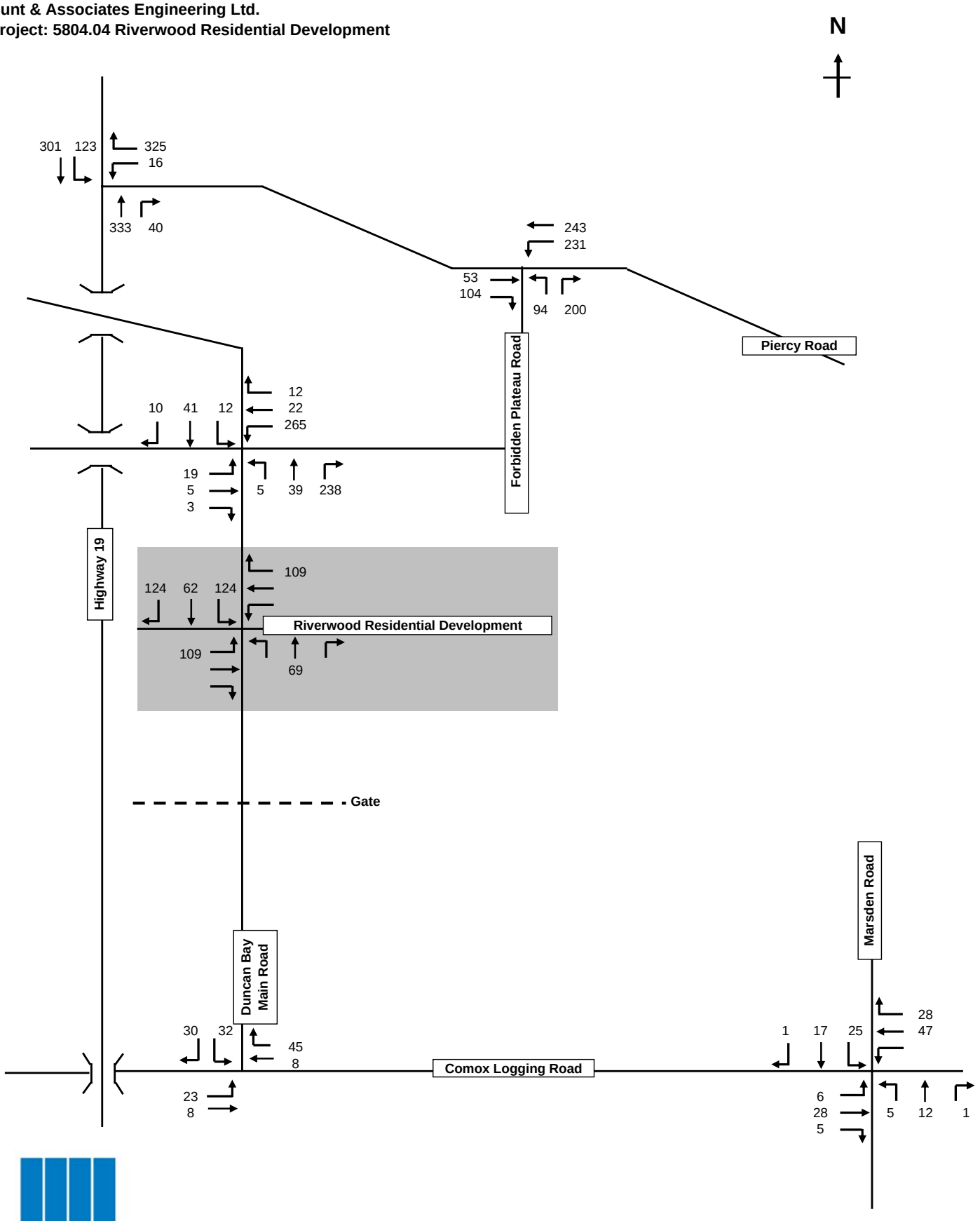
2022
Sat Peak
11:45am-12:45pm
Option B (AM Peak Period, Year 2022, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
Sat Peak
11:45am-12:45pm
Option D (AM Peak Period, Year 2022, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

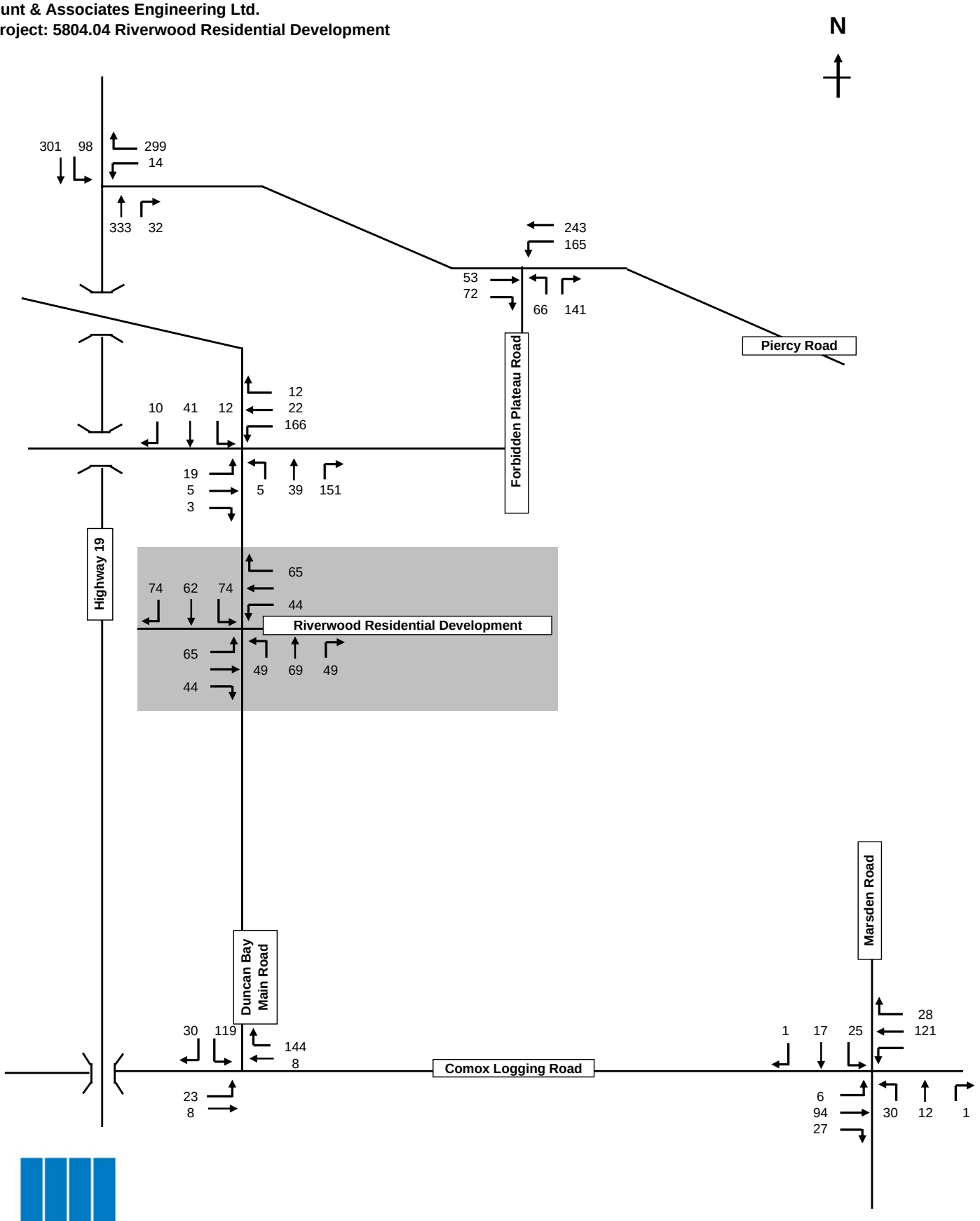
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
Sat Peak
11:45am-12:45pm

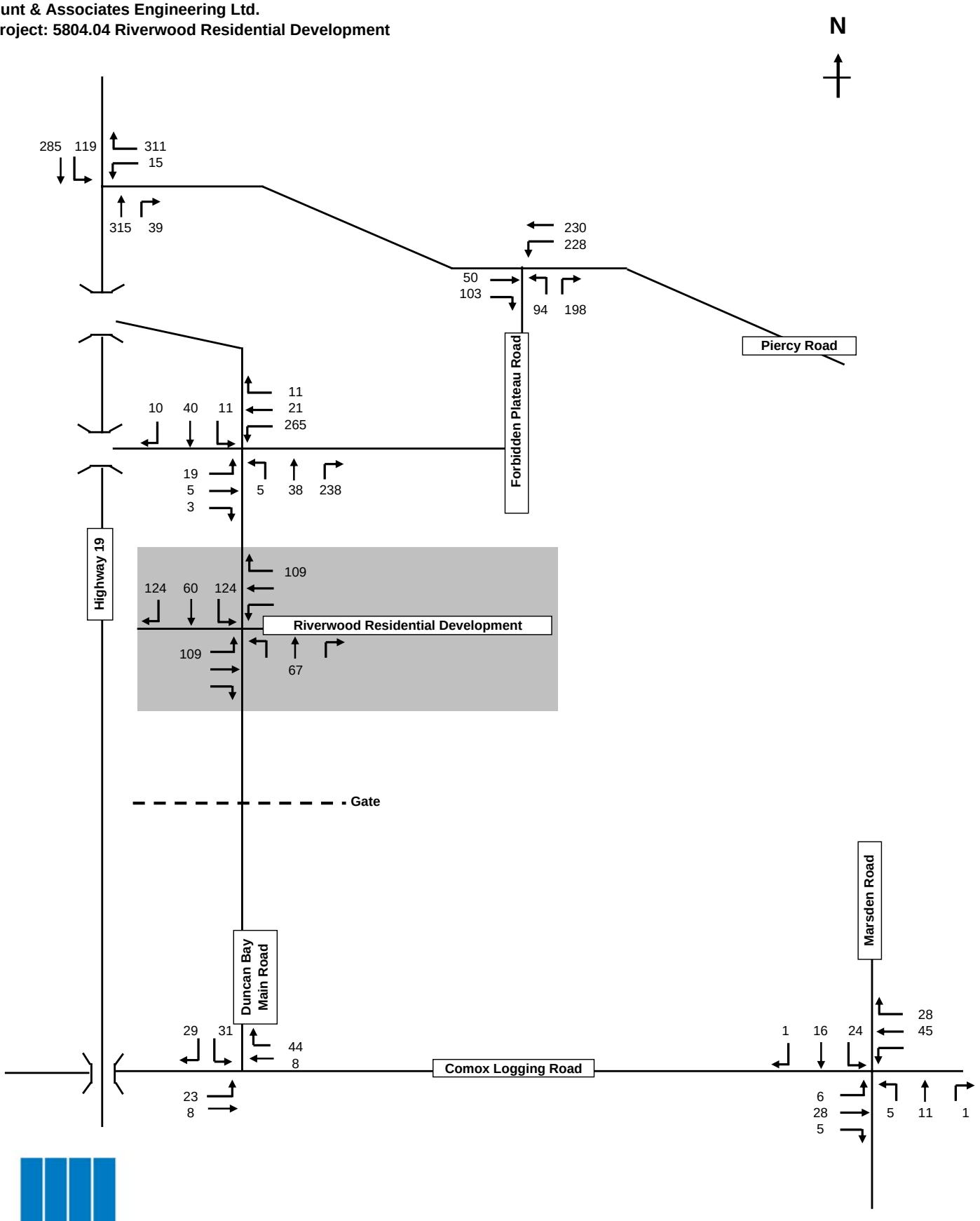
Option F (AM Peak Period, Year 2022, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2022
Sat Peak
11:45am-12:45pm
Option H (AM Peak Period, Year 2022, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

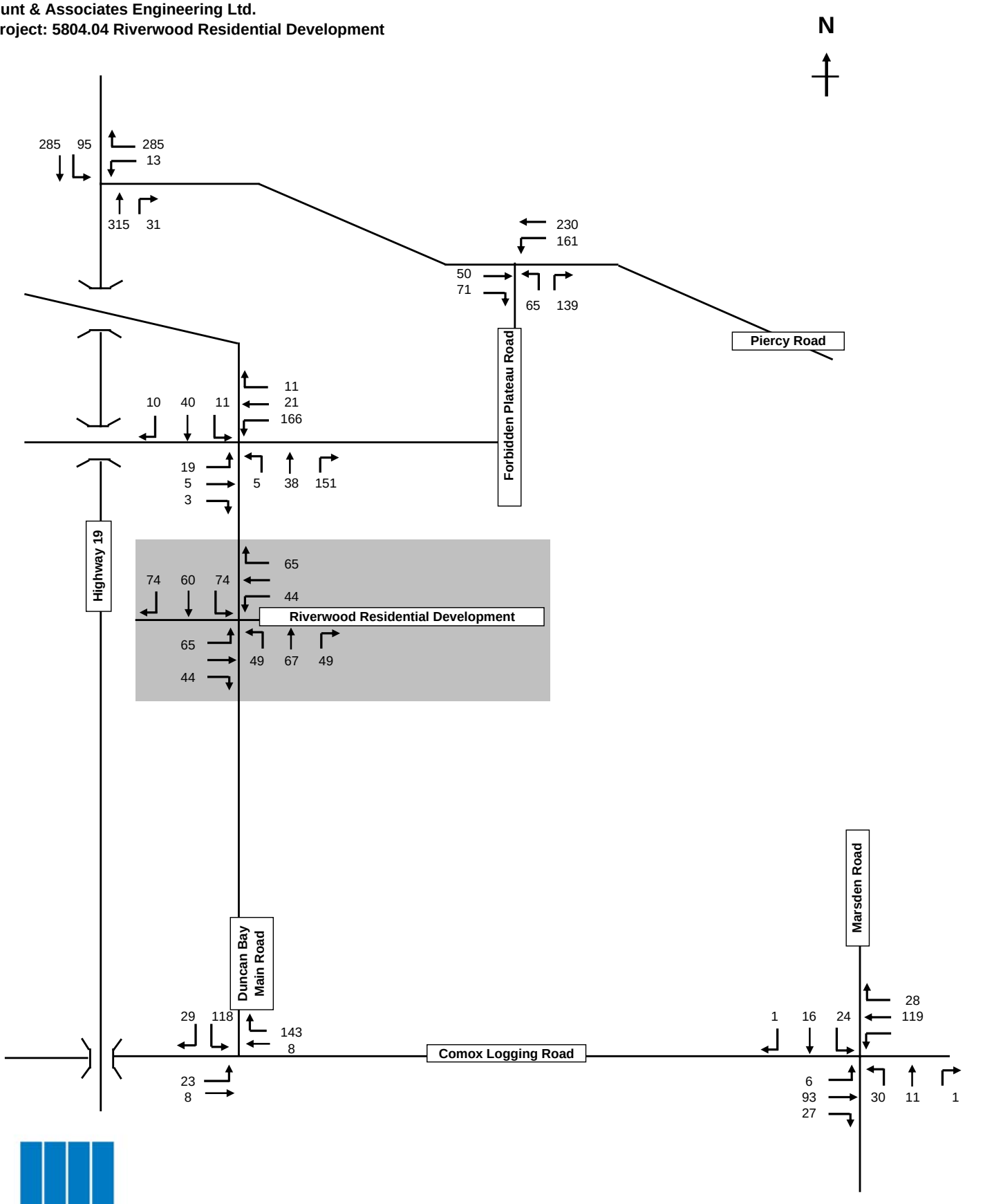
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
Sat Peak
11:45am-12:45pm

Option B (SAT Peak Period, Year 2032, Growth rate 2% -1%, 100% north, Trip Gen with ITE rate)

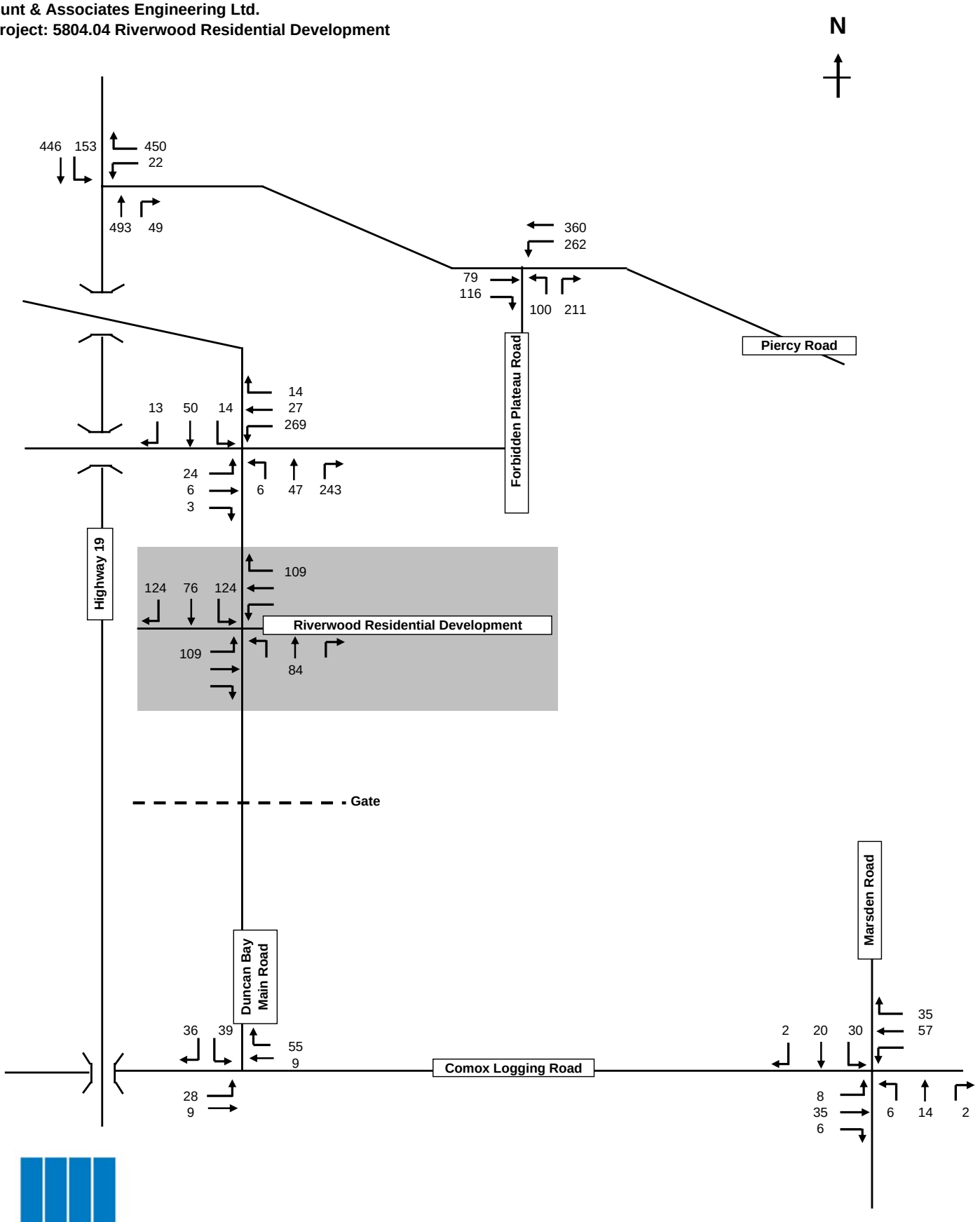
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
Sat Peak
11:45am-12:45pm

Option D (SAT Peak Period, Year 2032, Growth rate 2% -1%, 60% north, Trip Gen with ITE rate)

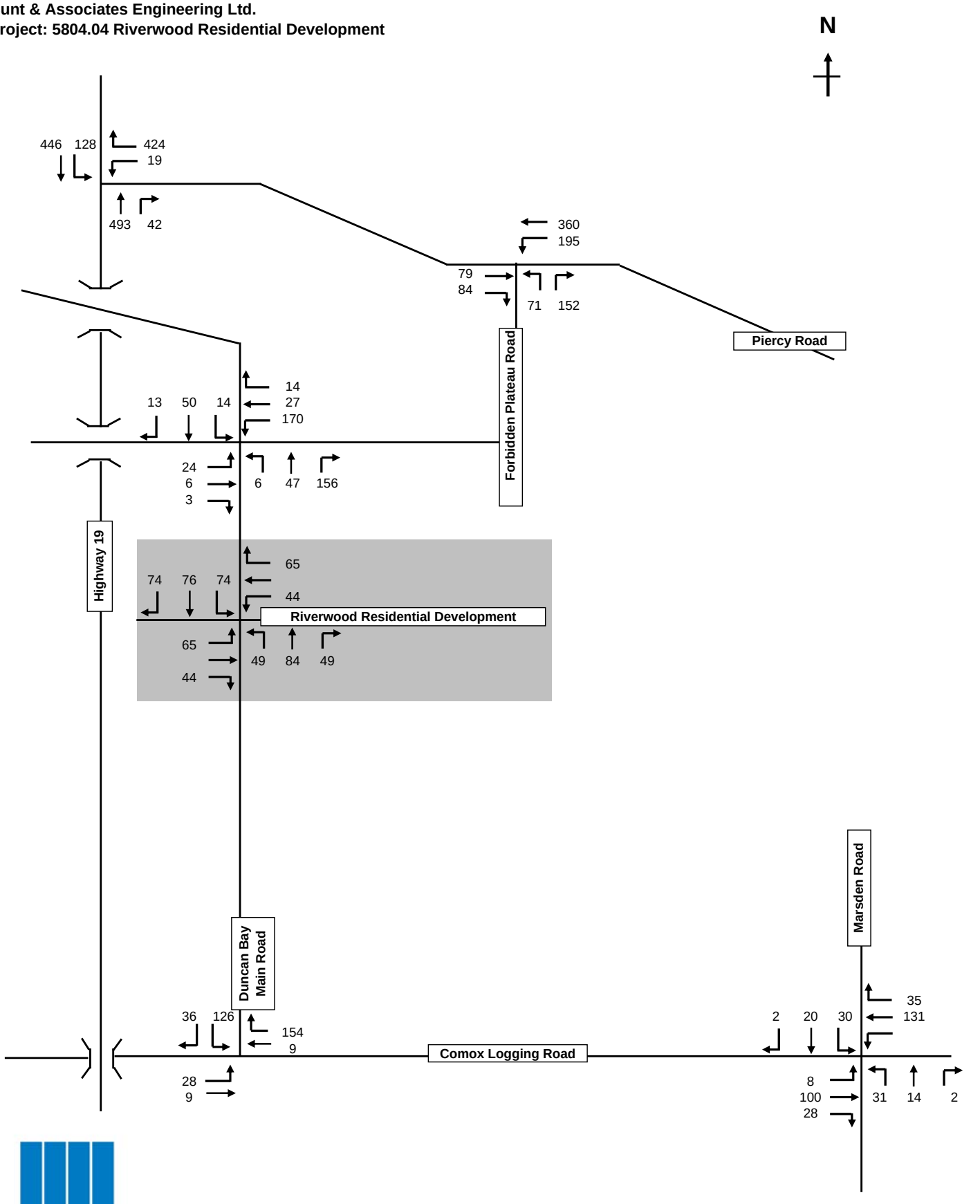
Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
Sat Peak
11:45am-12:45pm

Option F (SAT Peak Period, Year 2032, Growth rate 4% -2%, 100% north, Trip Gen with ITE rate)

Bunt & Associates Engineering Ltd.
Project: 5804.04 Riverwood Residential Development



2032
Sat Peak
11:45am-12:45pm

Option H (SAT Peak Period, Year 2032, Growth rate 4% -2%, 60% north, Trip Gen with ITE rate)

Appendix C – TAC Signal Warrant Analysis

2005 Canadian Matrix Traffic Signal Warrant Analysis

Main Street (name)	**Piercy Road**	**Direction (EW or NS)**	**EW**	**Date:**	**Oct 05, 2009**
Side Street (name)	**Forbidden Plateau Road**	**Direction (EW or NS)**	**NS**	**City:**	**Comox Valley Regional District**
Quadrant (if appl)					

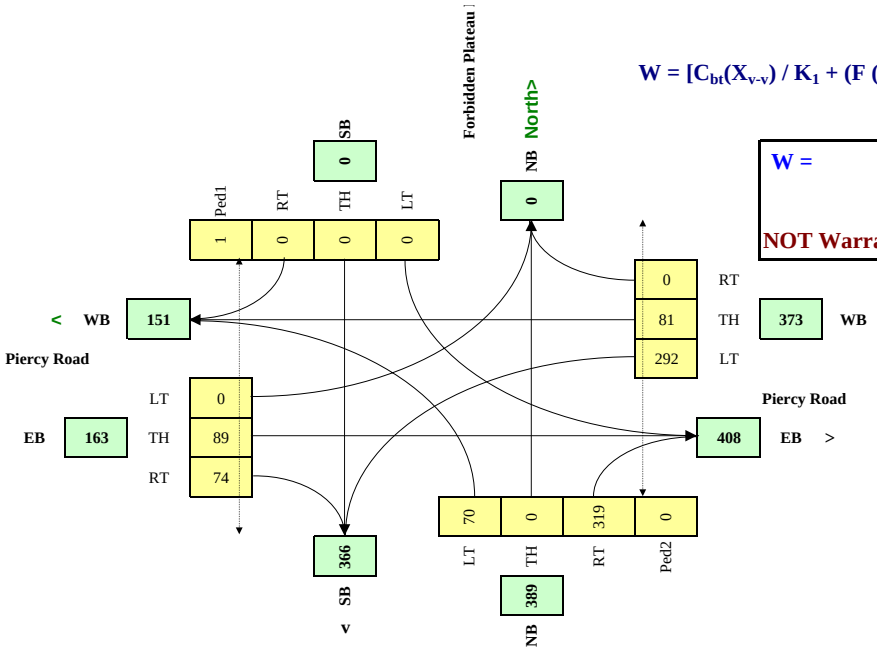
Lane Configuration		Excl LT	Th & LT	Through or Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes	
Piercy Road	WB	1	0	1	0	0		1	
Piercy Road	EB	0	0	1	0	0	1,444	1	
Forbidden Plateau Road	NB	1	0	0	0	1			
Forbidden Plateau Road	SB	0	0	0	0	0			

Demographics		
Elementary School	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	
Central Business District	(y/n)	n

Other input		Speed (Km/h)	Trucks %	Bus Rt (y/n)	Median (m)
Piercy Road	EW	70	7.0%	n	0.0
Forbidden Plateau Road	NS		4%	n	

Traffic Input	**NB**			**SB**			**WB**			**EB**			**Ped1 NS**	**Ped2 NS**	**Ped3 EW**	**Ped4 EW**
	LT	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**LT**	**Th**	**RT**	**0**	**E Side**	**N Side**	**S side**
7:30 - 8:30	116	0	540	0	0	0	89	60	0	0	60	43	4	0	0	0
8:30 - 9:30	73	0	412	0	0	0	160	108	0	0	69	24	0	0	0	0
11:30 - 12:30	32	0	294	0	0	0	436	77	0	0	36	51	0	0	0	0
12:30 - 13:30	39	0	130	0	0	0	226	58	0	0	62	58	0	0	0	0
16:00 - 17:00	63	0	241	0	0	0	530	111	0	0	136	138	0	0	0	0
17:00 - 18:00	97	0	294	0	0	0	311	73	0	0	171	127	1	0	0	0
Total (6-hour peak)	**420**	**0**	**1,911**	**0**	**0**	**0**	**1,752**	**487**	**0**	**0**	**534**	**441**	**5**	**0**	**0**	**0**
Average (6-hour peak)	**70**	**0**	**319**	**0**	**0**	**0**	**292**	**81**	**0**	**0**	**89**	**74**	**1**	**0**	**0**	**0**

Average 6-hour Peak Turning Movements



$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	64	64	0
		Veh	*Ped*

NOT Warranted