Halcrow MWT

Queensland Curtis LNG Project EIS

Traffic and Transport Impact Assessment

9 April 2009

QGC - A BG Group Business

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Contents

List of figures

List of tables

1 Introduction

1.1 Background

Halcrow Pacific Pty Ltd (trading as Halcrow MWT) has been commissioned by QGC - A BG Group Business (QGC) to undertake a traffic and transport assessment for the Environmental Impact Statement (EIS) of the proposed Queensland Curtis LNG (QCLNG) Project ("the Project"). The Project includes the development of existing coal seam gas fields in the Surat Basin of western Queensland, the construction of a liquefied natural gas (LNG) processing and export facility on Curtis Island near Gladstone in central Queensland and the construction of a pipeline network linking the gas fields to the processing and export facility.

The coverage of this study relates exclusively to the Project's LNG processing and exporting facility, and will include the following elements:

- Construction and operation of a three-train LNG processing plant with a production capacity of up to 12Mtpa (i.e. each train will have a nominal production capacity of 3-4Mtpa) designed for continuous 24-hour operation;
- Construction and operation of a marine jetty at Curtis Island which will include specialised LNG loading facilities and tanker berths;
- Construction of a construction dock and barge/ferry terminals on Curtis Island and corresponding terminals on the mainland for construction and operation transportation;
- Consideration for the construction of a bridge across the Narrows (i.e. between Curtis Island and the mainland) to establish ongoing road access to Curtis Island; and
- Provision of construction camps for a peak workforce of 2,000 persons.

1.2 Study Objectives

The objectives of the traffic and transport assessment are to:

- Prepare a baseline assessment of existing land-based traffic and transport conditions in the Gladstone / Curtis Island region;
- Identify and assess the potential traffic and transport impacts of the Project on the existing land-based transport networks in the Gladstone / Curtis Island region during both constructions and operational phases;
- Prepare mitigation and management plans to reduce traffic and transport impacts to acceptable levels; and
- Describe residual traffic and transport impacts and outline plans / measures to address any residual impacts.

1.3 Structure of this Report

The traffic and transport assessment is presented in this report through the following sections:

- **Section 2** describes the scope of the assessment and the study methodology.
- **Section 3** describes the site location, existing traffic / transport conditions and the future planned road network.
- **Section 4** describes the proposed development.
- **Section 5** details the methodology to generate and assessment of future year traffic volumes.
- **Section 6** details the assessment of link operations.
- **Section 7** details the assessment of intersection operations under the existing intersection configuration.
- **Section 8** details the required future year intersection forms where "do nothing" intersection layouts have been deemed to be inadequate.
- **Section 9** details the assessment of road pavement impacts;
- **Section 10** outlines council road infrastructure charges; and
- **Section 11** presents the study conclusions.

2 Scope of Assessment

2.1 Scope of Assessment

Consultation with the Department of Main Roads (DMR) and Gladstone Regional Council (GRC) was undertaken during the initial phases of the Road Impact Assessment (RIA). Based on the agreement between relevant parties, the scope of the RIA has included:

- Link analysis for the elements described in Table 2-1;
- Intersection analysis for each location and task described in Table 2-2; and
- Pavement impact analysis for the links identified in Table 2-3.

Table 2-1 Scope of Link Assessment

Assessment Task	Scope
Link Impact Assessment • Without and with LNG Plant components • During both construction and operational phases • For two road connection options between Curtis Island and Gladstone • For three construction camp options to be located on Curtis Island or within Gladstone	Bruce Highway: • north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road to Calliope River-Targinie Road • Calliope River-Targinie Road to Dawson Highway • south of Dawson Highway Gladstone-Mt Larcom Road: • Bruce Highway to Calliope River-Targinie Road • Calliope River-Targinie Road to Landing Road • Landing Road to Reid Road • Reid Road to Red Rover Road • Red Rover Road to Blain Drive • Blain Drive to Dawson Highway Dawson Highway: • Bruce Highway to Don Young Drive • Don Young Drive to Phillip Street • Phillip Street to Blain Drive • Blain Drive to Glenlyon Street

Table 2-2 Scope of Intersection Assessment

Assessment Task	Scope
Intersection Analysis • Without and with LNG Plant components • During both construction and operational phases • For two road connection options between Curtis Island and Gladstone • For three construction camp options to be located on Curtis Island or within Gladstone	Intersections: • Bruce Highway / Dawson Highway • Bruce Highway / Calliope River-Targinie Road • Bruce Highway / Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road / Calliope River-Targinie Road • Gladstone-Mt Larcom Road / Landing Road • Hanson Road / Reid Road • Hanson Road / Red Rover Road • Hanson Road / Blain Drive / Alf O'Rourke Drive • Glenlyon Street / William Street • Glenlyon Street) / Gladstone Port Access Road / Railway Street • Glenlyon Street / Dawson Highway / Bramston Street • Glenlyon Street / Herbert Street / Tennis Centre Access • Glenlyon Street / Tank Street • Bramston Street / Goondoon Street • Port Access Road / Mark Fenton Drive / Hopper Road / Tug Berth Access Road • Dawson Highway / Blain Drive / Herbertson Street • Dawson Highway / Philip Street / Shopping Centre Access • Dawson Highway / Don Young Drive

Table 2-3 Scope of Pavement Assessment

Assessment Task	Scope
Pavement Impact Assessment • Without and with LNG Plant components • During both construction and operational phases • For two road connection options between Curtis Island and Gladstone • For three construction camp options to be located on Curtis Island or within Gladstone	Bruce Highway: • north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road to Calliope River-Targinie Road • Calliope River-Targinie Road to Dawson Highway • south of Dawson Highway Gladstone-Mt Larcom Road: • Bruce Highway to Calliope River-Targinie Road • Calliope River-Targinie Road to Landing Road • Landing Road to Reid Road • Reid Road to Red Rover Road • Red Rover Road to Blain Drive • Blain Drive to Dawson Highway Dawson Highway: • Bruce Highway to Don Young Drive • Don Young Drive to Phillip Street • Phillip Street to Blain Drive • Blain Drive to Glenlyon Street

The geographic scope of the study area described above is also presented diagrammatically in Figure 2-1 below.

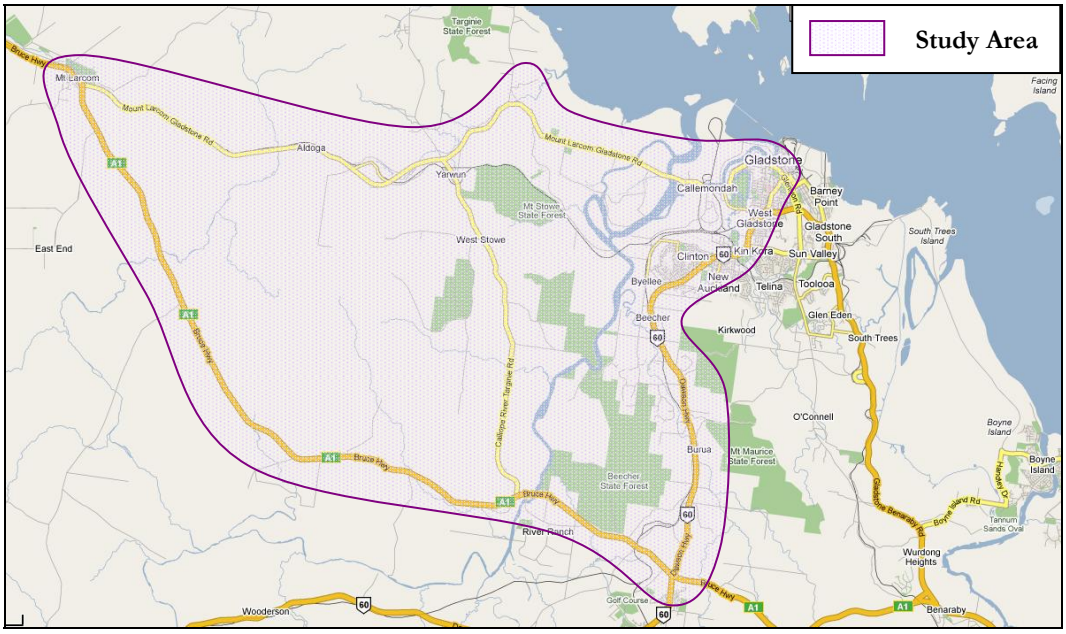


Figure 2-1 Road Impact Assessment – Study Area

The RIA has been undertaken with due consideration of the following reference resources:

- Guidelines for Assessment of Road Impacts of Development (GARID) (DMR, 2006);
- Road Planning and Design Manual (RPDM) (DMR, 2006);
- Pavement Design Manual (PDM) (DMR, 2005);
- Roads and Transport Standard (GRC, 2005); and
- Transport Infrastructure Policy (GRC, 2002)

2.2 Study Methodology

The following outlines the study methodology used to undertake the RIA.

Project Inception and Site Investigation

The first phase of the study involved a site investigation, discussions with relevant government authorities and a project inception meeting with QCG.

The intentions of the site investigation were to:

- Gain an appreciation of the road network form, including identification of any potential site access deficiencies for any of the traffic generating elements;

- Gain an appreciation of existing traffic volumes and likely directional distribution;
- Identify significant traffic generators and attractors within the vicinity of the proposed development sites; and
- To discuss potential issues with relevant stakeholders, as appropriate.

Following the completion of this phase, the scope of the assessment was further refined and resulted in the link, intersection and pavement analyses identified in Section 2.1.

Data Collection and Collation

Data that has been input into the analyses are listed below:

- Development details, such as:
  - Timelines for each phase of construction and operation;
  - Anticipated location for each traffic generating component of the LNG plant;
  - Expected employee requirements for each traffic generating component of the LNG plant;
  - Anticipated employee shift times;
  - Expected number of heavy vehicle movements to and from the site by times of day and vehicle type;
  - Likely origins and destinations for construction materials; and
  - Likely modes of transport used during the construction and operational phases;
- Existing road network details such as network geometry, existing road hierarchy and posted speed limits;
- Future road network provision;
- Tube and intersection count data, along with associated historical growth rates. Where existing data provision was insufficient, additional traffic counting was undertaken (see Section 3.4.1); and
- Existing pavement condition data and maintenance/rehabilitation cost rates.

Traffic Generation and Assignment

Determination of anticipated vehicle movements was undertaken through the following:

- Consultation with QCG regarding specific development details as outlined above (see data collection and collation);

- Conversion of these development details into peak hour flows for the intersection impact assessment;
- Conversion of these development details into daily flows for the link assessment;
- Conversion of these development details into yearly traffic flows for the pavement impact assessment; and
- Rather than using standard trip generation rates from DMR's RPDM or any other reference resource, trip generation was calculated through first principles and the knowledge of employee/heavy vehicle movements for different periods of the day.

Traffic was distributed onto the road network based on the outcome of a time and motion study undertaken by QCG, coupled with engineering judgement and our understanding of the region.

Traffic Impact Assessment

The impact assessment included 44 tested scenarios. These scenarios comprise a reference case with assumptions of workforce size and transport demand, a number of construction camp options, and various transport logistics scenarios incorporating a number of road bridge options connecting Curtis Island with Gladstone City. The scope of the assessment (see Section 2.1) was tested under all 44 scenarios, and further detailed analyses were conducted for all conditions where development generated traffic contributed to increases of greater than 5% of existing demands. This methodology is consistent with the procedures specified in GARID.

Intersection analysis was undertaken in the SIDRA Intersection software platform, and in some instances, also undertaken in the micro-simulation modelling package, Paramics. This report will cover the results of the SIDRA analyses only, and the results of the micro-simulation can be found in a separate document; *QLD Curtis LNG Project EIS Microsimulation Assessment* (Halcrow MWT, 2009).

Pavement Impact Assessment

The pavement impact assessment was conducted in accordance with the procedures identified within GARID. This procedure was supplemented through methodology discussions undertaken directly with DMR, Fitzroy district.

Impact management and mitigation

Based on the outcomes of the intersection and link impact analysis, alternative intersection/link forms and associated traffic management strategies were recommended for each phase of the project.

These have been based on local and state government requirements with due consideration of both operational and safety characteristics. Any proposed treatments also consider future infrastructure provision within the region.

Impact mitigation for pavements is usually managed by way of Developer Contributions. Specific cost elements (such as $ per km for road maintenance) have been determined through consultation with the relevant agencies and the resultant contribution was calculated for each of the 44 assessment scenarios.

3 Study Area

3.1 Site Location

The site identified for the Project's LNG processing and exporting facility is on the western side of Curtis Island as shown in Appendix A. The site is contained within the Curtis Island Industry Precinct (CIIP) of the Queensland State Government's Gladstone State Development Area (GSDA) as shown in Appendix B.

3.2 Existing State-Controlled Network

The key State-controlled road links which provide access to the project site during construction and operational phases are:

- Bruce Highway;
- Gladstone-Mt Larcom Road; and
- Dawson Highway.

3.2.1 Bruce Highway

The Bruce Highway is a fully sealed bitumen road which provides connectivity for the major urban centres along the eastern coastline of Queensland. Forming part of the national highway network, the Bruce Highway runs from Brisbane to Cairns and is generally a two lane undivided roadway with 1m – 1.5m sealed shoulders in rural areas. In urban areas and at major intersections (such as at Gladstone-Mt Larcom Road, Calliope River-Targinie Road and the Dawson Highway) the roadway form is of a higher standard and incorporates separation through raised or painted medians.

The posted speed limit is generally 100km/hr except in urban areas, where posted speed limits can drop down to 60km/hr.

3.2.2 Gladstone-Mt Larcom Road

Gladstone-Mt Larcom Road is the northern-most access road that provides connectivity between Gladstone and the Bruce Highway. It forms part of the State's strategic road network and is generally a two lane undivided sealed cross-section with a posted speed limit of 100km/hr.

As Gladstone-Mt Larcom Road extends eastward from Landing Road, it becomes Hanson Road. Hanson Road then becomes Glenlyon Road, south of Roseberry Street.

3.2.3 Dawson Highway

The Dawson Highway is part of the State's highway network and provides connectivity for the predominantly mining townships between Gladstone and Springsure. The link is generally a two lane undivided cross section, with a 100km/hr posted speed limit west of Don Young Drive. The part of the Dawson Highway to

the east of Don Young Drive which passes through the urban areas of Gladstone is referred to as Dawson Road. The form for this section of road is generally a four lane divided cross-section with a posted speed limit of 60km/hr.

3.3 Existing Council Controlled Network

The key Council-controlled road links which provide access to the project site during construction and operational phases are:

- Calliope River-Targinie Road;
- Landing Road;
- Reid Road;
- Blain Drive;
- Glenlyon Street; and
- Red Rover Road/Don Young Drive.

3.3.1 Calliope River-Targinie Road

Calliope River-Targinie Road extends from Phillipies Landing Road in the north and the Bruce Highway in the south. It is a sealed two way, single lane rural cross section north of Gladstone-Mt Larcom Road. To the south of Gladstone-Mt Larcom Road, the road becomes fully sealed with a two lane undivided cross section. The posted speed limit is generally 100km/hr, except in built up areas, where the posted speed limit drops down to 60km/hr.

Adjoining land uses are predominately rural residential, although a small parcel of land at Yarwun has been developed at a higher residential density.

3.3.2 Landing Road

Landing Road is a sealed two lane undivided road which extends from Gladstone-Mt Larcom Road to the port at Fisherman's Landing. The posted speed limit along this link is 80km/hr.

Adjoining allotments are mostly rural residential, with the exception of some industrial development (such as Cement Australia), proximate to the port site in the north.

3.3.3 Reid Road

Reid Road is a sealed two lane undivided council controlled road link with a posted speed limit of 60-70 km/hr.

Abutting land uses are primarily industrial and include rail yards, a water treatment plant and the ORICA chemical plant.

3.3.4 Blain Drive

Blain Drive is a sealed two lane undivided road which connects Hanson Road with Dawson Road. It is currently classified as a Sub Arterial Road in the GRC Transport Infrastructure Policy.

Abutting land uses along Blain Drive are predominantly industrial in the north, with some residential development in the south, proximate to Dawson Road.

3.3.5 Glenlyon Street

Glenlyon Street is the Council-controlled portion of road which continues from Hanson Road and Gladstone-Mt Larcom Road in the west. It passes through the Gladstone central business district and is generally a 4 lane divided roadway. It also provides access to the Gladstone Port through the connection with Port Access Road. Glenlyon Street is classified as a Major Urban Collector in the GRC Transport Infrastructure Policy.

Consistent with its hierarchical classification, intersection treatments are mostly signalised within the section bound by Lord Street and the Dawson Highway.

3.3.6 Red Rover Road/ Don Young Drive

Red Rover Road and Don Young Drive are currently sealed two lane undivided roads which connect Hanson Road to the Dawson Highway. They are currently classified as Sub Arterial Roads in the GRC Transport Infrastructure Policy.

Similar to Blain Drive, adjoining land uses are predominantly industrial in the north. Don Young Drive also provides access for higher density residential development in the south for the neighbouring suburb of Clinton.

3.4 Background Traffic Volumes

3.4.1 Traffic Volumes

Weekly traffic volume summary reports were supplied by DMR for the following sites:

- Dawson Highway, 150 m south of Park Street (coverage count, Oct 2007);
- Dawson Highway, west of Penda Avenue (coverage count, Sept 2007);
- Gladstone – Benaraby Road, 400m south east of the Dawson Highway (coverage count, Nov 2007); and
- Dawson Highway, 250m west of Breslin Street (coverage count, Dec 2007).

In addition to the above, average annual daily traffic (AADT) segment reports were also supplied by DMR. This information has been summarised and included in Table 3-1.

AusTraffic conducted intersection counts for those intersections described in Table 2-2. The counts were conducted on Thursday 6th November 2008 and were recorded for the respective morning and evening peak periods, 6:00 AM – 9:00 AM and 3:30 PM and 6:30 PM. This information has been summarised and included in Appendix C.

Table 3-1 Summary of AADT Segment Reports

Segment Start	Segment End	Length (km)	AADT* (veh/day)
Bruce Highway (from south to north)			
Gladstone-Benaraby Road intersection	500 m south of Dawson Highway	11.58	4,556
500 m south of Dawson Highway	25m North of Calliope River	33.83	3,450
25m North of Calliope River	Hut Creek (North of Ambrose)	39.91	5,051
Gladstone-Mt Larcom Road (from east to west)			
Glenlyon Street/Dawson Highway intersection	200m north of Lord Street	1.345	8,631
200m north of Lord Street	50m south of Auckland Creek	1.913	6,052
50m south of Auckland Creek	500m south of Red Rover Road	1.367	8,931
500m south of Red Rover Road	1 km north of Calliope River	7.667	6,161
1 km north of Calliope River	150m north of Yarwun Road	19.848	2,934
Dawson Highway (north to south)			
Glenlyon Street/Gladstone-Mt Larcom Road	150m south of Park Street	1.498	12,708
150m south of Park Street	250m west of Breslin Street	0.74	19,222
250m west of Breslin Street	250m north of Paterson Street	0.892	24,308
250m north of Paterson Street	Police Creek (Auckland Creek)	1.261	28,614
Police Creek (Auckland Creek)	West of Penda Avenue	0.788	22,079
West of Penda Avenue	450m west of Chapman Drive	5.117	2,435
450m west of Chapman Drive	250m west of Chamberlain Road	8.754	4,787
250m west of Chamberlain Road	200m east of Drynan Drive	2.7	5,308

*AADT figures are for the year 2007

3.4.2 Peak Period

Recent traffic count data that was obtained for this study has been analysed and is summarised in Table 3-2. From the information provided, the morning and evening peak hourly periods have been taken to be 7:45 AM – 8:45 AM and 4:15 PM – 5:15 PM.

Table 3-2 Summary of Count Data

Count Location	AM Peak	PM Peak
Dawson Highway, south of Park Street*	8:30 – 9:30	15:30 – 16:30
Dawson Highway, west of Penda Avenue*	8:30 – 9:30	16:30 – 17:30
Gladstone Benaraby Road, near Dawson Highway*	8:30 – 9:30	15:30 – 16:30
Dawson Highway, west of Breslin Street*	8:30 – 9:30	15:30 – 16:30
Hanson Road at Alf O'Rourke and Blain Drives**	6:30 – 7:30	16:30 – 17:30
Dawson Highway at Bramston Street**	8:30 – 9:30	16:30 – 17:30
Gladstone Mt Larcom Rd/Calliope River-Targinie Rd**	7:45 – 8:45	16:15 – 17:15
Gladstone Mt Larcom Rd/Landing Rd**	6:00 – 7:00	16:00 – 17:00
Hanson Rd/Reid Rd**	6:00 – 7:00	16:15 – 17:15
Glenlyon St/William Street**	7:45 – 8:45	16:30 – 17:30
Glenlyon St/Port Access Rd/Railway St**	7:45 – 8:45	16:30 – 17:30
Hanson Rd/Dawson Rd/Bramston St**	8:00 – 9:00	16:30 – 17:30
Glenlyon St/Herbert St/Tennis Centre Access**	7:45 – 8:45	16:30 – 17:30
Glenlyon St/Tank St**	7:45 – 8:45	16:45 – 17:45
Bramston St/Goondoon St**	8:00 – 9:00	15:30 – 16:30
Port Access Rd/Mark Fenton Dr/Hopper Rd/Tug Berth Access Rd**	7:45 – 8:45	15:30 – 16:30
Dawson Hwy/Blain Dr/Herbertson St**	7:45 – 8:45	16:30 – 17:30
Dawson Hwy/Philip St/Shopping Centre Access**	7:30 – 8:30	16:00 – 17:00
Dawson Hwy/Shopping Centre Access (i.e. access north of Philip St) **	7:45 – 8:45	16:15 – 17:15
Dawson Hwy/Don Young Dr**	7:45 – 8:45	16:30 – 17:30
Philip St/Shopping Centre Access (i.e. access to the east of Dawson Hwy) **	8:00 – 9:00	16:30 – 17:30
Peak period used in traffic assessment	7:45-8:45	16:15-17:15

* Peak periods are based on Average Weekday Traffic (ADT)
** Peak periods are calculated from a 1-day intersection count

3.5 Future Road Network

A review of the following documents identified a number of network improvements which are proposed for the study area:

- Roads Implementation Program 2008-09 to 2012-13, Fitzroy Region;
- Gladstone Integrated Regional Transport Plan 2001-2030;
- Capricornia Integrated Regional Transport Plan 2004-2030;
- Roads Connecting Queenslanders;
- Development Scheme for the Stanwell – Gladstone Infrastructure Corridor State Development Area, August 2008;
- Fitzroy & Central West Queensland – An Economic Powerhouse;
- The Gladstone Land, Port, Road and Rail Infrastructure Study;
- Kirkwood Road South Structure Plan – Summary of Investigations.

A summary of identified projects are provided in Table 3-3 below.

Table 3-3 Proposed Network Improvements

Project	Description	Funding Status
Callemondah to Yarwun (Mt Miller Road)	• Stage 1: Red Rover Road to Reid Road (new construction) • Stage 2: Reid Road to Aldoga precinct (new construction)	$25m (not funded) $15m (not funded)
Hanson Road Duplication	• Stage 1: - Gibson Street – Blain Drive - Blain Drive – Red Rover Road - Red Rover Road – Power Station Access • Stage 2: - Power Station Access – Gladstone- Mount Larcom Road intersection - Gladstone- Mount Larcom Road/ Landing Road intersection – Aldoga precinct	$10.1m (not funded) $31m (not funded) $17m (not funded)
Gladstone-Mount Larcom Rd / Landing Rd Intersection		$3m (not funded)
Link Rd from Hanson Rd to Mt Miller Rd		$4m (not funded)
Landing Road Upgrade	• Stage 1: widen and strengthen Gladstone- Mount Larcom Rd to QCL • Stage 2: widen and strengthen	$2m (not funded)

Project	Description	Funding Status
	QCL to Forest Road	$1m (not funded)
Glenlyon Road Extension – 8km (new construction) OR Upgrading of the existing Gladstone Benaraby Rd from Kirkwood Rd to Ten Mile Creek to 4 lanes	A new 2-lane extension of Glenlyon Road from Dalrymple Drive to the southern intersection with the Gladstone Benaraby Road	$20m (not funded)
Glenlyon Road to Gladstone – Benaraby Road Link	Kirkwood Road extension	$5m (not funded)
Gladstone – Benaraby Rd to 4 lanes between Glenlyon Rd extension and the Boyne Island Rd intersection (2.5km)	Including Glenlyon Road extension intersection and upgrading of Boyne Island Road intersection	$6m (not funded)
4-laning of the last 2-lane section of Philip Street		$2m (partial indicative funding from RIP)
Glenlyon Rd to 4 lanes between Bramston St and Derby St (1km)	Includes intersection upgrade at Tank and Derby Streets	$2.5m (not funded)
New 2-lane section of Kirkwood Rd from Dawson Hwy to Glenlyon Rd extension and associated intersection works	• Stage 1: middle part of new road • Stage 2: balance of new road	$3.5m (not funded) $9m (not funded)
Calliope – Targinie Road Upgrade	• Stage 1: Upgrade to two-lane bitumen standard • Stage Two: Upgrade and overlay strengthening to meet industrial traffic demand	$10m (not funded) $7m (not funded)
Upgrade Dawson Highway to 4 lanes	Stage 1: - Breslin Street to Blain Drive - Brifney Roundabout to Chapman Drive Stage 2: - Chapman Dr to Kirkwood Rd	$4.5m (RIP Funding) $4m (not funded)
Gladstone-Mount Larcom Road	Overtaking lanes	$1.4m (not funded)
Gladstone-Benaraby Road	Shoulder widening and overtaking lanes (Gladstone-Tooloola)	$2m (RIP Funding)

Project	Description	Funding Status
Calliope Crossroads	Grade separation of the Dawson Highway and Bruce Highway Intersection	$55m (not funded)

3.6 Existing and Future Rail Network

The existing rail network in the vicinity of the Project comprises of the following:

- A north-south linkage between Brisbane and Cairns, which is termed the *North Coast Line*. This is also linked to the *Blackwater* system that carries thermal coal from the Central Bowen Basin to Gladstone; and
- The *Moura s*ystem, which is currently a rail connection between the southern Bowen Basin and Gladstone. This system is soon to be linked to the *West Moreton* system via the proposed Surat Basin Rail project.

Improvements to the rail system are currently under investigation, with the most notable including:

- *Surat Basin Rail Feasibility Study* – Approximately 210 km of new railway is to be constructed between Wandoan and Banana. This new linkage will form part of the *Moura System* and is intended to complete the linkage between the *Western System* and (ultimately) the Port of Gladstone. The *Surat Basin Rail* is proposed to be an open-access railway with sufficient capacity to accommodate significant volumes of coal and freight;
- *Moura Link-Aldoga Rail Project* – This is a proposed railway line which will connect the proposed Wiggins Island Coal Terminal to the *Moura System.* The project also includes the construction of maintenance and provisioning facilities within the Gladstone State Development Area, as well as quadruplication of the *North Coast Line North Coast Line* from the new maintenance yard to just east of Yarwun township.

3.7 Existing and Future Port Facilities

Initially, development within Gladstone was stimulated by the presence of the Port. Today, it still plays a vital role on the economy of the surrounding regions. The Port of Gladstone (PoG) currently has six primary wharf centres, being:

- *Boyne Wharf* – cargoes commodities such as Aluminium, Petroleum Coke, General Cargo, Break Bulk and Liquid Pitch;
- *South Trees* (East and West) – cargoes Alumina, Caustic Soda, Bunker Oil, Bauxite and Bunker Coal;
- *Barney Point* – cargoes Coal, Magnesite, Bunker Coal and Illmenite;
- *Auckland Point* – cargoes commodities such as LP Gas, Magnesia, Calcite, Break Bulk, Grain, Petroleum Products, Caustic Soda and General Cargo;

- *Clinton Wharf* – cargoes coal only;
- *R.G. Tanna* – coal terminal; and
- *Fisherman's Landing* – cargoes bauxite, alumina, caustic soda, cement, fly ash and limestone.

The 50-year strategic plan for the PoG indicates that the harbour will be able to accommodate up to 300 million tonnes of export product in the next 50 years. This will be accomplished through a number of expansions to existing terminals.

In addition to the PoG, it is proposed to construct a new coal terminal on Wiggins Island. The export capacity of this terminal is earmarked to be in the order of 70 million tonnes per annum. It is proposed to be developed in 3 stages.

4 Proposed Development

4.1 Project Description

The project in its entirety, involves three principle components:

- The **Gas field** component, which involves the expansion of existing coal seam gas extraction in the Surat Basin;
- The **Pipeline** component, which involves the construction of approximately 380km of pipeline connecting the Surat Basin gas fields to the proposed LNG processing and export facility at Curtis Island in Gladstone; and
- The **LNG** Component, which involves the construction and operation of a multi-train LNG processing and exporting facility at Curtis Island, to be designed for continuous 24-hour operation upon its commissioning.

Although this study will focus on the traffic and transport impacts resulting from the LNG component, the traffic generated by the pipeline construction has been considered and has been overlaid onto the background traffic volumes for all links and intersections contained within the study area described in Figure 2-1. Further information regarding pipeline construction can be found in Volume 4 and Chapter 13 of the overarching EIS document.

The LNG Plant is to be located on the western side of Curtis Island, Gladstone. Beyond the facility itself, the project will also require the construction of ancillary infrastructure, such as:

- A marine jetty at Curtis Island, which will include specialised LNG loading facilities and tanker berths;
- A construction dock and barge/ferry terminals on Curtis Island along with corresponding terminals on the mainland at Auckland Point and at the end of Alf O'Rourke Drive; and
- Potentially a new road bridge across the Narrows (i.e. between Curtis Island and the mainland) to establish ongoing road access to Curtis Island.

4.2 Project Staging

Information provided by QGC has indicated that the project staging for the LNG Plant is as shown in Figure 4-1. Construction of Train 1 and Train 2 will start simultaneously in 2010. The starting year of commission for Train 1 and 2 is proposed to be 2013 and 2014, respectively. Train 3 construction will commence much later in 2018, with the start of operations commencing 3 years after in 2021.

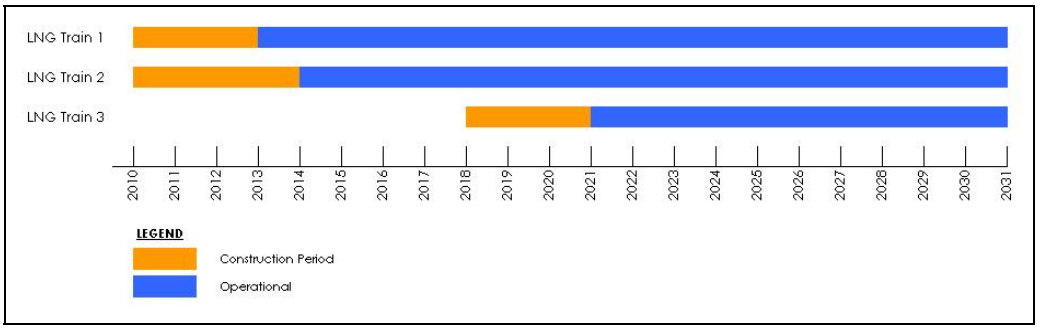


Figure 4-1 **Project Staging**

4.3 Transport Logistics

The planning for the construction and operational phases of the LNG Plant considers a number of scenarios for the transport of personnel and equipment between the mainland and site. These have been determined in consultation with QGC and are:

- **Construction Phase Prior to 2013**

  Transport of personnel and equipment from 2010 to 2013 will rely solely on barge/ferry services between a newly constructed marine jetty on Curtis Island to the existing terminal at Auckland Point; and

- **Construction / Operation Phases Beyond 2013**

  Transport of personnel and equipment after 2013 has three options for consideration and assessment. Mainland access from the Curtis Island site will be facilitated through either one of two road bridge options (see Section 4.3.1 and 4.3.2) or via a new mainland terminal to be located at the end of Alf O'Rourke Drive, behind RG Tanna Coal terminal. Note that transport via Auckland Point does not occur beyond 2013.

Where additional travel is required between the ferry terminals and the construction camps, shuttle bus services will be provided. Further to this, shuttle bus services may also be provided at the start and end of each fortnightly shift (during construction) for non-local worker travel to and from Gladstone and Rockhampton airports. This study will assess the traffic impacts resulting from providing/not providing airport shuttle services.

4.3.1 Road Bridge Option 1 – Landing Road Extension

Option 1 considers a predominantly north-south alignment which follows the coastline. The proposed road bridge connects to the existing network through an extension of Landing Road as shown in Figure 4-2 .

4.3.2 Road Bridge Option 2 – Phillipies Land Road Extension

Option 2 considers a predominantly east west alignment which is to connect with the existing road network through an extension of Phillipies Landing Road. This bridge

option will connect in with the study area network at Calliope River-Targinie Road, as shown in Figure 4-2.

Figure 4-2 Road Bridge Options

4.4 Staff Accommodation

4.4.1 Construction Personnel

This traffic and transport assessment considers four options for the housing of construction workers. This information has been provided by QGC and is as follows:

- **Construction Camp Option A**

  This option assumes that non local personnel (43% of total workforce requirements) will reside within a Construction Camp to be located on the mainland at Lot 200 SP116496, shown in Figure 4-3. The remainder of the workforce will source individual accommodation arrangements, either within Gladstone or in nearby townships.

- **Construction Camp Option B**

  This option assumes that non local personnel (43% of total workforce requirements) will reside within a Construction Camp to be located on the mainland at Lot 4 & 5 CTN1898, shown in Figure 4-3. The remainder of the workforce will source individual accommodation arrangements, either within Gladstone or in nearby townships.

- **Construction Camp Option C**

  This option assumes that all personnel, regardless of whether they are locally sourced, will reside within the Construction Camp to be located on Curtis Island, proximate to the LNG facility.

- **Construction Camp Option D**

  This option is a hybrid option and assumes that only non local personnel (45% of total workforce requirements) will reside within the Construction Camp located on Curtis Island. The remainder of the workforce will source individual accommodation arrangements, either within Gladstone or in nearby townships.

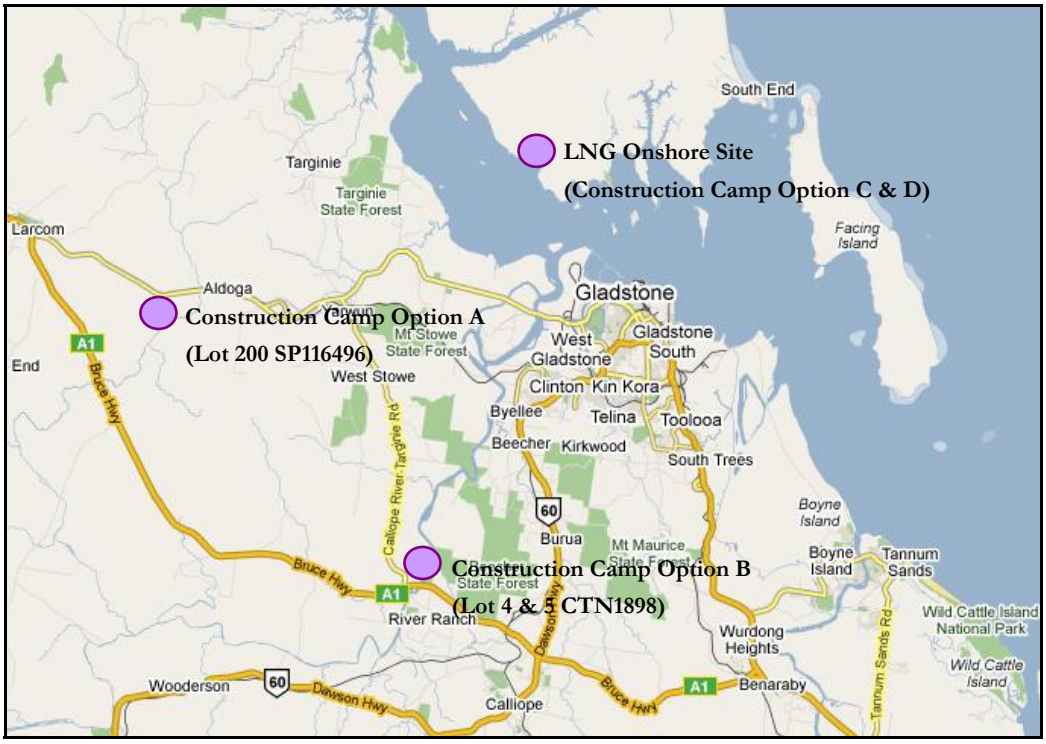


Figure 4-3 **Construction Camp Options**

4.4.2 Operations Personnel

All operations personnel will source individual accommodation arrangements, assumed to be either within Gladstone or in nearby townships. This may be in the form of owner-occupier or rental residential accommodation.

4.5 Staff Requirements

4.5.1 Construction Phase

Peak employee requirements, as provided by QGC, for the construction phases are as follows:

- Train 1 and 2 combined: 2,000 personnel
- Tran 2 only: 2,000 personnel
- Train 3 only: 1,000 personnel

These workers will be required to work on a fortnightly rotation of 10 days on/4 days off. There will be one shift per day, which will occur between the hours of 6:00 AM

and 6:00 PM. At the end of each fortnightly shift, a portion of employees will be required to remain on site. QGC has indicated that for construction of all three trains, this will be in the order of 2.5% of total workforce requirements. Therefore, the number of employees that will enter/leave the site at the start/end of each fortnightly shift will be as follows:

- Train 1 and 2 combined: 1,950 personnel
- Tran 2 only: 1,950 personnel
- Train 3 only: 975 personnel

4.5.2 Operations Phase

Employee requirements, as provided by QGC, for the operation and maintenance of the Plant are as follows:

- Train 1 : 80 personnel
- Train 1 & 2 combined: 104 personnel
- All 3 Trains: 130 personnel

Given that plant operations are expected to be continuous over each 24-hour period, two shifts will be required each day. Shift changeover times will occur at 6:00 AM and 6:00 PM.

In addition to the plant personnel required above, approximately 90 personnel will be located at an office in Gladstone City. As the location of the office is yet to be determined, these employee movements have been omitted from the traffic analyses.

4.6 Traffic Demands during Construction

There are two components of expected traffic generation during the construction period:

- Traffic that is generated at the start and end of each daily shift; and
- Traffic that is generated at the start and end of each fortnightly shift.
- The design peak generation that has been selected for the traffic analyses which follows represents the critical peak hour/day. For all construction camp options, the critical peak hour traffic generating period coincides with the afternoon movement at the end of each fortnightly shift. The critical day in each fortnightly period also occurs on that same day, and can be expressed as follows:

<u>Construction Camp A & B</u>

- Personnel depart for their scheduled days off (i.e. movement of 1,950 personnel at peak construction); plus

- Daily movement of employees in the morning for the start the daily shift (i.e. movement of 1,950 personnel at peak construction).

Construction Camp C

- Personnel depart for their scheduled days off (i.e. movement of 1,950 personnel at peak construction).

Construction Camp D

- Personnel depart for their scheduled days off (i.e. movement of 1,950 personnel at peak construction); plus
- Daily movement of employees in the morning for the start the daily shift (i.e. movement of 1,100 personnel at peak construction).

The trip generating equations that have been applied in the assessment are as shown in Equation 4-1 and Equation 4-2.

$$Peak\ Hour\ Generation = \frac{Max\ Hourly\ Arrival/Departure}{Vehicle\ Occupancy}$$

Equation 4-1 Peak Hour Trip Generation

$$Daily\ Generation = \frac{Total\ Number\ of\ Employee\ Arrivals\ \&\ Departures}{Vehicle\ Occupancy}$$

Equation 4-2 Daily Trip Generation

The assumed vehicle occupancies are taken to be 1.5 persons/vehicle for private vehicle trips and 50 persons/vehicle for shuttle bus trips. Although a vehicle occupancy value of 1.5 is slightly higher than is normally attributed to urban trips (i.e. usually in the order of 1.2 persons/vehicle), a recent study into the travel patterns of Gladstone Comalco Refinery employees indicated that the vehicle occupancy is 1.8 persons/vehicle[1]. Therefore, it is considered that a vehicle occupancy of 1.5 persons/vehicle represents a balanced outcome between industry accepted norms and the surveyed characteristics of the study area.

[1] Vehicle occupancies are quoted in Section 4.3.1 of *Gladstone Pacific Nickel Refinery Traffic Report* (Cardno Eppell Olsen, Dec 2006)

4.6.1 LNG Train 1 & 2 Construction

4.6.2 Employee Arrival/Departure Profiles at Auckland Point

Advice received from QGC has indicated that for Construction Camp Options A, B and D (mainland and partial mainland options), shuttling of workers between Gladstone and Curtis Island will need to be relatively expedient, as the movements would be performed each day. This results in the assumption that all workers will need to be transported to and from Curtis Island over the hour period before/after the start/end of each daily shift. This means that the maximum number of arrivals/departures at the start/end of each shift is as follows:

Start/End of Daily Shift (Maximum flow rate)

- Construction Camp A: 1,950 persons/hr;
- Construction Camp B: 1,950 persons/hr; and
- Construction Camp D: 1,100 persons/hr.

Start/End of Fortnightly Shift (Maximum flow rate)

- Construction Camp A: 1,950 persons/hr;
- Construction Camp B: 1,950 persons/hr; and
- Construction Camp D: 1,950 persons/hr.

Unlike the abovementioned options, Construction Camp C will require all workers to reside on Curtis Island for the 10 day duration of work. This eliminates the need to supply a shuttle ferry each day and the only movements into/out of Gladstone will occur at the start or end of each fortnightly shift. Therefore, the need for quick access onto the mainland is reduced and the arrival/departure profiles can be throttled in order to reduce the road network impacts. QGC has conducted a Time and Motion Study which details the anticipated fortnightly employee movements, based on the frequency and capacity of ferry services. The information has been interpreted and represented graphically in Figure 4-4 and Figure 4-5 below.

The number of arrivals/departures at the start/end of each shift for Construction Camp Option C is as follows:

Start/End of Daily Shift

- Construction Camp C: 0 persons/hr

Start of Fortnightly Shift

- Construction Camp C: 946 persons/hr

End of Fortnightly Shift

- Construction Camp C: 999 persons/hr

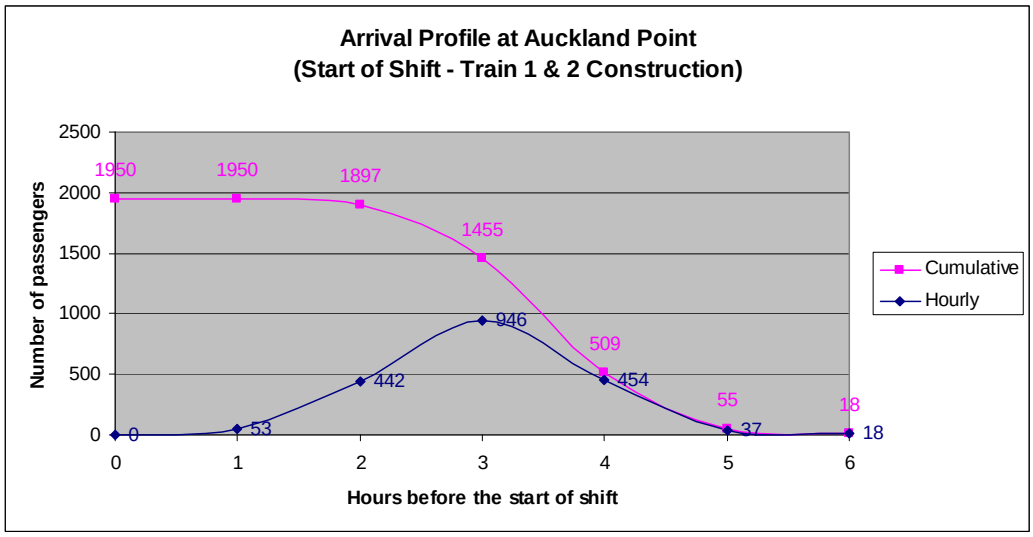


Figure 4-4 **Arrival Profile at Auckland Point – Train 1 and 2 Construction (Opt C)**

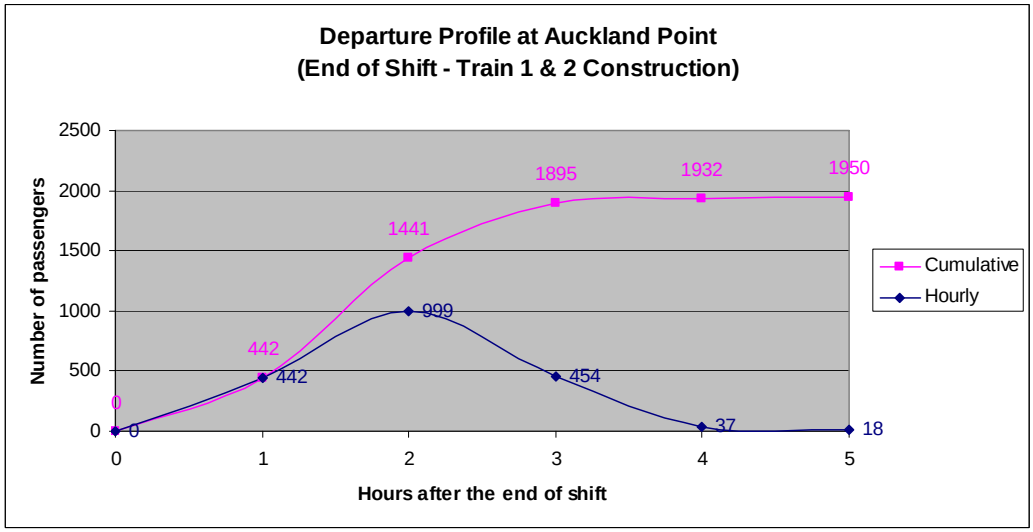


Figure 4-5 **Departure Profile at Auckland Point – Train 1 and 2 Construction (Opt C)**

4.6.3 Light Vehicle Demands

Light vehicle demands at the start/end of each daily shift and at the start/end of each fortnightly shift are indicated in Table 4-1 and Table 4-2, respectively. These demands have been calculated through the application of Equation 4-1 and Equation 4-2 to the employee arrival/departure profiles identified in Section 4.6.2.

Table 4-1 Daily Generation – LNG Train 1 & 2 Construction

Period	Camp Option A	Camp Option B	Camp Option C	Camp Option D
AM Peak	741 veh/hr 34 bus/hr	741 veh/hr 34 bus/hr	None	733 veh/hr
PM Peak	741 veh/hr 34 bus/hr	741 veh/hr 34 bus/hr	None	733 veh/hr
Daily	1482 veh/day 68 bus/day	1482 veh/day 68 bus/day	None	1467 veh/day

Table 4-2 Fortnightly Generation – LNG Train 1 & 2 Construction

Period	Camp Option A	Camp Option B	Camp Option C	Camp Option D
AM Peak (Shuttle Bus)	741 veh/hr 34 bus/hr	741 veh/hr 34 bus/hr	550 veh/hr 5 bus/hr	1124 veh/hr 9 bus/hr
AM Peak (No Shuttle Bus)	741 veh/hr 34 bus/hr	741 veh/hr 34 bus/hr	631 veh/hr	1300 veh/hr
PM Peak (Shuttle Bus)	1029 veh/hr 52 bus/hr	1029 veh/hr 52 bus/hr	581 veh/hr 5 bus/hr	1124 veh/hr 9 bus/hr
PM Peak (No Shuttle Bus)	1195 veh/hr 34 bus/hr	1195 veh/hr 34 bus/hr	666 veh/hr	1300 veh/hr
Daily (Shuttle Bus)	1770 veh/day 86 bus/day	1770 veh/day 86 bus/day	1134 veh/day 10 bus/day	1857 veh/day 9 bus/day
Daily (No Shuttle Bus)	1936 veh/day 48 bus/day	1936 veh/day 48 bus/day	1300 veh/day	2033 veh/day

Note: No shuttle bus refers to airport shuttle as discussed in Section 4.3.

All values are relevant to the critical AM, PM or daily period

4.6.4 Heavy Vehicle Demands

LNG Plant

Heavy vehicle demands relating to the construction of the LNG Facility for the peak construction period are as follows:

- Transport of cement – 1 truck per day;

- Transport of waste – 7 trucks per day at peak for 3-4 months, average demand for transport of waste 3-4 trucks/day;
- Transport of fuel – 1 truck per day;
- Transport of refrigerated food and dry goods – 1 truck per day; and
- Transport of water – 1 truck per day for the first 12 months of construction.

To be conservative, these trips are assumed to occur during the commuter peak. Although in reality, the impact will be managed.

Pipeline Transport

Advice from QGC/KBR indicates that the start of pipe delivery is to begin in late 2010, with the pipeline to be fully constructed by the starting year of operations for Train 1 (i.e. 2013). It has been advised that all pipe shall arrive by barge at the Port of Gladstone and will traverse the existing road network via Port Access Road and either Gladstone Mt- Larcom Road or the Dawson Highway. Delivered pipe will be used for the following components:

- Main Pipe Line 1;
- Collection Lateral; and
- Upstream Infrastructure Corridor (UIC).

Anticipated pipeline movements are:

- Dawson Highway – 336 truck movements/day for 167 days; and
- Gladstone-Mt Larcom Road – 108 truck movements/day for 21 days.

These volumes are based on the assumption that all three pipelines will be constructed concurrently. This has been utilised for this analysis as it represents the critical construction scenario. If the pipelines are constructed consecutively rather than concurrently, the number of truck movements per day will decrease, but the number of construction days will increase.

4.6.5 LNG Train 2 Construction

4.6.6 Employee Arrival/Departure Profiles at Alf O'Rourke Drive

Employee requirements during Train 2 construction are identical to the construction requirements for Train 1 and 2 combined. Therefore the employee arrival/departure profiles specified in Section 4.6.2 apply and are as follows:

Start/End of Daily Shift (Maximum flow rate)

- Construction Camp A: 1,950 persons/hr
- Construction Camp B: 1,950 persons/hr
- Construction Camp C: 0 persons/hr
- Construction Camp D: 1,100 persons/hr

Start/End of Fortnightly Shift (Maximum flow rate)

- Construction Camp A: 1,950 persons/hr
- Construction Camp B: 1,950 persons/hr
- Construction Camp C: 946 persons/hr (arrivals)
- Construction Camp C: 999 persons/hr (departure)
- Construction Camp D: 1,950 persons/hr

4.6.7 Employee Arrival/Departure Profiles with Road Bridge

Converse to the scenario where arrivals/departures are dependant upon ferry service frequency and capacity, such constraints do not exist in a "with road bridge" scenario. As such, employees are able to arrive/depart the Curtis Island site within the hour before/after the shift. Therefore the maximum flow rates (for both arrivals and departures) are 1950 persons/hr for all construction camp options at the start/end of the fortnight shift.

Start/End of Daily Shift (Maximum flow rate)

- Construction Camp A: 1,950 persons/hr
- Construction Camp B: 1,950 persons/hr
- Construction Camp C: 0 persons/hr
- Construction Camp D: 1,100 persons/hr

Start/End of Fortnightly Shift (Maximum flow rate)

- Construction Camp A: 1,950 persons/hr;
- Construction Camp B: 1,950 persons/hr;
- Construction Camp C: 1,950 persons/hr; and
- Construction Camp D: 1,950 persons/hr.

4.6.8 Light Vehicle Demands

Light vehicle demands for construction of Train 2, without the presence of the road bridge are as indicated in Table 4-1 and Table 4-2 above. The trip generation for Construction Camp Options A, B and D "with road bridge" will also match the values stated in Table 4-1 and Table 4-2. Therefore, the only difference in trip generation will be for Construction Camp C, with road bridge scenario. The revised demands are indicated in Table 4-3.

Table 4-3 Fortnightly Generation – LNG Train 2 Construction – Camp Opt C

Period	Camp Option C
AM Peak (Shuttle Bus)	1134 veh/hr; 9 bus/hr

AM Peak (No Shuttle Bus)	1300 veh/hr
PM Peak (Shuttle Bus)	1134 veh/hr; 9 bus/hr
PM Peak (No Shuttle Bus)	1300 veh/hr
Daily (Shuttle Bus)	1134 veh/day; 9 bus/day
Daily (No Shuttle Bus)	1300 veh/day

Note: No shuttle bus refers to airport shuttle as discussed in Section 4.3.

All values are relevant to the critical AM, PM or daily period

4.6.9 Heavy Vehicle Demands

Heavy vehicle demands for construction of Train 2 of the LNG Plant will match those specified in Section 4.6.4.

Note that heavy vehicle demands relating to pipeline transport are no longer applied to the background traffic volumes.

4.6.10 LNG Train 3 Construction

4.6.11 Employee Arrival/Departure Profiles at Alf O'Rourke Drive

The methodology for determining maximum arrival/departure profiles for construction of Train 3 follows the methodology discussed in Section 4.6.2. The values have, however, been modified to match the employee requirements for Train 3 construction. The resulting flows are as follows:

Start/End of Daily Shift (Maximum flow rate)

- Construction Camp A: 975 persons/hr
- Construction Camp B: 975 persons/hr;
- Construction Camp C: 0 persons/hr
- Construction Camp D: 550 persons/hr

Start/End of Fortnightly Shift (Maximum flow rate)

- Construction Camp A: 975 persons/hr
- Construction Camp B: 975 persons/hr
- Construction Camp C: 480 persons/hr (arrivals)
- Construction Camp C: 533 persons/hr (departures)
- Construction Camp D: 975 persons/hr

The modified arrival/departure profile plots are provided in Figure 4-6 and Figure 4-7.

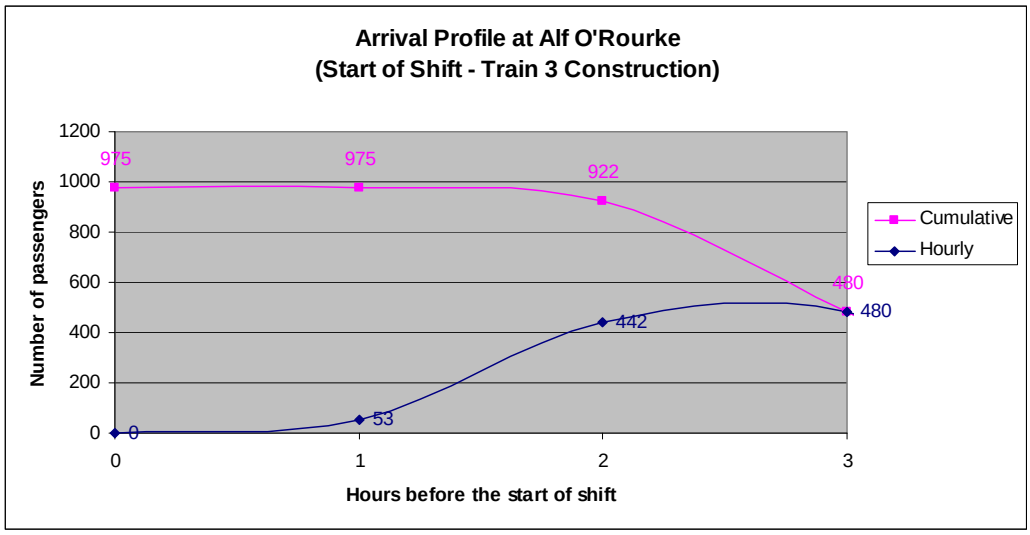


Figure 4-6 Arrival Profile at Alf O'Rourke Drive – Train 3 Construction (Opt C)

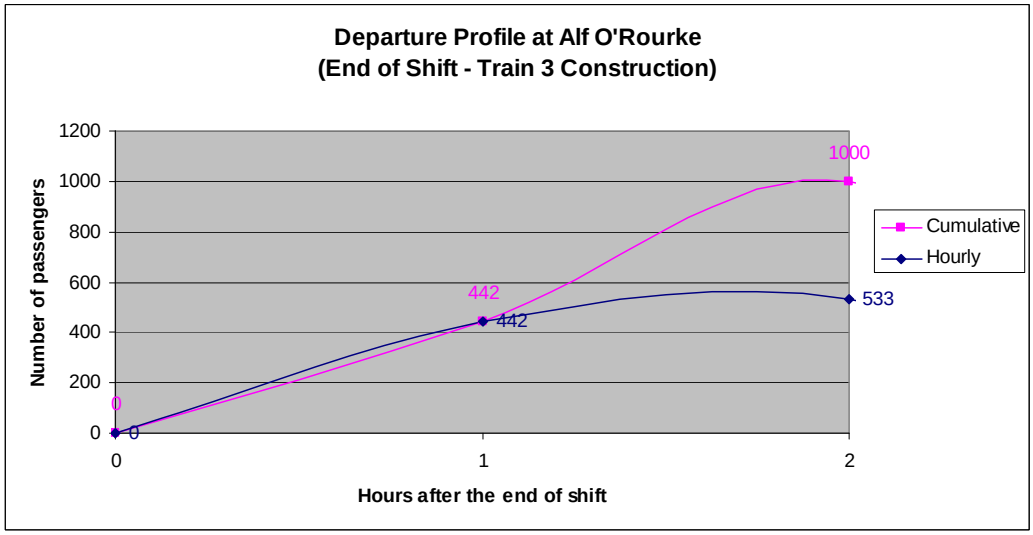


Figure 4-7 Departure Profile at Alf O'Rourke Drive – Train 3 Construction (Opt C)

4.6.12 Employee Arrival/Departure Profiles with Road Bridge

Following the rationale presented in Section 4.6.7, the maximum flow rates (for arrivals and departures) would be 975 persons/hr for all construction camp options at the start/end of the fortnight shift.

Start/End of Daily Shift (Maximum flow rate)

- Construction Camp A: 975 persons/hr
- Construction Camp B: 975 persons/hr;
- Construction Camp C: 0 persons/hr
- Construction Camp D: 550 persons/hr

Start/End of Fortnightly Shift (Maximum flow rate)

- Construction Camp A: 975 persons/hr
- Construction Camp B: 975 persons/hr
- Construction Camp C: 975 persons/hr
- Construction Camp D: 975 persons/hr

4.6.13 Light Vehicle Demands

Light vehicle demands at the start/end of each daily shift and at the start/end of each fortnightly shift are indicated in Table 4-4 and Table 4-5, respectively. These demands have been calculated through the application of Equation 4-1 and Equation 4-2 to the employee arrival/departure profiles identified in Section 4.6.11 and 4.6.12.

Table 4-4 Daily Generation – LNG Train 3 Construction

Period	Camp Option A	Camp Option B	Camp Option C	Camp Option D
AM Peak	371 veh/hr 16 bus/hr	371 veh/hr 16 bus/hr	None	367 veh/hr
PM Peak	371 veh/hr 16 bus/hr	371 veh/hr 16 bus/hr	None	367 veh/hr
Daily	741 veh/day 32 bus/day	741 veh/day 32 bus/day	None	733 veh/day

Table 4-5 Fortnightly Generation – LNG Train 3 Construction

Period	Camp Option A	Camp Option B	Camp Option C*	Camp Option C**	Camp Option D
AM Peak (Shuttle Bus)	371 veh/hr 16 bus/hr	371 veh/hr 16 bus/hr	279 veh/hr 2 bus/hr	567 veh/hr 5 bus/hr	562 veh/hr 5 bus/hr
AM Peak (No Shuttle Bus)	371 veh/hr 16 bus/hr	371 veh/hr 16 bus/hr	320 veh/hr	650 veh/hr	650 veh/hr
PM Peak (Shuttle Bus)	515 veh/hr 26 bus/hr	515 veh/hr 26 bus/hr	310 veh/hr 2 bus/hr	567 veh/hr 5 bus/hr	562 veh/hr 5 bus/hr
PM Peak (No Shuttle Bus)	598 veh/hr 16 bus/hr	598 veh/hr 16 bus/hr	355 veh/hr	650 veh/hr	650 veh/hr
Daily (Shuttle Bus)	886 veh/day	886 veh/day	567 veh/day	567 veh/day	929 veh/day

Period	Camp Option A	Camp Option B	Camp Option C*	Camp Option C**	Camp Option D
	42 bus/day	42 bus/day	6 bus/day	6 bus/day	5 bus/day
Daily (No Shuttle Bus)	969 veh/day 32 bus/day	969 veh/day 32 bus/day	650 veh/day	650 veh/day	1017 veh/day

Note: No shuttle bus refers to airport shuttle as discussed in Section 4.3.

All values are relevant to the critical AM, PM or daily period

* Denotes traffic generation for Construction Camp C without Road Bridge

** Denotes traffic generation for Construction Camp C with Road Bridge

4.6.14 Heavy Vehicle Demands

Heavy vehicle demands for construction of Train 2 of the LNG Plant will match those specified in Section 4.6.4.

Note that heavy vehicle demands relating to pipeline transport are no longer applied to the background traffic volumes.

4.7 Traffic Demands during Operations

Traffic demands during the operational phases are provided below. These values have been determined through the application of Equation 4-1 and Equation 4-2 to the employee requirements discussed in Section 4.5.2.

Table 4-6 Operations – Traffic Demands

Traffic Generation Period	Train 1	Train 1 and 2 combined	All 3 Trains
Peak Generation	54 veh/hr	70 veh/hr	88 veh/hr
Daily Generation	108 veh/day	140 veh/day	176 veh/day

4.8 Traffic Distribution

Presented in Table 4-7 is the assumed traffic distribution for the greater Gladstone network. These values have been adopted based on advice from the Time and Motion Study.

Note that Construction Camp Option D has a slightly different distribution to the other camp options. This is due to the lower proportion of local based workers (i.e. 55% of total workforce requirements) when compared against that of Construction Camp Options A, B and C (i.e. 57% of total workforce requirements). Values have been adjusted accordingly.

Table 4-7 Traffic Distribution – Wider Network

Origin	Destination	% of Total Trips	
		Camp Opt A, B & C	Camp Opt D
Start of Fortnight Shift			
Gladstone City (local)*	Auckland Point/ Alf O'Rourke Drive/ LNG Site depending upon stage of construction/operation	62 %	60 %
Gladstone Airport		9 %	10 %
Outside Gladstone (South)		11 %	12%
Outside Gladstone (West)		5 %	6%
Rockhampton		9 %	9%
Rockhampton Airport		3 %	4%
End of Fortnight Shift			
Auckland Point/ Alf O'Rourke Drive/ LNG Site depending upon stage of construction/operation	Gladstone City (local)*	62 %	60 %
	Gladstone Airport	9 %	10 %
	Outside Gladstone (South)	11 %	12%
	Outside Gladstone (West)	5 %	6%
	Rockhampton	9 %	9%
	Rockhampton Airport	3 %	4%

*See Figure 4-8 for breakdown by suburb

The traffic distribution for Gladstone City (local) (Figure 4-8) was based upon information sourced from the Australian Bureau of Statistics 2006 Census. The proportion of workers residing in each suburb is based upon the number of residents (on Census night) working within the following industries, broken down by the listed occupations:

Industries

- Mining
- Manufacturing
- Construction
- Professional/Scientific/ Technical Services

Occupations

- Managers
- Professionals
- Technicians/Trades
- Machinery operators/Drivers
- Labourers
- Clerical/Administration

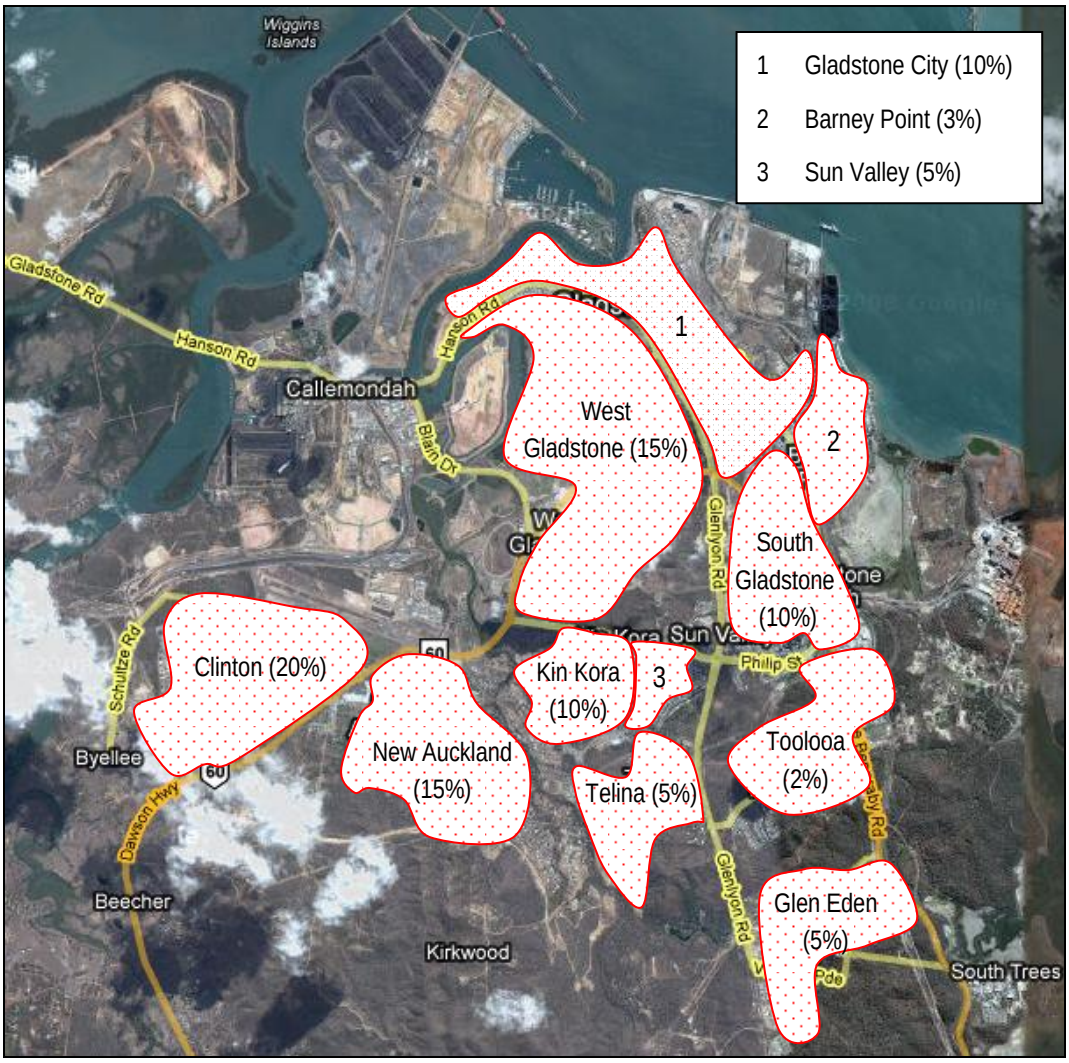
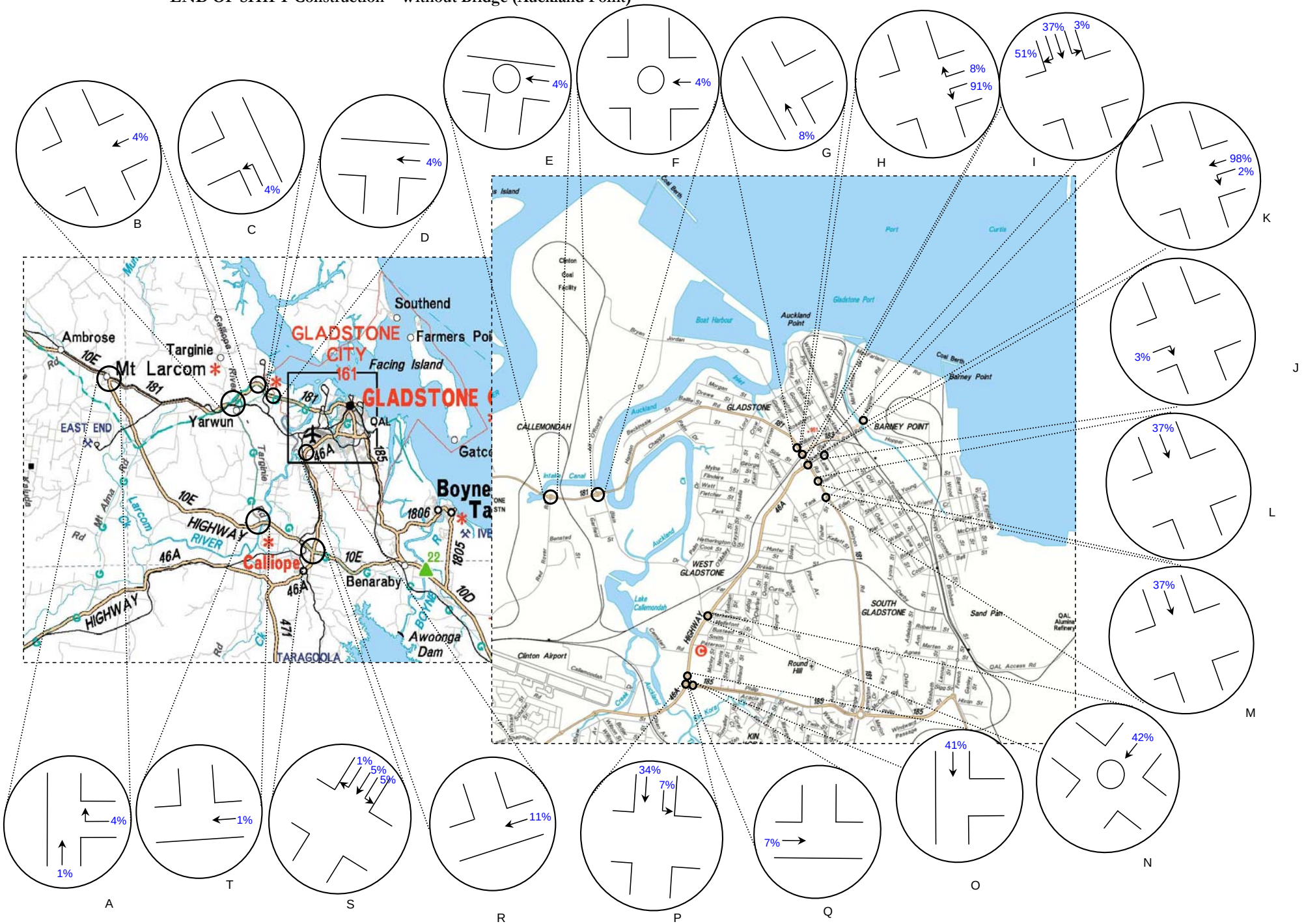


Figure 4-8 Traffic Distribution – Gladstone Local

The translation of the distribution (for Gladstone City local) to movements through assessable intersections is provided in Figure 4-9 to Figure 4-12. Other Origin-Destination pairs (e.g. Gladstone Airport to Auckland Point) have been added individually to the relevant movements, based upon the most likely route choice/s.

Figure 4-9 **Traffic Distribution (Employee's residing in Gladstone and surrounds)**
END OF SHIFT Construction – Without Bridge (Auckland Point)



Note: Values are expressed as a percentage of total traffic generation for employees residing in Gladstone & surrounds. Distribution for the Start of Shift is taken to be the reverse of the above.

Figure 4-10 **Traffic Distribution (Employee's residing in Gladstone and surrounds)**
SHIFT CHANGE Operations – With Bridge Option 2

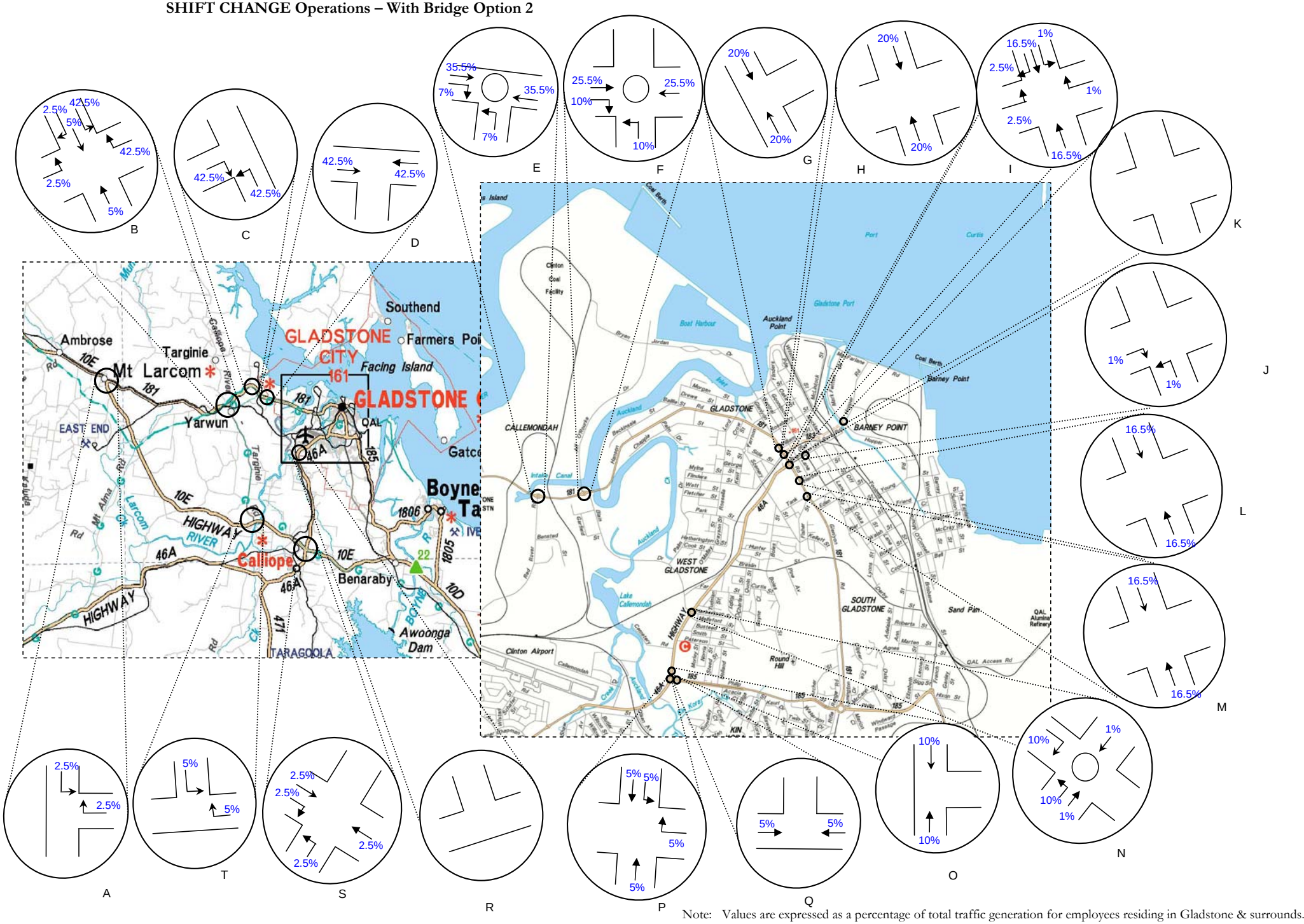
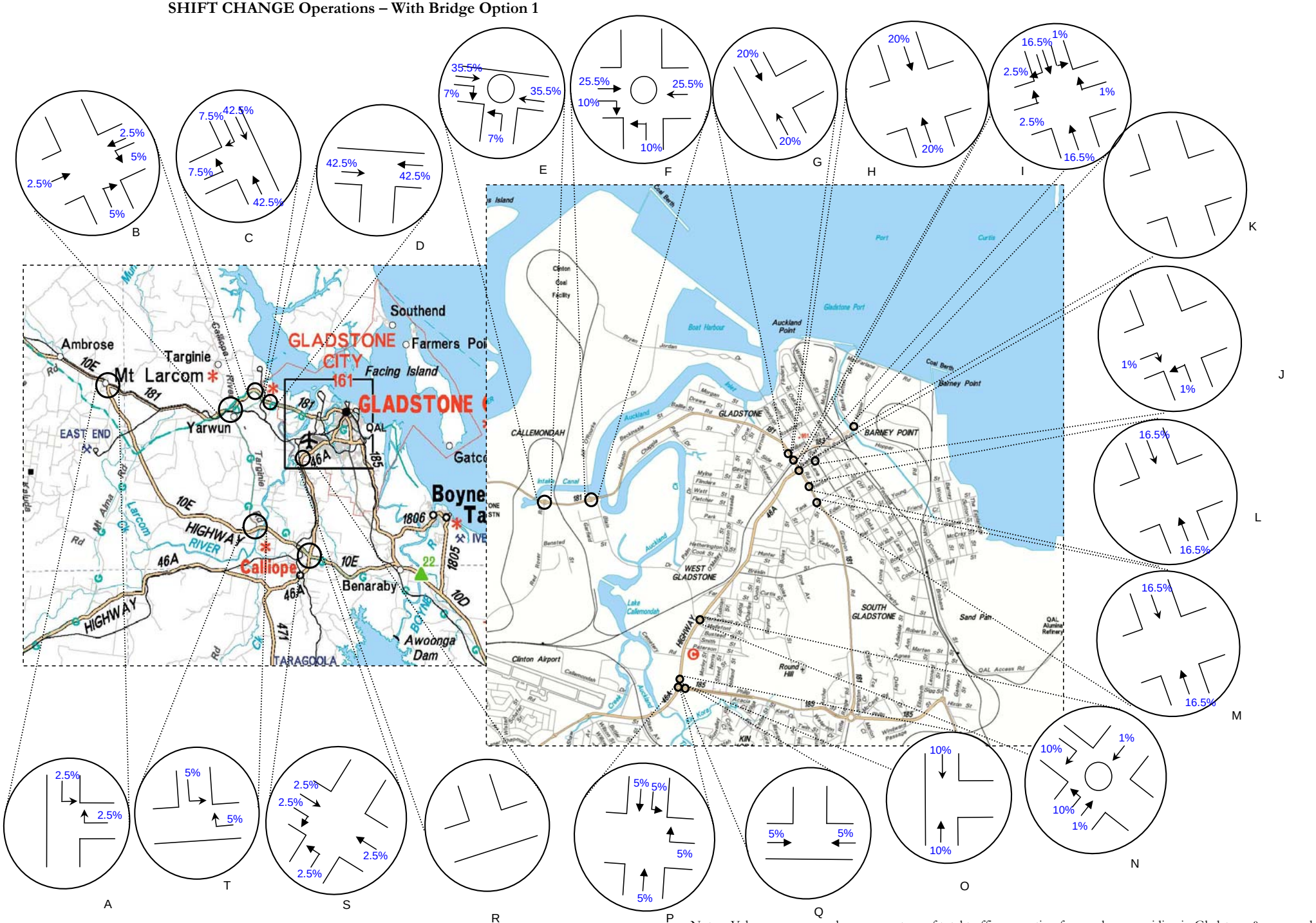
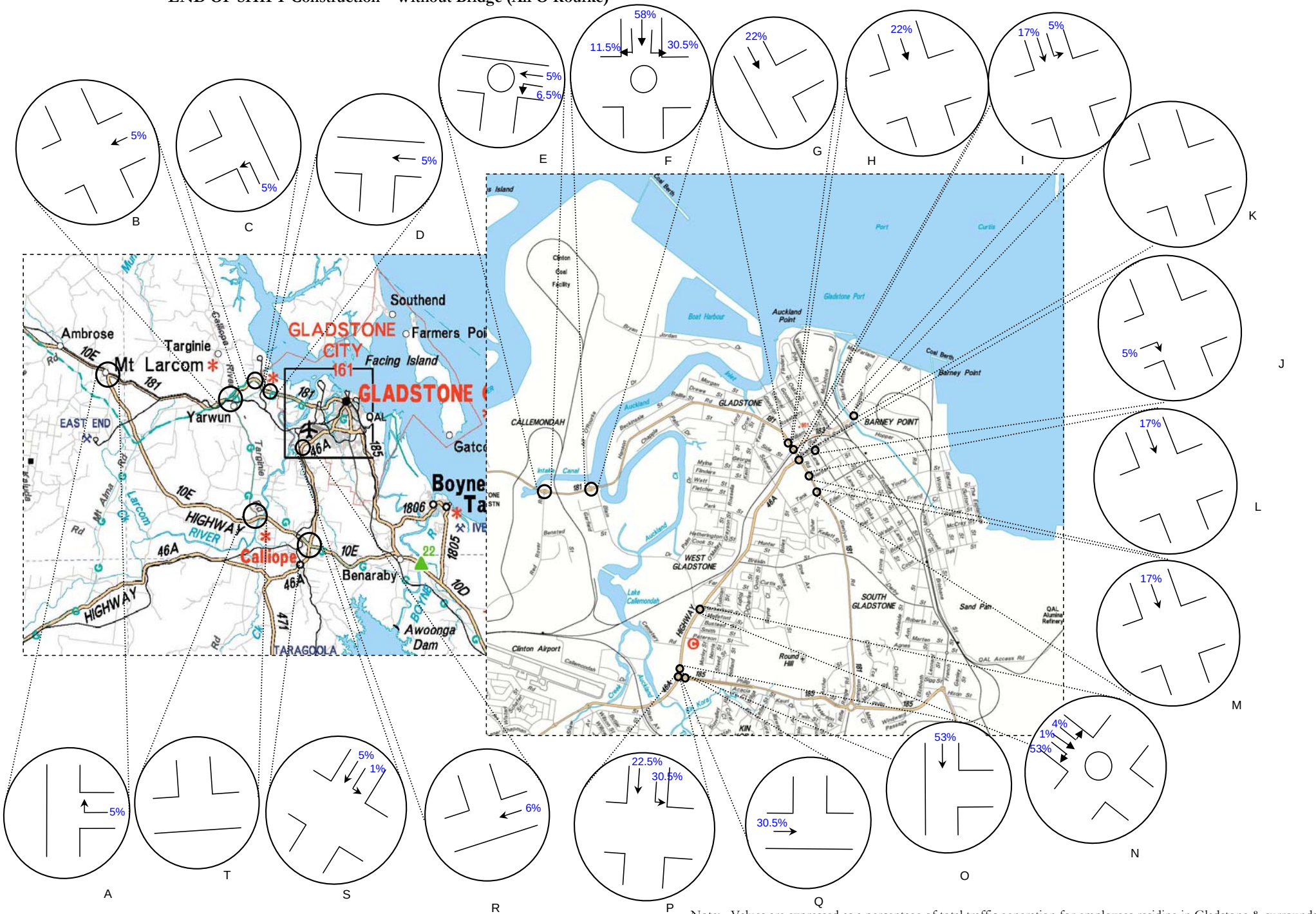


Figure 4-11: **Traffic Distribution (Employee's residing in Gladstone and surrounds)**
SHIFT CHANGE Operations – With Bridge Option 1



Note: Values are expressed as a percentage of total traffic generation for employees residing in Gladstone & surrounds.
AM Peak construction traffic is taken to be the inbound direction, multiplied by 2.
PM Peak construction traffic is taken to be the outbound direction, multiplied by 2.

Figure 4-12 **Traffic Distribution (Employee's residing in Gladstone and surrounds)**
END OF SHIFT Construction – Without Bridge (Alf O'Rourke)



Note: Values are expressed as a percentage of total traffic generation for employees residing in Gladstone & surrounds.
AM Peak construction traffic is taken to be the inbound direction, multiplied by 2.
PM Peak construction traffic is taken to be the outbound direction, multiplied by 2.

5 Future Traffic Volumes

5.1 Background Traffic Growth

AADT segment reports were supplied by DMR for the major roads and highways in the vicinity of the study area. Analysis of the historical traffic data indicated that the following growth rates were observed over the period between 1997 and 2007:

Rural Roads

- Bruce Highway – 4%
- Gladstone-Mt Larcom Road – 6%
- Dawson Highway – 5%

Urban Roads

- Gladstone-Mt Larcom Road – 3%
- Dawson Highway – 2%

Based on the information presented above, an annual growth of 5% and 3% (compounding) has been adopted for rural and urban roads, respectively.

AADT segment reports and the associated growth calculations are included in Appendix D.

5.2 Traffic Assessment Scenarios

Given the project staging (see Section 4.2), road bridge options (see Section 4.3.1 and 4.3.2) and construction camp options (see Section 4.4.1), the traffic assessment scenarios indicated in Table 5-1 apply.

Table 5-1 Traffic Assessment Scenarios

Scenario / Year	No Dev	Construction			Operation			Road Option	Camp Option
		Train 1	Train 2	Train 3	Train 1	Train 2	Train 3		
Scenario 1 / 2008	✓							N/A	N/A
Scenario 2 / 2010	✓							N/A	N/A
Scenario 3a / 2010		✓	✓					N/A	A
Scenario 3b / 2010		✓	✓					N/A	B
Scenario 3c / 2010		✓	✓					N/A	C
Scenario 3d / 2010		✓	✓					N/A	D
Scenario 4 / 2013	✓							N/A	N/A
Scenario 5a / 2013			✓		✓			1	A
Scenario 5b / 2013			✓		✓			1	B
Scenario 5c / 2013			✓		✓			1	C
Scenario 5d / 2013			✓		✓			1	D

Scenario / Year	No Dev	Construction			Operation			Road Option	Camp Option
		Train 1	Train 2	Train 3	Train 1	Train 2	Train 3		
Scenario 6a / 2013			✓		✓			2	A
Scenario 6b / 2013			✓		✓			2	B
Scenario 6c / 2013			✓		✓			2	C
Scenario 6d / 2013			✓		✓			2	D
Scenario 7a / 2013			✓		✓			No Bridge	A
Scenario 7b / 2013			✓		✓			No Bridge	B
Scenario 7c / 2013			✓		✓			No Bridge	C
Scenario 7d / 2013			✓		✓			No Bridge	D
Scenario 8 / 2014	✓							N/A	N/A
Scenario 9 / 2014					✓	✓		1	N/A
Scenario 10 / 2014					✓	✓		2	N/A
Scenario 11 / 2014					✓	✓		No Bridge	N/A
Scenario 12 / 2018	✓							N/A	N/A
Scenario 13a / 2018				✓	✓	✓		1	A
Scenario 13b / 2018				✓	✓	✓		1	B
Scenario 13c / 2018				✓	✓	✓		1	C
Scenario 13d / 2018				✓	✓	✓		1	D
Scenario 14a / 2018				✓	✓	✓		2	A
Scenario 14b / 2018				✓	✓	✓		2	B
Scenario 14c / 2018				✓	✓	✓		2	C
Scenario 14d / 2018				✓	✓	✓		2	D
Scenario 15a / 2018				✓	✓	✓		No Bridge	A
Scenario 15b / 2018				✓	✓	✓		No Bridge	B
Scenario 15c / 2018				✓	✓	✓		No Bridge	C
Scenario 15d / 2018				✓	✓	✓		No Bridge	D
Scenario 16 / 2021	✓							N/A	N/A
Scenario 17 / 2021					✓	✓	✓	1	N/A
Scenario 18 / 2021					✓	✓	✓	2	N/A
Scenario 19 / 2021					✓	✓	✓	No Bridge	N/A
Scenario 20 / 2031	✓							N/A	N/A
Scenario 21 / 2031					✓	✓	✓	1	N/A
Scenario 22 / 2031					✓	✓	✓	2	N/A
Scenario 23 / 2031					✓	✓	✓	No Bridge	N/A

5.3 Traffic Volumes – State-Controlled Network

The growth rates discussed in Section 5.1 have been applied as a compounding annual growth to the existing traffic volumes provided in Table 3-1. Table 5-2 is a summary of future link volumes for each of the design years identified in Table 5-1.

Table 5-2 Future Link Volumes

Description	2010	2013	2014	2018	2021	2031
Bruce Highway (from south to north)						
Gladstone-Benaraby Road intersection to 500 m south of Dawson Highway	5,190	5,915	6,180	7,355	8,380	12,950
500 m south of Dawson Highway to 25m North of Calliope River	3,930	4,480	4,680	5,570	6,350	9,810
25m North of Calliope River to Hut Creek (North of Ambrose)	5,755	6,560	6,850	8,155	9,290	14,360
Gladstone-Mt Larcom Road (from east to west)						
Glenlyon Street/Dawson Highway intersection to 200m north of Lord Street	9,460	10,360	10,680	12,065	13,220	17,930
200m north of Lord Street to 50m south of Auckland Creek	6,630	7,265	7,490	8,460	9,270	12,570
50m south of Auckland Creek to 500m south of Red Rover Road	9,785	10,720	11,055	12,485	13,680	18,550
500m south of Red Rover Road to 1 km north of Calliope River	7,290	8,620	9,115	11,400	13,490	23,605
1 km north of Calliope River to 150m north of Yarwun Road	3,470	4,105	4,340	5,430	6,420	11,240
Dawson Highway (from north to south)						
Glenlyon Street/Gladstone-Mt Larcom Road to 150m south of Park Street	13,445	14,220	14,490	16,620	16,525	19,940
150m south of Park Street to 250m west of Breslin Street	20,335	21,510	21,920	23,630	25,000	30,155
250m west of Breslin Street to 250m north of Paterson Street	25,715	27,205	27,720	29,880	31,610	38,135

Description	2010	2013	2014	2018	2021	2031
250m north of Paterson Street to Police Creek (Auckland Creek)	30,270	32,025	32,630	35,175	37,210	44,890
Police Creek (Auckland Creek) to West of Penda Avenue	23,360	24,710	25,180	27,140	28,710	34,640
West of Penda Avenue to 450m west of Chapman Drive	7,080	8,3050	8,760	10,840	12,720	21,675
450m west of Chapman Drive to 250m west of Chamberlain Road	5,620	6,590	6,950	8,600	10,095	17,200
250m west of Chamberlain Road to 200m east of Drynan Drive	6,230	7,310	7,710	9,540	11,190	19,070

5.4 Traffic Volumes – Council Controlled Network

Future traffic volumes on the Council-controlled network have been calculated and are included in Appendix E. These volumes were determined through the application of the growth rates specified in Section 5.1.

6 Link Analysis

6.1 Overview

The impact analysis presented in this section is based upon the principles defined within the *Guidelines for Assessment of Road Impacts of Development* (GARID) (DMR, 2006). In particular, the following reference holds the general directive as to the assessment pf impacts being triggered:

"In general, Main Roads considers a development's road impacts to be insignificant if the development generates an increase in traffic on State-controlled roads (SCR) of no more than 5% of existing levels… Traffic operation impacts need to be considered for any section of a SCR where the construction or operational traffic generated by the development equals or exceeds 5% of the existing AADT on the road section, intersection movements or turning movements"

The following sections will therefore express the increase in development traffic as a proportion of existing traffic to observe whether the triggers of GARID are met.

As discussed in Section 2, link analysis will be conducted for the following links and sections:

- Bruce Highway – from Gladstone-Mt Larcom Road to the Dawson Highway;
- Gladstone-Mt Larcom Road – from Bruce Highway to Dawson Highway; and
- Dawson Highway – from Bruce Highway to Glenlyon Road (Glenlyon Gladstone-Mt Larcom Road).

6.2 Impact Identification

The results of the impact analysis are presented in Table 6-1 to Table 6-4. The percentage value represents the increase in traffic over the whole day and is an assessment of the "without shuttle bus" scenario. This is the critical condition in terms of the number of vehicles added onto the road network.

The results show that the greatest impacts are expected during the Project's construction periods. During the operational phases, increases are less than 5% and therefore indicate that impacts are likely to be insignificant.

Capacity analysis (see Section 6.3 to 6.6) has been undertaken for all affected sections which are marked in orange.

Table 6-1 Link Impact Identification (Construction Camp Option A)

Link	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Highway													
North of Gladstone-Mt Larcom Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road to Calliope River-Targinie Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Calliope River-Targinie Road to Dawson Highway	5%	9%	9%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
South of Dawson Highway	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road / Glenlyon Street													
Bruce Highway to Calliope River-Targinie Road	13%	14%	14%	14%	<5%	<5%	<5%	7%	7%	7%	<5%	<5%	<5%
Calliope River-Targinie Road to Landing Road	8%	14%	22%	9%	<5%	<5%	<5%	8%	14%	<5%	<5%	<5%	<5%
Landing Road to Reid Road	9%	33%	33%	9%	<5%	<5%	<5%	22%	22%	<5%	<5%	<5%	<5%
Reid Road to Red Rover Road	<5%	19%	19%	<5%	<5%	<5%	<5%	12%	12%	<5%	<5%	<5%	<5%
Red Rover Road to Blain Drive	<5%	12%	12%	<5%	<5%	<5%	<5%	7%	7%	<5%	<5%	<5%	<5%
Blain Drive to Dawson Highway	16%	8%	8%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Highway													
Bruce Highway to Don Young Drive	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Don Young Drive to Phillip Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Phillip Street to Blain Drive	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Blain Drive to Glenlyon Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

Table 6-2 Link Impact Identification (Construction Camp Option B)

Link	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Highway													
North of Gladstone-Mt Larcom Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road to Calliope River-Targinie Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Calliope River-Targinie Road to Dawson Highway	9%	12%	12%	9%	<5%	<5%	<5%	7%	7%	<5%	<5%	<5%	<5%
South of Dawson Highway	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road / Glenlyon Street													
Bruce Highway to Calliope River-Targinie Road	<5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Calliope River-Targinie Road to Landing Road	<5%	10%	19%	<5%	<5%	<5%	<5%	6%	11%	<5%	<5%	<5%	<5%
Landing Road to Reid Road	<5%	31%	31%	<5%	<5%	<5%	<5%	20%	20%	<5%	<5%	<5%	<5%
Reid Road to Red Rover Road	<5%	18%	18%	<5%	<5%	<5%	<5%	11%	11%	<5%	<5%	<5%	<5%
Red Rover Road to Blain Drive	<5%	11%	11%	<5%	<5%	<5%	<5%	6%	6%	<5%	<5%	<5%	<5%
Blain Drive to Dawson Highway	16%	8%	8%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Highway													
Bruce Highway to Don Young Drive	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Don Young Drive to Phillip Street	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Phillip Street to Blain Drive	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Blain Drive to Glenlyon Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

Table 6-3 Link Impact Identification (Construction Camp Option C)

Link	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Highway													
North of Gladstone-Mt Larcom Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road to Calliope River-Targinie Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Calliope River-Targinie Road to Dawson Highway	<5%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
South of Dawson Highway	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road / Glenlyon Street													
Bruce Highway to Calliope River-Targinie Road	5%	6%	6%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Calliope River-Targinie Road to Landing Road	5%	12%	26%	5%	<5%	<5%	<5%	7%	15%	<5%	<5%	<5%	<5%
Landing Road to Reid Road	5%	26%	26%	5%	<5%	<5%	<5%	17%	17%	<5%	<5%	<5%	<5%
Reid Road to Red Rover Road	<5%	14%	14%	<5%	<5%	<5%	<5%	9%	9%	<5%	<5%	<5%	<5%
Red Rover Road to Blain Drive	<5%	9%	9%	<5%	<5%	<5%	<5%	5%	5%	<5%	<5%	<5%	<5%
Blain Drive to Dawson Highway	13%	6%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Highway													
Bruce Highway to Don Young Drive	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Don Young Drive to Phillip Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Phillip Street to Blain Drive	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Blain Drive to Glenlyon Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

Table 6-4 Link Impact Identification (Construction Camp Option D)

Link	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Highway													
North of Gladstone-Mt Larcom Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road to Calliope River-Targinie Road	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Calliope River-Targinie Road to Dawson Highway	<5%	7%	7%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
South of Dawson Highway	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone-Mt Larcom Road / Glenlyon Street													
Bruce Highway to Calliope River-Targinie Road	6%	8%	8%	7%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Calliope River-Targinie Road to Landing Road	6%	15%	36%	7%	<5%	<5%	<5%	8%	22%	<5%	<5%	<5%	<5%
Landing Road to Reid Road	6%	36%	36%	7%	<5%	<5%	<5%	23%	23%	<5%	<5%	<5%	<5%
Reid Road to Red Rover Road	<5%	21%	21%	<5%	<5%	<5%	<5%	13%	13%	<5%	<5%	<5%	<5%
Red Rover Road to Blain Drive	<5%	13%	13%	<5%	<5%	<5%	<5%	8%	8%	<5%	<5%	<5%	<5%
Blain Drive to Dawson Highway	20%	10%	10%	6%	<5%	<5%	<5%	6%	6%	<5%	<5%	<5%	<5%
Dawson Highway													
Bruce Highway to Don Young Drive	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Don Young Drive to Phillip Street	6%	<5%	<5%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Phillip Street to Blain Drive	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Blain Drive to Glenlyon Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

6.3 Link Capacities

The Austroads *Guide to Traffic Engineering Practice – Part 2 Roadway Capacity* specifies various link capacity formulae for varying road types. These formulae have been used to calculate hourly link capacities, which have then been translated to daily link capacities through the assumption that the peak hours normally comprise of 15%[2] of daily traffic. The hourly capacity can therefore be converted to equivalent daily capacities by dividing the hourly capacity by 15%. It should be noted that the theoretical daily capacity will be much larger than the capacities quoted below. However, taking into consideration the daily traffic flow profiles and the fact that roads are not fully utilised over a full 24-hour period, it is considered that the capacities presented in Table 6-5 are reasonable conservative representations of daily link capacity.

The following assumptions were made with respect to calculating appropriate hourly capacities:

- Capacity is reached when the road section reaches a level of service D;
- Terrain is predominantly level for all assessable roads;
- Directional distribution is 60/40 during peak hours;
- Road widths are at least 3.3m/lane with 1m usable shoulders;
- Heavy vehicle composition is assumed to be 20% and 5% for rural and urban road sections, respectively; and
- Users of the road are predominantly commuters or any other regular users.

Table 6-5 Adopted Link Capacities

Road Type	Hourly 2 – Way Capacity (PCU*/hour)	Daily 2 Way Capacity (PCU*/day)
Uninterrupted 2 lane 2 way roads – Rural	1,060**	7,070**
Uninterrupted, undivided 4 lane 2 way roads - Rural	1,810	12,070
Uninterrupted, divided 4 lane 2 way roads - Rural	1,910	12,730
Interrupted, undivided 4 lane 2 way arterials – Urban	3,000	20,000
Interrupted, divided 4 lane 2 way arterials – Urban	3,800	25,330

* PCU – Passenger Car Equivalent

** This assumes no overtaking lanes, which is the critical operating condition.

[2] 15% is taken from *Road Planning and Design Manual – Chapter 13 Intersections at Grade* (DMR, 2006, page 13-40)

6.4 Bruce Highway

The only impacted section along the Bruce Highway within the study area is for the section between Calliope River-Targinie Road and the Dawson Highway. This section is currently an uninterrupted two lane two way rural road with a daily capacity of 7,070 passenger car equivalents (PCUs) per day (see Table 6-5).

Future year volumes for the road section are presented in Table 6-6. As can be seen in the results, all two way daily volumes are less than the capacity of the current roadway form. Therefore upgrade works are not required.

Table 6-6 Required Link Configuration – Bruce Highway (No shuttle bus)

Scenario	Future Year 2 Way Volume (veh/day)	Required Link Configuration
Calliope River-Targinie Road to Dawson Highway		
Scenario 2 (Without Dev)	3,995	No change from existing
Scenario 3a	4,180	No change from existing
Scenario 3b	4,355	No change from existing
Scenario 4 (Without Dev)	4,620	No change from existing
Scenario 5a	4,960	No change from existing
Scenario 5b	5,100	No change from existing
Scenario 5c	4,815	No change from existing
Scenario 5d	4,890	No change from existing
Scenario 6a	4,960	No change from existing
Scenario 6b	5,100	No change from existing
Scenario 6c	4,815	No change from existing
Scenario 6d	4,890	No change from existing
Scenario 7b	4,970	No change from existing

Note: No shuttle bus refers to airport shuttle as discussed in Section 4.3.

6.5 Gladstone-Mt Larcom Road

As indicated in Section 6.2, all sections of Gladstone-Mt Larcom Road experience development generated increases of equal to or more 5% of existing daily traffic. Required link configurations for each of the impacted future design years are provided in Table 6-7 and Table 6-8 for the "with" and "without" shuttle bus scenarios, respectively.

Gladstone-Mt Larcom Road is an uninterrupted two lane two way rural road from the Bruce Highway through to Gibson Street, which is the intersection to the north of Blain Drive. North of Gibson Street it widens to a divided four lane urban arterial road with interrupted flow. Daily link capacities are 7,070 PCUs per day for the rural section and 25,330 PCUs per day for the urban section.

The results presented in Table 6-7 show that upgrades are required for the Gladstone-Mt Larcom Road section between Reid Road to Blain Drive. For the condition without the proposed development, the following link configurations are required:

Reid Road to Red Rover Road

- 2013 - Undivided 4 lane 2 way road - Rural
- 2018 - Undivided 4 lane 2 way road - Rural

Red Rover Road to Blain Drive

- 2013 - Undivided 4 lane 2 way road - Rural
- 2018 - Divided 4 lane 2 way road - Rural

As per the future road network upgrades discussed in Section 3.5, these sections have already been earmarked for improvements. These two sections form part of the works required under Stage 1 of the Hanson Road duplication.

The link configurations required for the "with development" scenarios are as follows:

Reid Road to Red Rover Road

- 2013 - Undivided 4 lane 2 way road - Rural
- 2018 - Undivided 4 lane 2 way road - Rural

Red Rover Road to Blain Drive

- 2013 - Undivided 4 lane 2 way road - Rural
- 2018 - Undivided 4 lane 2 way arterial road - Urban

Providing an airport shuttle bus does not affect the required road configuration.

A comparison of the "with" and "without" development scenarios shows that the development does not trigger additional works for the Reid Road to Red Rover Road section. For the Red Rover Road to Blain Drive section, additional works are not triggered under the 2013 design year but are triggered for the 2018 design year. As a result of the proposed development, Gladstone-Mt Larcom Road between Red Rover Road and Blain Drive should be upgraded from a rural divided four lane two way road to an urban undivided four lane two way arterial road.

Table 6-7 Required Link Configuration – Gladstone-Mt Larcom Road (No shuttle bus)

Scenario	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration
	Bruce Highway to Calliope River-Targinie Road		Calliope River-Targinie Road to Landing Road		Landing Road to Reid Road		Reid Road to Red Rover Road		Red Rover Road to Blain Drive		Blain Drive to Dawson Highway	
Scenario 2 (Without Dev)	3,400	No change from existing	3,400	No change from existing	3,400	No change from existing	7,130	No change from existing	9,760	Undivided 4 lane2 way road - Rural	7,780	No change from existing
Scenario 3a	3,845	No change from existing	3,655	No change from existing	3,675	No change from existing	-	-	-	-	9,130	No change from existing
Scenario 3b	-	-	-	-	-	-	-	-	-	-	9,135	No change from existing
Scenario 3c	3,560	No change from existing	3,560	No change from existing	3,560	No change from existing	-	-	-	-	8,860	No change from existing
Scenario 3d	3,600	No change from existing	3,600	No change from existing	3,600	No change from existing	-	-	-	-	9,520	No change from existing
Scenario 4 (Without Dev)	3,930	No change from existing	3,930	No change from existing	3,930	No change from existing	8,260	Undivided 4 lane2 way road - Rural	10,660	Undivided 4 lane2 way road - Rural	8,500	No change from existing
Scenario 5a	4,400	No change from existing	4,395	No change from existing	5,405	No change from existing	9,730	Undivided 4 lane2 way road - Rural	11,880	Undivided 4 lane2 way road - Rural	9,155	No change from existing
Scenario 5b	4,095	No change from existing	4,255	No change from existing	5,265	No change from existing	9,590	Undivided 4 lane2 way road - Rural	11,775	Undivided 4 lane2 way road - Rural	9,130	No change from existing
Scenario 5c	4,135	No change from existing	4,325	No change from existing	4,945	No change from existing	9,270	Undivided 4 lane2 way road - Rural	11,515	Undivided 4 lane2 way road - Rural	8,980	No change from existing
Scenario 5d	4,180	No change from existing	4,445	No change from existing	5,560	No change from existing	9,885	Undivided 4 lane2 way road - Rural	12,025	Undivided 4 lane2 way road - Rural	9,270	No change from existing
Scenario 6a	4,400	No change from existing	4,755	No change from existing	5,405	No change from existing	9,730	Undivided 4 lane2 way road - Rural	11,880	Undivided 4 lane2 way road - Rural	9,155	No change from existing
Scenario 6b	-	-	4,615	No change from existing	5,265	No change from existing	9,590	Undivided 4 lane2 way road - Rural	11,775	Undivided 4 lane2 way road - Rural	9,130	No change from existing
Scenario 6c	4,135	No change from existing	4,950	No change from existing	4,950	No change from existing	9,270	Undivided 4 lane2 way road - Rural	11,515	Undivided 4 lane2 way road - Rural	8,980	No change from existing
Scenario 6d	4,155	No change from existing	4,155	No change from existing	4,155	No change from existing	9,885	Undivided 4 lane2 way road - Rural	12,025	Undivided 4 lane2 way road - Rural	9,270	No change from existing
Scenario 7a	4,400	No change from existing	4,210	No change from existing	4,230	No change from existing	-	-	-	-	-	-
Scenario 7c	4,100	No change from existing	4,100	No change from existing	4,100	No change from existing	-	-	-	-	-	-
Scenario 7d	4,155	No change from existing	4,155	No change from existing	4,155	No change from existing	-	-	-	-	8,930	-
Scenario 12 (Without Dev)	5,020	No change from existing	5,020	No change from existing	5,020	No change from existing	10,540	Undivided 4 lane2 way road - Rural	12,360	Divided 4 lane 2 way roads - Rural	9,850	No change from existing
Scenario 13a	5,255	No change from existing	5,260	No change from existing	5,830	No change from existing	11,350	Undivided 4 lane2 way road - Rural	13,030	Undivided 4 lane 2 way arterial urban	-	-

Scenario	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration
	Bruce Highway to Calliope River-Targinie Road		Calliope River-Targinie Road to Landing Road		Landing Road to Reid Road		Reid Road to Red Rover Road		Red Rover Road to Blain Drive		Blain Drive to Dawson Highway	
Scenario 13b	-	-	5,190	No change from existing	5,760	No change from existing	11,280	Undivided 4 lane2 way road - Rural	12,980	Undivided 4 lane 2 way arterial urban	-	-
Scenario 13c	-	-	5,230	No change from existing	5,600	No change from existing	11,120	Undivided 4 lane2 way road - Rural	12,850	Undivided 4 lane 2 way arterial urban	-	-
Scenario 13d	-	-	5,290	No change from existing	5,905	No change from existing	11,425	Undivided 4 lane2 way road - Rural	13,105	Undivided 4 lane 2 way arterial urban	10,270	No change from existing
Scenario 14a	5,255	No change from existing	5,485	No change from existing	5,830	No change from existing	11,350	Undivided 4 lane2 way road - Rural	13,030	Undivided 4 lane 2 way arterial urban	-	-
Scenario 14b	-	-	5,395	No change from existing	5,760	No change from existing	11,280	Undivided 4 lane2 way road - Rural	12,980	Undivided 4 lane 2 way arterial urban	-	-
Scenario 14c	-	-	5,550	No change from existing	5,600	No change from existing	11,120	Undivided 4 lane2 way road - Rural	12,850	Undivided 4 lane 2 way arterial urban	-	-
Scenario 14d	-	-	5,855	No change from existing	5,905	No change from existing	11,425	Undivided 4 lane2 way road - Rural	13,105	Undivided 4 lane 2 way arterial urban	10,270	No change from existing
Scenario 15a	5,255	No change from existing	-	-	-	-	-	-	-	-	-	-

Note: No shuttle bus refers to airport shuttle as discussed in Section 4.3.

Table 6-8 Required Link Configuration – Gladstone-Mt Larcom Road (With shuttle bus)

Scenario	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration
	Bruce Highway to Calliope River-Targinie Road		Calliope River-Targinie Road to Landing Road		Landing Road to Reid Road		Reid Road to Red Rover Road		Red Rover Road to Blain Drive		Blain Drive to Dawson Highway	
Scenario 2 (Without Dev)	-	-	-	-	-	-	-	-	9,760	Undivided 4 lane2 way road - Rural	-	-
Scenario 3a	-	-	-	-	-	-	-	-	-	-	-	-
Scenario 3b	-	-	-	-	-	-	-	-	-	-	-	-
Scenario 3c	-	-	-	-	-	-	-	-	-	-	-	-
Scenario 3d	-	-	-	-	-	-	-	-	-	-	-	-
Scenario 4 (Without Dev)	-	-	-	-	-	-	8,260	Undivided 4 lane2 way road - Rural	10,660	Undivided 4 lane2 way road - Rural	-	-
Scenario 5a	-	-	-	-	-	-	9,625	Undivided 4 lane2 way road - Rural	11,805	Undivided 4 lane2 way road - Rural	-	-
Scenario 5b	-	-	-	-	-	-	9,590	Undivided 4 lane2 way road - Rural	11,775	Undivided 4 lane2 way road - Rural	-	-
Scenario 5c	-	-	-	-	-	-	9,160	Undivided 4 lane2 way road - Rural	11,435	Undivided 4 lane2 way road - Rural	-	-

Scenario	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration	Future Year 2 Way Volume (veh/day)	Required Link Configuration
	Bruce Highway to Calliope River-Targinie Road		Calliope River-Targinie Road to Landing Road		Landing Road to Reid Road		Reid Road to Red Rover Road		Red Rover Road to Blain Drive		Blain Drive to Dawson Highway	
Scenario 5d	-	-	-	-	-	-	9,765	Undivided 4 lane2 way road - Rural	11,940	Undivided 4 lane2 way road - Rural	-	-
Scenario 6a	-	-	-	-	-	-	9,625	Undivided 4 lane2 way road - Rural	11,805	Undivided 4 lane2 way road - Rural	-	-
Scenario 6b	-	-	-	-	-	-	9,590	Undivided 4 lane2 way road - Rural	11,775	Undivided 4 lane2 way road - Rural	-	-
Scenario 6c	-	-	-	-	-	-	9,160	Undivided 4 lane2 way road - Rural	11,435	Undivided 4 lane2 way road - Rural	-	-
Scenario 6d	-	-	-	-	-	-	9,765	Undivided 4 lane2 way road - Rural	11,940	Undivided 4 lane2 way road - Rural	-	-
Scenario 7a	-	-	-	-	-	-	-	-	-	-	-	-
Scenario 7c	-	-	-	-	-	-	-	-	-	-	-	-
Scenario 7d	-	-	-	-	-	-	-	-	-	-	-	-
Scenario 12 (Without Dev)	-	-	-	-	-	-	10,540	Undivided 4 lane2 way road - Rural	12,360	Divided 4 lane 2 way roads - Rural	-	-
Scenario 13a	-	-	-	-	-	-	11,295	Undivided 4 lane2 way road - Rural	12,995	Undivided 4 lane 2 way arterial urban	-	-
Scenario 13b	-	-	-	-	-	-	11,280	Undivided 4 lane2 way road - Rural	12,980	Undivided 4 lane 2 way arterial urban	-	-
Scenario 13c	-	-	-	-	-	-	11,060	Undivided 4 lane2 way road - Rural	12,810	Undivided 4 lane 2 way arterial urban	-	-
Scenario 13d	-	-	-	-	-	-	11,365	Undivided 4 lane2 way road - Rural	13,065	Undivided 4 lane 2 way arterial urban	-	-
Scenario 14a	-	-	-	-	-	-	11,295	Undivided 4 lane2 way road - Rural	12,995	Undivided 4 lane 2 way arterial urban	-	-
Scenario 14b	-	-	-	-	-	-	11,280	Undivided 4 lane2 way road - Rural	12,980	Undivided 4 lane 2 way arterial urban	-	-
Scenario 14c	-	-	-	-	-	-	11,060	Undivided 4 lane2 way road - Rural	12,810	Undivided 4 lane 2 way arterial urban	-	-
Scenario 14d	-	-	-	-	-	-	11,365	Undivided 4 lane2 way road - Rural	13,065	Undivided 4 lane 2 way arterial urban	-	-
Scenario 15a	-	-	-	-	-	-	-	-	-	-	-	-

Note: With shuttle bus refers to airport shuttle as discussed in Section 4.3.

6.6 Dawson Highway

Two sections of the Dawson Highway are potentially impacted, these are:

- Bruce Highway to Don Young Drive; and
- Don Young Drive to Phillip Street.

The Bruce Highway to Don Young Drive section is an uninterrupted two lane two way rural road. As per Section 6.3, the daily capacity of the road section is 7,070 PCUs per day. Given the future year volumes presented in Table 6-9, upgrade works are not required.

The Don Young Drive to Phillip Street section is a two lane two way uninterrupted road south of Chapman Drive, which then widens to a four lane two way rural divided road all the way through to Phillip Street. Daily capacities for these road sections are 7,070 and 12,730 PCUs per day. Given the future year volumes presented in Table 6-9, upgrade works are also not required.

Table 6-9 Required Link Configuration – Dawson Highway (No shuttle bus)

Scenario	Future Year 2 Way Volume (veh/day)	Required Link Configuration
Bruce Highway to Don Young Drive		
Scenario 2 (Without Dev)	5,680	No change from existing
Scenario 3b	6,000	No change from existing
Scenario 3d	5,980	No change from existing
Don Young Drive to Phillip Street		
Scenario 2 (Without Dev)	5,850	No change from existing
Scenario 3b	6,155	No change from existing
Scenario 3d	6,150	No change from existing
Scenario 7d	6,470 (south of Chapman Dr)	No change from existing
	7,085 (between Phillip St and Chapman Dr)	No change from existing

Note: No shuttle bus refers to airport shuttle as discussed in Section 4.3.

7 Intersection Analysis

7.1 Overview

The impact analysis presented in this section follows a similar premise to that discussed in Section 6.1. SIDRA analyses have been undertaken for all locations where development generated traffic increases anticipated volumes by equal to or more than 5% of any intersection movement. The assessment considers each of the traffic scenarios (Table 5-1) at each of the following intersections:

- Bruce Highway / Dawson Highway;
- Bruce Highway / Calliope River-Targinie Road;
- Bruce Highway / Gladstone-Mt Larcom Road;
- Gladstone-Mt Larcom Road / Calliope River-Targinie Road;
- Gladstone-Mt Larcom Road / Landing Road;
- Hanson Road / Reid Road;
- Hanson Road / Red Rover Road;
- Hanson Road / Blain Drive / Alf O'Rourke Drive;
- Glenlyon Street / William Street;
- Glenlyon Street) / Gladstone Port Access Road / Railway Street;
- Glenlyon Street / Dawson Highway / Bramston Street;
- Glenlyon Street / Herbert Street / Tennis Centre Access;
- Glenlyon Street / Tank Street;
- Bramston Street / Goondoon Street;
- Port Access Rd / Mark Fenton Dr / Hopper Road / Tug Berth Access Road;
- Dawson Highway / Blain Drive / Herbertson Street;
- Dawson Highway / Philip Street / Shopping Centre Access; and
- Dawson Highway / Don Young Drive.

7.2 Impact Identification

The results of the impact analyses are presented in Table 7-1 to Table 7-4. The percentage value represents the increase in traffic over the whole day, and is the greatest increase for any movement (i.e. the percentage increases are not the total traffic increase for the whole intersection). This is to allow for the assessment of impacts as per Section 7.1 above. The assessment is also based on a "without shuttle bus" scenario as this is the critical condition in terms of number of vehicles added onto the road network.

SIDRA analysis (see Section 7.3 to 7.19) has been undertaken for all affected intersections which are marked in orange.

Table 7-1 Intersection Impact Identification (Construction Camp Option A)

Intersection	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Hwy/Dawson Hwy	13%	20%	20%	13%	<5%	<5%	<5%	12%	12%	7%	<5%	<5%	<5%
Bruce Hwy/Calliope River-Targinie Rd	45%	55%	55%	45%	6%	6%	<5%	39%	39%	29%	7%	7%	<5%
Bruce Hwy/Gladstone Mt Larcom Rd	11%	12%	10%	11%	<5%	<5%	<5%	6%	5%	6%	<5%	<5%	<5%
Gladstone Mt Larcom Rd/Calliope River-Targinie Rd	62%	62%	92%	62%	<5%	47%	<5%	45%	85%	45%	<5%	53%	<5%
Gladstone Mt Larcom Rd/Landing Rd	9%	74%	25%	10%	16%	<5%	<5%	61%	18%	5%	20%	<5%	<5%
Hanson Rd/Reid Rd	<5%	20%	20%	<5%	<5%	<5%	<5%	12%	12%	<5%	<5%	<5%	<5%
Hanson Rd/Red Rover Rd	<5%	17%	17%	11%	<5%	<5%	<5%	10%	10%	6%	<5%	<5%	<5%
Hanson Rd/Blain Dr/Alf O'Rourke Dr	<5%	11%	11%	65%	<5%	<5%	13%	7%	7%	51%	<5%	<5%	17%
Glenlyon St/William Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Port Access Rd/Railway St	79%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Hanson Rd/Dawson Rd/Bramston St	12%	5%	5%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Herbert St/Tennis Centre Access	5%	5%	4%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Tank St	6%	6%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Bramston St/Goondoon St	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Port Access Rd/Mark Fenton Dr/Hopper Rd/Tug Berth Access Rd	88%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Hwy/Blain Dr/Herbertson St	10%	10%	10%	13%	<5%	<5%	<5%	5%	5%	7%	<5%	<5%	<5%
Dawson Hwy/Philip St/Shopping Centre Access	<5%	<5%	<5%	9%	<5%	<5%	<5%	<5%	<5%	5%	<5%	<5%	<5%
Dawson Hwy/Don Young Dr	5%	6%	6%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

*Note: Impacts presented in this table are based on daily figures

Table 7-2 Intersection Impact Identification (Construction Camp Option B)

Intersection	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Hwy/Dawson Hwy	26%	22%	22%	25%	<5%	<5%	<5%	13%	13%	14%	<5%	<5%	<5%
Bruce Hwy/Calliope River-Targinie Rd	66%	66%	66%	61%	6%	6%	<5%	50%	49%	44%	7%	7%	<5%
Bruce Hwy/Gladstone Mt Larcom Rd	10%	8%	7%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Gladstone Mt Larcom Rd/Calliope River-Targinie Rd	34%	42%	91%	34%	<5%	47%	<5%	26%	84%	21%	<5%	53%	<5%
Gladstone Mt Larcom Rd/Landing Rd	<5%	74%	25%	<5%	16%	<5%	<5%	61%	14%	<5%	20%	<5%	<5%
Hanson Rd/Reid Rd	<5%	20%	20%	<5%	<5%	<5%	<5%	12%	12%	<5%	<5%	<5%	<5%
Hanson Rd/Red Rover Rd	<5%	17%	17%	11%	<5%	<5%	<5%	10%	10%	6%	<5%	<5%	<5%
Hanson Rd/Blain Dr/Al O'Rourke Dr	<5%	11%	11%	66%	<5%	<5%	13%	7%	7%	52%	<5%	<5%	17%
Glenlyon St/William Street	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Port Access Rd/Railway St	80%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Hanson Rd/Dawson Rd/Bramston St	12%	5%	5%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Herbert St/Tennis Centre Access	5%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Tank St	6%	6%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Bramston St/Goondoon St	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Port Access Rd/Mark Fenton Dr/Hopper Rd/Tug Berth Access Rd	88%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Hwy/Blain Dr/Herbertson St	<5%	5%	5%	13%	<5%	<5%	<5%	<5%	<5%	8%	<5%	<5%	<5%
Dawson Hwy/Philip St/Shopping Centre Access	<5%	<5%	<5%	9%	<5%	<5%	<5%	<5%	<5%	5%	<5%	<5%	<5%
Dawson Hwy/Don Young Dr	5%	<5%	<5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

*Note: Impacts presented in this table are based on daily figures

Table 7-3 Intersection Impact Identification (Construction Camp Option C)

Intersection	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Hwy/Dawson Hwy	18%	21%	21%	9%	<5%	<5%	<5%	12%	12%	<5%	<5%	<5%	<5%
Bruce Hwy/Calliope River-Targinie Rd	<5%	47%	47%	<5%	6%	6%	<5%	31%	32%	<5%	7%	7%	<5%
Bruce Hwy/Gladstone Mt Larcom Rd	10%	12%	12%	10%	<5%	<5%	<5%	6%	7%	5%	<5%	<5%	<5%
Gladstone Mt Larcom Rd/Calliope River-Targinie Rd	9%	22%	92%	9%	<5%	47%	<5%	12%	85%	<5%	<5%	53%	<5%
Gladstone Mt Larcom Rd/Landing Rd	7%	70%	32%	7%	16%	<5%	<5%	54%	19%	<5%	20%	<5%	<5%
Hanson Rd/Reid Rd	6%	14%	14%	5%	<5%	<5%	<5%	8%	8%	<5%	<5%	<5%	<5%
Hanson Rd/Red Rover Rd	6%	12%	12%	5%	<5%	<5%	<5%	7%	7%	<5%	<5%	<5%	<5%
Hanson Rd/Blain Dr/Al O'Rourke Dr	5%	9%	9%	58%	<5%	<5%	13%	5%	5%	39%	<5%	<5%	17%
Glenlyon St/William Street	<5%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Port Access Rd/Railway St	86%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Hanson Rd/Dawson Rd/Bramston St	19%	6%	6%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Herbert St/Tennis Centre Access	6%	6%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Tank St	8%	7%	7%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Bramston St/Goondoon St	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Port Access Rd/Mark Fenton Dr/Hopper Rd/Tug Berth Access Rd	87%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Hwy/Blain Dr/Herbertson St	7%	10%	10%	12%	<5%	<5%	<5%	5%	6%	6%	<5%	<5%	<5%
Dawson Hwy/Philip St/Shopping Centre Access	6%	<5%	<5%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Hwy/Don Young Dr	6%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

*Note: Impacts presented in this table are based on daily figures

Table 7-4 Intersection Impact Identification (Construction Camp Option D)

Intersection	Scenario												
	3	5	6	7	9	10	11	13	14	15	17	18	19
Bruce Hwy/Dawson Hwy	19%	21%	21%	10%	<5%	<5%	<5%	12%	12%	5%	<5%	<5%	<5%
Bruce Hwy/Calliope River-Targinie Rd	<5%	48%	48%	<5%	6%	6%	<5%	32%	32%	<5%	7%	7%	<5%
Bruce Hwy/Gladstone Mt Larcom Rd	10%	12%	12%	11%	<5%	<5%	<5%	7%	7%	6%	<5%	<5%	<5%
Gladstone Mt Larcom Rd/Calliope River-Targinie Rd	10%	22%	92%	10%	<5%	47%	<5%	13%	85%	6%	<5%	53%	<5%
Gladstone Mt Larcom Rd/Landing Rd	7%	70%	32%	8%	16%	<5%	<5%	55%	19%	<5%	20%	<5%	<5%
Hanson Rd/Reid Rd	6%	20%	20%	6%	<5%	<5%	<5%	12%	12%	<5%	<5%	<5%	<5%
Hanson Rd/Red Rover Rd	6%	17%	17%	10%	<5%	<5%	<5%	10%	10%	<5%	<5%	<5%	<5%
Hanson Rd/Blain Dr/Al O'Rourke Dr	5%	11%	11%	65%	<5%	<5%	13%	6%	6%	51%	<5%	<5%	17%
Glenlyon St/William Street	<5%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Port Access Rd/Railway St	86%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Hanson Rd/Dawson Rd/Bramston St	19%	6%	6%	7%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Herbert St/Tennis Centre Access	6%	6%	6%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Glenlyon St/Tank St	7%	7%	7%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Bramston St/Goondoon St	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Port Access Rd/Mark Fenton Dr/Hopper Rd/Tug Berth Access Rd	87%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Hwy/Blain Dr/Herbertson St	7%	11%	11%	13%	<5%	<5%	<5%	6%	6%	7%	<5%	<5%	<5%
Dawson Hwy/Philip St/Shopping Centre Access	6%	<5%	<5%	9%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%
Dawson Hwy/Don Young Dr	7%	5%	5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%	<5%

*Note: Impacts presented in this table are based on daily figures

7.3 Bruce Highway/ Dawson Highway

The existing layout at the Bruce Highway/Dawson Highway intersection is presented in Figure 7-1. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-5 below.

Figure 7-1 Bruce Highway/ Dawson Highway – Existing Layout

For priority controlled intersections, a degree of saturation (DOS) of less than 0.80 is considered acceptable. As can be seen in the results, the intersection is expected to perform with acceptable DOS for the 2010 and 2013 "without development" conditions. Generally, the intersection is also expected to operate with adequate service under additional development loading for these years. However there are a few cases where a DOS of 0.80 is exceeded. These are:

AM Peak

- Scenario 5c & 5d;
- Scenario 6c & 6d; and
- Scenario 7d.

PM Peak

- Scenario 3b;
- Scenario 5a & 5b;
- Scenario 6a & 6b; and
- Scenario 7a & 7b.

Although the practical absorption capacity has been reached for the above cases, it is noted that the average delay does not exceed 25 seconds for any condition.

The SIDRA results for the 2018 "without development" design horizon indicate that the intersection is expected to operate above the practical capacity in the afternoon peak, and above the theoretical capacity in the morning peak. As would be expected, this condition worsens with the inclusion of additional development traffic and anticipated DOS could increase up to 1.159 in the 2018 morning peak.

Given that the intersection is not anticipated to operate within capacity limitations under a "without development" scenario, further SIDRA analysis for the 'with shuttle bus" condition (see Section 4.3) has not been undertaken. Although development generated traffic will be reduced with the use of shuttle busses, intersection operations cannot improve to acceptable levels.

Further analysis of the required intersection form at 2018, "with" and "without" the proposed development is presented in Section 8.2.

Table 7-5 Intersection Performance – Bruce Highway/ Dawson Highway

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.473	9.5	35	0.419	8.7	25
Scenario 2	0.551	10.4	47	0.482	9.4	33
Scenario 3a	0.660	12.0	67	0.776	13.6	85
Scenario 3b	0.660	12.1	67	0.827	14.2	99
Scenario 3c	0.678	12.2	72	0.638	10.9	61
Scenario 3d	0.778	15.4	99	0.750	12.4	95
Scenario 4	0.681	12.5	72	0.600	10.9	50
Scenario 5a	0.758	13.5	93	0.893	18.0	109
Scenario 5b	0.758	13.8	93	0.926	19.3	128
Scenario 5c	0.870	16.9	143	0.789	14.9	81
Scenario 5d	0.870	17.0	145	0.772	17.5	55
Scenario 6a	0.758	13.8	93	0.893	18.0	109
Scenario 6b	0.758	13.8	93	0.926	19.3	128
Scenario 6c	0.870	16.9	143	0.786	14.8	80
Scenario 6d	0.870	17.0	145	0.787	14.9	81

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 7a	0.744	13.5	89	0.880	17.5	123
Scenario 7b	0.744	13.6	89	0.927	20.5	151
Scenario 7c	0.784	14.4	101	0.703	12.1	75
Scenario 7d	0.914	19.8	172	0.756	12.9	90
Scenario 12	1.025	35.9	293	0.872	17.9	130
Scenario 13a	1.085	50.5	384	1.079	45.9	311
Scenario 13b	1.085	50.5	384	1.103	50.2	342
Scenario 13c	1.135	70.9	512	1.007	33.1	240
Scenario 13d	1.138	71.2	514	1.009	33.4	242
Scenario 14a	1.085	50.5	384	1.079	45.9	311
Scenario 14b	1.085	50.5	384	1.084	49.3	338
Scenario 14c	1.135	70.9	512	1.007	33.1	240
Scenario 14d	1.138	71.2	514	1.009	33.4	242
Scenario 15a	1.051	42.4	337	1.028	35.4	271
Scenario 15b	1.062	44.4	348	1.088	47.4	346
Scenario 15d	1.159	76.4	535	1.000	30.8	258

7.4 Bruce Highway/ Calliope River-Targinie Road

The existing layout at the Bruce Highway/Calliope River-Targinie Road intersection is presented in Figure 7-2. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-6 below.

Analysis results indicate that the intersection is expected to operate within acceptable service parameters for all design horizons. The degree of saturation is well below the practical absorption capacity for priority controlled intersections (i.e. DOS<0.8) and the average delay is less than 10 seconds for all conditions.

Figure 7-2 **Bruce Highway/ Calliope River-Targinie Road – Existing Layout**

Table 7-6 **Intersection Performance – Bruce Hwy/ Calliope River-Targinie Road**

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.056	1.2	0	0.055	1.9	1
Scenario 2	0.062	1.1	0	0.061	1.9	1
Scenario 3a	0.062	1.1	0	0.328	4.9	7
Scenario 3b	0.062	1.7	1	0.580	7.6	20
Scenario 4	0.071	1.2	1	0.070	1.9	1
Scenario 5a	0.071	3.1	3	0.479	5.8	13
Scenario 5b	0.071	3.1	3	0.713	8.8	37
Scenario 5c	0.159	4.6	7	0.358	4.9	8
Scenario 5d	0.161	4.7	7	0.363	5.0	8
Scenario 6a	0.071	3.1	3	0.479	5.8	13
Scenario 6b	0.071	3.1	3	0.713	8.8	37
Scenario 6c	0.159	4.6	7	0.358	4.9	8

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 6d	0.161	4.7	7	0.363	5.0	8
Scenario 7a	0.071	1.2	1	0.337	4.7	8
Scenario 7b	0.071	1.7	1	0.590	7.3	22
Scenario 8	0.074	1.1	1	0.074	1.8	1
Scenario 9	0.074	1.4	1	0.074	2.0	1
Scenario 10	0.074	1.4	1	0.074	2.0	1
Scenario 12	0.091	1.2	1	0.090	2.0	1
Scenario 13a	0.091	2.3	2	0.281	4.1	6
Scenario 13b	0.091	2.3	2	0.406	5.3	10
Scenario 13c	0.091	3.2	3	0.223	3.7	5
Scenario 13d	0.091	3.2	4	0.224	3.7	5
Scenario 14a	0.091	2.3	2	0.281	4.1	6
Scenario 14b	0.091	2.3	2	0.405	5.2	10
Scenario 14c	0.091	3.2	3	0.223	3.7	5
Scenario 14d	0.091	3.2	4	0.224	3.7	5
Scenario 15a	0.091	1.2	1	0.221	3.6	5
Scenario 15b	0.091	1.5	1	0.207	3.5	4
Scenario 16	0.106	1.3	1	0.104	2.0	1
Scenario 17	0.106	1.5	1	0.104	2.2	2
Scenario 18	0.106	1.5	1	0.104	2.2	2
Scenario 20	0.171	1.5	2	0.169	2.3	3
Scenario 21	0.171	1.6	2	0.169	2.4	3
Scenario 22	0.171	1.6	2	0.169	2.4	3

7.5 Bruce Highway/ Gladstone-Mt Larcom Road

The existing layout at the Bruce Highway/Gladstone-Mt Larcom Road intersection is presented in Figure 7-3. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-7 below.

Figure 7-3 Bruce Highway / Gladstone-Mt Larcom Road – Existing Layout

The SIDRA results indicate that the intersection is expected to operate adequately with the presence of the proposed development. The maximum degree of saturation is 0.737, which occurs during the afternoon peak of Scenario 13a. Anticipated average delays are not expected to exceed 15 seconds for any of the impacted design horizon.

Table 7-7 Intersection Performance – Bruce Highway/ Gladstone-Mt Larcom Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.256	6.6	12	0.230	6.3	10
Scenario 2	0.303	7.0	15	0.265	6.5	12

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3a	0.317	7.1	16	0.569	9.8	44
Scenario 3b	0.317	7.1	16	0.481	7.8	29
Scenario 3c	0.338	7.3	18	0.406	7.7	23
Scenario 3d	0.382	7.6	20	0.571	9.6	43
Scenario 4	0.392	7.7	22	0.331	7.1	17
Scenario 5a	0.409	7.9	23	0.662	11.2	59
Scenario 5b	0.409	7.9	23	0.605	9.6	44
Scenario 5c	0.476	8.6	28	0.670	11.3	61
Scenario 5d	0.480	8.6	28	0.681	11.6	63
Scenario 6a	0.409	7.9	23	0.604	10.3	48
Scenario 6b	0.409	7.9	23	0.567	9.0	39
Scenario 6c	0.476	8.6	28	0.670	11.3	61
Scenario 6d	0.480	8.6	28	0.681	11.6	63
Scenario 7a	0.409	7.9	23	0.658	11.1	58
Scenario 7b	0.409	7.9	23	0.550	9.0	38
Scenario 7c	0.435	8.2	25	0.495	8.7	32
Scenario 7d	0.480	8.6	28	0.663	11.0	57
Scenario 12	0.623	10.2	43	0.486	8.5	30
Scenario 13a	0.641	10.4	45	0.737	12.8	71
Scenario 13c	0.709	11.4	53	0.677	11.2	56
Scenario 13d	0.709	11.4	53	0.684	11.3	58
Scenario 14a	0.641	10.4	45	0.641	10.6	50
Scenario 14c	0.709	11.4	53	0.677	11.2	56
Scenario 14d	0.709	11.4	53	0.684	11.3	58
Scenario 15a	0.641	10.4	45	0.678	11.2	56
Scenario 15c	0.669	10.8	48	0.583	9.6	41
Scenario 15d	0.709	11.4	53	0.681	11.2	56

7.6 Gladstone-Mt Larcom Road/ Calliope River-Targinie Road

The existing layout at the Gladstone-Mt Larcom Road/Calliope River-Targinie Road intersection is presented in Figure 7-4. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-8 below.

Figure 7-4 Gladstone Mt Larcom Rd/Calliope River Targinie Rd – Existing Layout

Analysis results suggest that the intersection will be able to operate within acceptable service criteria for all "without development" conditions, except for Scenario 20 AM Peak; 2031 "without development". The DOS for this scenario and year is expected to reach 1.250.

In terms of the "with development" intersection operations, significant impacts are expected with the addition of Road Bridge Option 2 (Phillipies Landing Road extension). Anticipated operations degrade considerably for the 2013 peak periods (Scenario 6a – 6d). The condition improves slightly for Scenario 14c and 14d due to decreased development loadings, however, anticipated DOS still exceeds the theoretical capacity of 1.0.

Table 7-8 Intersection Performance – Gladstone Mt Larcom/Calliope River Targinie

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.093	5.0	4	0.079	5.1	2
Scenario 2	0.111	5.1	4	0.087	5.1	2
Scenario 3a	0.123	4.9	5	0.183	5.9	7

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3b	0.133	5.2	5	0.136	5.6	5
Scenario 3c	0.140	4.8	5	0.133	4.8	3
Scenario 3d	0.190	4.7	6	0.180	4.6	3
Scenario 4	0.143	5.3	6	0.100	5.2	3
Scenario 5a	0.346	6.8	15	0.214	6.5	8
Scenario 5b	0.365	7.2	17	0.238	6.4	9
Scenario 5c	0.752	11.8	55	0.208	5.7	5
Scenario 5d	0.833	12.2	58	0.212	5.7	5
Scenario 6a	1.164	36.0	163	1.392	188.8	1211
Scenario 6b	1.303	49.8	229	1.021	41.9	459
Scenario 6c	4.500	392.8	950	1.850	573.1	3161
Scenario 6d	4.500	402.4	963	1.856	581.9	3187
Scenario 7a	0.161	5.1	6	0.194	6.0	8
Scenario 7b	0.172	5.4	7	0.167	5.7	6
Scenario 7c	0.168	5.0	7	0.149	4.9	3
Scenario 7d	0.223	5.0	8	0.199	4.7	4
Scenario 8	0.156	5.3	6	0.105	5.2	3
Scenario 10	0.181	6.1	7	0.105	5.9	4
Scenario 12	0.231	5.9	9	0.128	5.5	4
Scenario 13a	0.355	6.9	16	0.182	6.2	7
Scenario 13b	0.375	7.1	17	0.205	6.1	7
Scenario 13c	0.240	6.0	10	0.182	5.8	6
Scenario 13d	0.560	8.7	30	0.184	5.8	6
Scenario 14a	0.705	12.4	37	0.729	11.5	73
Scenario 14b	0.663	11.6	34	0.615	9.9	54
Scenario 14c	1.266	50.5	238	1.095	67.7	532
Scenario 14d	1.259	50.4	238	1.105	71.0	548
Scenario 15a	0.344	6.7	16	0.160	5.9	6

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 15b	0.250	6.0	10	0.160	5.7	6
Scenario 15d	0.286	5.9	12	0.177	5.3	5
Scenario 16	0.318	6.5	14	0.158	5.7	6
Scenario 18	0.379	7.5	17	0.188	6.3	7
Scenario 20	1.250	42.7	201	0.542	7.7	24
Scenario 22	1.538	70.8	304	0.647	8.9	30

The SIDRA results presented in Table 7-9 show the expected intersection performance when shuttle busses are provided to and from the airport. The results suggest that the provision of shuttle buses does not reduce generated traffic to levels where intersection performance becomes acceptable.

The required future year intersection form is discussed further in Section 8.3. Note that further analysis of Scenario 14c and 14d are not required, as the traffic volumes are based from the same distribution as Scenario 6c and 6d. Given that scenario 14c and 14d simply represent reduced volumes from Scenario 6c and 6d, any intersection form deemed appropriate for Scenario 6c and 6d will be adequate for Scenario 14c and 14d also.

Table 7-9 Performance With Shuttle - Gladstone Mt Larcom/Calliope River Targinie

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 6a	1.164	36.0	163	1.197	111.3	841
Scenario 6b	1.303	49.8	229	1.021	41.9	459
Scenario 6c	3.397	340.4	886	1.631	415.9	2402
Scenario 6d	3.333	334.9	886	1.635	415.6	2386
Scenario 14c	1.100	32.0	150	0.972	26.2	258
Scenario 14d	1.100	31.0	146	0.972	26.2	256

7.7 Gladstone-Mt Larcom Road / Landing Road

The existing layout at the Gladstone-Mt Larcom Road/ Landing Road intersection is presented in Figure 7-5. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-10 below.

Figure 7-5 Gladstone-Mt Larcom Road/ Landing Road – Existing Layout

The SIDRA results indicate that the intersection operates adequately under the 2013 and 2018 "without development" scenarios. This condition changes, however, with the potential implementation of either road bridge option. Under the 2013 "with development" scenario, anticipated volumes could exceed available capacity up to 7 times if a do nothing scenario proceeds. The results for the shuttle bus scenario (see Table 7-11) indicate that this projection does not improve significantly, even with the reduction in development generated traffic.

Further analysis of intersection requirements is discussed in Section 8.3.2. Note that the recommended intersection layouts for Scenario 5a – 6d are applicable to the 13a – 14d scenarios as the same traffic distribution is shared between the two design horizons. Since scenarios 13a -14d simply represent reduced volumes from Scenario 5a through to 6d, any intersection form deemed appropriate for Scenario 5a - 6d will also be adequate for Scenario 13a - 14d.

For the 2021 design horizon, the SIDRA results indicate that the intersection is not expected to provide acceptable service conditions, even without the presence of the proposed development. The DOS for Scenario 16 show that the practical absorption capacity of 0.8 is exceeded in the afternoon peak, whilst the theoretical capacity of 1.0 is exceeded in the morning peak. As would be expected, the condition worsens for the 2031 design horizon.

Alternative intersection layouts for Scenario 20 and 21 are provided in Section 8.3.2.

Table 7-10 Intersection Performance – Gladstone-Mt Larcom Road/Landing Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.350	8.6	18	0.278	7.1	12
Scenario 2	0.408	9.3	24	0.332	7.5	16
Scenario 3a	0.491	10.1	33	0.681	11.5	54
Scenario 3c	0.545	10.8	40	0.347	7.9	16
Scenario 3d	0.695	13.1	68	0.376	8.3	18
Scenario 4	0.511	10.4	34	0.430	8.3	23
Scenario 5a	2.026	163.3	660	3.729	462.6	1153
Scenario 5b	2.026	163.3	660	2.361	143.4	532
Scenario 5c	6.974	1137.6	1873	2.833	164.5	596
Scenario 5d	7.050	1164.1	1895	2.833	164.7	596
Scenario 6a	1.020	26.4	164	2.344	780.3	2719
Scenario 6b	1.020	26.4	164	1.995	547.9	2036
Scenario 6c	1.396	73.1	435	2.767	1080.8	3549
Scenario 6d	1.381	71.1	425	2.750	1064.1	3505
Scenario 7a	0.616	11.7	49	0.830	14.9	85
Scenario 7c	0.690	13.0	64	0.468	8.8	25
Scenario 7d	0.883	20.2	137	0.509	9.3	27
Scenario 8	0.555	10.9	39	0.468	8.6	25
Scenario 9	0.624	11.2	46	0.525	8.7	29
Scenario 12	0.774	15.0	76	0.699	11.2	47
Scenario 13a	1.659	159.4	663	2.109	210.1	774
Scenario 13b	1.659	159.4	663	1.667	105.1	467

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 13c	2.237	235.2	893	3.162	264.2	772
Scenario 13d	2.204	231.0	886	3.116	262.6	770
Scenario 14a	1.160	61.3	335	1.940	410.5	1523
Scenario 14b	1.180	60.1	326	1.725	299.7	1187
Scenario 14c	1.373	92.7	482	2.215	559.1	1941
Scenario 14d	1.360	90.9	474	2.190	547.8	1909
Scenario 15a	0.842	17.5	98	0.940	20.5	119
Scenario 16	1.026	40.1	218	0.958	21.2	118
Scenario 17	1.199	83.3	389	1.126	42.9	231
Scenario 20	3.202	805.4	2037	4.000	650.5	1565
Scenario 21	3.800	962.7	2187	4.800	785.8	1664

Table 7-11 Performance with Shuttle – Gladstone-Mt Larcom Road/Landing Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	2.026	163.3	660	2.645	197.5	657
Scenario 5b	2.026	163.3	660	2.361	143.4	532
Scenario 5c	6.999	1146.4	1880	2.833	166.5	594
Scenario 5d	3.871	457.0	1224	2.833	166.9	594
Scenario 6a	1.020	26.4	164	2.079	599.2	2190
Scenario 6b	1.020	26.4	164	1.995	547.9	2036
Scenario 6c	1.238	54.6	334	2.490	874.3	2981
Scenario 6d	1.216	51.7	317	2.442	844.1	2897
Scenario 13a	1.659	159.4	663	1.798	132.3	553
Scenario 13b	1.659	159.4	663	1.667	105.1	467
Scenario 13c	1.961	197.8	802	2.734	225.4	726
Scenario 13d	1.924	190.8	786	2.700	221.5	720
Scenario 14a	1.160	61.3	335	1.770	321.6	1255

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 14b	1.180	60.1	326	1.725	299.7	1187
Scenario 14c	1.309	84.2	440	2.027	455.9	1654
Scenario 14d	1.298	81.8	429	2.000	440.4	1610

7.8 Hanson Road/ Reid Road

The existing layout at the Hanson Road/Reid Road intersection is presented in Figure 7-6. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-12 below.

Figure 7-6 Hanson Road/ Reid Road – Existing Layout

Analysis results indicate that the intersection is expected to operate slightly above its practical absorption capacity in the afternoon peak of 2010. By 2018, "without development" intersection performance is anticipated to degrade to a DOS above 2.

Given that the intersection is not anticipated to operate within capacity limitations under a "without development" scenario, further SIDRA analysis for the 'with shuttle bus" condition (see Section 4.3) has not been undertaken. Although development generated traffic will be reduced with the use of shuttle busses, intersection operations cannot improve to acceptable levels.

Further analysis of the required intersection form is provided in Section 8.5.

Table 7-12 Intersection Performance – Hanson Road/Reid Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	DOS	Ave. delay (sec)	DOS	Ave. delay (sec)
Scenario 1	0.154	1.6	2	0.584	4.5	25

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	DOS	Ave. delay (sec)	DOS	Ave. delay (sec)
Scenario 2	0.170	1.8	3	0.822	7.8	44
Scenario 3c	0.213	1.7	4	1.000	13.2	77
Scenario 3d	0.263	1.6	5	1.228	25.4	150
Scenario 4	0.197	2.0	5	1.354	37.4	202
Scenario 5a	0.818	5.8	32	1.850	69.1	318
Scenario 5b	0.818	5.8	32	1.850	64.2	312
Scenario 5c	1.000	15.8	58	1.850	81.2	330
Scenario 5d	1.000	15.4	58	1.850	80.1	329
Scenario 6a	0.818	5.8	32	1.850	69.1	318
Scenario 6b	0.818	5.8	32	1.850	64.2	312
Scenario 6c	1.000	15.8	58	1.850	81.2	330
Scenario 6d	1.000	15.4	58	1.850	80.1	329
Scenario 7c	0.247	1.9	6	1.682	58.4	278
Scenario 7d	0.305	2.0	8	1.850	67.3	308
Scenario 12	0.253	2.6	9	2.367	120.9	462
Scenario 13a	0.710	5.0	27	2.367	116.6	470
Scenario 13b	0.710	5.0	27	2.367	114.4	467
Scenario 13c	1.000	8.5	47	2.367	119.2	473
Scenario 13d	1.000	8.4	47	2.367	119.0	473
Scenario 14a	0.710	5.0	27	2.367	116.6	470
Scenario 14b	0.710	5.0	27	2.367	114.4	467
Scenario 14c	1.000	8.5	47	2.367	119.2	473
Scenario 14d	1.000	8.4	47	2.367	119.0	473

7.9 Hanson Road/ Red Rover Road

The existing layout at the Hanson Road/Red Rover Road intersection is presented in Figure 7-7. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-13 and Table 7-14 below.

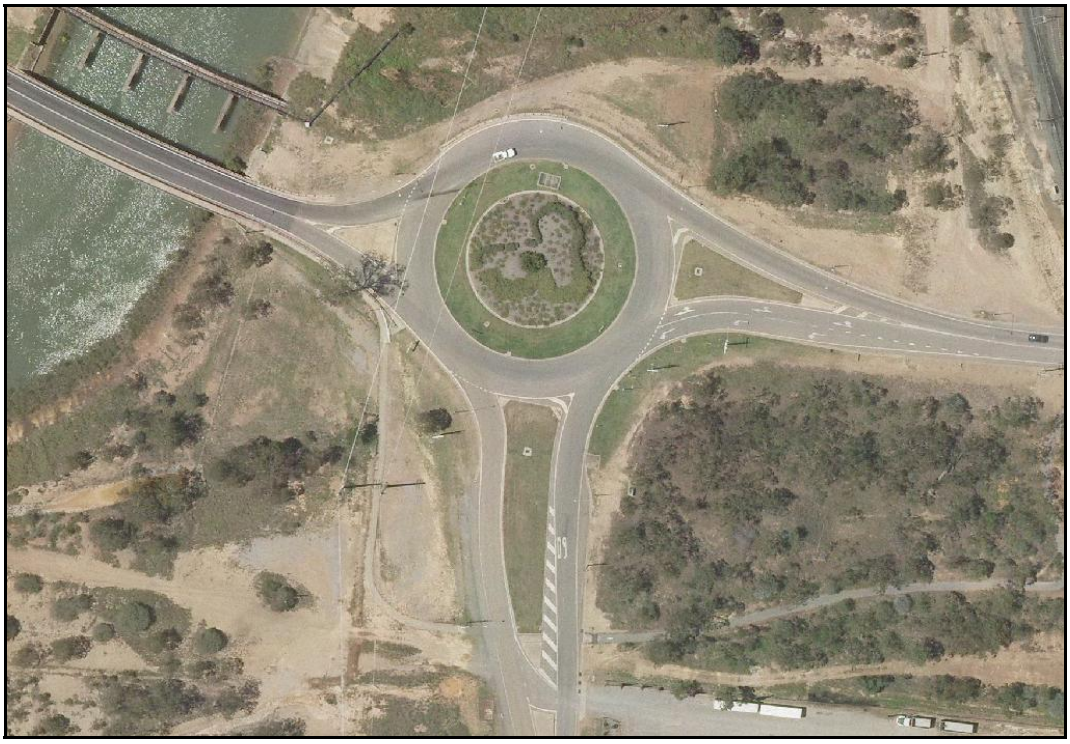


Figure 7-7 Hanson Road/ Red Rover Road – Existing Layout

Analysis results suggest that the intersection is anticipated to operate satisfactorily under 2010, 2013 and 2018 "without development" conditions. This condition changes however, with]] the potential implementation of either road bridge option. With the presence of the road bridge, DOS reaches up to 1.254 in the afternoon peak of 2013 and 1.063 in the afternoon peak of 2018. The results of the "with shuttle bus" scenario (provided in Table 7-14) show that although performance is improved slightly with the reduced traffic generation, anticipated performance still exceeds acceptable criteria.

The required future year intersection layouts are presented in Section 8.6.

Table 7-13 Intersection Performance – Hanson Road / Red Rover Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.306	6.1 (LOS A)	17	0.559	6.4 (LOS A)	41

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 2	0.324	6.1 (LOS A)	19	0.591	6.5 (LOS A)	45
Scenario 3c	0.377	6.0 (LOS A)	23	0.592	6.4 (LOS A)	46
Scenario 3d	0.342	6.1 (LOS A)	20	0.591	6.4 (LOS A)	46
Scenario 4	0.355	6.2 (LOS A)	21	0.647	6.5 (LOS A)	55
Scenario 5a	0.607	7.8 (LOS A)	62	1.150	98.8 (LOS F)	1592
Scenario 5b	0.607	7.8 (LOS A)	62	1.055	41.1 (LOS D)	914
Scenario 5c	0.917	18.3 (LOS B)	203	1.254	166.0 (LOS F)	2363
Scenario 5d	0.902	17.2 (LOS B)	191	1.247	160.7 (LOS F)	2304
Scenario 6a	0.607	7.8 (LOS A)	62	1.142	93.5 (LOS F)	1536
Scenario 6b	0.607	7.8 (LOS A)	62	1.048	37.5 (LOS D)	869
Scenario 6c	0.902	17.2 (LOS B)	192	1.254	166.0 (LOS F)	2364
Scenario 6d	0.887	16.2 (LOS B)	181	1.247	160.7 (LOS F)	2304
Scenario 7a	0.423	6.5 (LOS A)	27	0.752	6.7 (LOS A)	81
Scenario 7b	0.417	6.5 (LOS A)	26	0.656	6.5 (LOS A)	57
Scenario 7c	0.439	6.3 (LOS A)	28	0.645	6.5 (LOS A)	55
Scenario 7d	0.527	6.4 (LOS A)	37	0.647	6.4 (LOS A)	56
Scenario 12	0.414	6.3 (LOS A)	27	0.751	6.7 (LOS A)	81
Scenario 13a	0.521	6.9 (LOS A)	42	1.009	15.8 (LOS B)	571
Scenario 13b	0.521	6.9 (LOS A)	42	0.960	7.7 (LOS A)	274
Scenario 13c	0.624	7.7 (LOS A)	63	1.059	41.5 (LOS D)	894
Scenario 13d	0.624	7.7 (LOS A)	62	1.055	39.5 (LOS D)	869
Scenario 14a	0.521	6.9 (LOS A)	42	1.016	19.1 (LOS B)	613
Scenario 14b	0.521	6.9 (LOS A)	42	0.968	8.0 (LOS A)	302
Scenario 14c	0.624	7.7 (LOS A)	63	1.066	45.4 (LOS D)	943
Scenario 14d	0.624	7.7 (LOS A)	62	1.063	44.4 (LOS D)	931
Scenario 15a	0.453	6.5 (LOS A)	31	0.805	6.8 (LOS A)	100
Scenario 15b	0.449	6.5 (LOS A)	30	0.753	6.7 (LOS A)	81

Table 7-14 Performance With Shuttle - Hanson Road / Red Rover Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	-	-	-	1.074	52.7 (LOS D)	1055
Scenario 5b	-	-	-	1.055	41.1 (LOS D)	914
Scenario 5c	-	-	-	1.117	115.7 (LOS F)	1797
Scenario 5d	-	-	-	1.163	107.5 (LOS F)	1702
Scenario 6a	-	-	-	1.074	52.7 (LOS D)	1055
Scenario 6b	-	-	-	1.048	37.5 (LOS D)	869
Scenario 6c	-	-	-	1.117	115.7 (LOS F)	1797
Scenario 6d	-	-	-	1.163	107.5 (LOS F)	1702
Scenario 13a	-	-	-	0.981	8.8 (LOS A)	360
Scenario 13c	-	-	-	1.028	24.9 (LOS C)	687
Scenario 13d	-	-	-	1.021	21.5 (LOS C)	644
Scenario 14a	-	-	-	0.981	8.8 (LOS A)	360
Scenario 14c	-	-	-	1.028	24.9 (LOS C)	687
Scenario 14d	-	-	-	1.021	21.5 (LOS C)	644

7.10 Hanson Road/ Blain Drive/ Alf O'Rourke Drive

The existing layout at the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection is presented in Figure 7-8. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-15 and Table 7-16 below.

For roundabouts, a degree of saturation (DOS) of less than 0.85 is considered acceptable. As can be seen in the results, the intersection is expected to perform with acceptable DOS for the 2010 and 2013 "without development" conditions. However, intersection performance under 2013 "with development" traffic loading degrades to unacceptable levels and remedial solutions are discussed in Section 8.7.

The SIDRA results for the 2018 "without development" design horizon indicate that the intersection is expected to operate above the practical capacity in the afternoon peak. As would be expected, this condition worsens with the inclusion of additional development traffic and anticipated DOS could increase up to 2.701 without the use of shuttle buses.

Further analysis of the required intersection form at 2018 will not be required as the intersection form that is deemed adequate for Scenarios 5a to 7d will also be appropriate for 2018 traffic loadings.

Figure 7-8 **Hanson Road/ Blain Drive/ Alf O'Rourke Drive – Existing Layout**

Table 7-15 **Intersection Performance – Hanson Rd/ Blain Drive/ Alf O'Rourke Drive**

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.466	7.2 (LOS A)	28	0.633	8.7 (LOS A)	48
Scenario 2	0.493	7.2 (LOS A)	31	0.667	9.0 (LOS A)	55
Scenario 3c	0.549	7.1 (LOS A)	37	0.667	9.3 (LOS A)	55
Scenario 3d	0.614	7.1 (LOS A)	46	0.709	9.9 (LOS A)	67
Scenario 4	0.542	7.3 (LOS A)	37	0.733	9.7 (LOS A)	68
Scenario 5a	0.638	7.4 (LOS A)	47	1.183	126.2 (LOS F)	1432
Scenario 5b	0.638	7.4 (LOS A)	47	1.105	78.9 (LOS E)	939
Scenario 5c	0.759	8.4 (LOS A)	78	1.300	198.9 (LOS F)	2175
Scenario 5d	0.751	8.3 (LOS A)	75	1.294	194.9 (LOS F)	2133
Scenario 6a	0.638	7.4 (LOS A)	47	1.183	126.2 (LOS F)	1432
Scenario 6b	0.638	7.4 (LOS A)	47	1.105	78.9 (LOS E)	939
Scenario 6c	0.759	8.4 (LOS A)	78	1.300	198.9 (LOS F)	2175

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 6d	0.751	8.3 (LOS A)	75	1.294	194.9 (LOS F)	2133
Scenario 7a	1.330	124.6 (LOS F)	1051	2.514	503.8 (LOS F)	2841
Scenario 7b	1.331	124.8 (LOS F)	1051	1.993	347.4 (LOS F)	2352
Scenario 7c	1.132	64.6 (LOS E)	603	2.046	344.0 (LOS F)	2174
Scenario 7d	2.980	652.5 (LOS F)	3141	3.009	876.7 (LOS F)	4711
Scenario 8	0.558	7.4 (LOS A)	39	0.759	10.0 (LOS A)	73
Scenario 11	0.582	7.6 (LOS A)	41	0.781	10.7 (LOS B)	83
Scenario 12	0.634	7.6 (LOS A)	49	0.862	13.0 (LOS B)	120
Scenario 13a	0.653	7.5 (LOS A)	53	1.097	76.1 (LOS E)	864
Scenario 13b	0.653	7.5 (LOS A)	53	1.057	55.0 (LOS D)	642
Scenario 13c	0.653	7.7 (LOS A)	54	1.151	105.5 (LOS F)	1191
Scenario 13d	0.653	7.7 (LOS A)	54	0.972	23.3 (LOS C)	277
Scenario 14a	0.653	7.5 (LOS A)	53	1.097	76.1 (LOS E)	864
Scenario 14b	0.653	7.5 (LOS A)	53	1.057	55.0 (LOS D)	642
Scenario 14c	0.653	7.7 (LOS A)	54	1.151	105.5 (LOS F)	1191
Scenario 14c	0.653	7.7 (LOS A)	54	1.149	104.0 (LOS F)	1175
Scenario 15a	0.990	24.0 (LOS C)	274	2.182	273.7 (LOS F)	1657
Scenario 15b	0.990	24.0 (LOS C)	274	1.903	216.8 (LOS F)	1457
Scenario 15c	0.930	15.8 (LOS B)	184	1.789	186.6 (LOS F)	1303
Scenario 15d	1.347	144.9 (LOS F)	1260	2.701	504.6 (LOS F)	2712

Table 7-16 Performance With Shuttle - Hanson Rd/ Blain Drive/ Alf O'Rourke Drive

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	-	-	-	1.127	91.7 (LOS F)	1078
Scenario 5b	-	-	-	1.105	78.9 (LOS E)	939
Scenario 5c	-	-	-	1.241	160.2 (LOS F)	1793

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5d	-	-	-	1.230	153.7 (LOS F)	1726
Scenario 6a	-	-	-	1.127	91.7 (LOS F)	1078
Scenario 6b	-	-	-	1.105	78.9 (LOS E)	939
Scenario 6c	-	-	-	1.241	160.2 (LOS F)	1793
Scenario 6d	-	-	-	1.230	153.7 (LOS F)	1726
Scenario 7a	1.330	124.6 (LOS F)	1051	2.157	397.1 (LOS F)	2528
Scenario 7b	1.331	124.8 (LOS F)	1051	1.993	347.4 (LOS F)	2352
Scenario 7c	1.028	33.7 (LOS C)	344	1.630	200.5 (LOS F)	1513
Scenario 7d	2.980	652.5 (LOS F)	3141	3.009	876.7 (LOS F)	4711
Scenario 13a	-	-	-	1.087	60.0 (LOS E)	698
Scenario 13b	-	-	-	1.057	55.0 (LOS D)	642
Scenario 13c	-	-	-	1.136	87.7 (LOS F)	1007
Scenario 14a	-	-	-	1.087	60.0 (LOS E)	698
Scenario 14b	-	-	-	1.057	55.0 (LOS D)	642
Scenario 14c	-	-	-	1.136	91.3 (LOS F)	1048
Scenario 14c	-	-	-	1.136	88.6 (LOS F)	1020
Scenario 15a	-	-	-	2.000	236.6 (LOS F)	1533
Scenario 15b	-	-	-	1.903	216.8 (LOS F)	1457
Scenario 15c	-	-	-	1.659	150.4 (LOS F)	1099
Scenario 15d	1.347	144.9 (LOS F)	1260	2.701	504.6 (LOS F)	2712

7.11 Glenlyon Street/ William Street

The existing layout at the Glenlyon Street/William Street intersection is presented in Figure 7-9. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-17 below.

Figure 7-9 Glenlyon Street/ William Street – Existing Layout

Analysis results indicate that the intersection is expected to operate within acceptable service parameters for all design horizons. The degree of saturation is well below the practical absorption capacity for priority controlled intersections (i.e. DOS<0.8) and the average delay is less than 5 seconds for all conditions.

Table 7-17 Intersection Performance – Glenlyon Street / William Street

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.213	1.3	5	0.248	1.5	7
Scenario 4	0.248	1.4	6	0.319	1.7	11
Scenario 5c	0.369	1.1	6	0.678	2.8	25
Scenario 5d	0.368	1.1	6	0.673	2.8	25
Scenario 6c	0.369	1.1	6	0.678	2.8	25
Scenario 6d	0.368	1.1	6	0.673	2.8	25

7.12 Glenlyon Street/ Gladstone Port Access Road/ Railway Street

The existing layout at the Glenlyon Street/Gladstone Port Access Road/Railway Street intersection is presented in Figure 7-10. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-18 and Table 7-19 below.

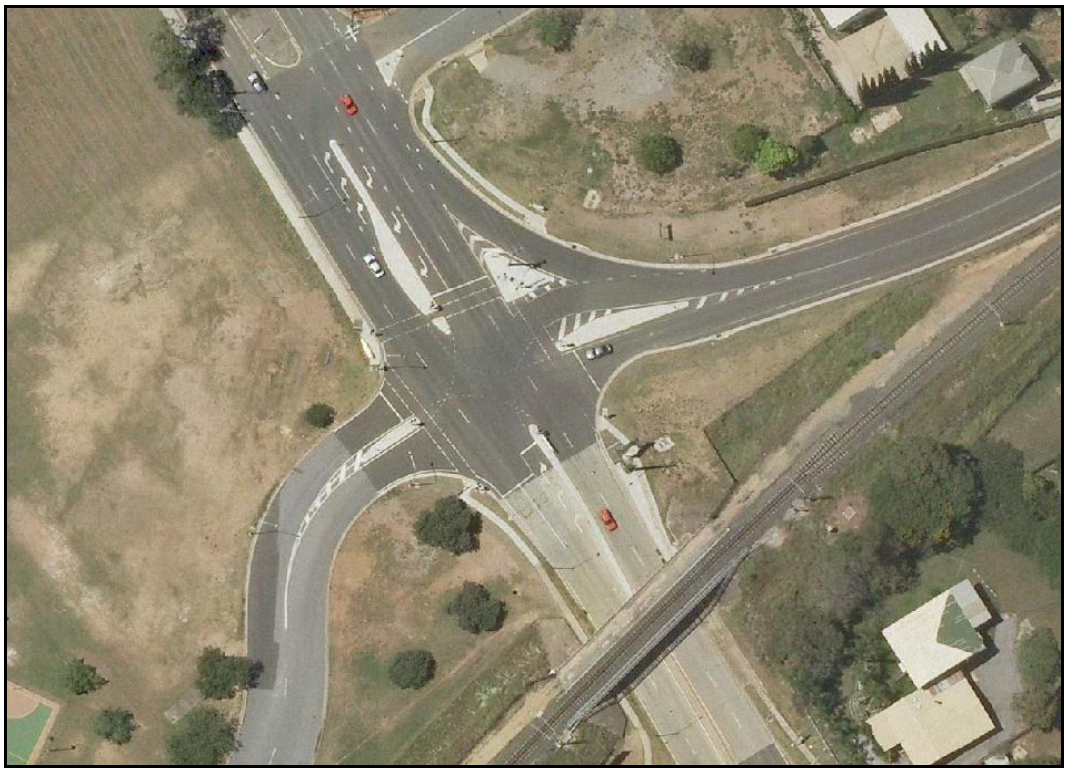


Figure 7-10 Glenlyon Street/ Gladstone Port Access Road – Existing Layout

The results indicate that the existing intersection form is able to provide acceptable service conditions without the presence of the proposed development in 2010 and 2013. This however, is not the case under all "with development" scenarios, and this condition does not improve even with the implementation of shuttle buses (see Table 7-20). Therefore remedial works will be required as part of the development proposal and these requirements are discussed further in Section 8.8.

Investigation of the site revealed that this intersection is in close proximity to the Bramston Street intersection, which is located approximately 130m to the south. As SIDRA only considers the operation of intersections in isolation, this intersection has been analysed further in a microsimulation model. The microsimulation will yield a more accurate representation of the likely performance, and results are reported in a separate report; *QLD Curtis LNG Project EIS Microsimulation Assessment* (Halcrow MWT, 2009).

Table 7-18 Intersection Performance – Glenlyon Street / Port Access Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.451	16.1 (LOS B)	79	0.689	20.7 (LOS C)	122
Scenario 2	0.476	16.3 (LOS B)	85	0.720	21.8 (LOS C)	136
Scenario 3a	1.000	19.5 (LOS B)	169	1.564	78.2 (LOS E)	1347
Scenario 3b	1.000	24.5 (LOS C)	208	1.574	74.2 (LOS E)	1359
Scenario 3c	0.999	17.9 (LOS B)	136	1.398	72.0 (LOS E)	1056
Scenario 3d	1.000	23.3 (LOS C)	338	2.402	142.6 (LOS F)	2993
Scenario 4	0.521	16.7 (LOS B)	95	0.802	30.2 (LOS C)	197
Scenario 5b	0.672	16.5 (LOS B)	133	1.068	90.2 (LOS F)	552
Scenario 5c	0.749	17.0 (LOS B)	156	1.037	69.3 (LOS E)	511
Scenario 5d	0.749	17.0 (LOS B)	155	1.037	68.1 (LOS E)	506
Scenario 6c	0.749	17.0 (LOS B)	156	1.037	68.1 (LOS E)	506
Scenario 6d	0.749	17.0 (LOS B)	155	1.037	68.1 (LOS E)	506

Table 7-19 Performance With Shuttle - Glenlyon Street / Port Access Road

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3a	-	-	-	1.564	78.2 (LOS E)	1347
Scenario 3b	-	-	-	1.574	74.2 (LOS E)	1359
Scenario 3c	-	-	-	1.108	50.1 (LOS D)	590
Scenario 3d	-	-	-	2.090	109.2 (LOS F)	2402
Scenario 5b	-	-	-	1.068	90.2 (LOS F)	552
Scenario 5c	-	-	-	1.068	82.7 (LOS F)	556
Scenario 5d	-	-	-	1.059	81.4 (LOS F)	551
Scenario 6c	-	-	-	1.068	82.7 (LOS F)	556
Scenario 6d	-	-	-	1.059	81.4 (LOS F)	551

7.13 Glenlyon Street/ Dawson Highway/ Bramston Street

The existing layout at the Glenlyon Street/Dawson Highway/Bramston Street intersection is presented in Figure 7-11. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-20 below.

Figure 7-11 Glenlyon Road/ Dawson Highway/ Bramston Street – Existing Layout

The SIDRA results indicate that the intersection is already operating at its theoretical capacity. Therefore any increase in volumes would further exacerbate the situation.

Given that the intersection is not anticipated to operate within capacity limitations under a "without development" scenario, further SIDRA analysis for the 'with shuttle bus" condition (see Section 4.3) has not been undertaken. Although development generated traffic will be reduced with the use of shuttle busses, intersection operations cannot improve to acceptable levels.

Further analysis of the required intersection form at 2018, "with" and "without" the proposed development is presented in Section 8.9.

As mentioned in Section 7.12 above, this intersection has also been modelled via microsimulation. The result of this assessment is presented in *QLD Curtis LNG Project EIS Microsimulation Assessment* (Halcrow MWT, 2009).

Table 7-20 Intersection Performance – Glenlyon St / Dawson Hwy/ Bramston St

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.755	35.7 (LOS D)	101	1.000	44.6 (LOS D)	206
Scenario 2	0.822	36.9 (LOS D)	110	1.000	46.2 (LOS D)	232
Scenario 3a	1.000	45.4 (LOS D)	200	1.339	226.2 (LOS F)	1052
Scenario 3b	1.000	45.7 (LOS D)	202	1.325	217.9 (LOS F)	1024
Scenario 3c	1.000	43.4 (LOS D)	181	1.231	168.8 (LOS F)	837
Scenario 3d	1.000	55.9 (LOS E)	425	1.659	417.0 (LOS F)	1703
Scenario 4	0.938	38.8 (LOS D)	124	1.000	49.2 (LOS D)	279
Scenario 5a	1.000	43.3 (LOS D)	191	1.121	113.1 (LOS F)	631
Scenario 5b	1.000	43.3 (LOS D)	191	1.098	103.6 (LOS F)	593
Scenario 5c	1.000	45.9 (LOS D)	231	1.224	160.8 (LOS F)	820
Scenario 5d	1.000	45.8 (LOS D)	231	1.218	158.5 (LOS F)	811
Scenario 6a	1.000	43.3 (LOS D)	191	1.121	113.1 (LOS F)	631
Scenario 6b	1.000	43.3 (LOS D)	191	1.098	103.6 (LOS F)	593
Scenario 6c	1.000	45.9 (LOS D)	231	1.224	160.8 (LOS F)	820
Scenario 6d	1.000	43.3 (LOS D)	190	1.218	158.5 (LOS F)	811
Scenario 7a	1.000	41.2 (LOS D)	157	1.007	70.7 (LOS E)	451
Scenario 7b	1.000	41.2 (LOS D)	157	1.000	64.7 (LOS E)	419
Scenario 7c	1.000	40.9 (LOS D)	156	1.000	59.5 (LOS E)	386
Scenario 7d	1.000	44.4 (LOS D)	195	1.057	87.5 (LOS F)	527

7.14 Glenlyon Street/ Herbert Street/ Tennis Centre Access

The existing layout at the Glenlyon Street/Herbert Street/ Tennis Centre Access intersection is presented in Figure 7-12. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-21 below.

Analysis results indicate that the intersection is expected to operate within acceptable service parameters for all design horizons. The degree of saturation is well below the

practical absorption capacity for priority controlled intersections (i.e. DOS<0.8) and the average delay is less than 5 seconds for all conditions.

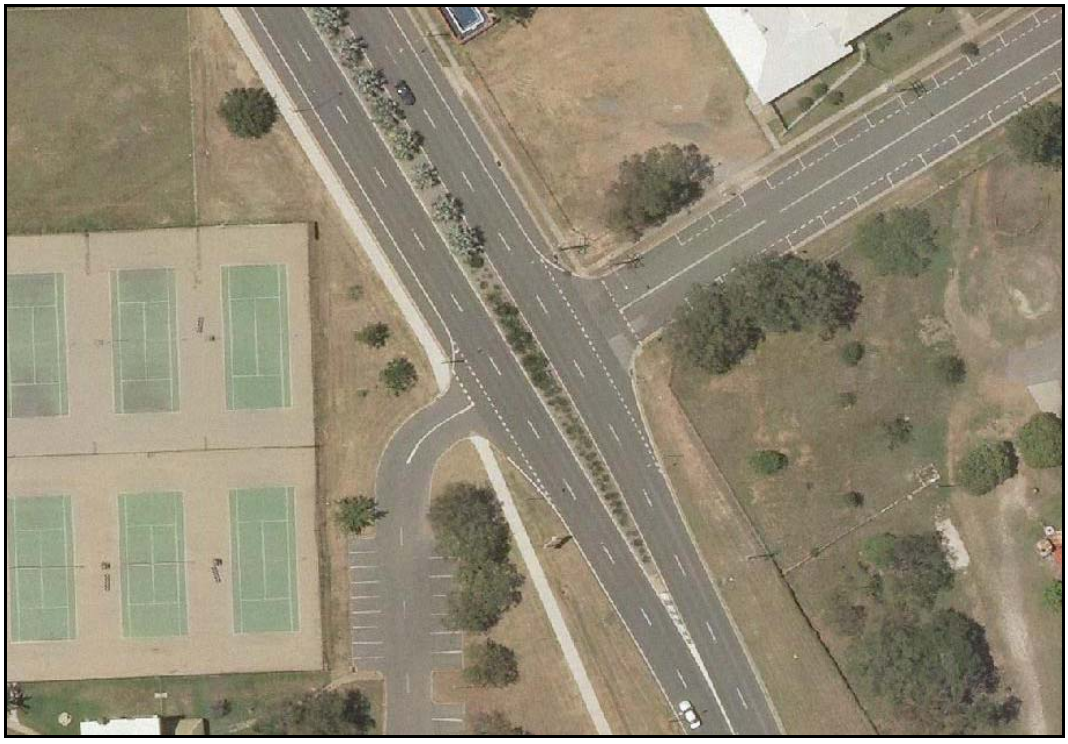


Figure 7-12 Glenlyon Street/ Herbert Street/ Tennis Centre Access – Existing Layout

Table 7-21 Intersection Performance – Glenlyon St / Herbert St/ Tennis C Access

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.147	1.7	3	0.212	1.0	3
Scenario 2	0.156	1.7	4	0.226	1.0	3
Scenario 3a	0.229	1.4	4	0.307	1.0	5
Scenario 3b	0.229	1.4	4	0.300	1.0	5
Scenario 3c	0.210	1.5	4	0.284	1.0	4
Scenario 3d	0.286	1.3	4	0.339	1.1	6
Scenario 4	0.170	1.7	4	0.246	1.1	4
Scenario 5a	0.250	1.4	4	0.320	1.1	6
Scenario 5b	0.250	1.4	4	0.313	1.1	6
Scenario 5c	0.286	1.3	4	0.352	1.2	7

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5d	0.286	1.3	4	0.351	1.2	7
Scenario 6a	0.250	1.4	4	0.320	1.1	6
Scenario 6b	0.250	1.4	4	0.313	1.1	6
Scenario 6c	0.286	1.3	4	0.352	1.2	7
Scenario 6d	0.286	1.3	4	0.351	1.2	7

7.15 Glenlyon Street/ Tank Street

The existing intersection at the Glenlyon Street/Tank Street intersection is presented in Figure 7-13. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-22 below.

Figure 7-13 Glenlyon Street/Tank Street – Existing Layout

The SIDRA results indicate that the intersection is already operating at its theoretical capacity. Therefore any increase in volumes would further exacerbate the situation.

Given that the intersection is not anticipated to operate within capacity limitations under a "without development" scenario, further SIDRA analysis for the 'with shuttle bus" condition (see Section 4.3) has not been undertaken. Although development generated traffic will be reduced with the use of shuttle busses, intersection operations cannot improve to acceptable levels.

Upgrade requirements at this location are provided in Section 8.10.

Table 7-22 Intersection Performance – Glenlyon Street / Tank Street

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	1.002	36.6 (LOS D)	201	1.000	33.4 (LOS C)	177
Scenario 2	1.003	37.6 (LOS D)	229	2.143	140.0 (LOS F)	590
Scenario 3a	1.109	131.5 (LOS F)	823	2.260	207.0 (LOS F)	735
Scenario 3b	1.109	131.5 (LOS F)	823	2.260	192.8 (LOS F)	735
Scenario 3c	1.003	61.5 (LOS E)	472	2.260	174.2 (LOS F)	735
Scenario 3d	1.305	304.1 (LOS F)	1609	2.260	284.1 (LOS F)	1076
Scenario 4	1.000	39.3 (LOS D)	240	2.309	291.1 (LOS F)	1154
Scenario 5a	1.142	153.6 (LOS F)	957	2.390	358.0 (LOS F)	1256
Scenario 5b	1.142	153.6 (LOS F)	957	2.390	343.1 (LOS F)	1256
Scenario 5c	1.327	313.2 (LOS F)	1692	2.390	429.3 (LOS F)	1255
Scenario 5d	1.325	309.3 (LOS F)	1675	2.390	427.4 (LOS F)	1255
Scenario 6a	1.142	153.6 (LOS F)	957	2.390	358.7 (LOS F)	1256
Scenario 6b	1.142	153.6 (LOS F)	957	2.390	343.1 (LOS F)	1256
Scenario 6c	1.327	313.2 (LOS F)	1692	2.390	429.3 (LOS F)	1255
Scenario 6d	1.325	309.3 (LOS F)	1675	2.390	427.4 (LOS F)	1255

7.16 Port Access Road/ Mark Fenton Drive/ Hopper Road/ Tug Berth Access Road

The existing layout at the Gladstone Port Access Road/Mark Fenton Drive/Hopper Road/Tug Berth Access Road intersection is presented in Figure 7-14. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-23 below.

Figure 7-14 Port Access/ Mark Fenton Dr/ Tug Berth Access Rd – Existing Layout

The analysis results indicate that the intersection is anticipated to operate within satisfactory service criteria for all scenarios with the exception of Scenario 3. Additional SIDRA analyses have been completed for the airport shuttle scenario (see Section 4.3) and the results provided in Table 7-24 indicate that the intersection is still anticipated to operate above the practical absorption capacity for roundabouts (i.e. 0.85).

The required future year intersection form is discussed in Section 8.11.

Table 7-23 Intersection Performance – Port Access Rd/Tug Berth Access Rd

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.093	9.6 (LOS A)	4	0.076	8.9 (LOS A)	3
Scenario 2	0.099	9.6 (LOS A)	5	0.081	8.9 (LOS A)	3
Scenario 3a	0.619	6.1 (LOS A)	46	0.651	6.3 (LOS A)	46
Scenario 3b	0.619	6.1 (LOSA)	46	0.651	6.3 (LOS A)	46

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3c	0.534	6.2 (LOS A)	35	0.583	6.2 (LOSA)	37
Scenario 3d	1.067	47.0 (LOS D)	949	1.040	46.0 (LOS D)	554

Table 7-24 Performance with Shuttle - Port Access Rd/Tug Berth Access Rd

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3d	0.956	8.4 (LOS A)	284	0.916	8.9 (LOS A)	154

7.17 Dawson Road/ Blain Drive/ Herbertson Street

The existing layout at the Dawson Road/Blain Drive/Herbertson Street intersection is presented in Figure 7-15. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-25 and Table 7-26 below.

Figure 7-15 Dawson Highway/ Blain Drive/ Herbertson Street

The results of the analysis suggest that the existing intersection form is able to provide adequate service for 2010, 2013 and 2018 "without development" conditions. This is not the case however, for "with development" conditions in 2013 for both road bridge options and anticipated DOS in the afternoon peak slightly exceeds the practical absorption capacity of 0.85 for roundabouts. It is noted, however, that anticipated delays still do not exceed 20 seconds for any of the road bridge scenarios in 2013.

Intersection performance for the "with development" scenario with no road bridge (i.e. water transport is utilised from a jetty at the end of Alf O'Rourke Drive) indicates that performance is well beyond acceptable conditions and anticipated average delays are either close to or exceed 1 minute. The required future year intersection form is discussed in Section 8.12 of this report.

Table 7-25 Intersection Performance – Dawson Highway/Blain Drive/ Herbertson St

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.429	6.9 (LOS A)	25	0.564	8.9 (LOS A)	34
Scenario 2	0.454	6.9 (LOS A)	27	0.610	9.3 (LOS A)	39
Scenario 3a	0.581	6.9 (LOS A)	39	0.751	11.4 (LOS B)	70
Scenario 3c	0.565	6.9 (LOS A)	38	0.692	10.4 (LOS B)	58
Scenario 3d	0.673	7.1 (LOS A)	53	0.866	13.6 (LOS B)	106
Scenario 4	0.503	7.1 (LOS A)	32	0.685	10.1 (LOS B)	50
Scenario 5a	0.564	7.2 (LOS A)	38	0.852	14.4 (LOS B)	90
Scenario 5b	0.564	7.2 (LOS A)	38	0.836	13.0 (LOS B)	84
Scenario 5c	0.576	7.2 (LOS A)	38	0.874	15.5 (LOS B)	100
Scenario 5d	0.567	7.2 (LOS A)	38	0.871	15.4 (LOS B)	98
Scenario 6a	0.564	7.2 (LOS A)	38	0.852	14.4 (LOS B)	90
Scenario 6b	0.564	7.2 (LOS A)	38	0.836	13.0 (LOS B)	84
Scenario 6c	0.576	7.2 (LOS A)	38	0.874	15.5 (LOS B)	100
Scenario 6d	0.576	7.2 (LOS A)	38	0.871	15.4 (LOS B)	98
Scenario 7a	0.679	7.8 (LOS A)	56	1.137	64.6 (LOS E)	734
Scenario 7b	0.679	7.9 (LOS A)	56	1.125	58.9 (LOS E)	702
Scenario 7c	0.634	7.5 (LOS A)	47	1.078	45.0 (LOS D)	508

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 7d	0.772	8.7 (LOS A)	83	1.397	159.8 (LOS F)	1924
Scenario 12	0.606	7.6 (LOS A)	42	0.844	13.8 (LOS B)	86
Scenario 13a	0.632	7.8 (LOS A)	47	0.939	21.3 (LOS C)	143
Scenario 13c	0.634	7.8 (LOS A)	48	0.951	23.2 (LOS C)	156
Scenario 13d	0.632	7.8 (LOS A)	48	0.950	22.9 (LOS C)	154
Scenario 14a	0.632	7.8 (LOS A)	47	0.939	21.3 (LOS C)	143
Scenario 14c	0.634	7.8 (LOS A)	48	0.951	23.2 (LOS C)	156
Scenario 14d	0.632	7.8 (LOS A)	48	0.950	22.9 (LOS C)	154
Scenario 15a	0.690	8.4 (LOS A)	60	1.098	53.3 (LOS D)	549
Scenario 15b	0.690	8.4 (LOS A)	60	1.093	49.5 (LOS D)	535
Scenario 15c	0.668	8.1 (LOS A)	55	1.081	46.8 (LOS D)	494
Scenario 15d	0.741	8.8 (LOS A)	73	1.258	99.3 (LOS F)	1212

Table 7-26 Intersection Performance – Dawson Highway/Blain Drive/ Herbertson St

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	-	-	-	0.839	13.1 (LOS B)	86
Scenario 5c	-	-	-	0.862	13.8 (LOS B)	95
Scenario 5d	-	-	-	0.854	13.6 (LOS B)	91
Scenario 6a	-	-	-	0.839	13.1 (LOS B)	86
Scenario 6b	-	-	-	0.836	13.0 (LOS B)	84
Scenario 6c	-	-	-	0.857	13.7 (LOS B)	92
Scenario 6d	-	-	-	0.852	13.5 (LOS B)	90
Scenario 7a	-	-	-	1.115	55.8 (LOS E)	657
Scenario 7b	-	-	-	1.125	58.9 (LOS E)	702
Scenario 7c	-	-	-	1.018	29.8 (LOS C)	296

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 7d	-	-	-	1.272	109.9 (LOS F)	1350
Scenario 13a	-	-	-	0.931	19.2 (LOS B)	136
Scenario 13c	-	-	-	0.943	20.5 (LOS C)	148
Scenario 13d	-	-	-	0.940	20.1 (LOS C)	145
Scenario 14a	-	-	-	0.930	19.1 (LOS B)	135
Scenario 14c	-	-	-	0.941	20.3 (LOS C)	146
Scenario 14d	-	-	-	0.939	20.0 (LOS B)	143
Scenario 15a	-	-	-	1.087	48.3 (LOS D)	515
Scenario 15b	-	-	-	1.093	49.5 (LOS D)	535
Scenario 15c	-	-	-	1.046	38.5 (LOS D)	371
Scenario 15d	-	-	-	1.190	77.7 (LOS E)	930

7.18 Dawson Highway/ Phillip Street/ Shopping Centre Access

The existing layout at the Dawson Highway/Phillip Street/Shopping Centre Access is shown below in Figure 7-16. It is a signalised roundabout with metered approaches on Phillip Street, the southern approach of the Dawson Highway and at the shopping centre access. The meter on the Phillip Street approach operates during the morning peak hour and the other two approaches at the Dawson Highway and at the shopping centre access operate during the afternoon peak.

The SIDRA results presented in Table 7-27 are for the existing intersection layout but without roundabout metering. Whilst SIDRA is able to roughly approximate intersection performance through a series of iterations involving analysis of performance "with" and then "without" the meter, this intersection has been selected to be part of additional micro-simulation analysis. As micro-simulation will yield a far more accurate result, further analysis using SIDRA has not been completed. The results of the microsimulation can be found in *QLD Curtis LNG Project EIS Microsimulation Assessment* (Halcrow MWT, 2009).

The results in Table 7-27 indicate that without roundabout metering, the intersection is not expected to provide acceptable service conditions.

Figure 7-16 **Dawson Highway/Phillip Street/Shopping Access – Existing Layout**

Table 7-27 **Intersection Performance – Dawson Hwy/Phillip Street/Shopping Centre**

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.793	11.0 (LOS B)	94	0.932	16.0 (LOS B)	135
Scenario 2	0.855	12.6 (LOS B)	124	1.080	30.3 (LOS C)	360
Scenario 3c	0.990	23.5 (LOS C)	285	1.331	84.8 (LOS F)	834
Scenario 3d	1.128	80.2 (LOS F)	838	1.370	140.9 (LOS F)	913
Scenario 4	0.967	21.1 (LOS C)	250	1.320	75.9 (LOS E)	890
Scenario 7a	1.223	119.9 (LOS F)	1168	1.299	147.3 (LOS F)	1102
Scenario 7b	1.233	122.5 (LOS F)	1193	1.301	149.3 (LOS F)	1124
Scenario 7c	1.142	84.3 (LOS F)	863	1.330	143.4 (LOS F)	1008
Scenario 7d	1.377	196.6 (LOS F)	1836	1.371	217.0 (LOS F)	1787
Scenario 12	1.206	112.6 (LOS F)	1168	1.471	176.1 (LOS F)	1306
Scenario 13c	1.233	126.9 (LOS F)	1304	1.461	195.0 (LOS F)	1304
Scenario 13d	1.231	125.8 (LOS F)	1294	1.461	194.2 (LOS F)	1294

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 14c	1.233	126.9 (LOS F)	1304	1.461	195.0 (LOS F)	1304
Scenario 14d	1.231	125.8 (LOS F)	1294	1.461	194.2 (LOS F)	1294
Scenario 15a	1.328	170.5 (LOS F)	1683	1.443	224.5 (LOS F)	1637
Scenario 15b	1.337	171.7 (LOS F)	1694	1.443	225.6 (LOS F)	1650
Scenario 15c	1.288	153.4 (LOS F)	1547	1.456	225.2 (LOS F)	1621
Scenario 15d	1.398	207.6 (LOS F)	2010	1.467	266.2 (LOS F)	2034

7.19 Dawson Highway/ Don Young Drive

The existing layout at the Dawson Highway/Don Young Drive intersection is presented in Figure 7-17. The results of the SIDRA analyses "with" and "without" the proposed LNG facility for affected scenarios (as per Section 7.2) are provided in Table 7-28 (without shuttle bus) and Table 7-29 (with shuttle bus) below.

Figure 7-17 Dawson Highway/Don Young Drive – Existing Layout

Analysis results indicate that the intersection is expected to operate within acceptable service parameters for all design horizons with the exception of Scenario 7b in the afternoon peak. Recalculation of intersection operations with the inclusion of the airport shuttle, however, brings anticipated intersection operations back down to

acceptable levels. Therefore, upgrade works at this intersection are not required, provided that the airport shuttle service is in operation in 2013 for Construction Camp Option D.

Table 7-28 Intersection Performance – Dawson Highway/ Don Young Drive

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 1	0.325	4.4	15	0.453	5.5	24
Scenario 2	0.409	4.9	19	0.544	6.3	32
Scenario 3a	0.519	5.2	25	0.699	7.9	50
Scenario 3b	0.542	5.3	26	0.817	9.7	63
Scenario 3c	0.545	5.4	27	0.684	7.4	45
Scenario 3d	0.675	6.3	35	0.785	9.0	59
Scenario 4	0.609	6.3	32	0.732	8.7	54
Scenario 5a	0.609	6.3	32	0.778	9.9	68
Scenario 5c	0.775	9.3	47	0.772	9.7	66
Scenario 5d	0.791	9.6	49	0.775	9.8	67
Scenario 6a	0.609	6.3	32	0.778	9.9	68

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 6c	0.775	9.3	47	0.772	9.7	66
Scenario 6d	0.791	9.6	49	0.775	9.8	67
Scenario 7a	0.681	6.9	37	0.849	11.8	84
Scenario 7b	0.707	7.2	40	1.039	27.3	170

Table 7-29 Performance with Shuttle – Dawson Highway/ Don Young Drive

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 7b	-	-	-	0.845	11.3	76

7.20 Intersection Analysis Summary

The following intersections presented in Table 7-30 require further investigation so that anticipated impacts can be mitigated through appropriate remedial works.

Table 7-30 Intersection Analysis Summary

Intersection	Scenarios
Bruce Highway/Dawson Highway	12 13a, 13b, 13c, 13d 14a, 14b, 14c, 14d 15a, 15b, 15d
Gladstone-Mt Larcom Road/Calliope River-Targinie Road	6a, 6b, 6c, 6d 20, 22
Gladstone-Mt Larcom Road/Landing Road	5a, 5b, 5c, 5d 6a, 6b, 6c, 6d 20, 21
Hanson Road/Reid Road	12 13a, 13b, 13c, 13d 14a, 14b, 14c, 14d
Hanson Road/Red Rover Road	5a, 5b, 5c, 5d 6a, 6b, 6c, 6d

Intersection	Scenarios
Hanson Road/Blain Drive/Alf O'Rourke Drive	5a, 5b, 5c, 5d 6a, 6b, 6c, 6d 7a, 7b, 7c, 7d
Glenlyon Street/Gladstone Port Access Road/Railway Street	3a, 3b, 3c, 3d
Glenlyon Street/Dawson Highway/Bramston Street	4 5a, 5b, 5c, 5d 6a, 6b, 6c, 6d 7a, 7b, 7c, 7d
Glenlyon Street/Tank Street	4 5a, 5b, 5c, 5d 6a, 6b, 6c, 6d
Port Access Rd/Mark Fenton Dr/Hopper Rd/Tug Berth Access Rd	3d
Dawson Highway/Blain Drive/Herbertson Street	7a, 7b, 7c, 7d 13a, 13c, 13d 14a, 14c, 14d

The future year intersection forms are supplied in Section 8.

8 Intersection Form

8.1 Overview

As per Table 7-30 above, this section presents the intersection layouts that are required in order to provide adequate servicing conditions at the future design years.

8.2 Bruce Highway/Dawson Highway

8.2.1 Without Development Intersection Requirements

The Bruce Highway/Dawson Highway intersection, termed the Calliope Crossroads, is currently under investigation for potential grade separation due to safety concerns with the current design. Late last year, the federal government provided $3 million to bring forward the planning for the intersection upgrade (which is anticipated to be completed by December 2009), and will eventually amount to a $55 million contribution towards construction.

Given the current planning, a grade separated configuration has been adopted for the analysis. Whilst there are a number of potential options for grade separation, it is assumed that the Bruce Highway will become the grade separated portion, leaving the Dawson Highway at-grade. This is considered the most likely solution as the Bruce Highway forms part of the Auslink network.

The at grade portion for the upgraded intersection is shown in Figure 8-1. Note that the through lanes on the Bruce Highway are included for access considerations only, and the corresponding traffic flow on these through movements have been reduced to a nominal 10 vehicles per hour with a 5% heavy vehicle composition.

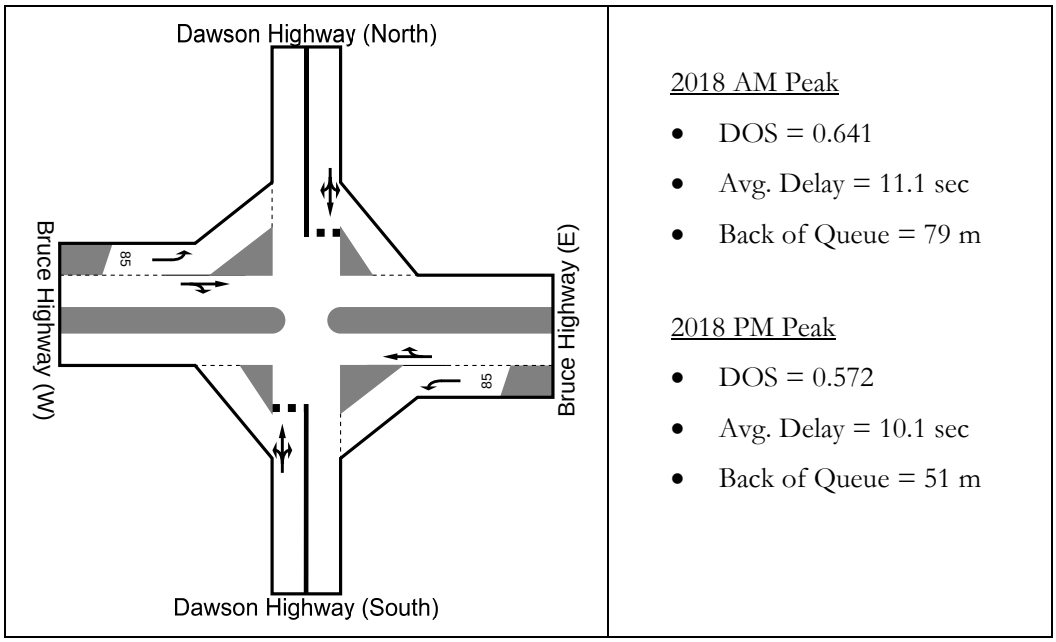


Figure 8-1 Bruce Highway/Dawson Highway – Upgrade Works (Without Dev)

8.2.2 With Development Intersection Requirements

The "without development" intersection configuration shown in Figure 8-1 has been tested with the addition of development generated traffic. SIDRA results are presented in Table 8-1.

The analysis results suggest that the intersection is expected to operate within acceptable performance parameters under the additional development generated traffic loading. Remedial works resultant from the proposed development is therefore not required.

Table 8-1 Bruce Highway/Dawson Highway – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 13a	0.660	11.2	84	0.621	11.3	63
Scenario 13b	0.660	16.2	85	0.621	11.2	63
Scenario 13c	0.684	11.5	95	0.621	11.4	63
Scenario 13d	0.685	11.4	95	0.621	11.4	63
Scenario 14a	0.660	11.2	85	0.621	11.3	63
Scenario 14b	0.660	11.2	85	0.621	11.2	63
Scenario 14c	0.684	11.5	95	0.621	11.4	63
Scenario 14d	0.685	11.5	96	0.621	11.4	63
Scenario 15a	0.662	11.3	86	0.628	11.0	67
Scenario 15b	0.666	11.4	87	0.639	11.1	70
Scenario 15d	0.732	12.5	112	0.661	10.9	77

8.3 Gladstone-Mt Larcom Road/Calliope River-Targinie Road

8.3.1 With Development Intersection Requirements at 2013

SIDRA results presented in Section 7.6 indicated that the Gladstone-Mt Larcom Road/Calliope River-Targinie Road intersection was not anticipated to operate with acceptable performance parameters under road bridge option 2 (Phillipies Landing Road extension) for all construction camp options. For the 2013 design year, it was also shown that the intersection was expected to operate adequately without the presence of the proposed development. Therefore, the upgrade works presented in this section would be the responsibility of the proponent, should any of Scenarios 6a to 6d proceed.

Inspection of SIDRA results indicate that the critical movements under the existing intersection form are:

- All movements at the southern approach of Calliope River-Targinie Road during the morning peak, for all construction camp options;
- Right turn movement from the eastern approach at Gladstone-Mt Larcom Road during the morning peak, for construction camp options C and D; and
- All movements at the northern approach of Calliope River-Targinie Road during the afternoon peak, for all construction camp options.

The future year intersection forms for each construction camp option are presented in Figure 8-2. Corresponding SIDRA results are provided in Table 8-2.

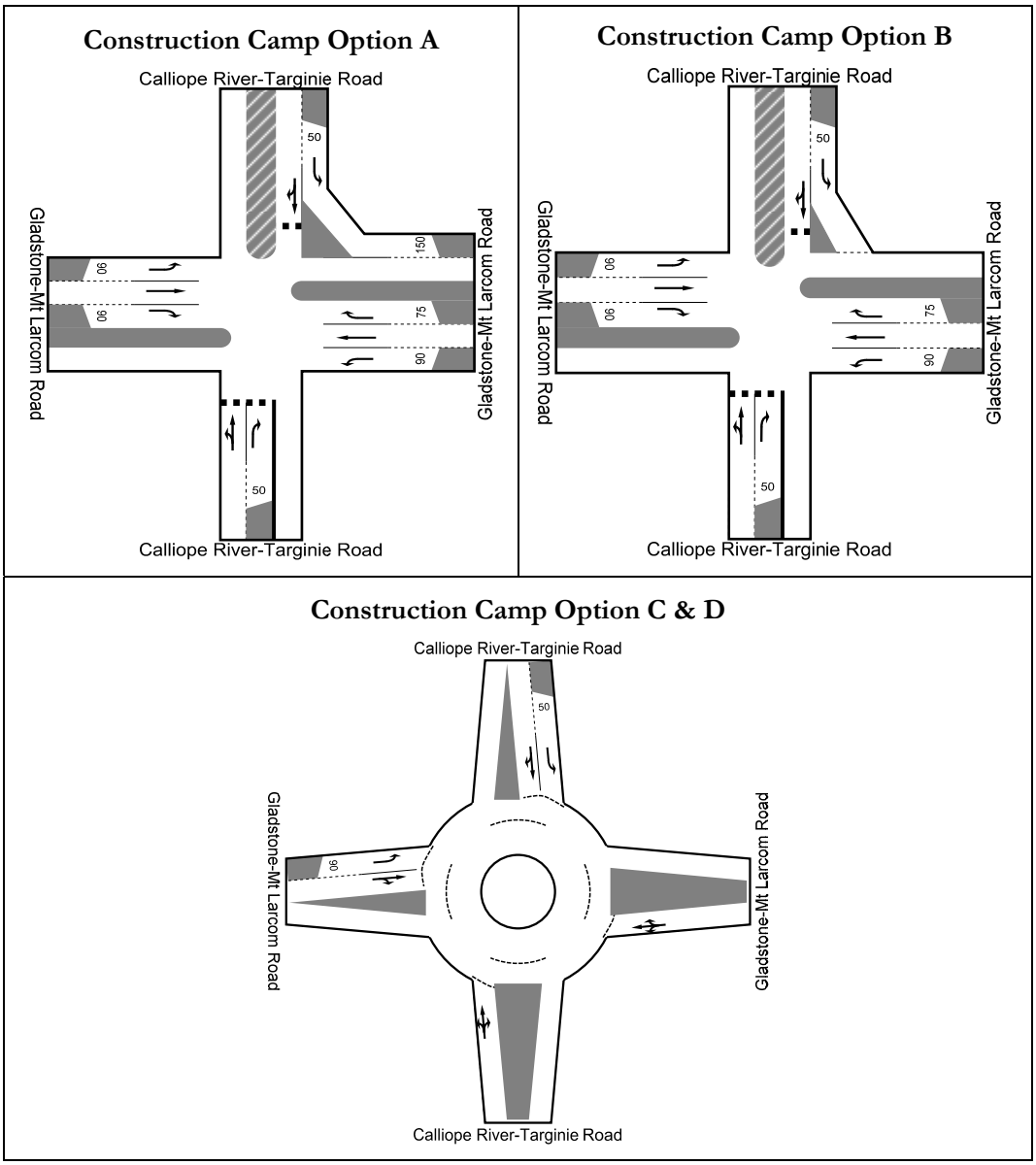


Figure 8-2 Gladstone Mt Larcom/Calliope River Targinie – Upgrade Works (With Dev)

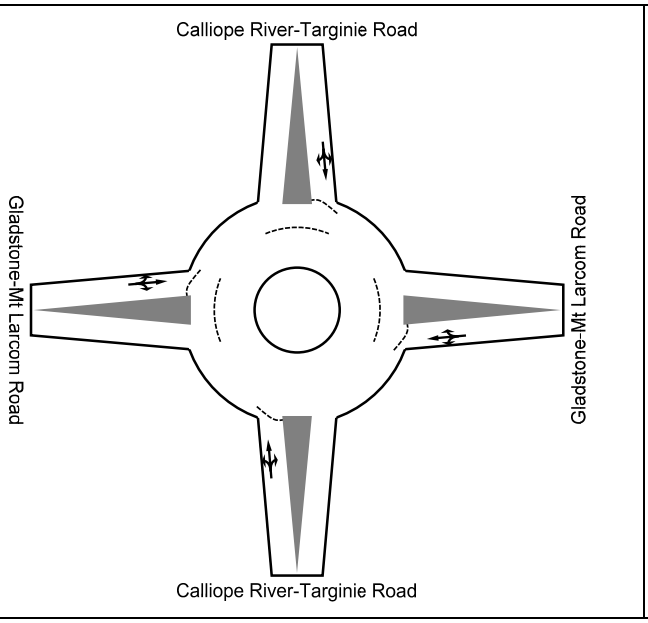
Table 8-2 Gladstone Mt Larcom Rd/Calliope River Targinie Rd – Performance

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 6a	0.633	14.7	63	0.597	9.0	29
Scenario 6b	0.692	15.5	60	0.686	9.7	77
Scenario 6c	0.822	20.6 (LOS C)	95	0.783	8.6 (LOS A)	73
Scenario 6d	0.769	19.1 (LOS B)	102	0.776	8.7 (LOS A)	71

8.3.2 Without Development Intersection Requirements at 2031

If Bridge Option 2 does not proceed, background volumes are anticipated to increase to the point where "without development" remedial works may be required in 2031. The future year intersection form is shown in Figure 8-3.

It should be noted that variations of priority controlled arrangements, similar to existing, were tested. As all tested options did not provide acceptable service conditions, upgrade to a roundabout arrangement was deemed necessary.



2031 AM Peak

- DOS = 0.500
- Avg. Delay = 9.1 sec
- LOS A
- Back of Queue = 36 m

2031 PM Peak

- DOS = 0.513
- Avg. Delay = 7.7 sec
- LOS A
- Back of Queue = 39 m

Figure 8-3 Gladstone Mt Larcom/Calliope River Targinie – Upgrade Works (Without Dev)

8.3.3 With Development Intersection Requirements at 2031

The "without development" intersection configuration shown in Figure 8-3 has been tested with the addition of development generated traffic. SIDRA results are presented in Table 8-3.

The analysis results suggest that the intersection is expected to operate within acceptable performance parameters under the additional development generated traffic loading. Therefore, if road bridge option 2 does not proceed, additional works at this intersection are not required as part of the development proposal.

Table 8-3 Gladstone Mt Larcom Rd/Calliope River Targinie Rd – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 22	0.502	9.5 (LOS A)	38	0.544	8.0 (LOS A)	43

8.4 Gladstone-Mt Larcom Road/Landing Road

8.4.1 With Development Intersection Requirements at 2013

SIDRA results presented in Section 7.7 indicated that the Gladstone-Mt Larcom Road/Landing Road intersection was not anticipated to operate with acceptable performance parameters in 2013 for all construction camp options and both bridge options. For the 2013 design year, it was also shown that the intersection was expected to operate adequately without the presence of the proposed development. Therefore, the upgrade works presented in this section would be the responsibility of the proponent, should any of Scenarios 5a through to 6d proceed.

Bridge Option 1 – Landing Road Extension

Inspection of SIDRA results indicate that the critical movement under the existing intersection form is the right turn from the eastern approach at Gladstone-Mt Larcom Road, for all construction camp options during both peak periods.

Bridge Option 2 – Phillipies Landing Road Extension

For Bridge Option 2, the critical movement is the right turn into Gladstone-Mt Larcom Road (south) from Gladstone-Mt Larcom Road (west). This is the case for both peak periods.

The future year intersection forms for each construction camp option are presented in Figure 8-4 and Figure 8-5. Corresponding SIDRA results are provided in Table 8-4. It should be noted that a number of priority controlled configurations were tested, however, to provide the required capacity a roundabout arrangement was deemed to be necessary.

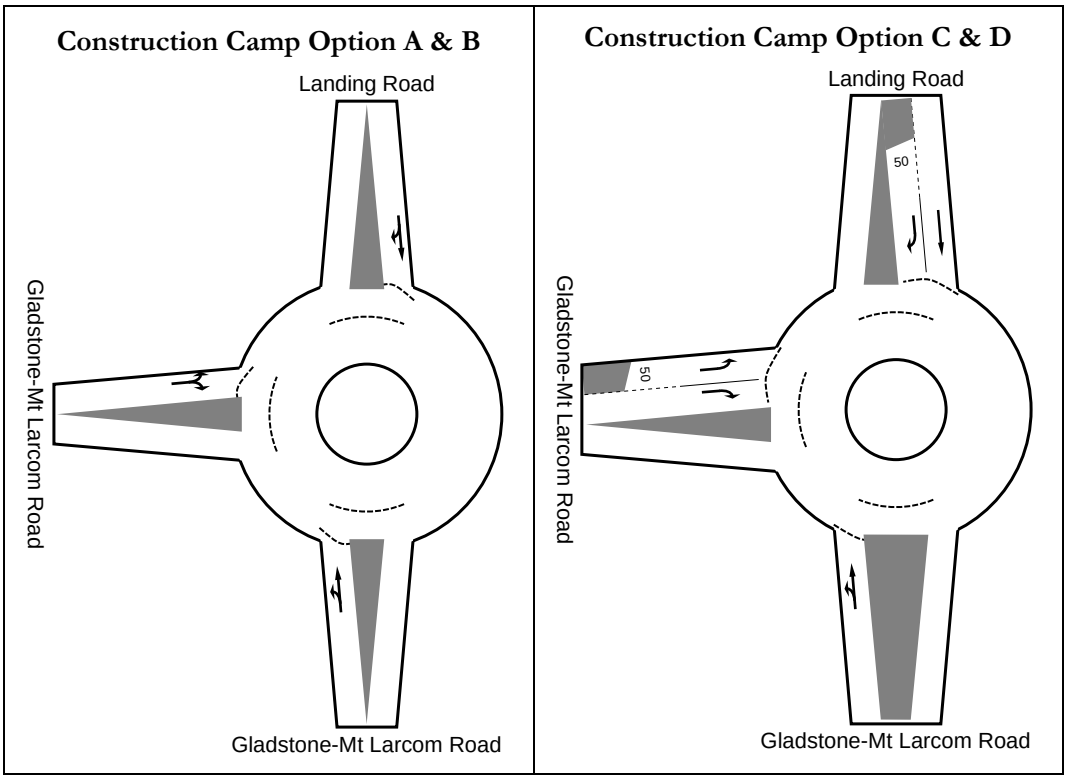


Figure 8-4 Gladstone Mt Larcom/Landing Rd – Upgrade Works (With Dev, Bridge 1)

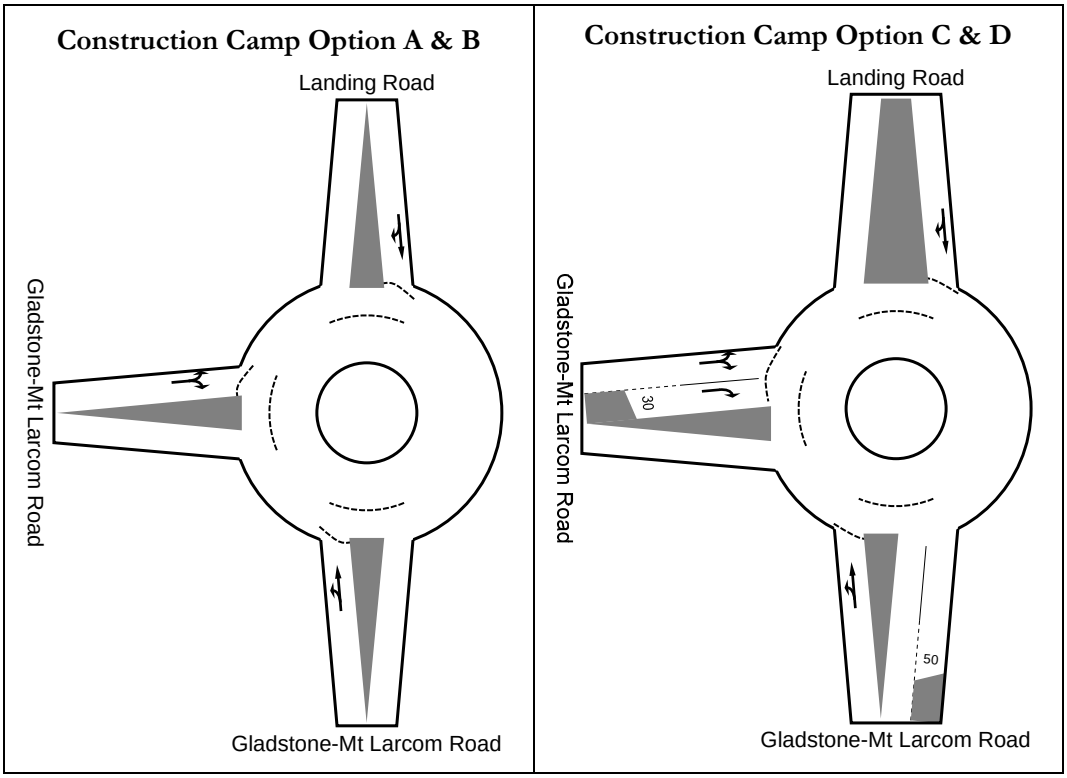


Figure 8-5 Gladstone Mt Larcom/Landing Rd – Upgrade Works (With Dev, Bridge 2)

Table 8-4 Gladstone Mt Larcom Rd/Landing Rd – Performance

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	0.624	9.6 (LOS A)	63	0.703	9.2 (LOS A)	71
Scenario 5b	0.624	9.6 (LOS A)	63	0.602	7.5 (LOS A)	50
Scenario 5c	0.789	12.8 (LOS B)	125	0.842	9.2 (LOS A)	116
Scenario 5d	0.782	12.8 (LOS B)	121	0.835	9.2 (LOS A)	112
Scenario 6a	0.567	7.1 (LOS A)	60	0.724	12.1 (LOS B)	73
Scenario 6b	0.567	7.1 (LOS A)	60	0.667	10.9 (LOS B)	52
Scenario 6c	0.785	6.8 (LOS A)	125	0.615	11.1 (LOS B)	31
Scenario 6d	0.778	6.8 (LOS A)	121	0.610	11.0 (LOS B)	30

8.4.2 Without Development Intersection Requirements at 2031

If both Bridge Options 1 and 2 do not proceed and ferry transport continues to be utilised for the transport of equipment and personnel, background volumes at the Gladstone-Mt Larcom Road/Landing Road intersection are still anticipated to increase to the point where "without development" remedial works may be required in 2021. As would be expected, this condition worsens through to 2031 and anticipated DOS could reach 5 times the available capacity if a "do nothing" scenario proceeds and the existing intersection form is retained.

The future year intersection form that is required to cater for 2031 predicted volumes is presented in Figure 8-6. It should be noted that various priority controlled arrangements, similar to existing, were tested. As all tested options did not provide acceptable service conditions, upgrade to a roundabout arrangement was deemed necessary.

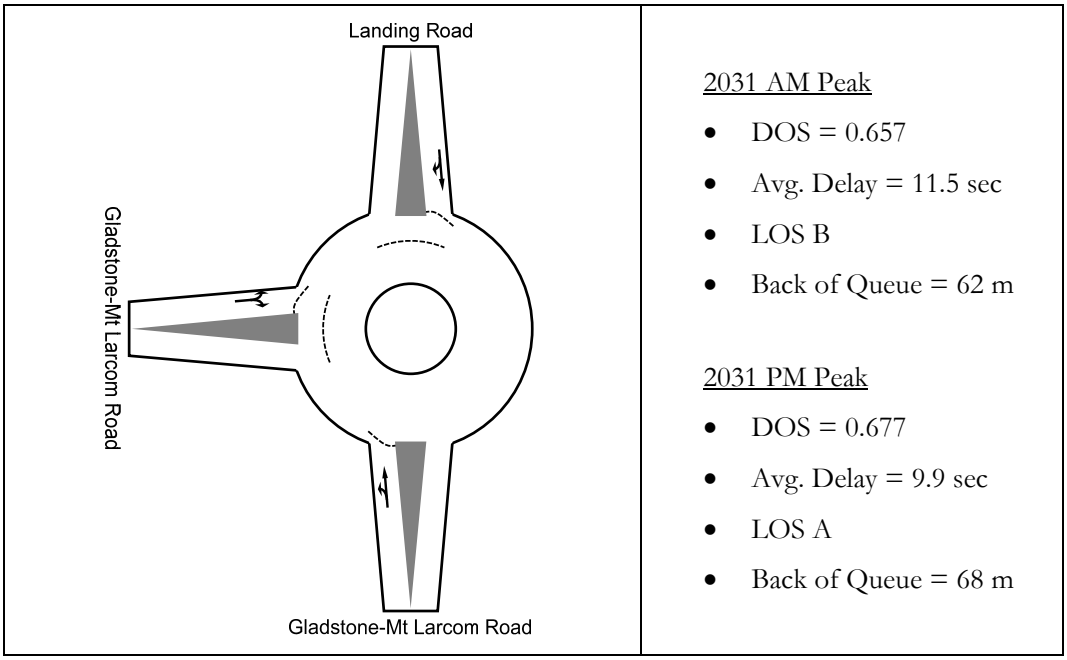


Figure 8-6 Gladstone-Mt Larcom Road/Landing Road – Upgrade Works (Without Dev)

8.4.3 With Development Intersection Requirements at 2031

The "without development" intersection configuration shown in Figure 8-6 has been tested with the addition of development generated traffic. SIDRA results are presented in Table 8-5.

The analysis results suggest that the intersection is expected to operate within acceptable performance parameters under the additional development generated traffic loading. Therefore, if neither bridge option proceeds, additional works at this intersection are not required as part of the development proposal.

Table 8-5 Gladstone Mt Larcom Rd/Landing Road – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 21	0.698	12.0 (LOS B)	71	0.728	10.3 (LOS B)	82

8.5 Hanson Road/Reid Road

8.5.1 Without Development Intersection Requirements

As discussed in Section 6.5, Gladstone-Mt Larcom Road between Reid Road and Red Rover Road is required to be a four lane rural cross section. The corresponding intersection layout that would complement the midblock form is shown in Figure 8-7.

The SIDRA results suggest that a layout of this standard does not provide the required capacity in the 2018 afternoon peak.

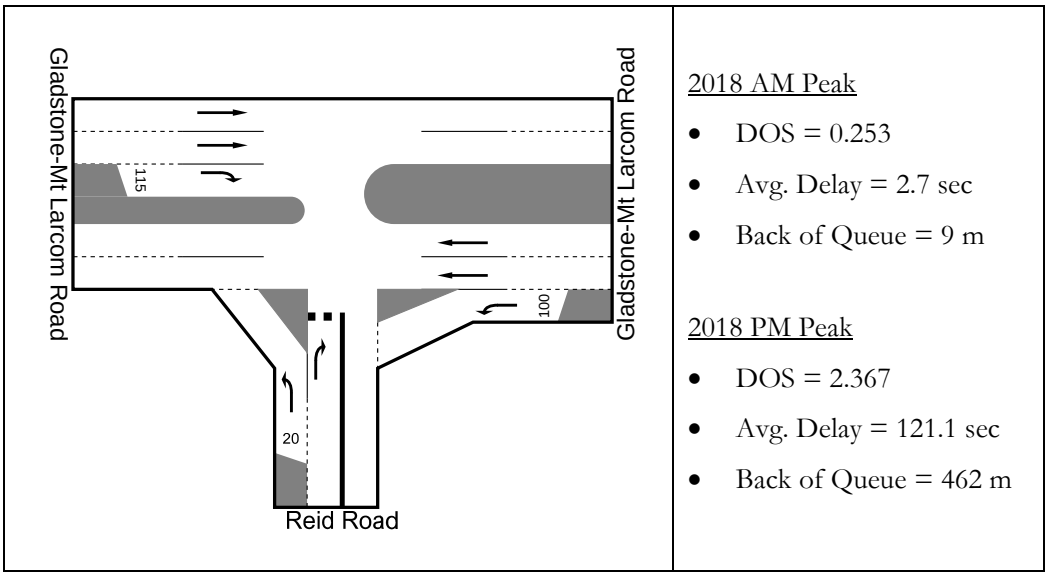


Figure 8-7 Hanson Rd/Reid Rd – Upgrade Works (Match Midblock)

The critical movement in the 2018 afternoon peak is the right turn from Reid Road. To improve operations for this movement a seagull arrangement can be implemented. The required intersection form is indicated roughly in Figure 8-8 below.

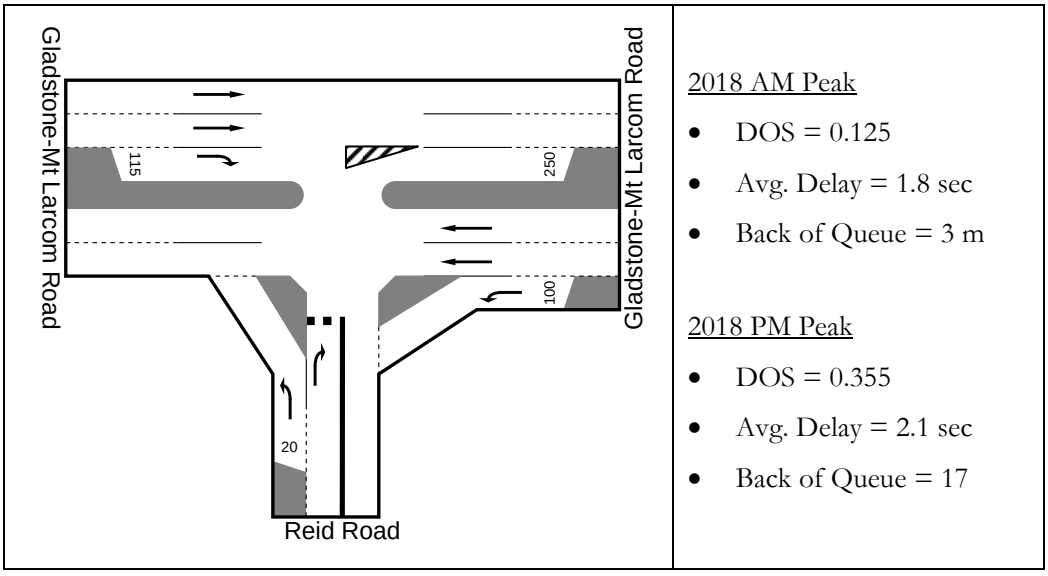


Figure 8-8 Hanson Rd/Reid Rd – Upgrade Works (Without Dev)

8.5.2 With Development Intersection Requirements

The "without development" intersection configuration shown in Figure 8-7 has been tested with the addition of development generated traffic. SIDRA results are presented in Table 8-6.

The analysis results suggest that the intersection is expected to operate within acceptable performance parameters under the additional development generated

traffic loading. Therefore, further works are not required as part of the proposed development.

Table 8-6 Hanson Road/Reid Road – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 13a	0.190	2.0	6	0.397	1.8	18
Scenario 13b	0.190	2.0	6	0.377	1.8	18
Scenario 13c	0.250	2.3	9	0.418	1.7	18
Scenario 13d	0.247	2.3	9	0.416	1.7	18
Scenario 14a	0.190	2.0	6	0.416	1.7	18
Scenario 14b	0.190	2.0	6	0.377	1.8	18
Scenario 14c	0.250	2.3	9	0.418	1.7	18
Scenario 14d	0.247	2.3	9	0.416	1.7	18

8.6 Hanson Road/Red Rover Road

8.6.1 Without Development Intersection Requirements

This intersection operates adequately without the presence of the proposed development.

8.6.2 With Development Intersection Requirements

SIDRA results presented in Section 7.9 indicated that the Hanson Road/Red Rover Road intersection was not anticipated to operate with acceptable performance parameters under both road bridge options for all construction camp options. This is not surprising considering that the section between Reid Road and Blain Drive was flagged for upgrade to an undivided 4 lane 2 way rural road, even without the presence of the proposed development.

Inspection of the SIDRA results indicates that the critical movement generally occurs in the afternoon peak and are:

- The through and right turn from Gladstone-Mt Larcom Road west for all construction camp options under the scenarios including bridge option 1;
- Although not the critical movement over the whole day, the left and right turn from Red Rover Road also operates above the practical absorption capacity during the morning peak for Construction Camp Options C and D; and
- The abovementioned comments are also applicable for all construction camp options under the scenarios including bridge option 2.

The future year intersection forms for each construction camp option are presented in Figure 8-9. The intersection forms conform to the mid-block requirements and assume that the 4 laning of Hanson Road does not extend over the bridge to the west of the intersection. Also note that the additional short turning lane from Red Rover Road takes into consideration the location of the adjacent access point.

Corresponding SIDRA results are provided in Table 8-2.

Given that the future year intersection form for construction camp options A and B does not require any additional flaring beyond that to match the mid block requirements, the proponent may not be responsible for the full cost of upgrade at the intersection. This may also be the case for construction camp options C and D when considering the cost of upgrade for the Hanson Road legs.

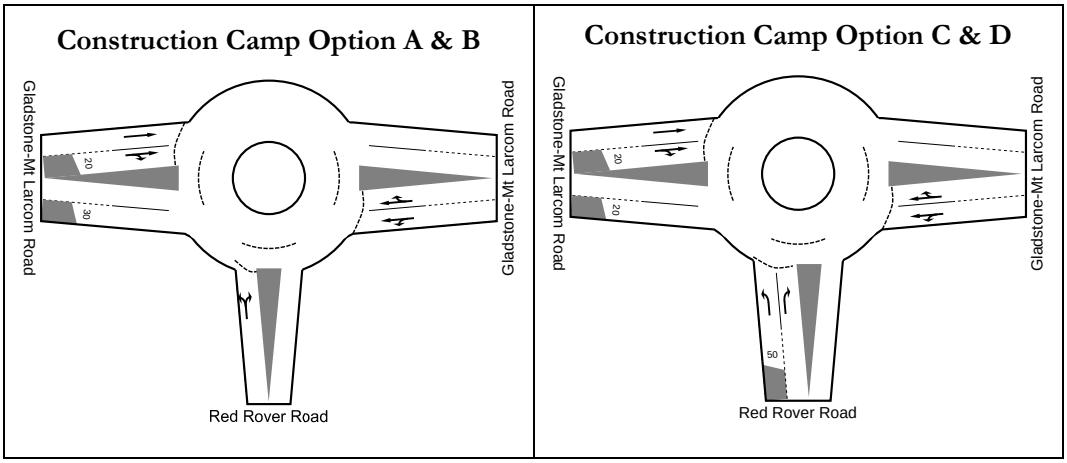


Figure 8-9 Hanson Road/Red Rover Road – Upgrade Works (With Dev, Bridge 1 & 2)

Table 8-7 Hanson Road/Red Rover Road – Performance

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	0.632	7.2 (LOS A)	51	0.692	6.8 (LOS A)	62
Scenario 5b	0.643	7.4 (LOS A)	55	0.635	6.7 (LOS A)	51
Scenario 5c	0.616	7.3 (LOS A)	55	0.756	6.8 (LOS A)	80
Scenario 5d	0.613	7.2 (LOS A)	54	0.750	6.8 (LOS A)	78
Scenario 6a	0.605	7.8 (LOS A)	61	0.688	6.8 (LOS A)	61
Scenario 6b	0.643	7.4 (LOS A)	55	0.631	6.7 (LOS A)	50
Scenario 6c	0.612	7.2 (LOS A)	54	0.756	6.8 (LOS A)	80
Scenario 6d	0.611	7.9 (LOS A)	66	0.750	6.8 (LOS A)	78

8.7 Hanson Road/ Blain Drive/ Alf O'Rourke Drive

8.7.1 Without Development Intersection Requirements

This intersection operates adequately without the presence of the proposed development, up to 2018.

8.7.2 With Development Intersection Requirements

Section 7.10 indicated that with development intersection performance decreased to unacceptable levels in 2013. This conforms to the findings of the link analyses which indicated that Hanson Road, between Red Rover Road and Blain Drive required upgrading to an undivided 4 lane, 2 way road in 2013, even without the presence of the proposed development. This requirement increases to a divided 4 lane 2 way road by 2018.

Inspection of SIDRA results under a "do nothing" arrangement indicates that the critical movements occur on the Alf O'Rourke Drive approach and the western Gladstone-Mt Larcom Road approach during the afternoon peak for both bridge options. For the scenario without the road bridge, the critical movement in the morning peak occurs on Gladstone-Mt Larcom Road west and in the afternoon peak occurs on the Alf O'Rourke Drive approach.

The future year intersection forms for each construction camp option are presented in Figure 8-10 and Figure 8-11. The intersection forms conform to the mid-block requirements and assume that the 4 laning of Hanson Road does not extend over the bridges to the north and east of the intersection.

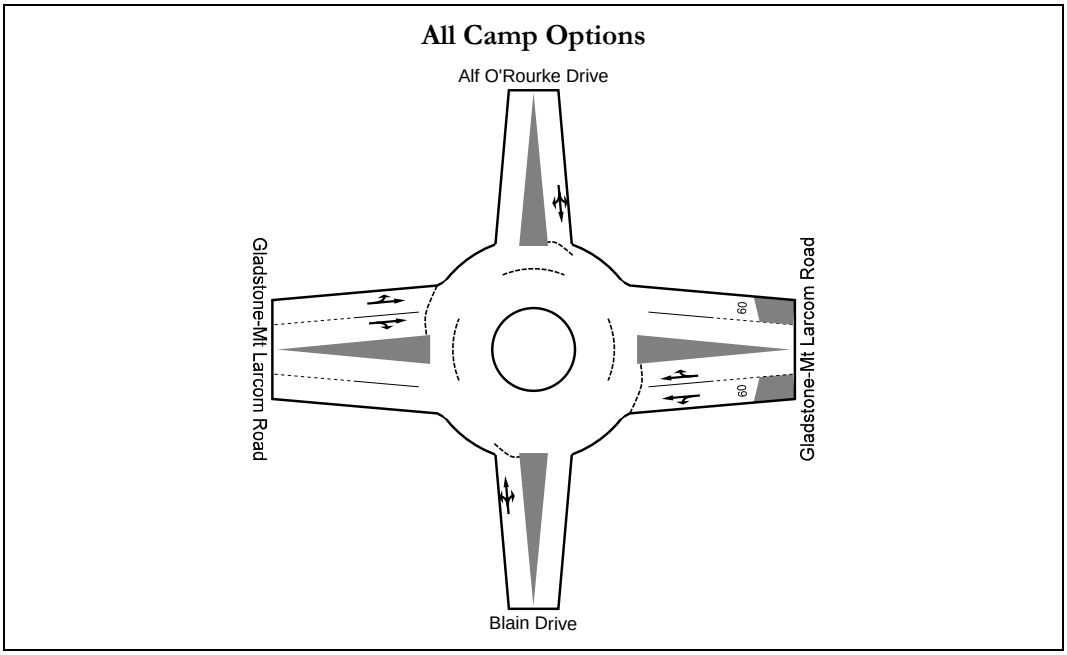


Figure 8-10 Hanson/Blain/Alf O'Rourke Dr – Upgrade Works (With Dev, Bridge 1 & 2)

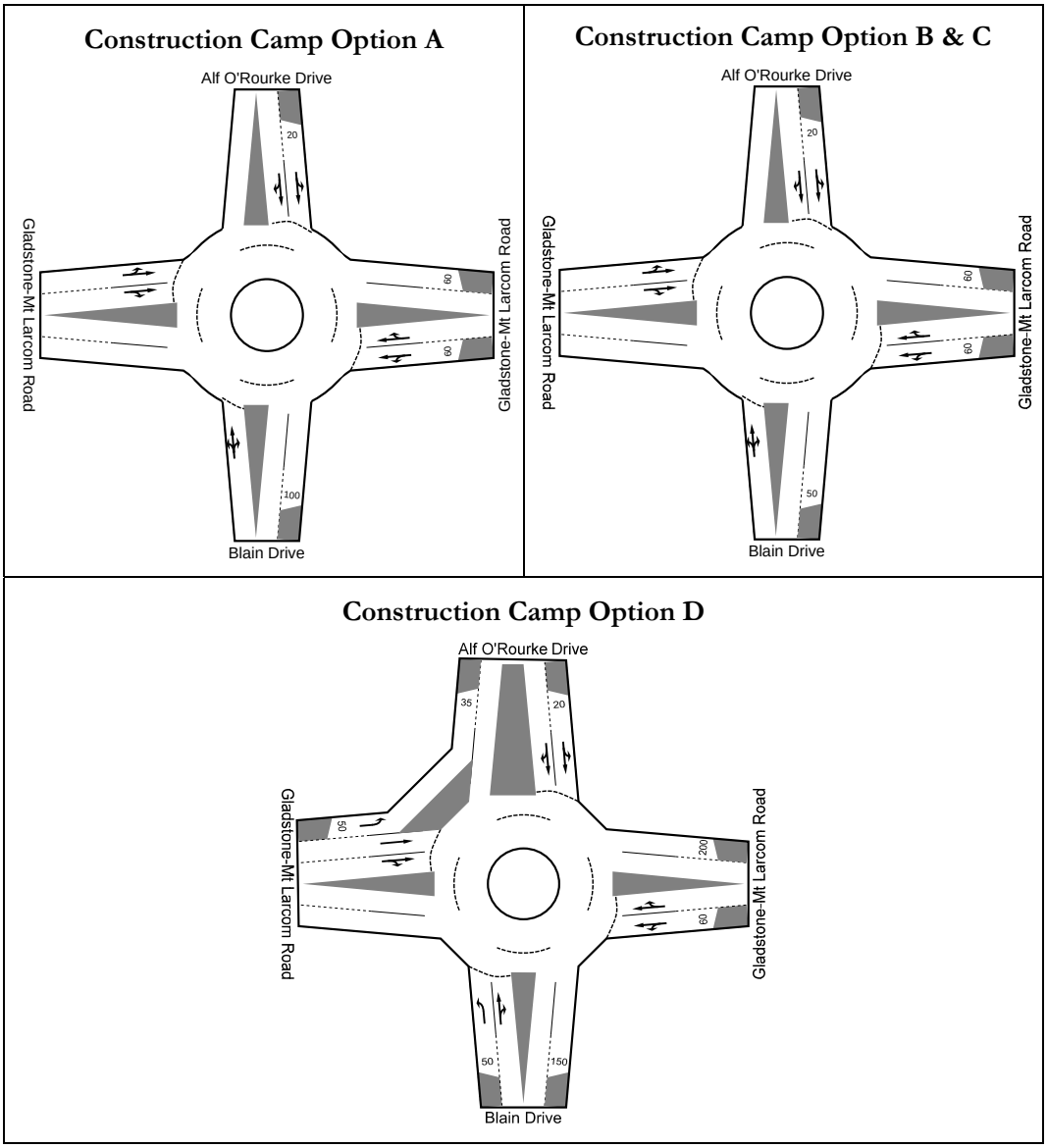


Figure 8-11 Hanson/Blain/Alf O'Rourke Dr – Upgrade Works (With Dev, No Bridge)

Table 8-8 Hanson Road/Blain Drive/Alf O'Rourke Drive – Performance

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	0.363	6.8 (LOS A)	25	0.780	9.1 (LOS A)	79
Scenario 5b	0.645	6.7 (LOS A)	27	0.726	8.6 (LOS A)	65
Scenario 5c	0.405	6.5 (LOS A)	20	0.858	9.6 (LOS A)	110
Scenario 5d	0.425	6.9 (LOS A)	31	0.856	9.6 (LOS A)	111

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 6a	0.363	6.8 (LOS A)	25	0.782	9.2 (LOS A)	81
Scenario 6b	0.363	6.8 (LOS A)	25	0.729	8.7 (LOS A)	66
Scenario 6c	0.436	7.0 (LOS A)	33	0.861	9.7 (LOS A)	113
Scenario 6d	0.425	6.9 (LOS A)	31	0.856	9.6 (LOS A)	111
Scenario 7a	0.753	12.3 (LOS B)	89	0.770	12.3 (LOS B)	73
Scenario 7b	0.756	12.3 (LOS B)	90	0.815	13.3 (LOS B)	85
Scenario 7c	0.664	10.1 (LOS B)	65	0.783	12.5 (LOS A)	75
Scenario 7d	0.820	19.0 (LOS B)	117	0.879	14.2 (LOS B)	97

8.8 Glenlyon Street/Gladstone Port Access Road/Railway Street

8.8.1 Without Development Intersection Requirements

This intersection operates adequately without the presence of the proposed development.

8.8.2 With Development Intersection Requirements

The SIDRA analysis presented in Section 7.12 indicated that the Glenlyon Street/Port Access Road/Railway Street intersection operates with unacceptable service parameters for all construction camp options in 2010. Inspection of SIDRA results for the existing layout indicates that the critical movements are as follows:

- Right turn from the southern approach at Glenlyon Street in the morning peak; and
- All movements on the Port Access Road and the northern Glenlyon Street approach in the afternoon peak.

The required future year intersection form is illustrated in Figure 8-12. This layout is applicable to all proposed camp options and features the addition of a short left turn slip lane on the Port Access Road approach. In addition to this, the intersection analysis has made use of pre-timed signal phasing rather than actuated signal phasing, as a greater degree of control can be applied to the cycle timing.

The corresponding SIDRA results are presented in Table 8-9. The anticipated levels of DOS have been flagged as 1.00 or near 1.00 for most cases. Although this is usually cause for concern, in this case a DOS of 1.00 applies to the short turning lanes not being of sufficient length, and thus causing some overflow onto the adjacent lane. The DOS for all other lanes have been checked and these all operate with a DOS at or below the acceptable practical absorption capacity of 0.9. Whilst it would be ideal to

increase short turning lane lengths so that no excess flow occurs, this intersection has a number of potential constraints to available space. These are

- The existing rail bridge to the south of the intersection. The distance from the right turning stop line on the southern approach to the edge of the bridge deck is approximately 30m;
- The rail line which runs directly adjacent to Port Access Road. The available space from the existing stop line on the eastern approach to the convergence point with the rail line is approximately 75m; and
- The location of the adjacent intersection to the north at William Street. The distance from the right turn stop line on the northern approach to the southern edge of the median break is approximately 30m.

The presented layout takes these constraints into consideration.

As mentioned in Section 7.12, this intersection has also been modelled in the microsimulation software package; Paramics. The results of this study can be found in the *QLD Curtis LNG Project EIS Microsimulation Assessment* (Halcrow MWT, 2009).

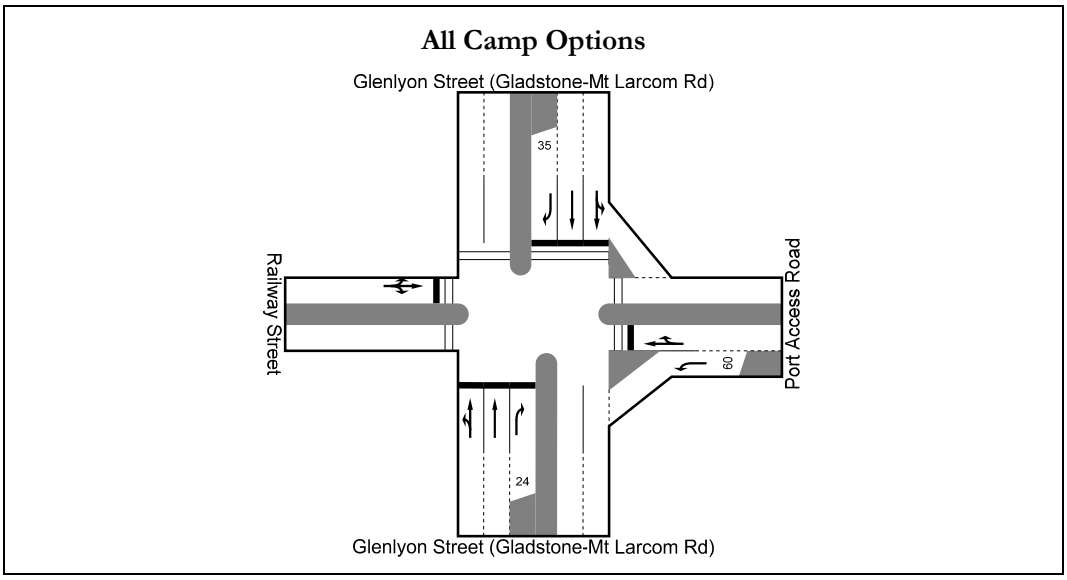


Figure 8-12 Hanson Rd/Port Access Rd/Railway St– Upgrade Works (With Dev)

Table 8-9 Hanson Road/Port Access Road/Railway Street – Performance

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3a	1.001*	26.6 (LOS C)	190	0.760	23.4 (LOS C)	168
Scenario 3b	1.000*	19.1 (LOS B)	166	0.789	23.0 (LOS C)	157
Scenario 3c	0.999*	17.6 (LOS B)	136	0.719	24.0 (LOS C)	160

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3d	1.000*	23.3 (LOS C)	338	1.000*	38.0 (LOS D)	265

*Indicates that DOS is for short lane with resulting excess flow

8.9 Glenlyon Street/Dawson Highway/Bramston Street

8.9.1 Without Development Intersection Requirements

The "without development" intersection requirement is shown in Figure 8-13. The critical movement for this intersection is the right turn from the northern Glenlyon Street approach. Whilst lengthening of the right turn slot would improve operations to ideal parameters, the presence of the rail bridge to the north potentially creates constraints to the available length of short lane. Therefore, the short turning lanes on the northern approach have been limited to a maximum storage of 70m. Upgrade works include the following:

- Lengthening of the short right turn lane on Glenlyon Street (north) to 70m, from 40m;
- Reconfiguration of the median-side through movement on Glenlyon Street (north) to a shared right/through lane; and
- Reconfiguration of signal phasing and modification of actuated timing to fixed timing.

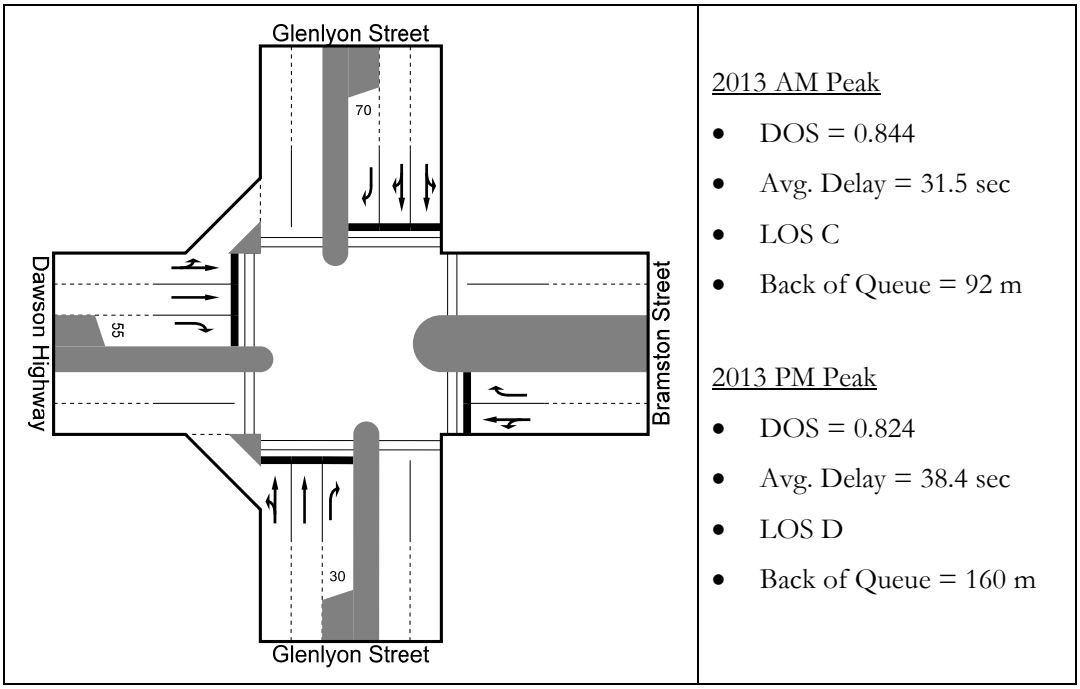


Figure 8-13 Glenlyon St/Dawson Hwy/Bramston St – Upgrade Works (Without Dev)

As mentioned in Section 7.13, this intersection has also been modelled in the microsimulation software package; Paramics. The results of this study can be found in the *QLD Curtis LNG Project EIS Microsimulation Assessment* (Halcrow MWT, 2009).

8.9.2 With Development Intersection Requirements

The "without development" intersection configuration shown in Figure 8-14 has been tested with the addition of development generated traffic. SIDRA results are presented in Table 8-10.

The results suggest that the intersection operates within acceptable performance parameters for all scenarios with the exception of 5a, 5b, 6a and 6b. In these cases the DOS is expected to be very slightly above the practical absorption capacity of 0.9. Given that the anticipated overall LOS is still at an acceptable LOS D, it is considered that the "without development" intersection form is still adequate for Scenario 5a, 5b, 6a and 6b.

Table 8-10 Glenlyon Street/Tank Street – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	0.818	36.5 (LOSD)	148	0.907	45.7 (LOS D)	255
Scenario 5b	0.818	36.5 (LOSD)	148	0.907	44.7 (LOS D)	242
Scenario 5c	0.812	39.0 (LOS D)	179	0.885	48.5 (LOS D)	310
Scenario 5d	0.812	38.9 (LOS D)	178	0.885	48.3 (LOS D)	306
Scenario 6a	0.818	36.5 (LOSD)	148	0.907	45.7 (LOS D)	255
Scenario 6b	0.818	36.5 (LOSD)	148	0.907	44.7 (LOS D)	242
Scenario 6c	0.812	39.0 (LOS D)	179	0.885	48.5 (LOS D)	310
Scenario 6d	0.812	38.9 (LOS D)	178	0.885	48.3 (LOS D)	306
Scenario 7a	0.734	34.4 (LOS C)	122	0.861	42.7 (LOS D)	214
Scenario 7b	0.734	34.4 (LOS C)	122	0.850	42.6 (LOS D)	211
Scenario 7c	0.730	34.0 (LOS C)	121	0.831	41.5 (LOS D)	200
Scenario 7d	0.835	37.3 (LOS D)	153	0.896	45.0 (LOS D)	240

8.10 Glenlyon Street/Tank Street

8.10.1 Without Development Intersection Requirements

As discussed in Section 3.5, Glenlyon Street between Bramston Street and Derby Street will be upgraded to 4 lanes. This also includes associated intersection upgrades at Tank and Derby Streets.

The 2013 "without development" intersection requirement is shown in Figure 8-14. It is similar to the existing layout except for the additional lanes on Glenlyon Street to match the 4 lane mid block cross section discussed above. The short left/through shared slip lane on the Tank Street approach has also been extended from the existing length of approximately 20m to the adjacent intersection at Goondoon Street. This length is approximately 200m. The revised layout will also require minor signal reconfiguration to ensure that adequate safety is maintained at this location. In particular, the filtered right turn movements on Glenlyon Street will need to be removed.

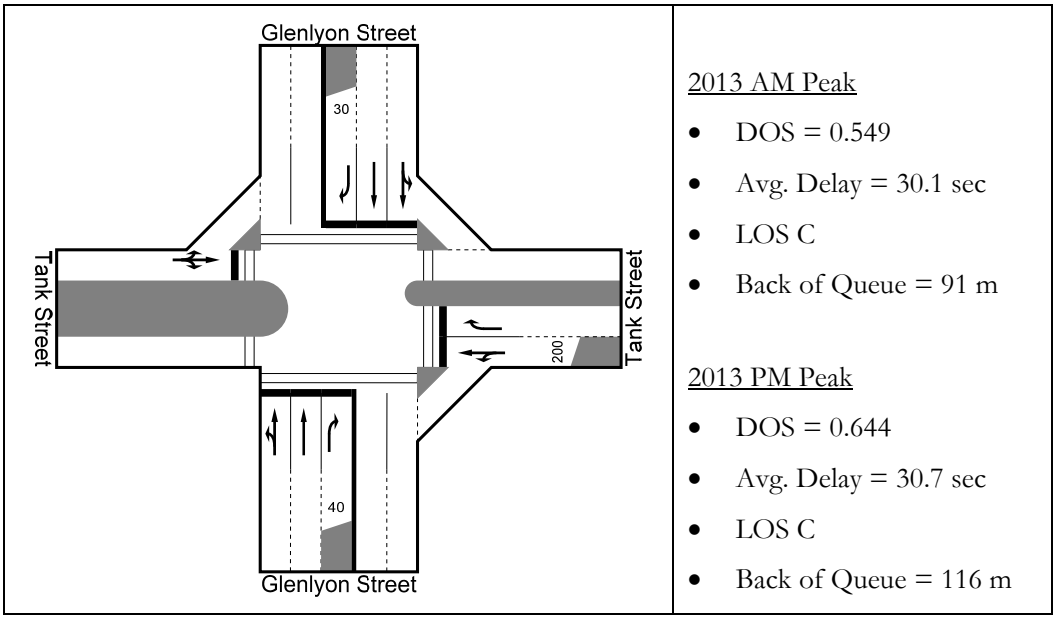


Figure 8-14 Glenlyon Street/Tank Street – Upgrade Works (Without Dev)

8.10.2 With Development Intersection Requirements

The "without development" intersection configuration shown in Figure 8-14 has been tested with the addition of development generated traffic. SIDRA results are presented in Table 8-11.

The analysis results suggest that the intersection is expected to operate within acceptable performance parameters under the additional development generated traffic loading. Therefore, further works are not required as part of the proposed development.

Table 8-11 Glenlyon Street/Tank Street – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 5a	0.676	33.9 (LOS C)	136	0.764	36.2 (LOSD)	182
Scenario 5b	0.676	33.9 (LOS C)	136	0.771	36.0 (LOS D)	176
Scenario 5c	0.728	36.3 (LOS D)	166	0.818	38.5 (LOSD)	214
Scenario 5d	0.727	36.3 (LOS D)	166	0.816	38.5 (LOS D)	214
Scenario 6a	0.676	33.9 (LOS C)	136	0.764	36.2 (LOSD)	182
Scenario 6b	0.676	33.9 (LOS C)	136	0.771	36.0 (LOSD)	176
Scenario 6c	0.728	36.3 (LOS D)	166	0.818	38.5 (LOS D)	214
Scenario 6d	0.727	36.3 (LOS D)	166	0.816	38.5 (LOS D)	214

8.11 Port Access Road/Mark Fenton Drive/Hopper Road/Tug Berth Access Road

8.11.1 Without Development Intersection Requirements

This intersection operates adequately without the presence of the proposed development.

8.11.2 With Development Intersection Requirements

As discussed in Section 7.16, upgrade works are required at this intersection for Scenario 3d – 2010 Construction Camp Option D. For this scenario, the critical approach is the Gladstone Port Access Road in the morning peak and Tug Berth Access Road in the afternoon peak. The required intersection form is shown in Figure 8-15.

The upgrade incorporates the following:

- The addition of a 50m shared left/through lane on the Port Access and Tug Berth Access Roads; and
- The provision of complementary short downstream lanes on Port Access and Tug Berth Access Road to cater for the additional through lane on the opposing approach.

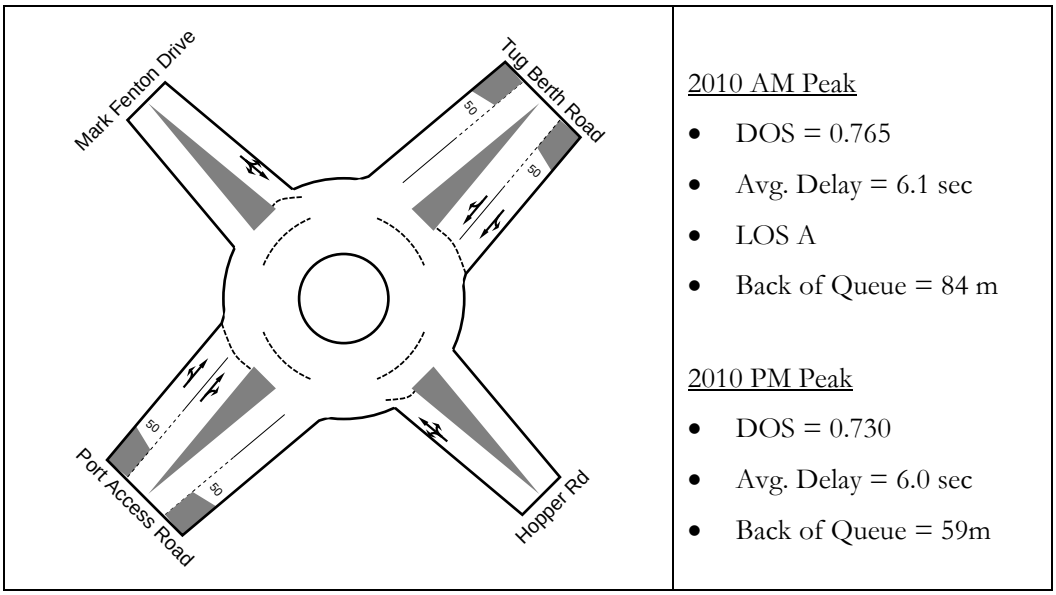


Figure 8-15 Port Access Rd/Tug Berth Access Rd– Upgrade Works (Without Dev)

Table 8-12 Port Access Rd/Tug Berth Access Rd – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 3d	0.765	6.1	84	0.730	6.0	59

8.12 Dawson Road/Blain Drive/Herbertson Street

8.12.1 Without Development Intersection Requirements

This intersection operates adequately without the presence of the proposed development.

8.12.2 With Development Intersection Requirements

The SIDRA analysis presented in Section 7.17 indicated that the Dawson Road/Blain Drive/Herbertson Road intersection operates with unacceptable service parameters for a number of "with development" scenarios. The critical operating scenarios were selected and remedial solution presented for these. The future year intersection form and corresponding SIDRA results are presented in Figure 8-16 and Table 8-13, respectively.

Inspection of SIDRA results for the existing layout indicates that the critical movement occurs in the afternoon peak and is the right turn from Blain Drive under all assessable scenarios.

Analysis results suggest that all scenarios operate with acceptable service conditions under the revised layout, with the exception of Scenario 7d in the afternoon peak.

The SIDRA results for this condition indicated that the critical movement is the right turn from the northern approach at the Dawson Highway. Taking into consideration anticipated through and left turn volumes at this approach, the only option for improving operations exist with the addition of a potential short left turn slip lane from the Dawson Highway (north) into Herbertson Road (east) (see Figure 8-17). Aerial photography indicates that the slip lane cannot be constructed without creating moderate to significant impacts on the adjacent residential property. The SIDRA results for the alternative intersection form indicate that the DOS only decreases to 0.931 with the addition of the slip lane and it is not considered appropriate to undertake the work for such a minor improvement. This is also combined with the consideration that the intersection would only operate at that DOS for one afternoon peak each fortnight, for a total period of only 3 years.

The layout presented in Figure 8-16 is therefore deemed appropriate for all construction camp options.

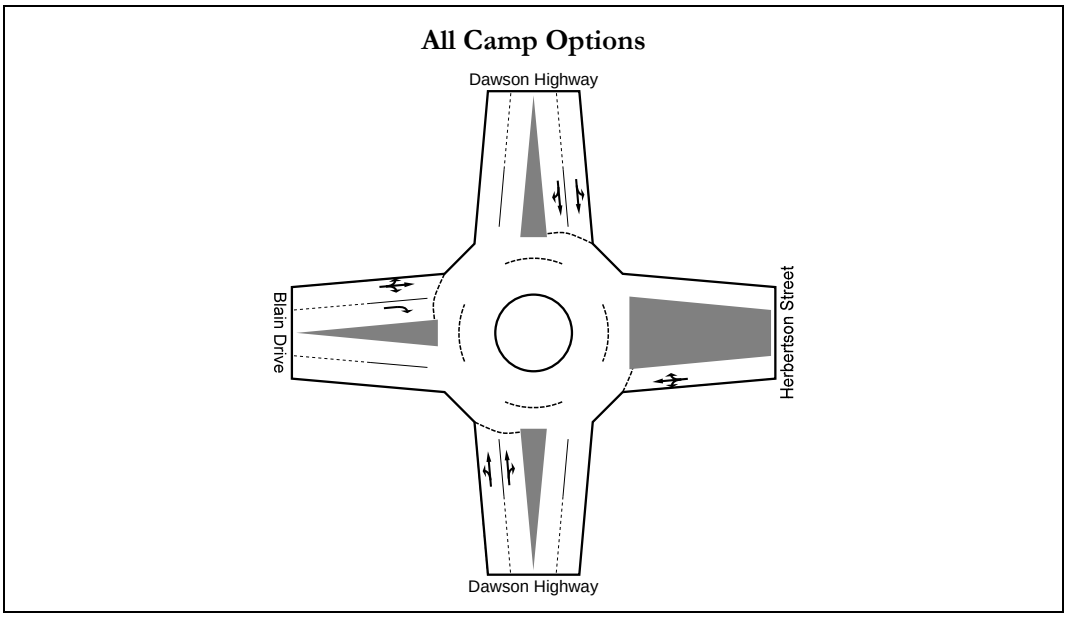


Figure 8-16 Hanson Rd/Blain Dr/Herbertson St– Upgrade Works (With Dev)

Table 8-13 Dawson Road/Blain Drive/Herbertson Street – Performance test

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
Scenario 7a	0.679	7.7 (LOS A)	55	0.799	13.2 (LOS B)	63
Scenario 7b	0.679	7.8 (LOS A)	56	0.746	12.3 (LOS B)	61
Scenario 7c	0.633	7.4 (LOS A)	46	0.712	11.7 (LOS B)	54
Scenario 7d	0.770	8.5 (LOS A)	82	0.955	21.8 (LOS C)	114

	AM Peak			PM Peak		
	DOS	Ave. delay (sec)	Queue Length (m)	DOS	Ave. delay (sec)	Queue Length (m)
	N/A			0.931	20.5 (LOS C)	114
Scenario 13a	0.630	7.7 (LOS A)	47	0.759	11.2 (LOS B)	57
Scenario 13c	0.632	7.7 (LOS A)	47	0.760	11.4 (LOS B)	58
Scenario 13d	0.631	7.7 (LOS A)	47	0.760	11.3 (LOS B)	58
Scenario 14a	0.630	7.7 (LOS A)	47	0.759	11.2 (LOS B)	57
Scenario 14c	0.632	7.7 (LOS A)	47	0.760	11.4 (LOS B)	58
Scenario 14d	0.631	7.7 (LOS A)	47	0.760	11.3 (LOS B)	58

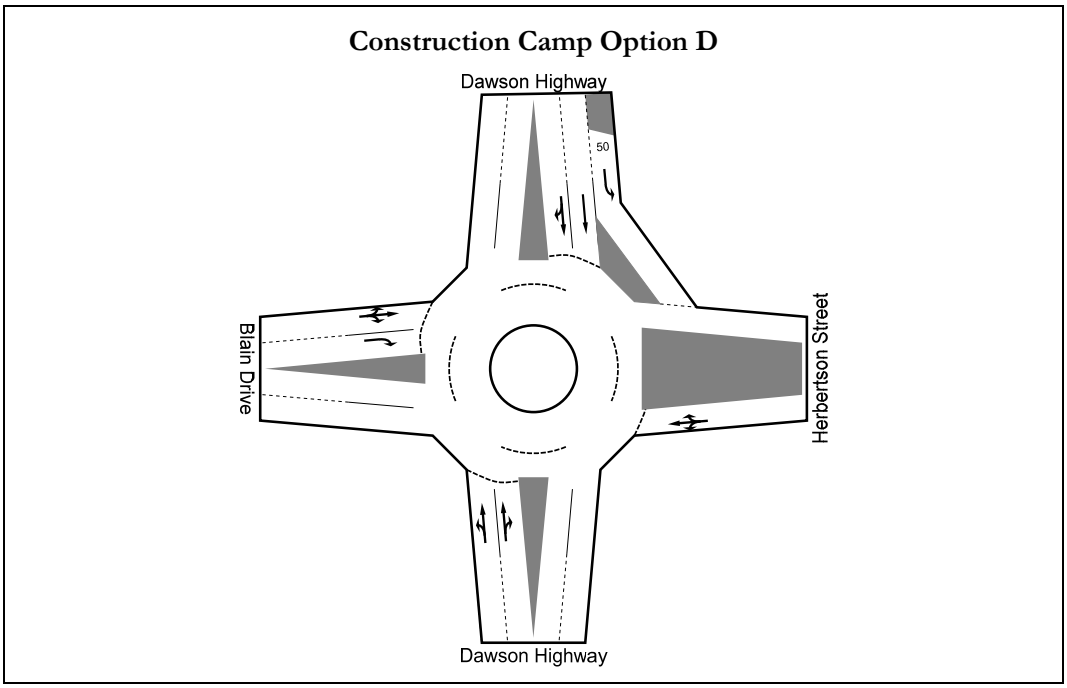


Figure 8-17 Hanson Rd/Blain Dr/Herbertson St– Alternative Layout

9 Pavement Impact Assessment

9.1 Overview

The impact analysis presented in this section is based upon the principles defined within GARID (DMR, 2006) and direct advice received from DMR. The following reference, obtained from GARID, holds the general directive as to how impacts are assessed:

"Generally, pavement impacts need to be considered for any section of a SCR where the construction or operational traffic generated by the development equals or exceeds 5% of the existing Equivalent Standard Axles (ESA) on the road section."

The following sections will therefore express the increase in development ESA's as a proportion of existing ESAs to observe whether the triggers of GARID are met.

DMR defines ESAs as:

"Equivalent Standard Axles is a measure defining the cumulative damaging effect to the pavement of the design traffic. It is expressed in terms of the equivalent number of 80kN axles passing over the pavement up to the design horizon."

ESAs are generally expressed in annual terms.

It is important to note that the pavement impact assessment presented in this report is applicable to the heavy vehicle generation of the LNG Plant component only. Pavement impacts resulting from the transport of pipeline has been undertaken in a separate commission and can be found in Volume 4 and Chapter 13 of the overarching EIS document.

As discussed in Section 2, pavement impact analysis will be conducted for the following links and sections:

- Bruce Highway – from Gladstone-Mt Larcom Road to the Dawson Highway;
- Gladstone-Mt Larcom Road – from Bruce Highway to Dawson Highway; and
- Dawson Highway – from Bruce Highway to Glenlyon Road (Glenlyon Gladstone-Mt Larcom Road).

9.2 Background Traffic – Equivalent Standard Axles

As mentioned in Section 9.1, assessment of pavement impacts is based upon the annual increase in ESA's. The following ESA conversion factors were supplied by DMR:

- Bruce Highway – 2.9 ESA's per heavy vehicle; and
- All other State-controlled Roads - 3.2 ESA's per heavy vehicle.

These values have been used in order to determine background traffic ESA's. The equation is as follows.

$$\text{Annual ESAs (each direction)} = \frac{AADT \times \%\ Heavy\ Vehicles \times ESA\ Conversion\ Factor \times 365}{2}$$

Equation 9-1 Calculation of Annual Background ESA's

Base year background ESAs are presented in Table 9-1. Base ARMIS data and detailed calculations are provided in Appendix F.

Table 9-1 Background Traffic ESAs – Base Year (2008)

Link	Section	AADT (2-Way)	% Heavy Vehicles	Annual ESA's (1-Way)
Bruce Hwy (Road 10E)	Benaraby to Dawson Hwy	4,556	25.3	589,013
	Dawson Hwy to Targinie Rd	3,450	31.93	562,910
	Targinie Rd to GML*	3,450	31.93	562,910
Gladstone Mt Larcom Rd (Road 181)	Dawson Hwy to Hildebrand St	8,631	12.56	633,087
	Hildebrand St to Blain Dr	6,052	17.17	606,851
	Blain Dr to G. Poicier Stn	8,931	16.3	850,160
	G. Poicier Stn to Reid Rd	6,161	16.02	576,403
	Reid Rd to Landing Rd	6,161	16.02	576,406
	Landing Rd to Targinie Rd	2,934	20.13	344,919
	Targinie Rd to Quarry Rd	2,934	20.13	344,919
	Quarry Rd to GML/Bruce Hwy	2,934	20.13	344,919
Dawson Hwy (Road 46A)	GML to Breslin St	12,708	2.95	218,933
	Breslin St to Blain Dr	19,222	3.02	339,015
	Blain Dr to Phillip St	24,308	7.08	1,005,068
	Phillip St to Penda Ave	28,000	3.48	569,050
	Penda Ave to Chapman Rd	22,079	.46	832,961
	Chapman Rd to Harvey Rd	6,033	5.49	193,428
	Harvey Rd to Bruce Hwy	4,787	9.4	262,787

Link	Section	AADT (2-Way)	% Heavy Vehicles	Annual ESA's (1-Way)
Port Access Rd (Road 183)	Port Access Rd	1,750	27.51	281,152

*GML – Gladstone-Mt Larcom Road

9.3 Heavy Vehicle Haul Routes

The heavy vehicle haul routes utilised in the analysis are presented in Table 9-2 to Table 9-5

These routes dictate where pavement impacts could potentially be expected. It should be noted that at this stage in the planning, definitive origin/destination pairs are unknown for the transport of fuel, refrigerated goods/dry foods and water. Therefore, it has been assumed that these goods will originate from the Bruce Highway and will traverse the majority of the study area SCR network. This assumption ensures that the critical condition is assessed.

Table 9-2 Heavy Vehicle Haul Routes (Train 1 & 2 Combined Construct – Auckland Point)

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
Truck Estimated Austroads Class 9	Cement	Cement Australia Red Rover Rd	Auckland Point	• Hanson Road – between Red Rover Road and Port Access Road • Port Access Road
Truck Estimated Austroads Class 9	Waste	Benaraby landfill	Auckland Point	• Bruce Highway – between Benaraby and Dawson Highway • Dawson Highway – between Bruce Highway and Glenlyon Street • Port Access Road
20 tonne tanker Estimated Austroads Class 9	Fuel	Bruce Highway	Auckland Point	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Port Access Road • Port Access Road OR • Bruce Highway – south of Benaraby to Dawson Highway • Dawson Highway – between Bruce Highway and Glenlyon Street • Port Access Road
Truck Estimated Austroads Class 3	Refrigerated food and dry goods	Bruce Highway	Auckland Point	Same haul route options as fuel
20 tonne tanker Estimated Austroads Class 9	Water	Bruce Highway	Auckland Point	Same haul route options as fuel
Construction Camp A				
Bus	Employees	Camp Site	Auckland Point	• Gladstone-Mt Larcom Road – from Camp Site to Port Access Road • Port Access Road

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
Bus	Employees	Gladstone Airport	Camp Site	• Gladstone-Mt Larcom Road – from Camp Site to Blain Drive • Dawson Highway – from Blain Drive to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Camp Site
Construction Camp B				
Bus	Employees	Camp Site	Auckland Point	• Bruce Highway – From Calliope River-Targinie Road to Dawson Highway • Dawson Highway – between Bruce Highway and Glenlyon Street • Port Access Road
Bus	Employees	Gladstone Airport	Camp Site	• Bruce Highway – from Calliope River-Targinie Road to Dawson Highway • Dawson Highway – from Bruce Highway to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Bruce Highway – between Gladstone Mt Larcom Rd to Calliope River Targinie Rd
Construction Camp C and D				
Bus	Employees	Gladstone Airport	Auckland Point	• Dawson Highway – from Aerodrome Road to Glenlyon Street • Port Access Road
Bus	Employees	Rockhampton Airport	Auckland Point	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Port Access Road • Port Access Road

Table 9-3 Heavy Vehicle Haul Routes (Train 2 & Train 3 Construct –Bridge Opt 1 – Landing Rd Ext)

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
Truck Estimated Austroads Class 9	Cement	Cement Australia Red Rover Rd	Curtis Island Site	• Hanson Road – between Red Rover Road Landing Road
Truck Estimated Austroads Class 9	Waste	Benaraby landfill	Curtis Island Site	• Bruce Highway – between Benaraby and Calliope River-Targinie Road • Gladstone Mt Larcom - Road between Calliope River-Targinie Road and Landing Road
20 tonne tanker Estimated Austroads Class 9	Fuel	Bruce Highway	Curtis Island Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Landing Road OR • Bruce Highway – between Benaraby and Calliope River-Targinie Road • Gladstone-Mt Larcom Road - between Calliope River-Targinie Road and Landing Road
Truck Estimated Austroads Class 3	Refrigerated food and dry goods	Bruce Highway	Curtis Island Site	Same haul route options as fuel
20 tonne tanker Estimated Austroads Class 9	Water	Bruce Highway	Curtis Island Site	Same haul route options as fuel
Construction Camp A				
Bus	Employees	Camp Site	Curtis Island Site	• Gladstone-Mt Larcom Road – from Camp Site to Landing Road
Bus	Employees	Gladstone Airport	Camp Site	• Gladstone-Mt Larcom Road – from Camp Site to Blain Drive • Dawson Highway – from Blain Drive to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
				• Gladstone-Mt Larcom Road – between Bruce Highway and Camp Site
Construction Camp B				
Bus	Employees	Camp Site	Curtis Island Site	• Gladstone-Mt Larcom Road - between Calliope River-Targinie Road and Landing Road
Bus	Employees	Gladstone Airport	Camp Site	• Bruce Highway – from Calliope River-Targinie Road to Dawson Highway • Dawson Highway – from Bruce Highway to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Bruce Highway – between Gladstone Mt Larcom Rd to Calliope River Targinie Rd
Construction Camp C and D				
Bus	Employees	Gladstone Airport	Curtis Island Site	• Gladstone-Mt Larcom Road - between Landing Road and Blain Drive • Dawson Highway – between Blain Drive and Aerodrome Road
Bus	Employees	Rockhampton Airport	Curtis Island Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Landing Road

Table 9-4 Heavy Vehicle Haul Routes (Train 2 & Train 3 Construction – Bridge Opt 2 – Phillipies Landing Rd Ext)

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
Truck Estimated Austroads Class 9	Cement	Cement Australia Red Rover Rd	Curtis Island Site	• Hanson Road – between Red Rover Road and Calliope River-Targinie Road
Truck Estimated Austroads Class 9	Waste	Benaraby landfill	Curtis Island Site	• Bruce Highway – between Benaraby and Calliope River-Targinie Road
20 tonne tanker Estimated Austroads Class 9	Fuel	Bruce Highway	Curtis Island Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Calliope River-Targinie Road OR • Bruce Highway – south of Benaraby to Calliope River-Targinie Road
Truck Estimated Austroads Class 3	Refrigerated food and dry goods	Bruce Highway	Curtis Island Site	Same haul route options as fuel
20 tonne tanker Estimated Austroads Class 9	Water	Bruce Highway	Curtis Island Site	Same haul route options as fuel
Construction Camp A				
Bus	Employees	Camp Site	Curtis Island Site	• Gladstone-Mt Larcom Road – from Camp Site to Calliope River-Targinie Road
Bus	Employees	Gladstone Airport	Camp Site	• Gladstone-Mt Larcom Road – from Camp Site to Blain Drive • Dawson Highway – from Blain Drive to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Camp Site

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
Construction Camp B				
Bus	Employees	Camp Site	Curtis Island Site	• Route does not traverse SCR
Bus	Employees	Gladstone Airport	Camp Site	• Bruce Highway – from Calliope River-Targinie Road to Dawson Highway • Dawson Highway – from Bruce Highway to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Bruce Highway – between Gladstone Mt Larcom Rd to Calliope River Targinie Rd
Construction Camp C and D				
Bus	Employees	Gladstone Airport	Curtis Island Site	• Gladstone-Mt Larcom Road – between Calliope River-Targinie Road and Blain Drive • Dawson Highway – between Blain Drive and Aerodrome Road
Bus	Employees	Rockhampton Airport	Curtis Island Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Calliope River-Targinie Road

Table 9-5 Heavy Vehicle Haul Routes (Train 2 & Train 3 Construct – Alf O'Rourke Dr)

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
Truck Estimated Austroads Class 9	Cement	Cement Australia Red Rover Rd	Alf O'Rourke Drive	• Hanson Road – between Red Rover Road and Blain Drive
Truck Estimated Austroads Class 9	Waste	Benaraby landfill	Alf O'Rourke Drive	• Bruce Highway – between Benaraby and Dawson Highway • Dawson Highway – between Bruce Highway and Blain Drive
20 tonne tanker Estimated Austroads Class 9	Fuel	Bruce Highway	Alf O'Rourke Drive	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Blain Drive OR • Bruce Highway – south of Benaraby to Dawson Highway • Dawson Highway – between Bruce Highway and Blain Drive
Truck Estimated Austroads Class 3	Refrigerated food and dry goods	Bruce Highway	Alf O'Rourke Drive	Same haul route options as fuel
20 tonne tanker Estimated Austroads Class 9	Water	Bruce Highway	Alf O'Rourke Drive	Same haul route options as fuel
Construction Camp A				
Bus	Employees	Camp Site	Alf O'Rourke Drive	• Gladstone-Mt Larcom Road – from Camp Site to Blain Drive
Bus	Employees	Gladstone Airport	Camp Site	• Gladstone-Mt Larcom Road – from Camp Site to Blain Drive • Dawson Highway – from Blain Drive to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road

Heavy Vehicle Type	Transporting	Origin/Destination		Assumed Haul Route
				• Gladstone-Mt Larcom Road – between Bruce Highway and Camp Site
Construction Camp B				
Bus	Employees	Camp Site	Alf O'Rourke Drive	• Bruce Highway – From Calliope River-Targinie Road to Dawson Highway • Dawson Highway – between Bruce Highway and Blain Drive
Bus	Employees	Gladstone Airport	Camp Site	• Bruce Highway – from Calliope River-Targinie Road to Dawson Highway • Dawson Highway – from Bruce Highway to Aerodrome Road
Bus	Employees	Rockhampton Airport	Camp Site	• Bruce Highway – north of Gladstone-Mt Larcom Road • Bruce Highway – between Gladstone Mt Larcom Rd to Calliope River Targinie Rd
Construction Camp C and D				
Bus	Employees	Gladstone Airport	Alf O'Rourke Drive	• Dawson Highway – from Aerodrome Road to Blain Drive
Bus	Employees	Rockhampton Airport	Alf O'Rourke Drive	• Bruce Highway – north of Gladstone-Mt Larcom Road • Gladstone-Mt Larcom Road – between Bruce Highway and Blain Drive

9.4 Development Traffic – Equivalent Standard Axles

ESA conversion factors for the vehicle types identified in Table 9-2 are shown in Table 9-6. These values were sourced from the *Road Planning and Design Manual* (DMR, 2004) which was then considered in conjunction with advice obtained from DMR – Fitzroy district.

Table 9-6 Development Traffic – ESA Conversion Factors

Vehicle Class	Unladen	Laden
Bus	0.54	3.0
Class 3	0.54	3.0
Class 9	0.51	5.1

The formula for calculating development generated ESAs is shown Equation 9-2.

Annual ESA's = Daily Heavy Vehicle Generation × ESA Conversion Factor × Number of Operational days per year

Equation 9-2 Calculation of Development Generated ESAs

The number of operational days per year is indicated in Table 9-7. The numbers for deliveries and daily shuttle bus trips have been developed through the assumption that during the construction period the working schedule is 10 days on/4 days off. This working schedule equates to 260 operational days per year. Similarly, with each fortnightly period, employees will complete two journeys (i.e. leave the site and return to the site). This therefore equates to 52 operational days per year.

Table 9-7 Number of Operational Days per Year

Vehicle Class	Trip Purpose	Number of Operational Days per Year
Class 3, Class 9	Deliveries	260
Bus	Daily shuttle of employees (applicable to Camp Option A/B)	260
Bus	Fortnightly shuttle of employees to airports (applicable to all camp options)	52

Calculated development generated ESAs are provided in Appendix F.

9.5 Impact Identification

The impact identification is presented in Appendix F.

The following is a summary of links where the increase in development generated ESA's exceeds 5%:

- Camp Option A
  - Gladstone-Mt Larcom Road between Landing Road and Calliope River-Targinie Road;
  - Gladstone-Mt Larcom Road between Calliope River-Targinie Road and Quarry Road; and
  - Port Access Road
- Camp Option B
  - Gladstone Mt Larcom Road between Landing Road and Targinie Road;
  - Dawson Highway between Gladstone-Mt Larcom Road to Breslin Street;
  - Dawson Highway between Breslin Street and Blain Drive;
  - Dawson Highway between Chapman Road and Harvey Road;
  - Dawson Highway between Harvey Road and the Bruce Highway; and
  - Port Access Road
- Camp Option C
  - No Impact
- Camp Option D
  - No Impact

9.6 Developer Contribution for Pavements

The methodology to calculate and input costs used within the contribution have been supplied by DMR. Detailed calculations are provided in Appendix F.

A summary of maintenance contributions are provided in Table 9-8 and Table 9-9. These costs are the single up front payment that is required under each impacted scenario. They are based on the present value of costs which should be paid by developer at the starting year of construction. Maintenance contributions are not required for either construction camp options C & D, as per Section 9.5 above.

Also note that the development proposal does not bring forward the required date for rehabilitation by more than 1 year. Therefore, rehabilitation contributions are not required.

Table 9-8 Maintenance Contribution – Construction Camp A

Road	Section	Contribution
Road Bridge Option 1 ($11,977)		
Gladstone Mt Larcom Rd	Landing Rd to Calliope River Targinie Rd	$6,326

	Calliope River Targinie Rd to Quarry Rd;	$3,067
Port Access Road		$2,584
Road Bridge Option 2 ($10,195)		
Gladstone Mt Larcom Rd	Landing Rd to Calliope River Targinie Rd	$4,544
	Calliope River Targinie Rd to Quarry Rd;	$3,067
Port Access Road		$2,584
No Road Bridge ($10,195)		
Gladstone Mt Larcom Rd	Landing Rd to Calliope River Targinie Rd	$4,544
	Calliope River Targinie Rd to Quarry Rd;	$3,067
Port Access Road		$2,584

Table 9-9 Maintenance Contribution – Construction Camp B

Road	Section	Contribution
Road Bridge Option 1 ($63,797)		
Gladstone Mt Larcom Rd	Landing Road to Targinie Road	$1,476
Dawson Highway	Gladstone Mt Larcom Rd to Breslin St	$5,923
	Breslin St to Blain Dr	$1,010
	Chapman Rd to Harvey Rd	$23,410
	Harvey Rd to Bruce Highway	$29,394
Port Access Road		$2,584
Road Bridge Option 2 ($63,322)		
Dawson Highway	Gladstone Mt Larcom Rd to Breslin St	$5,923
	Breslin St to Blain Dr	$1,010
	Chapman Rd to Harvey Rd	$23,410
	Harvey Rd to Bruce Highway	$29,394

Port Access Road		$2,584
No Road Bridge ($81,737)		
Dawson Highway	Gladstone Mt Larcom Rd to Breslin St	$5,923
	Breslin St to Blain Dr	$1,010
	Chapman Rd to Harvey Rd	$34,115
	Harvey Rd to Bruce Highway	$38,105
Port Access Road		$2,584

10 Road Infrastructure Charges

Where development occurs within the jurisdiction of the Gladstone Regional Council, monetary road works contributions may be required as a condition of approval, payable under the various superseded planning schemes and associated policies for impact on the local road network.

Based on an estimated building Gross Floor Area (GFA) of 9,845 m², an indicative $45,400 may be payable under the Gladstone City Council Transport Infrastructure Policy. The indicative charge is based upon a rate of $460.96 per 100 m², which is the charge payable for industrial land uses. Gladstone Regional Council will determine any local road works contribution amounts payable during the decision stage based on the final plans of layout accompanying the development application.

11 Conclusions

The Road Impact Assessment for the proposed Queensland Curtis LNG Project has been completed. A number of scenarios were assessed and these included the consideration of a number of construction camp options in conjunction with various transport logistics scenarios incorporating a number of road bridge options connecting Curtis Island with Gladstone City.

The assessment was undertaken with due consideration of the procedures stipulated within the *Guidelines for Assessment of Road Impacts of Development* (DMR, 2006). Consultation with appropriate government authorities was also undertaken.

The proposed development is to be constructed in stages as indicated in Figure 11-1.

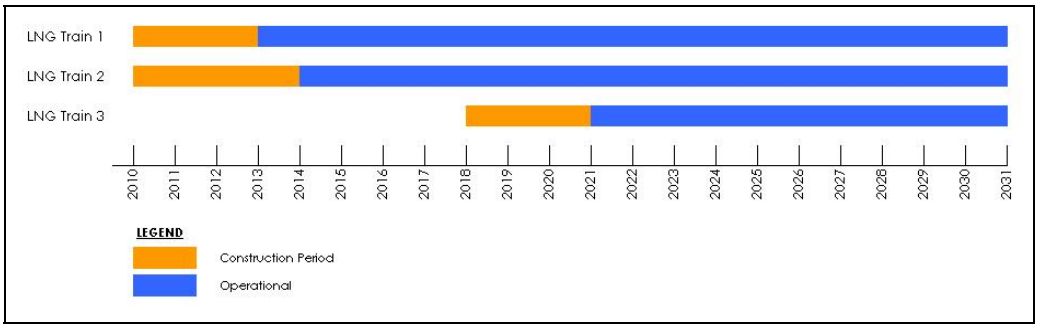


Figure 11-1 Project Staging

11.1.1 Traffic Generation

Anticipated daily trip generation for the peak fortnightly period under each of these stages are as follows:

LNG Train 1 & 2 Construction (2010 & 2013) – With Airport Shuttle

- Construction Camp A: 1,770 veh/day and 86 bus/day;
- Construction Camp B: 1,770 veh/day and 86 bus/day
- Construction Camp C: 1,134 veh/day and 10 bus/day
- Construction Camp D: 1,857 veh/day and 9 bus/day

LNG Train 1 & 2 Construction (2010 & 2013) – No Airport Shuttle

- Construction Camp A: 1,936 veh/day and 48 bus/day
- Construction Camp B: 1,936 veh/day and 48 bus/day
- Construction Camp C: 1,300 veh/day
- Construction Camp D: 2,033 veh/day

LNG Train 3 Construction (2018) – With Airport Shuttle

- Construction Camp A: 886 veh/day and 42 bus/day
- Construction Camp B: 886 veh/day and 42 bus/day
- Construction Camp C: 567 veh/day and 6 bus/day
- Construction Camp D: 929 veh/day and 5 bus/day

LNG Train 3 Construction (2018) – No Airport Shuttle

- Construction Camp A: 969 veh/day and 32 bus/day
- Construction Camp B: 969 veh/day and 32 bus/day
- Construction Camp C: 650 veh/day
- Construction Camp D: 1,017 veh/day

Operations

- Train 1 (2013): 108 veh/day
- Train 1 and 2 combined (2014): 140 veh/day
- All 3 Trains (2021): 176 veh/day

11.1.2 Road Network Improvements

The assessment of potential road network impacts indicated that a number of road network improvements may be required as a result of the proposed development. Please note that the improvements presented below result from the findings of the SIDRA analyses only. Paramics microsimulation modelling was undertaken for a number of intersections (see Section 7.12 and 7.18) and the findings presented below should be read in conjunction with the findings of the *QLD Curtis LNG Project EIS Microsimulation Assessment* (Halcrow MWT, 2009).

Road network improvements identified within this report include:

Road Bridge Option 1 – Landing Road Extension

Construction Camp Option A – Road Bridge 1

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;

- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Construction Camp Option B – Road Bridge 1

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement; and
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction.

Construction Camp Option C – Road Bridge 1

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement. In addition to the works required for camp options A and B, an additional short turning lane is required on the northern Landing Road approach and the western Gladstone-Mt Larcom Road approach;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Red Rover Road intersection to incorporate an additional short left turn lane on the Red Rover Road approach;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Construction Camp Option D – Road Bridge 1

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement. In addition to the works required for camp options A and B, an additional short turning lane is required on the northern Landing Road approach and the western Gladstone-Mt Larcom Road approach;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Red Rover Road intersection to incorporate an additional short left turn lane on the Red Rover Road approach;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction;
- Upgrade of the Port Access/Mark Fenton Drive/Hopper Road/Tug Berth Access Road intersection to incorporate additional short turning lanes on Port Access and Tug Berth Access roads. Provision of complementary short downstream lanes on these legs are also required; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Road Bridge Option 2 – Phillipies Landing Road Extension

Construction Camp Option A – Road Bridge 2

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Calliope River-Targinie Road intersection to include:
    - Continuous left turn slip lane on the northern Calliope River-Targinie Road approach. A corresponding downstream short lane on Gladstone-Mt Larcom Road (east) is also required; and
    - An additional right turn short lane from the southern approach at Calliope River-Targinie Road.
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement;

- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Construction Camp Option B – Road Bridge 2

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Calliope River-Targinie Road intersection to include:
    - Left turn slip lane on the northern Calliope River-Targinie Road approach; and
    - An additional right turn short lane from the southern approach at Calliope River-Targinie Road.
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement; and
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction.

Construction Camp Option C – Road Bridge 2

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Calliope River-Targinie Road intersection to include a revised roundabout arrangement;
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement. In addition to the works required for camp options A and B, an additional short turning lane is required on the western Gladstone-Mt Larcom Road approach. Due to the dual right turn on

the western approach, a complementing downstream short lane is also required on the southern Gladstone-Mt Larcom Road exit;

- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Red Rover Road intersection to incorporate an additional short left turn lane on the Red Rover Road approach;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Construction Camp Option D – Road Bridge 2

- Upgrade of Hanson Road between Red Rover to Blain Drive from a divided 4 lane 2 way rural road to an undivided 4 lane 2 way urban arterial road. Works are required to be completed by 2018.
- Upgrade of the Gladstone-Mt Larcom Road/Calliope River-Targinie Road intersection to include a revised roundabout arrangement;
- Upgrade of the Gladstone-Mt Larcom Road/Landing Road intersection to include a basic roundabout arrangement. In addition to the works required for camp options A and B, an additional short turning lane is required on the western Gladstone-Mt Larcom Road approach. Due to the dual right turn on the western approach, a complementing downstream short lane is also required on the southern Gladstone-Mt Larcom Road exit;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Red Rover Road intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Red Rover Road intersection to incorporate an additional short left turn lane on the Red Rover Road approach;
- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction;
- Upgrade of the Port Access/Mark Fenton Drive/Hopper Road/Tug Berth Access Road intersection to incorporate additional short turning lanes on Port Access and Tug Berth Access roads. Provision of complementary short downstream lanes on these legs are also required; and

- Reconfiguration of existing lane designation on the Blain Drive approach.

No Road Bridge

Construction Camp Option A – No Road Bridge

- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- In addition to the above, an additional short turn lane is required on the northern Alf O'Rourke Drive approach. A complementing downstream short lane is required on the Blain Drive exit. This downstream short lane is slighter longer than the requirement for camp options B and C below;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Construction Camp Option B – No Road Bridge

- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- In addition to the above, an additional short turn lane is required on the northern Alf O'Rourke Drive approach. A complementing downstream short lane is required on the Blain Drive exit;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Construction Camp Option C – No Road Bridge

- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- In addition to the above, an additional short turn lane is required on the northern Alf O'Rourke Drive approach. A complementing downstream short lane is required on the Blain Drive exit;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

Construction Camp Option D – No Road Bridge

- Possible partial contribution may be required for the upgrading of the Hanson Road/Blain Drive/Alf O'Rourke Drive intersection to match the midblock link requirement;
- In addition to the above, the following is required
  - An additional left turn continuous lane from Gladstone-Mt Larcom Road (west) into Alf O'Rourke Drive. A corresponding short downstream exit lane is also required on Alf O'Rourke Drive; and
  - An additional short turn lane is required on the northern Alf O'Rourke Drive approach. A complementing downstream short lane is required on the Blain Drive exit. This downstream short lane is required to be slighter longer than any of the camp option A, B or C discussed above;
- Upgrade of the Hanson Road/Port Access Road/Railway Street intersection to include a short left turn slip lane on the eastern Port Access Road approach. Works are required for the commencement of Train 1 and 2 construction;
- Upgrade of the Port Access/Mark Fenton Drive/Hopper Road/Tug Berth Access Road intersection to incorporate additional short turning lanes on Port Access and Tug Berth Access roads. Provision of complementary short downstream lanes on these legs are also required; and
- Reconfiguration of existing lane designation on the Blain Drive approach.

11.1.3 Contribution for Pavements

The required contribution for pavement maintenance is as follows:

- Road Bridge Option 1
  - Camp Option A - $11,977
  - Camp Option B - $63,797
  - Camp Option C - $0
  - Camp Option D - $0
- Road Bridge Option 2
  - Camp Option A - $10,195
  - Camp Option B - $62,322
  - Camp Option C - $0
  - Camp Option D - $0
- No Bridge Option
  - Camp Option A - $10,195
  - Camp Option B - $81,737
  - Camp Option C - $0

- Camp Option D - $0

The contribution amounts specified above are required to be paid at the starting year of construction as single one off payments.

The development proposal does not bring forward the required date for rehabilitation more than 1 year. Therefore, rehabilitation contributions are not required.

11.1.4 Road Infrastructure Charges

Gladstone Regional Council will determine any local road works contribution amounts payable during the decision stage based on the final plans of layout accompanying the development application. A preliminary estimate of the charge, should Council require it to be paid as a condition of approval, is $45,400 based on an estimated GFA of 9,845 m^2.

Appendix A. LNG Plant Locality Plan

QUEENSLAND CURTIS LNG
A BG Group business

PROJECT: Queensland Curtis LNG

TITLE: Figure 2 Major Project Components - Port of Gladstone

DATE: 6-August-2008

DATA SOURCE:
1:250,000 Topographic data copyright Geoscience Australia
LandsatTM Bands 123 copyright Commonwealth of Australia
Mining & Petroleum Tenure data copyright State of Queensland

Prepared by Mpela G.I.S. > Phone. +61-7-3252 5589 > Web: www.mpela.com.au > Email: info@mpela.com.au

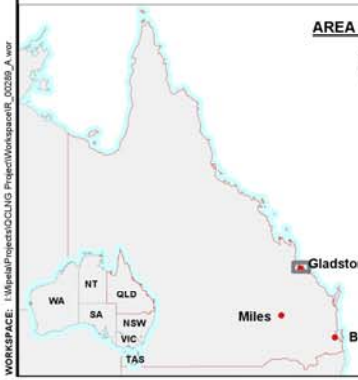
SCALE: 1:150,000 (A3)

-3 0 3 6
Kilometres

LEGEND
- Locality
- Roads
- Rail
- Existing Gas Pipeline
- Proposed Pipeline Corridors
- Great Barrier Reef Marine Park
- Proposed New Road Alignment
- Proposed Bridge Alignment
- LNG Facility Investigation Area
- Dredging Investigation Area
- LNG Marine Facility Investigation Area

Note 1. GBRWHA extends eastwards from the mainland LAT incorporating all waters and islands shown in this figure
Note 2. The GBRWHA is also a listed National Heritage Place

AREA OF DETAIL



WORKSPACE: I:\Mpela\Projects\QCLNG Project\Workspace\R_00269_A.wor

GBRMP Southern Boundary
Lat -23 44 51.94
The Narrows
Graham Creek
Phillipies Landing Road
Laird Point
Friend Point
Curtis Island
Calliope River Targinie Road
Forest Road
North China Bay
Hamilton Point
Port of Gladstone
Gladstone Mount Larcom R
Graham Creek
Curtis Island
Targinie
Hamilton Point
Port of Gladstone
Yarwun
Callemondah
Gladstone
Clinton
Sun Valley
New Auckland
Telina
Gatcombe
Beecher
Glen Eden
West Stowe
Toolooa
Burua
Boyne Island
Wurdong Heights
River Ranch

Appendix B. Gladstone State Development Area

THE COORDINATOR - GENERAL

GLADSTONE STATE DEVELOPMENT AREA

DESIGNATION MAP

Disclaimer
(i) The Department of Infrastructure & Planning accepts no responsibility for any loss or damage suffered howeverso arising to any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses (ii) & (iii)
(ii) The dimensions, areas, number of lots, size & location of corridor information are approximate only and may vary.
(iii) This plan may not be copied unless this note is included.

RESTRICTED DEVELOPMENT PRECINCT
ENVIRONMENTAL MANAGEMENT PRECINCT
CURTIS ISLAND INDUSTRY PRECINCT
TARGINIE PRECINCT
Gladstone Mount Larcom Road
YARWUN PRECINCT
CLINTON PRECINCT
ALDOGA PRECINCT
BRUCE HIGHWAY

Legend

Gladstone State Development Area Precincts

- ALDOGA PRECINCT
- CLINTON PRECINCT
- CORRIDOR AREA BUFFER PRECINCT
- CURTIS ISLAND INDUSTRY PRECINCT
- ENVIRONMENTAL MANAGEMENT PRECINCT
- MATERIALS TRANSPORTATION & SERVICES CORRIDOR
- RESTRICTED DEVELOPMENT PRECINCT
- STUART OIL SHALE RESERVE PRESERVATION AREA
- TARGINIE PRECINCT
- YARWUN PRECINCT

0 2 4 8 Kilometres

DATUM: MGA 94
SCALE: A1
1:72,331

GDA

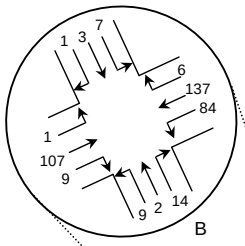
Queensland Government
The Coordinator-General

FILE REF:

DSDA_001_056
VERSION: 01
DATE: 21-07-08

Appendix C. Base Intersection Traffic Volumes

Qld Curtis LNG Traffic Flows
2008 PM Peak Base (No Development)
Scenario 1



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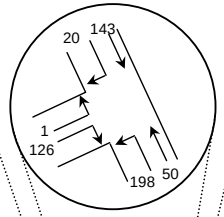

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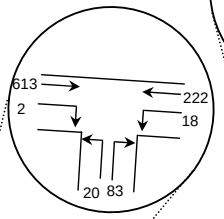

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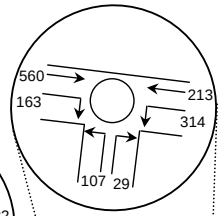

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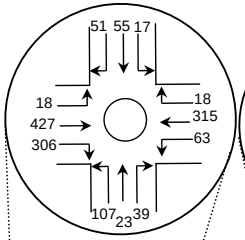

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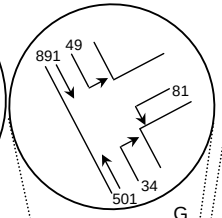

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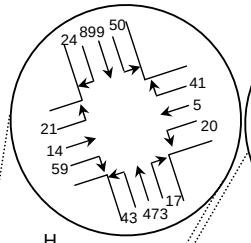

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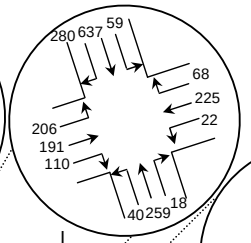

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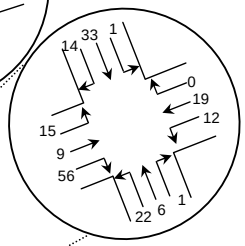

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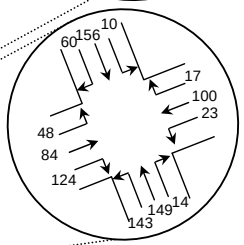

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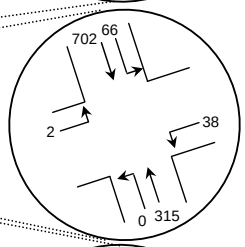

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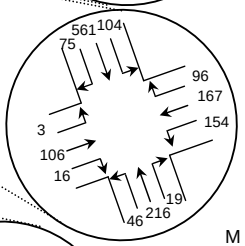

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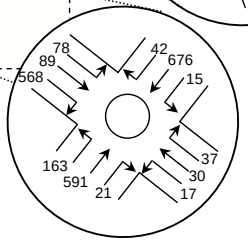

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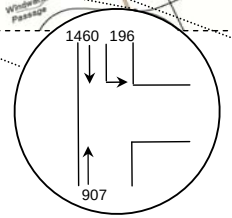

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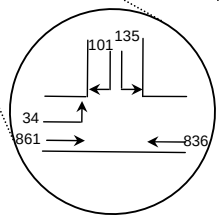

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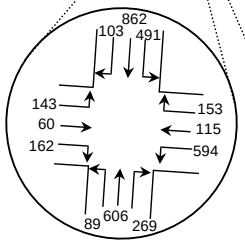

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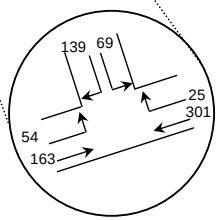

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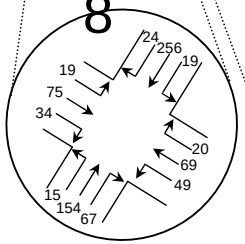

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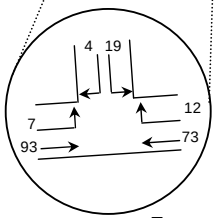

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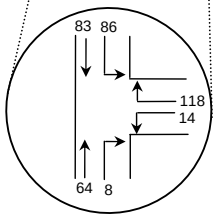

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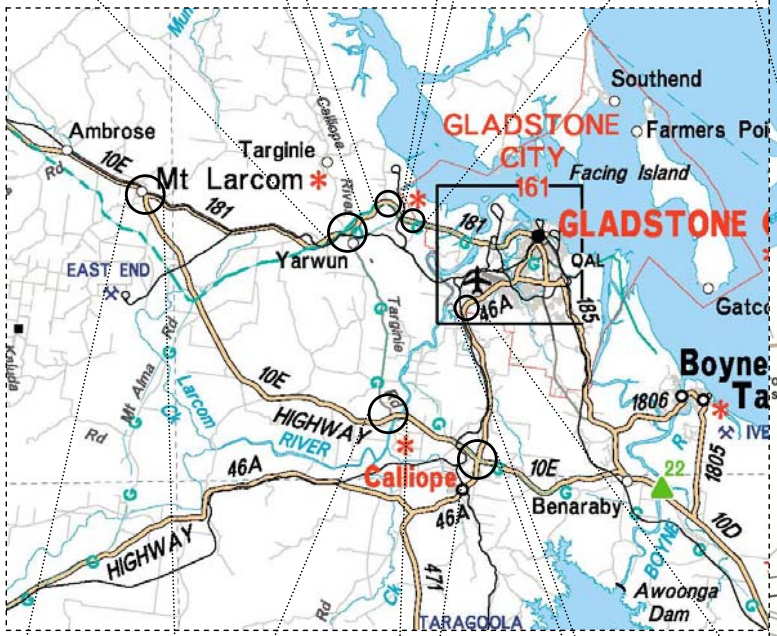
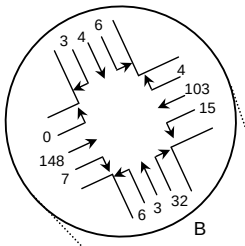


Qld Curtis LNG Traffic Flows
2008 AM Peak Base (No Development)
Scenario 1



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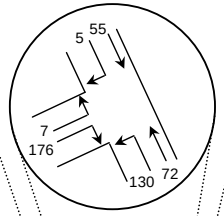

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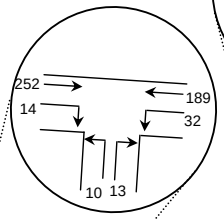

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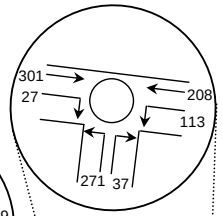

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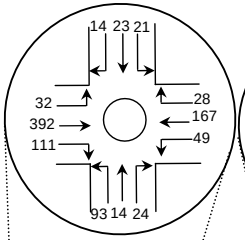

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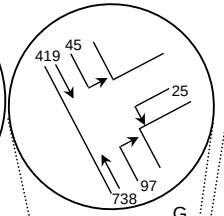

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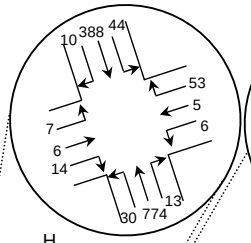

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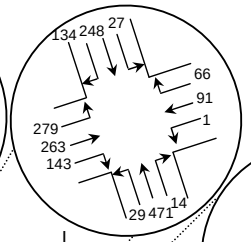

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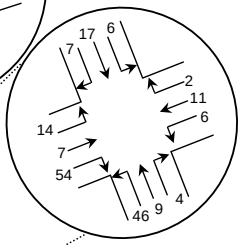

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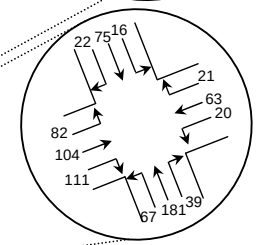

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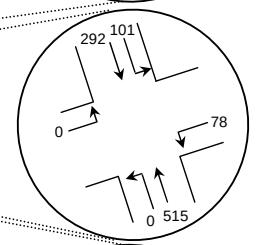

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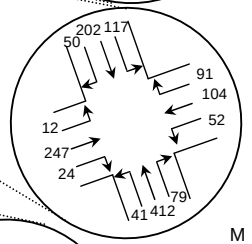

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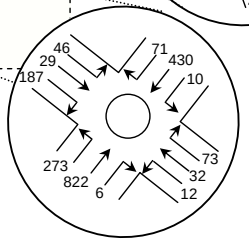

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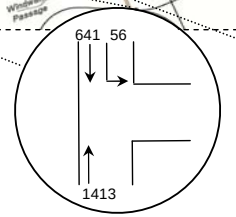

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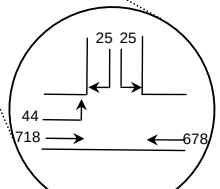

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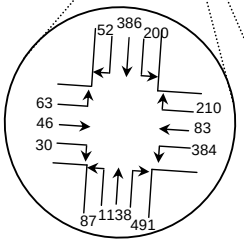

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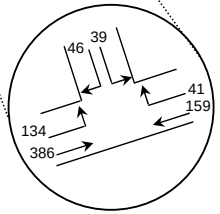

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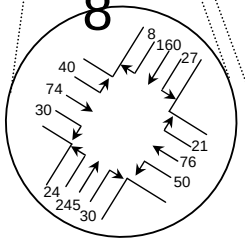

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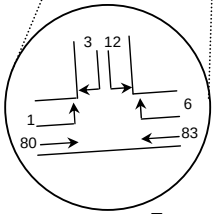

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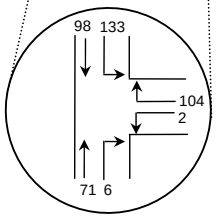

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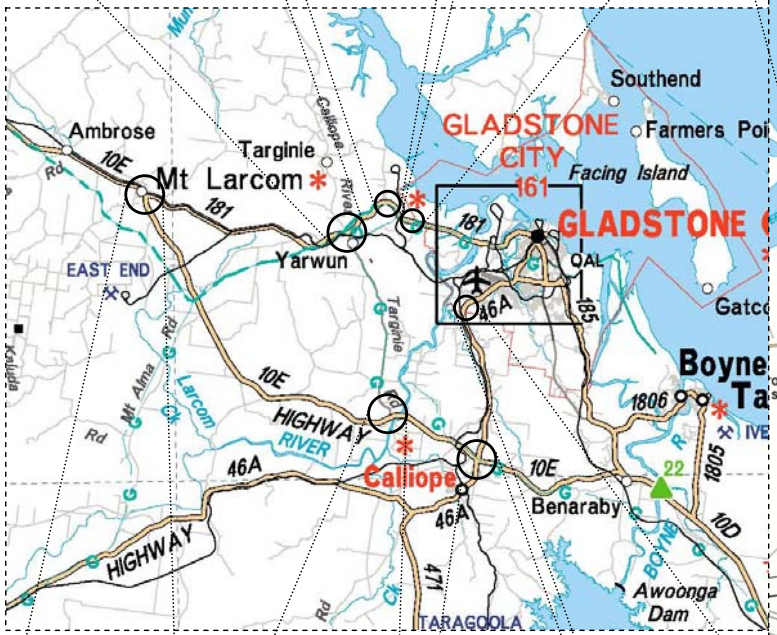


Appendix D. DMR Supplied Historical Traffic Data

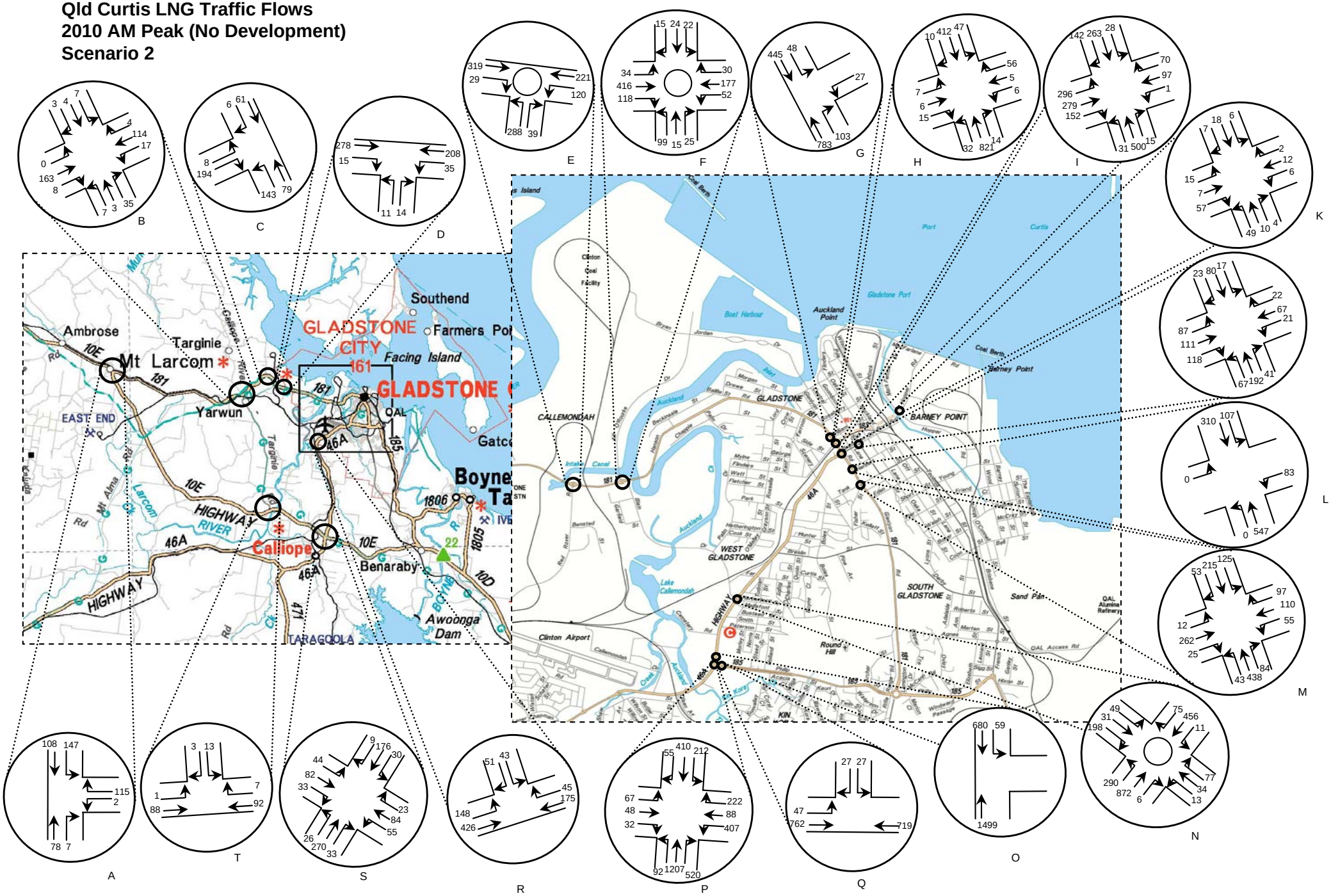
HISTORICAL TRAFFIC COUNTS - DMR SUPPIED DATA

Segment starts at:	Segment ends at:	Distance (km)	Direction	Daily Traffic Volume	% Vehicle Class						% Growth			Weighted Average for 10 yr growth
					Light	Heavy	Short	Truck or Bus	Articulated	Road Train	1 yr	5 yr	10 yr	
Bruce Hwy (S to N)														
Gladstone-Benaraby Rd i'section	500m S Dawson Hwy (11.58km)	11.58	Gazettal	2268	74.56	25.44	74.56	6.47	11.57	7.4	18.19	5.27	5.88	
			Against Gazettal	2288	74.82	25.18	74.82	6.76	10.9	7.52	16.79	5.51	6.83	
			Both	4556	74.7	25.3	74.7	6.61	11.23	7.46	17.48	5.39	6.33	
500m S Dawson Hwy (11.58km)	25m Nth Calliope River on Bruce Hwy (45.41km)	33.83	Gazettal	1805	70.23	29.77	70.23	7.9	12.45	9.42	17.28	6.19	4.71	
			Against Gazettal	1645	65.7	34.3	65.7	11.52	13.15	9.63	9.08	4.46	2.93	4%
			Both	3450	68.07	31.93	68.07	9.62	12.79	9.52	13.23	5.35	3.83	
25m Nth Calliope River on Bruce Hwy (45.41km)	Hut Ck (Nth Ambrose) on Bruce Hwy (85.32km)	39.91	Gazettal	2545	71.98	28.02	71.98	7.11	11.72	9.19	12.02	4.1	5.07	
			Against Gazettal	2506	71.93	28.07	71.93	7.7	11.18	9.19	9.77	4.69	3.86	
			Both	5051	71.94	28.06	71.94	7.41	11.46	9.19	10.89	4.38	4.43	
Gladstone-Mt Larcom Rd (E to W)														
Glenlyon St/Dawson Hwy	200m N Lord St (1.345km)	1.345	Gazettal	4362	87.84	12.16	87.84	8.3	2.32	1.54	-2.15	-3.81	-0.64	
			Against Gazettal	4269	87.04	12.96	87.04	8.41	2.55	2	1.64	-7.03	-1.35	
			Both	8631	87.44	12.56	87.44	8.36	2.43	1.77	-0.31	-5.51	-1.01	
200m N Lord St (1.345km)	50m S Auckland Ck (3.258km)	1.913	Gazettal	3113	81.76	18.24	81.76	12.12	3.71	2.41	5.78	4.49	3.38	
			Against Gazettal	2939	83.97	16.03	83.97	9.93	3.69	2.41	6.49	5.1	3.96	3%
			Both	6052	82.83	17.17	82.83	11.05	3.7	2.42	6.12	4.78	3.65	
50m S Auckland Ck (3.258km)	500m S Red Rover Rd (4.625km)	1.367	Gazettal	4447	83.45	16.55	83.45	9.74	4.7	2.11	16.17	11.3	6.33	
			Against Gazettal	4484	83.92	16.08	83.92	9.48	4.47	2.13	18.06	11.48	6.37	
			Both	8931	83.7	16.3	83.7	9.61	4.58	2.11	17.11	11.39	6.35	
500m S Red Rover Rd (4.625km)	1km N Calliope River (12.292km)	7.667	Gazettal	3038	84.28	15.72	84.28	5.72	6.34	3.66	17.84	6.01	5.75	
			Against Gazettal	3123	83.68	16.32	83.68	6.26	6.29	3.77	19.11	6.47	6.2	
			Both	6161	83.98	16.02	83.98	6	6.31	3.71	18.48	6.24	5.98	
1km N Calliope River (12.292km)	150m N Yarwun Rd (32.14km)	19.848	Gazettal	1419	79.45	20.55	79.45	8.77	5.53	6.25	5.42	4.98	5.78	6%
			Against Gazettal	1515	80.24	19.76	80.24	6.64	6.39	6.73	8.14	5.76	5.61	
			Both	2934	79.87	20.13	79.87	7.67	5.97	6.49	6.81	5.38	5.67	
Dawson Hwy (N to S)														
Glenlyon St/Gladstone-Mt Larcom Rd	150m South Park St (Gstone) (1.498km)	1.498	Gazettal	6834	96.13	3.87	96.13	3.16	0.65	0.06	-2.51	2.31	2.34	
			Against Gazettal	5874	97.75	2.25	87.75	1.77	0.4	0.08	-1.72	-2.9	-1.22	
			Both	12708	97.05	2.95	97.05	2.38	0.5	0.07	-2.15	-0.29	0.55	
150m South Park St (Gstone) (1.498km)	250m West Breslin St (2.238km)	0.74	Gazettal	9875	93.64	6.36	93.64	3.75	2.38	0.23	-8.87	0.51	1.12	
			Against Gazettal	9347	95.57	4.43	95.57	2.65	1.64	0.14	-5.7	0.11	0.79	
			Both	19222	96.98	3.02	96.98	2.59	0.35	0.08	-7.35	0.31	0.96	
250m West Breslin St (2.238km)	250m North Paterson St (3.13km)	0.892	Gazettal	12428	89.38	10.62	89.38	9.96	0.57	0.09	1.3	0.94	2.04	
			Against Gazettal	11880	96.67	3.33	96.67	2.83	0.42	0.08	-0.58	0.39	2.07	2%
			Both	24308	92.92	7.08	92.92	6.48	0.51	0.09	0.37	0.67	2.05	
250m North Paterson St (3.13km)	Police Ck (Auckland Ck) (4.391km)	1.261	Gazettal	14437	96.58	3.42	96.58	3.03	0.33	0.06	7.92	3.12	4.06	
			Against Gazettal	14177	96.44	3.56	96.44	3.17	0.34	0.05	-0.56	2.04	2.7	
			Both	28614	96.52	3.48	96.52	3.1	0.33	0.05	3.55	2.58	3.35	
Police Ck (Auckland Ck) (4.391km)	West Penda Ave (5.179km)	0.788	Gazettal	11055	91.44	8.56	91.44	7.99	0.49	0.08	4	3.28	2.84	
			Against Gazettal	11024	95.67	4.33	95.67	3.88	0.39	0.06	11.2	4.8	2.8	
			Both	22079	93.54	6.46	93.54	5.94	0.45	0.07	7.47	4.01	2.82	
West Penda Ave (5.179km)	450m W Chapman Dr (10.296km)	5.117	Gazettal	3029	94.66	5.34	94.66	4.12	0.97	0.25	7.41	6.25	5.45	
			Against Gazettal	3004	94.37	5.63	94.37	4.34	1.09	0.2	1.11	5.73	5.13	
			Both	6033	94.51	5.49	94.51	4.23	1.03	0.23	4.18	5.99	5.28	
450m W Chapman Dr (10.296km)	250m W Chamberlain Rd (19.05km)	8.754	Gazettal	2435	90.46	9.54	90.46	5.46	2.53	1.55	13.94	5.8	5.86	
			Against Gazettal	2352	90.75	9.25	90.75	5.38	2.52	1.35	11.36	3.91	5.34	5%
			Both	4787	90.6	9.4	90.6	5.42	2.52	1.46	12.66	4.85	5.6	
250m W Chamberlain Rd (19.05km)	200m E Drynan Dr (21.75km)	2.7	Gazettal	2666	89.67	10.33	89.67	6.04	2.59	1.7	13.25	5.19	5.42	
			Against Gazettal	2642	89.05	10.95	89.05	6.53	2.71	1.71	12.28	5.05	5.44	
			Both	5308	89.38	10.62	89.38	6.27	2.65	1.7	12.77	5.12	5.43	

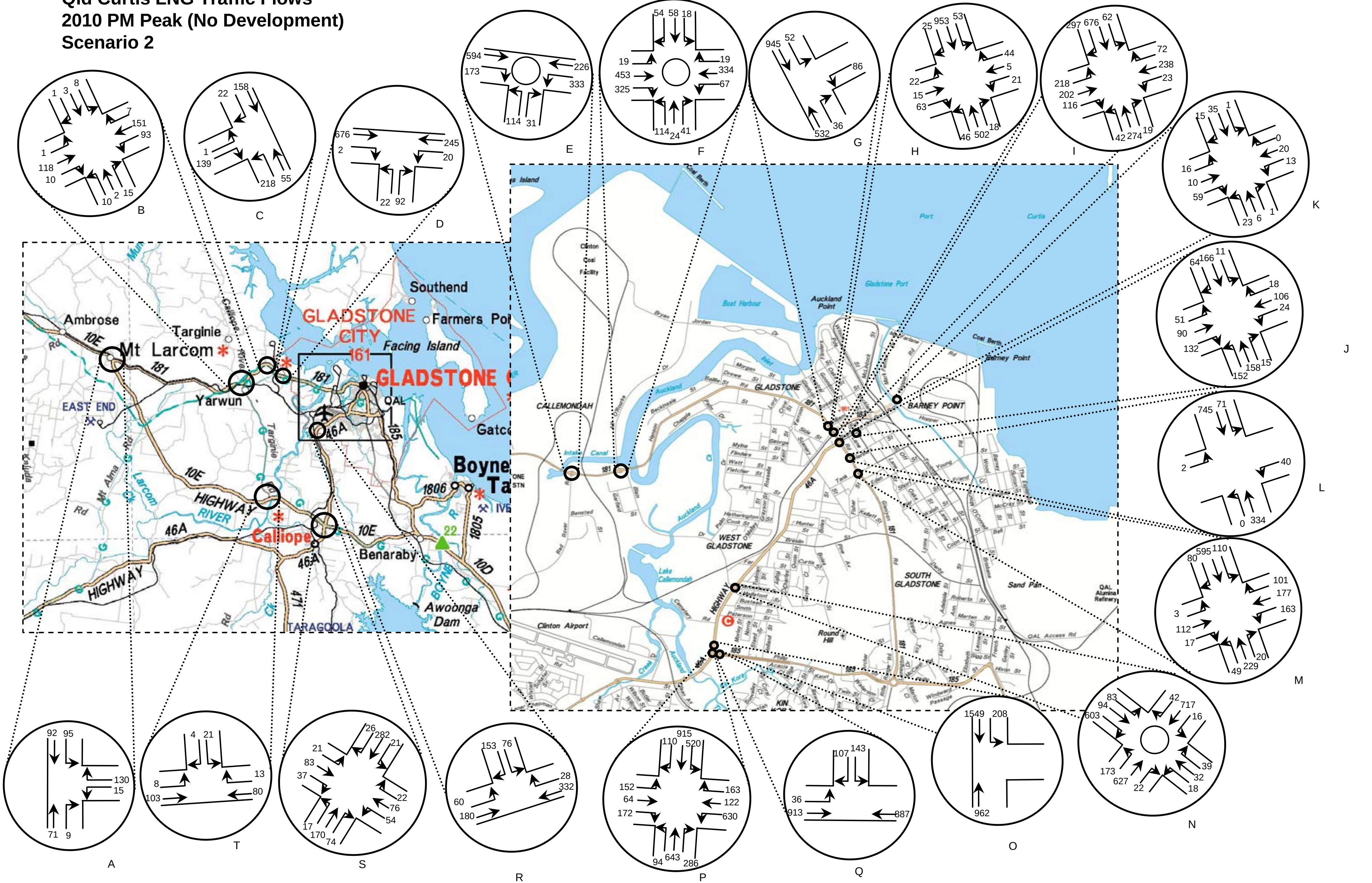
Legend
Rural Area
Urban Area

Appendix E. Future Intersection Volumes (No Dev)

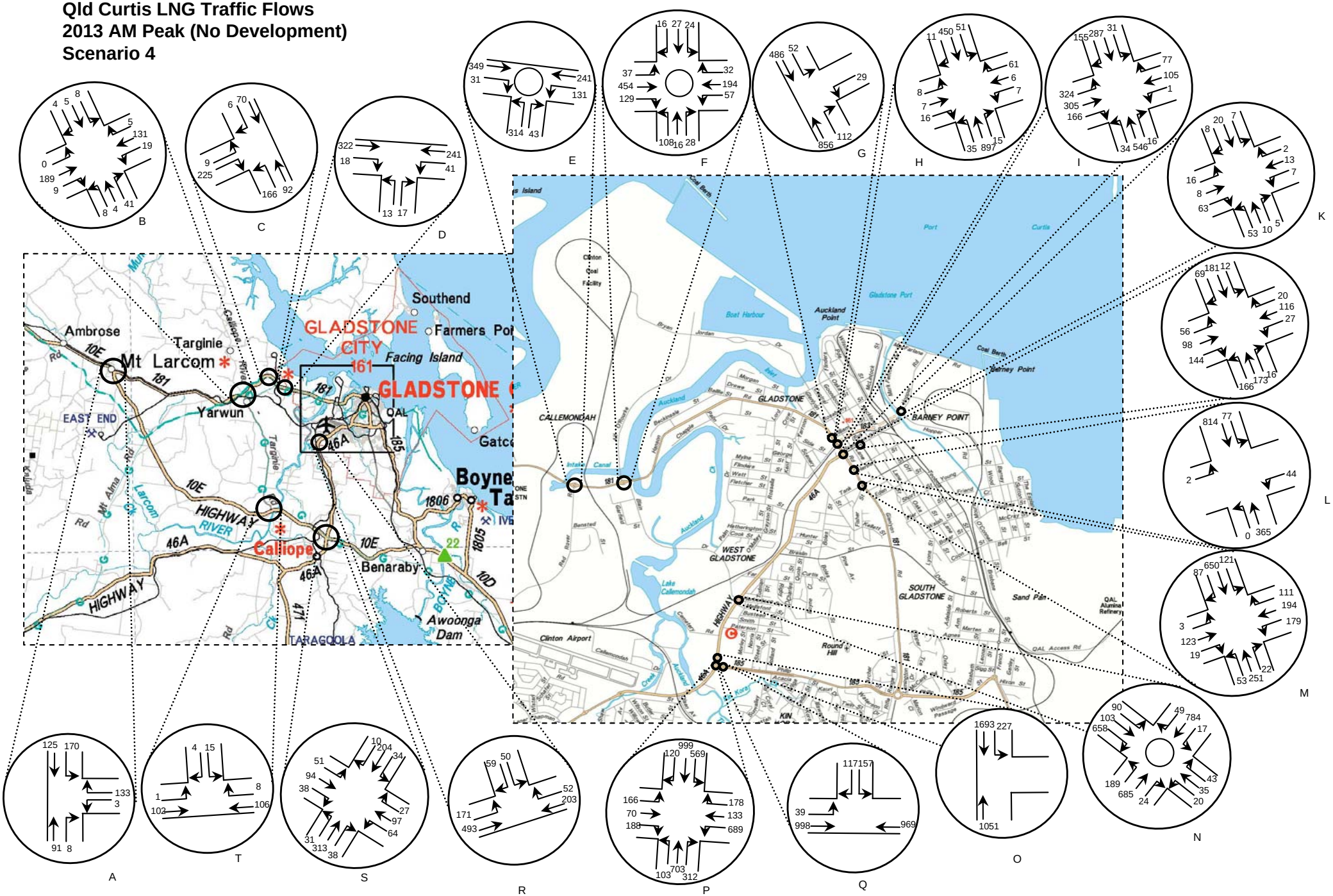
Qld Curtis LNG Traffic Flows
2010 AM Peak (No Development)
Scenario 2



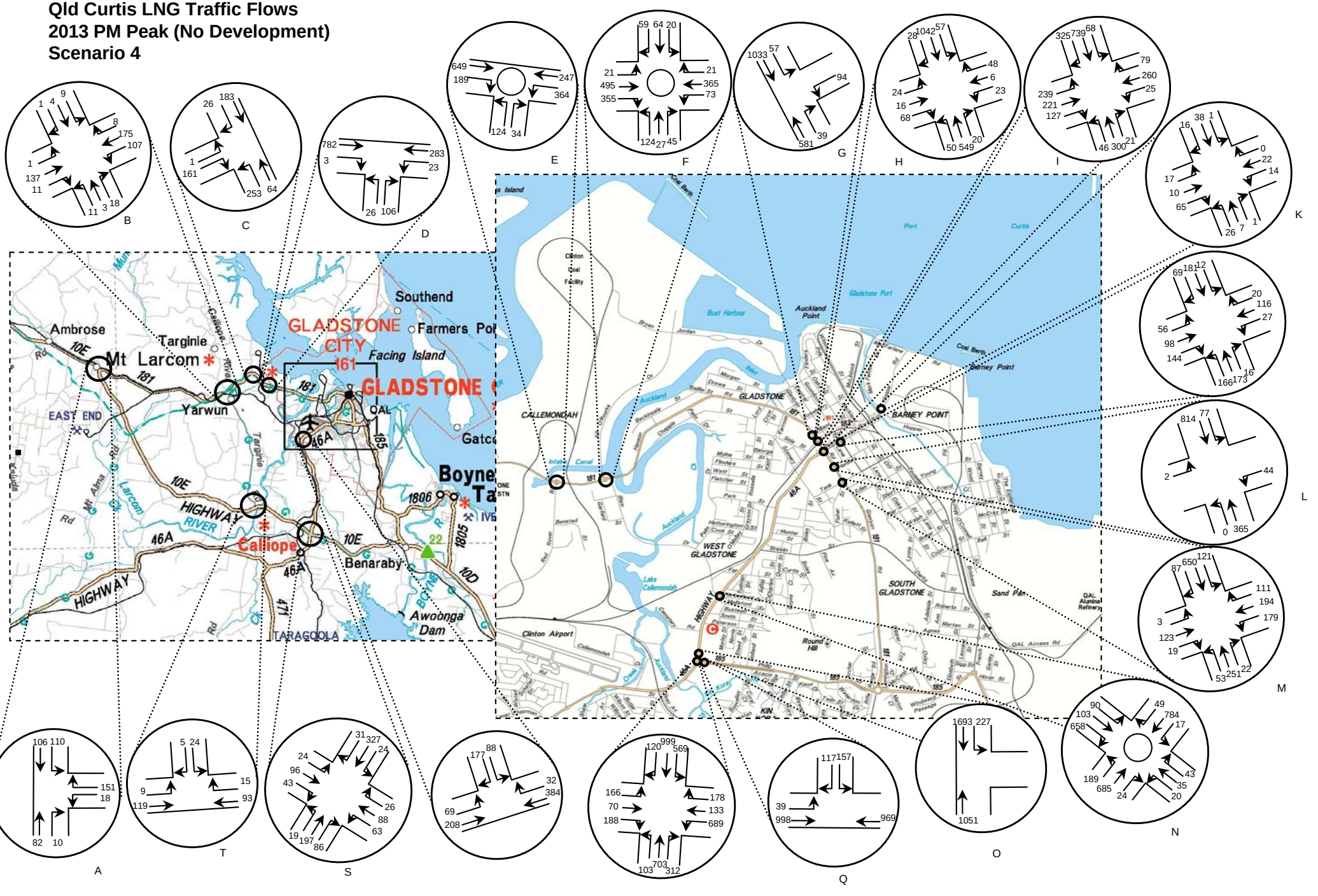
Qld Curtis LNG Traffic Flows
2010 PM Peak (No Development)
Scenario 2



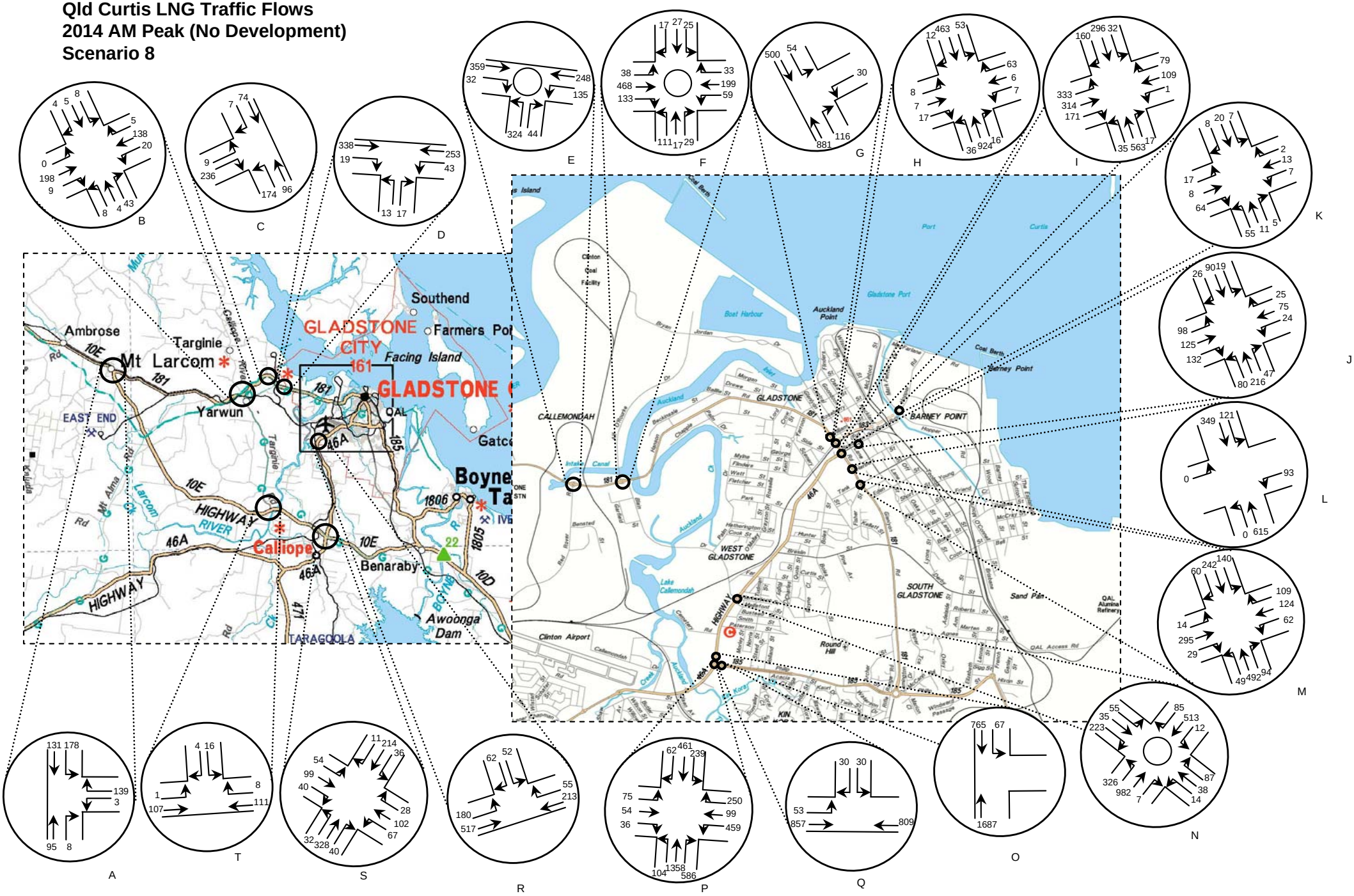
Qld Curtis LNG Traffic Flows
2013 AM Peak (No Development)
Scenario 4



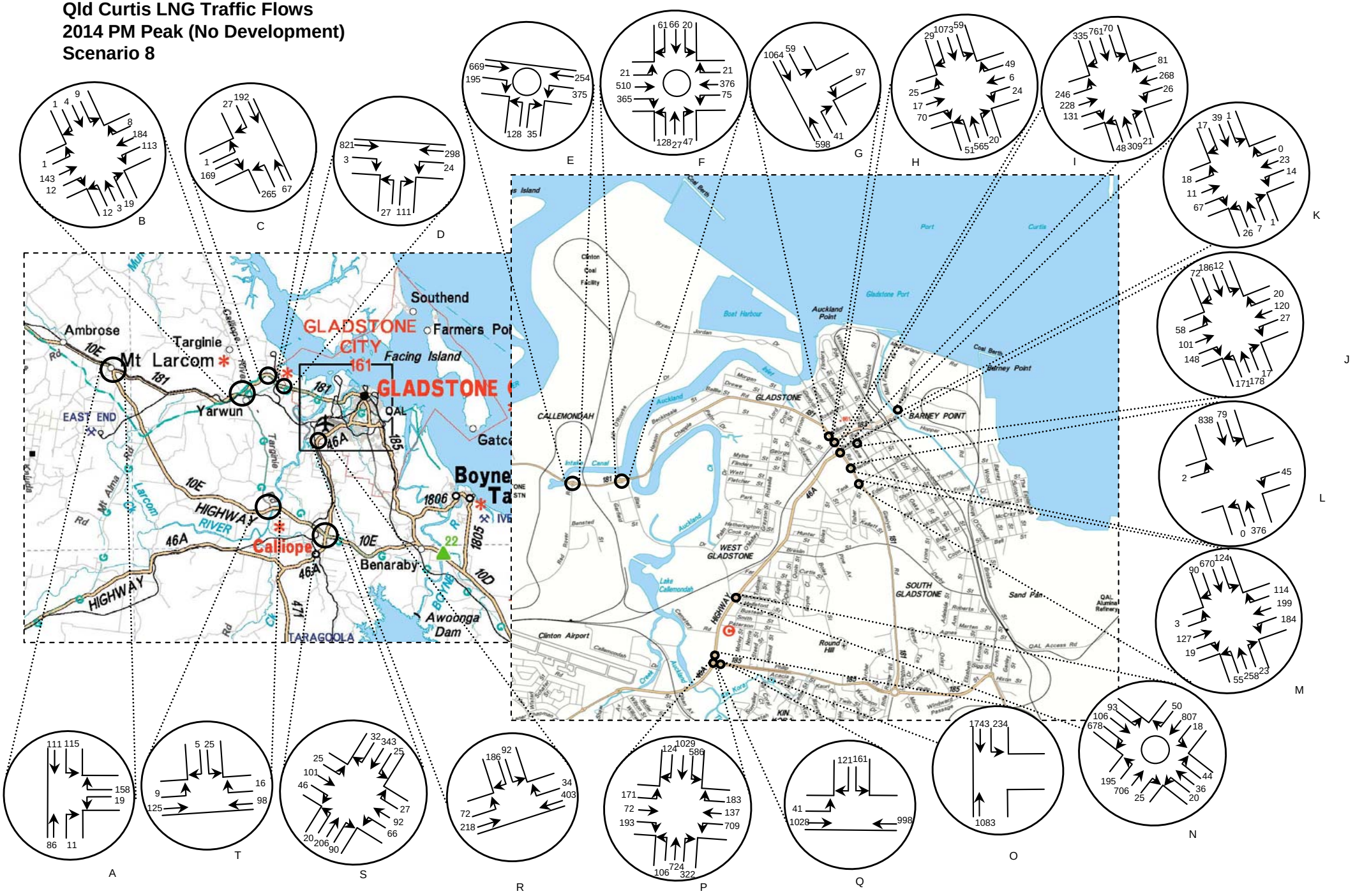
Qld Curtis LNG Traffic Flows
2013 PM Peak (No Development)
Scenario 4



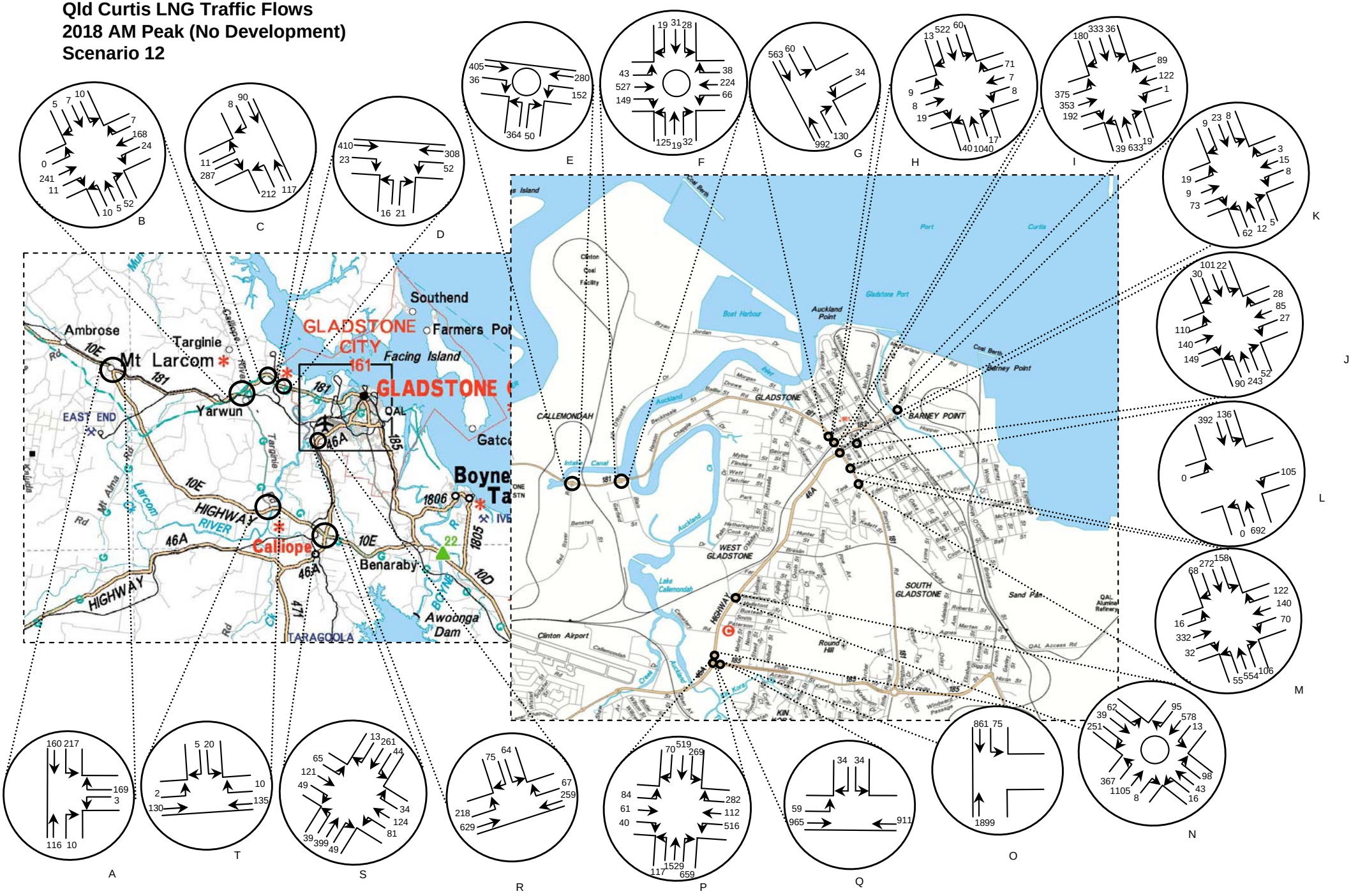
Qld Curtis LNG Traffic Flows
2014 AM Peak (No Development)
Scenario 8



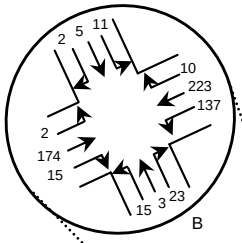
Qld Curtis LNG Traffic Flows
2014 PM Peak (No Development)
Scenario 8



Qld Curtis LNG Traffic Flows
2018 AM Peak (No Development)
Scenario 12



Qld Curtis LNG Traffic Flows
2018 PM Peak (No Development)
Scenario 12



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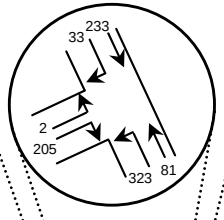

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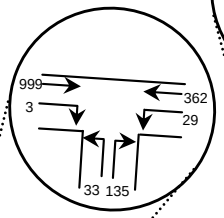

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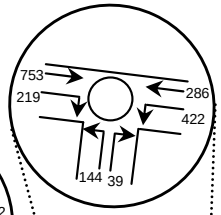

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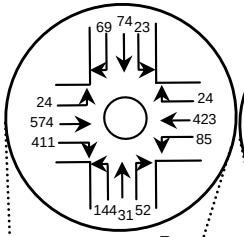

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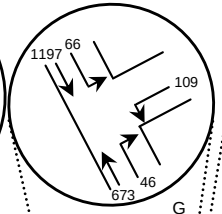

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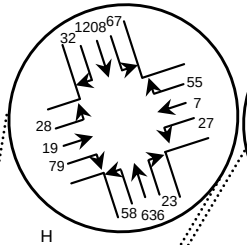

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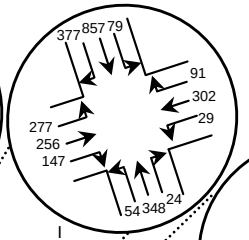

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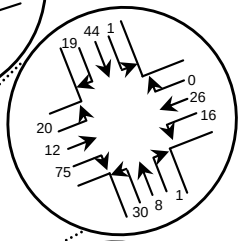

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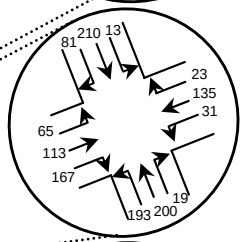

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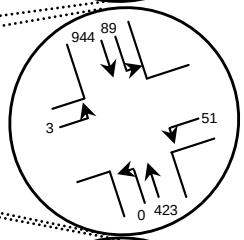

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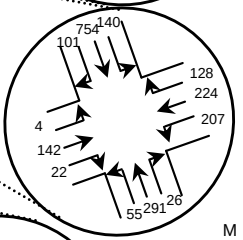

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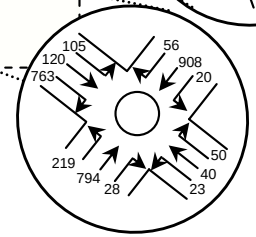

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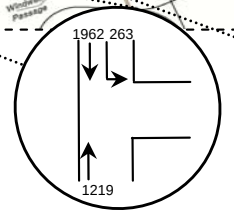

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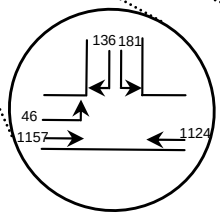

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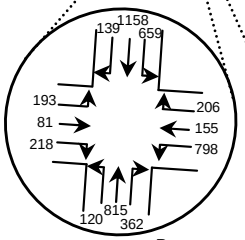

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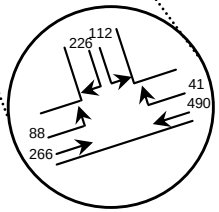

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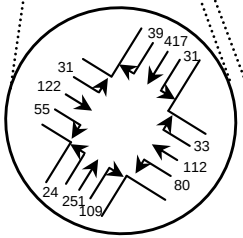

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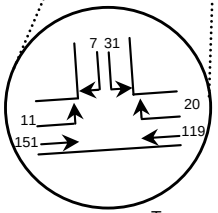

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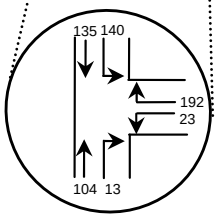

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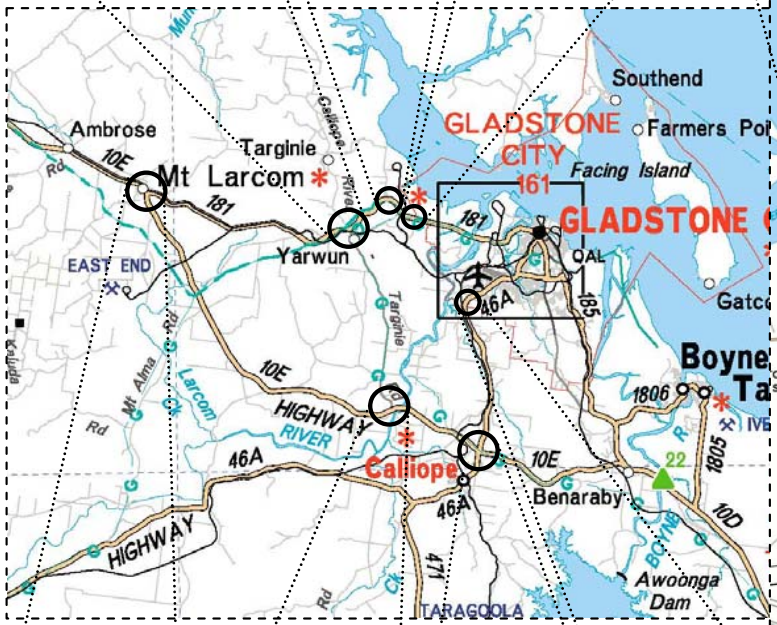
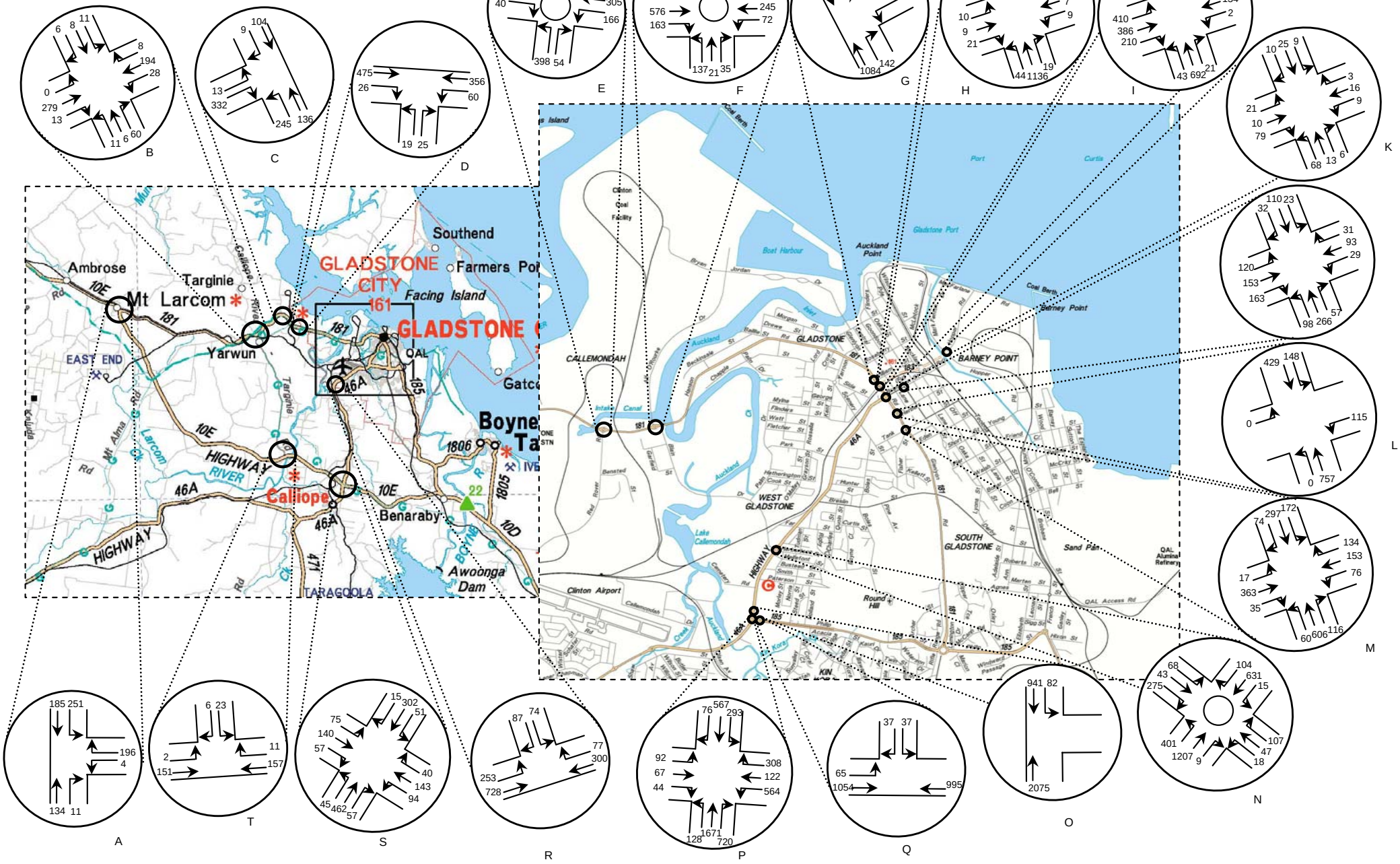
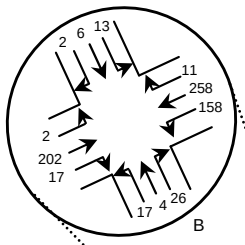


Qld Curtis LNG Traffic Flows
2021 AM Peak (No Development)
Scenario 16



Qld Curtis LNG Traffic Flows
2021 PM Peak (No Development)
Scenario 16



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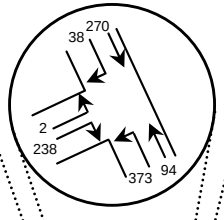

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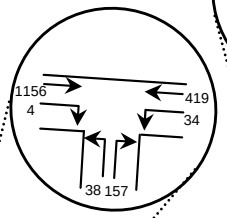

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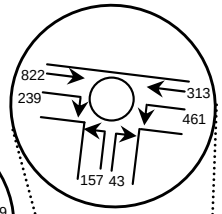

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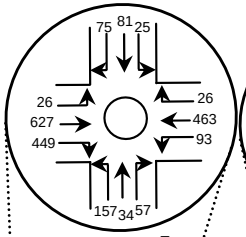

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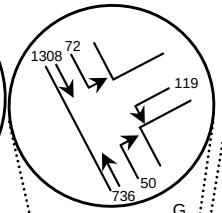

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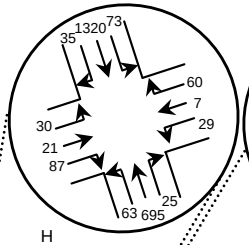

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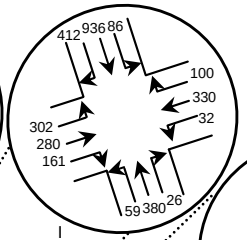

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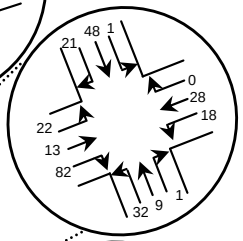

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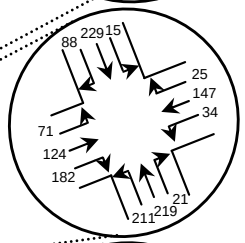

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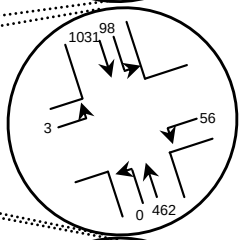

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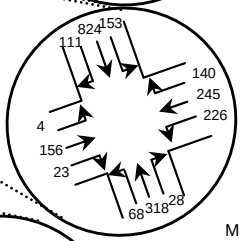

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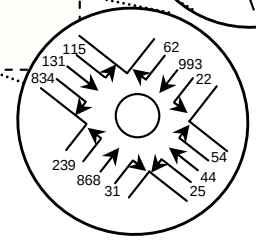

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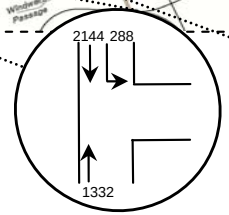

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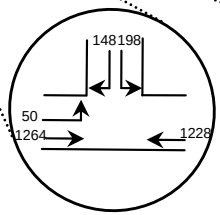

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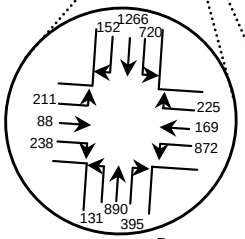

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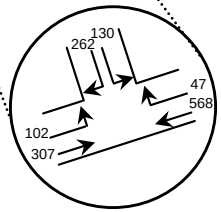

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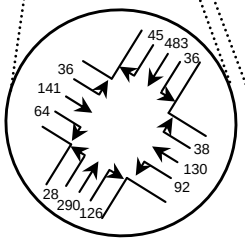

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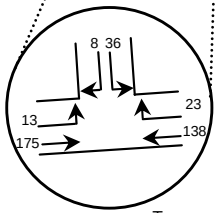

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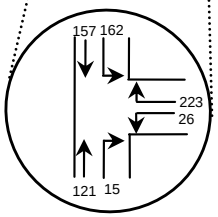

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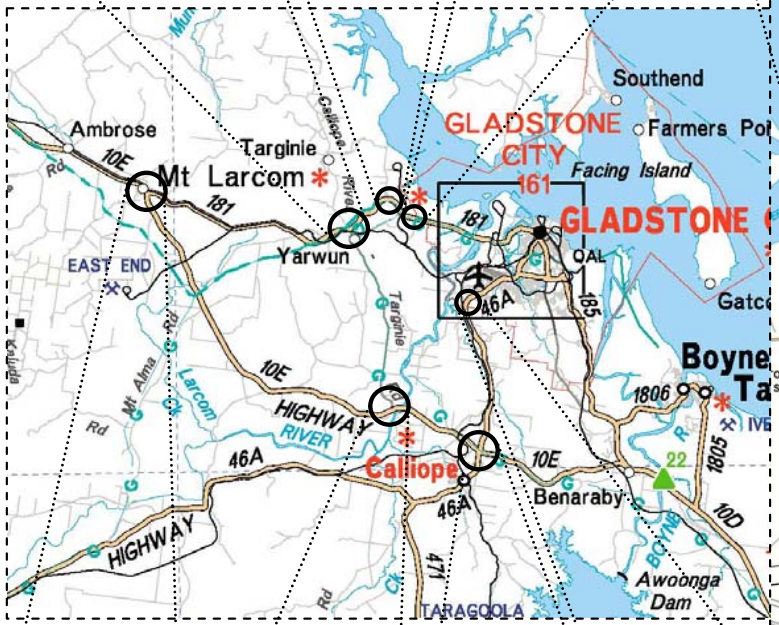
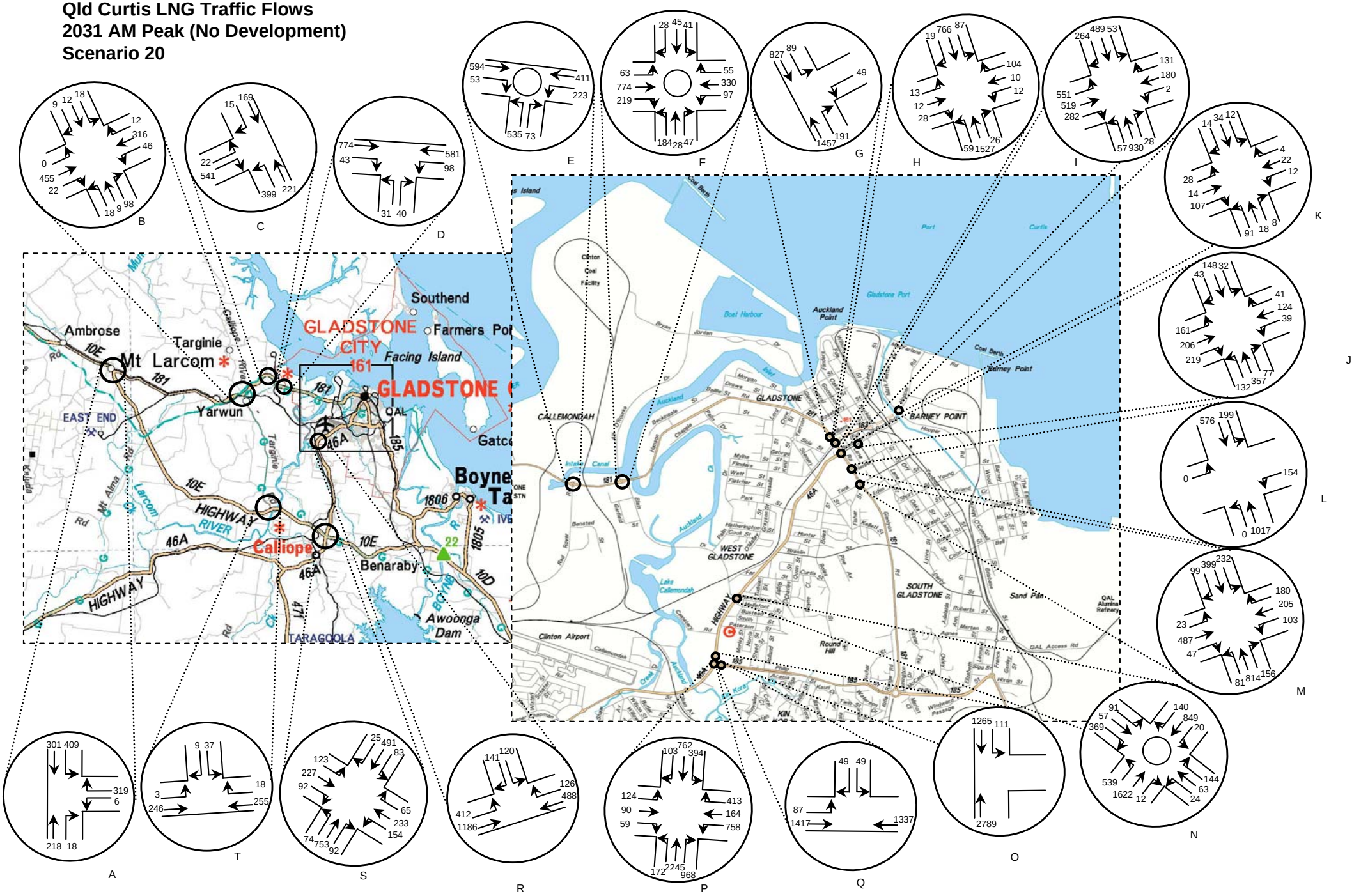
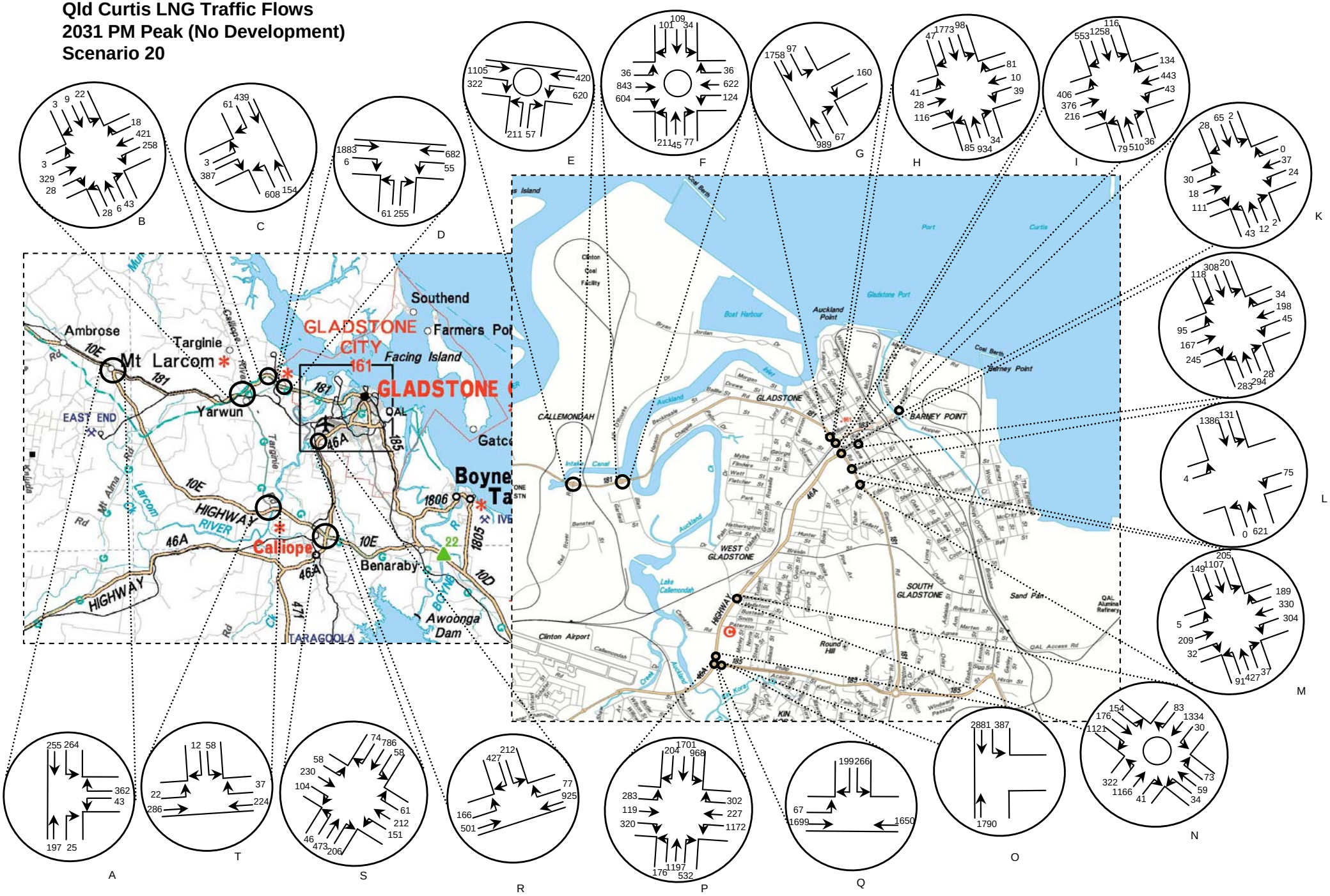


Qld Curtis LNG Traffic Flows
2031 AM Peak (No Development)
Scenario 20



Qld Curtis LNG Traffic Flows
2031 PM Peak (No Development)
Scenario 20



Appendix F. Pavement Impact Assessment

QCLNG Curtis Island LNG Facility

Developer Contribution Summary - Camp Option A (Road Option 1)

Sect No.	Road No.	Road Name	Road Sections	Lgth (km)	Reduced Pvt Life To	Reduced Pvt Life From	Dev. PV Contribution Rehab ($) To	Rehab ($) From	Mtce ($) To	Mtce ($) From	Total $
1	10E	Bruce Hwy	Benaraby - Dawson Hwy		0.2%	0.1%				$0	$0
2			Dawson Hwy to Targinie Rd		0.2%	0.0%				$0	$0
3			Targinie Rd to Gladstone Mt Larcom Rd		0.0%	0.0%				$0	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St		0.3%	0.2%				$0	$0
5			Hildebrand St to Blain Dr		0.3%	0.2%				$0	$0
6			Blain Dr to G. Poicier Stn		0.2%	0.2%				$0	$0
7			G. Poicier Stn to Reid Rd		0.3%	0.3%				$0	$0
8			Reid Rd to Landing Road		0.3%	0.2%				$0	$0
9			Landing Road to Targinie Road	4	1.0%	0.8%			$6,326	$0	$6,326
10			Targinie Rd to Quarry Rd	2.7	0.8%	0.7%			$3,067	$0	$3,067
11			Quarry Rd to Mt Larcom/Bruce Highway		0.5%	0.3%				$0	$0
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St		0.3%	0.1%				$0	$0
13			Breslin St to Blain Dr		0.2%	0.1%				$0	$0
14			Blain Dr to Phillip Street		0.1%	0.0%				$0	$0
15			Phillip Street to Penda Ave		0.1%	0.1%				$0	$0
16			Penda Ave to Chapman Rd		0.1%	0.1%				$0	$0
17			Chapman Rd to Harvey Rd		0.3%	0.1%				$0	$0
18			Harvey Rd to Bruce Hwy		0.2%	0.1%				$0	$0
19	183	Port Access Road	Port Access Road	0.858	0.7%	0.5%			$1,493	$1,091	$2,584
			Totals =	7.6			$0	$0	$10,886	$1,091	**$11,977**

Start of Development Traffic = 2010

ESA Increase Trigger = 5.0%

QCLNG Curtis Island LNG Facility

Developer Contribution Summary - Camp Option B (Road Option 1)

Sect No.	Road No.	Road Name	Road Sections	Lgth (km)	Reduced Pvt Life To	Reduced Pvt Life From	Dev. PV Contribution Rehab ($) To	Rehab ($) From	Mtce ($) To	Mtce ($) From	Total $
1	10E	Bruce Hwy	Benaraby - Dawson Hwy		0.2%	0.1%				$0	$0
2			Dawson Hwy to Targinie Rd		0.4%	0.4%				$0	$0
3			Targinie Rd to Gladstone Mt Larcom Rd		0.0%	0.0%				$0	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St		0.1%	0.0%				$0	$0
5			Hildebrand St to Blain Dr		0.1%	0.0%				$0	$0
6			Blain Dr to G. Poicier Stn		0.1%	0.0%				$0	$0
7			G. Poicier Stn to Reid Rd		0.1%	0.0%				$0	$0
8			Reid Rd to Landing Road		0.0%	0.0%				$0	$0
9			Landing Road to Targinie Road	4	0.6%	0.3%			$1,476	$0	$1,476
10			Targinie Rd to Quarry Rd		0.2%	0.0%				$0	$0
11			Quarry Rd to Mt Larcom/Bruce Highway		0.2%	0.0%				$0	$0
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	1.5	1.0%	0.8%			$3,353	$2,570	$5,923
13			Breslin St to Blain Dr	0.7	0.6%	0.4%			$1,010	$0	$1,010
14			Blain Dr to Phillip Street		0.1%	0.2%				$0	$0
15			Phillip Street to Penda Ave		0.4%	0.3%				$0	$0
16			Penda Ave to Chapman Rd		0.2%	0.2%				$0	$0
17			Chapman Rd to Harvey Rd	5.1	0.9%	0.7%			$13,211	$10,199	$23,410
18			Harvey Rd to Bruce Hwy	8.7	0.7%	0.6%			$16,588	$12,806	$29,394
19	183	Port Access Road	Port Access Road	0.858	0.7%	0.5%			$1,493	$1,091	$2,584
			Totals =	20.9			$0	$0	$37,131	$26,666	**$63,797**

Start of Development Traffic = 2010

ESA Increase Trigger = 5.0%

QCLNG Curtis Island LNG Facility

Developer Contribution Summary - Camp Option A (Road Option 2)

Sect No.	Road No.	Road Name	Road Sections	Lgth (km)	Reduced Pvt Life To	Reduced Pvt Life From	Dev. PV Contribution Rehab ($) To	Rehab ($) From	Mtce ($) To	Mtce ($) From	Total $
1	10E	Bruce Hwy	Benaraby - Dawson Hwy		0.2%	0.1%				$0	$0
2			Dawson Hwy to Targinie Rd		0.2%	0.0%				$0	$0
3			Targinie Rd to Gladstone Mt Larcom Rd		0.0%	0.0%				$0	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St		0.3%	0.2%				$0	$0
5			Hildebrand St to Blain Dr		0.3%	0.2%				$0	$0
6			Blain Dr to G. Poicier Stn		0.2%	0.2%				$0	$0
7			G. Poicier Stn to Reid Rd		0.3%	0.3%				$0	$0
8			Reid Rd to Landing Road		0.3%	0.2%				$0	$0
9			Landing Road to Targinie Road	4	0.4%	0.4%			$4,544	$0	$4,544
10			Targinie Rd to Quarry Rd	2.7	0.8%	0.7%			$3,067	$0	$3,067
11			Quarry Rd to Mt Larcom/Bruce Highway		0.5%	0.3%				$0	$0
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St		0.3%	0.1%				$0	$0
13			Breslin St to Blain Dr		0.2%	0.1%				$0	$0
14			Blain Dr to Phillip Street		0.1%	0.0%				$0	$0
15			Phillip Street to Penda Ave		0.1%	0.1%				$0	$0
16			Penda Ave to Chapman Rd		0.1%	0.1%				$0	$0
17			Chapman Rd to Harvey Rd		0.3%	0.1%				$0	$0
18			Harvey Rd to Bruce Hwy		0.2%	0.1%				$0	$0
19	183	Port Access Road	Port Access Road	0.858	0.7%	0.5%			$1,493	$1,091	$2,584
			Totals =	7.6			$0	$0	$9,104	$1,091	**$10,195**

Start of Development Traffic = 2010

ESA Increase Trigger = 5.0%

QCLNG Curtis Island LNG Facility

Developer Contribution Summary - Camp Option B (Road Option 2)

Sect No.	Road No.	Road Name	Road Sections	Lgth (km)	Reduced Pvt Life To	Reduced Pvt Life From	Dev. PV Contribution Rehab ($) To	Rehab ($) From	Mtce ($) To	Mtce ($) From	Total $
1	10E	Bruce Hwy	Benaraby - Dawson Hwy		0.2%	0.1%				$0	$0
2			Dawson Hwy to Targinie Rd		0.4%	0.4%				$0	$0
3			Targinie Rd to Gladstone Mt Larcom Rd		0.0%	0.0%				$0	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St		0.1%	0.0%				$0	$0
5			Hildebrand St to Blain Dr		0.1%	0.0%				$0	$0
6			Blain Dr to G. Poicier Stn		0.1%	0.0%				$0	$0
7			G. Poicier Stn to Reid Rd		0.1%	0.0%				$0	$0
8			Reid Rd to Landing Road		0.0%	0.0%				$0	$0
9			Landing Road to Targinie Road		0.1%	0.0%				$0	$0
10			Targinie Rd to Quarry Rd		0.2%	0.0%				$0	$0
11			Quarry Rd to Mt Larcom/Bruce Highway		0.2%	0.0%				$0	$0
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	1.5	1.0%	0.8%			$3,353	$2,570	$5,923
13			Breslin St to Blain Dr	0.7	0.6%	0.4%			$1,010	$0	$1,010
14			Blain Dr to Phillip Street		0.1%	0.2%				$0	$0
15			Phillip Street to Penda Ave		0.4%	0.3%				$0	$0
16			Penda Ave to Chapman Rd		0.2%	0.2%				$0	$0
17			Chapman Rd to Harvey Rd	5.1	0.9%	0.7%			$13,211	$10,199	$23,410
18			Harvey Rd to Bruce Hwy	8.7	0.7%	0.6%			$16,588	$12,806	$29,394
19	183	Port Access Road	Port Access Road	0.858	0.7%	0.5%			$1,493	$1,091	$2,584
			Totals =	16.9			$0	$0	$35,655	$26,666	**$62,322**

Start of Development Traffic = 2010

ESA Increase Trigger = 5.0%

QCLNG Curtis Island LNG Facility

Developer Contribution Summary - Camp Option A (No Road Bridge)

Sect No.	Road No.	Road Name	Road Sections	Lgth (km)	Reduced Pvt Life To	Reduced Pvt Life From	Dev. PV Contribution Rehab ($) To	Rehab ($) From	Mtce ($) To	Mtce ($) From	Total $
1	10E	Bruce Hwy	Benaraby - Dawson Hwy		0.2%	0.1%				$0	$0
2			Dawson Hwy to Targinie Rd		0.0%	0.0%				$0	$0
3			Targinie Rd to Gladstone Mt Larcom Rd		0.0%	0.0%				$0	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St		0.3%	0.2%				$0	$0
5			Hildebrand St to Blain Dr		0.3%	0.2%				$0	$0
6			Blain Dr to G. Poicier Stn		0.5%	0.4%				$0	$0
7			G. Poicier Stn to Reid Rd		0.6%	0.5%				$0	$0
8			Reid Rd to Landing Road		0.5%	0.4%				$0	$0
9			Landing Road to Targinie Road	4	0.8%	0.7%			$4,544	$0	$4,544
10			Targinie Rd to Quarry Rd	2.7	0.8%	0.7%			$3,067	$0	$3,067
11			Quarry Rd to Mt Larcom/Bruce Highway		0.5%	0.3%				$0	$0
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St		0.3%	0.1%				$0	$0
13			Breslin St to Blain Dr		0.2%	0.1%				$0	$0
14			Blain Dr to Phillip Street		0.2%	0.1%				$0	$0
15			Phillip Street to Penda Ave		0.3%	0.1%				$0	$0
16			Penda Ave to Chapman Rd		0.2%	0.1%				$0	$0
17			Chapman Rd to Harvey Rd		0.7%	0.2%				$0	$0
18			Harvey Rd to Bruce Hwy		0.5%	0.1%				$0	$0
19	183	Port Access Road	Port Access Road	0.858	0.7%	0.5%			$1,493	$1,091	$2,584
			Totals =	7.6			$0	$0	$9,104	$1,091	**$10,195**

Start of Development Traffic = 2010

ESA Increase Trigger = 5.0%

QCLNG Curtis Island LNG Facility

Developer Contribution Summary - Camp Option B (No Road Bridge)

Sect No.	Road No.	Road Name	Road Sections	Lgth (km)	Reduced Pvt Life To	Reduced Pvt Life From	Dev. PV Contribution Rehab ($) To	Rehab ($) From	Mtce ($) To	Mtce ($) From	Total $
1	10E	Bruce Hwy	Benaraby - Dawson Hwy		0.2%	0.1%				$0	$0
2			Dawson Hwy to Targinie Rd		0.5%	0.6%				$0	$0
3			Targinie Rd to Gladstone Mt Larcom Rd		0.0%	0.0%				$0	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St		0.1%	0.0%				$0	$0
5			Hildebrand St to Blain Dr		0.1%	0.0%				$0	$0
6			Blain Dr to G. Poicier Stn		0.1%	0.0%				$0	$0
7			G. Poicier Stn to Reid Rd		0.1%	0.0%				$0	$0
8			Reid Rd to Landing Road		0.1%	0.0%				$0	$0
9			Landing Road to Targinie Road		0.2%	0.0%				$0	$0
10			Targinie Rd to Quarry Rd		0.2%	0.0%				$0	$0
11			Quarry Rd to Mt Larcom/Bruce Highway		0.2%	0.0%				$0	$0
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	1.5	1.0%	0.8%			$3,353	$2,570	$5,923
13			Breslin St to Blain Dr	0.7	0.6%	0.4%			$1,010	$0	$1,010
14			Blain Dr to Phillip Street		0.3%	0.3%				$0	$0
15			Phillip Street to Penda Ave		0.8%	0.6%				$0	$0
16			Penda Ave to Chapman Rd		0.4%	0.4%				$0	$0
17			Chapman Rd to Harvey Rd	5.1	1.8%	1.4%			$20,893	$13,221	$34,115
18			Harvey Rd to Bruce Hwy	8.7	1.4%	1.0%			$21,504	$16,601	$38,105
19	183	Port Access Road	Port Access Road	0.858	0.7%	0.5%			$1,493	$1,091	$2,584
			Totals =	16.9			$0	$0	$48,253	$33,483	**$81,737**

Start of Development Traffic = 2010

ESA Increase Trigger = 5.0%

Increase Trigger = 5.0%

Routine Mtce Contribution Calculation (Road Option 1)

Camp Option A

Sect. No.	Road No.	Road Name	Length (km)	ESA's/lane per Year	Routine Mtce $/lane-km/yr	Unit Cost $/ESA/km/yr	TO(WARDS) Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)	FROM Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)
1	10E	Benaraby - Dawson Hwy	11.6	6.25E+05	$7,473	$0.0120																					$0
2		Dawson Hwy to Targinie Rd	7.1	5.97E+05	$8,637	$0.0145																					$0
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	5.97E+05	$6,738	$0.0113																					$0
4	181	Dawson Hwy to Hildebrand St	1.4	6.72E+05	$7,902	$0.0118																					$0
5		Hildebrand St to Blain Dr	1.9	6.44E+05	$7,473	$0.0116																					$0
6		Blain Dr to G. Poicier Stn	1.3	9.02E+05	$7,902	$0.0088																					$0
7		G. Poicier Stn to Reid Rd	5.2	6.12E+05	$7,473	$0.0122																					$0
8		Reid Rd to Landing Road	2.5	6.12E+05	$7,902	$0.0129																					$0
9		Landing Road to Targinie Road	4	3.66E+05	$7,473	$0.0204	$1,604	$1,513	$1,427	$1,782							$6,326										$0
10		Targinie Rd to Quarry Rd	2.7	3.66E+05	$7,473	$0.0204	$1,083	$1,021	$963								$3,067										$0
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	3.66E+05	$7,473	$0.0204																					$0
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	2.32E+05	$7,902	$0.0340																					$0
13		Breslin St to Blain Dr	0.7	3.60E+05	$7,902	$0.0220																					$0
14		Blain Dr to Phillip Street	0.9	1.07E+06	$7,902	$0.0074																					$0
15		Phillip Street to Penda Ave	1.3	6.04E+05	$7,902	$0.0131																					$0
16		Penda Ave to Chapman Rd	0.8	8.84E+05	$7,902	$0.0089																					$0
17		Chapman Rd to Harvey Rd	5.1	2.05E+05	$7,902	$0.0385																					$0
18		Harvey Rd to Bruce Hwy	8.7	2.79E+05	$7,902	$0.0283																					$0
19	183	Port Access Road	0.858	2.98E+05	$7,473	$0.0251	$527	$497	$469								$1,493	$385	$363	$343							$1,091
		Total =	97.4														$10,886										$1,091

Camp Option B

Sect. No.	Road No.	Road Name	Length (km)	ESA's/lane per Year	Routine Mtce $/lane-km/yr	Unit Cost $/ESA/km/yr	TO(WARDS) Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)	FROM Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)
1	10E	Benaraby - Dawson Hwy	11.6	6.25E+05	$7,473	$0.0120																					$0
2		Dawson Hwy to Targinie Rd	7.1	5.97E+05	$8,637	$0.0145																					$0
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	5.97E+05	$6,738	$0.0113																					$0
4	181	Dawson Hwy to Hildebrand St	1.4	6.72E+05	$7,902	$0.0118																					$0
5		Hildebrand St to Blain Dr	1.9	6.44E+05	$7,473	$0.0116																					$0
6		Blain Dr to G. Poicier Stn	1.3	9.02E+05	$7,902	$0.0088																					$0
7		G. Poicier Stn to Reid Rd	5.2	6.12E+05	$7,473	$0.0122																					$0
8		Reid Rd to Landing Road	2.5	6.12E+05	$7,902	$0.0129																					$0
9		Landing Road to Targinie Road	4	3.66E+05	$7,473	$0.0204				$1,476							$1,476										$0
10		Targinie Rd to Quarry Rd	2.7	3.66E+05	$7,473	$0.0204																					$0
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	3.66E+05	$7,473	$0.0204																					$0
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	2.32E+05	$7,902	$0.0340	$1,183	$1,116	$1,053								$3,353	$907	$856	$807							$2,570
13		Breslin St to Blain Dr	0.7	3.60E+05	$7,902	$0.0220	$357	$336	$317								$1,010										$0
14		Blain Dr to Phillip Street	0.9	1.07E+06	$7,902	$0.0074																					$0
15		Phillip Street to Penda Ave	1.3	6.04E+05	$7,902	$0.0131																					$0
16		Penda Ave to Chapman Rd	0.8	8.84E+05	$7,902	$0.0089																					$0
17		Chapman Rd to Harvey Rd	5.1	2.05E+05	$7,902	$0.0385	$4,663	$4,399	$4,150								$13,211	$3,600	$3,396	$3,204							$10,199
18		Harvey Rd to Bruce Hwy	8.7	2.79E+05	$7,902	$0.0283	$5,855	$5,523	$5,210								$16,588	$4,520	$4,264	$4,023							$12,806
19	183	Port Access Road	0.858	2.98E+05	$7,473	$0.0251	$527	$497	$469								$1,493	$385	$363	$343							$1,091
			97.358														$37,131										$26,666

Increase Trigger = 5.0%

Routine Mtce Contribution Calculation (Road Option 2)

Camp Option A

Sect. No.	Road No.	Road Name	Length (km)	ESA's/lane per Year	Routine Mtce $/lane-km/yr	Unit Cost $/ESA/km/yr	TO(WARDS) Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total	FROM Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total
		Link Data		Mtce Costs at PV Base Year (2010)			Discount Rate = 6.0%											Discount Rate = 6.0%										
1	10E	Benaraby - Dawson Hwy	11.6	6.25E+05	$7,473	$0.0120																					$0
2		Dawson Hwy to Targinie Rd	7.1	5.97E+05	$8,637	$0.0145																					$0
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	5.97E+05	$6,738	$0.0113																					$0
4	181	Dawson Hwy to Hildebrand St	1.4	6.72E+05	$7,902	$0.0118																					$0
5		Hildebrand St to Blain Dr	1.9	6.44E+05	$7,473	$0.0116																					$0
6		Blain Dr to G. Poicier Stn	1.3	9.02E+05	$7,902	$0.0088																					$0
7		G. Poicier Stn to Reid Rd	5.2	6.12E+05	$7,473	$0.0122																					$0
8		Reid Rd to Landing Road	2.5	6.12E+05	$7,902	$0.0129																					$0
9		Landing Road to Targinie Road	4	3.66E+05	$7,473	$0.0204	$1,604	$1,513	$1,427								$4,544										$0
10		Targinie Rd to Quarry Rd	2.7	3.66E+05	$7,473	$0.0204	$1,083	$1,021	$963								$3,067										$0
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	3.66E+05	$7,473	$0.0204																					$0
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	2.32E+05	$7,902	$0.0340																					$0
13		Breslin St to Blain Dr	0.7	3.60E+05	$7,902	$0.0220																					$0
14		Blain Dr to Phillip Street	0.9	1.07E+06	$7,902	$0.0074																					$0
15		Phillip Street to Penda Ave	1.3	6.04E+05	$7,902	$0.0131																					$0
16		Penda Ave to Chapman Rd	0.8	8.84E+05	$7,902	$0.0089																					$0
17		Chapman Rd to Harvey Rd	5.1	2.05E+05	$7,902	$0.0385																					$0
18		Harvey Rd to Bruce Hwy	8.7	2.79E+05	$7,902	$0.0283																					$0
19	183	Port Access Road	0.858	2.98E+05	$7,473	$0.0251	$527	$497	$469								$1,493	$385	$363	$343							$1,091
		Total =	97.4														$9,104										$1,091

Camp Option B

Sect. No.	Road No.	Road Name	Length (km)	ESA's/lane per Year	Routine Mtce $/lane-km/yr	Unit Cost $/ESA/km/yr	TO(WARDS) Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total	FROM Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total
		Link Data		Mtce Costs at PV Base Year ( )			Discount Rate = 6.0%											Discount Rate = 6.0%										
1	10E	Benaraby - Dawson Hwy	11.6	6.25E+05	$7,473	$0.0120																					$0
2		Dawson Hwy to Targinie Rd	7.1	5.97E+05	$8,637	$0.0145																					$0
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	5.97E+05	$6,738	$0.0113																					$0
4	181	Dawson Hwy to Hildebrand St	1.4	6.72E+05	$7,902	$0.0118																					$0
5		Hildebrand St to Blain Dr	1.9	6.44E+05	$7,473	$0.0116																					$0
6		Blain Dr to G. Poicier Stn	1.3	9.02E+05	$7,902	$0.0088																					$0
7		G. Poicier Stn to Reid Rd	5.2	6.12E+05	$7,473	$0.0122																					$0
8		Reid Rd to Landing Road	2.5	6.12E+05	$7,902	$0.0129																					$0
9		Landing Road to Targinie Road	4	3.66E+05	$7,473	$0.0204																					$0
10		Targinie Rd to Quarry Rd	2.7	3.66E+05	$7,473	$0.0204																					$0
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	3.66E+05	$7,473	$0.0204																					$0
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	2.32E+05	$7,902	$0.0340	$1,183	$1,116	$1,053								$3,353	$907	$856	$807							$2,570
13		Breslin St to Blain Dr	0.7	3.60E+05	$7,902	$0.0220	$357	$336	$317								$1,010										$0
14		Blain Dr to Phillip Street	0.9	1.07E+06	$7,902	$0.0074																					$0
15		Phillip Street to Penda Ave	1.3	6.04E+05	$7,902	$0.0131																					$0
16		Penda Ave to Chapman Rd	0.8	8.84E+05	$7,902	$0.0089																					$0
17		Chapman Rd to Harvey Rd	5.1	2.05E+05	$7,902	$0.0385	$4,663	$4,399	$4,150								$13,211	$3,600	$3,396	$3,204							$10,199
18		Harvey Rd to Bruce Hwy	8.7	2.79E+05	$7,902	$0.0283	$5,855	$5,523	$5,210								$16,588	$4,520	$4,264	$4,023							$12,806
19	183	Port Access Road	0.858	2.98E+05	$7,473	$0.0251	$527	$497	$469								$1,493	$385	$363	$343							$1,091
			97.358														$35,655										$26,666

Increase Trigger = 5.0%

Routine Mtce Contribution Calculation (No Road Bridge)

Camp Option A

Sect. No.	Road No.	Road Name	Length (km)	ESA's/lane per Year	Routine Mtce $/lane-km/yr	Unit Cost $/ESA/km/yr	TO(WARDS) Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)	FROM Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)
1	10E	Benaraby - Dawson Hwy	11.6	6.25E+05	$7,473	$0.0120																					$0
2		Dawson Hwy to Targinie Rd	7.1	5.97E+05	$8,637	$0.0145																					$0
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	5.97E+05	$6,738	$0.0113																					$0
4	181	Dawson Hwy to Hildebrand St	1.4	6.72E+05	$7,902	$0.0118																					$0
5		Hildebrand St to Blain Dr	1.9	6.44E+05	$7,473	$0.0116																					$0
6		Blain Dr to G. Poicier Stn	1.3	9.02E+05	$7,902	$0.0088																					$0
7		G. Poicier Stn to Reid Rd	5.2	6.12E+05	$7,473	$0.0122																					$0
8		Reid Rd to Landing Road	2.5	6.12E+05	$7,902	$0.0129																					$0
9		Landing Road to Targinie Road	4	3.66E+05	$7,473	$0.0204	$1,604	$1,513	$1,427								$4,544										$0
10		Targinie Rd to Quarry Rd	2.7	3.66E+05	$7,473	$0.0204	$1,083	$1,021	$963								$3,067										$0
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	3.66E+05	$7,473	$0.0204																					$0
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	2.32E+05	$7,902	$0.0340																					$0
13		Breslin St to Blain Dr	0.7	3.60E+05	$7,902	$0.0220																					$0
14		Blain Dr to Phillip Street	0.9	1.07E+06	$7,902	$0.0074																					$0
15		Phillip Street to Penda Ave	1.3	6.04E+05	$7,902	$0.0131																					$0
16		Penda Ave to Chapman Rd	0.8	8.84E+05	$7,902	$0.0089																					$0
17		Chapman Rd to Harvey Rd	5.1	2.05E+05	$7,902	$0.0385																					$0
18		Harvey Rd to Bruce Hwy	8.7	2.79E+05	$7,902	$0.0283																					$0
19	183	Port Access Road	0.858	2.98E+05	$7,473	$0.0251	$527	$497	$469								$1,493	$385	$363	$343							$1,091
		Total =	97.4														$9,104										$1,091

Camp Option B

Sect. No.	Road No.	Road Name	Length (km)	ESA's/lane per Year	Routine Mtce $/lane-km/yr	Unit Cost $/ESA/km/yr	TO(WARDS) Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)	FROM Development - PV Increase in Mtce Costs (year by year) 1 2010	2 2011	3 2012	4 2013	5 2014	6 2015	7 2016	8 2017	9 2018	10 2019	PV Total (Discount Rate = 6.0%)
1	10E	Benaraby - Dawson Hwy	11.6	6.25E+05	$7,473	$0.0120																					$0
2		Dawson Hwy to Targinie Rd	7.1	5.97E+05	$8,637	$0.0145																					$0
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	5.97E+05	$6,738	$0.0113																					$0
4	181	Dawson Hwy to Hildebrand St	1.4	6.72E+05	$7,902	$0.0118																					$0
5		Hildebrand St to Blain Dr	1.9	6.44E+05	$7,473	$0.0116																					$0
6		Blain Dr to G. Poicier Stn	1.3	9.02E+05	$7,902	$0.0088																					$0
7		G. Poicier Stn to Reid Rd	5.2	6.12E+05	$7,473	$0.0122																					$0
8		Reid Rd to Landing Road	2.5	6.12E+05	$7,902	$0.0129																					$0
9		Landing Road to Targinie Road	4	3.66E+05	$7,473	$0.0204																					$0
10		Targinie Rd to Quarry Rd	2.7	3.66E+05	$7,473	$0.0204																					$0
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	3.66E+05	$7,473	$0.0204																					$0
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	2.32E+05	$7,902	$0.0340	$1,183	$1,116	$1,053								$3,353	$907	$856	$807							$2,570
13		Breslin St to Blain Dr	0.7	3.60E+05	$7,902	$0.0220	$357	$336	$317								$1,010										$0
14		Blain Dr to Phillip Street	0.9	1.07E+06	$7,902	$0.0074																					$0
15		Phillip Street to Penda Ave	1.3	6.04E+05	$7,902	$0.0131																					$0
16		Penda Ave to Chapman Rd	0.8	8.84E+05	$7,902	$0.0089																					$0
17		Chapman Rd to Harvey Rd	5.1	2.05E+05	$7,902	$0.0385	$4,663	$4,399	$4,150	$3,915					$1,939	$1,829	$20,893	$3,600	$3,396	$3,204	$3,022						$13,221
18		Harvey Rd to Bruce Hwy	8.7	2.79E+05	$7,902	$0.0283	$5,855	$5,523	$5,210	$4,916							$21,504	$4,520	$4,264	$4,023	$3,795						$16,601
19	183	Port Access Road	0.858	2.98E+05	$7,473	$0.0251	$527	$497	$469								$1,493	$385	$363	$343							$1,091
			97.358														$48,253										$33,483

Rehabilitation Contribution Calculation (Road Option 1)

Camp Option A

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Rehab. Year **WITHOUT** Dev Traffic. Based on 2008 Roughness Data: Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year): Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward Factor	Dev. Contrib.	**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward factor	Dev. Contrib.
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	11.6	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$2,450	14,906	1.43E+07	17.3	0.01	0.0003	$691
2			Dawson Hwy to Targinie Rd	7.1	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	30,170	1.05E+07	14.0	0.03	0.0008	$1,441	8,518	1.05E+07	14.0	0.01	0.0002	$406
3			Targinie Rd to Gladstone Mt Larcom Rd	26.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	0	1.11E+07	14.7	0.00	0.0000	$0	0	1.11E+07	14.7	0.00	0.0000	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	1.4	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	61,214	9.76E+06	11.9	0.06	0.0018	$565	48,555	9.77E+06	12.0	0.05	0.0014	$448
5			Hildebrand St to Blain Dr	1.9	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	61,214	1.47E+07	17.3	0.06	0.0012	$452	48,555	1.47E+07	17.3	0.04	0.0009	$358
6			Blain Dr to G. Poicier Stn	1.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	65,067	1.31E+07	12.0	0.05	0.0014	$415	57,182	1.31E+07	12.0	0.04	0.0013	$364
7			G. Poicier Stn to Reid Rd	5.2	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	61,089	9.47E+06	12.6	0.07	0.0019	$1,958	56,784	9.48E+06	12.6	0.06	0.0018	$1,819
8			Reid Rd to Landing Road	2.5	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	61,089	1.80E+07	20.9	0.05	0.0009	$501	56,784	1.80E+07	21.0	0.05	0.0008	$466
9			Landing Road to Targinie Road	4	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	138,801	1.07E+07	20.8	0.20	0.0035	$2,767	105,510	1.07E+07	20.8	0.15	0.0026	$2,099
10			Targinie Rd to Quarry Rd	2.7	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	113,404	1.07E+07	20.8	0.16	0.0028	$1,523	92,219	1.07E+07	20.9	0.13	0.0023	$1,237
11			Quarry Rd to Mt Larcom/Bruce Highway	13.1	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	66,094	1.07E+07	20.9	0.10	0.0016	$4,294	44,910	1.08E+07	20.9	0.07	0.0011	$2,914
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	1.5	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	22,628	3.26E+06	11.6	0.07	0.0020	$666	6,388	3.28E+06	11.6	0.02	0.0006	$188
13			Breslin St to Blain Dr	0.7	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	22,628	8.86E+06	18.3	0.04	0.0007	$112	6,388	8.88E+06	18.3	0.01	0.0002	$31
14			Blain Dr to Phillip Street	0.9	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	25,950	2.21E+07	16.0	0.01	0.0003	$68	9,711	2.21E+07	16.0	0.01	0.0001	$25
15			Phillip Street to Penda Ave	1.3	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	25,950	9.39E+06	12.6	0.03	0.0008	$233	9,711	9.40E+06	12.7	0.01	0.0003	$87
16			Penda Ave to Chapman Rd	0.8	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	25,950	2.44E+07	20.0	0.02	0.0003	$51	22,955	2.44E+07	20.0	0.01	0.0003	$45
17			Chapman Rd to Harvey Rd	5.1	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	22,628	6.04E+06	20.9	0.06	0.0010	$1,129	6,388	6.05E+06	21.0	0.02	0.0003	$318
18			Harvey Rd to Bruce Hwy	8.7	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	22,628	7.69E+06	20.0	0.04	0.0008	$1,546	6,388	7.71E+06	20.0	0.01	0.0002	$436
19	183	Port Access Road	Port Access Road	0.858	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	73,546	7.12E+06	17.9	0.14	0.0029	$501	53,726	7.14E+06	17.9	0.10	0.0021	$365
																		$20,671						$12,298

Camp Option B

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Rehab. Year **WITHOUT** Dev Traffic. Based on Roughness Data: Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year): Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward Factor	Dev. Contrib.	**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward factor	Dev. Contrib.
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	0	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$0	14,906	1.43E+07	17.3	0.01	0.0003	$0
2			Dawson Hwy to Targinie Rd	11.6	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	80,433	1.04E+07	13.9	0.09	0.0023	$6,290	72,025	1.04E+07	13.9	0.08	0.0020	$5,630
3			Targinie Rd to Gladstone Mt Larcom Rd	18.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	1,292	1.11E+07	14.7	0.00	0.0000	$116	1,292	1.11E+07	14.7	0.00	0.0000	$116
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	0	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	14,274	9.80E+06	12.0	0.01	0.0004	$0	1,615	9.82E+06	12.0	0.00	0.0000	$0
5			Hildebrand St to Blain Dr	1.4	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	14,274	1.48E+07	17.3	0.01	0.0003	$77	1,615	1.48E+07	17.3	0.00	0.0000	$9
6			Blain Dr to G. Poicier Stn	3.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	14,804	1.32E+07	12.0	0.01	0.0003	$239	6,919	1.32E+07	12.0	0.01	0.0002	$112
7			G. Poicier Stn to Reid Rd	4.6	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	10,826	9.52E+06	12.7	0.01	0.0003	$306	6,521	9.53E+06	12.7	0.01	0.0002	$184
8			Reid Rd to Landing Road	9.8	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	10,826	1.81E+07	21.0	0.01	0.0002	$347	6,521	1.81E+07	21.0	0.01	0.0001	$209
9			Landing Road to Targinie Road	12.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	84,626	1.07E+07	20.9	0.12	0.0021	$5,169	47,424	1.08E+07	20.9	0.07	0.0012	$2,890
10			Targinie Rd to Quarry Rd	16.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	24,024	1.08E+07	21.0	0.03	0.0006	$1,937	2,839	1.08E+07	21.0	0.00	0.0001	$229
11			Quarry Rd to Mt Larcom/Bruce Highway	19	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	24,024	1.08E+07	21.0	0.03	0.0006	$2,258	2,839	1.08E+07	21.0	0.00	0.0001	$266
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	0	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	69,568	3.21E+06	11.5	0.21	0.0062	$0	53,329	3.23E+06	11.5	0.16	0.0048	$0
13			Breslin St to Blain Dr	1.5	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	69,568	8.81E+06	18.2	0.11	0.0022	$738	53,329	8.83E+06	18.2	0.09	0.0017	$565
14			Blain Dr to Phillip Street	2.2	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	32,042	2.21E+07	16.0	0.02	0.0004	$205	53,329	2.21E+07	16.0	0.03	0.0007	$342
15			Phillip Street to Penda Ave	3.1	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	69,568	9.34E+06	12.6	0.08	0.0022	$1,492	53,329	9.36E+06	12.6	0.06	0.0017	$1,143
16			Penda Ave to Chapman Rd	4.4	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	72,891	2.44E+07	20.0	0.05	0.0008	$795	69,896	2.44E+07	20.0	0.04	0.0008	$762
17			Chapman Rd to Harvey Rd	5.2	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	72,891	5.99E+06	20.8	0.19	0.0033	$3,729	56,651	6.00E+06	20.9	0.15	0.0025	$2,892
18			Harvey Rd to Bruce Hwy	10.3	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	72,891	7.64E+06	19.9	0.14	0.0026	$5,923	56,651	7.66E+06	19.9	0.11	0.0020	$4,597
19	183	Port Access Road	Port Access Road	0	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	73,546	7.12E+06	17.9	0.14	0.0029	$0	53,726	7.14E+06	17.9	0.10	0.0021	$0
																		$29,622						$19,947

Camp Option C/D

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Rehab. Year **WITHOUT** Dev Traffic. Based on Roughness Data: Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year): Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward Factor	Dev. Contrib.	**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward factor	Dev. Contrib.
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	0	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$0	14,906	1.43E+07	17.3	0.01	0.0003	$0
2			Dawson Hwy to Targinie Rd	11.6	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	30,170	1.05E+07	14.0	0.03	0.0008	$2,354	8,518	1.05E+07	14.0	0.01	0.0002	$664
3			Targinie Rd to Gladstone Mt Larcom Rd	18.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	0	1.11E+07	14.7	0.00	0.0000	$0	0	1.11E+07	14.7	0.00	0.0000	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	0	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	15,382	9.80E+06	12.0	0.02	0.0005	$0	2,722	9.82E+06	12.0	0.00	0.0001	$0
5			Hildebrand St to Blain Dr	1.4	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	15,382	1.48E+07	17.3	0.01	0.0003	$83	2,722	1.48E+07	17.3	0.00	0.0001	$15
6			Blain Dr to G. Poicier Stn	3.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	17,758	1.32E+07	12.0	0.01	0.0004	$287	9,872	1.32E+07	12.0	0.01	0.0002	$159
7			G. Poicier Stn to Reid Rd	4.6	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	13,780	9.52E+06	12.7	0.02	0.0004	$390	9,474	9.53E+06	12.7	0.01	0.0003	$268
8			Reid Rd to Landing Road	9.8	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	13,780	1.80E+07	21.0	0.01	0.0002	$442	9,474	1.81E+07	21.0	0.01	0.0001	$304
9			Landing Road to Targinie Road	12.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	52,005	1.08E+07	20.9	0.08	0.0013	$3,170	18,715	1.08E+07	21.0	0.03	0.0005	$1,138
10			Targinie Rd to Quarry Rd	16.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	26,608	1.08E+07	21.0	0.04	0.0007	$2,146	5,423	1.08E+07	21.0	0.01	0.0001	$437
11			Quarry Rd to Mt Larcom/Bruce Highway	19	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	26,608	1.08E+07	21.0	0.04	0.0007	$2,501	5,423	1.08E+07	21.0	0.01	0.0001	$509
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	0	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	24,843	3.26E+06	11.6	0.07	0.0022	$0	8,603	3.28E+06	11.6	0.03	0.0008	$0
13			Breslin St to Blain Dr	1.5	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	24,843	8.86E+06	18.3	0.04	0.0008	$263	17,433	8.86E+06	18.3	0.03	0.0006	$184
14			Blain Dr to Phillip Street	2.2	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	26,689	2.21E+07	16.0	0.02	0.0004	$171	10,449	2.21E+07	16.0	0.01	0.0001	$67
15			Phillip Street to Penda Ave	3.1	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	26,689	9.39E+06	12.6	0.03	0.0008	$571	10,449	9.40E+06	12.7	0.01	0.0003	$223
16			Penda Ave to Chapman Rd	4.4	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	26,689	2.44E+07	20.0	0.02	0.0003	$291	26,637	2.44E+07	20.0	0.02	0.0003	$290
17			Chapman Rd to Harvey Rd	5.2	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	22,628	6.04E+06	20.9	0.06	0.0010	$1,151	6,388	6.05E+06	21.0	0.02	0.0003	$324
18			Harvey Rd to Bruce Hwy	10.3	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	22,628	7.69E+06	20.0	0.04	0.0008	$1,831	6,388	7.71E+06	20.0	0.01	0.0002	$516
19	183	Port Access Road	Port Access Road	0	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	29,928	7.16E+06	17.9	0.06	0.0012	$0	10,109	7.18E+06	18.0	0.02	0.0004	$0
																		$15,650						$5,099

Rehabilitation Contribution Calculation (Road Option 2)

Camp Option A

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Bring Forward Factor	Dev. Contrib.	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Bring Forward factor	Dev. Contrib.
					Rehab. Year **WITHOUT** Dev Traffic. Based on 2008 Roughness Data					PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year)			**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year)				Discount Rate = 6.0% PV - Rehab.		**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year)				Discount Rate = 6.0% PV - Rehab.	
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18.00*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	11.6	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$2,450	14,906	1.43E+07	17.3	0.01	0.0003	$691
2			Dawson Hwy to Targinie Rd	7.1	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	30,170	1.05E+07	14.0	0.03	0.0008	$1,441	8,518	1.05E+07	14.0	0.01	0.0002	$406
3			Targinie Rd to Gladstone Mt Larcom Rd	26.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	0	1.11E+07	14.7	0.00	0.0000	$0	0	1.11E+07	14.7	0.00	0.0000	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	1.4	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	61,214	9.76E+06	11.9	0.06	0.0018	$565	48,555	9.77E+06	12.0	0.05	0.0014	$448
5			Hildebrand St to Blain Dr	1.9	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	61,214	1.47E+07	17.3	0.06	0.0012	$452	48,555	1.47E+07	17.3	0.04	0.0009	$358
6			Blain Dr to G. Poicier Stn	1.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	65,067	1.31E+07	12.0	0.05	0.0014	$415	57,182	1.31E+07	12.0	0.04	0.0013	$364
7			G. Poicier Stn to Reid Rd	5.2	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	61,089	9.47E+06	12.6	0.07	0.0019	$1,958	56,784	9.48E+06	12.6	0.06	0.0018	$1,819
8			Reid Rd to Landing Road	2.5	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	61,089	1.80E+07	20.9	0.05	0.0009	$501	56,784	1.80E+07	21.0	0.05	0.0008	$466
9			Landing Road to Targinie Road	4	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	61,089	1.07E+07	20.9	0.09	0.0015	$1,212	56,784	1.08E+07	20.9	0.08	0.0014	$1,126
10			Targinie Rd to Quarry Rd	2.7	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	113,404	1.07E+07	20.8	0.16	0.0028	$1,523	92,219	1.07E+07	20.9	0.13	0.0023	$1,237
11			Quarry Rd to Mt Larcom/Bruce Highway	13.1	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	66,094	1.07E+07	20.9	0.10	0.0016	$4,294	44,910	1.08E+07	20.9	0.07	0.0011	$2,914
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	1.5	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	22,628	3.26E+06	11.6	0.07	0.0020	$666	6,388	3.28E+06	11.6	0.02	0.0006	$188
13			Breslin St to Blain Dr	0.7	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	22,628	8.86E+06	18.3	0.04	0.0007	$112	6,388	8.88E+06	18.3	0.01	0.0002	$31
14			Blain Dr to Phillip Street	0.9	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	25,950	2.21E+07	16.0	0.01	0.0003	$68	9,711	2.21E+07	16.0	0.01	0.0001	$25
15			Phillip Street to Penda Ave	1.3	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	25,950	9.39E+06	12.6	0.03	0.0008	$233	9,711	9.40E+06	12.7	0.01	0.0003	$87
16			Penda Ave to Chapman Rd	0.8	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	25,950	2.44E+07	20.0	0.02	0.0003	$51	22,955	2.44E+07	20.0	0.01	0.0003	$45
17			Chapman Rd to Harvey Rd	5.1	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	22,628	6.04E+06	20.9	0.06	0.0010	$1,129	6,388	6.05E+06	21.0	0.02	0.0003	$318
18			Harvey Rd to Bruce Hwy	8.7	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	22,628	7.69E+06	20.0	0.04	0.0008	$1,546	6,388	7.71E+06	20.0	0.01	0.0002	$436
19	183	Port Access Road	Port Access Road	0.858	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	73,546	7.12E+06	17.9	0.14	0.0029	$501	53,726	7.14E+06	17.9	0.10	0.0021	$365
																		$19,116						$11,325

Camp Option B

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Bring Forward Factor	Dev. Contrib.	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Bring Forward factor	Dev. Contrib.
					Rehab. Year **WITHOUT** Dev Traffic. Based on Roughness Data					PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year)			**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year)				Discount Rate = 6.0% PV - Rehab.		**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year)				Discount Rate = 6.0% PV - Rehab.	
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18.00*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	0	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$0	14,906	1.43E+07	17.3	0.01	0.0003	$0
2			Dawson Hwy to Targinie Rd	11.6	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	80,433	1.04E+07	13.9	0.09	0.0023	$6,290	72,025	1.04E+07	13.9	0.08	0.0020	$5,630
3			Targinie Rd to Gladstone Mt Larcom Rd	18.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	1,292	1.11E+07	14.7	0.00	0.0000	$116	1,292	1.11E+07	14.7	0.00	0.0000	$116
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	0	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	14,274	9.80E+06	12.0	0.01	0.0004	$0	1,615	9.82E+06	12.0	0.00	0.0000	$0
5			Hildebrand St to Blain Dr	1.4	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	14,274	1.48E+07	17.3	0.01	0.0003	$77	1,615	1.48E+07	17.3	0.00	0.0000	$9
6			Blain Dr to G. Poicier Stn	3.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	14,804	1.32E+07	12.0	0.01	0.0003	$239	6,919	1.32E+07	12.0	0.01	0.0002	$112
7			G. Poicier Stn to Reid Rd	4.6	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	10,826	9.52E+06	12.7	0.01	0.0003	$306	6,521	9.53E+06	12.7	0.01	0.0002	$184
8			Reid Rd to Landing Road	9.8	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	10,826	1.81E+07	21.0	0.01	0.0002	$347	6,521	1.81E+07	21.0	0.01	0.0001	$209
9			Landing Road to Targinie Road	12.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	10,826	1.08E+07	21.0	0.02	0.0003	$658	6,521	1.08E+07	21.0	0.01	0.0002	$396
10			Targinie Rd to Quarry Rd	16.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	24,024	1.08E+07	21.0	0.03	0.0006	$1,937	2,839	1.08E+07	21.0	0.00	0.0001	$229
11			Quarry Rd to Mt Larcom/Bruce Highway	19	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	24,024	1.08E+07	21.0	0.03	0.0006	$2,258	2,839	1.08E+07	21.0	0.00	0.0001	$266
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	0	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	69,568	3.21E+06	11.5	0.21	0.0062	$0	53,329	3.23E+06	11.5	0.16	0.0048	$0
13			Breslin St to Blain Dr	1.5	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	69,568	8.81E+06	18.2	0.11	0.0022	$738	53,329	8.83E+06	18.2	0.09	0.0017	$565
14			Blain Dr to Phillip Street	2.2	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	32,042	2.21E+07	16.0	0.02	0.0004	$205	53,329	2.21E+07	16.0	0.03	0.0007	$342
15			Phillip Street to Penda Ave	3.1	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	69,568	9.34E+06	12.6	0.08	0.0022	$1,492	53,329	9.36E+06	12.6	0.06	0.0017	$1,143
16			Penda Ave to Chapman Rd	4.4	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	72,891	2.44E+07	20.0	0.05	0.0008	$795	69,896	2.44E+07	20.0	0.04	0.0008	$762
17			Chapman Rd to Harvey Rd	5.2	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	72,891	5.99E+06	20.8	0.19	0.0033	$3,729	56,651	6.00E+06	20.9	0.15	0.0025	$2,892
18			Harvey Rd to Bruce Hwy	10.3	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	72,891	7.64E+06	19.9	0.14	0.0026	$5,923	56,651	7.66E+06	19.9	0.11	0.0020	$4,597
19	183	Port Access Road	Port Access Road	0	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	73,546	7.12E+06	17.9	0.14	0.0029	$0	53,726	7.14E+06	17.9	0.10	0.0021	$0
																		$25,111						$17,453

Camp Option C/D

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Bring Forward Factor	Dev. Contrib.	Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Bring Forward factor	Dev. Contrib.
					Rehab. Year **WITHOUT** Dev Traffic. Based on Roughness Data					PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year)			**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year)				Discount Rate = 6.0% PV - Rehab.		**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year)				Discount Rate = 6.0% PV - Rehab.	
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18.00*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	0	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$0	14,906	1.43E+07	17.3	0.01	0.0003	$0
2			Dawson Hwy to Targinie Rd	11.6	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	30,170	1.05E+07	14.0	0.03	0.0008	$2,354	8,518	1.05E+07	14.0	0.01	0.0002	$664
3			Targinie Rd to Gladstone Mt Larcom Rd	18.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	0	1.11E+07	14.7	0.00	0.0000	$0	0	1.11E+07	14.7	0.00	0.0000	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	0	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	15,382	9.80E+06	12.0	0.02	0.0005	$0	2,722	9.82E+06	12.0	0.00	0.0001	$0
5			Hildebrand St to Blain Dr	1.4	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	15,382	1.48E+07	17.3	0.01	0.0003	$83	2,722	1.48E+07	17.3	0.00	0.0001	$15
6			Blain Dr to G. Poicier Stn	3.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	17,758	1.32E+07	12.0	0.01	0.0004	$287	9,872	1.32E+07	12.0	0.01	0.0002	$159
7			G. Poicier Stn to Reid Rd	4.6	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	13,780	9.52E+06	12.7	0.02	0.0004	$390	9,474	9.53E+06	12.7	0.01	0.0003	$268
8			Reid Rd to Landing Road	9.8	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	13,780	1.80E+07	21.0	0.01	0.0002	$442	9,474	1.81E+07	21.0	0.01	0.0001	$304
9			Landing Road to Targinie Road	12.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	13,780	1.08E+07	21.0	0.02	0.0003	$838	9,474	1.08E+07	21.0	0.01	0.0002	$576
10			Targinie Rd to Quarry Rd	16.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	26,608	1.08E+07	21.0	0.04	0.0007	$2,146	5,423	1.08E+07	21.0	0.01	0.0001	$437
11			Quarry Rd to Mt Larcom/Bruce Highway	19	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	26,608	1.08E+07	21.0	0.04	0.0007	$2,501	5,423	1.08E+07	21.0	0.01	0.0001	$509
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	0	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	24,843	3.26E+06	11.6	0.07	0.0022	$0	8,603	3.28E+06	11.6	0.03	0.0008	$0
13			Breslin St to Blain Dr	1.5	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	24,843	8.86E+06	18.3	0.04	0.0008	$263	17,433	8.86E+06	18.3	0.03	0.0006	$184
14			Blain Dr to Phillip Street	2.2	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	26,689	2.21E+07	16.0	0.02	0.0004	$171	10,449	2.21E+07	16.0	0.01	0.0001	$67
15			Phillip Street to Penda Ave	3.1	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	26,689	9.39E+06	12.6	0.03	0.0008	$571	10,449	9.40E+06	12.7	0.01	0.0003	$223
16			Penda Ave to Chapman Rd	4.4	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	26,689	2.44E+07	20.0	0.02	0.0003	$291	26,637	2.44E+07	20.0	0.02	0.0003	$290
17			Chapman Rd to Harvey Rd	5.2	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	22,628	6.04E+06	20.9	0.06	0.0010	$1,151	6,388	6.05E+06	21.0	0.02	0.0003	$324
18			Harvey Rd to Bruce Hwy	10.3	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	22,628	7.69E+06	20.0	0.04	0.0008	$1,831	6,388	7.71E+06	20.0	0.01	0.0002	$516
19	183	Port Access Road	Port Access Road	0	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	29,928	7.16E+06	17.9	0.06	0.0012	$0	10,109	7.18E+06	18.0	0.02	0.0004	$0
																		$13,318						$4,537

Rehabilitation Contribution Calculation (No Road Bridge)

Camp Option A

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Rehab. Year **WITHOUT** Dev Traffic. Based on 2008 Roughness Data: Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year): Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward Factor	Dev. Contrib.	**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward factor	Dev. Contrib.
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18.00*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	11.6	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$2,450	14,906	1.43E+07	17.3	0.01	0.0003	$691
2			Dawson Hwy to Targinie Rd	7.1	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	0	1.05E+07	14.0	0.00	0.0000	$0	0	1.05E+07	14.0	0.00	0.0000	$0
3			Targinie Rd to Gladstone Mt Larcom Rd	26.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	0	1.11E+07	14.7	0.00	0.0000	$0	0	1.11E+07	14.7	0.00	0.0000	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	1.4	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	61,214	9.76E+06	11.9	0.06	0.0018	$565	48,555	9.77E+06	12.0	0.05	0.0014	$448
5			Hildebrand St to Blain Dr	1.9	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	61,214	1.47E+07	17.3	0.06	0.0012	$452	48,555	1.47E+07	17.3	0.04	0.0009	$358
6			Blain Dr to G. Poicier Stn	1.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	122,686	1.31E+07	11.9	0.09	0.0027	$784	93,147	1.31E+07	11.9	0.07	0.0021	$594
7			G. Poicier Stn to Reid Rd	5.2	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	113,404	9.42E+06	12.5	0.13	0.0035	$3,644	92,219	9.44E+06	12.6	0.10	0.0029	$2,960
8			Reid Rd to Landing Road	2.5	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	113,404	1.79E+07	20.9	0.10	0.0017	$932	92,219	1.80E+07	20.9	0.08	0.0014	$757
9			Landing Road to Targinie Road	4	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	113,404	1.07E+07	20.8	0.16	0.0028	$2,257	92,219	1.07E+07	20.9	0.13	0.0023	$1,833
10			Targinie Rd to Quarry Rd	2.7	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	113,404	1.07E+07	20.8	0.16	0.0028	$1,523	92,219	1.07E+07	20.9	0.13	0.0023	$1,237
11			Quarry Rd to Mt Larcom/Bruce Highway	13.1	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	66,002	1.07E+07	20.9	0.10	0.0016	$4,288	44,910	1.08E+07	20.9	0.07	0.0011	$2,914
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	1.5	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	22,628	3.26E+06	11.6	0.07	0.0020	$666	6,388	3.28E+06	11.6	0.02	0.0006	$188
13			Breslin St to Blain Dr	0.7	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	22,628	8.86E+06	18.3	0.04	0.0007	$112	6,388	8.88E+06	18.3	0.01	0.0002	$31
14			Blain Dr to Phillip Street	0.9	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	56,121	2.21E+07	16.0	0.03	0.0007	$147	18,228	2.21E+07	16.0	0.01	0.0002	$48
15			Phillip Street to Penda Ave	1.3	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	56,121	9.36E+06	12.6	0.06	0.0018	$504	18,228	9.39E+06	12.6	0.02	0.0006	$164
16			Penda Ave to Chapman Rd	0.8	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	56,121	2.44E+07	20.0	0.03	0.0006	$111	28,712	2.44E+07	20.0	0.02	0.0003	$57
17			Chapman Rd to Harvey Rd	5.1	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	52,798	6.01E+06	20.9	0.14	0.0023	$2,643	14,906	6.05E+06	21.0	0.04	0.0007	$743
18			Harvey Rd to Bruce Hwy	8.7	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	52,798	7.66E+06	19.9	0.10	0.0019	$3,618	14,906	7.70E+06	20.0	0.03	0.0005	$1,018
19	183	Port Access Road	Port Access Road	0.858	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	73,546	7.12E+06	17.9	0.14	0.0029	$501	53,726	7.14E+06	17.9	0.10	0.0021	$365
																		$25,196						$14,405

Camp Option B

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Rehab. Year **WITHOUT** Dev Traffic. Based on Roughness Data: Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year): Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward Factor	Dev. Contrib.	**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward factor	Dev. Contrib.
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18.00*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	0	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$0	14,906	1.43E+07	17.3	0.01	0.0003	$0
2			Dawson Hwy to Targinie Rd	11.6	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	89,380	1.04E+07	13.9	0.10	0.0025	$6,993	102,625	1.04E+07	13.9	0.11	0.0029	$8,034
3			Targinie Rd to Gladstone Mt Larcom Rd	18.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	1,292	1.11E+07	14.7	0.00	0.0000	$116	1,292	1.11E+07	14.7	0.00	0.0000	$116
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	0	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	14,274	9.80E+06	12.0	0.01	0.0004	$0	1,615	9.82E+06	12.0	0.00	0.0000	$0
5			Hildebrand St to Blain Dr	1.4	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	14,274	1.48E+07	17.3	0.01	0.0003	$77	1,615	1.48E+07	17.3	0.00	0.0000	$9
6			Blain Dr to G. Poicier Stn	3.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	33,306	1.32E+07	12.0	0.03	0.0007	$538	3,767	1.32E+07	12.0	0.00	0.0001	$61
7			G. Poicier Stn to Reid Rd	4.6	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	24,024	9.51E+06	12.6	0.03	0.0007	$680	2,839	9.53E+06	12.7	0.00	0.0001	$80
8			Reid Rd to Landing Road	9.8	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	24,024	1.80E+07	21.0	0.02	0.0004	$771	2,839	1.81E+07	21.0	0.00	0.0000	$91
9			Landing Road to Targinie Road	12.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	24,024	1.08E+07	21.0	0.03	0.0006	$1,462	2,839	1.08E+07	21.0	0.00	0.0001	$173
10			Targinie Rd to Quarry Rd	16.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	24,024	1.08E+07	21.0	0.03	0.0006	$1,937	2,839	1.08E+07	21.0	0.00	0.0001	$229
11			Quarry Rd to Mt Larcom/Bruce Highway	19	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	24,024	1.08E+07	21.0	0.03	0.0006	$2,258	2,839	1.08E+07	21.0	0.00	0.0001	$266
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	0	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	69,568	3.21E+06	11.5	0.21	0.0062	$0	53,329	3.23E+06	11.5	0.16	0.0048	$0
13			Breslin St to Blain Dr	1.5	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	69,568	8.81E+06	18.2	0.11	0.0022	$738	53,329	8.83E+06	18.2	0.09	0.0017	$565
14			Blain Dr to Phillip Street	2.2	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	101,329	2.20E+07	15.9	0.06	0.0013	$651	100,963	2.20E+07	15.9	0.06	0.0013	$649
15			Phillip Street to Penda Ave	3.1	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	142,178	9.27E+06	12.5	0.16	0.0044	$2,988	100,963	9.31E+06	12.6	0.11	0.0032	$2,169
16			Penda Ave to Chapman Rd	4.4	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	142,178	2.43E+07	19.9	0.09	0.0016	$1,553	117,530	2.43E+07	19.9	0.07	0.0013	$1,283
17			Chapman Rd to Harvey Rd	5.2	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	142,178	5.92E+06	20.6	0.37	0.0064	$7,331	104,286	5.96E+06	20.7	0.27	0.0047	$5,354
18			Harvey Rd to Bruce Hwy	10.3	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	142,178	7.57E+06	19.7	0.28	0.0051	$11,623	104,286	7.61E+06	19.8	0.20	0.0037	$8,497
19	183	Port Access Road	Port Access Road	0	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	73,546	7.12E+06	17.9	0.14	0.0029	$0	53,726	7.14E+06	17.9	0.10	0.0021	$0
																		$39,716						$27,575

Camp Option C/D

Rehab Design Life = 20

Sect No.	Road No.	Road Name	Road Sections	Length (km)	Rehab. Year **WITHOUT** Dev Traffic. Based on Roughness Data: Exist. Roughness	Roughness at fail	Years to failure	Rehab. Yr. (Rough)	Rehab. Year for Contrib Calc	PVT. Life **WITHOUT** Dev. Traffic - (Dev. Start to Rehab. Year): Years to Rehab. From Dev Start	ESA's/yr at Dev Start (2010)	Cumul.B'gr ESA (Dev Start to Rehab)	**To(wards)** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Years to Rehab (with Dev)	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward Factor	Dev. Contrib.	**From** Development: Reduced PVT. Life **WITH** Dev. Traffic - (Dev. Start to Rehab. Year): Cumul. Dev Traffic	Reduced B'ground ESA's to Rehab	Reduced years to Rehab.	Reduced Pvt. Life (years)	Discount Rate = 6.0% PV - Rehab.: Bring Forward factor	Dev. Contrib.
					1	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12.00*	*13*	*14*	*15*	*16*	*17*	*18.00*	*19*	*20*
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	0	62	120	19.3	2027	2027	17.3	6.25E+05	1.44E+07	52,798	1.43E+07	17.3	0.05	0.0011	$0	14,906	1.43E+07	17.3	0.01	0.0003	$0
2			Dawson Hwy to Targinie Rd	11.6	72	120	16.0	2024	2024	14.0	5.97E+05	1.05E+07	0	1.05E+07	14.0	0.00	0.0000	$0	0	1.05E+07	14.0	0.00	0.0000	$0
3			Targinie Rd to Gladstone Mt Larcom Rd	18.7	70	120	16.7	2025	2025	14.7	5.97E+05	1.11E+07	0	1.11E+07	14.7	0.00	0.0000	$0	0	1.11E+07	14.7	0.00	0.0000	$0
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	0	78	120	14.0	2022	2022	12.0	6.72E+05	9.82E+06	15,382	9.80E+06	12.0	0.02	0.0005	$0	2,722	9.82E+06	12.0	0.00	0.0001	$0
5			Hildebrand St to Blain Dr	1.4	62	120	19.3	2027	2027	17.3	6.44E+05	1.48E+07	15,382	1.48E+07	17.3	0.01	0.0003	$83	2,722	1.48E+07	17.3	0.00	0.0001	$15
6			Blain Dr to G. Poicier Stn	3.3	78	120	14.0	2022	2022	12.0	9.02E+05	1.32E+07	35,890	1.31E+07	12.0	0.03	0.0008	$580	6,352	1.32E+07	12.0	0.00	0.0001	$103
7			G. Poicier Stn to Reid Rd	4.6	76	120	14.7	2023	2023	12.7	6.12E+05	9.53E+06	26,608	9.51E+06	12.6	0.03	0.0008	$753	5,423	9.53E+06	12.7	0.01	0.0002	$153
8			Reid Rd to Landing Road	9.8	51	120	23.0	2031	2031	21.0	6.12E+05	1.81E+07	26,608	1.80E+07	21.0	0.02	0.0004	$855	5,423	1.81E+07	21.0	0.00	0.0001	$174
9			Landing Road to Targinie Road	12.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	26,608	1.08E+07	21.0	0.04	0.0007	$1,619	5,423	1.08E+07	21.0	0.01	0.0001	$330
10			Targinie Rd to Quarry Rd	16.3	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	26,608	1.08E+07	21.0	0.04	0.0007	$2,146	5,423	1.08E+07	21.0	0.01	0.0001	$437
11			Quarry Rd to Mt Larcom/Bruce Highway	19	51	120	23.0	2031	2031	21.0	3.66E+05	1.08E+07	26,608	1.08E+07	21.0	0.04	0.0007	$2,501	5,423	1.08E+07	21.0	0.01	0.0001	$509
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	0	79	120	13.7	2022	2022	11.7	2.32E+05	3.28E+06	24,843	3.26E+06	11.6	0.07	0.0022	$0	8,603	3.28E+06	11.6	0.03	0.0008	$0
13			Breslin St to Blain Dr	1.5	59	120	20.3	2028	2028	18.3	3.60E+05	8.88E+06	24,843	8.86E+06	18.3	0.04	0.0008	$263	17,433	8.86E+06	18.3	0.03	0.0006	$184
14			Blain Dr to Phillip Street	2.2	66	120	18.0	2026	2026	16.0	1.07E+06	2.21E+07	56,859	2.21E+07	16.0	0.03	0.0008	$365	35,206	2.21E+07	16.0	0.02	0.0005	$226
15			Phillip Street to Penda Ave	3.1	76	120	14.7	2023	2023	12.7	6.04E+05	9.41E+06	56,859	9.36E+06	12.6	0.06	0.0018	$1,219	18,967	9.39E+06	12.6	0.02	0.0006	$406
16			Penda Ave to Chapman Rd	4.4	54	120	22.0	2030	2030	20.0	8.84E+05	2.45E+07	56,859	2.44E+07	20.0	0.04	0.0006	$620	35,155	2.44E+07	20.0	0.02	0.0004	$383
17			Chapman Rd to Harvey Rd	5.2	51	120	23.0	2031	2031	21.0	2.05E+05	6.06E+06	52,798	6.01E+06	20.9	0.14	0.0023	$2,695	14,906	6.05E+06	21.0	0.04	0.0007	$757
18			Harvey Rd to Bruce Hwy	10.3	54	120	22.0	2030	2030	20.0	2.79E+05	7.72E+06	52,798	7.66E+06	19.9	0.10	0.0019	$4,283	14,906	7.70E+06	20.0	0.03	0.0005	$1,205
19	183	Port Access Road	Port Access Road	0	60	120	20.0	2028	2028	18.0	2.98E+05	7.19E+06	29,928	7.16E+06	17.9	0.06	0.0012	$0	10,109	7.18E+06	18.0	0.02	0.0004	$0
																		$17,981						$4,882

QCLNG Curtis Island LNG Facility

MRD INPUT DATA

Start of Development Traffic = 2010

Development Duration = 11 years

ESA Increase Trigger = 5.0%

Roughness Increase = 3 Counts / yr

Treasury Discount Rate = 6.0%

Inflation % =	7.0%	Inflation % =	7.0%

ROAD SECTIONS AND LENGTHS							ARMIS TRAFFIC DATA			CONDITION AND STANDARDS				UNIT COSTS			
								2008			2008			Rehab. Costs		Mtce. Costs	
Sect. No.	Road No.	Road Name	Road Sections	Ch.	Ch	Length (km)	AADT 2008	HV %	Growth Adopt	ESA per HV	Exist. Rough	Terminal Rough.	Seal Width	Base Year **2007** $/km	PV Base Yr 2010 $/lane-km	Base Year **2007** Mtce $/km	PV Base Yr 2010 $/lane-km
1	10E	Bruce Hwy	Benaraby - Dawson Hwy	0.0	11.6	11.6	4556	25.3	3.0%	2.8	62	120	10	$325,000	$199,069	$12,200	$7,473
2			Dawson Hwy to Targinie Rd	11.6	18.7	7.1	3450	31.93	3.0%	2.8	72	120	12	$390,000	$238,883	$14,100	$8,637
3			Targinie Rd to Gladstone Mt Larcom Rd	18.7	45.4	26.7	3450	31.93	3.0%	2.8	70	120	9	$295,000	$180,694	$11,000	$6,738
4	181	Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	0.0	1.4	1.4	8631	12.56	3.0%	3.2	78	120	11	$360,000	$220,508	$12,900	$7,902
5			Hildebrand St to Blain Dr	1.4	3.3	1.9	6052	17.17	3.0%	3.2	62	120	10	$325,000	$199,069	$12,200	$7,473
6			Blain Dr to G. Poicier Stn	3.3	4.6	1.3	8931	16.3	3.0%	3.2	78	120	11	$360,000	$220,508	$12,900	$7,902
7			G. Poicier Stn to Reid Rd	4.6	9.8	5.2	6161	16.02	3.0%	3.2	76	120	10	$325,000	$199,069	$12,200	$7,473
8			Reid Rd to Landing Road	9.8	12.3	2.5	6161	16.02	3.0%	3.2	51	120	11	$360,000	$220,508	$12,900	$7,902
9			Landing Road to Targinie Road	12.3	16.3	4.0	2934	20.13	3.0%	3.2	51	120	10	$325,000	$199,069	$12,200	$7,473
10			Targinie Rd to Quarry Rd	16.3	19.0	2.7	2934	20.13	3.0%	3.2	51	120	10	$325,000	$199,069	$12,200	$7,473
11			Quarry Rd to Mt Larcom/Bruce Highway	19.0	32.1	13.1	2934	20.13	3.0%	3.2	51	120	10	$325,000	$199,069	$12,200	$7,473
12	46A	Dawson Hwy	Gladstone Mt Larcom Rd to Breslin St	0.0	1.5	1.5	12708	2.95	3.0%	3.2	79	120	11	$360,000	$220,508	$12,900	$7,902
13			Breslin St to Blain Dr	1.5	2.2	0.7	19222	3.02	3.0%	3.2	59	120	11	$360,000	$220,508	$12,900	$7,902
14			Blain Dr to Phillip Street	2.2	3.1	0.9	24308	7.08	3.0%	3.2	66	120	11	$360,000	$220,508	$12,900	$7,902
15			Phillip Street to Penda Ave	3.1	4.4	1.3	28000	3.48	3.0%	3.2	76	120	11	$360,000	$220,508	$12,900	$7,902
16			Penda Ave to Chapman Rd	4.4	5.2	0.8	22079	6.46	3.0%	3.2	54	120	11	$360,000	$220,508	$12,900	$7,902
17			Chapman Rd to Harvey Rd	5.2	10.3	5.1	6033	5.49	3.0%	3.2	51	120	11	$360,000	$220,508	$12,900	$7,902
18			Harvey Rd to Bruce Hwy	10.3	19.0	8.7	4787	9.4	3.0%	3.2	54	120	11	$360,000	$220,508	$12,900	$7,902
19	183	Port Access Road	Port Access Road	0.0	0.9	0.9	1750	27.51	3.0%	3.2	60	120	10	$325,000	$199,069	$12,200	$7,473
					Total =	97.4											

MRD INPUT COSTS

BITUMEN ROADS REHAB. & MTCE (incl. RESEAL) COSTS

INPUT COSTS		
Seal Width	Rehabilitation Costs	Annual Routine Mtce.
m	$ / km	$ / km
3.6	$115,000	$4,700
5	$160,000	$6,000
6	$195,000	$9,800
7	$230,000	$9,100
8	$260,000	$10,300
9	$295,000	$11,000
10	$325,000	$12,200
11	$360,000	$12,900
12	$390,000	$14,100
Base year for the above costs =		2007

OTHER INPUT DATA

(a) ESA's / HV = 2.8 ESA's/HV (Bruce Hwy)
= 3.2 ESA's/HV (All Other Roads)

(b) Roughness Increase = 3 counts per year

(c Terminal Roughness*= 110 NRM (Bruce Hwy)
= 120 NRM (All other Roads)

(d) Inflation Rate = 7%

(e) Discount Rate = 6%

(f) HV Growth Rate (background traffic) = adopt a constant 3% for all road sections, unless agreed otherwise by Central District.

*Note :- Terminal Roughness is considered to be a more realistic indicator of rehabilitation timing than pavement age or other methods of estimating the life of the existing pavement.

Vehicle Combination / ESA Calculation

Bus/Truck

Axle Config. O O

	Axles Tyres	Single Single	Single Dual				Total
Unloaded	Axle Group Load (t)	4.5	4				8.5
	Base Load / ESA's	5.4	8.2				
	Equiv. ESA's	0.482	0.057				0.54
Loaded	Legal Loading (t)	6	9				15
Payload (t)	Axle Group Load (t)	6.00	9.00				15.00
6.5	Equiv. ESA's [1]	1.524	1.451				2.98
						Legal Payload =	6.5 t

Tandem

Axle Config. O OO

	Axles Tyres	Single Single	Tandem Dual				Total
Unloaded	Axle Group Load (t)	4.5	5				9.5
	Base Load / ESA's	5.4	13.8				
	Equiv. ESA's	0.482	0.017				0.50
Loaded	Legal Loading (t)	6	16.5				22.5
Payload (t)	Axle Group Load (t)	6.00	16.50				22.50
13	Equiv. ESA's [1]	1.524	2.044				3.57
						Legal Payload =	13 t

Semi

Axle Config. O OO OOO

	Axles Tyres	Single Single	Tandem Dual	Tri Dual			Total
Unloaded	Axle Group Load (t)	4.5	5	6.5			16
	Base Load / ESA's	5.4	13.8	18.5			
	Equiv. ESA's	0.482	0.017	0.015			0.51
Loaded	Legal Loading (t)	6	16.5	20			42.5
Payload (t)	Axle Group Load (t)	6.00	16.50	20.00			42.50
26.5	Equiv. ESA's [1]	1.524	2.044	1.366			4.93
						Legal Payload =	26.5 t

B-Double

Axle Config. O OO OOO OOO

	Axles Tyres	Single Single	Tandem Dual	Tri Dual	Tri Dual		Total
Unloaded	Axle Group Load (t)	4.5	5	6.5	6.5		22.5
	Base Load / ESA's	5.4	13.8	18.5	18.5		
	Equiv. ESA's	0.482	0.017	0.015	0.015		0.53
Loaded	Legal Loading (t)	6	16.5	20	20		62.5
Payload (t)	Axle Group Load (t)	6.00	16.50	20.00	20.00		62.50
40	Equiv. ESA's [1]	1.524	2.044	1.366	1.366		6.30
						Legal Payload =	40 t

Rd Train 1

Axle Config. O OO OOO OO OOO

	Axles Tyres	Single Single	Tandem Dual	Tri Dual	Tandem Dual	Tri Dual	Total
Unloaded	Axle Group Load (t)	4.5	5	6.5	5	6.5	27.5
	Base Load / ESA's	5.4	13.8	18.5	13.8	18.5	
	Equiv. ESA's	0.482	0.017	0.015	0.017	0.015	0.55
Loaded	Legal Loading (t)	6	16.5	20	16.5	20	79
Payload (t)	Axle Group Load (t)	6.00	16.50	20.00	16.50	20.00	79.00
51.5	Equiv. ESA's [1]	1.524	2.044	1.366	2.044	1.366	8.34
						Legal Payload =	51.5 t

proportioned between the unloaded and the loaded tonnages for that axle group.

Road Option 1

Development Generated ESA's per Year - Camp Option A

Sect No.	Road No.	Road Section	**Northbound/Eastbound** - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's	**Southbound/Westbound** - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	11	
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	0.00E+00	0.00E+00	0.00E+00	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	3.02E+04	0.00E+00	0.00E+00	0.00E+00	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	8.52E+03
3		Targinie Rd to Gladstone Mt Larcom Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	181	Dawson Hwy to Hildebrand St	2.04E+04	2.04E+04	2.04E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.12E+04	1.62E+04	1.62E+04	1.62E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.86E+04
5		Hildebrand St to Blain Dr	2.04E+04	2.04E+04	2.04E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.12E+04	1.62E+04	1.62E+04	1.62E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.86E+04
6		Blain Dr to G. Poicier Stn	2.10E+04	2.10E+04	2.10E+04	6.86E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	6.51E+04	1.67E+04	1.67E+04	1.67E+04	1.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	5.72E+04
7		G. Poicier Stn to Reid Rd	1.96E+04	1.96E+04	1.96E+04	6.86E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	6.11E+04	1.66E+04	1.66E+04	1.66E+04	1.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	5.68E+04
8		Reid Rd to Landing Road	1.96E+04	1.96E+04	1.96E+04	6.86E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	6.11E+04	1.66E+04	1.66E+04	1.66E+04	1.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	5.68E+04
9		Landing Road to Targinie Road	1.96E+04	1.96E+04	1.96E+04	2.60E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.80E+04	1.80E+04	1.80E+04	1.39E+05	1.66E+04	1.66E+04	1.66E+04	1.99E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.19E+04	1.19E+04	1.19E+04	1.06E+05
10		Targinie Rd to Quarry Rd	1.96E+04	1.96E+04	1.96E+04	1.96E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+04	1.16E+04	1.16E+04	1.13E+05	1.66E+04	1.66E+04	1.66E+04	1.66E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03	8.60E+03	8.60E+03	9.22E+04
11		Quarry Rd to Mt Larcom/Bruce Highway	3.62E+03	3.62E+03	3.62E+03	1.98E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E+04	1.18E+04	1.18E+04	6.61E+04	5.90E+02	5.90E+02	5.90E+02	1.68E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.78E+03	8.78E+03	8.78E+03	4.49E+04
12	46A	Gladstone Mt Larcom Rd to Breslin St	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
13		Breslin St to Blain Dr	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
14		Blain Dr to Phillip Street	8.10E+03	8.10E+03	8.10E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.60E+04	2.68E+03	2.68E+03	2.68E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	9.71E+03
15		Phillip Street to Penda Ave	8.10E+03	8.10E+03	8.10E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.60E+04	2.68E+03	2.68E+03	2.68E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	9.71E+03
16		Penda Ave to Chapman Rd	8.10E+03	8.10E+03	8.10E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.60E+04	4.89E+03	4.89E+03	4.89E+03	2.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E+03	1.84E+03	1.84E+03	2.30E+04
17		Chapman Rd to Harvey Rd	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
18		Harvey Rd to Bruce Hwy	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
19	183	Port Access Road	2.45E+04	2.45E+04	2.45E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E+04	1.79E+04	1.79E+04	1.79E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E+04

Development Generated ESA's per Year - Camp Option B

Sect No.	Road No.	Road Section	**Northbound/Eastbound** - Development Generated ESA's (Year by Year)										Cumul. Dev Traffic ESA's	**Southbound/Westbound** - Development Generated ESA's (Year by Year)										Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	11		1	2	3	4	5	6	7	8	9	10	11	
			0	1	2	3	4	5	6	7	8	10		0	1	2	3	4	5	6	7	8	9	10	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	1.62E+04	1.62E+04	1.62E+04	8.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	8.04E+04	1.84E+04	1.84E+04	1.84E+04	4.89E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E+03	3.97E+03	3.97E+03	7.20E+04
3		Targinie Rd to Gladstone Mt Larcom Rd	1.85E+02	1.85E+02	1.85E+02	1.85E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+02	1.85E+02	1.85E+02	1.29E+03	1.85E+02	1.85E+02	1.85E+02	1.85E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+02	1.85E+02	1.85E+02	1.29E+03
4	181	Dawson Hwy to Hildebrand St	4.76E+03	4.76E+03	4.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+04	5.38E+02	5.38E+02	5.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+03
5		Hildebrand St to Blain Dr	4.76E+03	4.76E+03	4.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+04	5.38E+02	5.38E+02	5.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+03
6		Blain Dr to G. Poicier Stn	4.76E+03	4.76E+03	4.76E+03	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+02	1.33E+02	1.33E+02	1.48E+04	5.38E+02	5.38E+02	5.38E+02	1.33E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+03	1.33E+03	1.33E+03	6.92E+03
7		G. Poicier Stn to Reid Rd	3.43E+03	3.43E+03	3.43E+03	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+02	1.33E+02	1.33E+02	1.08E+04	4.06E+02	4.06E+02	4.06E+02	1.33E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+03	1.33E+03	1.33E+03	6.52E+03
8		Reid Rd to Landing Road	3.43E+03	3.43E+03	3.43E+03	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+02	1.33E+02	1.33E+02	1.08E+04	4.06E+02	4.06E+02	4.06E+02	1.33E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+03	1.33E+03	1.33E+03	6.52E+03
9		Landing Road to Targinie Road	3.43E+03	3.43E+03	3.43E+03	2.15E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.76E+04	1.76E+04	1.76E+04	8.46E+04	4.06E+02	4.06E+02	4.06E+02	1.16E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+04	1.16E+04	1.16E+04	4.74E+04
10		Targinie Rd to Quarry Rd	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
11		Quarry Rd to Mt Larcom/Bruce Highway	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
12	46A	Gladstone Mt Larcom Rd to Breslin St	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
13		Breslin St to Blain Dr	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
14		Blain Dr to Phillip Street	1.07E+04	1.07E+04	1.07E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.20E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
15		Phillip Street to Penda Ave	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
16		Penda Ave to Chapman Rd	2.37E+04	2.37E+04	2.37E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	7.29E+04	2.05E+04	2.05E+04	2.05E+04	2.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E+03	1.84E+03	1.84E+03	6.99E+04
17		Chapman Rd to Harvey Rd	2.37E+04	2.37E+04	2.37E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	7.29E+04	1.83E+04	1.83E+04	1.83E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	5.67E+04
18		Harvey Rd to Bruce Hwy	2.37E+04	2.37E+04	2.37E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	7.29E+04	1.83E+04	1.83E+04	1.83E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	5.67E+04
19	183	Port Access Road	2.45E+04	2.45E+04	2.45E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E+04	1.79E+04	1.79E+04	1.79E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E+04

Development Generated ESA's per Year - Camp Option C/D

Sect No.	Road No.	Road Section	**Northbound/Eastbound** - Development Generated ESA's (Year by Year)										Cumul. Dev Traffic ESA's	**Southbound/Westbound** - Development Generated ESA's (Year by Year)										Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	11		1	2	3	4	5	6	7	8	9	10	11	
			0	1	2	3	4	5	6	7	8	10		0	1	2	3	4	5	6	7	8	9	10	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	0.00E+00	0.00E+00	0.00E+00	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	3.02E+04	0.00E+00	0.00E+00	0.00E+00	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	8.52E+03
3		Targinie Rd to Gladstone Mt Larcom Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	181	Dawson Hwy to Hildebrand St	5.13E+03	5.13E+03	5.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	9.07E+02	9.07E+02	9.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E+03
5		Hildebrand St to Blain Dr	5.13E+03	5.13E+03	5.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	9.07E+02	9.07E+02	9.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E+03
6		Blain Dr to G. Poicier Stn	5.13E+03	5.13E+03	5.13E+03	8.71E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	1.78E+04	9.07E+02	9.07E+02	9.07E+02	2.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	9.87E+03
7		G. Poicier Stn to Reid Rd	3.80E+03	3.80E+03	3.80E+03	8.71E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	1.38E+04	7.75E+02	7.75E+02	7.75E+02	2.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	9.47E+03
8		Reid Rd to Landing Road	3.80E+03	3.80E+03	3.80E+03	8.71E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	1.38E+04	7.75E+02	7.75E+02	7.75E+02	2.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	9.47E+03
9		Landing Road to Targinie Road	3.80E+03	3.80E+03	3.80E+03	1.02E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.02E+04	1.02E+04	1.02E+04	5.20E+04	7.75E+02	7.75E+02	7.75E+02	4.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.10E+03	4.10E+03	4.10E+03	1.87E+04
10		Targinie Rd to Quarry Rd	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
11		Quarry Rd to Mt Larcom/Bruce Highway	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
12	46A	Gladstone Mt Larcom Rd to Breslin St	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E+04	2.87E+03	2.87E+03	2.87E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03
13		Breslin St to Blain Dr	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E+04	5.81E+03	5.81E+03	5.81E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E+04
14		Blain Dr to Phillip Street	8.28E+03	8.28E+03	8.28E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.67E+04	2.87E+03	2.87E+03	2.87E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	1.04E+04
15		Phillip Street to Penda Ave	8.28E+03	8.28E+03	8.28E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.67E+04	2.87E+03	2.87E+03	2.87E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	1.04E+04
16		Penda Ave to Chapman Rd	8.28E+03	8.28E+03	8.28E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.67E+04	5.81E+03	5.81E+03	5.81E+03	3.68E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E+03	1.84E+03	1.84E+03	2.66E+04
17		Chapman Rd to Harvey Rd	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
18		Harvey Rd to Bruce Hwy	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
19	183	Port Access Road	9.98E+03	9.98E+03	9.98E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E+04	3.37E+03	3.37E+03	3.37E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E+04

Road Option 2

Development Generated ESA's per Year - Camp Option A

Sect No.	Road No.	Road Section	Northbound/Eastbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's	Southbound/Westbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	11	
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	0.00E+00	0.00E+00	0.00E+00	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	3.02E+04	0.00E+00	0.00E+00	0.00E+00	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	8.52E+03
3		Targinie Rd to Gladstone Mt Larcom Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	181	Dawson Hwy to Hildebrand St	2.04E+04	2.04E+04	2.04E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.12E+04	1.62E+04	1.62E+04	1.62E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.86E+04
5		Hildebrand St to Blain Dr	2.04E+04	2.04E+04	2.04E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.12E+04	1.62E+04	1.62E+04	1.62E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.86E+04
6		Blain Dr to G. Poicier Stn	2.10E+04	2.10E+04	2.10E+04	6.86E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	6.51E+04	1.67E+04	1.67E+04	1.67E+04	1.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	5.72E+04
7		G. Poicier Stn to Reid Rd	1.96E+04	1.96E+04	1.96E+04	6.86E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	6.11E+04	1.66E+04	1.66E+04	1.66E+04	1.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	5.68E+04
8		Reid Rd to Landing Road	1.96E+04	1.96E+04	1.96E+04	6.86E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	6.11E+04	1.66E+04	1.66E+04	1.66E+04	1.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	5.68E+04
9		Landing Road to Targinie Road	1.96E+04	1.96E+04	1.96E+04	6.86E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	6.11E+04	1.66E+04	1.66E+04	1.66E+04	1.88E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	5.68E+04
10		Targinie Rd to Quarry Rd	1.96E+04	1.96E+04	1.96E+04	1.96E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+04	1.16E+04	1.16E+04	1.13E+05	1.66E+04	1.66E+04	1.66E+04	1.66E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03	8.60E+03	8.60E+03	9.22E+04
11		Quarry Rd to Mt Larcom/Bruce Highway	3.62E+03	3.62E+03	3.62E+03	1.98E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E+04	1.18E+04	1.18E+04	6.61E+04	5.90E+02	5.90E+02	5.90E+02	1.68E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.78E+03	8.78E+03	8.78E+03	4.49E+04
12	46A	Gladstone Mt Larcom Rd to Breslin St	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
13		Breslin St to Blain Dr	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
14		Blain Dr to Phillip Street	8.10E+03	8.10E+03	8.10E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.60E+04	2.68E+03	2.68E+03	2.68E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	9.71E+03
15		Phillip Street to Penda Ave	8.10E+03	8.10E+03	8.10E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.60E+04	2.68E+03	2.68E+03	2.68E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	9.71E+03
16		Penda Ave to Chapman Rd	8.10E+03	8.10E+03	8.10E+03	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.60E+04	4.89E+03	4.89E+03	4.89E+03	2.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E+03	1.84E+03	1.84E+03	2.30E+04
17		Chapman Rd to Harvey Rd	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
18		Harvey Rd to Bruce Hwy	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
19	183	Port Access Road	2.45E+04	2.45E+04	2.45E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E+04	1.79E+04	1.79E+04	1.79E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E+04

Development Generated ESA's per Year - Camp Option B

Sect No.	Road No.	Road Section	Northbound/Eastbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's	Southbound/Westbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	11	
			0	1	2	3	4	5	6	7	8	9	10		0	1	2	3	4	5	6	7	8	9	10	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	1.62E+04	1.62E+04	1.62E+04	8.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	8.04E+04	1.84E+04	1.84E+04	1.84E+04	4.89E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E+03	3.97E+03	3.97E+03	7.20E+04
3		Targinie Rd to Gladstone Mt Larcom Rd	1.85E+02	1.85E+02	1.85E+02	1.85E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+02	1.85E+02	1.85E+02	1.29E+03	1.85E+02	1.85E+02	1.85E+02	1.85E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+02	1.85E+02	1.85E+02	1.29E+03
4	181	Dawson Hwy to Hildebrand St	4.76E+03	4.76E+03	4.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+04	5.38E+02	5.38E+02	5.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+03
5		Hildebrand St to Blain Dr	4.76E+03	4.76E+03	4.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+04	5.38E+02	5.38E+02	5.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+03
6		Blain Dr to G. Poicier Stn	4.76E+03	4.76E+03	4.76E+03	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+02	1.33E+02	1.33E+02	1.48E+04	5.38E+02	5.38E+02	5.38E+02	1.33E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+03	1.33E+03	1.33E+03	6.92E+03
7		G. Poicier Stn to Reid Rd	3.43E+03	3.43E+03	3.43E+03	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+02	1.33E+02	1.33E+02	1.08E+04	4.06E+02	4.06E+02	4.06E+02	1.33E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+03	1.33E+03	1.33E+03	6.52E+03
8		Reid Rd to Landing Road	3.43E+03	3.43E+03	3.43E+03	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+02	1.33E+02	1.33E+02	1.08E+04	4.06E+02	4.06E+02	4.06E+02	1.33E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+03	1.33E+03	1.33E+03	6.52E+03
9		Landing Road to Targinie Road	3.43E+03	3.43E+03	3.43E+03	1.33E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+02	1.33E+02	1.33E+02	1.08E+04	4.06E+02	4.06E+02	4.06E+02	1.33E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.33E+03	1.33E+03	1.33E+03	6.52E+03
10		Targinie Rd to Quarry Rd	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
11		Quarry Rd to Mt Larcom/Bruce Highway	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
12	46A	Gladstone Mt Larcom Rd to Breslin St	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
13		Breslin St to Blain Dr	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
14		Blain Dr to Phillip Street	1.07E+04	1.07E+04	1.07E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.20E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
15		Phillip Street to Penda Ave	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
16		Penda Ave to Chapman Rd	2.37E+04	2.37E+04	2.37E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	7.29E+04	2.05E+04	2.05E+04	2.05E+04	2.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E+03	1.84E+03	1.84E+03	6.99E+04
17		Chapman Rd to Harvey Rd	2.37E+04	2.37E+04	2.37E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	7.29E+04	1.83E+04	1.83E+04	1.83E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	5.67E+04
18		Harvey Rd to Bruce Hwy	2.37E+04	2.37E+04	2.37E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	7.29E+04	1.83E+04	1.83E+04	1.83E+04	5.54E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	5.67E+04
19	183	Port Access Road	2.45E+04	2.45E+04	2.45E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E+04	1.79E+04	1.79E+04	1.79E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E+04

Development Generated ESA's per Year - Camp Option C/D

Sect No.	Road No.	Road Section	Northbound/Eastbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's	Southbound/Westbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	11	
			0	1	2	3	4	5	6	7	8	9	10		0	1	2	3	4	5	6	7	8	9	10	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	0.00E+00	0.00E+00	0.00E+00	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	3.02E+04	0.00E+00	0.00E+00	0.00E+00	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	8.52E+03
3		Targinie Rd to Gladstone Mt Larcom Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	181	Dawson Hwy to Hildebrand St	5.13E+03	5.13E+03	5.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	9.07E+02	9.07E+02	9.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E+03
5		Hildebrand St to Blain Dr	5.13E+03	5.13E+03	5.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	9.07E+02	9.07E+02	9.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E+03
6		Blain Dr to G. Poicier Stn	5.13E+03	5.13E+03	5.13E+03	8.71E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	1.78E+04	9.07E+02	9.07E+02	9.07E+02	2.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	9.87E+03
7		G. Poicier Stn to Reid Rd	3.80E+03	3.80E+03	3.80E+03	8.71E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	1.38E+04	7.75E+02	7.75E+02	7.75E+02	2.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	9.47E+03
8		Reid Rd to Landing Road	3.80E+03	3.80E+03	3.80E+03	8.71E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	1.38E+04	7.75E+02	7.75E+02	7.75E+02	2.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	9.47E+03
9		Landing Road to Targinie Road	3.80E+03	3.80E+03	3.80E+03	8.71E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.02E+02	5.02E+02	5.02E+02	1.38E+04	7.75E+02	7.75E+02	7.75E+02	2.06E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.70E+03	1.70E+03	1.70E+03	9.47E+03
10		Targinie Rd to Quarry Rd	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
11		Quarry Rd to Mt Larcom/Bruce Highway	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
12	46A	Gladstone Mt Larcom Rd to Breslin St	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E+04	2.87E+03	2.87E+03	2.87E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03
13		Breslin St to Blain Dr	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E+04	5.81E+03	5.81E+03	5.81E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E+04
14		Blain Dr to Phillip Street	8.28E+03	8.28E+03	8.28E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.67E+04	2.87E+03	2.87E+03	2.87E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	1.04E+04
15		Phillip Street to Penda Ave	8.28E+03	8.28E+03	8.28E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.67E+04	2.87E+03	2.87E+03	2.87E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	1.04E+04
16		Penda Ave to Chapman Rd	8.28E+03	8.28E+03	8.28E+03	7.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.69E+02	3.69E+02	3.69E+02	2.67E+04	5.81E+03	5.81E+03	5.81E+03	3.68E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.84E+03	1.84E+03	1.84E+03	2.66E+04
17		Chapman Rd to Harvey Rd	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
18		Harvey Rd to Bruce Hwy	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
19	183	Port Access Road	9.98E+03	9.98E+03	9.98E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E+04	3.37E+03	3.37E+03	3.37E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E+04

No Bridge

Development Generated ESA's per Year - Camp Option A

Sect No.	Road No.	Road Section	Northbound/Eastbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's	Southbound/Westbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	11	
			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3		Targinie Rd to Gladstone Mt Larcom Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	181	Dawson Hwy to Hildebrand St	2.04E+04	2.04E+04	2.04E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.12E+04	1.62E+04	1.62E+04	1.62E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.86E+04
5		Hildebrand St to Blain Dr	2.04E+04	2.04E+04	2.04E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.12E+04	1.62E+04	1.62E+04	1.62E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.86E+04
6		Blain Dr to G. Poicier Stn	2.10E+04	2.10E+04	2.10E+04	2.10E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.30E+04	1.30E+04	1.30E+04	1.23E+05	1.67E+04	1.67E+04	1.67E+04	1.67E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.73E+03	8.73E+03	8.73E+03	9.31E+04
7		G. Poicier Stn to Reid Rd	1.96E+04	1.96E+04	1.96E+04	1.96E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+04	1.16E+04	1.16E+04	1.13E+05	1.66E+04	1.66E+04	1.66E+04	1.66E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03	8.60E+03	8.60E+03	9.22E+04
8		Reid Rd to Landing Road	1.96E+04	1.96E+04	1.96E+04	1.96E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+04	1.16E+04	1.16E+04	1.13E+05	1.66E+04	1.66E+04	1.66E+04	1.66E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03	8.60E+03	8.60E+03	9.22E+04
9		Landing Road to Targinie Road	1.96E+04	1.96E+04	1.96E+04	1.96E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+04	1.16E+04	1.16E+04	1.13E+05	1.66E+04	1.66E+04	1.66E+04	1.66E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03	8.60E+03	8.60E+03	9.22E+04
10		Targinie Rd to Quarry Rd	1.96E+04	1.96E+04	1.96E+04	1.96E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.16E+04	1.16E+04	1.16E+04	1.13E+05	1.66E+04	1.66E+04	1.66E+04	1.66E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03	8.60E+03	8.60E+03	9.22E+04
11		Quarry Rd to Mt Larcom/Bruce Highway	3.62E+03	3.62E+03	3.62E+03	1.97E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E+04	1.18E+04	1.18E+04	6.60E+04	5.90E+02	5.90E+02	5.90E+02	1.68E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.78E+03	8.78E+03	8.78E+03	4.49E+04
12	46A	Gladstone Mt Larcom Rd to Breslin St	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
13		Breslin St to Blain Dr	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.26E+04	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.39E+03
14		Blain Dr to Phillip Street	8.10E+03	8.10E+03	8.10E+03	8.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	5.61E+04	2.68E+03	2.68E+03	2.68E+03	2.68E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+03	2.50E+03	2.50E+03	1.82E+04
15		Phillip Street to Penda Ave	8.10E+03	8.10E+03	8.10E+03	8.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	5.61E+04	2.68E+03	2.68E+03	2.68E+03	2.68E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+03	2.50E+03	2.50E+03	1.82E+04
16		Penda Ave to Chapman Rd	8.10E+03	8.10E+03	8.10E+03	8.10E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	5.61E+04	4.89E+03	4.89E+03	4.89E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E+03	3.97E+03	3.97E+03	2.87E+04
17		Chapman Rd to Harvey Rd	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
18		Harvey Rd to Bruce Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
19	183	Port Access Road	2.45E+04	2.45E+04	2.45E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E+04	1.79E+04	1.79E+04	1.79E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E+04

Development Generated ESA's per Year - Camp Option B

Sect No.	Road No.	Road Section	Northbound/Eastbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's	Southbound/Westbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	11	
			0	1	2	3	4	5	6	7	8	9	10		0	1	2	3	4	5	6	7	8	9	10	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	1.62E+04	1.62E+04	1.62E+04	1.62E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.19E+03	8.19E+03	8.19E+03	8.94E+04	1.84E+04	1.84E+04	1.84E+04	1.84E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.66E+03	9.66E+03	9.66E+03	1.03E+05
3		Targinie Rd to Gladstone Mt Larcom Rd	1.85E+02	1.85E+02	1.85E+02	1.85E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+02	1.85E+02	1.85E+02	1.29E+03	1.85E+02	1.85E+02	1.85E+02	1.85E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.85E+02	1.85E+02	1.85E+02	1.29E+03
4	181	Dawson Hwy to Hildebrand St	4.76E+03	4.76E+03	4.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+04	5.38E+02	5.38E+02	5.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+03
5		Hildebrand St to Blain Dr	4.76E+03	4.76E+03	4.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.43E+04	5.38E+02	5.38E+02	5.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.61E+03
6		Blain Dr to G. Poicier Stn	4.76E+03	4.76E+03	4.76E+03	4.76E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.76E+03	4.76E+03	4.76E+03	3.33E+04	5.38E+02	5.38E+02	5.38E+02	5.38E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.38E+02	5.38E+02	5.38E+02	3.77E+03
7		G. Poicier Stn to Reid Rd	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
8		Reid Rd to Landing Road	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
9		Landing Road to Targinie Road	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
10		Targinie Rd to Quarry Rd	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
11		Quarry Rd to Mt Larcom/Bruce Highway	3.43E+03	3.43E+03	3.43E+03	3.43E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.43E+03	3.43E+03	3.43E+03	2.40E+04	4.06E+02	4.06E+02	4.06E+02	4.06E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	4.06E+02	4.06E+02	4.06E+02	2.84E+03
12	46A	Gladstone Mt Larcom Rd to Breslin St	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
13		Breslin St to Blain Dr	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	6.96E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.33E+04
14		Blain Dr to Phillip Street	1.07E+04	1.07E+04	1.07E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	1.54E+04	1.54E+04	1.01E+05	1.78E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.95E+03	9.95E+03	9.95E+03	1.01E+05
15		Phillip Street to Penda Ave	2.32E+04	2.32E+04	2.32E+04	2.32E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	1.54E+04	1.54E+04	1.39E+05	1.78E+04	1.78E+04	1.78E+04	1.78E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.95E+03	9.95E+03	9.95E+03	1.01E+05
16		Penda Ave to Chapman Rd	2.37E+04	2.37E+04	2.37E+04	2.37E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E+04	1.57E+04	1.57E+04	1.42E+05	2.05E+04	2.05E+04	2.05E+04	2.05E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.18E+04	1.18E+04	1.18E+04	1.18E+05
17		Chapman Rd to Harvey Rd	2.37E+04	2.37E+04	2.37E+04	2.37E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E+04	1.57E+04	1.57E+04	1.42E+05	1.83E+04	1.83E+04	1.83E+04	1.83E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E+04	1.03E+04	1.03E+04	1.04E+05
18		Harvey Rd to Bruce Hwy	2.37E+04	2.37E+04	2.37E+04	2.37E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.57E+04	1.57E+04	1.57E+04	1.42E+05	1.83E+04	1.83E+04	1.83E+04	1.83E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.03E+04	1.03E+04	1.03E+04	1.04E+05
19	183	Port Access Road	2.45E+04	2.45E+04	2.45E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.35E+04	1.79E+04	1.79E+04	1.79E+04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.37E+04

Development Generated ESA's per Year - Camp Option C/D

Sect No.	Road No.	Road Section	Northbound/Eastbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's	Southbound/Westbound - Development Generated ESA's (Year by Year)											Cumul. Dev Traffic ESA's
			1	2	3	4	5	6	7	8	9	10	11		1	2	3	4	5	6	7	8	9	10	11	
			0	1	2	3	4	5	6	7	8	9	10		0	1	2	3	4	5	6	7	8	9	10	
1	10E	Benaraby - Dawson Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
2		Dawson Hwy to Targinie Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
3		Targinie Rd to Gladstone Mt Larcom Rd	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
4	181	Dawson Hwy to Hildebrand St	5.13E+03	5.13E+03	5.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	9.07E+02	9.07E+02	9.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E+03
5		Hildebrand St to Blain Dr	5.13E+03	5.13E+03	5.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+04	9.07E+02	9.07E+02	9.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.72E+03
6		Blain Dr to G. Poicier Stn	5.13E+03	5.13E+03	5.13E+03	5.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.13E+03	5.13E+03	5.13E+03	3.59E+04	9.07E+02	9.07E+02	9.07E+02	9.07E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.07E+02	9.07E+02	9.07E+02	6.35E+03
7		G. Poicier Stn to Reid Rd	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
8		Reid Rd to Landing Road	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
9		Landing Road to Targinie Road	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
10		Targinie Rd to Quarry Rd	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
11		Quarry Rd to Mt Larcom/Bruce Highway	3.80E+03	3.80E+03	3.80E+03	3.80E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.80E+03	3.80E+03	3.80E+03	2.66E+04	7.75E+02	7.75E+02	7.75E+02	7.75E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.75E+02	7.75E+02	7.75E+02	5.42E+03
12	46A	Gladstone Mt Larcom Rd to Breslin St	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E+04	2.87E+03	2.87E+03	2.87E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.60E+03
13		Breslin St to Blain Dr	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.48E+04	5.81E+03	5.81E+03	5.81E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.74E+04
14		Blain Dr to Phillip Street	8.28E+03	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	5.69E+04	2.87E+03	2.87E+03	2.87E+03	2.87E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	3.52E+04
15		Phillip Street to Penda Ave	8.28E+03	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	5.69E+04	2.87E+03	2.87E+03	2.87E+03	2.87E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.50E+03	2.50E+03	2.50E+03	1.90E+04
16		Penda Ave to Chapman Rd	8.28E+03	8.28E+03	8.28E+03	8.28E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.91E+03	7.91E+03	7.91E+03	5.69E+04	5.81E+03	5.81E+03	5.81E+03	5.81E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	3.97E+03	3.97E+03	3.97E+03	3.52E+04
17		Chapman Rd to Harvey Rd	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
18		Harvey Rd to Bruce Hwy	7.54E+03	7.54E+03	7.54E+03	7.54E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E+03	7.54E+03	7.54E+03	5.28E+04	2.13E+03	2.13E+03	2.13E+03	2.13E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.13E+03	2.13E+03	2.13E+03	1.49E+04
19	183	Port Access Road	9.98E+03	9.98E+03	9.98E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.99E+04	3.37E+03	3.37E+03	3.37E+03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.01E+04

Road Option 1

Camp Option A

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	3.0%	2.9%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	2.3%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	3.2%	3.1%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	2.3%	2.3%	2.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%	1.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
7		G. Poicier Stn to Reid Rd	5.2	3.2%	3.1%	3.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	2.7%	2.6%	2.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
8		Reid Rd to Landing Road	2.5	3.2%	3.1%	3.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	2.7%	2.6%	2.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
9		Landing Road to Targinie Road	4	5.4%	5.2%	5.1%	6.5%	0.0%	0.0%	0.0%	0.0%	3.9%	3.8%	4.5%	4.4%	4.3%	5.0%	0.0%	0.0%	0.0%	0.0%	2.6%	2.5%
10		Targinie Rd to Quarry Rd	2.7	5.4%	5.2%	5.1%	4.9%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%	4.5%	4.4%	4.3%	4.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	1.0%	1.0%	0.9%	5.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2.5%	0.2%	0.2%	0.2%	4.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	3.2%	3.2%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	2.1%	2.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
15		Phillip Street to Penda Ave	1.3	1.3%	1.3%	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16		Penda Ave to Chapman Rd	0.8	0.9%	0.9%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.5%	0.5%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
17		Chapman Rd to Harvey Rd	5.1	3.7%	3.6%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18		Harvey Rd to Bruce Hwy	8.7	2.7%	2.6%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	183	Port Access Road	0.858	8.2%	8.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	5.8%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Camp Option B

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3	18.3	19.3	10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3	18.3	19.3
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	2.7%	2.6%	2.6%	1.2%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	3.1%	3.0%	2.9%	0.7%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
7		G. Poicier Stn to Reid Rd	5.2	0.6%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
8		Reid Rd to Landing Road	2.5	0.6%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
9		Landing Road to Targinie Road	4	0.9%	0.9%	0.9%	5.4%	0.0%	0.0%	0.0%	0.0%	3.8%	3.7%	0.1%	0.1%	0.1%	2.9%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%
10		Targinie Rd to Quarry Rd	2.7	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	10.0%	9.7%	9.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	7.4%	7.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	6.4%	6.3%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	4.8%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	1.0%	1.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	1.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
15		Phillip Street to Penda Ave	1.3	3.8%	3.7%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	2.9%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16		Penda Ave to Chapman Rd	0.8	2.7%	2.6%	2.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	2.3%	2.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
17		Chapman Rd to Harvey Rd	5.1	11.6%	11.2%	10.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	8.9%	8.7%	8.4%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
18		Harvey Rd to Bruce Hwy	8.7	8.5%	8.3%	8.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	6.6%	6.4%	6.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
19	183	Port Access Road	0.858	8.2%	8.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	5.8%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Camp Option C/D

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	0.8%	0.8%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	0.6%	0.6%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
7		G. Poicier Stn to Reid Rd	5.2	0.6%	0.6%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
8		Reid Rd to Landing Road	2.5	0.6%	0.6%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
9		Landing Road to Targinie Road	4	1.0%	1.0%	1.0%	2.5%	0.0%	0.0%	0.0%	0.0%	2.2%	2.1%	0.2%	0.2%	0.2%	1.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.9%
10		Targinie Rd to Quarry Rd	2.7	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	3.6%	3.5%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	2.3%	2.2%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	1.6%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	0.8%	0.8%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
15		Phillip Street to Penda Ave	1.3	1.4%	1.3%	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16		Penda Ave to Chapman Rd	0.8	0.9%	0.9%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.6%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
17		Chapman Rd to Harvey Rd	5.1	3.7%	3.6%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18		Harvey Rd to Bruce Hwy	8.7	2.7%	2.6%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	183	Port Access Road	0.858	3.3%	3.2%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Road Option 2

Road 2

Camp Option A

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	3.0%	2.9%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	2.3%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	3.2%	3.1%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	2.3%	2.3%	2.2%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%	1.7%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
7		G. Poicier Stn to Reid Rd	5.2	3.2%	3.1%	3.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	2.7%	2.6%	2.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
8		Reid Rd to Landing Road	2.5	3.2%	3.1%	3.0%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	2.7%	2.6%	2.6%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
9		Landing Road to Targinie Road	4	5.4%	5.2%	5.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	4.5%	4.4%	4.3%	0.5%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
10		Targinie Rd to Quarry Rd	2.7	5.4%	5.2%	5.1%	4.9%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%	4.5%	4.4%	4.3%	4.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	1.0%	1.0%	0.9%	5.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2.5%	0.2%	0.2%	0.2%	4.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	3.2%	3.2%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	2.1%	2.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
15		Phillip Street to Penda Ave	1.3	1.3%	1.3%	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16		Penda Ave to Chapman Rd	0.8	0.9%	0.9%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.5%	0.5%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
17		Chapman Rd to Harvey Rd	5.1	3.7%	3.6%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18		Harvey Rd to Bruce Hwy	8.7	2.7%	2.6%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	183	Port Access Road	0.858	8.2%	8.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	5.8%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Camp Option B

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3	18.3	19.3	10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3	18.3	19.3
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	2.7%	2.6%	2.6%	1.2%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	3.1%	3.0%	2.9%	0.7%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
7		G. Poicier Stn to Reid Rd	5.2	0.6%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
8		Reid Rd to Landing Road	2.5	0.6%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
9		Landing Road to Targinie Road	4	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
10		Targinie Rd to Quarry Rd	2.7	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	10.0%	9.7%	9.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	7.4%	7.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	6.4%	6.3%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	4.8%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	1.0%	1.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.7%	1.6%	1.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
15		Phillip Street to Penda Ave	1.3	3.8%	3.7%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.9%	2.9%	2.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16		Penda Ave to Chapman Rd	0.8	2.7%	2.6%	2.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.3%	2.3%	2.2%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
17		Chapman Rd to Harvey Rd	5.1	11.6%	11.2%	10.9%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	8.9%	8.7%	8.4%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
18		Harvey Rd to Bruce Hwy	8.7	8.5%	8.3%	8.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	6.6%	6.4%	6.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
19	183	Port Access Road	0.858	8.2%	8.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	5.8%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Camp Option C/D

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	0.0%	0.0%	0.0%	1.2%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	0.8%	0.8%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	0.6%	0.6%	0.5%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
7		G. Poicier Stn to Reid Rd	5.2	0.6%	0.6%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
8		Reid Rd to Landing Road	2.5	0.6%	0.6%	0.6%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.1%	0.1%	0.3%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
9		Landing Road to Targinie Road	4	1.0%	1.0%	1.0%	0.2%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.2%	0.2%	0.2%	0.5%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%
10		Targinie Rd to Quarry Rd	2.7	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	3.6%	3.5%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	2.3%	2.2%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	1.6%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	0.8%	0.8%	0.7%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%	0.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
15		Phillip Street to Penda Ave	1.3	1.4%	1.3%	1.3%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.4%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
16		Penda Ave to Chapman Rd	0.8	0.9%	0.9%	0.9%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.7%	0.6%	0.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
17		Chapman Rd to Harvey Rd	5.1	3.7%	3.6%	3.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
18		Harvey Rd to Bruce Hwy	8.7	2.7%	2.6%	2.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
19	183	Port Access Road	0.858	3.3%	3.2%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

No Bridge

Road 2

Camp Option A

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	3.0%	2.9%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	2.3%	2.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	3.2%	3.1%	3.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%	2.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	2.3%	2.3%	2.2%	2.1%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%	1.9%	1.8%	1.7%	1.7%	0.0%	0.0%	0.0%	0.0%	0.8%	0.7%
7		G. Poicier Stn to Reid Rd	5.2	3.2%	3.1%	3.0%	2.9%	0.0%	0.0%	0.0%	0.0%	1.5%	1.5%	2.7%	2.6%	2.6%	2.5%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%
8		Reid Rd to Landing Road	2.5	3.2%	3.1%	3.0%	2.9%	0.0%	0.0%	0.0%	0.0%	1.5%	1.5%	2.7%	2.6%	2.6%	2.5%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%
9		Landing Road to Targinie Road	4	5.4%	5.2%	5.1%	4.9%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%	4.5%	4.4%	4.3%	4.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%
10		Targinie Rd to Quarry Rd	2.7	5.4%	5.2%	5.1%	4.9%	0.0%	0.0%	0.0%	0.0%	2.5%	2.4%	4.5%	4.4%	4.3%	4.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	1.0%	1.0%	0.9%	4.9%	0.0%	0.0%	0.0%	0.0%	2.5%	2.5%	0.2%	0.2%	0.2%	4.2%	0.0%	0.0%	0.0%	0.0%	1.9%	1.8%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	3.2%	3.2%	3.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	2.1%	2.0%	2.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	0.8%	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%	0.3%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
15		Phillip Street to Penda Ave	1.3	1.3%	1.3%	1.3%	1.2%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.4%	0.4%	0.4%	0.4%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
16		Penda Ave to Chapman Rd	0.8	0.9%	0.9%	0.9%	0.8%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.6%	0.5%	0.5%	0.2%	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%
17		Chapman Rd to Harvey Rd	5.1	3.7%	3.6%	3.5%	3.4%	0.0%	0.0%	0.0%	0.0%	2.9%	2.8%	1.0%	1.0%	1.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%
18		Harvey Rd to Bruce Hwy	8.7	2.7%	2.6%	2.6%	2.5%	0.0%	0.0%	0.0%	0.0%	2.1%	2.1%	0.8%	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%
19	183	Port Access Road	0.858	8.2%	8.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	5.8%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Camp Option B

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3	18.3	19.3	10.3	11.3	12.3	13.3	14.3	15.3	16.3	17.3	18.3	19.3
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	2.7%	2.6%	2.6%	2.5%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%	3.1%	3.0%	2.9%	2.8%	0.0%	0.0%	0.0%	0.0%	1.3%	1.2%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	0.5%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
7		G. Poicier Stn to Reid Rd	5.2	0.6%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
8		Reid Rd to Landing Road	2.5	0.6%	0.5%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
9		Landing Road to Targinie Road	4	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
10		Targinie Rd to Quarry Rd	2.7	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	10.0%	9.7%	9.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	7.7%	7.4%	7.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	6.4%	6.3%	6.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	4.9%	4.8%	4.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	1.0%	1.0%	0.9%	2.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%	1.7%	1.6%	1.6%	1.5%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%
15		Phillip Street to Penda Ave	1.3	3.8%	3.7%	3.6%	3.5%	0.0%	0.0%	0.0%	0.0%	2.0%	2.0%	2.9%	2.9%	2.8%	2.7%	0.0%	0.0%	0.0%	0.0%	1.3%	1.3%
16		Penda Ave to Chapman Rd	0.8	2.7%	2.6%	2.5%	2.5%	0.0%	0.0%	0.0%	0.0%	1.4%	1.4%	2.3%	2.3%	2.2%	2.1%	0.0%	0.0%	0.0%	0.0%	1.1%	1.0%
17		Chapman Rd to Harvey Rd	5.1	11.6%	11.2%	10.9%	10.6%	0.0%	0.0%	0.0%	0.0%	6.1%	5.9%	8.9%	8.7%	8.4%	8.2%	0.0%	0.0%	0.0%	0.0%	4.0%	3.9%
18		Harvey Rd to Bruce Hwy	8.7	8.5%	8.3%	8.0%	7.8%	0.0%	0.0%	0.0%	0.0%	4.5%	4.3%	6.6%	6.4%	6.2%	6.0%	0.0%	0.0%	0.0%	0.0%	2.9%	2.8%
19	183	Port Access Road	0.858	8.2%	8.0%	7.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.0%	5.8%	5.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Camp Option C/D

Development Generated ESA % (Year by Year)

ESA Increase Trigger = 5.0%

Sect No.	Road No.	Road Section	Length	**TO(WARDS)** - Development Generated % Year by Year										**FROM** - Development Generated % Year by Year									
				1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7	8	9	10
				0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
1	10E	Benaraby - Dawson Hwy	11.6	1.2%	1.2%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	1.0%	0.9%	0.3%	0.3%	0.3%	0.3%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
2		Dawson Hwy to Targinie Rd	7.1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
4	181	Dawson Hwy to Hildebrand St	1.4	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
5		Hildebrand St to Blain Dr	1.9	0.8%	0.8%	0.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
6		Blain Dr to G. Poicier Stn	1.3	0.6%	0.6%	0.5%	0.5%	0.0%	0.0%	0.0%	0.0%	0.4%	0.4%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
7		G. Poicier Stn to Reid Rd	5.2	0.6%	0.6%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
8		Reid Rd to Landing Road	2.5	0.6%	0.6%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.5%	0.5%	0.1%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%	0.0%	0.1%	0.1%
9		Landing Road to Targinie Road	4	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
10		Targinie Rd to Quarry Rd	2.7	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	1.0%	1.0%	1.0%	1.0%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%	0.2%	0.2%	0.2%	0.2%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	3.6%	3.5%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.2%	1.2%	1.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
13		Breslin St to Blain Dr	0.7	2.3%	2.2%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.6%	1.6%	1.5%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
14		Blain Dr to Phillip Street	0.9	0.8%	0.8%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%	0.3%	0.3%	0.3%	0.2%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%
15		Phillip Street to Penda Ave	1.3	1.4%	1.3%	1.3%	1.3%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	0.5%	0.5%	0.4%	0.4%	0.0%	0.0%	0.0%	0.0%	0.3%	0.3%
16		Penda Ave to Chapman Rd	0.8	0.9%	0.9%	0.9%	0.9%	0.0%	0.0%	0.0%	0.0%	0.7%	0.7%	0.7%	0.6%	0.6%	0.6%	0.0%	0.0%	0.0%	0.0%	0.4%	0.3%
17		Chapman Rd to Harvey Rd	5.1	3.7%	3.6%	3.5%	3.4%	0.0%	0.0%	0.0%	0.0%	2.9%	2.8%	1.0%	1.0%	1.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.8%	0.8%
18		Harvey Rd to Bruce Hwy	8.7	2.7%	2.6%	2.6%	2.5%	0.0%	0.0%	0.0%	0.0%	2.1%	2.1%	0.8%	0.7%	0.7%	0.7%	0.0%	0.0%	0.0%	0.0%	0.6%	0.6%
19	183	Port Access Road	0.858	3.3%	3.2%	3.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.1%	1.1%	1.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Estimated Background Traffic ESA'S at Development Start Date (2010)

Pavement Design Life = 20 yrs

Sect. No.	Link	Road Section	Length (km)	Estimated ESA's per Year at Dev Start (2010) AADT Traffic (HV/day) 2008	% HV	Growth	2010	%HV	Heavy	HV per DIR	ESA per HV	ESA's per Yr (2010)	Design Traffic (20 yr life)	Background ESAs (EACH DIR) Year by Year without Dev. 1 (2010)	2 (2011)	3 (2012)	4 (2013)	5 (2014)	6 (2015)	7 (2016)	8 (2017)	9 (2018)	10 (2019)	11 (2020)	Cumul. B'ground ESAs
1	10E	Benaraby - Dawson Hwy	11.6	4556	25.3	3.0%	4833	25.3	1223	611	2.8	624,884	1.73E+07	6.25E+05	6.44E+05	6.63E+05	6.83E+05	7.03E+05	7.24E+05	7.46E+05	7.69E+05	7.92E+05	8.15E+05	8.40E+05	8.00E+06
2		Dawson Hwy to Targinie Rd	7.1	3450	31.93	3.0%	3660	31.93	1169	584	2.8	597,191	1.65E+07	5.97E+05	6.15E+05	6.34E+05	6.53E+05	6.72E+05	6.92E+05	7.13E+05	7.34E+05	7.57E+05	7.79E+05	8.03E+05	7.65E+06
3		Targinie Rd to Gladstone Mt Larcom Rd	26.7	3450	31.93	3.0%	3660	31.93	1169	584	2.8	597,191	1.65E+07	5.97E+05	6.15E+05	6.34E+05	6.53E+05	6.72E+05	6.92E+05	7.13E+05	7.34E+05	7.57E+05	7.79E+05	8.03E+05	7.65E+06
4	181	Dawson Hwy to Hildebrand St	1.4	8631	12.56	3.0%	9157	12.56	1150	575	3.2	671,642	1.86E+07	6.72E+05	6.92E+05	7.13E+05	7.34E+05	7.56E+05	7.79E+05	8.02E+05	8.26E+05	8.51E+05	8.76E+05	9.03E+05	8.60E+06
5		Hildebrand St to Blain Dr	1.9	6052	17.17	3.0%	6421	17.17	1102	551	3.2	643,808	1.78E+07	6.44E+05	6.63E+05	6.83E+05	7.04E+05	7.25E+05	7.46E+05	7.69E+05	7.92E+05	8.16E+05	8.40E+05	8.65E+05	8.25E+06
6		Blain Dr to G. Poicier Stn	1.3	8931	16.3	3.0%	9475	16.3	1544	772	3.2	901,934	2.50E+07	9.02E+05	9.29E+05	9.57E+05	9.86E+05	1.02E+06	1.05E+06	1.08E+06	1.11E+06	1.14E+06	1.18E+06	1.21E+06	1.16E+07
7		G. Poicier Stn to Reid Rd	5.2	6161	16.02	3.0%	6536	16.02	1047	524	3.2	611,506	1.69E+07	6.12E+05	6.30E+05	6.49E+05	6.68E+05	6.88E+05	7.09E+05	7.30E+05	7.52E+05	7.75E+05	7.98E+05	8.22E+05	7.83E+06
8		Reid Rd to Landing Road	2.5	6161	16.02	3.0%	6536	16.02	1047	524	3.2	611,506	1.69E+07	6.12E+05	6.30E+05	6.49E+05	6.68E+05	6.88E+05	7.09E+05	7.30E+05	7.52E+05	7.75E+05	7.98E+05	8.22E+05	7.83E+06
9		Landing Road to Targinie Road	4	2934	20.13	3.0%	3113	20.13	627	313	3.2	365,924	1.01E+07	3.66E+05	3.77E+05	3.88E+05	4.00E+05	4.12E+05	4.24E+05	4.37E+05	4.50E+05	4.64E+05	4.77E+05	4.92E+05	4.69E+06
10		Targinie Rd to Quarry Rd	2.7	2934	20.13	3.0%	3113	20.13	627	313	3.2	365,924	1.01E+07	3.66E+05	3.77E+05	3.88E+05	4.00E+05	4.12E+05	4.24E+05	4.37E+05	4.50E+05	4.64E+05	4.77E+05	4.92E+05	4.69E+06
11		Quarry Rd to Mt Larcom/Bruce Highway	13.1	2934	20.13	3.0%	3113	20.13	627	313	3.2	365,924	1.01E+07	3.66E+05	3.77E+05	3.88E+05	4.00E+05	4.12E+05	4.24E+05	4.37E+05	4.50E+05	4.64E+05	4.77E+05	4.92E+05	4.69E+06
12	46A	Gladstone Mt Larcom Rd to Breslin St	1.5	12708	2.95	3.0%	13482	2.95	398	199	3.2	232,266	6.43E+06	2.32E+05	2.39E+05	2.46E+05	2.54E+05	2.61E+05	2.69E+05	2.77E+05	2.86E+05	2.94E+05	3.03E+05	3.12E+05	2.97E+06
13		Breslin St to Blain Dr	0.7	19222	3.02	3.0%	20393	3.02	616	308	3.2	359,661	9.95E+06	3.60E+05	3.70E+05	3.82E+05	3.93E+05	4.05E+05	4.17E+05	4.29E+05	4.42E+05	4.56E+05	4.69E+05	4.83E+05	4.61E+06
14		Blain Dr to Phillip Street	0.9	24308	7.08	3.0%	25788	7.08	1826	913	3.2	1,066,276	2.95E+07	1.07E+06	1.10E+06	1.13E+06	1.17E+06	1.20E+06	1.24E+06	1.27E+06	1.31E+06	1.35E+06	1.39E+06	1.43E+06	1.37E+07
15		Phillip Street to Penda Ave	1.3	28000	3.48	3.0%	29705	3.48	1034	517	3.2	603,705	1.67E+07	6.04E+05	6.22E+05	6.40E+05	6.60E+05	6.79E+05	7.00E+05	7.21E+05	7.42E+05	7.65E+05	7.88E+05	8.11E+05	7.73E+06
16		Penda Ave to Chapman Rd	0.8	22079	6.46	3.0%	23424	6.46	1513	757	3.2	883,689	2.45E+07	8.84E+05	9.10E+05	9.38E+05	9.66E+05	9.95E+05	1.02E+06	1.06E+06	1.09E+06	1.12E+06	1.15E+06	1.19E+06	1.13E+07
17		Chapman Rd to Harvey Rd	5.1	6033	5.49	3.0%	6400	5.49	351	176	3.2	205,207	5.68E+06	2.05E+05	2.11E+05	2.18E+05	2.24E+05	2.31E+05	2.38E+05	2.45E+05	2.52E+05	2.60E+05	2.68E+05	2.76E+05	2.63E+06
18		Harvey Rd to Bruce Hwy	8.7	4787	9.4	3.0%	5079	9.4	477	239	3.2	278,791	7.72E+06	2.79E+05	2.87E+05	2.96E+05	3.05E+05	3.14E+05	3.23E+05	3.33E+05	3.43E+05	3.53E+05	3.64E+05	3.75E+05	3.57E+06
19	183	Port Access Road	0.858	1750	27.51	3.0%	1857	27.51	511	255	3.2	298,274	8.26E+06	2.98E+05	3.07E+05	3.16E+05	3.26E+05	3.36E+05	3.46E+05	3.56E+05	3.67E+05	3.78E+05	3.89E+05	4.01E+05	3.82E+06

ESA Conversion Factors

Vehicle Class	unloaded	loaded	avg
Bus	0.54	3	1.77
Cls 3	0.54	3	
Cls 9	0.51	5.1	

No. Days/year	260
Fortnightly buses	52

				Camp A				Camp B				Camp C			
Road	Section	Dir	Vehicle Class	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA
Bruce Hwy	Benaraby - Dawson Hwy	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0			0	0			0	0
			Bus			0	0			0	0			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0			0	0			0	0
			Bus			0	0			0	0			0	0
	Dawson Hwy to Targinie Rd	NB	Cls 9			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0	3	3	10.62	554			0	0
		SB	Cls 9			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0	3	3	10.62	2761			0	0
	Targinie Rd to Gladstone Mt Larcom Rd	NB	Cls 9			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0
			Bus			0	0			0	0			0	0
			Bus			0	0	1	1	3.54	185			0	0
		SB	Cls 9			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0
			Bus			0	0			0	0			0	0
			Bus			0	0	1	1	3.54	185			0	0
Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	EB	Cls 9	3		15.3	3978	3		15.3	3978	3		15.3	3978
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0
			Bus			0	0			0	0	2	2	7.08	369
		WB	Cls 9		3	1.53	398		3	1.53	398		3	1.53	398
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0
			Bus			0	0			0	0	2	2	7.08	369
	Hildebrand St to Blain Dr	EB	Cls 9	3		15.3	3978	3		15.3	3978	3		15.3	3978
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0
			Bus			0	0			0	0	2	2	7.08	369
		WB	Cls 9		3	1.53	398		3	1.53	398		3	1.53	398
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0
			Bus			0	0			0	0	2	2	7.08	369
	Blain Dr to G. Poicier Stn	EB	Cls 9	3		15.3	3978	3		15.3	3978	3		15.3	3978
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		3	1.53	398		3	1.53	398		3	1.53	398
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
	G Poicier Stn to Reid Rd	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
	Reid Rd to Landing Road	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
	Landing Road to Targinie Road	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
	Targinie Rd to Quarry Rd	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369
	Quarry Rd to Mt Larcom/Bruce Highway	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0			0	0			0	0
			Bus	1	1	3.54	185			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0			0	0			0	0
			Bus	1	1	3.54	185			0	0	2	2	7.08	369

				Camp A				Camp B				Camp C			
Road	**Section**	**Dir**	**Vehicle Class**	**loaded**	**unloaded**	**Daily ESA**	**Annual ESA**	**loaded**	**unloaded**	**Daily ESA**	**Annual ESA**	**loaded**	**unloaded**	**Daily ESA**	**Annual ESA**
Dawson Highway	Gladstone Mt Larcom Rd to Breslin St	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0			0	0	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0			0	0	4	4	14.16	738
	Breslin St to Blain Dr	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0			0	0	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0			0	0	4	4	14.16	3682
	Blain Dr to Phillip Street	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0			0	0			0	0
			Bus	3	3	10.62	554	17	17	60.18	3138	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	17	17	60.18	15647			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738
	Phillip Street to Penda Ave	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0	17	17	60.18	15647			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	17	17	60.18	15647			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738
	Penda Ave to Chapman Rd	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0	17	17	60.18	15647			0	0
			Bus	3	3	10.62	554	3	3	10.62	554	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	17	17	60.18	15647			0	0
			Bus	3	3	10.62	2761	3	3	10.62	2761	4	4	14.16	3682
	Chapman Rd to Harvey Rd	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0	3	3	10.62	554			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0	3	3	10.62	554			0	0
	Harvey Rd to Bruce Hwy	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0	3	3	10.62	554			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	17	17	60.18	15647			0	0
			Bus			0	0	3	3	10.62	554			0	0
Port Access Road	Port Access Road	EB	Cls 9	6	1	31.11	8089	6	1	31.11	8089	6	1	31.11	8089
			Cls 3	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647	17	17	60.18	15647			0	0
			Bus			0	0			0	0	6	6	21.24	1108
		WB	Cls 9	1	6	8.16	2122	1	6	8.16	2122	1	6	8.16	2122
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647	17	17	60.18	15647			0	0
			Bus			0	0			0	0	6	6	21.24	1108

ESA Conversion Factors

Vehicle Class	unloaded	loaded	avg
Bus	0.54	3	1.77
Cls 3	0.54	3	
Cls 9	0.51	5.1	

No. Days/year 260
Fortnightly buses 52

Road	Section	Dir	Vehicle Class	Train 2 construction --> Camp A				Camp B				Camp C				Train 3 construction --> Camp A				Camp B				Camp C			
				loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA
Bruce Hwy	Benaraby - Dawson Hwy	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
	Dawson Hwy to Targinie Rd	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0			0	0	2	2	7.08	369			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0	3	3	10.62	2761			0	0			0	0	2	2	7.08	1841			0	0
	Targinie Rd to Gladstone Mt Larcom Rd	NB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0	1	1	3.54	185			0	0			0	0	1	1	3.54	185			0	0
		SB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0	1	1	3.54	185			0	0			0	0	1	1	3.54	185			0	0
Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	EB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
		WB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
	Hildebrand St to Blain Dr	EB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
		WB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
	Blain Dr to G. Poicier Stn	EB	Cls 9		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738	2	2	7.08	369			0	0	2	2	7.08	369
		WB	Cls 9	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738	2	2	7.08	369			0	0	2	2	7.08	369
	G Poicier Stn to Reid Rd	EB	Cls 9		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738	2	2	7.08	369			0	0	2	2	7.08	369
		WB	Cls 9	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738	2	2	7.08	369			0	0	2	2	7.08	369
	Reid Rd to Landing Road	EB	Cls 9		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133		1	0.51	133
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738	2	2	7.08	369			0	0	2	2	7.08	369
		WB	Cls 9	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326	1		5.1	1326
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738	2	2	7.08	369			0	0	2	2	7.08	369
	Landing Road to Targinie Road	EB	Cls 9	6	2	31.62	8221	6	2	31.62	8221	6	2	31.62	8221	6	2	31.62	8221	6	2	31.62	8221	6	2	31.62	8221
			Cls 3	2		6	1560	2		6	1560	2		6	1560	2		6	1560	2		6	1560	2		6	1560
			Bus	17	17	60.18	15647	17	8.5	45.135	11735			0	0	8.5	8.5	30.09	7823	8.5	8.5	30.09	7823			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369	2	2	7.08	369			0	0	2	2	7.08	369
		WB	Cls 9	2	6	13.26	3448	2	6	13.26	3448	2	6	13.26	3448	2	6	13.26	3448	2	6	13.26	3448	2	6	13.26	3448
			Cls 3		2	1.08	281		2	1.08	281		2	1.08	281		2	1.08	281		2	1.08	281		2	1.08	281
			Bus	17	17	60.18	15647	8.5	8.5	30.09	7823			0	0	8.5	8.5	30.09	7823	8.5	8.5	30.09	7823			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369	2	2	7.08	369			0	0	2	2	7.08	369
	Targinie Rd to Quarry Rd	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652	2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0	8.5	8.5	30.09	7823			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369	2	2	7.08	369			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265		2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0	8.5	8.5	30.09	7823			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369	2	2	7.08	369			0	0	2	2	7.08	369
	Quarry Rd to Mt Larcom/Bruce Highway	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652	2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780	1		3	780
			Bus	17	17	60.18	15647			0	0			0	0	8.5	8.5	30.09	7823			0	0			0	0
			Bus	4	4	14.16	738			0	0	2	2	7.08	369	3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265		2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140		1	0.54	140
			Bus	17	17	60.18	15647			0	0			0	0	8.5	8.5	30.09	7823			0	0			0	0
			Bus	4	4	14.16	738			0	0	2	2	7.08	369	3	3	10.62	554			0	0	2	2	7.08	369
	Gladstone Mt Larcom Rd to Breslin St	NB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
		SB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
	Breslin St to Blain Dr	NB	Cls 9			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Bus			0	0			0	0			0	0			0	0			0	0			0	0
			Cls 9			0	0			0	0			0	0			0	0			0	0			0	0

Train 2 construction -->				Camp A				Camp B				Camp C				Train 3 construction -->	Camp A				Camp B				Camp C			
Road	Section	Dir	Vehicle Class	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA		loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA
Dawson Highway		SB	Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
	Blain Dr to Phillip Street	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
	Phillip Street to Penda Ave	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
	Penda Ave to Chapman Rd	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554	3	3	10.62	554	4	4	14.16	738		2	2	7.08	369	2	2	7.08	369	2	2	7.08	369
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	2761	3	3	10.62	2761	4	4	14.16	3682		2	2	7.08	1841	2	2	7.08	1841	2	2	7.08	1841
	Chapman Rd to Harvey Rd	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
	Harvey Rd to Bruce Hwy	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
Port Access Road	Port Access Road	EB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
		WB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0

ESA Conversion Factors

Vehicle Class	unloaded	loaded	avg
Bus	0.54	3	1.77
Cls 3	0.54	3	
Cls 9	0.51	5.1	

No. Days/year 260
Fortnightly buses 52

				Train 2 construction -->					Camp A				Camp B				Camp C				Train 3 construction -->	Camp A				Camp B				Camp C			
Road	Section	Dir	Vehicle Class	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA		loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA						
Bruce Hwy	Benaraby - Dawson Hwy	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763						
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989						
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
	Dawson Hwy to Targinie Rd	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763						
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0						
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989						
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0	3	3	10.62	2761			0	0				0	0	2	2	7.08	1841			0	0						
	Targinie Rd to Gladstone Mt Larcom Rd	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0	1	1	3.54	185			0	0				0	0	1	1	3.54	185			0	0						
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0	1	1	3.54	185			0	0				0	0	1	1	3.54	185			0	0						
Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	EB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
		WB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
	Hildebrand St to Blain Dr	EB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
		WB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
	Blain Dr to G. Poicier Stn	EB	Cls 9		1	0.51	133		1	0.51	133		1	0.51	133			1	0.51	133		1	0.51	133		1	0.51	133						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
		WB	Cls 9	1		5.1	1326	1		5.1	1326	1		5.1	1326		1		5.1	1326	1		5.1	1326	1		5.1	1326						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
	G Poicier Stn to Reid Rd	EB	Cls 9		1	0.51	133		1	0.51	133		1	0.51	133			1	0.51	133		1	0.51	133		1	0.51	133						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
		WB	Cls 9	1		5.1	1326	1		5.1	1326	1		5.1	1326		1		5.1	1326	1		5.1	1326	1		5.1	1326						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
	Reid Rd to Landing Road	EB	Cls 9		1	0.51	133		1	0.51	133		1	0.51	133			1	0.51	133		1	0.51	133		1	0.51	133						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
		WB	Cls 9	1		5.1	1326	1		5.1	1326	1		5.1	1326		1		5.1	1326	1		5.1	1326	1		5.1	1326						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
	Landing Road to Targinie Road	EB	Cls 9		1	0.51	133		1	0.51	133		1	0.51	133			1	0.51	133		1	0.51	133		1	0.51	133						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
		WB	Cls 9	1		5.1	1326	1		5.1	1326	1		5.1	1326		1		5.1	1326	1		5.1	1326	1		5.1	1326						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369						
	Targinie Rd to Quarry Rd	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652		2		10.2	2652	2		10.2	2652	2		10.2	2652						
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780						
			Bus	17	17	60.18	15647			0	0			0	0		8.5	8.5	30.09	7823			0	0			0	0						
			Bus	3	3	10.62	554			0	0	2	2	7.08	369		2	2	7.08	369			0	0	2	2	7.08	369						
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265			2	1.02	265		2	1.02	265		2	1.02	265						
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140						
			Bus	17	17	60.18	15647			0	0			0	0		8.5	8.5	30.09	7823			0	0			0	0						
			Bus	3	3	10.62	554			0	0	2	2	7.08	369		2	2	7.08	369			0	0	2	2	7.08	369						
	Quarry Rd to Mt Larcom/Bruce Highway	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652		2		10.2	2652	2		10.2	2652	2		10.2	2652						
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780						
			Bus	17	17	60.18	15647			0	0			0	0		8.5	8.5	30.09	7823			0	0			0	0						
			Bus	4	4	14.16	738			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369						
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265			2	1.02	265		2	1.02	265		2	1.02	265						
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140						
			Bus	17	17	60.18	15647			0	0			0	0		8.5	8.5	30.09	7823			0	0			0	0						
			Bus	4	4	14.16	738			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369						
	Gladstone Mt Larcom Rd to Breslin St	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
	Breslin St to Blain Dr	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Bus			0	0			0	0			0	0				0	0			0	0			0	0						
			Cls 9			0	0			0	0			0	0				0	0			0	0			0	0						

Train 2 construction -->				Camp A				Camp B				Camp C				Train 3 construction -->	Camp A				Camp B				Camp C			
Road	Section	Dir	Vehicle Class	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA		loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA
Dawson Highway	Blain Dr to Phillip Street	NB	Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
	Phillip Street to Penda Ave	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554			0	0	4	4	14.16	738		2	2	7.08	369			0	0	2	2	7.08	369
	Penda Ave to Chapman Rd	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	554	3	3	10.62	554	4	4	14.16	738		2	2	7.08	369	2	2	7.08	369	2	2	7.08	369
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus	3	3	10.62	2761	3	3	10.62	2761	4	4	14.16	3682		2	2	7.08	1841	2	2	7.08	1841	2	2	7.08	1841
	Chapman Rd to Harvey Rd	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
	Harvey Rd to Bruce Hwy	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	3	3	10.62	554			0	0				0	0	2	2	7.08	369			0	0
Port Access Road	Port Access Road	EB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
		WB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0

ESA Conversion Factors

Vehicle Class	unloaded	loaded	avg
Bus	0.54	3	1.77
Cls 3	0.54	3	
Cls 9	0.51	5.1	

No. Days/year 260
Fortnightly buses 52

				Train 3 construction -->	Camp A				Camp B				Camp C				Train 2 construction -->	Camp A				Camp B				Camp C			
Road	Section	Dir	Vehicle Class	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA		loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA
Bruce Hwy	Benaraby - Dawson Hwy	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
	Dawson Hwy to Targinie Rd	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus			0	0	2	2	7.08	369			0	0				0	0	3	3	10.62	554			0	0
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus			0	0	2	2	7.08	1841			0	0				0	0	3	3	10.62	2761			0	0
	Targinie Rd to Gladstone Mt Larcom Rd	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	1	1	3.54	185			0	0				0	0	1	1	3.54	185			0	0
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0	1	1	3.54	185			0	0				0	0	1	1	3.54	185			0	0
Gladstone Mt Larcom Rd	Dawson Hwy to Hildebrand St	EB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
		WB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
	Hildebrand St to Blain Dr	EB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
		WB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
	Blain Dr to G. Poicier Stn	EB	Cls 9	3		15.3	3978	3		15.3	3978	3		15.3	3978		3		15.3	3978	3		15.3	3978	3		15.3	3978
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		3	1.53	398		3	1.53	398		3	1.53	398			3	1.53	398		3	1.53	398		3	1.53	398
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
	G Poicier Stn to Reid Rd	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652		2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265			2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
	Reid Rd to Landing Road	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652		2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265			2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
	Landing Road to Targinie Road	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652		2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265			2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
	Targinie Rd to Quarry Rd	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652		2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265			2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	2	2	7.08	369
	Quarry Rd to Mt Larcom/Bruce Highway	EB	Cls 9	2		10.2	2652	2		10.2	2652	2		10.2	2652		2		10.2	2652	2		10.2	2652	2		10.2	2652
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369		4	4	12.39	646			0	0	2	2	7.08	369
		WB	Cls 9		2	1.02	265		2	1.02	265		2	1.02	265			2	1.02	265		2	1.02	265		2	1.02	265
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus	8.5	8.5	30.09	7823			0	0			0	0		17	17	60.18	15647			0	0			0	0
			Bus	3	3	10.62	554			0	0	2	2	7.08	369		4	4	14.16	738			0	0	2	2	7.08	369
	Gladstone Mt Larcom Rd to Breslin St	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
		SB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
	Breslin St to Blain Dr	NB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 9			0	0			0	0			0	0				0	0			0	0			0	0

Train 3 construction -->				Camp A				Camp B				Camp C				Train 2 construction -->	Camp A				Camp B				Camp C			
Road	Section	Dir	Vehicle Class	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA		loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA	loaded	unloaded	Daily ESA	Annual ESA
Dawson Highway		SB	Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
	Blain Dr to Phillip Street	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	4	4	14.16	738
	Phillip Street to Penda Ave	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus	2	2	7.08	369			0	0	2	2	7.08	369		3	3	10.62	554			0	0	4	4	14.16	738
	Penda Ave to Chapman Rd	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus	2	2	7.08	369	2	2	7.08	369	2	2	7.08	369		3	3	10.62	554	3	3	10.62	554	4	4	14.16	738
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus	2	2	7.08	1841	2	2	7.08	1841	2	2	7.08	1841				0	0	3	3	10.62	2761	4	4	14.16	3682
	Chapman Rd to Harvey Rd	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus			0	0	2	2	7.08	369			0	0				0	0	3	3	10.62	554			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus			0	0	2	2	7.08	369			0	0				0	0	3	3	10.62	554			0	0
	Harvey Rd to Bruce Hwy	NB	Cls 9	5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763		5	1	26.01	6763	5	1	26.01	6763	5	1	26.01	6763
			Cls 3	1		3	780	1		3	780	1		3	780		1		3	780	1		3	780	1		3	780
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus			0	0	2	2	7.08	369			0	0				0	0	3	3	10.62	554			0	0
		SB	Cls 9	1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989		1	5	7.65	1989	1	5	7.65	1989	1	5	7.65	1989
			Cls 3		1	0.54	140		1	0.54	140		1	0.54	140			1	0.54	140		1	0.54	140		1	0.54	140
			Bus			0	0	8.5	8.5	30.09	7823			0	0				0	0	17	17	60.18	15647			0	0
			Bus			0	0	2	2	7.08	369			0	0				0	0	3	3	10.62	554			0	0
Port Access Road	Port Access Road	EB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
		WB	Cls 9			0	0			0	0			0	0				0	0			0	0			0	0
			Cls 3			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0
			Bus			0	0			0	0			0	0				0	0			0	0			0	0