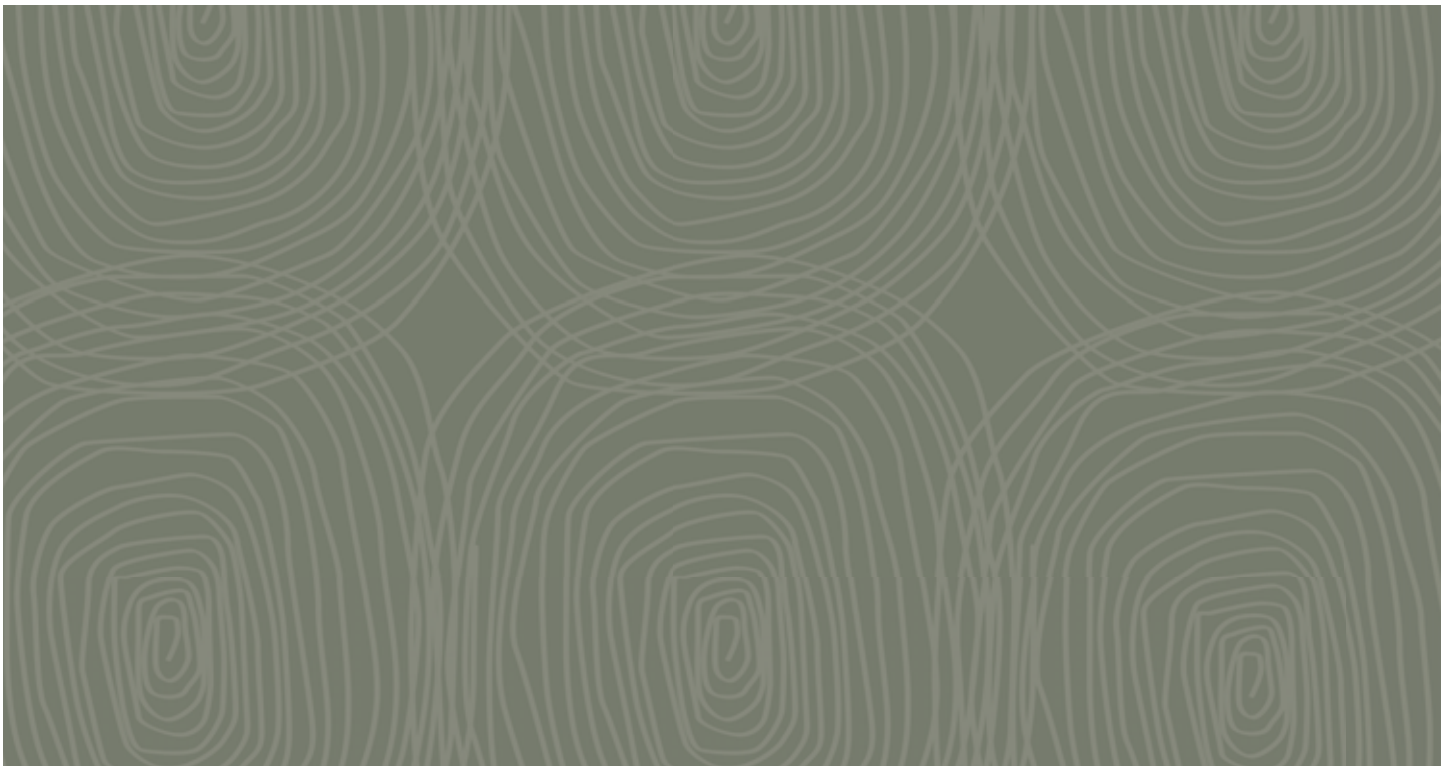


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Report

Traffic Impact Assessment

Kevin's Corner Coal Project (Mine)

15 APRIL 2011


Prepared for
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Executive Summary

The traffic and transport assessment undertaken as part of the EIS determined that the impact of the mine upon the performance of both the major road links and their intersections that will be used to service the mine are insignificant and do not require specific mitigation.

Increased traffic volumes arising from construction and operations activity will have some direct impacts upon the design life and ongoing maintenance of roads in the immediate vicinity of the mine including Clermont-Alpha Road, Jericho-Degulla Road and Degulla Road.

It should be noted that for the purposes of this assessment the southern boundary of the Kevin's Corner site (i.e southern access point) intersects Jericho-Degulla Road. However upon completion of both the Kevin's Corner and Alpha Coal projects the access from the public road network to both sites will be via Degulla Road due to the closure of sections of the public road network and the construction of bypasses.

Alternate methods of transport to the site such as an on-site airport and rail transport for coal are briefly discussed in this assessment.

Consultations with Barcaldine Regional Council and with the Department of Transport and Main Roads will be conducted to resolve matters related to road upgrades, diversions and maintenance programs.

Introduction

1.1 Project Background

Hancock Galilee Pty Ltd (HGPL) (the Proponent) is proposing to develop the Kevin's Corner Project (Mine), a 30 Mtpa capacity open cut and underground thermal coal mine. The coal mine will be supported by privately owned and operated rail and port infrastructure facilities. At the Project site the coal will be mined, washed and conveyed to a train load-out facility where it will be transported by rail approximately 495 kilometres (km) to the east coast of Australia to the port facility of Abbot Point for export. The rail line from Kevin's Corner will join with the proposed rail line from the adjacent Alpha Coal Project.

URS has been engaged by HGPL to prepare a Traffic Impact Assessment (TIA) for the proposed Project planned for the Alpha region in Central Queensland. This study assesses both the construction and ongoing operational phases of the development.

This TIA will form part of a wider Environmental Impact Statement (EIS) to be prepared and referred to the Queensland Government required under the 'State Development and Public Works Organisation Act 1971 (SDPWO Act)' and also under the 'Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)'.

This TIA has been prepared to evaluate the traffic impacts of the proposed Project on the existing road network in accordance with the *Queensland Government Department of Transport and Main Roads (DTMR) 'Guidelines for Assessment of Road Impacts of Developments' (2006)*. This assessment focuses on the preferred routes to the Project site and provides appropriate mitigation measures for potential impacts identified.

In order to understand the proposed Project, a site inspection was undertaken of the existing road network and data has been sourced from the Queensland Department of Transport and Main Roads (DTMR). Information regarding the Project has been sourced from HGPL.

1.2 Government Guidelines

The DTMR has published the 'Guidelines for Assessment of Road Impacts of Developments' (2006), which is a document used to provide industry and developers with advice on information that DTMR may require to assist the approval processes of government and reduce project delay.

Whilst not mandatory, these Guidelines provide a basis for the assessment of impacts and have been used where relevant to assist in the production of this report.

1.3 Report Scope

This report evaluates the traffic impacts of the proposed Project on the existing road network and recommends appropriate mitigation measures for any critical impacts identified. The following tasks have been completed as part of this assessment:

- A site inspection of the road network between Mackay and the proposed mine site, between Emerald and the Project site, as well as the local road network surrounding the Project site;
- Review of existing traffic volume data provided by DTMR for the roads identified as part of potential transport routes for the development;
- Report on historic crash statistics on the relevant road network;
- Collation of projected traffic generation data provided by HGPL and assignment of this traffic data to potential transport routes;

1 Introduction

- Estimation of future background traffic growth on the relevant road network without influence from the Project;
- Estimation of future traffic demand on the relevant road network including both background traffic and generated traffic from the Project;
- Assessment of the future road network performance and pavement design life for scenarios with and without the Project to evaluate impacts of the Project; and
- Identification of possible mitigation measures to address critical impacts on the road network and pavement due to the increase traffic demand of the Project.

The Project impacts on the ongoing operation of existing regional/State air and sea port facilities are not included in this EIS and are subject to assessment by third party operators responsible for this infrastructure.

Proposed Project Profile

This section outlines the information reviewed and assumptions made in the preparation of the TIA. Information has been provided by HGPL, DTMR and other sources and relates to the construction/ commissioning (hereafter referred to as 'construction') and operational phases of the Project.

2.1 Location and General Details

The Kevin's Corner Project (the Project) is located in Central Queensland approximately, approximately 70 kilometres (km) by road north of Alpha, 130km south-west of Clermont and 360km south-west of Mackay (Figure 2-1). A new partly open cut and underground thermal coal mine 37,381Ha in size, the Project is located within MLA is 70425 which is a combination of MDL 333 and a portion of EPC 1210. The Project is proposed to produce up to 30 million tonnes per annum (Mtpa) of thermal coal for the export market. The scheduled life of mine (LOM) is 30 years with sufficient Joint Ore Reserves Committee (JORC) compliant resources to potentially extend the Project life beyond 30 years.

A location map of the mining lease area, including the surrounding regional road network is provided in Figure 2-1

The 30Mtpa open-cut and underground thermal coal mine with associated infrastructure and utilities will utilise the rail and port facilities provided by the prospective neighbouring Alpha Coal Project.

When it comes to excavating, four main seams will be targeted by open-cut operations, and underground longwall mines, with one to two seams targeted for recovery. Draglines, shovels and trucks will be used to expose these seams in the opencut for the duration of the mine life. Truck and shovel mining methods and conveyors will be used to extract the coal and deliver it to the coal preparation plant prior to being transported by rail at the on-site rail load out facility. Lonwall operations will primarily work in the lower of the seams recovering coal and transporting it by conveyor to the CPP.

Processed coal will then be transported by rail shared with the adjacent Alpha Coal Project to a terminal at Abbott Point.

An airport is proposed to be constructed as part of the proposed Project to transport most employees in and out of the site. For the purposes of this TIA in developing a 'worst-case scenario', it is assumed that the airport will be used to only transport passengers and not mine-related equipment or materials.

The Project site infrastructure will include, but is not limited to the items listed in Table 2-1.

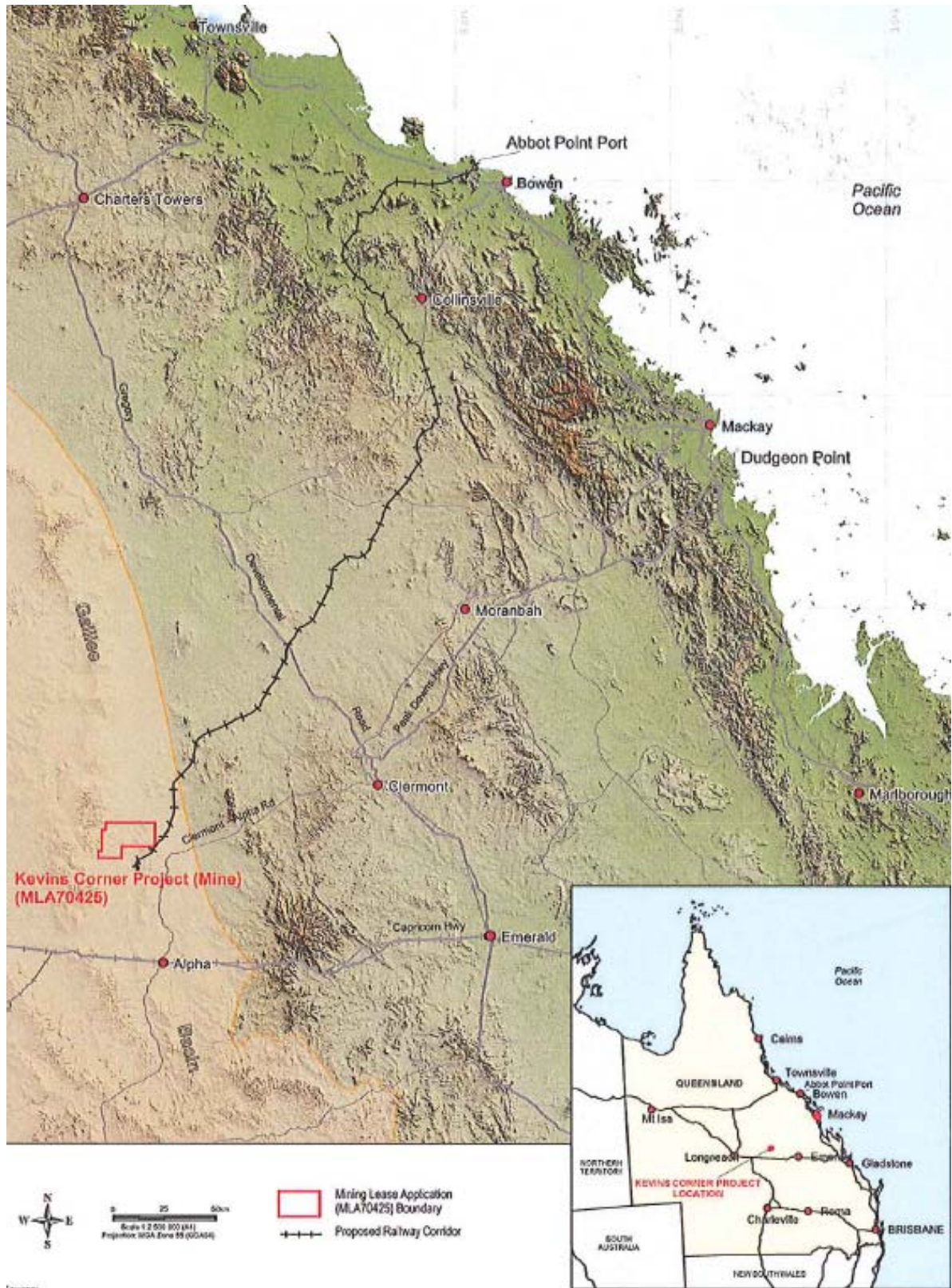
2 Proposed Project Profile

Table 2-1 Site Infrastructure Description

Infrastructure Type	Infrastructure Items
Heavy structures	Heavy equipment workshop; electrical workshop; field maintenance workshop; tyre change/ repair workshop; heavy vehicle washdown facility; refuelling and lubrication facility; light vehicle wash; warehouse.
Other buildings	Main administration and technical services office; muster and mine operations building; amenities building; security; training/ induction facilities; services workshops.
Miscellaneous structures	Covered car parks; water treatment plant shed; hazardous materials storage; where required explosives magazine and storage.
Fuel/ Lubricants/ Air	Main tank farm and lubrication storage; light vehicle fuelling station; air compressor and reticulation.
Civil	Public access areas; public entry road; car parks; secure areas; road/paved areas; mine infrastructure area light vehicle network; mine infrastructure area heavy vehicle access road; hardstands; machine assembly areas; on-site light industrial area; airport.
Site water	Industrial effluent; oily water sources; wash down sources; treatment reuse/ disposal; industrial area storm water collection, treatment, reuse and disposal; site drainage plan.
Raw water	Raw water storage/ reticulation, potable water treatment, storage and reticulation; fire systems storage tanks, pumping system and reticulation.
Power	Site power supply; site substation; reticulation; lighting.
Communications	Main control; reticulation; towers for wireless communications.

2 Proposed Project Profile

Figure 2-1 Project Site Location



2 Proposed Project Profile

2.2 Transport Infrastructure

Jericho-Degulla Road

As part of the Project, it is proposed that the existing Jericho-Degulla Road within the mining lease area will be closed to public traffic and a bypass road around the active mining areas of the site will be constructed to facilitate traffic flow around the Project site, linking Jericho-Degulla Road to Cudmore National Park to the north.

Hancock Coal Pty Ltd, the Proponent for the Alpha Coal project, is currently operating a bulk sample test pit program (BSTP) at the proposed site. As part of this testing program, an agreement has been made with the Barcaldine Regional Council (BRC) and DTMR to upgrade and maintain the existing Hobartville Road, Clermont-Alpha Road and Duck Ponds Road.

Hobartville Road

It is unlikely that construction and operation traffic generated from the proposed Project site require the use Hobartville Road, therefore responsibility for the upgrade of this section of road should remain with its original contributor.

The following upgrades are currently covered under the Alpha Coal Mine EIS submission as part of the BSTP construction and operation:

- Upgrade along a length of 28 km from the BSTP entrance to the intersection with the Clermont-Alpha Road;
- Add approximately 150 mm of gravel formation for a width of approximately eight metres;
- Replace seven stock grids along the length of the road;
- Seal the gravel formation with a one coat bitumen seal of four metre width along the length of the road; and
- Divert the road around the existing Hobartville Homestead to limit noise and dust issues.

A site visit revealed that a substantial amount of these works have been completed. It is important to note that the proposed Alpha and Kevin's Corner mine traffic will not use Hobartville Road during their construction or operational phases.

Clermont-Alpha Road

The following upgrades are also covered under the Alpha Coal Mine EIS submission as part of the BSTP construction and operation:

- Improve intersection of Clermont-Alpha Road and Hobartville Road;
- Provide a four metre wide passing opportunity between the above mentioned intersection and the township of Alpha; and
- Ongoing shoulder maintenance of the road between Alpha and Hobartville Road for the duration of the haulage period.

A site visit revealed that these works are currently underway. It is thought that the proposed traffic from the proposed Alpha Coal Mine will use this section of Alpha-Clermont Road.

It should be noted that as part of the Alpha EIS, recommendations within suggest that the section of Alpha-Clermont Road between Hobartville Road and Degulla Road be upgraded to cater for two-way traffic generated from the proposed development.

2 Proposed Project Profile

Degulla Road

As part of the Alpha EIS, recommendations within suggest that the section of Degulla Road between Alpha-Clermont Road and the site access to Alpha Coal Mine be upgraded to cater for the traffic generated from the proposed development. These upgrades are to cater for two-way vehicular traffic.

There is no report of improvements to the section of Degulla Road between the proposed Alpha Coal Mine site access and Jericho-Degulla Road.

2.3 Timelines

The Project will occur in two phases, construction and operation. The initial construction phase is expected to occur over 24 months, with ongoing construction activities continuing over the following six years until ramp-up is complete. The operational phase of the Project is expected to begin in 2015 and continues to 2044. Note that construction of the CPP continues in the early stages of operation to build up to 30 Mtpa capacity.

This study assesses both the construction and operation phases of the Project.

2.4 Employment and Hours of Operation

It is expected that the construction phase of the Project will, at its peak, consist of a workforce of approximately 1,556 employees during year 3 of construction (Source: HGPL, 28 March 2011). Hours of operation for the construction phase will be during daylight hours, seven days a week with potential night works as required for specialist activities.

The operational phase of the Project is expected to remain constant over the life of the Project with peak on-site physical employment of approximately 1,715 construction and operation employees (Source: HGPL, 28 March 2011) forecasted in 2017.

These peak employee figures are used in this report to provide a 'worst case' assessment of impacts.

2.5 Origin of Inputs and Destination of Outputs

The origin of inputs for both the construction and operational phases of the Project is important in assessing the impacts of transport on the road network. The origins nominated for relevant components of the Project at the time of the assessment are identified in Table 2-2.

2 Proposed Project Profile

Table 2-2 Origin of Project Inputs

Input	Origin (assumptions only)	Remarks
Employees	<ul style="list-style-type: none"> 95% National 2% Alpha 1% Barcaldine Council Area 1% Emerald 1% Clermont 	<ul style="list-style-type: none"> National employees will Fly-In-Fly-Out to Kevin's Corner Airport Remainder of employees to be sourced within region
Construction Equipment	<ul style="list-style-type: none"> 40% Brisbane 40% Mackay 20% Rockhampton 	<ul style="list-style-type: none"> 40% of total cargo to be containerised from Brisbane 60% of total cargo to be break bulk from Mackay and Rockhampton
General Construction Materials	<ul style="list-style-type: none"> 46% Brisbane 24% Mackay 18% Gladstone 3% Newcastle 3% Wollongong 3% Adelaide 	<ul style="list-style-type: none"> Origin of general construction materials assumed to be split between these six port regions These include consumable, diesel, lube and mining equipment.
Waste	<ul style="list-style-type: none"> 100% Emerald 	<ul style="list-style-type: none"> Transported to an existing BRC sewage treatment works at Emerald.

At present it is considered that construction equipment brought in by ship will be delivered to Brisbane, however the Port of Mackay and Rockhampton is being considered as additional ports to receive containerised shipments of construction equipment wherever possible and as such may potentially reduce the number of containers through Brisbane. However, it is acknowledged that there are limitations at these Ports due to the few scheduled services and limited available portside space. In order to produce a 'worst-case' scenario, this traffic assessment will utilise all three ports with the following distribution proportions:

- 40% of the total cargo will still originate in Brisbane (on the assumption that the Port of Townsville cannot be utilised);
- The Port of Mackay, if available, will receive 40% of containerised cargo where available given the ports size and annual container throughput when compared to the Port of Brisbane; and
- The Port of Rockhampton, if available, will receive 20% of containerised cargo where available given the ports size and annual container throughput when compared to the Port of Brisbane.

The other major output of the Project will be waste materials. During early works only, solid waste will be delivered to the BRC landfill on Landsborough Highway until onsite facilities are established. The number of vehicles generated to transport this waste material to the BRC landfill will be insignificant and temporary (i.e. less than six total trips per day) and as such impact to the Landsborough Highway created by waste delivery vehicles during these early works is considered insignificant and therefore not been considered in this TIA.

From construction phase, solid waste will be disposed to an on-site landfill. For the purposes of the TIA, during all phases of the Project, sewage sludge has been assumed to be transported to an existing BRC sewage treatment works at Emerald. Hazardous materials and recovered materials will be transported to Emerald for treatment.

Existing Conditions

3.1 Existing Road Network

An outline of relevant information on road conditions in the vicinity of the Project site investigation area is presented in this section.

URS is aware that route survey reports have been provided to the Proponent for transporting oversized cargo to the local area by transport logistics company DHL. These reports have been reviewed by URS, with roads outlined by the report included in this investigation; however no comment is made on the accuracy of the DHL reports.

URS undertook two site visits to the regional and local areas surrounding the Project site on 20-21 July 2010 (dry conditions) and 1-2 March 2011 (wet conditions).

An overview of the State Controlled Roads and Local Government Roads can be found in Figure 3-1.



This drawing is subject to COPYRIGHT.

0 50 100km
Scale: 1:4 500 000 (A4)
Datum: GDA94, MGA Zone55

- Mining Lease Application (MLA70425) Boundary
- State Controlled Roads
- Local Government Roads
- Major Road Network

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HANCOCK GALILEE PTY LTD
Kevin's Corner Project
Environmental Impact Statement

STATE AND GOVERNMENT ROAD ASSETS

URS

KEVINS CORNER PROJECT - TRANSPORT

File No: 42626660-g-2021.wor

Drawn: RG

Approved: CP

Date: 12-09-2011

Figure: **1**

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3 Existing Conditions

3.1.1 Regional Road Network

The central region of Queensland is serviced by a network of highways that provide connections to Rockhampton to the east, Mackay and Townsville to the north-east, Brisbane to the south-east, New South Wales to the south and Mount Isa to the west. A map of the regional road network has been provided previously in Figure 3-2 and defines the respective road authorities..

Advice from BRC and DTMR recommends that the most appropriate and efficient route from potential ports to the local project area for haulage routes follow:

1. Interstate Route 70 from the north eastern ports (Peak Downs Highway and Gregory Highway) to Clermont;
2. the A7 (Gregory Highway) to Emerald;
3. Capricorn Highway to Alpha;
4. Clermont-Alpha Road to Degulla Road;
5. Degulla and Jericho-Degulla Road to site.

(An alternate route from Clermont is to follow the Project site west along Clermont-Alpha Road to Degulla Road.

From the east, the preferred route to Emerald is along the A4 (Capricorn Highway). From the southeast, the preferred route from Brisbane to site is via the Warrego, Carnarvon, Dawson and Gregory Highways to Emerald. Once at Emerald, these routes follow the A4 (Capricorn Highway) to Alpha.

These regional roads are managed by DTMR. A description of the relevant regional roads is provided below.

Peak Downs Highway (70)

The Peak Downs Highway (70) is an interstate highway which links Mackay on the central east coast of Queensland to Clermont in a south-westerly direction. It is a two lane, two-way sealed road with a 100 kilometre per hour (km/hr) speed limit which is reduced to 80 km/hr or 60 km/hr where the road passes through communities.

The Highway is maintained and managed by DTMR and currently provides access from Mackay to a growing number of coal mine sites located in the region. A number of localised upgrades of the road have occurred due to these coal mine projects and the road is frequently used by both Commercial Vehicles (CV) and Over Dimensioned Vehicles (OD).

The current condition of the Highway varies due to the localised upgrades at mine site access points. In these areas, the highway is in good-excellent condition, with sealed shoulders, line markings and additional lanes provided to separate turning movements and street lighting provided at intersections. Grade separations have been provided over mining infrastructure and rail lines. However, the road midblocks between these mine access points is generally in poor-good condition with unsealed shoulders and visible patching and rutting on the road surface. However line marking is present (although only a centreline is provided in the narrower sections).

There are a number of floodways along the length of Peak Downs Highway, which are clearly marked and have depth indicators provided.

3 Existing Conditions

Intermittent, single direction overtaking lanes are provided for approximately 100 km outside of Mackay.

Approximately 75 km from Mackay the Highway crosses the Eton Range, which results in a 12% grade with a number of curves on this grade for a length of 3 km. The speed limit here is reduced to 60 km/hr and safety run-out bays are provided for CV.

On approach to Mackay the Highway passes through the townships of Eton and Walkerston with reduced speed limits, shopping districts on the side of the highway, 40 km school zones and increased pedestrian and cyclist activities. A school bus route operates along this road.

The Peak Downs Highway is suitable for use as a transport route for the Kevin's Corner Project (Mine) Figure 3-2 shows the typical cross section of the Peak Downs Highway.

Figure 3-2 Peak Downs Highway - Typical Cross Section



Gregory Highway (A7)

The Gregory Highway (A7) runs in a north/south direction through central eastern Queensland, connecting Springsure in the south to Clermont, further north. Extending from the Gregory Highway (north of Clermont) is the Gregory Developmental Road, connecting to Einasliegh. Gregory Highway is a two lane, two-way sealed road with a 100 km/hr speed limit which is reduced to 80 km/hr or 60 km/hr where the road passes through communities. The Highway is maintained and managed by DTMR and is frequently used by both CV and OD.

The current condition of the Highway is generally good, with varied width of sealed shoulders from 0-1.5 m, line markings and wide road reservations. Some visible patching and rutting on the road surface reduces the road condition to poor in a number of sites.

There are a number of floodways along the length of Highway, which are clearly marked and have depth indicators provided.

3 Existing Conditions

The Highway provides access to private properties on either side of the road reservation, as well as access to the local road network through unsignalised minor intersections. There are rail crossings as well as a signed stock crossing between Emerald and Clermont.

The road passes through a number of communities, notably Clermont, Capella and Emerald. Speed limits are reduced to 60 km/hr in these areas due to the residential, commercial and increased pedestrian activities. A school bus route operates along this road.

The Gregory Highway connects to the Capricorn Highway at Emerald with a seagull-type intersection.

The Gregory Highway is suitable for use as a haulage route for the Kevin's Corner Project (Mine) site. Figure 3-3 shows the typical cross section of the Gregory Highway.

Figure 3-3 Gregory Highway - Typical Cross Section



Capricorn Highway

This is the main east-west highway linking Rockhampton to Emerald, and further west to Barcaldine via Alpha. It is a heavily trafficked CV route, with a speed limit of 100 km/h. The Capricorn Highway is mainly one lane in each direction with sealed shoulders in some areas and overtaking lanes at various locations. Generally, the road surface is adequate and there are no obvious issues for CV access.

A school bus route operates along this road.

The Capricorn Highway is suitable for use as a haulage route for the Kevin's Corner Project (Mine) site. Figure 3-4 shows the typical cross section of the Capricorn Highway.

3 Existing Conditions

Figure 3-4 Capricorn Highway - Typical Cross Section



Clermont-Alpha Road

The Clermont-Alpha Road provides a north/south route connecting the Capricorn Highway at Alpha in the south to the Gregory Highway at Clermont further north.

The road is a single carriageway, single lane road with a varying seal width of approximately 3.5 to 4.5 metres for 37 km north of the intersection with the Capricorn Highway. The seal is in average condition with some potholes and rutting evident. Unformed grassed shoulders extend from the edge of the seal to create a wide road reservation. There is insufficient width on the seal for two vehicles to pass in opposing directions and the grassed shoulders need to be used in this instance. For approximately 3 km the seal widens to two lane widths to enable two-way traffic. There are no line markings on the seal.

Approximately 37 km north of the intersection with the Capricorn Highway the carriageway becomes a formed, unsealed road approximately 8-10 m in width, providing two lanes to accommodate two-way traffic; however there is no delineation of lanes. This unsealed carriageway was in good condition at the time of the site inspection, however would be subject to rutting, corrugations and potholes without proper maintenance regimes. The unsealed carriageway cross-section is inconsistent across its length, with intermittent narrowings and some small sealed sections primarily across floodways and creeks.

The road returns to a two-way, two lane sealed carriageway for approximately 7 km on the approach into Clermont from the west.

3 Existing Conditions

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. Although a majority of the land is fenced, there are sections which are open to stock, horses and also native wildlife.

A number of floodways and cattle grids exist along the route as well as a low lying lagoon area to the west, approximately 42 km north of Alpha.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area; existing cattle grids, old bridges and low capacity culverts prevent OD vehicles to access this section of road.

Note that upgrades are proposed to this road as part of the Alpha Coal BSTP program; however, the road will be assessed in its current condition.

Figure 3-5 to Figure 3-8 show typical cross sections of Clermont-Alpha Road.

Figure 3-5 Clermont-Alpha Road - Single Lane Section North of Alpha



3 Existing Conditions

Figure 3-6 Clermont-Alpha Road - Typical Unsealed Cross-Section



Figure 3-7 Clermont-Alpha Road - Narrow and Sealed Floodway Crossing



3 Existing Conditions

Figure 3-8 **Clermont-Alpha Road - Sealed Section West of Clermont**



Flinders Highway (A6) – Townsville to Charters Towers

The Flinders Highway is the main east-west highway linking Townsville and Charters Towers and continues further west to its terminus at Cloncurry. The section between Townsville and Charters Towers has one lane in each direction with sealed shoulders (although sometimes narrow) along most of its length and centre and edge line marking is provided. There are no apparent issues for CV access.

Flinders Highway forms part of the National Road Network

Gregory Developmental Road (A7) – Charters Towers to Clermont

The Gregory Development Road is a north-south route linking Conjuboy in the north with Clermont to the south. The section between Charters Towers and Clermont forms part of the A7 road link and provides an alternate, inland route to the A1 in central Queensland. One lane is provided in each direction, centre and edge line marking is provided and it is sealed between Charters Towers and Clermont. There are no apparent issues for the use of this road by CVs.

This section of the Gregory Development Road between Charters Towers and Clermont is classified as a State Strategic Road.

3 Existing Conditions

Dawson Highway (A7) – Rolleston to Springsure

The Dawson Highway is an east-west link connecting Springsure in the west with Gladstone in the east and is an alternate route to the Capricorn Highway. The section between Rolleston and Springsure connects the Gregory Highway and Carnarvon Highway which further connects into the Warrego Highway with a direct link to southeast Queensland. It has one lane in each direction with centre linemarking, however sealed shoulders and edge linemarking is not provided continuously for the full length of this section (particularly the southern half). This section of the Dawson Highway is considered suitable for access by CVs.

The section of Dawson Highway between Rolleston and Springsure is classified as a State Strategic Road.

Carnarvon Highway (A55) – Rolleston to Roma

The Carnarvon Highway is a north-south route linking Rolleston in the north with Mungindi in the south at the Queensland/New South Wales border. The section between Rolleston and Roma is a sealed road and has one lane in each direction. Centre and edge linemarking is provided along the majority of this section however there are some lengths where linemarking is limited to centre linemarking. Shoulder condition adjacent to the carriageway varies from non-existent to unsealed to narrow sealed. Carnarvon Highway is suitable for use by CVs.

The section of Carnarvon Highway between Rolleston and Roma is classified as a State Strategic Road.

Warrego Highway (A2) – Metropolitan Brisbane to Roma

The Warrego Highway is an east-west route linking Brisbane and southeast Queensland in the east with Charleville to the west. The road configuration varies along the section between metropolitan Brisbane and Roma due to the different land uses along this section of road (i.e. rural in the west through to urban in the east). The rural sections of this length of Warrego Highway have one lane in each direction with varied shoulder construction from non-existent to unsealed to sealed. In urbanised areas, particularly between Toowoomba and its eastern terminus as the Ipswich Motorway in metropolitan Brisbane, two lanes are provided in both directions and are separated by a median and sealed shoulders.

Immediately east of the Toowoomba township the Highway crosses the Toowoomba Range, which results in a 10% grade with a number of curves on this grade for a length of 4 km. The speed limit here is reduced and safety run-out bays are provided for CV.

The section of Warrego Highway between metropolitan Brisbane and Roma is suitable for use by CV (although care is to be taken when crossing the Toowoomba Range) and is part of the National Road Network.

3.1.2 Local Road Network

The Project site is surrounded by a network of local roads, which are primarily unsealed local access roads.

Local road conditions are managed by the BRC. In general, all local roads are within rural private property areas and do not have speed limit signs, unless otherwise specified.

3 Existing Conditions

Hobartville Road

Hobartville Road is a formed, unsealed road connecting the Clermont-Alpha Road and accessing the privately owned Hobartville Station and then running north directly through the Project site.

The carriageway was initially a single lane formed road in a wide reservation; however recent grading activities have provided a formed roadway wide enough to accommodate two-way traffic in most areas. The surface condition is poor-average with potholes, rutting and corrugations evident. The road surface is open to erosion, dust and flooding issues. The road reservation is approximately 10 m wide with very little vegetation.

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. A majority of the land is unfenced open to stock and also native wildlife.

A number of floodways and cattle grids exist along the route with widths varying from 3.6 to 4 m.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area; existing cattle grids, old bridges and low capacity culverts prevent OD vehicles to access this section of road.

Note that upgrades are proposed to this road as part of the BSTP program; however, the road will be assessed in its current condition. However it is envisaged that no traffic from the Project will be utilising Hobartville Road to complete their journey.

Figure 3-9 shows the typical cross section of Hobartville Road.

Figure 3-9 Hobartville Road - Typical Cross Section



3 Existing Conditions

Degulla Road

Degulla Road is a formed, unsealed east-west road connecting from Jericho-Degulla Road in the west to Clermont-Alpha Road in the east.

The carriageway is a single lane formed road in a wide reservation with less formed shoulders to enable two-way traffic to pass. The surface condition is poor-average, with potholes, rutting and corrugations evident. The road surface is open to erosion, dust and flooding issues. The road reservation is approximately 10 m wide with very little vegetation.

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. A majority of the land is unfenced open to stock and also native wildlife.

A number of floodways and cattle grids exist along the route with widths varying from 3.6 to 4 m.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area; however, it is unsuitable from a road safety perspective to be used as a thoroughfare by a large volume of commercial vehicles on a regular basis. Furthermore, existing cattle grids, old bridges and low capacity culverts prevent OD vehicles to access this section of road.

Figure 3-10 shows the typical cross section of Degulla Road.

Figure 3-10 Degulla Road - Typical Cross Section



3 Existing Conditions

Jehricho – Degulla Road

Jehricho-Degulla Road is a formed, unsealed north-south road connecting Hobartville Road and Degulla Road to the south with Cudmore Reserve to the north.

The carriageway is a two-way formed road in a wide reservation with less formed shoulders and in other areas the road is a single track with less formed shoulders to enable two-way traffic to pass. The surface condition is poor-average, with potholes, rutting and corrugations evident. The road surface is open to erosion, dust and flooding issues.

The surrounding land is primarily privately owned open bushland, utilised for grazing and other farming activities. A majority of the land is unfenced open to stock and also native wildlife.

A number of floodways and cattle grids exist along the route with widths varying from 3.6 to 4 m.

This road is suitable for light vehicles or commercial vehicles requiring access to the local area; Cattle grids, old bridges and low capacity culverts would restrict the size and weight of over dimensional vehicles able to access the area.

Figure 3-11 and Figure 3-12 shows the typical cross section of Jericho-Degulla Road.

Figure 3-11 Jericho-Degulla Road – Typical Cross Section



3 Existing Conditions

Figure 3-12 Jericho-Degulla Road – Typical Cross Section



3.2 Public Transport and Freight Routes

There are currently a number of existing designated routes in the study area utilised by public transport, school buses, haulage and stock.

School bus routes currently exist along the Capricorn, Gregory and Peak Downs Highways. Typical school bus route operation times vary within the ranges of 7.00am to 8.30am and 2.30pm to 4.30pm, depending on the proximity and starting time of local schools. School bus route operators and local school principals should be contacted as part of any road use management plan to determine any curfews or additional mitigation requirements such as improving safety to school children alighting and disembarking the bus and for the interaction of haulage vehicles and school bus operations. The existing HCPL operations will implement such measures during haulage.

A number of long-distance regional bus services operate throughout rural Queensland and eight of these routes operate along the same State Controlled Roads as identified in Section 3.1.1. These public transport services occur at a low frequency and are generally at or below one service per day (with the exception of the Mt Isa – Brisbane Greyhound service). It is therefore considered that any interaction between construction and operational vehicles will be minimal.

3 Existing Conditions

Table 3-1 Summary of Existing Public transport Services

Route (bus operator)		Direction	Direction	Section of Route Overlapping Proposed Vehicles Routes of Project
		Northbound or Westbound	Southbound or Eastbound	
Mt Isa – Brisbane (Greyhound)	Between Mt Isa and Brisbane	1 daily service	1 daily service	Roma to Brisbane
	Between Charleville and Brisbane	1 daily service	1 daily service	
	Between Chinchilla and Brisbane	1 Friday service only	-	
	Between Dalby and Brisbane	1 daily service except Friday	1 daily service	
Mt Isa – Townsville (Greyhound)		4 weekly services – Tues, Thurs, Fri and Sat	4 weekly services – Tues, Thurs, Fri and Sat	Charters Towers – Townsville
Emerald – Mackay (Paradise Coaches)		1 daily service	1 daily service	Full distance of route
Longreach – Emerald (Paradise Coaches)		2 weekly services – Tues and Sat	2 weekly services – Wed and Sun	Barcaldine – Emerald
Cunnamulla – Toowoomba (Greyhound)		3 weekly services – Sun, Wed and Fri	3 weekly services – Mon, Thurs and Sat	Dalby – Toowoomba
Toowoomba – Rockhampton (Greyhound)		3 weekly services – Mon, Wed and Fri	3 weekly services – Tues, Thurs and Sun	Toowoomba – Miles
Charters Towers – Townsville (Douglas Coaches)		1 daily service weekdays only	1 daily service weekdays only	Full distance of route

The use of stock routes in rural areas can create safety concerns for freight haulage routes. Road use management plans should consider the interaction between stock and freight routes and implement any risk management procedures as necessary such as increased signage and communications with land owners on locations of stock.

Stock routes U291 running north-south beside Hobartville Road towards Forrester Station and U301 running east-west parallel with Degulla Road are currently classed as unused.

Stock route M304 that runs beside Clermont-Alpha Road is still in use.

3.3 Existing Road Crash Data

Road crash data has been analysed along the routes proposed to be utilised by the traffic movements of the Project for which DTMR was able to provide statistics. For the purposes of this study, the summary of crash data at intersections and mid-blocks are displayed together.

The following crash data was obtained from DTMR from July 2005 to July 2010 and detailed locations of the crashes are shown in Figure 3-13.

3 Existing Conditions

Figure 3-13 Location of Crashes



Further analysis of trends across each road section is discussed in Table 3-2 below.

Table 3-2 Crash Data - Overall Summary

Road Section	Fatality		Other Injury		Property Damage		Total
	No.	% of Total	No.	% of Total	No.	% of Total	
Capricorn Highway							
16A Rockhampton – Duaringa	6	18%	17	52%	10	30%	33
16B Duaringa – Emerald	1	1%	75	52%	68	47%	144
16C Emerald - Alpha	1	2%	30	61%	18	37%	49
16D Alpha - Barcaldine	0	0%	6	55%	5	45%	11
Total Capricorn Hwy	8	3%	128	54%	101	43%	237
Gregory Highway							
27B Emerald - Clermont	4	4%	46	48%	46	48%	96
Total Gregory Highway	4	4%	46	48%	46	48%	96
Clermont – Alpha Road							
Clermont – Alpha Road	0	0%	5	56%	4	44%	9
Total Clermont - Alpha Road	0	0%	5	56%	4	44%	9

Capricorn Highway (Rockhampton to Duaringa)

This section of road shows general trends consistent with rural highways. 53% of incidents were single vehicle crashes and 78% of the crashes occurred at midblock locations. There were no evident trends as to weekday or weekend incidents; however 19% occurred between the hours of 6pm and 6am. 16% of incidents involved a commercial vehicle.

3 Existing Conditions

Capricorn Highway (Duaringa to Emerald)

This section of road shows general trends consistent with rural highways. The most common types of crashes are rear end in the same lane and single vehicles running off the carriageway. 78% of the crashes occurred at midblock locations and 29% of all crashes occurred between the hours of 6pm and 6am. 19% of incidents involved a commercial vehicle.

Capricorn Highway (Emerald to Alpha)

This section of road shows general trends consistent with rural highways. The most common types of crashes were single vehicles running off the carriageway (55%). 80% of the crashes occurred at midblock locations and 20% of all crashes occurred between the hours of 6pm and 6am. 24% of incidents involved a commercial vehicle. This section of road showed a bias towards crashes occurring on a Friday at twice the rate of any other day of the week.

Capricorn Highway (Alpha to Barcaldine)

This section of road shows general trends consistent with rural highways. Almost all crashes were single vehicle crashes, with the most common type classified as running off the carriageway (55%).

75% of the crashes occurred at midblock locations and 27% of all crashes occurred between the hours of 6pm and 6am. 18% of incidents involved a commercial vehicle.

Gregory Highway (Emerald to Clermont)

This section of road shows general trends consistent with rural highways which run through rural residential areas. There was an approximately even spread of crashes between midblock and intersection locations, reflecting the major rural towns located on the Gregory Highway. The most common type of crash is classified as an intersection crash with vehicles from adjacent right-right approaches. There was no significant trend between single or multiple vehicle crashes. 25% of all crashes occurred between the hours of 6pm and 6am and 12% of incidents involved a commercial vehicle.

Clermont-Alpha Road

The low crash numbers on the Clermont-Alpha Road reflects the overall low traffic volumes which utilise this road. From the data available, it is evident that Wednesday has a significantly higher proportion of crashes than any other day of the week. The majority of crashes occur during daylight hours and the most common type of crash is classified as a single vehicle out of control on the carriageway. These trends are reflective of the low usage of this road and the surrounding land use patterns.

The overall pattern of crashes on the road network generally reflects trends associated with a normal rural environment, i.e. single vehicle crashes in midblock locations between residential centres, with higher proportion of intersection crashes in residential areas.

It should be noted that the *Galilee Basin Economic and Social Impact Study Report – Transport* (Economic Associates, 2010) has identified that a time-series analysis of major highway sections in the Galilee Basin (including the highways surrounding this Project) has determined that there is no correlation between the recent increase in mining activity and any upward trends in the number of road crashes.

3 Existing Conditions

3.4 Scheduled Road Improvement Projects

The DTMR outlines proposed road improvement projects in the publication *'Roads Implementation Program 2009-2010 to 2013-2014'*. This document has been reviewed to identify any road improvement projects scheduled to occur on the roads proposed to be used for the Project. A summary of proposed works is provided in Table 3-3. Note that the proposed works may not occur over the entire length of road and may be limited to specific locations. Works outlined for 2009-2010 may have already occurred at the time of writing this report.

Table 3-3 Scheduled Road Improvement Projects

Road	Proposed Works	Indicative Timing
Capricorn Highway		
Alpha - Barcaldine	<ul style="list-style-type: none"> • Realignment 	2009-2010
Emerald - Alpha	<ul style="list-style-type: none"> • Seal shoulders 	2009-2011
Duaringa – Emerald	<ul style="list-style-type: none"> • Construct auxiliary lane – Comet River Road • Miscellaneous works • Improve drainage • Seal shoulders • Rehabilitate and widen 	2009-2011 2009-2010 2011-Future 2011-Future 2009-2014
Rockhampton - Duaringa	<ul style="list-style-type: none"> • Construct auxiliary lane • Construct overtaking lane 	2009-2010 2010-2014
Clermont-Alpha Road		
Native Companion Creek	<ul style="list-style-type: none"> • Construction of bridge and approaches 	2011-2014
Selected sections	<ul style="list-style-type: none"> • Minor regrade 	2009-2014
Peak Downs Highway		
Clermont - Nebo	<ul style="list-style-type: none"> • Intersection improvements • Driver fatigue management improvements • Miscellaneous works • Reconstruction of pavement • Rehabilitate and widen • Construct additional lanes • Widen pavement • Creek bridges – concept planning 	2009-2011 2009-2011 2009-2010 2009-2014 2011-Future 2009-2010 2009-2014 2009-2011
Nebo – Mackay	<ul style="list-style-type: none"> • Eton Range minor realignment • Construct overtaking lanes • Upgrade Sandy Creek bridge • Replace guardrail • Intersection improvements • Widen pavement • Walkerston and Eton Range concept planning 	2010-2011 2009-Future 2011-2014 2009-2010 2009-2010 Future 2009-2011
Gregory Highway		
Emerald - Clermont	<ul style="list-style-type: none"> • Install traffic signals – Emerald 	2009-2014

Upgrades proposed to surrounding roads as part of the BSTP program are outlined in Section 2.2 of this report.

3 Existing Conditions

3.5 Consultation Summary

A representative from URS met with Rob Bauer, Executive Officer at BRC in the Alpha Office on 20 July 2010. The following items were discussed.

- BRC would like to extend Eureka Road towards the Project site to shuttle people straight to and from the Alpha Township airport. This would be out of the floodplain and a better alignment, but there are no plans or road reservations at the moment and planning permits may not suit the timing of the development.
- A number of old bridges on Clermont-Alpha Road may not suit OD vehicles.
- Unsealed roads have a number of issues for use by CV, primarily dust production and flooding.
- There are no planned road upgrades in Alpha and town planning is at the stage of determining where they can expand the town. There are a number of potential land development sites, but no decisions have been made.

On 10/3/2011 a telephone conference meeting was held with BRC to establish a more recent view on the proposed Project. The following was discussed:

- The proposed redirected Jericho-Degulla Road will still be classified as a 'rural standard road' according to BRC.
- Jericho-Degulla Road and Degulla Road will still be maintained by BRC, however any road upgrade costs as a result of increased traffic volumes related to the proposed Project will be the responsibility of the HGPL;
- Prior to the operation of the proposed Project, BRC will inspect and approve the proposed re-aligned Jericho-Degulla Road;
- The proposed re-alignment of Jericho-Degulla Road should be designed to Queensland's Main Road Specifications. HGPL should plan in advance and ideally construct the road during the dry season weather conditions;

There are a number of creek crossings that need to be accounted for as part of the proposed re-alignment and existing bridges are not designed to carry heavy equipment.

Traffic Volumes

This section provides existing traffic volumes and forecasts of future traffic volumes during the construction and operational phases of the Project.

4.1 Existing Traffic Volumes

Annual Average Daily Traffic (AADT) is a simple measure of transport demand obtained by counting the number of axles passing a given point on the road. AADT was obtained from DTMR (refer Table 4-1) for mid-blocks on the arterial roads surrounding the subject site and is for two-way traffic. Such information is not available for Jericho-Degulla Road; however an estimate of volumes for these roads was undertaken based on on-site observations.

The larger links between major centres are broken down into road segments by DTMR for analysis purposes. The highest volumes along these segments have been used.

Table 4-1 2010 Annual Average Daily Traffic Volumes (AADT)

Road	Link	AADT (Total Vehicles)	% Commercial Vehicles
Jericho-Degulla Rd		20*	30*
Clermont Alpha Rd	Alpha-Hobartville	88	25
	Hobartville-Mistake Ck	21	14
	Mistake Ck-Clermont	81	14
Capricorn Hwy	Jericho-Alpha	350	24
	Alpha-Gemfields	524	23
	Gemfields-Emerald	1263	23
	Emerald-Rockhampton	3374	23
Gregory Hwy	Emerald-Capella	2288	19
	Capella-Clermont	1119	32
Peak Downs Hwy	Clermont-Peak Downs	612	20
	Peak Downs-Nebo	3435	14
	Nebo-Mackay	3893	15

*Volume data not available, figure based on site observations

A diagrammatical format of these AADT volumes are shown in Section 4-4.

4.2 Traffic Volume Assessment Scenarios

The Proponent has supplied information to URS regarding the expected road network traffic volumes generated from the construction and operation of the Project. Information supplied included an outline of the anticipated traffic volumes associated with employees and construction vehicles. As the traffic volumes and patterns vary over the construction and operating phases of the Project, including variations over the life of the mine, different scenarios have been assessed to identify the worst case scenario for traffic impacts. Table 4-2 shows the years that have been assessed.

4 Traffic Volumes

Table 4-2 Traffic Volume Assessment Years

Assessment Year	Traffic Pattern
2014	Peak traffic volume during construction phase
2017	Peak equipment deliveries during operational phase
2022	10 year post operation design horizon
2030	Additional assessment year during operation for comparison purposes
2041	Additional assessment year during operation for comparison purposes

All roads have been assessed against their existing condition as of the site inspections undertaken and the 2010 AADT data supplied by DTMR.

4.3 Historic Traffic Growth and Future Background Volumes

In order to determine the future background traffic volumes (expected volumes across the road network without the Project), the existing traffic volumes are projected forward using historical growth rates. Historical growth rate figures have been provided by DTMR; however these rates vary significantly across the assessment area and many gaps in the data are evident.

Predicted future growth rate data for the region was unavailable. Therefore, an estimate of background traffic growth rates has been made based on relevant available data and an understanding of rural road networks.

The available historic growth rates and the adopted growth rates for analysis purposes are provided in Table 4-3

4 Traffic Volumes

Table 4-3 Historical Traffic Annual Growth Rates and Projected Background Traffic Volumes

Road	Link	Historic Annual Growth Rate Range (%)	Adopted Annual Growth Rate 2010-2020	Adopted Annual Growth Rate 2021-2042	Background Traffic Volumes					
					2010	2014	2017	2022	2030	2041
Degulla Road (Inc Jericho-Degulla Road)	Clermont-Alpha Rd to Site		3%	3%	20	22	25	29	37	51
Clermont Alpha Rd	Alpha- Hobartville Rd		3%	3%	88	99	109	126	159	221
	Hobartville to Mistake Ck		3%	3%	21	24	26	30	38	53
	Mistake Ck-Clermont		3%	3%	81	91	100	116	147	203
Capricorn Hwy	Jericho-Alpha	1.5 to 6.5	5%	3%	350	420	497	605	767	1,061
	Alpha-Gemfields	-4 to 9.5	3%	3%	524	587	647	748	947	1,311
	Gemfields-Emerald	-4 to 9.5	3%	3%	1,263	1,415	1,560	1,801	2,282	3,158
	Emerald-Rockhampton	4 to 12	7%	5%	3,374	4,319	5,490	7,318	10,812	18,491
Gregory Hwy	Emerald-Capella	-11 to 8	5%	3%	2,288	2,746	3,249	3,954	5,009	6,934
	Capella-Clermont	-11 to 8	5%	3%	1,119	1,343	1,589	1,934	2,450	3,391
Peak Downs Hwy	Clermont-Peak Downs		5%	3%	612	734	869	1,058	1,340	1,855
	Peak Downs-Nebo	3 to 17	10%	5%	3,435	4,809	6,801	9,823	14,513	24,822
	Nebo-Mackay	3 to 17	10%	5%	3,893	5,450	7,708	11,133	16,448	28,132

4 Traffic Volumes

4.4 Traffic Generation of Project

4.4.1 Construction Phase

Approach and Assumptions

The Proponent has provided data showing the predicted traffic generated as a result of the construction of the Project. The data is based on the current status of the design. Traffic volumes are preliminary estimates at this stage. The data provided has originated from a number of different technical analyses and hence has had to be consolidated and summarised to provide equivalent yearly traffic volumes. The data that has been incorporated into this assessment is outlined below.

Personnel numbers, mode of transport and origin data has been provided by HGPL and is based on the majority (95%) of the construction workforce utilising a Fly-In-Fly-Out (FIFO) method of transport. A minority of the workforce will drive to and from the site each day from surrounding areas such as Alpha, Clermont, Barcaldine or Emerald,

It is expected that the Project will operate 24 hours a day, 7 days a week where daily shift periods are expected to be 12 hours in length, with daily Kevin's Corner personnel traffic arriving and departing in the 1hr period either side of the shift. Transportation modes will be provided to transfer personnel to Kevin's Corner airport within the site and will arrive according to flight times or as scheduled to meet shift times; however it has been assumed they will occur during peak hours for a conservative impact assessment.

It has been assumed that employees driving to and from Alpha, as well as those from nearby regional centres driving to the accommodation facilities will be in single occupancy vehicles. This assumption is considered to produce the worst case scenario for traffic assessment.

From HGPL's vision is for peak construction personnel numbers to be in 2014 with a total of 1,556 people required onsite.

No allowance has been made for transport movements from the accommodation facilities to the work area or to Kevin's Corner airport as all of these movements will occur within the Project area and will have no affect on the external road network.

Delivery of materials, equipment and consumables is assumed to occur 7 days a week, over a 10 hour period, therefore the number of deliveries occurring during each of the peak hour periods is 10% of the daily total (i.e. total deliveries per day divided by 10 hours equals 10% per hour). Initial advice provided by the Proponent estimates that less 5 % of all vehicle movements generated by the Project during the construction phase will consist of over-dimensional vehicles.

Waste is assumed to be disposed to the on-site landfill wherever possible; however some waste (hazardous and recyclable) will need to be removed from site to a treatment site in Emerald. During all phases of the Project, sewage sludge will be transported to an existing BRC sewage treatment works at Emerald. During early works only, solid waste will be delivered to the BRC landfill along the Landsborough Highway. During all project phases, hazardous and recovered materials will be transported.

4 Traffic Volumes

A summary of the traffic volumes generated by construction activity as outlined in the provided data is shown in Table 4-4. Vehicles have been classified according to the AustRoads *Vehicle Classification System* which defines 12 classes to distinguish between the lengths (and size) of short, medium, long, medium combination and long combination vehicles. For the purposes of this assessment, Light Vehicles (LV) represent classes 1 to 3, Commercial Vehicles (CV) represent classes 4 to 10, and Over-Dimensional (OD) Vehicles represent classes 11, 12 and above.

It should be noted that these are average daily volumes that have been calculated using the total estimated number of traffic movements during the peak of construction, extrapolated to a yearly value. For the purposes of this analysis, peak is anticipated in 2014.

Impacts of specific scheduling of activities have not been considered and will vary depending on the length of time required to complete each task. For this assessment all activities are assumed to occur concurrently and over the whole construction period.

4 Traffic Volumes

Table 4-4 Generated Peak Construction Traffic, 2014

Category		Vehicle Type (AustRoads Vehicle Class)	Origin	Destinat ion	Network Vehicles (single trip) per year	AADT
Personnel						
1.1	FIFO	Internal Transport Mode	KC Airport	Accommo dation	0	0
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	11315	62
1.4	DIDO	LV (Class 1)	Barcaldine Council	Accommo dation	832	5
1.6	DIDO	LV (Class 1)	Emerald	Accommo dation	832	5
1.8	DIDO	LV (Class 1)	Clermont	Accommo dation	832	5
Equipment						
2.1	Construction	Standard Semi (CV) (Class 8)	Brisbane	Project Site	898	5
2.2			Mackay	Project Site	898	5
2.3			Rockhampto n	Project Site	449	2
2.4	Construction	Over- Dimensional (OD)	Brisbane	Project Site	792	4
2.5			Mackay	Project Site	792	4
2.6			Rockhampto n	Project Site	396	2
Material						
3.1	Construction materials	Standard Semi (Class 8) or 57kL tanker (Class 10)	Brisbane	Project Site	1415	8
3.2			Mackay	Project Site	1887	10
3.3			Gladstone	Project Site	944	5
3.4			Newcastle	Project Site	157	1
3.5			Wollongong	Project Site	157	1
3.6			Adelaide	Project Site	157	1

4 Traffic Volumes

Category		Vehicle Type (AustRoads Vehicle Class)	Origin	Destinat ion	Network Vehicles (single trip) per year	AADT
Waste						
4.1	Non-landfill waste	20 t capacity (Class 4 or 5)	Project Site	Emerald	936	5
Total LV single trips per year					13,811	76
Total CV single trips per year					7,897	43
Total OD single trips per year					1,979	11

4.4.2 Operational Phase

Approach and Assumptions

The Proponent has provided preliminary estimates of the predicted traffic generated as a result of the operational phase of the Project. The data provided has originated from a number of different technical analyses and hence has had to be consolidated and summarised to provide equivalent yearly traffic volumes. The data which has been incorporated into this assessment is outlined below.

It is envisaged that operation personnel staff will peak during year 2019 with 1,367 operation personnel on site at one time. However in 2017, construction personnel of 450 will still be present on site, together with operation personnel of 1,265 totalling 1,715 personnel on site. For a 'worst case' scenario, 2017 total personnel values are to represent the peak operational year for this assessment.

From the collation of this data, it is apparent that within the 10 year design horizon required by the DTMR guidelines, the worst case scenario for traffic impact occurs in 2017 and hence this year has been used for further analysis to assess the worst case impacts on the road network.

A summary of the traffic volumes generated by operational activity as outlined in the provided data is shown in Table 4-5. Vehicles have been classified according to the AustRoads *Vehicle Classification System* which defines 12 classes to distinguish between the lengths (and size) of short, medium, long, medium combination and long combination vehicles. For the purposes of this assessment, Light Vehicles (LV) represent classes 1 to 3, Commercial Vehicles (CV) represent classes 4 to 10, and Over-Dimensional (OD) Vehicles represent classes 11, 12 and above.

Impacts of specific scheduling of activities have not been considered and will vary depending on the length of time required to complete each task. For this assessment all activities are assumed to occur concurrently and over the whole operational period.

4 Traffic Volumes

Table 4-5 Generated Peak Operational Traffic, 2017

Category	Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Network Vehicles (single trip) per year	Annual Vehicles (single trips)	AADT
1 Personnel						
1.1	FIFO	Internal Transport Mode	KC Airport	Accommodation	0	0
1.2	DIDO	LV (Class 1)	Alpha Town	Project Site	12,522	69
1.4	DIDO	LV (Class 1)	Barcaldine Council	Accommodation	892	5
1.6	DIDO	LV (Class 1)	Emerald	Accommodation	892	5
1.8	DIDO	LV (Class 1)	Clermont	Accommodation	892	5
2. Equipment						
2.1	New mining equipment	Standard Semi (Class 8)	Brisbane	Project Site	654	4
			Mackay	Project Site	654	4
			Rockhampton	Project Site	327	2
2.2	Replacement equipment (NB: generated vehicles are for 2017)	Standard Semi (Class 8)	Brisbane	Project Site	0	0
			Mackay	Project Site	0	0
			Rockhampton	Project Site	0	0

4 Traffic Volumes

Category	Vehicle Type (AustRoads Vehicle Class)	Origin	Destination	Network Vehicles (single trip) per year	Annual Vehicles (single trips)	AADT
3. Materials						
3.1	Construction materials	Standard Semi (Class 8) or 57kL tanker (Class 10) or 20t Capacity (Class 4 or 5)	Brisbane	Project Site	1444	8
3.2			Mackay	Project Site	1925	11
3.3			Gladstone	Project Site	963	5
3.4			Newcastle	Project Site	160	1
3.5			Wollongong	Project Site	160	1
3.2			Adelaide	Project Site	160	1
3.3						
4. Waste						
3.5	Non landfill waste & Lube waste	20t Capacity (Class 4 or 5)	Emerald	Project Site	698	4
		Total LV Single Trips per Year			15,199	83
		Total CV Single Trips per Year			7,145	39
		Total OD Single Trips per Year			0	0

4 Traffic Volumes

Distribution of Project Traffic

For the impact assessment, it is assumed that all generated traffic will use the existing road network.

A number of factors will influence the decision of which roads to utilise to access the Project site. Major considerations include:

- Road assessment, monitoring, maintenance and upgrade requirements;
- Travel time;
- Road safety; and
- Council and DTMR approval requirements.

It is assumed that all materials and equipment will be delivered to site via major highways to the local area. Within the local area, routes will be based on the most direct link available as travel time is often the predominant factor influencing transportation of bulk cargo.

Figure 4-1 and Figure 4-2 shows the proposed traffic distribution routes.

Mackay to Site

The majority of vehicle types will follow the Peak Downs Highway to Clermont, then the Gregory Highway to Emerald. From Emerald they will continue west along the Capricorn Highway to Clermont Alpha Road. Following the Clermont Alpha road, they will then turn left onto Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

LV accessing the site from the north will be required to continue south on the Clermont-Alpha Road and access the site from Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

Brisbane to Site

From Brisbane, general construction and personnel traffic will follow the Warrego Highway to Roma where it will turn north into the Carnarvon Highway and continue to Rolleston. At Rolleston, traffic will follow the Dawson Highway into the Gregory Highway towards Emerald where they will continue west along the Capricorn Highway to Clermont Alpha Road. Travelling north along Clermont Alpha Road, they will then turn left onto Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

LV accessing the site from the north will be required to continue south on the Clermont-Alpha Road and access the site from Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

Gladstone and Rockhampton to Site

From Gladstone, traffic will follow the Bruce Highway to Rockhampton. At Rockhampton, traffic will follow the Capricorn Highway west to Alpha. Following the Clermont-Alpha road north from Alpha and access the site from Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

4 Traffic Volumes

Newcastle and Wollongong

From Newcastle and Wollongong, traffic would use route 32, 39 and 55, north to Roma, then continue north on route 55 to Rolleston, then the A7 north to Emerald. Then filter to the Capricorn Highway and then follow the highway east towards Alpha then north along Clermont-Alpha Road and access the site from Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

Adelaide

From Adelaide, it is anticipated that traffic would use route 32 to Dubbo (NSW), then head north via route 55 to Roma, then Rolleston, then the A7 north to Emerald. Then filter to the Capricorn Highway and then follow the highway east towards Alpha then north along Clermont-Alpha Road and access the site from Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

Regional Centres to Site

It is anticipated that personnel from the regional centres will follow one of the routes outlined above. Those personnel residing to the west of the project site are anticipated to filter to the Capricorn Highway and then follow the highway east towards Alpha then north along Clermont-Alpha Road and access the site from Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

Townsville Site

Should traffic come from Townsville, it is anticipated that general construction and personnel traffic will follow the Flinders Highway to Charters Towers where it will turn south and follow the Gregory Developmental Road to Clermont and Gregory Highway towards Emerald where they will continue west along the Capricorn Highway to Clermont Alpha Road. Travelling north along Clermont Alpha Road, they will then turn left onto Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

LV accessing the site from the north will be required to continue south on the Clermont-Alpha Road and access the site from Degulla Road leading into Jericho-Degulla Road to access the Project site via the access road.

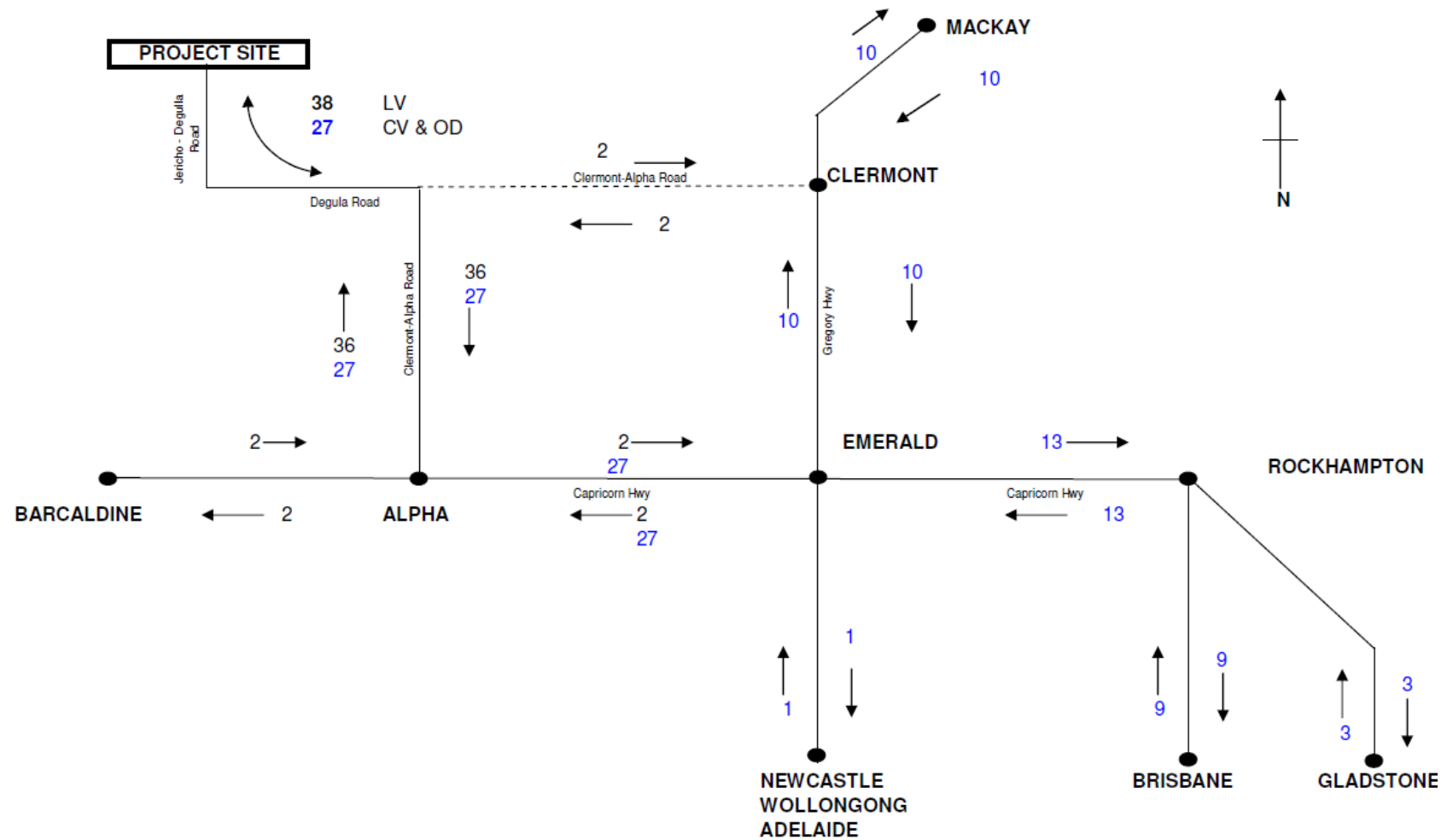
Traffic Assignment

From the above route designation and previous generated traffic calculations, Figure 4-1 and Figure 4-2 shows the appropriate traffic assignment and resulting AADT values for the 2014 construction and 2017 operational assessment scenarios respectively.

Figure 4-3, Figure 4-4 and Figure 4-5 present existing and predicted AADT traffic volumes for 2010, 2014 and 2017 respectively.

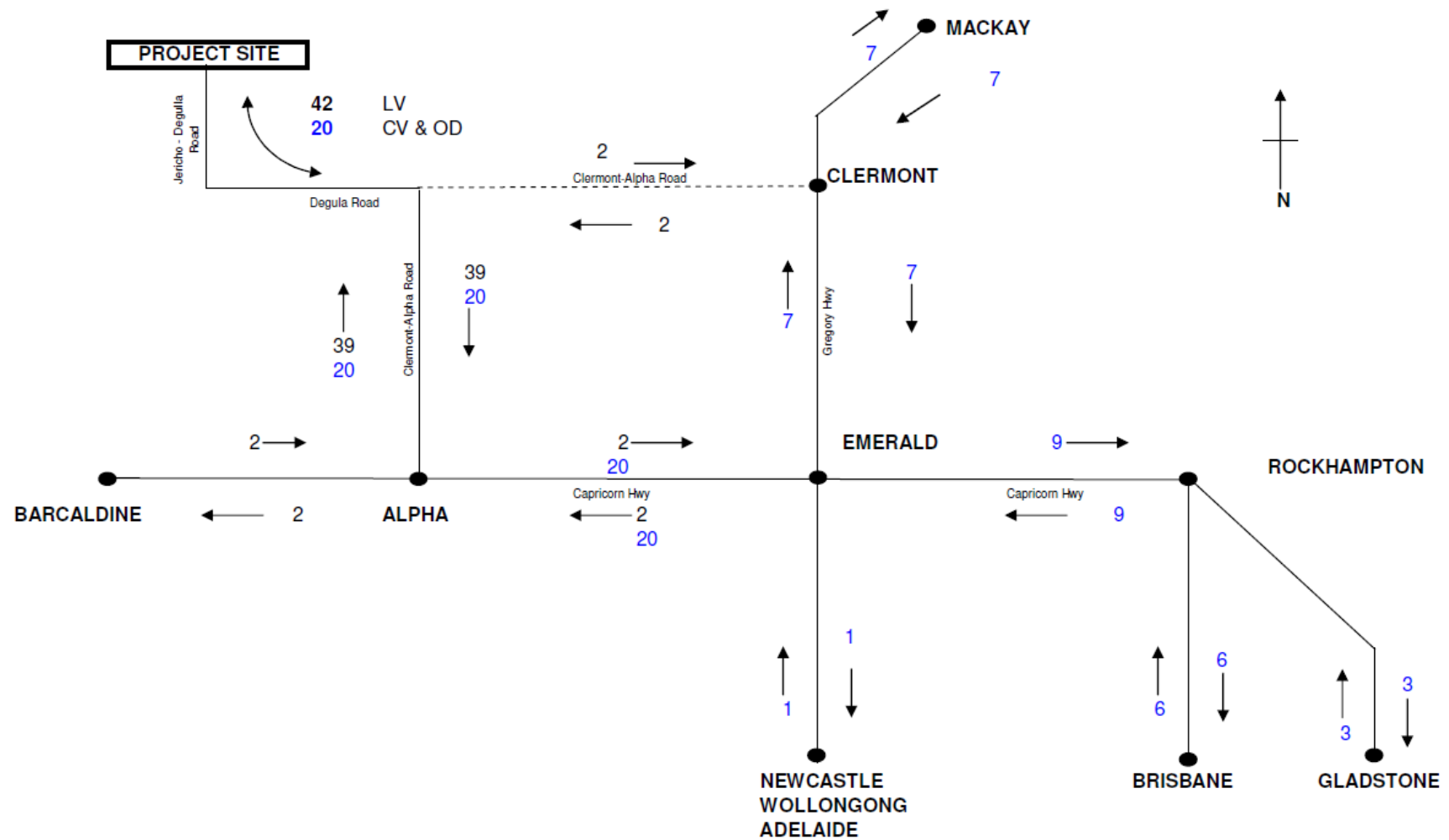
4 Traffic Volumes

Figure 4-1 Daily Single Direction Volumes for Construction Year 2014



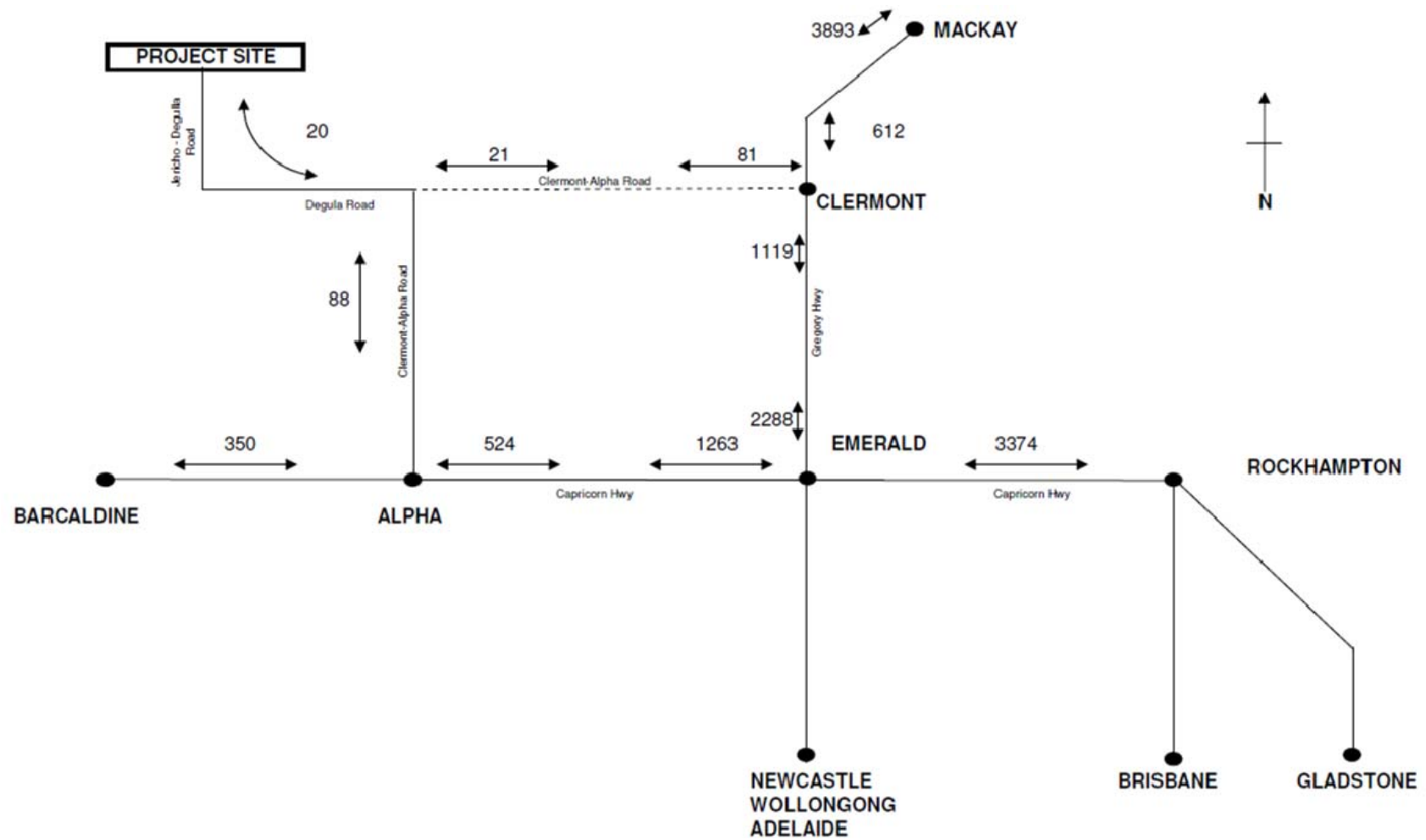
4 Traffic Volumes

Figure 4-2 Daily Single Direction Volumes for Operation Year 2017



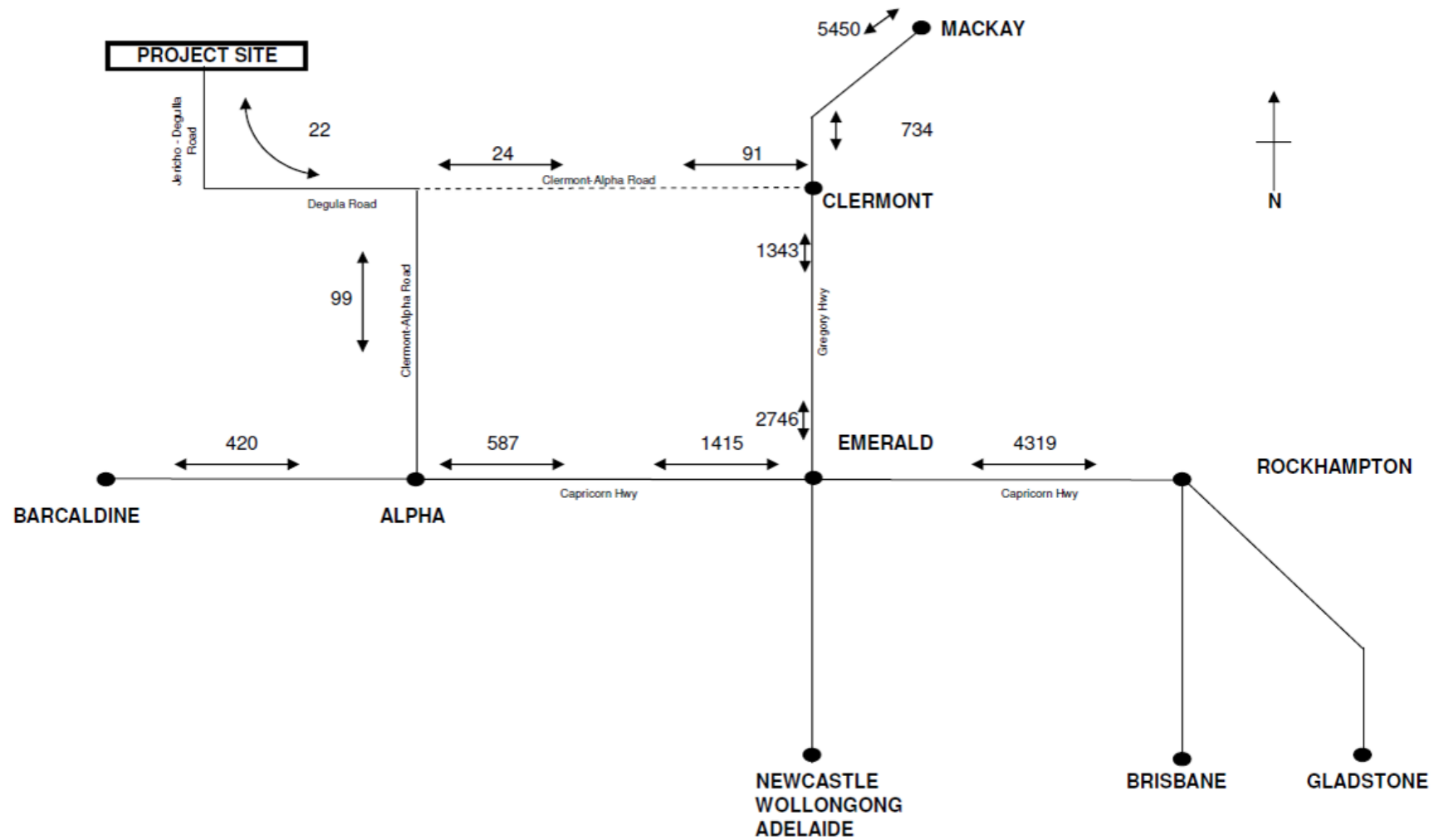
4 Traffic Volumes

Figure 4-3 2010 AADT Existing Year



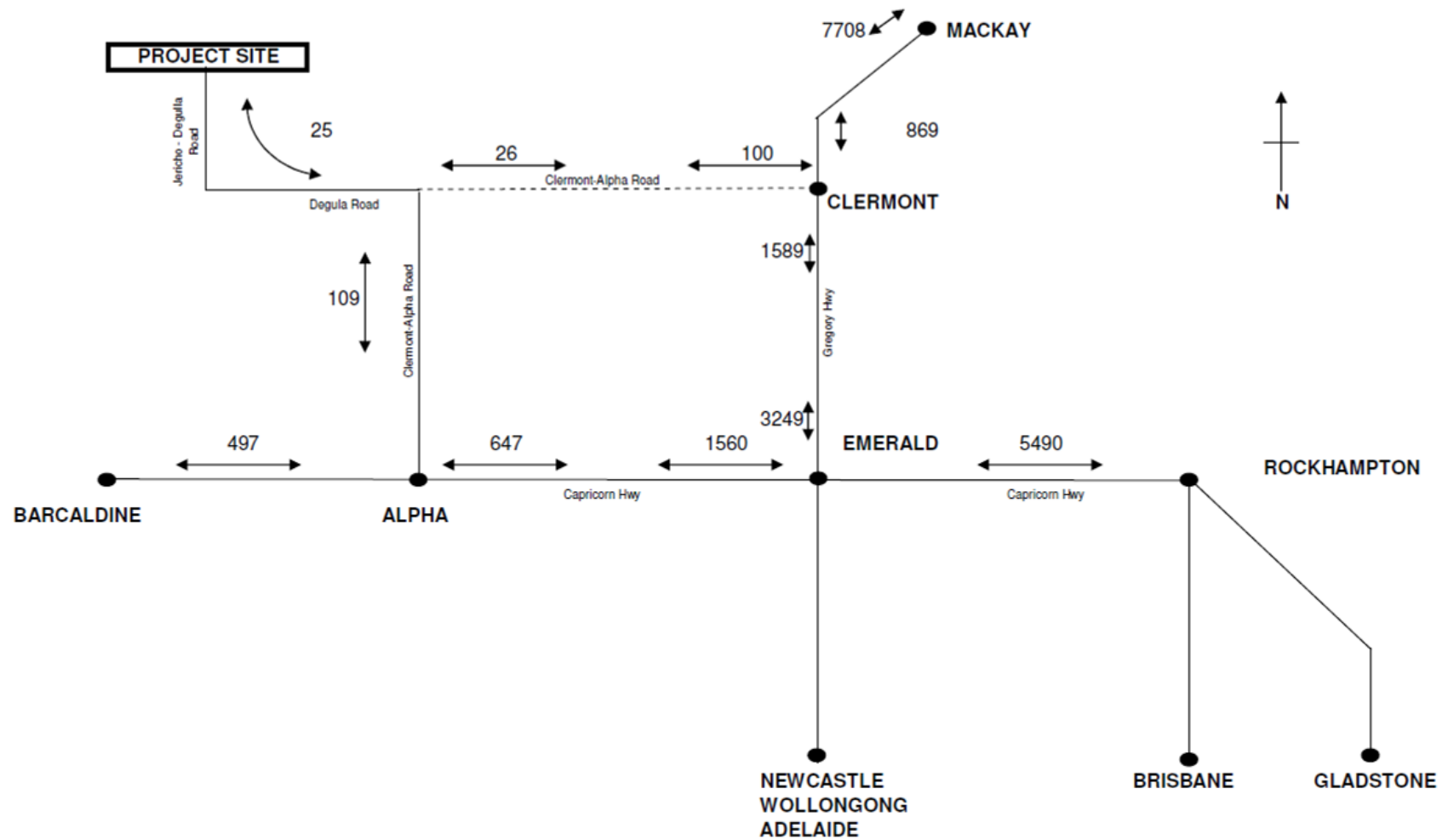
4 Traffic Volumes

Figure 4-4 2014 Future Year AADT (Background Traffic for Construction Year)



4 Traffic Volumes

Figure 4-5 2017 Future Year AADT (Background Traffic for Operation Year)



4 Traffic Volumes

4.5 Future Traffic Volumes

The total volume of traffic in the network in future assessment scenarios is determined by the following combining the future background traffic volume 'future year' with the Project's generated traffic together for the selected 'assessment year', i.e.

$$2014 \text{ Future Year} + 2014 \text{ Project Year} = 2014 \text{ Assessment Year}$$

As noted previously, the worst case scenarios within the 10 year design horizon occur at 2014 during the construction period and 2017 for the operational period. Both years have been assessed given the different vehicle routes and volumes required between the construction and operational phases.

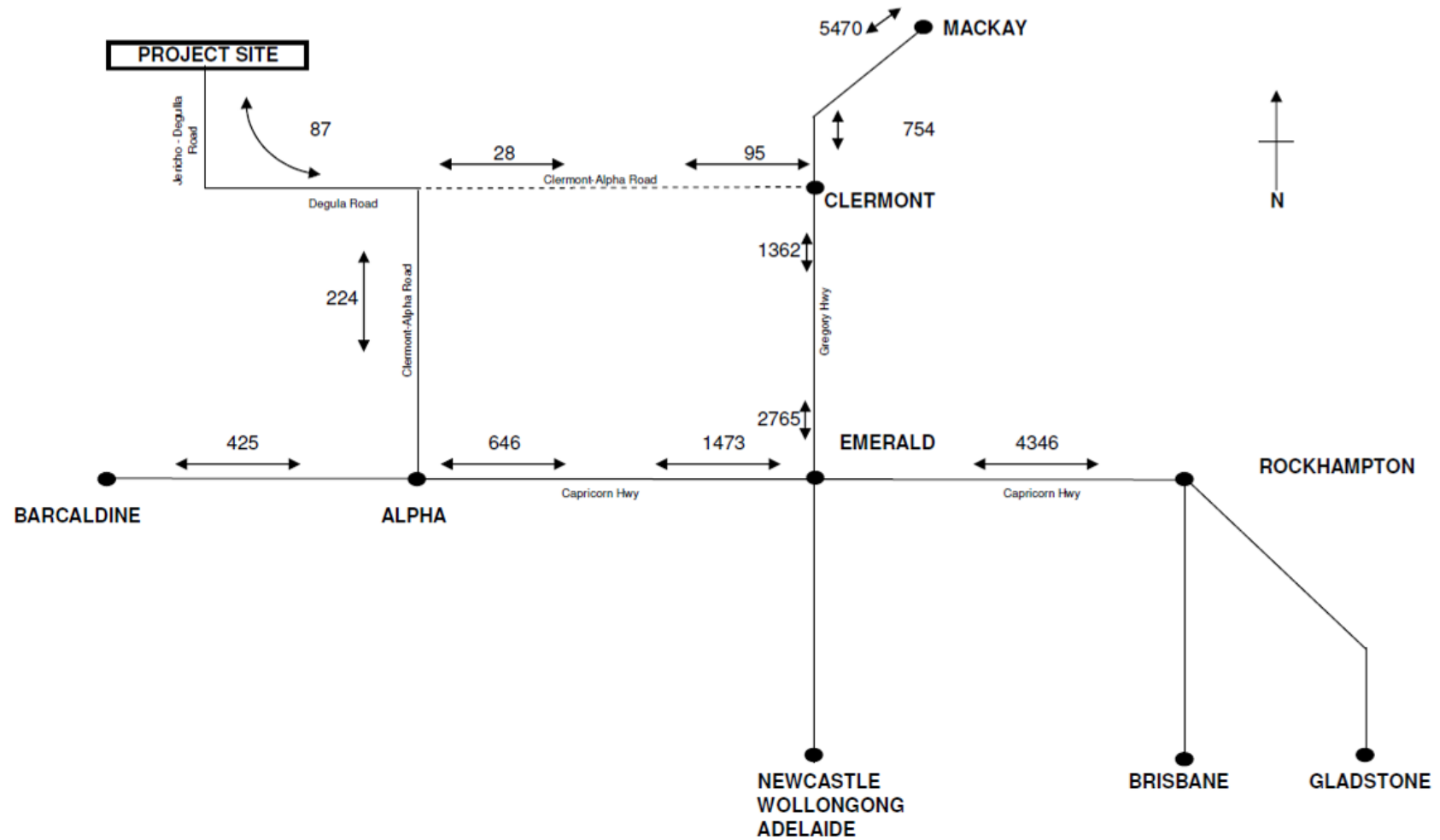
Figure 4-6 outlines the total future traffic volumes with Project development for 2014 (construction phase) and Figure 4-7 summarises the percentage increase caused by the generated traffic after assignment to the designated transport routes.

Figure 4-8 outlines the total future traffic volumes with Project development for 2017 (operation phase) and Figure 4-9 summarises percentage increase caused by the generated traffic after assignment to the designated transport routes.

In order to understand the impact proportion traffic generated from the Project will have on the 'background' traffic network, the 'assessment' year has been compared against the 'background' year as a percentage.

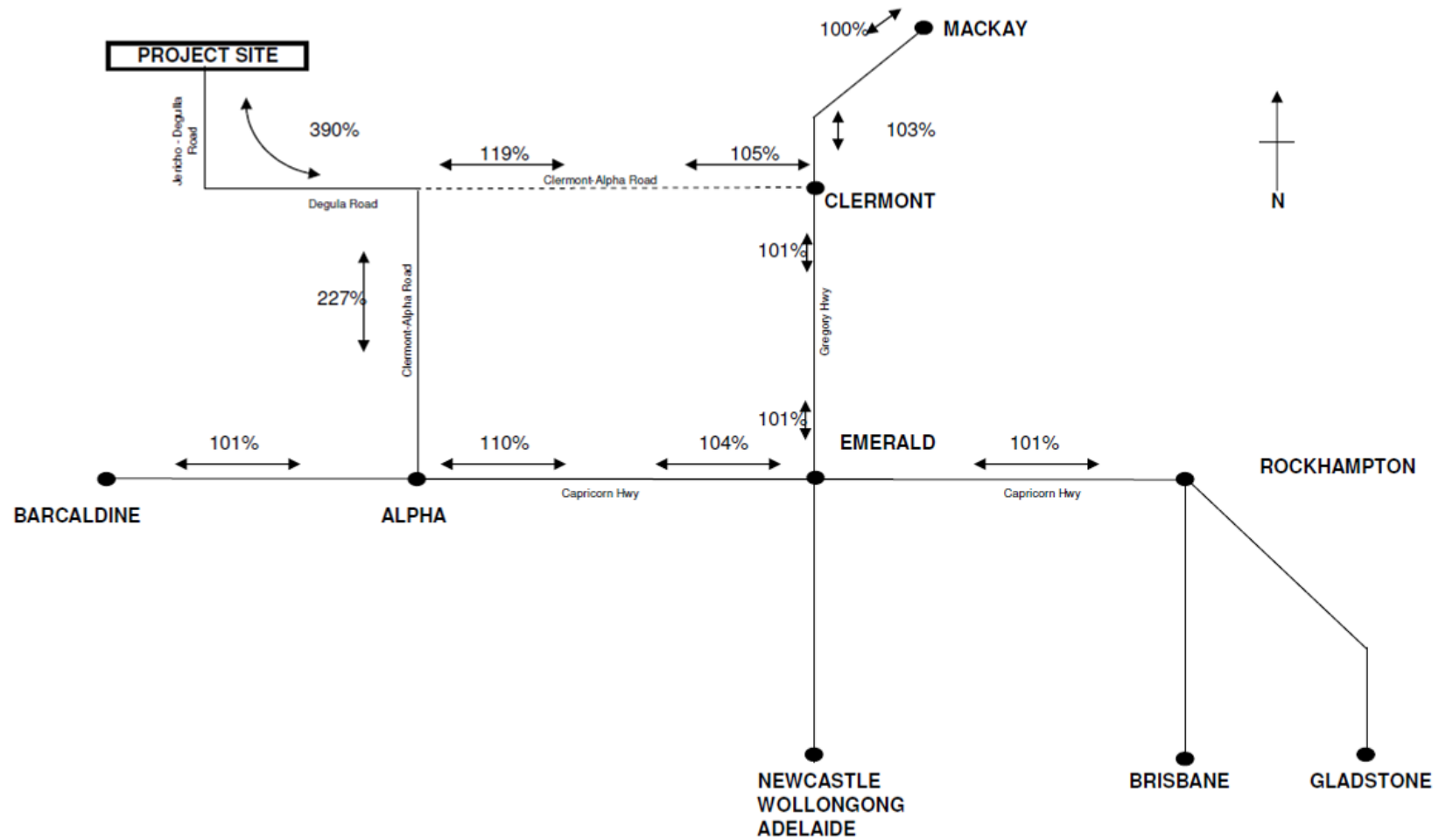
4 Traffic Volumes

Figure 4-6 2014 Assessment Year AADT (Construction Year)



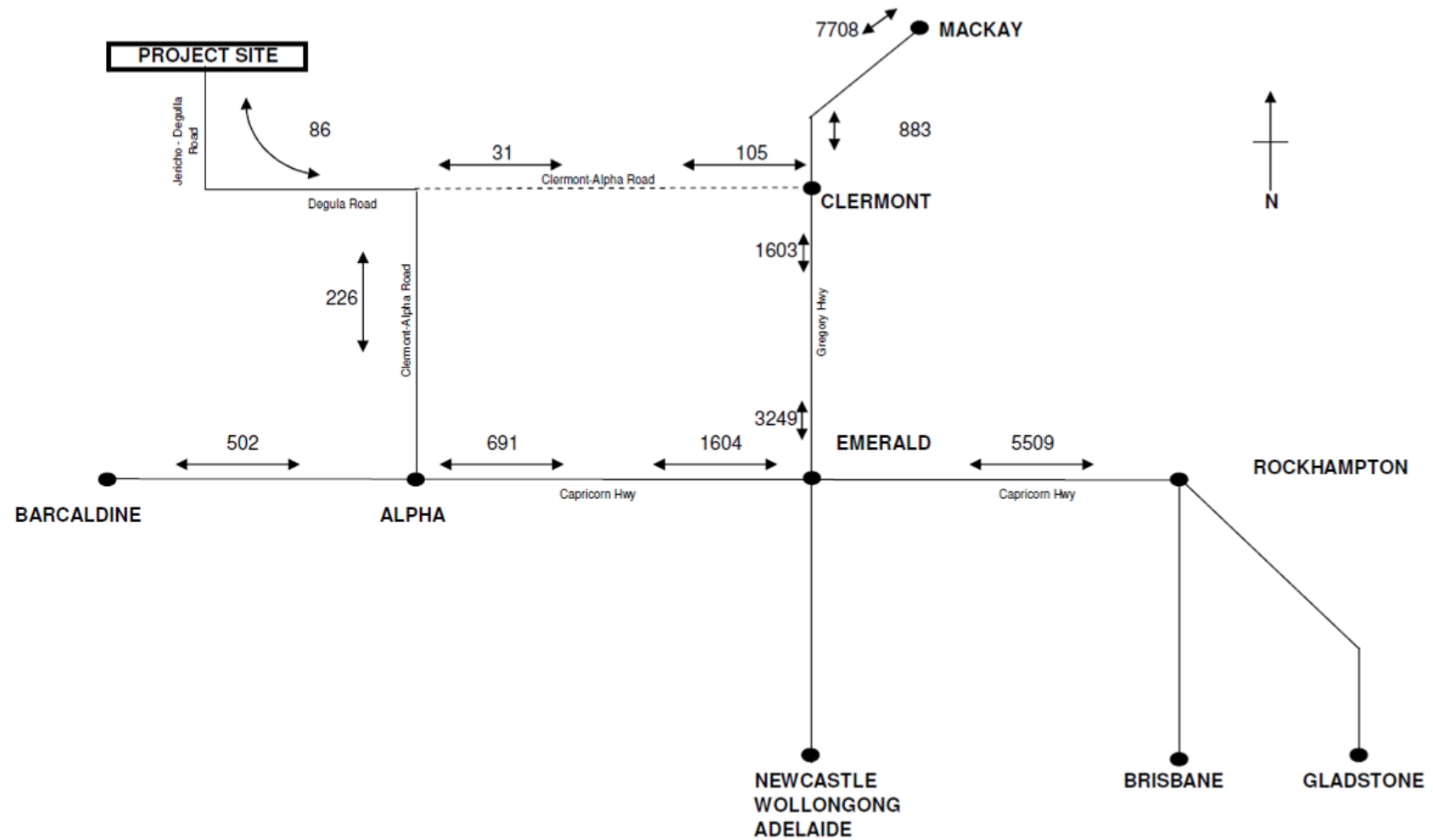
4 Traffic Volumes

Figure 4-7 2014 Traffic Impact (Operation Year)



4 Traffic Volumes

Figure 4-8 2017 Assessment Year AADT (Operation Year)



The map illustrates the Capricorn Highway project area, showing the route from Barcaldine to Rockhampton. Key locations and road segments are labeled:

- Locations:** BARCALDINE, ALPHA, CLERMONT, EMERALD, ROCKHAMPTON, MACKAY, BRISBANE, GLADSTONE, NEWCASTLE, WOLLONGONG, ADELAIDE.
- Road Segments and Distances:**
 - Jericho - Degulla Road: 348%
 - Degulla Road: 208%
 - Clermont-Alpha Road: 119%
 - Capricorn Hwy (Barcaldine to Alpha): 101%
 - Capricorn Hwy (Alpha to Emerald): 107%
 - Capricorn Hwy (Emerald to Rockhampton): 100%
 - Gregory Hwy (Emerald to Mackay): 101%
 - Gregory Hwy (Emerald to Newcastle/Wollongong/Adelaide): 100%
 - Rockhampton to Gladstone: 100%
 - Rockhampton to Brisbane: 100%
 - Rockhampton to Newcastle/Wollongong/Adelaide: 100%
 - Emerald to Mackay: 102%
 - Emerald to Rockhampton: 100%
 - Emerald to Newcastle/Wollongong/Adelaide: 100%
- Other Features:**
 - A north arrow pointing upwards.
 - A box labeled "PROJECT SITE" near the top left.
 - A dashed line connecting the Project Site to the Clermont-Alpha Road.

Pavement Impact Assessment

An initial assessment has been conducted to identify impacts that the Project will have on the pavement design life of affected roads. This section details this assessment and its findings.

5.1 Assessment Methodology, Scope and Assumptions

The DTMR 'Guidelines for the Assessment of Road Impacts of Development' (GARID) specifies that a pavement impact assessment should be completed when evaluating the full impact a development may have on the surrounding state controlled road (SCR) network. As per the GARID, the Central West Region DTMR office was contacted for guidance regarding the appropriate scope of the pavement assessment. We were advised that a normal assessment is required and to include bridges and major culverts.

Information provided for the DTMR roads includes:

- Pavement design life;
- Pavement age and width data;
- Maintenance costs;
- Proposed upgrades (referred to the Queensland Transport and Roads Investment Program (QTRIP); and
- 2010 or 2011 AADT values.

Barcaldine Regional Council was contacted regarding Hobartville and Degulla Roads. Barcaldine Regional Council advised that neither road is a high priority for Council; Degulla Road is classified as a category 2 road and is consists of naturally formed earth with gravel overlay in sections of approximately 50mm depth. Maintenance for the road is generally \$30 000 a year.

A site inspection was undertaken between the 1st and 3rd of March, 2011.

The underlying purpose of the pavement assessment is to assist DTMR to maintain the SCR network in a safe and functional condition and determine if the impact of the development requires the Proponent to contribute towards any unplanned upgrades or maintenance or to accelerate the progress of any DTMR planned future works.

Only pavement impacts directly attributable to the Project are required to be assessed in this process. All roads have been assessed against their existing condition as of March 2011.

5.2 Project Profile and Future Traffic Volumes

Refer to Sections 4 and 6 of this report for details of traffic volumes and the Project profile used in this assessment.

The GARID provides a set of "Underlying Principles" which includes at Principle 3 a comment that an increase in traffic on SCRs of less than 5% is deemed insignificant unless the increase actually provides a significant impact on an aspect of road performance.

Sections of SCR's with a traffic affect of more than 5% are the Clermont-Alpha Road from the Project to Clermont and the Clermont-Alpha Road from Alpha to the Project. These are considered further in the discussion below.

Jericho-Degulla Road and Degulla Road are not considered SCR as they are maintained by Barcaldine Regional Council. However, due to the increase in traffic volume and distribution they have been included in the analysis.

5 Pavement Impact Assessment

5.3 Impact Assessment and Estimated Contribution Requirements

5.3.1 Clermont-Alpha Road (180km)

A section of Clermont-Alpha Road, directly to the west of Clermont is sealed two lanes, with the following 180km to Alpha varying from single lane sealed to gravel pavements with some bridges and some concrete floodways.

The existing condition of this road, as provided by DTMR, shows that the pavement is an average of 14 years old, with a maximum of 29 years and a minimum of less than 1 year old. The design life for pavement in the Central West Region is 10 years for both rehabilitation and construction works. The width is reported to be an average of 8.2m, with a maximum of 11.6m and minimum of 3.7m.

There are few planned and future upgrades for Clermont-Alpha Road. The Roads Alliance 'Addendum to the Queensland Transport and Roads Investment Program 2010-2011 to 2013-2014' (Transport and Main Roads, November 2010) includes the following upgrades:

- Project Number 16/552/13; Sections 79.00 to 83.00km; Indicative total cost \$497 000; full Queensland Government contribution; approved for the 2011-2012 financial year; to undertake minor regrade.
- Project Number 16/552/14; Sections 75.00 to 79.00km; Indicative total cost \$526 000; full Queensland Government contribution; indicated to be in the 2012-2013 financial year; to undertake minor regrade.
- Project Number 16/552/16; Sections 35.00 to 38.00km; Indicative total cost \$604 000; full Queensland Government contribution; indicated to be in the 2013-2014 financial year; to undertake minor regrade.
- Project Number 16/552/17; the Belyando River; indicative total cost of \$10 200 000; full Queensland Government contribution; \$772 000 approved for the period to June 2012, remainder to be confirmed; to undertake a replacement of the bridge/s.

Maintenance for Clermont-Alpha Road is undertaken by maintenance providers under a Road Maintenance Performance Contract to the Queensland DTMR. Maintenance costs are \$2,116.72/km per annum.

Between Degulla Road and Clermont Township (120km)

The existing condition of Clermont-Alpha Road between Degulla Road and the township of Clermont is highly variable:

- The pavement ages range from 1 year to >45 years old;
- Pavement widths vary from one trafficable lane to three trafficable lanes; and
- Pavement surfaces are asphalt, concrete, formed gravel, and natural surfaces (light gravel or sand).

The proponent had advised that no commercial vehicles (CV's) will use Clermont-Alpha Road between Clermont and Degulla Road. A marginal increase in light vehicles is expected, however this is not considered significant.

5 Pavement Impact Assessment

Table 5-1 Clermont-Alpha Road between Clermont and Degulla Road AADT and Commercial Vehicle Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	81	14%		0%	81	11	14%
2014	91	14%	5	0%	95	13	14%
2017+	100	14%	5	0%	105	14	13%

¹ Construction traffic due to mining activities only

² Traffic due to mining activities only. Considered consistent after 2017

Sections of **Clermont-Alpha Road that are sealed** (approximately 21km) are generally in very good condition with pavement ages between 2 and 10 years. Given the marginal contribution of vehicles to this road segment, it is recommended that only routine maintenance will be required.

There are a number of sealed areas that require attention *as soon as possible* as they present a risk to existing users. These are not the responsibility of the Developer. These include:

- The causeway over Back Creek can flow very fast when the water is over 200mm deep. This causes a safety concern for existing road users, one local saying that she's seen vehicles being moved in the direction of flow at about 200mm depth. This causeway should be raised to provide safe access.
- The causeway over an un-signed creek approximately 25km west of Clermont has a significant hole on the south side. This is a significant safety concern given that it is very difficult to see if there is rain over the causeway. This should be mended as soon as possible.
- All culverts should be cleared of silt for them to be effective. The culverts were found to be in good condition, though most were filled with a significant amount of silt.

Sections of **Clermont-Alpha Road that are formed gravel** (approximately 30km) are in variable condition. These sections are between 3 and 10 years old, with a design life of 10 years. These sections showed some signs of pot holing, though likely due to the recent wet season. These sections should be maintained as soon as possible to extend their remaining life. If pot holes are filled, the marginal increase in light vehicles is unlikely to significantly affect these sections of the road.

Given the marginal contribution of vehicles to this road segment it is recommended that only routine maintenance will be required.

Sections of the **Clermont-Alpha Road that are natural surface** (approximately 69km) are also in variable condition. The age of the natural surface road is reported to be between 20 and 45 years. The condition of the naturally surfaced road is dependent upon the natural base:

- Approximately 8km is light gravel / sand over hard pack / rock – generally in good condition;
- Approximately 41km is light gravel over a sandy base – in low condition prior to rain, bad condition after rain; and
- Approximately 20km is sand over a sandy base – in okay condition prior to rain, very bad condition after rain.

5 Pavement Impact Assessment

During the site visit along the Clermont-Alpha Road rain swept through the area. Following an unloaded road train, the condition of the road became extremely slippery. The road train got bogged approximately 90km out of Clermont. Due to the marginal increase (2%) in light vehicles using this road segment, no work or maintenance is recommended on behalf of the Project.



The fast-flowing Back Creek after approx. 30mm rain



Unknown causeway with significant hole requiring immediate attention.



Gravel section in good condition



Gravel section requiring maintenance

5 Pavement Impact Assessment



Light gravel over sandy base after rain and one light vehicle



Light gravel over sandy base after rain and one road train



Light gravel over sandy base after rain and one road train



Bridge over Native Companion Creek should be completed to replace existing bridge



One lane bridge over Native Companion Creek requiring replacement (commenced as per previous photo)

5 Pavement Impact Assessment

Between Degulla Road and Hobartville Road (30km)

The existing condition of Clermont-Alpha Road between Degulla Road and Hobartville Road is generally quite good. Approximately 13km is gravel, 2.5km is sealed, and the rest is natural surface. There are isolated locations of softness around the culverts and low spots, but otherwise the road is in good condition.

The sealed sections are predominantly 1.5 lanes wide. This is sufficient for the existing traffic uses as there are significant hard shoulders through this section. The age of the pavement is mostly 3 to 5 years old, though the natural surface is at least 20 years old.

There is a culvert crossing approximately 15km north of Hobartville Road which is showing signs of degradation, see the photo below. This point is likely to degrade swiftly, potentially creating a significant hole in the carriageway. It should be maintained as soon as possible, though is not the responsibility of the Developer. Other culvert crossings and floodways along this section are in good condition.

Table 5-2 Clermont-Alpha Road between Degulla Road and Hobartville Road AADT and Commercial Vehicle Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	88	14%			88	3	14%
2014	99	14%	125	43%	224	67	30%
2017+	109	14%	118	34%	227	55	24%

¹ Construction traffic due to mining activities only

² Traffic due to mining activities only. Considered consistent after 2017

Given the increase in traffic, particularly commercial vehicles, it is recommended that this road segment be upgraded to a 2 lane all-weather surface.



Single Lane section of Clermont-Alpha Road between Degulla Road and Hobartville Road



Floodway approx. 15km north of Hobartville Road requiring maintenance

5 Pavement Impact Assessment

Between Hobartville Road and Alpha

The Clermont-Alpha Road between Alpha and Hobartville Road is predominantly sealed. The condition of this road is very good. There is an approximately 4 m section of surface degradation about 11 km north of Alpha which will require maintenance within the 2011 dry season to ensure it doesn't degrade further through the next wet season. This is an existing condition that should be maintained by the DTMR.

Table 5-3 Clermont-Alpha Road between Hobartville Road and Alpha AADT and Commercial Vehicle Distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	88	14%			88	3	14%
2014	99	14%	125	43%	224	67	30%
2017+	109	14%	118	34%	227	55	24%

¹ Construction traffic due to mining activities only

² Traffic due to mining activities only. Considered consistent after 2017

The short north-south section of the Clermont-Alpha Road will take most of the mine traffic and all of the commercial vehicles related to the mine. Throughout the construction period there is an expected increase of 16% commercial vehicles, while the operations the commercial vehicle content will increase compared with existing by 10%.

Given the existing good condition of the road, it is recommended that no additional works are required for the implementation of the Project. Anecdotal evidence suggests that this road segment regularly floods during the wet season. This should be investigated by the DTMR for potential upgrade. It is recommended that any upgrade of this road segment be attributable to the Project, if undertaken during the life of the Project, as it will facilitate unimpeded access to the Project site.

5.3.2 Jericho – Degulla & Degulla Road

Degulla Road is also a Barcaldine Regional Council Road. It is classified as a category 2 road as it is a thoroughfare between Alpha and Degulla. The maintenance budget for the 2010 / 2011 year is in the order of \$30 000.

Jericho-Degulla Road links is a less classified road and is considered a 'Rural Standard Road' use the route between Degulla and Cudmore Reserve. The condition of the road seemed in very good condition with adequate creek crossings and even ground surface.

A site visit revealed that little traffic currently uses these roads, though traffic counts were not provided by Barcaldine Regional Council. An estimate of 20 vehicles per day has been assumed for Degulla Road between Clermont-Alpha intersection and Degulla, this road on the basis of traffic noted during the site inspection. A robust commercial vehicle contribution of 30% has been assumed.

5 Pavement Impact Assessment

Table 5-4 Jericho-Degulla Road and Degulla Road AADT and Commercial Vehicle distribution

	Base Data		Mine Activity		Total Vehicles		
Year	AADT	% CVs	AADT	% CVs	AADT	No. CVs	% CVs
2010	20	30%			20	6	30%
2014	22	30%	65 ¹	42%	87	34	39%
2017+	25	30%	62 ²	33%	87	28	33%

¹ Construction traffic due to mining activities only

² Traffic due to mining activities only. Considered consistent after 2017

It can be seen from the table above that there is a significant increase in the number of vehicles using both Jericho-Degulla Road and Degulla Road, during both construction and operation of the Project. The added vehicles are both commercial and light vehicles.

It is recommended that both Jericho-Degulla Road and Degulla Road be upgraded to an all weather surface between the Clermont-Alpha Road and the Project site.



Indicative road condition for the Degulla Road (left) and Jericho – Degulla Road (right)

5.4 Recommended Works

The following is a summary of the recommended works for the roads affected by the Project development:

- Clermont-Alpha Road between Alpha and Hobartville Road
 - No works recommended as a result of the Project.
- Clermont-Alpha Road between Hobartville Road and Degulla Road
 - Upgrade of road segment to a consistent two-lane all-weather surface.
- Clermont-Alpha Road between Degulla Road and Clermont
 - No works recommended as a result of the Project.
- Hobartville Road
 - No works recommended as a result of the Project.

5 Pavement Impact Assessment

- Jericho-Degulla & Degulla Road
 - Upgrade to an all weather surface between Clermont-Alpha Road and the Project site;
 - Upgrade of intersection of Clermont-Alpha Road and Degulla Road;
 - Upgrade of intersection of Jericho-Degulla/ Degulla Road and Hobartville Road.

These upgrades are recommended to be considered in conjunction with the neighbouring Alpha Coal project upgrades (including proposed bypasses and road closures).

5.5 Further Investigation and Current Agreements

Further investigation is recommended for the following segments:

- The Clermont-Alpha Road between Hobartville Road and Alpha is subject to flooding. This is an existing condition that the developer should investigate prior to committing all commercial vehicles to use this road segment.

The existing condition if the Clermont-Alpha Road between Clermont and Degulla Road should be investigated by the DTMR. It is recommended this is not the responsibility of the Proponent given the insignificant light vehicle increase due to the Project.

Road Network Performance

This section analyses the road network from a traffic performance perspective at both midblock (road links) and intersection locations.

6.1 Network Assessment Requirements

DTMR's 'Guidelines for the Assessment of Road Impacts of Developments' states that;

'...traffic operation impacts need to be considered for any State Controlled Roads where the construction or operational traffic generated by a proposed development equals or exceeds 5% of the existing AADT on the road section, intersection movements or turning movements.'

Based on the figures previously shown in Figures 4-7 & 4-9, the following justification for selecting the scope of assessment is as follows:

Roads and Intersections Included in Assessment

- Degulla Road & Jericho-Degulla Road – Not a state controlled road, however included in assessment based on increased development generation traffic;
- Clermont-Alpha Road – Above 5% criteria threshold;
- Capricorn Highway (Alpha to Gemfields section) – Above 5% criteria threshold;
- Intersection of Clermont-Alpha Road and Capricorn Highway – Above 5% criteria threshold;
- Capricorn Highway excluding Alpha to Gemfields section - Above 5% threshold.

Roads and Intersections Not Included in Assessment

- Intersection of Capricorn Highway and Gregory Highway – Equal to 5% threshold;
- Peak Downs Highway (to Mackay) – below 5% criteria threshold.
- Gregory Highway – below the 5% criteria threshold.

Based on previous discussions, assessment has taken place for the 2014 construction phase and 2017 operational phase scenarios, as these present the worst cases for traffic impacts this assessment is considered a robust scenario.

It should be noted that only road-based transport is considered for OD vehicles as part of the Kevin's Corner EIS – refer to the Alpha Rail EIS for all rail associated transport.

6.2 Road Links Assessment

6.2.1 Analysis Method and Required Performance Criteria

In accordance with the DTMR guidelines, road links were assessed based on a measure of Level of Service (LOS).

LOS is an index of the operational performance of traffic on a given traffic lane, carriageway, road or intersection, based on service measures such as speed, travel time, delay and degree of saturation during a given flow period.

In general there are six levels of service, designated from A to F, with LOS A representing free flowing traffic with no delays and LOS F being congested with no flow and major delays. A LOS up to LOS C is generally considered acceptable in road design.

6 Road Network Performance

The DTMR guidelines require that a minimum standard of LOS C is maintained, but LOS D may be acceptable under certain conditions. In general, remedial measures are sought to maintain existing LOS on rural roads.

The assessment of LOS for the road network in question has been completed using the methodology detailed in the AustRoads 'Guide to Traffic Engineering Practice Part 2 – Roadway Capacity'.

6.2.2 Assumptions and Analysis

Whilst the methodology used is suitable for the Capricorn Highway and results in no impact on LOS for the 2014 and 2017 'With Project' scenarios, there is little information available to provide standard guidelines for the assessment on narrow or unpaved rural roads such as Jericho - Degulla Road and Clermont-Alpha Roads.

Therefore, the following methodology has been adapted from the guidelines for use in assessing these two roads.

For a standard two lane, two-way rural road, the appropriate threshold for LOS A is 2,000 AADT on level terrain. Using a factor of 0.5 to account for unpaved roads and an additional 0.5 factor for single lane roads, the resulting threshold for LOS A would be 500 AADT. Additionally, if the terrain is classified as 'rolling' the resulting threshold for LOS A would be 225 AADT. The maximum AADT value on these unpaved or narrow rural roads in the assessment is 200 and hence all can be classified as having a LOS A.

Table 6-1 and Table 6-2 summarise the assessment of the road links during the 2014 and 2017 assessment years respectively.

6.2.3 Summary of Road Link Impact Assessment

The analysis shows that the additional average daily traffic generated by the Project using peak transport estimates is minimal in comparison to the capacity of the road network. Therefore, the Project will not have a significant impact on the road link performance based on a LOS measurement.

Whilst from a road network performance perspective, there are no significant impacts created by the Project, additional considerations such as safety, pavement design life and road use management may be relevant in the overall impact of the Project and are discussed in Section 7-1.

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Table 6-1 Road link assessment - Level of Service (LOS) during Construction Phase (2014)

Road Segment	K Factor		Existing 2010		Projected 2014			
	Surveyed	Assumed	AADT	LOS	Without Project		With Project	
					AADT	LOS	AADT	LOS
Degulla Road								
Clermont Alpha Road to Site	-	0.12	20*	A	22	A	87	A
Clermont-Alpha Road								
Alpha to Degulla Road	-	0.12	88	A	99	A	224	A
Degulla Road to Mistake Creek	-	0.12	21	A	24	A	28	A
Mistake Creek to Clermont	-	0.12	81	A	91	A	95	A
Capricorn Highway								
Alpha to Gemfields	.09 to .12	0.11	524	A	587	A	646	A

Note: K Factor is the ratio of the AADT volume to the design hourly peak volume. Typical K factors for rural roads range from 0.10 to 0.15.

* No existing AADT on Jericho-Degulla Road and Degulla Road available, estimated based on site observations

Table 6-2 Road link assessment - Level of Service (LOS) during Operational Phase (2017)

Road Segment	K Factor		Existing 2010		Projected 2017			
	Surveyed	Assumed	AADT	LOS	Without Project		With Project	
					AADT	LOS	AADT	LOS
Degulla Road								
Clermont Alpha Road to Site	-	0.12	20*	A	25	A	86	A
Clermont-Alpha Road								
Alpha to Mistake Creek	-	0.12	88	A	109	A	226	A
Degulla Road – Mistake Creek	-	0.12	21	A	26	A	31	A
Mistake Creek to Clermont	-	0.12	81	A	100	A	105	A
Capricorn Highway								
Alpha to Gemfields	.09 to .12	0.11	524	A	647	A	691	A

Note: K Factor is the ratio of the AADT volume to the design hourly peak volume. Typical K factors for rural roads range from 0.10 to 0.15.

* No existing AADT on Jericho-Degulla Road and Degulla Road available, estimated based on site observations

6.3 Intersection Assessment

6.3.1 Analysis Method and Required Performance Criteria

The DTMR guidelines state that intersections should be assessed against the performance criteria of Degree of Saturation (DOS). For unsignalised intersections, the key indicator of DOS is the utilisation ratio of individual turning movements within the intersection. Utilisation ratio is expressed as demand volume/capacity ratio for entering movements.

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The DTMR guidelines suggest that the minimum required utilisation ratio or DOS for unsignalised intersections is 0.8. Above this value, the intersection is considered to be nearing its practical capacity and upgrade works may be required. At near capacity users are likely to encounter increased delays and queues.

The computer program Signalised & Unsignalised Intersection Design and Research Aid (SIDRA) Intersection 5.0 is a commonly used intersection analysis software package, which uses traffic volumes, intersection geometry and intersection control (e.g. signals, roundabouts etc) to determine intersection operational performance. It has been developed to assist traffic engineers in determining the performance of intersections based on algorithms and technical analysis techniques. SIDRA has the ability to analyse both signalised and unsignalised intersections.

The SIDRA modelling package was used to analyse the existing (2009) and future performance of the road network for both the future year and assessment year scenarios for the intersection of Clermont-Alpha Road and Capricorn Highway in Alpha (Unsignalised 4 way Intersection).

A new intersection will need to be constructed to access the Project site from Jericho - Degulla Road. This new intersection has not been modelled due to the extremely low volume of traffic on these roads and the fact the intersection will be designed to all required standards and to minimise any impact on the existing road network.

The DOS for each approach of the intersections has been used as a guide to determine the baseline characteristics of the existing performance of the intersections. This information can then be used as a comparison with the anticipated construction vehicle movements to determine the traffic impact of the development.

It should be noted that the worst case results for DOS may come from different movements or movements in which traffic volumes have not been increased by the Project in the same model. This is due to the interaction between traffic volumes, movement priorities and geometric layouts of each intersection.

Traffic Volumes

Existing turning movement volume data was provided by DTMR for this intersection over the period 7.30am to 6.00pm on Wednesday 6 August 2009. From this data it was determined that for the overall volume of traffic entering the intersection, the relevant AM and PM peak hours were between 7.45am to 8.45am and 4.15pm to 5.15pm. The percentage of CV's for each leg was also provided.

These peak hours and peak hour volumes have been used in the analysis for the existing performance levels.

To reiterate, years 2014 and 2017 scenarios have been assessed as traffic patterns differ between the construction and operational phases. These two scenarios represent the worst case for both phases.

For the 2014 and 2017 future year background traffic volumes scenario, the existing 2009 turning movement volumes were extrapolated using the proposed growth rates as discussed previously. CV percentages remain the same as the existing conditions.

These volumes were then added to the additional traffic generated by the Project to the relevant movements, based on the traffic distribution outlined in Section 4 and the following assumptions:

6 Road Network Performance

- All CV deliveries are expected to occur over a 10 hour period each day and therefore, 10% of the total daily volume of CV trips will occur in any one hour period, including each peak hour period;
- All DIDO trips between Clermont, Emerald and Barcaldine and the mine Accommodation facilities will occur during the peak hour; and
- For a robust analysis, all DIDO trips will occur towards the mine site in the AM peak and away from the mine site in the PM peak period – two-way trips for CV and OD vehicles will occur during both peak periods.

The movements which additional traffic is added are the North-West and West-North turning movements, and the South-North and North - South through movements.

Table 6-3 and 6-4 summarise the outcome of this analysis based on the worst performing movement, with full SIDRA outcome reports available in Appendix A to this report.

6.3.2 Capricorn Highway and Clermont-Alpha Road Intersection, Alpha

Intersection Geometry and Control

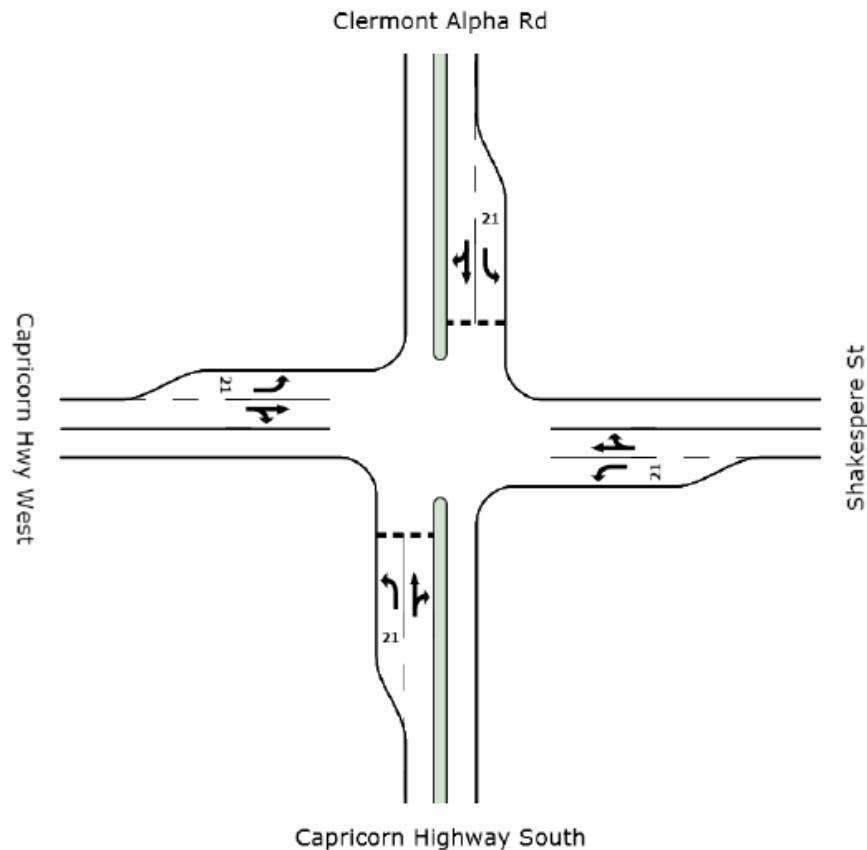
To assist in modelling this intersection DTMR provided intersection layout plans, which show the geometric layout of the intersection. Geometry for the intersection was also sourced from publicly available aerial photographs.

The intersection is classified as an unsignalised 4-way, give way intersection, with the major road running in an east-west direction. Traffic entering the main road from the northern and southern legs are controlled by give-way signs.

SIDRA output showing the layout of this intersection is provided in Figure 6-1.

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Figure 6-1 Capricorn Highway and Clermont-Alpha Road Intersection Layout



Traffic Volumes

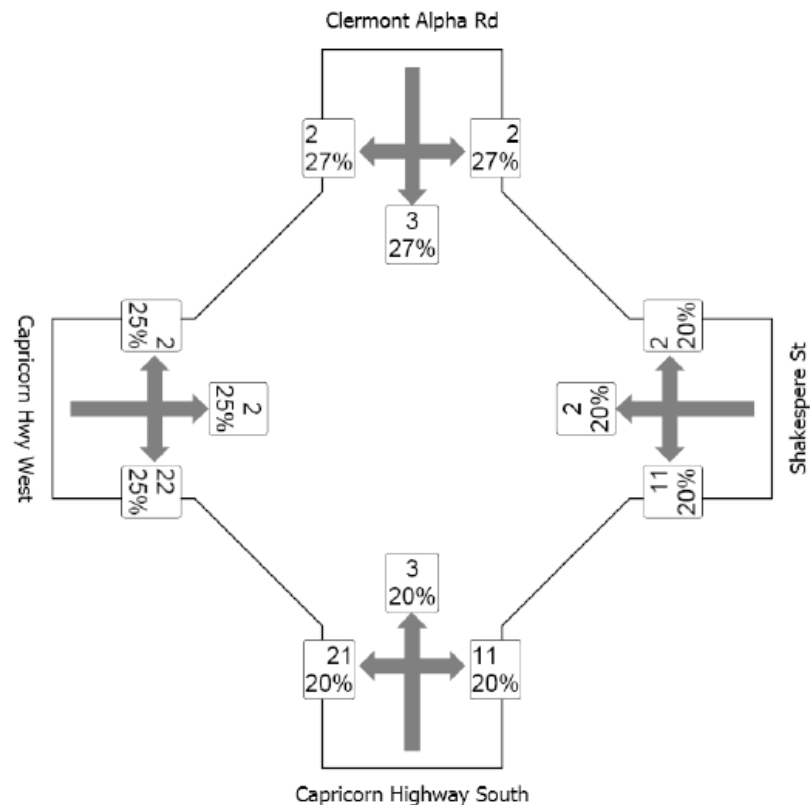
Existing turning movement volume data was not available for this intersection. 2009 midblock AADT data was used to determine the volume of traffic entering the intersection at each leg and the percentage of commercial vehicles, although no data was available for the western leg. AADT data was converted to Design Hourly Volumes (DHV) using a K factor of 0.12, which is consistent with rural roads. This means that approximately 12% of AADT volumes are expected to occur within the peak hours.

From on-site observations, it was determined that the major movement is the south-east turn following the Capricorn Highway. Utilising on-site observations, knowledge of the surrounding land use and usage patterns of each road, the AADT data was split into turning movements.

Figure 6-2 shows the estimated turning movements used for this assessment showing total vehicles and the percentage of commercial vehicles.

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Figure 6-2 Capricorn Highway and Clermont-Alpha Road Intersection - Estimated Turning Movement Volumes



It was considered appropriate to assess both the 2014 and 2017 scenarios as the traffic patterns differ and between the construction and operational phases. These two scenarios represent the worst case for both phases.

For 2014 and 2017 'future year' scenarios, the existing 2009 turning movement volumes were extrapolated using the proposed growth rates as discussed previously. CV percentages remain the same as the existing conditions.

The 2014 and 2017 'assessment year' scenarios then add the additional traffic generated by the Project to the relevant movements, based on the traffic distribution outlined in Section 4 and the following assumptions.

- All light vehicle movements from Alpha to the Project site will occur outside of peak hours and are not included in this assessment. This is due to the shift hours of 7am to 7pm, with light vehicles expected to commute in the half hours before and after shift times.
- All CV deliveries are expected to occur over a 10 hour period each day and therefore, 10% of the total daily volume of CV trips will occur in any one hour period, including each peak hour period.
- All DIDO trips between Clermont, Emerald and Barcaldine and the mine Accommodation facilities will occur during the peak hour; and
- For the worst case scenario analysis, DIDO trips will occur towards the Project site in the AM peak and away from the mine site in the PM peak period – return trips for CV and OD trips will occur during both peak periods.

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The movements to which additional traffic are added are the North-West turning movement, the West-North, the North-South through movement and the South-North turning movement.

Table 6-3 and Table 6-4 summarise the outcome of the SIDRA analysis based on the worst performing movement, with full reports available in Appendix A.

Table 6-3 Capricorn Highway and Clermont-Alpha Road Intersection Assessment - SIDRA Summary AM

	2009	2014 - Construction			2017 - Operation		
	Existing	Without Project	With Project	Incremental Impact	Without Project	With Project	Incremental Impact
Critical Movement	South-West		North-South		South to East (Right Turn)		
DOS	0.030	0.042	0.220	0.178	0.050	0.196	0.146
Average Delay (sec)	9	9	11	2	9	10	1
Queue Length (m)	< 1 car	< 1 car	2 car	1	< 1 car	< 2 car	1

Table 6-4 Capricorn Highway and Clermont-Alpha Road Intersection Assessment - SIDRA Summary PM

	2009	2014 - Construction			2017 - Operation		
	Existing	Without Project	With Project	Incremental Impact	Without Project	With Project	Incremental Impact
Critical Movement	South-West		North to South		North to West (Right Turn)		
DOS	0.030	0.042	0.225	0.183	0.050	0.200	0.150
Average Delay (sec)	9	9	11	2	9	10	1
Queue Length (m)	< 1 car	< 1 car	2 car	Approx 4	< 1 car	< 2 car	1

These results show that for each assessment year, the Project has minimal incremental impact on the intersection performance levels when compared to the 'future year' scenarios.

The results also show that this intersection is anticipated to operate well within DTMR's standard DOS performance criteria of a DOS of 0.8 during the assessed project life period. Therefore no upgrade works are required from a performance perspective.

6.3.3 Summary of Intersection Impact Assessment

The analysis shows that the additional peak hourly traffic generated by the Project using peak transport estimates does not produce any significant incremental impacts on the performance of the nominated intersections.

It should be noted that the CV and OD vehicle content during construction phase used in this assessment has been based on Alpha Project (Mine) construction traffic generations estimations. As Kevin's Corner is partly underground, it is envisaged that less equipment requiring oversized transporters will be required for traffic associated with the mobilisation of mining equipment. Therefore, with the high proportion of OD vehicles included, this analysis is considered a robust scenario.

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The Capricorn Highway is anticipated to operate slightly above DTMR's standard DOS performance criteria during the overall operation period, however this is expected to be only temporary in nature. Further investigation in the Road-Use Management Plan needs to be undertaken (i.e. refinement of traffic volumes) to determine whether any minor, temporary intersection upgrades are required.

Whilst from a intersection performance perspective, there are no significant incremental impacts created by the Project, additional considerations such as safety and road use management may be relevant in the overall impact of the Section 7-1.

Road Use Considerations

This section summarises a number of transport management issues that need to be considered as planning and implementation of the project proceeds.

7.1 Road Use Management

Transport to and from the Project site has the potential to impact on the community and appropriate road use management should be in place to manage or mitigate potential impacts. This should be defined in a detailed Road-Use Management Plan, which should cover:

- Permit conditions – standard conditions for Queensland apply for Over Dimensional vehicles and dangerous goods;
- Passing space for large vehicles on narrow roads or unsealed sections;
- Wet weather operations;
- Unfenced stock on roads;
- Designated routes, operating times, curfews, etc;
- Protocols for potential coal product spills;
- Signage, e.g. for narrow cattle gates or other potential hazards;
- Lighting; and
- Washdown facilities.

A draft structure of the Road-Use Management Plan is provided in section 8.1.4.

7.2 Planning

Extraction of coal in the Galilee Basin by this and other new mines will generate additional regional development, to support the mining activities. Planning for long-term traffic growth in the vicinity of the Project site and the broader access routes has been taken into account in the traffic analysis as described in Section 1.3.4 of the Environmental Impact Statement.

7.3 Noise

Traffic generates noise and therefore additional traffic generated by the proposed mine development will create additional traffic noise both at the Project site and along the roads used to travel to the site. The impacts of traffic-generated noise are assessed within Volume 2, Appendix P and discussed in Section 15 of this EIS.

7.4 Dust

Dust generation by vehicles on the project site or travelling/delivering to the site should be mitigated to the extent feasible as it impacts on nearby homesteads and has the potential to cause a safety issue for sight distances due to obscuration, particularly on unsealed roads. Air quality impacts, included dust, are assessed within Volume 1, Section 13 and Volume 2, Appendix O of the EIS. Appropriate mitigation measures form part of the Environmental Management Plan as outlined in Volume 2, Appendix W of this EIS.

7.5 Flood Control

The impacts of road infrastructure within the mining lease area on surface water flow regimes are covered in Volume 2, Appendix M2 and discussed in Section 11 of this EIS. It should be noted that

7 Road Use Considerations

flooding is an occasional event and may close sections of roads and lead to damage of roads. The EMP should include a risk assessment and appropriate management measures to deal with the consequences of a flooding event.

7.6 Roadworks in Road Reserve

It is possible that there will be requirements for works in road reserves along the access routes to the development site (e.g. to accommodate over dimensional loads – see following sections below). Appropriate work plans which should cover the relevant permits required for such works and management of associated issues such as land disturbance, drainage impacts and impact on structures will be prepared for such works and presented in the EMP.

7.7 On-site Parking, Circulation and Vehicle Separation

Access to the Project site will be required from existing roads and it is assumed that some form of control/security gating will be installed at the entrance to the site. The configuration of the access must take into account the volume and swept path of vehicles that access and egress the site – particularly with regards to the large proportion of commercial vehicles.

The internal road layout within the site should take into consideration that a large number of commercial vehicle and bus movements (to and from on-site airport) will occur within the site. A continuous circulating internal road layout could be employed in order to reduce the likelihood of commercial vehicles being required to perform reversing or turning movements. Continuous circulation may include providing a one-way direction at all times or allowing ample space for large vehicles to safely perform a u-turn movement (without the need to do three-point turns).

Commercial vehicles will generally be performing through movements within the site whereby they will be delivering or picking up certain materials and continuing on to their destination. Buses and cars, on the other hand, will mainly be used for personal travel and will be situated at the site for extended durations. The mix of vehicles increases the safety risk of circulating traffic within the site and it is therefore suggested that commercial vehicle through movements be separated from bus and car movements to reduce the possibility for vehicle interactions. Once buses and cars have parked within the site, they will generate pedestrians. The safety and circulation of pedestrians within the development must also be taken into consideration and, where possible, conflict points should be avoided or appropriately managed (i.e. adequate visibility at pedestrian crossing locations).

Car parking within the site should be designed to provide adequate parking for cars, buses and commercial vehicles.

Articulated trucks and buses (not including road trains) have a swept path with a 26 m radius and this should be considered when designing 90 degree parking bays. This need for safe turning areas can be minimised by using 45 degree angle parking bays for large vehicles.

It is assumed that parking provision will be required for only a small proportion of commercial vehicles, as the majority will be completing round trips, with loading and unloading occurring on site before moving to their next location. Commercial vehicles should be accommodated within an off-site depot outside working hours and for maintenance purposes. This will ensure space on site is used efficiently.

Similarly, bus parking needs can be minimised by providing a circulation route within the site to drop off and pick up employees. Buses can then be stored at a dedicated facility until required. These

7 Road Use Considerations

needs may be filled through the use of a subcontract whereby buses can be provided as needed and then used for other purposes when not required. The provision of a number of bus stops within the site will also minimise pedestrian movements required to increase safety.

Provision will also be needed for some visitor car parking near the main site office.

A general guide for car parking space is 25 m² per car which allows safe circulation space. Commercial vehicle and bus parking area can vary according to configurations, but as a guide should be in the order of 170 – 250 m² per vehicle.

The design of car parking facilities should consider the Australian Standards for Parking Facilities:

- AS 2890.1:2004 Parking facilities Part 1: Off-street car parking; and
- AS 2890.2:2002 Parking facilities Part 2: Off-street commercial vehicle facilities.

7.8 Transportation of Dangerous Goods and Hazardous Materials

The DTMR is the relevant approval and management body for the transportation of dangerous goods and hazardous materials throughout Queensland and requires certain permits and conditions to be met for the transportation of these goods on the SCR network.

The legislative provisions for the transport of dangerous goods by road in Queensland are detailed in the Transport Operations (Road Use Management) Act 1995 and the Transport Operations (Road Use Management-Dangerous Goods) Regulation 2008.

Particular vehicle and driver licenses, placards, safety equipment, documentation and incident response plans are required for the transportation of dangerous goods and must be approved prior to transportation under 'The Australian Dangerous Goods Code 7th edition'.

The current Australian Dangerous Goods (ADG) Code (7th Edition) for road and rail is implemented by State and Territory legislation. It lists all provisions applicable to the transport of dangerous goods including:

- Classification;
- Packaging and performance testing;
- Use of bulk containers, freight containers and unit loads;
- Marking and placarding;
- Vehicle requirements;
- Segregation and stowage;
- Transfer of bulk dangerous goods;
- Documentation;
- Safety equipment, procedures during transport;
- Emergencies; and
- A dangerous goods list with United Nations (UN) dangerous goods identification numbers.

The classification of goods as 'dangerous' is specified in the Code and this document outlines which goods must be included under the permits and condition requirements. Goods may be classified due to properties such as:

- Combustion;
- Toxicity;
- Corrosiveness;

7 Road Use Considerations

- Ability to cause harm to the environment;
- Displacement of oxygen;
- Temperature or pressure hazards; and
- Adverse reactions with other materials.

It is likely that the Proponent will be required to transport dangerous goods and hazardous materials to and from the Project site. Details of exact materials have not been confirmed at this stage, however general mine related materials may include but are not limited to:

- Fuel;
- Explosives; and
- Hazardous waste materials.

The Road-Use Management Plan will describe the types of dangerous goods to be transported (by classification), their use and purpose, and an estimate of the quantities of dangerous goods to be transported. In addition, management and mitigation measures will be outlined and protocols will be defined should a coal (or other) product spill occur. Other items such as vehicle and driver licensing, vehicle placarding, handling and storage requirements will also be addressed. Table 7-1 provides an indicative list of dangerous goods and hazardous substances the will be transported for the Project.

Table 7-1 Indicative List of Dangerous Goods and Hazardous Substances

Chemical Name/ Shipping Name	DG Class	Raw conc. (wt%)	Storage conc. (wt%)	UN Number	Packaging group	Purpose/ Use
Diesel fuel	3 (Class C1)*	N/A	N/A	1202	III	Fuel for mobile equipment
Lubrication oils (hydraulic oil)	3 (Class C2)**	N/A	N/A	N/A	N/A	Lubricate plant and equipment
Ammonium nitrate/fuel oil (ANFO)	1.1D	N/A	N/A	0082	N/A	Blasting explosive
Caustic soda (sodium hydroxide)	8	50	50	1823	II	Concrete degreasing agent
Flotation agents (MIBC- methyl isobutyl carbinol)	3	99.5	99.5	2053	III	CHPP
Anionic flocculants (acrylamide / acrylate copolymer)	N/A	99.5	10	N/A	N/A	CHPP
Cationic flocculant (polydimethyl diyl ammonia chloride)	N/A	40	40	N/A	N/A	CHPP
Sodium Hypochlorite	8	12	12	1791	II or III	Water Treatment Plant Sewage Treatment Plant

7 Road Use Considerations

Chemical Name/ Shipping Name	DG Class	Raw conc. (wt%)	Storage conc. (wt%)	UN Number	Packaging group	Purpose/ Use
Sodium Hydroxide	8	10	10	1824	II or III	Water Treatment Plant Sewage Treatment Plant
Aluminium Sulphate	N/A	40	40	N/A	N/A	Water Treatment Plant Sewage Treatment Plant
Citric acid	N/A	95	95	N/A	N/A	Water Treatment Plant
Powdered activated carbon	N/A	100	100	N/A	N/A	Water Treatment Plant
Powdered polymer (cationic polyacrylamide)	N/A	100	100	N/A	N/A	Water Treatment Plant
Lime (calcium oxide)	8	100	100	1910	III	Water Treatment Plant
Solvents (e.g. acetone)	3	99.5	99.5	1090	II	Workshop degreasing agent
Sulphuric acid	8	15-51%	15-51%	2796	II	Batteries
Paints	3	N/A	N/A	1263	III	Paint

* Class C1—a combustible liquid that has a flashpoint of 150°C or less.

** Class C2—a combustible liquid that has a flashpoint exceeding 150°C.

7.9 Over Dimensional Vehicles

The transport operator for the proposed development, DHL, has developed detailed planning for over dimensional (OD) vehicles, addressing the following:

- Swept path envelope for OD vehicles (DHL Drawing Numbers AU-TR-D-01 to AU-TR-D-05 - Turning Radius Structural Steel, representing different module types); and
- Specific constraints along the access routes to the mine site.

OD vehicles require State Government permits to operate and there are specific regulations for pilots, escorts and police escorts, as follows:

- Vehicles less than 3.5 m wide - does not require escort;
- Vehicles 3.5 m to 4.5 m wide - one pilot vehicle;
- Vehicles 4.5 m to 5.5 m wide - one escort and one pilot vehicle (Depending on the route these vehicles may require Police involvement, which is decided by the Police when a permit is submitted as part of the approval process); and
- Vehicles greater than 5.5 m wide - two escorts and two pilot vehicles plus mandatory Police escort(s).

Logistics plans will need to be submitted for individual components (i.e. each separate vehicle) as well as the entire program of planned movements.

7 Road Use Considerations

Permit applications must include, but are not limited to individual axle loads, gross mass and vehicle configuration. For over dimension loads, route selection, potential traffic conflicts and proposed traffic management must also be provided in order to be assessed.

Typically site-specific issues that may need to be addressed when planning the routes for over-dimension vehicles include:

- Some overhead transmission lines may require lifting. A site investigation should be conducted along the proposed over-dimension route to determine whether low lying transmission lines pose a hazard;
- Some traffic signals may need to be laid down in order to allow for adequate movement of over-dimension vehicles;
- Rail crossings can have width issues for over-dimension vehicles;
- Bridges and culverts can have width or load constraints;
- Cattle grates can also have width and load constraints;
- Formed roads and verges at intersection can be insufficient for the swept path of the OD vehicles;
- Overhead or roadside objects (e.g. trees, fences, signs, etc) may sit within the swept path and overall horizontal and vertical vehicle envelope and would need to be removed, pruned or laid down; and
- Town or road movement curfews may also apply that restrict oversize movements.

These issues need to be identified and addressed in the Road-Use Management Plan.

Conceptual swept paths for the various OD vehicles (depending on delivery) are provided in Appendix B.

Impact Mitigation

This section outlines the recommended mitigation measures for impacts on the existing road network created by the Project.

8.1 Recommended Mitigation Measures and Works Required

8.1.1 Public Road Closures and Associated Bypass Works

As part of the site layout, the Proponent is proposing to close a section of Jericho-Degulla Road and construct bypasses to the east and north of the mining lease area from the Clermont-Alpha Road and Degulla Roads. As these works affect the existing road network, and are entirely attributed to the impact of the Project, the Proponent will be responsible for all associated costs.

These road closures and bypasses will be required to be designed and constructed to the Queensland Government Main Roads 'Road planning and Design' manual.

It is possible that the Proponent may enter into an agreement with the BRC regarding the delivery of these works, or may engage consultants and contractors directly to facilitate appropriate timing of the works.

Regardless of the delivery method, communication and consultation with all relevant stakeholders is essential to ensure these works meet required standards and are consistent with both State and Council planning.

The timing of these works will be incorporated into the construction period of the Project and hence agreements between parties should occur prior to construction commencing.

8.1.2 Site Access Intersections

In order to access the Project site from the existing road network a new intersection will need to be constructed at the southern entry to the site along Jericho-Degulla Road as part of the new bypass arrangements. As these works affect the existing road network and are entirely attributed to the impact of the Project, the Proponent will be responsible for all associated costs.

Whilst the permanent site access intersections will be integrated with the public road works, temporary site access intersections may need to be constructed during the construction period.

These intersections will be required to be designed and constructed to the Queensland Government Main Roads 'Road Planning and Design' manual.

8.1.3 Employee Transport Systems

As discussed previously in this report, the Proponent is proposing to use both a FIFO system in conjunction with an on-site accommodation village and on-site aerodrome to minimise the impact of employee transport on the road network. By utilising these systems, the number of light vehicles and therefore a large volume of potential generated traffic is reduced. The Proponent will implement these systems as part of its Road-Use Management Plan and Health and Safety plans to minimise transport impacts on the road network and enhance personal safety.

Although this assessment focuses on road-based transport impacts, it should be noted that the commencement of FIFO services will require certification from CASA where aircraft proposed to transport workers are more than 30 seats.

8 Impact Mitigation

8.1.4 Road-Use Management Plan

As discussed in Section 7 of this report, it is recommended that the Proponent creates a Road-Use Management Plan in order to manage the risks and impacts of any transport related issues. At this stage of the Project, the full details of the Road-Use Management Plan are unknown, and will evolve as the mine design and operation details are finalised. However, a draft outline of the components to the Road-Use Management Plan will include:

- Summary of the project traffic generation;
- Summary of this TIA findings;
- Outline management and mitigation measures;
 - A strategy to manage road usage by construction vehicles
 - Confirm escort arrangement requirements
 - Outline permit condition requirements for OD vehicles
 - Define measures for vehicle movements (particularly ODs during and following wet weather periods)
 - Vehicle interaction with public transport and school bus routes
 - Detail how the use of defined transport routes will be ensured throughout the project
 - Provide any hours of operation restrictions and/or roads to be avoided by construction and operational vehicles
 - Mitigation measures for local towns – particularly within Alpha (due to increased activity from Project related people using town facilities)
 - Determine how livestock will be managed on local roads where cattle grids are removed and there is no existing fencing (e.g. Degulla Road) and how livestock deliveries will be maintained
- Detail safe driver behaviour and fatigue management protocols;
- Detail road maintenance and/or road upgrade requirements;
 - To cater for extra traffic generated by project in construction and operational phases of project
 - Conduct a detailed baseline assessment prior to construction activities commencing
 - Define an inspection program
 - Detail any contributions plan required from relevant stakeholders
- Liaise with relevant stakeholders; and
 - DTMR
 - Local Councils
 - Queensland Police (in particular for escort arrangement protocols)
 - School Bus Operators
- Define community engagement strategies.

8.1.5 Road Maintenance Program

As outlined in Section 5 of this report, the Project will have an impact on the pavement design life of Jericho-Degulla Road, Degulla Road and Clermont-Alpha Roads. In order to mitigate these impacts, the following measures are recommended:

- An agreement between the Proponent and BRC for the diversion and ongoing maintenance of a section of Jericho-Degulla Road, Degulla Road for a 10 year mitigation period, in conjunction with other Proponents; and

8 Impact Mitigation

- Discussion with BRC regarding the road upgrade works required for traffic impacting sections of Jericho-Degulla Road and Degulla Road (between Clermont-Alpha Road and the Project site access point) as recommended by the pavement impact assessment in Section 5; and
- Discussion with DTMR and BRC regarding an infrastructure agreement for a proportion of the ongoing maintenance costs of the impacted sections of Jericho-Degulla Road, Degulla Road and Clermont-Alpha Road.

It should be noted that a number of factors will influence the size of the contribution to be provided by the Proponent. Factors may include; contributions required by other developments in the area, and the incremental requirements over the existing DTMR and Council maintenance schedules.

The road maintenance program may differ between the construction and operational phases of the project to reflect the shorter time and more intense activity of construction versus the sustained use of the road network over the operational phase.

A specially equipped vehicle provided by the proponent will be available to assist employees or visitors with disabilities to and from the on-site airfield or site entrance, to the location in question with the Project site.

8.1.6 Capacity Upgrades for Over Dimensional Vehicles

At the time of the assessment, no specific details were available on the number, size or weight of Over Dimensional (OD) vehicles required for the Project; however indicative swept paths for some OD vehicles is attached in Appendix B to this document. It is anticipated that a proportion of freight will fall into this category. Mitigation measures recommended to manage these vehicles impacts on the road network include:

- Planning of required freight movements to utilise non OD vehicles where possible;
- Planning freight movements to utilise OD vehicles which do not exceed the existing available envelope dimensions;
- Following required planning, permit applications and escort requirements as specified by DTMR; and
- For any OD vehicle requirements that do not fit the existing envelope dimensions and are not outlined in DTMR's 2 year infrastructure plans, all required upgrade works may be the responsibility of the Proponent. For those upgrades which are already proposed in DTMR's 2 year infrastructure plan a bring it forward contribution may be applicable.

Implementation of these mitigation measures will be refined as the details of specific freight requirements of the Project are finalised.

Conclusions

The proposed Kevin's Corner Coal Mine Project will generate additional traffic volumes on the existing road network in the region in the vicinity of Alpha and Emerald, in central Queensland. The impact of this additional traffic volume on the performance of the road network, the pavement design life and other safety concerns has been assessed by this Traffic Impact Assessment.

9.1 Traffic Generation

The Project will be completed in two phases. The construction phase is expected to have duration from 2012, peaking at 2014 and winding off until 2018. During the construction, slowly the operation of the site will evolve until the construction will slowly finish. The peak construction traffic generation will be in 2014 and with some operational staff starting, the site will generate up to 76 light vehicles, 43 commercial vehicle and 11 (robust value) over-dimensional return trips, based on a peak workforce of 1,556 employees.

The operational phase slowly starts in 2013 and within the initial 10 years, the site is expected to peak in year 2017 will generate up to 83 light vehicle and 39 commercial vehicle return trips per day, based on an average on site workforce of 1715 employees.

9.2 Background Traffic

The existing road network surrounding the Project site consisting of Clermont-Alpha Road, Capricorn Highway and Gregory Highway is expected to experience general traffic growth over the life of the project. 3% to 5% growth rates have been used in this assessment to simulate this background traffic impact on the existing road network. These growth rates account for general growth and small developments in the region, but do not include any significant impacts by other potential large developments which may occur during the mine life period. These impacts will be included in the cumulative impact assessment.

9.3 Road Network Performance Impacts

The road network performance impacts caused by the Kevin's Corner Coal Mine Project have been assessed in accordance with the DTMR *'Guidelines for the Assessment of Road Impacts of Developments'*. From this assessment, it is considered that the impact of the Project on the performance of both road links and intersections are not significant and most do not require mitigation by the Proponent. It is acknowledged that proposed works for closures to Jericho-Degulla Road and the construction of temporary and permanent site access intersections will be required as part of this Project.

9.4 Pavement Impacts

The road network performance impacts caused by the Project have been assessed in accordance with the DTMR *'Guidelines for the Assessment of Road Impacts of Developments'*.

The assessment shows that the project will have an impact on the pavement design life and ongoing maintenance of the Clermont-Alpha Road and Degulla Road to the site access along Jericho-Degulla Road.

9 Conclusions

Due to the limited information available to complete this initial pavement assessment, it is recommended that a further investigation and assessment is completed in conjunction with discussions with DTMR and BRC prior to entering any infrastructure contribution agreements.

9.5 Required Mitigation Measures

Following the road network performance, pavement design life and general safety assessment, the following mitigation measures are recommended for the proponent's consideration in ongoing development of the Project:

- Construction of required bypass road due to the closure of a section of Jericho-Degulla Road to the standards required by the Queensland DTMR;
- Road upgrade works to Jericho-Degulla Road and Degulla Road between Clermont-Alpha Road and the mine site access road in conjunction with the Alpha Coal Project, as recommended by the pavement impact assessment
- Construction of temporary and permanent access intersections to the standards required by the Queensland DTMR on Jericho-Degulla Road at the Project site;
- Implementation of on-site-based FIFO to minimise traffic volumes generated by employees travelling to and from the Project site;
- Development of a Road-Use Management Plan to manage risks associated with transport for the construction and operational phases of the Project, including use of on-site aerodrome;
- Development of a road maintenance program in conjunction with DTMR and BRC considering a number of influential factors on pavement design life for Clermont-Alpha Road, Degulla Road, Jericho-Degulla Road Diversion; and
- Implementation of planning and permit requirements, including the construction of any capacity upgrades to road infrastructure as required by Over Dimensional vehicles movements.

It should be noted that these recommended mitigation measures may change due to the influence of the cumulative impacts of other proposed developments in the surrounding region.

Glossary

Commercial Vehicles – a vehicle above 10 tonne gross vehicle mass.

Delay – the additional travel time experienced by a vehicle at an intersection.

Degree of Saturation (DOS) – the ratio of arrival (demand) flow rate to capacity during a given flow period.

Intersection - a place at which two roads meet or cross.

Level of Service (LOS) – an index of the operational performance of traffic on a given traffic lane, carriageway, road or intersection, based on service measures such as speed, travel time, delay and degree of saturation during a given flow period.

Midblock - the section of a road between intersections.

Seagull Intersection - a T-intersection where the right turn out of the side road gives way to oncoming traffic from the right and is provided with an acceleration lane in the median to merge into the traffic stream approaching from the left.

T-Intersection – an intersection where two roads meet (whether or not at right angles) and one of the roads ends.

References

Australian Standard AS 2890.1, (2004). Parking facilities Part 1: Off-street car parking

Australian Standard AS 2890.2 (2002). Parking facilities Part 2: Off-street commercial vehicle facilities

Austrroads, (1988). Guide to Traffic Engineering Practice Part 2 – Roadway Capacity

Commonwealth of Australia, National Transport Commission (2007). Australian Code for the Transportation of Dangerous Goods by Road and Rail (ADG), 7th Edition

The State of Queensland (Department of Main Roads), (2006), *Guidelines for Assessment of Road Impacts of Development*

The State of Queensland (Department of Main Roads), (2008), *Road Implementation Plan 2008-2009 to 2012-2013*

Transport Operations (Road Use Management) Act 1995. Commonwealth Government

Transport Operations (Road Use Management – Dangerous Goods) Regulation 2008. Commonwealth Government

Limitations

URS Australia Pty Ltd (URS) has prepared this report in accordance with the usual care and thoroughness of the consulting profession for the use of Hancock Galilee Pty Ltd and only those third parties who have been authorised in writing by URS to rely on the report. It is based on generally accepted practices and standards at the time it was prepared. No other warranty, expressed or implied, is made as to the professional advice included in this report. It is prepared in accordance with the scope of work and for the purpose outlined in the Proposal dated 6 August, 2010.

The methodology adopted and sources of information used by URS are outlined in this report. URS has made no independent verification of this information beyond the agreed scope of works and URS assumes no responsibility for any inaccuracies or omissions. No indications were found during our investigations that information contained in this report as provided to URS was false.

This report was prepared between 01 February 2011 and 7 April 2011 is based on the conditions encountered and information reviewed at the time of preparation. URS disclaims responsibility for any changes that may have occurred after this time.

This report should be read in full. No responsibility is accepted for use of any part of this report in any other context or for any other purpose or by third parties. This report does not purport to give legal advice. Legal advice can only be given by qualified legal practitioners.

Appendix A SIDRA Output Reports

DETAILED OUTPUT

Capricorn Hwy/Clermont Alpha Rd
2017 With Project PM

Capricorn Hwy/Clermont Alpha Road 2017 With Project PM
Stop (Two-Way)

OUTPUT TABLE LINKS



Movements

- Movement Capacity Parameters
- Movement Performance
- Fuel Consumption, Emissions and Cost (Total)
- Fuel Consumption, Emissions and Cost (Rate)
- Intersection Negotiation Data
- Movement Speeds and Geometric Delay
- Gap Acceptance Parameters



Lanes

- Lane Performance
- Lane Flow and Capacity Information
- Lane, Approach and Intersection Performance
- Driver Characteristics
- Lane Delays
- Lane Queues (Vehicles)
- Lane Queues (Distance)
- Lane Queue Percentiles (Vehicles)
- Lane Queue Percentiles (Distance)
- Lane Stops



Flow Rates and Demand Analysis

- Movement Definitions and Flow Rates (O-D)
- Flow Rates (Separate Light and Heavy Vehicles)
- Flow Rates (Total Vehicles and Percent Heavy)



Other

- Model Settings
- Parameters Used in Cost Calculations
- Diagnostics

Movements

Movement Capacity Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Demand Flow veh/h	HV %	Opposing Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Lane Util %	Deg. Satn x
South: Capricorn Highway South									
1 L	34	20.0	11+	20.0	13	672<	0.80	1496	100 0.050
2 T	99	41.0	72+	24.0	86	546	0.80	341	100 0.181
3 R	16	20.0	153+	34.9	199	87	0.80	341	100 0.181
East: Shakespere St									
4 L	16	20.0	0			1625	0.80	8133	100 0.010
5 T	3	20.0	0			713	0.80	****	100 0.004
6 R	3	20.0	24	25.0	29	713	0.80	****	100 0.004
North: Clermont Alpha Rd									
7 L	3	27.0	14+	25.0	16	620<	0.80	****	100 0.005
8 T	99	41.0	69+	23.4	82	494	0.80	299	100 0.200
9 R	21	35.3	186+	32.4	237	105	0.80	299	100 0.201*
West: Capricorn Hwy West									
10 L	21	25.0	0			1576	0.80	5889	100 0.013
11 T	3	25.0	0			103	0.80	2509	100 0.031
12 R	34	25.0	19	20.0	22	1100	0.80	2512	100 0.031

* Maximum degree of saturation
< Reduced saturation flow due to a short lane effect
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Movement Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)
South: Capricorn Highway South										
1	L	0.08	0.10	8.8	0.63	21.3	0.59	20.4	0.4	48.7
2	T	0.27	0.32	9.8	0.58	57.0	1.87	59.7	1.2	48.4
3	R	0.05	0.06	10.5	0.74	11.7	0.32	9.5	0.2	47.3
East: Shakespere St										
4	L	0.04	0.05	8.8	0.66	10.5	0.26	9.5	0.2	49.0
5	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.6
6	R	0.01	0.01	8.9	0.78	2.5	0.06	1.9	0.0	48.7
North: Clermont Alpha Rd										
7	L	0.01	0.01	9.1	0.63	2.0	0.06	1.9	0.0	48.6
8	T	0.28	0.33	10.1	0.57	56.7	1.90	59.7	1.2	48.0
9	R	0.07	0.08	11.3	0.77	16.3	0.43	12.7	0.3	47.0
West: Capricorn Hwy West										
10	L	0.05	0.06	8.9	0.66	14.0	0.34	12.7	0.3	49.0
11	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.7
12	R	0.08	0.10	9.1	0.65	22.0	0.59	20.3	0.4	48.5

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Total)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Total \$/h	Fuel Total L/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
South: Capricorn Highway South							
1	L	16.45	3.6	9.0	0.75	0.012	0.023
2	T	56.81	14.4	36.7	2.99	0.044	0.095
3	R	7.92	1.7	4.3	0.36	0.006	0.011
		81.18	19.7	50.0	4.09	0.063	0.129
East: Shakespere St							
4	L	7.67	1.7	4.2	0.35	0.006	0.011
5	T	1.16	0.2	0.5	0.02	0.001	0.001
6	R	1.55	0.3	0.8	0.07	0.001	0.002
		10.38	2.2	5.6	0.44	0.008	0.014
North: Clermont Alpha Rd							
7	L	1.63	0.4	1.0	0.08	0.001	0.002
8	T	57.08	14.5	36.7	2.99	0.044	0.095
9	R	11.98	2.9	7.4	0.62	0.009	0.019
		70.69	17.8	45.1	3.69	0.055	0.117
West: Capricorn Hwy West							
10	L	10.65	2.4	6.1	0.51	0.008	0.016
11	T	1.19	0.2	0.6	0.02	0.001	0.001
12	R	17.19	3.9	9.9	0.82	0.013	0.025
		29.04	6.6	16.6	1.35	0.022	0.042
INTERSECTION:		191.28	46.3	117.3	9.56	0.147	0.301

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Fuel Consumption, Emissions and Cost (Rate)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Rate \$/km	Fuel Rate L/100km	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
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South: Capricorn Highway South						
1 L	0.81	17.6	442.3	36.68	0.612	1.128
2 T	0.95	24.2	614.6	50.02	0.739	1.587
3 R	0.83	17.9	451.5	37.76	0.629	1.159

	0.91	22.0	558.1	45.69	0.698	1.437

East: Shakespere St						
4 L	0.80	17.5	440.4	36.44	0.608	1.122
5 T	0.61	11.2	281.8	8.86	0.296	0.414
6 R	0.81	17.6	444.8	36.97	0.616	1.137

	0.78	16.6	418.3	32.56	0.565	1.023

North: Clermont Alpha Rd						
7 L	0.86	19.8	501.3	41.61	0.660	1.290
8 T	0.96	24.2	615.5	50.06	0.740	1.588
9 R	0.94	23.0	583.9	48.87	0.739	1.524

	0.95	23.9	607.1	49.64	0.738	1.569

West: Capricorn Hwy West						
10 L	0.84	19.1	482.2	39.90	0.642	1.236
11 T	0.62	12.0	302.2	8.88	0.298	0.413
12 R	0.85	19.3	486.8	40.57	0.651	1.253

	0.83	18.8	475.0	38.59	0.629	1.201

INTERSECTION:	0.90	21.8	552.8	45.07	0.692	1.418

[Go to Table Links \(Top\)](#)

Intersection Negotiation Data

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

From	To		Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	Distance
Approach	Approach	Turn	m	km/h	m	m	m	User Spec?

South: Capricorn Highway South								
	East	Right	9.0	19.4	14.2	500	118	No
	North	Thru	S	25.0	13.2	500	145	No
	West	Left	10.0	20.2	15.7	500	123	No

East: Shakespere St								
	South	Left	10.0	20.2	15.7	500	123	No
	North	Right	9.3	19.6	14.6	500	107	No
	West	Thru	S	60.0	14.7	500	214	No

North: Clermont Alpha Rd								
	South	Thru	S	25.0	13.2	500	145	No
	East	Left	10.0	20.2	15.7	500	130	No
	West	Right	9.0	19.4	14.2	500	132	No

West: Capricorn Hwy West								
	South	Right	9.3	19.6	14.6	500	126	No
	East	Thru	S	60.0	14.7	500	237	No
	North	Left	10.0	20.2	15.7	500	128	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Movement Speeds and Geometric Delay

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running Overall	Geom Delay sec

South: Capricorn Highway South								
1 L	60.0	20.2	20.2	60.0			48.7	8.8
2 T	60.0	25.0	25.0	60.0			48.6	8.1
3 R	60.0	19.4	19.4	60.0			47.8	8.9

East: Shakespere St								
4 L	60.0	20.2	20.2	60.0		49.0	49.0	8.8
5 T	60.0	60.0	60.0	60.0		57.6	57.6	0.0
6 R	60.0	19.6	19.6	60.0		48.7	48.7	8.8

North: Clermont Alpha Rd								
7 L	60.0	20.2	20.2	60.0		48.6	48.6	9.0
8 T	60.0	25.0	25.0	60.0		48.6	48.0	8.1
9 R	60.0	19.4	19.4	60.0		47.8	47.0	9.3

West: Capricorn Hwy West								
10 L	60.0	20.2	20.2	60.0		49.0	49.0	8.9
11 T	60.0	60.0	60.0	60.0		57.7	57.7	0.0
12 R	60.0	19.6	19.6	60.0		48.5	48.5	9.0

"Running Speed" is the average speed excluding stopped periods.								

[Go to Table Links \(Top\)](#)

Gap Acceptance Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Critical Gap								
Mov	Mov	Opng	Hdwy	Dist	Foll-up	Entry	Intra	Propn
ID	Type	Flow	sec	m	Headway	HV	Bunch	Bnchd
		pcu/h			sec	Equiv	sec	

South: Capricorn Highway South								
1 L	Normal	13+	5.75	42.8	3.45	2.00	0.90	0.001
2 T	Normal	86+	8.84	56.6	4.76	2.00	0.60	0.004
3 R	Normal	199+	8.05	55.0	4.60	2.00	0.60	0.010

East: Shakespere St								
6 R	Normal	29	5.18	36.5	2.88	2.00	0.90	0.001

North: Clermont Alpha Rd								
7 L	Normal	16+	6.10	43.0	3.66	2.00	0.90	0.001
8 T	Normal	82+	8.84	56.6	4.76	2.00	0.60	0.004
9 R	Normal	237+	9.12	60.2	5.21	2.00	0.60	0.012

West: Capricorn Hwy West								
12 R	Normal	22	5.40	40.2	3.00	2.00	0.90	0.001

Values in this table are adjusted for heavy vehicles in the entry stream.
+ Percentage of exiting flow included in total opposing flow

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Lanes

Lane Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Q u e u e								
Lane	Flow	Cap	Deg.	Aver.	Eff.	95% Back		Lane
No.	veh/h	veh/h	x	Delay	Stop	veh	m	Length
				sec	Rate			m

South: Capricorn Highway South								
1 L	34	672	0.050	8.8	0.63	0.1	1.2	21.0T
2 TR	115	633	0.181	9.9	0.60	1.0	9.7	500.0

East: Shakespere St								
1 L	16	1625	0.010	8.8	0.66	0.0	0.0	21.0T
2 TR	6	1426	0.004	4.5	0.39	0.0	0.2	500.0

North: Clermont Alpha Rd								
1 L	3	620	0.005	9.1	0.63	0.0	0.1	21.0T
2 TR	120	599	0.200	10.4	0.61	1.2	10.9	500.0

West: Capricorn Hwy West								
1 L	21	1576	0.013	8.9	0.66	0.0	0.0	21.0T
2 TR	37	1203	0.031	8.3	0.60	0.2	1.3	500.0

T Short lane due to specification of Turn Bay

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Lane Flow and Capacity Information

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Dem Flow (veh/h)				Min Cap veh/h	Tot Cap veh/h	Deg. Satn x	Lane Util %
	Lef	Thru	Rig	Tot				
South: Capricorn Highway South								
1 L	34	0	0	34	34	672	0.050	100
2 TR	0	99	16	115	60	633	0.181	100
East: Shakespere St								
1 L	16	0	0	16	16	1625	0.010	100
2 TR	0	3	3	6	6	1426	0.004	100
North: Clermont Alpha Rd								
1 L	3	0	0	3	3	620	0.005	100
2 TR	0	99	21	120	60	599	0.200	100
West: Capricorn Hwy West								
1 L	21	0	0	21	21	1576	0.013	100
2 TR	0	3	34	37	37	1203	0.031	100

< Reduced capacity flow due to a short lane effect

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

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Lane, Approach and Intersection Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (sec)		Deg Sat x	Aver. Delay sec	Longest Queue m	Shrt Lane m
	L	T	R	Tot			1st	2nd				
South: Capricorn Highway South												
1 L	34			34	20				0.050	8.8	1	21
2 TR		99	16	115	38				0.181	9.9	10	500
	34	99	16	148	34				0.181	9.6	10	
East: Shakespere St												
1 L	16			16	20				0.010	8.8	0	21
2 TR		3	3	6	20				0.004	4.5	0	500
	16	3	3	22	20				0.010	7.6	0	
North: Clermont Alpha Rd												
1 L	3			3	27				0.005	9.1	0	21
2 TR		99	21	120	40				0.200	10.4	11	500
	3	99	21	123	40				0.200	10.3	11	
West: Capricorn Hwy West												
1 L	21			21	25				0.013	8.9	0	21
2 TR		3	34	37	25				0.031	8.3	1	500
	21	3	34	58	25				0.031	8.5	1	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				352	34				0.201	9.6	11	

Peak flow period = 30 minutes.

Queue values in this table are 95% queue (metres)

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

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Driver Characteristics

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Satn Speed km/h	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing m	Average Queue Space m	Driver Response Time sec
South: Capricorn Highway South						
1 L	NA - Short Lane					
2 TR	24.2	760	4.74	31.90	9.29	3.36
East: Shakespere St						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
North: Clermont Alpha Rd						
1 L	NA - Short Lane					
2 TR	24.0	744	4.84	32.29	9.40	3.43
West: Capricorn Hwy West						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					

Saturation Flow and Saturation Headway are derived from follow-up headway.

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Lane Delays

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Stop-line Delay			Delay (seconds/veh)			Stopd		
		1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queuing Total dq	MvUp dqm	(Idle) di	Geom dig	Control dic
South: Capricorn Highway South										
1 L	0.050	0.1	0.0	0.1	0.3	0.0	0.0	0.0	8.8	8.8
2 TR	0.181	1.7	0.0	1.7	1.5	0.2	0.0	0.2	8.2	9.9
East: Shakespere St										
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8
2 TR	0.004	0.1	0.0	0.1	0.6	0.0	0.0	0.0	4.4	4.5
North: Clermont Alpha Rd										
1 L	0.005	0.1	0.0	0.1	0.3	0.0	0.0	0.0	9.0	9.1
2 TR	0.200	2.0	0.0	2.0	1.5	0.6	0.0	0.6	8.3	10.4
West: Capricorn Hwy West										
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	8.9
2 TR	0.031	0.1	0.0	0.1	0.4	0.0	0.0	0.0	8.2	8.3
dn is average stop-start delay for all vehicles queued and unqueued										

dn is average stop-start delay for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

Lane Queues (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Ovrfl. Queue	Back of Queue (veh)				Queue Stor.	Prob. Block	P'ile Block	Cyc-Av.	Queue
	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.050	0.0	0.0	0.0	0.0	0.1	0.06	0.0	100.0	0.0	0.0
2 TR	0.181	0.0	0.3	0.0	0.3	1.0	0.02	0.0	100.0	0.1	0.2
East: Shakespere St											
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.01	0.0	100.0	0.0	0.0
2 TR	0.200	0.0	0.4	0.0	0.4	1.2	0.02	0.0	100.0	0.1	0.2
West: Capricorn Hwy West											
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.031	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queues (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

	Deg.	Ovrfl.	Back of Queue (m)				Queue	Prob.	P'ile	Cyc-Av.	Queue
Lane	Satn	Queue					Stor.	Block	Block		
No.	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.050	0.0	0.4	0.0	0.4	1.2	0.06	0.0	100.0	0.0	0.0
2 TR	0.181	0.0	3.1	0.0	3.1	9.7	0.02	0.0	100.0	0.5	1.6
East: Shakespere St											
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.1	0.01	0.0	100.0	0.0	0.0
2 TR	0.200	0.0	3.5	0.0	3.5	10.9	0.02	0.0	100.0	0.6	2.0
West: Capricorn Hwy West											
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.031	0.0	0.4	0.0	0.4	1.3	0.00	0.0	100.0	0.0	0.0

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Lane Queue Percentiles (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Percentile (veh)					
	x	50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.050	0.0	0.1	0.1	0.1	0.1	0.2
2 TR	0.181	0.3	0.5	0.7	0.8	1.0	1.2
East: Shakespere St							
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.0
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.200	0.4	0.5	0.8	0.9	1.2	1.3
West: Capricorn Hwy West							
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.031	0.1	0.1	0.1	0.1	0.2	0.2

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (metres)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.050	0.4	0.5	0.8	1.0	1.2	1.4
2 TR	0.181	3.1	4.2	6.4	7.8	9.7	11.2
East: Shakespere St							
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.1	0.1	0.1	0.2	0.2	0.2
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.200	3.5	4.7	7.2	8.7	10.9	12.6
West: Capricorn Hwy West							

1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.031	0.4	0.6	0.9	1.1	1.3	1.6

[Go to Table Links \(Top\)](#)

Lane Stops

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	-- Effective he1	Stop he2	Rate hig	-- Overall h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq
South: Capricorn Highway South									
1 L	0.050	0.01	0.00	0.62	0.63	21.3	0.00	0.0	0.07
2 TR	0.181	0.19	0.00	0.41	0.60	68.7	0.00	0.0	0.31
East: Shakespere St									
1 L	0.010	0.00	0.00	0.66	0.66	10.5	0.00	0.0	0.00
2 TR	0.004	0.01	0.00	0.38	0.39	2.5	0.00	0.0	0.10
North: Clermont Alpha Rd									
1 L	0.005	0.01	0.00	0.61	0.63	2.0	0.00	0.0	0.08
2 TR	0.200	0.20	0.00	0.41	0.61	73.0	0.00	0.0	0.32
West: Capricorn Hwy West									
1 L	0.013	0.00	0.00	0.66	0.66	14.0	0.00	0.0	0.00
2 TR	0.031	0.02	0.00	0.58	0.60	22.0	0.00	0.0	0.09

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

Flow Rates and Demand Analysis

Movement Definitions and Flow Rates (O-D)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale Fixed	Flow Scale Var	Peak Flow Factor
South: Capricorn Highway South								
	East	3	Right	13	3	1.00	1.00	0.95
	North	2	Thru	58	41	1.00	1.00	0.95
	West	1	Left	27	7	1.00	1.00	0.95
East: Shakespere St								
	South	4	Left	13	3	1.00	1.00	0.95
	North	6	Right	3	1	1.00	1.00	0.95
	West	5	Thru	3	1	1.00	1.00	0.95
North: Clermont Alpha Rd								
	South	8	Thru	58	41	1.00	1.00	0.95
	East	7	Left	2	1	1.00	1.00	0.95
	West	9	Right	14	7	1.00	1.00	0.95
West: Capricorn Hwy West								
	South	12	Right	25	8	1.00	1.00	0.95
	East	11	Thru	2	1	1.00	1.00	0.95
	North	10	Left	16	5	1.00	1.00	0.95

Unit Time for Volumes = 60 minutes
Peak Flow Period = 30 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

[Go to Table Links \(Top\)](#)

Flow Rates (Separate Light and Heavy Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	27	7	0	0	0	0
2 T	0	0	58	41	0	0
3 R	0	0	0	0	13	3
East: Shakespere St						
4 L	13	3	0	0	0	0
5 T	0	0	3	1	0	0
6 R	0	0	0	0	3	1
North: Clermont Alpha Rd						
7 L	2	1	0	0	0	0
8 T	0	0	58	41	0	0
9 R	0	0	0	0	14	7
West: Capricorn Hwy West						
10 L	16	5	0	0	0	0
11 T	0	0	2	1	0	0
12 R	0	0	0	0	25	8
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Flow Rates (Total Vehicles and Percent Heavy)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	34	20.0	0	0.0	0	0.0
2 T	0	0.0	99	41.0	0	0.0
3 R	0	0.0	0	0.0	16	20.0
East: Shakespere St						
4 L	16	20.0	0	0.0	0	0.0
5 T	0	0.0	3	20.0	0	0.0
6 R	0	0.0	0	0.0	3	20.0
North: Clermont Alpha Rd						
7 L	3	27.0	0	0.0	0	0.0
8 T	0	0.0	99	41.0	0	0.0
9 R	0	0.0	0	0.0	21	35.3
West: Capricorn Hwy West						
10 L	21	25.0	0	0.0	0	0.0
11 T	0	0.0	3	25.0	0	0.0
12 R	0	0.0	0	0.0	34	25.0
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Other

Model Settings

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

* Basic Parameters:
Intersection Type: Unsignalised - Two-Way Stop Control
Driving on the left-hand side of the road
Input data specified in Metric units
Model Defaults: Standard Left
Peak Flow Period (for performance): 30 minutes
Unit time (for volumes): 60 minutes.
SIDRA Standard Delay model used

SIDRA Standard Queue model used
Level of Service based on: Delay (HCM method)
Queue percentile: 95%

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Parameters Used in Cost Calculations

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Pump price of fuel (\$/L)	=	1.200
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	32.00
Time value factor	=	0.60
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

[Go to Table Links \(Top\)](#)

Diagnostics

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project PM

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Processed: Monday, 4 April 2011 4:02:40 p.m.
SIDRA INTERSECTION 5.0.2.1437

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Project: C:\Documents and Settings\kevin_ayen\My Documents\PROJECTS\Kev's Corner\Calculations\KC Coal
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SIDRA
INTERSECTION

DETAILED OUTPUT

Capricorn Hwy/Clermont Alpha Rd
2017 With Project AM

Capricorn Hwy/Clermont Alpha Road 2017 With Project AM
Stop (Two-Way)

OUTPUT TABLE LINKS



Movements

- Movement Capacity Parameters
- Movement Performance
- Fuel Consumption, Emissions and Cost (Total)
- Fuel Consumption, Emissions and Cost (Rate)
- Intersection Negotiation Data
- Movement Speeds and Geometric Delay
- Gap Acceptance Parameters



Lanes

- Lane Performance
- Lane Flow and Capacity Information
- Lane, Approach and Intersection Performance
- Driver Characteristics
- Lane Delays
- Lane Queues (Vehicles)
- Lane Queues (Distance)
- Lane Queue Percentiles (Vehicles)
- Lane Queue Percentiles (Distance)
- Lane Stops



Flow Rates and Demand Analysis

- Movement Definitions and Flow Rates (O-D)
- Flow Rates (Separate Light and Heavy Vehicles)
- Flow Rates (Total Vehicles and Percent Heavy)



Other

- Model Settings
- Parameters Used in Cost Calculations
- Diagnostics

Movements

Movement Capacity Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Demand Flow veh/h	HV %	Opposing Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Lane Util %	Deg. Satn x
South: Capricorn Highway South									
1 L	34	20.0	11+	20.0	13	672<	0.80	1496	100 0.050
2 T	99	41.0	72+	27.0	88	544	0.80	340	100 0.182
3 R	16	20.0	153+	34.9	199	87	0.80	341	100 0.181
East: Shakespere St									
4 L	16	20.0	0			1625	0.80	8133	100 0.010
5 T	3	20.0	0			712	0.80	****	100 0.004
6 R	3	20.0	24	34.0	31	712	0.80	****	100 0.004
North: Clermont Alpha Rd									
7 L	3	27.0	14+	32.9	18	620<	0.80	****	100 0.005
8 T	99	41.0	69+	25.0	83	504	0.80	307	100 0.196
9 R	21	27.0	186+	33.0	239	107	0.80	307	100 0.197*
West: Capricorn Hwy West									
10 L	21	35.3	0			1483	0.80	5535	100 0.014
11 T	3	25.0	0			103	0.80	2509	100 0.031
12 R	34	25.0	19	20.0	22	1100	0.80	2512	100 0.031

* Maximum degree of saturation
< Reduced saturation flow due to a short lane effect
+ Percentage of exiting flow included in total opposing flow

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Movement Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)
South: Capricorn Highway South										
1	L	0.08	0.10	8.8	0.63	21.3	0.59	20.4	0.4	48.7
2	T	0.27	0.32	9.8	0.58	57.2	1.87	59.7	1.2	48.4
3	R	0.05	0.06	10.5	0.74	11.7	0.32	9.5	0.2	47.3
East: Shakespere St										
4	L	0.04	0.05	8.8	0.66	10.5	0.26	9.5	0.2	49.0
5	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.5
6	R	0.01	0.01	9.0	0.77	2.4	0.06	1.9	0.0	48.7
North: Clermont Alpha Rd										
7	L	0.01	0.01	9.1	0.63	2.0	0.06	1.9	0.0	48.6
8	T	0.28	0.33	10.0	0.57	56.8	1.89	59.7	1.2	48.1
9	R	0.06	0.08	11.0	0.77	16.1	0.43	12.7	0.3	47.1
West: Capricorn Hwy West										
10	L	0.05	0.06	9.2	0.66	13.9	0.34	12.7	0.3	49.0
11	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.7
12	R	0.08	0.10	9.1	0.65	22.0	0.59	20.3	0.4	48.5

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Fuel Consumption, Emissions and Cost (Total)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Total \$/h	Fuel Total L/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
South: Capricorn Highway South							
1	L	16.45	3.6	9.0	0.75	0.012	0.023
2	T	56.84	14.4	36.7	2.99	0.044	0.095
3	R	7.93	1.7	4.3	0.36	0.006	0.011
		81.22	19.7	50.0	4.09	0.063	0.129
East: Shakespere St							
4	L	7.67	1.7	4.2	0.35	0.006	0.011
5	T	1.17	0.2	0.5	0.02	0.001	0.001
6	R	1.55	0.3	0.8	0.07	0.001	0.002
		10.38	2.2	5.6	0.44	0.008	0.014
North: Clermont Alpha Rd							
7	L	1.63	0.4	1.0	0.08	0.001	0.002
8	T	57.00	14.5	36.7	2.99	0.044	0.095
9	R	11.22	2.6	6.5	0.54	0.009	0.017
		69.86	17.4	44.2	3.61	0.054	0.114
West: Capricorn Hwy West							
10	L	11.53	2.9	7.2	0.60	0.009	0.019
11	T	1.19	0.2	0.6	0.02	0.001	0.001
12	R	17.19	3.9	9.9	0.82	0.013	0.025
		29.92	7.0	17.7	1.44	0.023	0.045
INTERSECTION:		191.38	46.3	117.5	9.58	0.147	0.301

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Rate)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Rate \$/km	Fuel Rate L/100km	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
--------	--	-----------------------	-------------------------	---------------------	--------------------	--------------------	---------------------

South: Capricorn Highway South						
1 L	0.81	17.6	442.3	36.68	0.612	1.128
2 T	0.95	24.2	614.9	50.06	0.739	1.588
3 R	0.83	17.9	451.6	37.77	0.630	1.159

	0.91	22.0	558.3	45.71	0.699	1.438

East: Shakespere St						
4 L	0.80	17.5	440.4	36.44	0.608	1.122
5 T	0.61	11.2	282.7	9.01	0.298	0.418
6 R	0.81	17.7	444.9	36.98	0.616	1.138

	0.78	16.6	418.5	32.58	0.565	1.023

North: Clermont Alpha Rd						
7 L	0.86	19.8	501.4	41.62	0.660	1.291
8 T	0.96	24.2	615.2	50.05	0.740	1.587
9 R	0.88	20.3	512.1	42.85	0.680	1.326

	0.94	23.4	594.7	48.60	0.728	1.535

West: Capricorn Hwy West						
10 L	0.91	22.4	568.7	47.03	0.711	1.471
11 T	0.62	12.0	302.2	8.88	0.298	0.413
12 R	0.85	19.3	486.8	40.57	0.651	1.253

	0.86	20.0	506.5	41.18	0.654	1.286

INTERSECTION:	0.90	21.8	553.7	45.15	0.693	1.421

[Go to Table Links \(Top\)](#)

Intersection Negotiation Data

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

From	To		Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	Distance
Approach	Approach	Turn	m	km/h	m	m	m	User Spec?

South: Capricorn Highway South								
	East	Right	9.0	19.4	14.2	500	118	No
	North	Thru	S	25.0	13.2	500	145	No
	West	Left	10.0	20.2	15.7	500	123	No

East: Shakespere St								
	South	Left	10.0	20.2	15.7	500	123	No
	North	Right	9.3	19.6	14.6	500	107	No
	West	Thru	S	60.0	14.7	500	214	No

North: Clermont Alpha Rd								
	South	Thru	S	25.0	13.2	500	145	No
	East	Left	10.0	20.2	15.7	500	130	No
	West	Right	9.0	19.4	14.2	500	125	No

West: Capricorn Hwy West								
	South	Right	9.3	19.6	14.6	500	126	No
	East	Thru	S	60.0	14.7	500	237	No
	North	Left	10.0	20.2	15.7	500	138	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

[Go to Table Links \(Top\)](#)

Movement Speeds and Geometric Delay

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running Overall	Geom Delay sec

South: Capricorn Highway South								
1 L	60.0	20.2	20.2	60.0			48.7	48.7
2 T	60.0	25.0	25.0	60.0			48.6	48.4
3 R	60.0	19.4	19.4	60.0			47.8	47.3

East: Shakespere St								
4 L	60.0	20.2	20.2	60.0		49.0	49.0	8.8
5 T	60.0	60.0	60.0	60.0		57.5	57.5	0.0
6 R	60.0	19.6	19.6	60.0		48.7	48.7	8.8

North: Clermont Alpha Rd								
7 L	60.0	20.2	20.2	60.0		48.6	48.6	9.0
8 T	60.0	25.0	25.0	60.0		48.6	48.1	8.1
9 R	60.0	19.4	19.4	60.0		47.8	47.1	9.1

West: Capricorn Hwy West								
10 L	60.0	20.2	20.2	60.0		49.0	49.0	9.2
11 T	60.0	60.0	60.0	60.0		57.7	57.7	0.0
12 R	60.0	19.6	19.6	60.0		48.5	48.5	9.0

"Running Speed" is the average speed excluding stopped periods.								

[Go to Table Links \(Top\)](#)

Gap Acceptance Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

		Opng	Critical Gap		Foll-up	Entry	Intra	Propn
Mov	Mov	Flow	Hdwy	Dist	Headway	HV	Bunch	Bnchd
ID	Type	pcu/h	sec	m	sec	Equiv	Hdwy	

South: Capricorn Highway South								
1 L	Normal	13+	5.75	42.8	3.45	2.00	0.90	0.001
2 T	Normal	88+	8.84	56.6	4.76	2.00	0.60	0.004
3 R	Normal	199+	8.05	55.0	4.60	2.00	0.60	0.010

East: Shakespere St								
6 R	Normal	31	5.18	36.5	2.88	2.00	0.90	0.002

North: Clermont Alpha Rd								
7 L	Normal	18+	6.10	43.0	3.66	2.00	0.90	0.001
8 T	Normal	83+	8.84	56.6	4.76	2.00	0.60	0.004
9 R	Normal	239+	8.54	56.4	4.88	2.00	0.60	0.012

West: Capricorn Hwy West								
12 R	Normal	22	5.40	40.2	3.00	2.00	0.90	0.001

Values in this table are adjusted for heavy vehicles in the entry stream.
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Lanes

Lane Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

		Flow	Cap	Deg.	Aver.	Eff.	Q u e u e	
Lane		veh/h	veh/h	Satn	Delay	Stop	95% Back	Lane
No.				x	sec	Rate	veh	Length

South: Capricorn Highway South								
1 L		34	672	0.050	8.8	0.63	0.1	21.0T
2 TR		115	631	0.182	9.9	0.60	1.0	500.0

East: Shakespere St								
1 L		16	1625	0.010	8.8	0.66	0.0	21.0T
2 TR		6	1424	0.004	4.5	0.39	0.0	500.0

North: Clermont Alpha Rd								
1 L		3	620	0.005	9.1	0.63	0.0	21.0T
2 TR		120	612	0.196	10.2	0.61	1.1	500.0

West: Capricorn Hwy West								
1 L		21	1483	0.014	9.2	0.66	0.0	21.0T
2 TR		37	1203	0.031	8.3	0.60	0.2	500.0

T Short lane due to specification of Turn Bay

[Go to Table Links \(Top\)](#)

Lane Flow and Capacity Information

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Dem Flow (veh/h)			Min Cap	Tot Cap	Deg. Satn	Lane Util
	Lef	Thru	Rig	Tot	veh/h	veh/h	x %
South: Capricorn Highway South							
1 L	34	0	0	34	34	672<	0.050 100
2 TR	0	99	16	115	60	631	0.182 100
East: Shakespere St							
1 L	16	0	0	16	16	1625	0.010 100
2 TR	0	3	3	6	6	1424	0.004 100
North: Clermont Alpha Rd							
1 L	3	0	0	3	3	620<	0.005 100
2 TR	0	99	21	120	60	612	0.196 100
West: Capricorn Hwy West							
1 L	21	0	0	21	21	1483	0.014 100
2 TR	0	3	34	37	37	1203	0.031 100

< Reduced capacity flow due to a short lane effect

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

[Go to Table Links \(Top\)](#)

Lane, Approach and Intersection Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (sec)		Deg Sat x	Aver. Delay sec	Longest Queue m	Shrt Lane m
	L	T	R	Tot			1st	2nd				
South: Capricorn Highway South												
1 L	34			34	20				0.050	8.8	1	21
2 TR		99	16	115	38				0.182	9.9	10	500
	34	99	16	148	34				0.182	9.7	10	
East: Shakespere St												
1 L	16			16	20				0.010	8.8	0	21
2 TR		3	3	6	20				0.004	4.5	0	500
	16	3	3	22	20				0.010	7.6	0	
North: Clermont Alpha Rd												
1 L	3			3	27				0.005	9.1	0	21
2 TR		99	21	120	39				0.196	10.2	11	500
	3	99	21	123	38				0.196	10.2	11	
West: Capricorn Hwy West												
1 L	21			21	35				0.014	9.2	0	21
2 TR		3	34	37	25				0.031	8.3	1	500
	21	3	34	58	29				0.031	8.6	1	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				352	34				0.197	9.5	11	

Peak flow period = 30 minutes.

Queue values in this table are 95% queue (metres)

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

[Go to Table Links \(Top\)](#)

Driver Characteristics

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Satn Speed km/h	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing m	Average Queue Space m	Driver Response Time sec
South: Capricorn Highway South						
1 L	NA - Short Lane					
2 TR	24.2	760	4.74	31.90	9.29	3.36
East: Shakespere St						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
North: Clermont Alpha Rd						
1 L	NA - Short Lane					
2 TR	24.0	753	4.78	31.91	9.31	3.39
West: Capricorn Hwy West						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
Saturation Flow and Saturation Headway are derived from follow-up headway.						

[Go to Table Links \(Top\)](#)

Lane Delays

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Stop-line Delay			Delay (seconds/veh)					Geom dig	Control dic
		1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queueing		Stopd (Idle) di			
						Total dq	MvUp dqm				
South: Capricorn Highway South											
1 L	0.050	0.1	0.0	0.1	0.3	0.0	0.0	0.0	8.8	8.8	
2 TR	0.182	1.7	0.0	1.7	1.5	0.2	0.0	0.2	8.2	9.9	
East: Shakespere St											
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8	
2 TR	0.004	0.1	0.0	0.1	0.7	0.0	0.0	0.0	4.4	4.5	
North: Clermont Alpha Rd											
1 L	0.005	0.1	0.0	0.1	0.3	0.0	0.0	0.0	9.0	9.1	
2 TR	0.196	1.9	0.0	1.9	1.5	0.5	0.0	0.5	8.3	10.2	
West: Capricorn Hwy West											
1 L	0.014	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.2	9.2	
2 TR	0.031	0.1	0.0	0.1	0.4	0.0	0.0	0.0	8.2	8.3	
dn is average stop-start delay for all vehicles queued and unqueued											

[Go to Table Links \(Top\)](#)

Lane Queues (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Ovrfl. Queue	Back of Queue (veh)				Queue Stor.	Prob. Block	P'ile Block	Cyc-Av.	Queue
	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.050	0.0	0.0	0.0	0.0	0.1	0.06	0.0	100.0	0.0	0.0
2 TR	0.182	0.0	0.3	0.0	0.3	1.0	0.02	0.0	100.0	0.1	0.2
East: Shakespere St											
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.01	0.0	100.0	0.0	0.0
2 TR	0.196	0.0	0.4	0.0	0.4	1.1	0.02	0.0	100.0	0.1	0.2
West: Capricorn Hwy West											
1 L	0.014	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.031	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queues (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

	Deg.	Ovrfl.	Back of Queue (m)				Queue	Prob.	P'ile	Cyc-Av.	Queue
Lane	Satn	Queue					Stor.	Block	Block		
No.	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.050	0.0	0.4	0.0	0.4	1.2	0.06	0.0	100.0	0.0	0.0
2 TR	0.182	0.0	3.1	0.0	3.1	9.7	0.02	0.0	100.0	0.5	1.6
East: Shakespere St											
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.1	0.01	0.0	100.0	0.0	0.0
2 TR	0.196	0.0	3.4	0.0	3.4	10.5	0.02	0.0	100.0	0.6	1.9
West: Capricorn Hwy West											
1 L	0.014	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.031	0.0	0.4	0.0	0.4	1.3	0.00	0.0	100.0	0.0	0.0

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Lane Queue Percentiles (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (veh)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.050	0.0	0.1	0.1	0.1	0.1	0.2
2 TR	0.182	0.3	0.5	0.7	0.8	1.0	1.2
East: Shakespere St							
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.0
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.196	0.4	0.5	0.7	0.9	1.1	1.3
West: Capricorn Hwy West							
1 L	0.014	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.031	0.1	0.1	0.1	0.1	0.2	0.2

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (metres)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.050	0.4	0.5	0.8	1.0	1.2	1.4
2 TR	0.182	3.1	4.2	6.4	7.8	9.7	11.3
East: Shakespere St							
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.1	0.1	0.1	0.2	0.2	0.2
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.196	3.4	4.6	7.0	8.4	10.5	12.2
West: Capricorn Hwy West							

1 L	0.014	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.031	0.4	0.6	0.9	1.1	1.3	1.6

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Lane Stops

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	-- Effective he1	Stop he2	Rate hig	-- Overall h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq
South: Capricorn Highway South									
1 L	0.050	0.01	0.00	0.62	0.63	21.3	0.00	0.0	0.07
2 TR	0.182	0.19	0.00	0.41	0.60	68.9	0.00	0.0	0.32
East: Shakespere St									
1 L	0.010	0.00	0.00	0.66	0.66	10.5	0.00	0.0	0.00
2 TR	0.004	0.01	0.00	0.38	0.39	2.4	0.00	0.0	0.11
North: Clermont Alpha Rd									
1 L	0.005	0.01	0.00	0.61	0.63	2.0	0.00	0.0	0.08
2 TR	0.196	0.19	0.00	0.41	0.61	72.9	0.00	0.0	0.31
West: Capricorn Hwy West									
1 L	0.014	0.00	0.00	0.66	0.66	13.9	0.00	0.0	0.00
2 TR	0.031	0.02	0.00	0.58	0.60	22.0	0.00	0.0	0.09

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Flow Rates and Demand Analysis

Movement Definitions and Flow Rates (O-D)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale Fixed	Flow Scale Var	Peak Flow Factor
South: Capricorn Highway South								
	East	3	Right	13	3	1.00	1.00	0.95
	North	2	Thru	58	41	1.00	1.00	0.95
	West	1	Left	27	7	1.00	1.00	0.95
East: Shakespere St								
	South	4	Left	13	3	1.00	1.00	0.95
	North	6	Right	3	1	1.00	1.00	0.95
	West	5	Thru	3	1	1.00	1.00	0.95
North: Clermont Alpha Rd								
	South	8	Thru	58	41	1.00	1.00	0.95
	East	7	Left	2	1	1.00	1.00	0.95
	West	9	Right	15	6	1.00	1.00	0.95
West: Capricorn Hwy West								
	South	12	Right	25	8	1.00	1.00	0.95
	East	11	Thru	2	1	1.00	1.00	0.95
	North	10	Left	14	7	1.00	1.00	0.95

Unit Time for Volumes = 60 minutes
Peak Flow Period = 30 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

[Go to Table Links \(Top\)](#)

Flow Rates (Separate Light and Heavy Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	27	7	0	0	0	0
2 T	0	0	58	41	0	0
3 R	0	0	0	0	13	3
East: Shakespere St						
4 L	13	3	0	0	0	0
5 T	0	0	3	1	0	0
6 R	0	0	0	0	3	1
North: Clermont Alpha Rd						
7 L	2	1	0	0	0	0
8 T	0	0	58	41	0	0
9 R	0	0	0	0	15	6
West: Capricorn Hwy West						
10 L	14	7	0	0	0	0
11 T	0	0	2	1	0	0
12 R	0	0	0	0	25	8
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Flow Rates (Total Vehicles and Percent Heavy)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1						
Stop Sign Controlled Intersection						
Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	34	20.0	0	0.0	0	0.0
2 T	0	0.0	99	41.0	0	0.0
3 R	0	0.0	0	0.0	16	20.0
East: Shakespere St						
4 L	16	20.0	0	0.0	0	0.0
5 T	0	0.0	3	20.0	0	0.0
6 R	0	0.0	0	0.0	3	20.0
North: Clermont Alpha Rd						
7 L	3	27.0	0	0.0	0	0.0
8 T	0	0.0	99	41.0	0	0.0
9 R	0	0.0	0	0.0	21	27.0
West: Capricorn Hwy West						
10 L	21	35.3	0	0.0	0	0.0
11 T	0	0.0	3	25.0	0	0.0
12 R	0	0.0	0	0.0	34	25.0
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

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Other

Model Settings

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1	
Stop Sign Controlled Intersection	
* Basic Parameters:	
Intersection Type: Unsignalised - Two-Way Stop Control	
Driving on the left-hand side of the road	
Input data specified in Metric units	
Model Defaults: Standard Left	
Peak Flow Period (for performance): 30 minutes	
Unit time (for volumes): 60 minutes.	
SIDRA Standard Delay model used	

SIDRA Standard Queue model used
Level of Service based on: Delay (HCM method)
Queue percentile: 95%

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Parameters Used in Cost Calculations

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Pump price of fuel (\$/L)	=	1.200
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	32.00
Time value factor	=	0.60
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

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Diagnostics

Site:Capricorn Hwy/Clermont Alpha Rd 2017 With Project AM

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Processed: Monday, 4 April 2011 4:02:06 p.m.
SIDRA INTERSECTION 5.0.2.1437

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SIDRA
INTERSECTION

DETAILED OUTPUT

Capricorn Hwy/Clermont Alpha Rd
2017 Without Project

Capricorn Hwy/Clermont Alpha Road 2017 Without Project
Stop (Two-Way)

OUTPUT TABLE LINKS



Movements

- Movement Capacity Parameters
- Movement Performance
- Fuel Consumption, Emissions and Cost (Total)
- Fuel Consumption, Emissions and Cost (Rate)
- Intersection Negotiation Data
- Movement Speeds and Geometric Delay
- Gap Acceptance Parameters



Lanes

- Lane Performance
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- Lane Queues (Vehicles)
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Flow Rates and Demand Analysis

- Movement Definitions and Flow Rates (O-D)
- Flow Rates (Separate Light and Heavy Vehicles)
- Flow Rates (Total Vehicles and Percent Heavy)



Other

- Model Settings
- Parameters Used in Cost Calculations
- Diagnostics

Movements

Movement Capacity Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Demand Flow veh/h	HV %	Opposing Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Lane Util %	Deg. Satn x
South: Capricorn Highway South									
1 L	34	20.0	11+	20.0	13	672<	0.80	1496	100 0.050*
2 T	5	20.0	54+	23.7	64	181	0.80	2651	100 0.029
3 R	16	20.0	59+	24.1	71	542	0.80	2646	100 0.029
East: Shakespere St									
4 L	16	20.0	0			1625	0.80	8133	100 0.010
5 T	3	20.0	0			722	0.80	****	100 0.004
6 R	3	20.0	6	25.0	8	722	0.80	****	100 0.004
North: Clermont Alpha Rd									
7 L	3	27.0	5+	25.0	6	623<	0.80	****	100 0.005
8 T	5	27.0	61+	23.2	72	435	0.80	6512	100 0.012
9 R	3	27.0	84+	22.3	98	261	0.80	6512	100 0.012
West: Capricorn Hwy West									
10 L	3	25.0	0			1576	0.80	****	100 0.002
11 T	3	25.0	0			103	0.80	2509	100 0.031
12 R	34	25.0	19	20.0	22	1100	0.80	2512	100 0.031

* Maximum degree of saturation
< Reduced saturation flow due to a short lane effect
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Movement Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)
South: Capricorn Highway South										
1	L	0.08	0.10	8.8	0.63	21.3	0.59	20.4	0.4	48.7
2	T	0.01	0.01	8.3	0.52	2.7	0.09	3.2	0.1	49.0
3	R	0.04	0.05	9.6	0.63	10.0	0.29	9.5	0.2	48.0
East: Shakespere St										
4	L	0.04	0.05	8.8	0.66	10.5	0.26	9.5	0.2	49.0
5	T	0.00	0.00	0.0	0.00	0.0	0.04	1.9	0.0	58.9
6	R	0.01	0.01	8.9	0.81	2.6	0.06	1.9	0.0	48.8
North: Clermont Alpha Rd										
7	L	0.01	0.01	9.0	0.64	2.0	0.06	1.9	0.0	48.8
8	T	0.01	0.02	8.6	0.53	2.8	0.09	3.2	0.1	49.0
9	R	0.01	0.01	10.0	0.65	2.1	0.06	1.9	0.0	48.0
West: Capricorn Hwy West										
10	L	0.01	0.01	8.9	0.66	2.1	0.05	1.9	0.0	49.0
11	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.7
12	R	0.08	0.10	9.1	0.65	22.0	0.59	20.3	0.4	48.5

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Total)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Total \$/h	Fuel Total L/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
South: Capricorn Highway South							
1	L	16.45	3.6	9.0	0.75	0.012	0.023
2	T	2.53	0.5	1.4	0.11	0.002	0.003
3	R	7.82	1.7	4.3	0.36	0.006	0.011
		26.80	5.8	14.7	1.22	0.020	0.037
East: Shakespere St							
4	L	7.67	1.7	4.2	0.35	0.006	0.011
5	T	1.14	0.2	0.5	0.01	0.001	0.001
6	R	1.54	0.3	0.8	0.07	0.001	0.002
		10.34	2.2	5.6	0.43	0.008	0.014
North: Clermont Alpha Rd							
7	L	1.63	0.4	1.0	0.08	0.001	0.002
8	T	2.69	0.6	1.6	0.13	0.002	0.004
9	R	1.66	0.4	1.0	0.08	0.001	0.003
		5.98	1.4	3.5	0.29	0.005	0.009
West: Capricorn Hwy West							
10	L	1.60	0.4	0.9	0.08	0.001	0.002
11	T	1.19	0.2	0.6	0.02	0.001	0.001
12	R	17.19	3.9	9.9	0.82	0.013	0.025
		19.98	4.5	11.4	0.92	0.015	0.029
INTERSECTION:		63.10	13.9	35.1	2.85	0.047	0.089

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Rate)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Rate \$/km	Fuel Rate L/100km	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
--------	--	-----------------------	-------------------------	---------------------	--------------------	--------------------	---------------------

South: Capricorn Highway South							
1 L	0.81	17.6	442.3	36.68	0.612	1.128	
2 T	0.80	17.2	434.0	35.12	0.591	1.096	
3 R	0.82	17.8	448.6	37.58	0.625	1.151	

	0.81	17.6	443.3	36.79	0.614	1.132	

East: Shakespere St							
4 L	0.80	17.5	440.4	36.44	0.608	1.122	
5 T	0.59	10.7	270.2	6.95	0.274	0.363	
6 R	0.81	17.6	443.4	36.85	0.614	1.133	

	0.77	16.5	416.5	32.27	0.561	1.015	

North: Clermont Alpha Rd							
7 L	0.85	19.8	500.2	41.46	0.658	1.286	
8 T	0.85	19.5	492.9	39.93	0.638	1.256	
9 R	0.87	20.1	508.8	42.62	0.674	1.318	

	0.86	19.8	499.2	41.08	0.653	1.281	

West: Capricorn Hwy West							
10 L	0.84	19.1	482.2	39.90	0.642	1.236	
11 T	0.62	12.0	302.2	8.88	0.298	0.413	
12 R	0.85	19.3	486.8	40.57	0.651	1.253	

	0.83	18.7	471.8	38.00	0.623	1.185	

INTERSECTION:	0.81	17.9	452.6	36.78	0.611	1.142	

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Intersection Negotiation Data

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

From	To		Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	Distance
Approach	Approach	Turn	m	km/h	m	m	m	User Spec?

South: Capricorn Highway South								
	East	Right	9.0	19.4	14.2	500	121	No
	North	Thru	S	25.0	13.2	500	127	No
	West	Left	10.0	20.2	15.7	500	123	No

East: Shakespere St								
	South	Left	10.0	20.2	15.7	500	123	No
	North	Right	9.3	19.6	14.6	500	107	No
	West	Thru	S	60.0	14.7	500	214	No

North: Clermont Alpha Rd								
	South	Thru	S	25.0	13.2	500	132	No
	East	Left	10.0	20.2	15.7	500	130	No
	West	Right	9.0	19.4	14.2	500	126	No

West: Capricorn Hwy West								
	South	Right	9.3	19.6	14.6	500	126	No
	East	Thru	S	60.0	14.7	500	237	No
	North	Left	10.0	20.2	15.7	500	128	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Movement Speeds and Geometric Delay

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running Overall	Geom Delay sec

South: Capricorn Highway South								
1 L	60.0	20.2	20.2	60.0			48.7	8.8
2 T	60.0	25.0	25.0	60.0			49.0	7.5
3 R	60.0	19.4	19.4	60.0			48.0	8.9

East: Shakespere St								
4 L	60.0	20.2	20.2	60.0		49.0	49.0	8.8
5 T	60.0	60.0	60.0	60.0		58.9	58.9	0.0
6 R	60.0	19.6	19.6	60.0		48.8	48.8	8.8

North: Clermont Alpha Rd								
7 L	60.0	20.2	20.2	60.0		48.8	48.8	9.0
8 T	60.0	25.0	25.0	60.0		49.0	49.0	7.7
9 R	60.0	19.4	19.4	60.0		48.0	48.0	9.1

West: Capricorn Hwy West								
10 L	60.0	20.2	20.2	60.0		49.0	49.0	8.9
11 T	60.0	60.0	60.0	60.0		57.7	57.7	0.0
12 R	60.0	19.6	19.6	60.0		48.5	48.5	9.0

"Running Speed" is the average speed excluding stopped periods.								

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Gap Acceptance Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

		Opng	Critical Gap		Foll-up	Entry	Intra	Propn
Mov	Mov	Flow	Hdwy	Dist	Headway	HV	Bunch	Bnchd
ID	Type	pcu/h	sec	m	sec	Equiv	Hdwy	Bnchd
							sec	

South: Capricorn Highway South								
1 L	Normal	13+	5.75	42.8	3.45	2.00	0.90	0.001
2 T	Normal	64+	7.48	49.6	4.03	2.00	0.60	0.003
3 R	Normal	71+	8.05	53.6	4.60	2.00	0.60	0.004

East: Shakespere St								
6 R	Normal	8	5.18	57.6	2.88	2.00	0.90	0.000

North: Clermont Alpha Rd								
7 L	Normal	6+	6.10	67.9	3.66	2.00	0.90	0.000
8 T	Normal	72+	7.93	52.7	4.27	2.00	0.60	0.004
9 R	Normal	98+	8.54	55.0	4.88	2.00	0.60	0.005

West: Capricorn Hwy West								
12 R	Normal	22	5.40	40.2	3.00	2.00	0.90	0.001

Values in this table are adjusted for heavy vehicles in the entry stream.
+ Percentage of exiting flow included in total opposing flow

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Lanes

Lane Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

		Flow	Cap	Deg.	Aver.	Eff.	Q u e u e	
Lane					Delay	Stop	95% Back	Lane
No.		veh/h	veh/h	x	sec	Rate	veh	Length
							m	m

South: Capricorn Highway South								
1 L		34	672	0.050	8.8	0.63	0.1	21.0T
2 TR		21	722	0.029	9.3	0.61	0.1	500.0

East: Shakespere St								
1 L		16	1625	0.010	8.8	0.66	0.0	21.0T
2 TR		6	1444	0.004	4.4	0.40	0.0	500.0

North: Clermont Alpha Rd								
1 L		3	623	0.005	9.0	0.64	0.0	21.0T
2 TR		8	696	0.012	9.1	0.57	0.1	500.0

West: Capricorn Hwy West								
1 L		3	1576	0.002	8.9	0.66	0.0	21.0T
2 TR		37	1203	0.031	8.3	0.60	0.2	500.0

T Short lane due to specification of Turn Bay

[Go to Table Links \(Top\)](#)

Lane Flow and Capacity Information

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Dem Flow (veh/h)			Min Cap	Tot Cap	Deg. Satn	Lane Util
	Lef	Thru	Rig	Tot	veh/h	veh/h	x %
South: Capricorn Highway South							
1 L	34	0	0	34	34	672<	0.050 100
2 TR	0	5	16	21	21	722	0.029 100
East: Shakespere St							
1 L	16	0	0	16	16	1625	0.010 100
2 TR	0	3	3	6	6	1444	0.004 100
North: Clermont Alpha Rd							
1 L	3	0	0	3	3	623<	0.005 100
2 TR	0	5	3	8	8	696	0.012 100
West: Capricorn Hwy West							
1 L	3	0	0	3	3	1576	0.002 100
2 TR	0	3	34	37	37	1203	0.031 100

< Reduced capacity flow due to a short lane effect

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

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Lane, Approach and Intersection Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff (sec) 1st	Grn 2nd	Deg Sat x	Aver. Delay sec	Longest Queue m	Shrt Lane m
	L	T	R	Tot								
South: Capricorn Highway South												
1 L	34			34	20				0.050	8.8	1	21
2 TR		5	16	21	20				0.029	9.3	1	500
	34	5	16	55	20				0.050	9.0	1	
East: Shakespere St												
1 L	16			16	20				0.010	8.8	0	21
2 TR		3	3	6	20				0.004	4.4	0	500
	16	3	3	22	20				0.010	7.5	0	
North: Clermont Alpha Rd												
1 L	3			3	27				0.005	9.0	0	21
2 TR		5	3	8	27				0.012	9.1	1	500
	3	5	3	12	27				0.012	9.1	1	
West: Capricorn Hwy West												
1 L	3			3	25				0.002	8.9	0	21
2 TR		3	34	37	25				0.031	8.3	1	500
	3	3	34	40	25				0.031	8.4	1	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				128	22				0.050	8.6	1	

Peak flow period = 30 minutes.

Queue values in this table are 95% queue (metres)

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

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Driver Characteristics

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Satn Speed km/h	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing m	Average Queue Space m	Driver Response Time sec
South: Capricorn Highway South						
1 L	NA - Short Lane					
2 TR	20.8	808	4.46	25.76	8.20	3.04
East: Shakespere St						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
North: Clermont Alpha Rd						
1 L	NA - Short Lane					
2 TR	22.9	800	4.50	28.63	8.62	3.14
West: Capricorn Hwy West						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					

Saturation Flow and Saturation Headway are derived from follow-up headway.

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Lane Delays

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Stop-line Delay			Delay (seconds/veh)				Geom dig	Control dic
		1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queueing		Stopd (Idle) di		
						Total dq	MvUp dqm			
South: Capricorn Highway South										
1 L	0.050	0.1	0.0	0.1	0.3	0.0	0.0	0.0	8.8	8.8
2 TR	0.029	0.8	0.0	0.8	0.9	0.0	0.0	0.0	8.5	9.3
East: Shakespere St										
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8
2 TR	0.004	0.0	0.0	0.0	0.3	0.0	0.0	0.0	4.4	4.4
North: Clermont Alpha Rd										
1 L	0.005	0.0	0.0	0.0	0.2	0.0	0.0	0.0	9.0	9.0
2 TR	0.012	0.9	0.0	0.9	1.1	0.0	0.0	0.0	8.2	9.1
West: Capricorn Hwy West										
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	8.9
2 TR	0.031	0.1	0.0	0.1	0.4	0.0	0.0	0.0	8.2	8.3
dn is average stop-start delay for all vehicles queued and unqueued										

[Go to Table Links \(Top\)](#)

Lane Queues (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Ovrfl. Queue	Back of Queue (veh)				Queue Stor.	Prob. Block	P'ile Block	Cyc-Av.	Queue
	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.050	0.0	0.0	0.0	0.0	0.1	0.06	0.0	100.0	0.0	0.0
2 TR	0.029	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
East: Shakespere St											
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.01	0.0	100.0	0.0	0.0
2 TR	0.012	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
West: Capricorn Hwy West											
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.031	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queues (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

	Deg.	Ovrfl.	Back of Queue (m)				Queue	Prob.	P'ile	Cyc-Av.	Queue
Lane	Satn	Queue					Stor.	Block	Block		
No.	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.050	0.0	0.4	0.0	0.4	1.2	0.06	0.0	100.0	0.0	0.0
2 TR	0.029	0.0	0.4	0.0	0.4	1.2	0.00	0.0	100.0	0.0	0.1
East: Shakespere St											
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.1	0.01	0.0	100.0	0.0	0.0
2 TR	0.012	0.0	0.2	0.0	0.2	0.5	0.00	0.0	100.0	0.0	0.1
West: Capricorn Hwy West											
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.031	0.0	0.4	0.0	0.4	1.3	0.00	0.0	100.0	0.0	0.0

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Lane Queue Percentiles (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Percentile (veh)					
	x	50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.050	0.0	0.1	0.1	0.1	0.1	0.2
2 TR	0.029	0.0	0.1	0.1	0.1	0.1	0.2
East: Shakespere St							
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.0
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.012	0.0	0.0	0.0	0.0	0.1	0.1
West: Capricorn Hwy West							
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.031	0.1	0.1	0.1	0.1	0.2	0.2

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (metres)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.050	0.4	0.5	0.8	1.0	1.2	1.4
2 TR	0.029	0.4	0.5	0.8	0.9	1.2	1.4
East: Shakespere St							
1 L	0.010	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.1	0.1	0.1	0.2	0.2	0.2
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.012	0.2	0.2	0.3	0.4	0.5	0.6
West: Capricorn Hwy West							

1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.031	0.4	0.6	0.9	1.1	1.3	1.6

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Lane Stops

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	-- Effective he1	Stop Rate he2	Geom. Overall hig	Total Stops h	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq
South: Capricorn Highway South								
1 L	0.050	0.01	0.00	0.62	0.63	21.3	0.00	0.07
2 TR	0.029	0.09	0.00	0.51	0.61	12.7	0.00	0.22
East: Shakespere St								
1 L	0.010	0.00	0.00	0.66	0.66	10.5	0.00	0.00
2 TR	0.004	0.00	0.00	0.40	0.40	2.6	0.00	0.05
North: Clermont Alpha Rd								
1 L	0.005	0.00	0.00	0.64	0.64	2.0	0.00	0.04
2 TR	0.012	0.10	0.00	0.47	0.57	4.8	0.00	0.24
West: Capricorn Hwy West								
1 L	0.002	0.00	0.00	0.66	0.66	2.1	0.00	0.00
2 TR	0.031	0.02	0.00	0.58	0.60	22.0	0.00	0.09

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Flow Rates and Demand Analysis

Movement Definitions and Flow Rates (O-D)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale Fixed	Flow Scale Var	Peak Flow Factor
South: Capricorn Highway South								
	East	3	Right	13	3	1.00	1.00	0.95
	North	2	Thru	4	1	1.00	1.00	0.95
	West	1	Left	27	7	1.00	1.00	0.95
East: Shakespere St								
	South	4	Left	13	3	1.00	1.00	0.95
	North	6	Right	3	1	1.00	1.00	0.95
	West	5	Thru	3	1	1.00	1.00	0.95
North: Clermont Alpha Rd								
	South	8	Thru	4	1	1.00	1.00	0.95
	East	7	Left	2	1	1.00	1.00	0.95
	West	9	Right	2	1	1.00	1.00	0.95
West: Capricorn Hwy West								
	South	12	Right	25	8	1.00	1.00	0.95
	East	11	Thru	2	1	1.00	1.00	0.95
	North	10	Left	2	1	1.00	1.00	0.95

Unit Time for Volumes = 60 minutes
Peak Flow Period = 30 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

[Go to Table Links \(Top\)](#)

Flow Rates (Separate Light and Heavy Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	27	7	0	0	0	0
2 T	0	0	4	1	0	0
3 R	0	0	0	0	13	3
East: Shakespere St						
4 L	13	3	0	0	0	0
5 T	0	0	3	1	0	0
6 R	0	0	0	0	3	1
North: Clermont Alpha Rd						
7 L	2	1	0	0	0	0
8 T	0	0	4	1	0	0
9 R	0	0	0	0	2	1
West: Capricorn Hwy West						
10 L	2	1	0	0	0	0
11 T	0	0	2	1	0	0
12 R	0	0	0	0	25	8
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Flow Rates (Total Vehicles and Percent Heavy) Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	34	20.0	0	0.0	0	0.0
2 T	0	0.0	5	20.0	0	0.0
3 R	0	0.0	0	0.0	16	20.0
East: Shakespere St						
4 L	16	20.0	0	0.0	0	0.0
5 T	0	0.0	3	20.0	0	0.0
6 R	0	0.0	0	0.0	3	20.0
North: Clermont Alpha Rd						
7 L	3	27.0	0	0.0	0	0.0
8 T	0	0.0	5	27.0	0	0.0
9 R	0	0.0	0	0.0	3	27.0
West: Capricorn Hwy West						
10 L	3	25.0	0	0.0	0	0.0
11 T	0	0.0	3	25.0	0	0.0
12 R	0	0.0	0	0.0	34	25.0
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Other

Model Settings Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

* Basic Parameters:

- Intersection Type: Unsignalised - Two-Way Stop Control
- Driving on the left-hand side of the road
- Input data specified in Metric units
- Model Defaults: Standard Left
- Peak Flow Period (for performance): 30 minutes
- Unit time (for volumes): 60 minutes.
- SIDRA Standard Delay model used

SIDRA Standard Queue model used
Level of Service based on: Delay (HCM method)
Queue percentile: 95%

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Parameters Used in Cost Calculations

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Pump price of fuel (\$/L)	=	1.200
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	32.00
Time value factor	=	0.60
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

[Go to Table Links \(Top\)](#)

Diagnostics

Site:Capricorn Hwy/Clermont Alpha Rd 2017 Without Project

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SIDRA INTERSECTION 5.0.2.1437

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Project: C:\Documents and Settings\kevin_ayen\My Documents\PROJECTS\Kev's Corner\Calculations\KC Coal
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SIDRA
INTERSECTION

DETAILED OUTPUT

Capricorn Hwy/Clermont Alpha Rd
2014 With Project PM

Capricorn Hwy/Clermont Alpha Road 2013 With Project PM
Stop (Two-Way)

OUTPUT TABLE LINKS



Movements

- Movement Capacity Parameters
- Movement Performance
- Fuel Consumption, Emissions and Cost (Total)
- Fuel Consumption, Emissions and Cost (Rate)
- Intersection Negotiation Data
- Movement Speeds and Geometric Delay
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Lanes

- Lane Performance
- Lane Flow and Capacity Information
- Lane, Approach and Intersection Performance
- Driver Characteristics
- Lane Delays
- Lane Queues (Vehicles)
- Lane Queues (Distance)
- Lane Queue Percentiles (Vehicles)
- Lane Queue Percentiles (Distance)
- Lane Stops



Flow Rates and Demand Analysis

- Movement Definitions and Flow Rates (O-D)
- Flow Rates (Separate Light and Heavy Vehicles)
- Flow Rates (Total Vehicles and Percent Heavy)



Other

- Model Settings
- Parameters Used in Cost Calculations
- Diagnostics

Movements

Movement Capacity Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Demand Flow veh/h	HV %	Opposing Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Lane Util %	Deg. Satn x
South: Capricorn Highway South									
1 L	28	20.0	10+	20.0	12	672<	0.80	1792	100 0.042
2 T	108	52.0	64+	24.0	76	528	0.80	290	100 0.205
3 R	14	20.0	156+	43.7	217	67	0.80	292	100 0.204
East: Shakespere St									
4 L	14	20.0	0			1625	0.80	9400	100 0.008
5 T	3	20.0	0			714	0.80	****	100 0.004
6 R	3	20.0	22	25.0	27	714	0.80	****	100 0.004
North: Clermont Alpha Rd									
7 L	3	45.5	13+	25.0	15	514<	0.80	****	100 0.006
8 T	108	52.0	61+	23.4	72	481	0.80	255	100 0.225
9 R	19	40.0	184+	39.9	249	84	0.80	255	100 0.226*
West: Capricorn Hwy West									
10 L	19	25.0	0			1576	0.80	6554	100 0.012
11 T	3	25.0	0			121	0.80	2965	100 0.026
12 R	28	25.0	17	20.0	19	1090	0.80	2968	100 0.026

* Maximum degree of saturation
< Reduced saturation flow due to a short lane effect
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Movement Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)
South: Capricorn Highway South										
1	L	0.07	0.08	8.8	0.64	18.1	0.50	17.2	0.4	48.7
2	T	0.31	0.37	10.2	0.57	62.3	2.09	65.4	1.4	48.4
3	R	0.04	0.05	10.6	0.75	10.3	0.28	8.3	0.2	47.3
East: Shakespere St										
4	L	0.03	0.04	8.8	0.66	9.1	0.22	8.3	0.2	49.0
5	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.7
6	R	0.01	0.01	8.9	0.78	2.5	0.06	1.9	0.0	48.7
North: Clermont Alpha Rd										
7	L	0.01	0.01	9.6	0.62	2.0	0.06	1.9	0.0	48.6
8	T	0.32	0.38	10.6	0.57	62.0	2.12	65.4	1.4	47.9
9	R	0.06	0.07	11.6	0.78	14.8	0.40	11.4	0.2	46.9
West: Capricorn Hwy West										
10	L	0.05	0.06	8.9	0.66	12.6	0.31	11.5	0.2	49.0
11	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.8
12	R	0.07	0.09	9.1	0.66	18.7	0.50	17.2	0.4	48.6

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Total)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Total \$/h	Fuel Total L/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
South: Capricorn Highway South							
1	L	13.87	3.0	7.6	0.63	0.011	0.019
2	T	67.22	18.2	46.3	3.76	0.053	0.120
3	R	6.87	1.5	3.7	0.31	0.005	0.010
		87.96	22.6	57.6	4.70	0.069	0.149
East: Shakespere St							
4	L	6.64	1.4	3.6	0.30	0.005	0.009
5	T	1.16	0.2	0.5	0.02	0.001	0.001
6	R	1.55	0.3	0.8	0.07	0.001	0.002
		9.35	2.0	5.0	0.39	0.007	0.012
North: Clermont Alpha Rd							
7	L	1.87	0.5	1.3	0.10	0.001	0.003
8	T	67.53	18.2	46.4	3.76	0.053	0.120
9	R	11.17	2.8	7.1	0.60	0.009	0.019
		80.57	21.5	54.8	4.47	0.064	0.142
West: Capricorn Hwy West							
10	L	9.59	2.2	5.5	0.46	0.007	0.014
11	T	1.19	0.2	0.6	0.02	0.001	0.001
12	R	14.50	3.3	8.3	0.70	0.011	0.021
		25.27	5.7	14.4	1.17	0.019	0.036
INTERSECTION:		203.17	51.8	131.9	10.73	0.158	0.340

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Rate)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Rate \$/km	Fuel Rate L/100km	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
--------	--	-----------------------	-------------------------	---------------------	--------------------	--------------------	---------------------

South: Capricorn Highway South						
1 L	0.81	17.5	442.1	36.66	0.612	1.128
2 T	1.03	27.8	708.3	57.55	0.812	1.836
3 R	0.83	17.9	451.5	37.75	0.630	1.158

	0.97	24.9	634.6	51.80	0.758	1.640

East: Shakespere St						
4 L	0.80	17.5	440.4	36.44	0.608	1.122
5 T	0.61	11.1	280.7	8.68	0.294	0.409
6 R	0.81	17.6	444.6	36.96	0.616	1.137

	0.77	16.5	415.8	32.12	0.560	1.011

North: Clermont Alpha Rd						
7 L	0.98	25.8	657.9	54.52	0.785	1.716
8 T	1.03	27.8	709.1	57.56	0.814	1.836
9 R	0.98	24.6	624.8	52.25	0.772	1.635

	1.02	27.3	695.6	56.72	0.807	1.804

West: Capricorn Hwy West						
10 L	0.84	19.1	482.2	39.90	0.642	1.236
11 T	0.62	11.9	300.7	8.64	0.295	0.406
12 R	0.85	19.3	486.6	40.54	0.651	1.252

	0.83	18.7	473.3	38.30	0.625	1.193

INTERSECTION:	0.96	24.4	621.6	50.56	0.746	1.601

[Go to Table Links \(Top\)](#)

Intersection Negotiation Data

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

From Approach	To Approach	Turn	Negn Radius m	Negn Speed km/h	Negn Dist. m	Appr. Dist. m	Downstream m	Distance User Spec?

South: Capricorn Highway South								
	East	Right	9.0	19.4	14.2	500	118	No
	North	Thru	S	25.0	13.2	500	155	No
	West	Left	10.0	20.2	15.7	500	123	No

East: Shakespere St								
	South	Left	10.0	20.2	15.7	500	123	No
	North	Right	9.3	19.6	14.6	500	107	No
	West	Thru	S	60.0	14.7	500	214	No

North: Clermont Alpha Rd								
	South	Thru	S	25.0	13.2	500	156	No
	East	Left	10.0	20.2	15.7	500	148	No
	West	Right	9.0	19.4	14.2	500	136	No

West: Capricorn Hwy West								
	South	Right	9.3	19.6	14.6	500	125	No
	East	Thru	S	60.0	14.7	500	236	No
	North	Left	10.0	20.2	15.7	500	128	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Movement Speeds and Geometric Delay

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd		Geom Delay sec
	-----		-----		1st	2nd	-----		
	Cruise	Negn	Negn	Cruise	Grn	Grn	Running	Overall	

South: Capricorn Highway South									
1 L	60.0	20.2	20.2	60.0			48.7	48.7	8.8
2 T	60.0	25.0	25.0	60.0			48.6	48.4	8.4
3 R	60.0	19.4	19.4	60.0			47.8	47.3	8.9

East: Shakespere St								
4 L	60.0	20.2	20.2	60.0		49.0	49.0	8.8
5 T	60.0	60.0	60.0	60.0		57.7	57.7	0.0
6 R	60.0	19.6	19.6	60.0		48.7	48.7	8.8

North: Clermont Alpha Rd								
7 L	60.0	20.2	20.2	60.0		48.6	48.6	9.5
8 T	60.0	25.0	25.0	60.0		48.6	47.9	8.4
9 R	60.0	19.4	19.4	60.0		47.8	46.9	9.5

West: Capricorn Hwy West								
10 L	60.0	20.2	20.2	60.0		49.0	49.0	8.9
11 T	60.0	60.0	60.0	60.0		57.8	57.8	0.0
12 R	60.0	19.6	19.6	60.0		48.6	48.6	9.0

"Running Speed" is the average speed excluding stopped periods.								

[Go to Table Links \(Top\)](#)

Gap Acceptance Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Critical Gap								
Mov	Mov	Opng	Hdwy	Dist	Foll-up	Entry	Intra	Propn
ID	Type	Flow	sec	m	Headway	HV	Bunch	Bnchd
		pcu/h			sec	Equiv	sec	

South: Capricorn Highway South								
1 L	Normal	12+	5.75	44.2	3.45	2.00	0.90	0.001
2 T	Normal	76+	9.56	62.4	5.15	2.00	0.60	0.004
3 R	Normal	217+	8.05	55.5	4.60	2.00	0.60	0.011

East: Shakespere St								
6 R	Normal	27	5.18	37.2	2.88	2.00	0.90	0.001

North: Clermont Alpha Rd								
7 L	Normal	15+	7.02	50.5	4.21	2.00	0.90	0.001
8 T	Normal	72+	9.56	62.4	5.15	2.00	0.60	0.004
9 R	Normal	249+	9.45	63.2	5.40	2.00	0.60	0.013

West: Capricorn Hwy West								
12 R	Normal	19	5.40	41.5	3.00	2.00	0.90	0.001

Values in this table are adjusted for heavy vehicles in the entry stream.
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Lanes

Lane Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Q u e u e								
Lane	Flow	Cap	Deg.	Aver.	Eff.	95% Back		Lane
No.	veh/h	veh/h	x	Delay	Stop	veh	m	Length
				sec	Rate			m

South: Capricorn Highway South								
1 L	28	672	0.042	8.8	0.64	0.1	1.0	21.0T
2 TR	122	595	0.205	10.2	0.60	1.2	12.0	500.0

East: Shakespere St								
1 L	14	1625	0.008	8.8	0.66	0.0	0.0	21.0T
2 TR	6	1428	0.004	4.5	0.39	0.0	0.2	500.0

North: Clermont Alpha Rd								
1 L	3	514	0.006	9.6	0.62	0.0	0.2	21.0T
2 TR	127	565	0.225	10.7	0.60	1.3	13.4	500.0

West: Capricorn Hwy West								
1 L	19	1576	0.012	8.9	0.66	0.0	0.0	21.0T
2 TR	32	1211	0.026	8.2	0.59	0.1	1.1	500.0

T Short lane due to specification of Turn Bay								

[Go to Table Links \(Top\)](#)

Lane Flow and Capacity Information

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Dem Flow (veh/h)			Min Cap	Tot Cap	Deg. Satn	Lane Util
	Lef	Thru	Rig	Tot	veh/h	veh/h	x %
South: Capricorn Highway South							
1 L	28	0	0	28	28	672<	0.042 100
2 TR	0	108	14	122	60	595	0.205 100
East: Shakespere St							
1 L	14	0	0	14	14	1625	0.008 100
2 TR	0	3	3	6	6	1428	0.004 100
North: Clermont Alpha Rd							
1 L	3	0	0	3	3	514<	0.006 100
2 TR	0	108	19	127	60	565	0.225 100
West: Capricorn Hwy West							
1 L	19	0	0	19	19	1576	0.012 100
2 TR	0	3	28	32	32	1211	0.026 100

< Reduced capacity flow due to a short lane effect

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

[Go to Table Links \(Top\)](#)

Lane, Approach and Intersection Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (sec) 1st 2nd	Deg Sat x	Aver. Delay sec	Longest Queue m	Shrt Lane m
	L	T	R	Tot							
South: Capricorn Highway South											
1 L	28			28	20			0.042	8.8	1	21
2 TR		108	14	122	48			0.205	10.2	12	500
	28	108	14	151	43			0.205	10.0	12	
East: Shakespere St											
1 L	14			14	20			0.008	8.8	0	21
2 TR		3	3	6	20			0.004	4.5	0	500
	14	3	3	20	20			0.008	7.4	0	
North: Clermont Alpha Rd											
1 L	3			3	45			0.006	9.6	0	21
2 TR		108	19	127	50			0.225	10.7	13	500
	3	108	19	131	50			0.225	10.7	13	
West: Capricorn Hwy West											
1 L	19			19	25			0.012	8.9	0	21
2 TR		3	28	32	25			0.026	8.2	1	500
	19	3	28	51	25			0.026	8.4	1	
ALL VEHICLES											
				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				352	42			0.226	9.9	13	

Peak flow period = 30 minutes.

Queue values in this table are 95% queue (metres)

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

[Go to Table Links \(Top\)](#)

Driver Characteristics

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Satn Speed km/h	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing m	Average Queue Space m	Driver Response Time sec
South: Capricorn Highway South						
1 L	NA - Short Lane					
2 TR	24.4	708	5.08	34.43	9.90	3.62
East: Shakespere St						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
North: Clermont Alpha Rd						
1 L	NA - Short Lane					
2 TR	24.2	694	5.18	34.80	10.01	3.69
West: Capricorn Hwy West						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
Saturation Flow and Saturation Headway are derived from follow-up headway.						

[Go to Table Links \(Top\)](#)

Lane Delays

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Stop-line Delay			Delay (seconds/veh)				Geom dig	Control dic	
		1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queueing		Stopd (Idle) di			
						Total dq	MvUp dqm				
South: Capricorn Highway South											
1 L	0.042	0.1	0.0	0.1	0.2	0.0	0.0	0.0	8.8	8.8	
2 TR	0.205	1.7	0.0	1.7	1.5	0.3	0.0	0.3	8.5	10.2	
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8	
2 TR	0.004	0.1	0.0	0.1	0.6	0.0	0.0	0.0	4.4	4.5	
North: Clermont Alpha Rd											
1 L	0.006	0.1	0.0	0.1	0.3	0.0	0.0	0.0	9.5	9.6	
2 TR	0.225	2.1	0.0	2.1	1.4	0.7	0.0	0.7	8.6	10.7	
West: Capricorn Hwy West											
1 L	0.012	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	8.9	
2 TR	0.026	0.1	0.0	0.1	0.4	0.0	0.0	0.0	8.1	8.2	
dn is average stop-start delay for all vehicles queued and unqueued											

[Go to Table Links \(Top\)](#)

Lane Queues (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Ovrfl. Queue	Back of Queue (veh)				Queue Stor.	Prob. Block	P'ile Block	Cyc-Av.	Queue
	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.042	0.0	0.0	0.0	0.0	0.1	0.05	0.0	100.0	0.0	0.0
2 TR	0.205	0.0	0.4	0.0	0.4	1.2	0.02	0.0	100.0	0.1	0.2
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.006	0.0	0.0	0.0	0.0	0.0	0.01	0.0	100.0	0.0	0.0
2 TR	0.225	0.0	0.4	0.0	0.4	1.3	0.03	0.0	100.0	0.1	0.2
West: Capricorn Hwy West											
1 L	0.012	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.026	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queues (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

	Deg.	Ovrfl.	Back of Queue (m)				Queue	Prob.	P'ile	Cyc-Av.	Queue
Lane	Satn	Queue					Stor.	Block	Block		
No.	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.042	0.0	0.3	0.0	0.3	1.0	0.05	0.0	100.0	0.0	0.0
2 TR	0.205	0.0	3.9	0.0	3.9	12.0	0.02	0.0	100.0	0.6	1.9
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.006	0.0	0.1	0.0	0.1	0.2	0.01	0.0	100.0	0.0	0.0
2 TR	0.225	0.0	4.3	0.0	4.3	13.4	0.03	0.0	100.0	0.8	2.4
West: Capricorn Hwy West											
1 L	0.012	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.026	0.0	0.4	0.0	0.4	1.1	0.00	0.0	100.0	0.0	0.0

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Lane Queue Percentiles (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Percentile (veh)					
	x	50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.042	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.205	0.4	0.5	0.8	1.0	1.2	1.4
East: Shakespere St							
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.0
North: Clermont Alpha Rd							
1 L	0.006	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.225	0.4	0.6	0.9	1.1	1.3	1.6
West: Capricorn Hwy West							
1 L	0.012	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.026	0.0	0.1	0.1	0.1	0.1	0.2

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (metres)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.042	0.3	0.4	0.7	0.8	1.0	1.2
2 TR	0.205	3.9	5.2	7.9	9.6	12.0	13.9
East: Shakespere St							
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.1	0.1	0.1	0.2	0.2	0.2
North: Clermont Alpha Rd							
1 L	0.006	0.1	0.1	0.1	0.1	0.2	0.2
2 TR	0.225	4.3	5.8	8.8	10.7	13.4	15.5
West: Capricorn Hwy West							

1 L	0.012	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.026	0.4	0.5	0.8	0.9	1.1	1.3

[Go to Table Links \(Top\)](#)

Lane Stops

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	-- Effective he1	Stop Rate he2	Geom. Overall hig	Rate h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq
South: Capricorn Highway South									
1 L	0.042	0.01	0.00	0.62	0.64	18.1	0.00	0.0	0.06
2 TR	0.205	0.18	0.00	0.41	0.60	72.7	0.00	0.0	0.31
East: Shakespere St									
1 L	0.008	0.00	0.00	0.66	0.66	9.1	0.00	0.0	0.00
2 TR	0.004	0.01	0.00	0.38	0.39	2.5	0.00	0.0	0.10
North: Clermont Alpha Rd									
1 L	0.006	0.01	0.00	0.61	0.62	2.0	0.00	0.0	0.08
2 TR	0.225	0.19	0.00	0.41	0.60	76.9	0.00	0.0	0.31
West: Capricorn Hwy West									
1 L	0.012	0.00	0.00	0.66	0.66	12.6	0.00	0.0	0.00
2 TR	0.026	0.02	0.00	0.58	0.59	18.7	0.00	0.0	0.08

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Flow Rates and Demand Analysis

Movement Definitions and Flow Rates (O-D)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale Fixed	Flow Scale Var	Peak Flow Factor
South: Capricorn Highway South								
	East	3	Right	11	3	1.00	1.00	0.95
	North	2	Thru	52	56	1.00	1.00	0.95
	West	1	Left	23	6	1.00	1.00	0.95
East: Shakespere St								
	South	4	Left	11	3	1.00	1.00	0.95
	North	6	Right	3	1	1.00	1.00	0.95
	West	5	Thru	3	1	1.00	1.00	0.95
North: Clermont Alpha Rd								
	South	8	Thru	52	56	1.00	1.00	0.95
	East	7	Left	2	1	1.00	1.00	0.95
	West	9	Right	11	8	1.00	1.00	0.95
West: Capricorn Hwy West								
	South	12	Right	21	7	1.00	1.00	0.95
	East	11	Thru	2	1	1.00	1.00	0.95
	North	10	Left	14	5	1.00	1.00	0.95

Unit Time for Volumes = 60 minutes
Peak Flow Period = 30 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

[Go to Table Links \(Top\)](#)

Flow Rates (Separate Light and Heavy Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	23	6	0	0	0	0
2 T	0	0	52	56	0	0
3 R	0	0	0	0	11	3
East: Shakespere St						
4 L	11	3	0	0	0	0
5 T	0	0	3	1	0	0
6 R	0	0	0	0	3	1
North: Clermont Alpha Rd						
7 L	2	1	0	0	0	0
8 T	0	0	52	56	0	0
9 R	0	0	0	0	11	8
West: Capricorn Hwy West						
10 L	14	5	0	0	0	0
11 T	0	0	2	1	0	0
12 R	0	0	0	0	21	7
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Flow Rates (Total Vehicles and Percent Heavy)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1						
Stop Sign Controlled Intersection						
Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	28	20.0	0	0.0	0	0.0
2 T	0	0.0	108	52.0	0	0.0
3 R	0	0.0	0	0.0	14	20.0
East: Shakespere St						
4 L	14	20.0	0	0.0	0	0.0
5 T	0	0.0	3	20.0	0	0.0
6 R	0	0.0	0	0.0	3	20.0
North: Clermont Alpha Rd						
7 L	3	45.5	0	0.0	0	0.0
8 T	0	0.0	108	52.0	0	0.0
9 R	0	0.0	0	0.0	19	40.0
West: Capricorn Hwy West						
10 L	19	25.0	0	0.0	0	0.0
11 T	0	0.0	3	25.0	0	0.0
12 R	0	0.0	0	0.0	28	25.0
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Other

Model Settings

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1	
Stop Sign Controlled Intersection	
* Basic Parameters:	
Intersection Type: Unsignalised - Two-Way Stop Control	
Driving on the left-hand side of the road	
Input data specified in Metric units	
Model Defaults: Standard Left	
Peak Flow Period (for performance): 30 minutes	
Unit time (for volumes): 60 minutes.	
SIDRA Standard Delay model used	

SIDRA Standard Queue model used
Level of Service based on: Delay (HCM method)
Queue percentile: 95%

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Parameters Used in Cost Calculations

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

Intersection ID: 1
Stop Sign Controlled Intersection

Pump price of fuel (\$/L)	=	1.200
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	32.00
Time value factor	=	0.60
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

[Go to Table Links \(Top\)](#)

Diagnostics

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project PM

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Processed: Monday, 4 April 2011 4:01:23 p.m.
SIDRA INTERSECTION 5.0.2.1437

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Project: C:\Documents and Settings\kevin_ayen\My Documents\PROJECTS\Kev's Corner\Calculations\KC Coal
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SIDRA
INTERSECTION

DETAILED OUTPUT

Capricorn Hwy/Clermont Alpha Rd
2014 With Project AM

Capricorn Hwy/Clermont Alpha Road 2013 With Project AM
Stop (Two-Way)

OUTPUT TABLE LINKS



Movements

- Movement Capacity Parameters
- Movement Performance
- Fuel Consumption, Emissions and Cost (Total)
- Fuel Consumption, Emissions and Cost (Rate)
- Intersection Negotiation Data
- Movement Speeds and Geometric Delay
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Lanes

- Lane Performance
- Lane Flow and Capacity Information
- Lane, Approach and Intersection Performance
- Driver Characteristics
- Lane Delays
- Lane Queues (Vehicles)
- Lane Queues (Distance)
- Lane Queue Percentiles (Vehicles)
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Flow Rates and Demand Analysis

- Movement Definitions and Flow Rates (O-D)
- Flow Rates (Separate Light and Heavy Vehicles)
- Flow Rates (Total Vehicles and Percent Heavy)



Other

- Model Settings
- Parameters Used in Cost Calculations
- Diagnostics

Movements

Movement Capacity Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Demand Flow veh/h	HV %	Opposing Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Lane Util %	Deg. Satn x
South: Capricorn Highway South									
1 L	28	19.2	10+	20.0	12	678<	0.80	1808	100 0.042
2 T	108	52.0	64+	28.4	79	526	0.80	288	100 0.206
3 R	14	20.0	156+	43.3	216	66	0.80	286	100 0.207
East: Shakespere St									
4 L	14	20.0	0			1625	0.80	9400	100 0.008
5 T	3	20.0	0			713	0.80	****	100 0.004
6 R	3	20.0	22	37.9	29	713	0.80	****	100 0.004
North: Clermont Alpha Rd									
7 L	3	27.0	13+	36.2	17	620<	0.80	****	100 0.005
8 T	108	52.0	61+	25.7	74	494	0.80	265	100 0.219
9 R	19	27.0	184+	40.6	250	86	0.80	263	100 0.220*
West: Capricorn Hwy West									
10 L	19	40.0	0			1444	0.80	5997	100 0.013
11 T	3	25.0	0			121	0.80	2965	100 0.026
12 R	28	25.0	17	20.0	19	1090	0.80	2968	100 0.026

* Maximum degree of saturation
< Reduced saturation flow due to a short lane effect
+ Percentage of exiting flow included in total opposing flow

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Movement Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)
South: Capricorn Highway South										
1	L	0.07	0.08	8.8	0.64	18.1	0.50	17.2	0.4	48.7
2	T	0.31	0.37	10.2	0.58	62.6	2.09	65.4	1.4	48.3
3	R	0.04	0.05	10.6	0.76	10.3	0.28	8.3	0.2	47.2
East: Shakespere St										
4	L	0.03	0.04	8.8	0.66	9.1	0.22	8.3	0.2	49.0
5	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.6
6	R	0.01	0.01	8.9	0.78	2.5	0.06	1.9	0.0	48.7
North: Clermont Alpha Rd										
7	L	0.01	0.01	9.1	0.63	2.0	0.06	1.9	0.0	48.6
8	T	0.31	0.38	10.4	0.57	62.1	2.11	65.4	1.4	48.1
9	R	0.06	0.07	11.0	0.77	14.7	0.39	11.4	0.2	47.0
West: Capricorn Hwy West										
10	L	0.05	0.06	9.3	0.66	12.5	0.31	11.5	0.2	49.0
11	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.8
12	R	0.07	0.09	9.1	0.66	18.7	0.50	17.2	0.4	48.6

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Fuel Consumption, Emissions and Cost (Total)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Total \$/h	Fuel Total L/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
South: Capricorn Highway South							
1	L	13.78	3.0	7.5	0.62	0.010	0.019
2	T	67.29	18.2	46.4	3.77	0.053	0.120
3	R	6.88	1.5	3.7	0.31	0.005	0.010
		87.95	22.6	57.6	4.70	0.069	0.149
East: Shakespere St							
4	L	6.64	1.4	3.6	0.30	0.005	0.009
5	T	1.16	0.2	0.5	0.02	0.001	0.001
6	R	1.55	0.3	0.8	0.07	0.001	0.002
		9.36	2.0	5.0	0.39	0.007	0.012
North: Clermont Alpha Rd							
7	L	1.63	0.4	1.0	0.08	0.001	0.002
8	T	67.41	18.2	46.4	3.76	0.053	0.120
9	R	10.11	2.3	5.9	0.49	0.008	0.015
		79.15	20.9	53.2	4.33	0.062	0.138
West: Capricorn Hwy West							
10	L	10.74	2.7	7.0	0.58	0.009	0.018
11	T	1.19	0.2	0.6	0.02	0.001	0.001
12	R	14.50	3.3	8.3	0.70	0.011	0.021
		26.43	6.3	15.9	1.29	0.020	0.040
INTERSECTION:		202.89	51.7	131.6	10.71	0.158	0.339

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Rate)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Rate \$/km	Fuel Rate L/100km	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
--------	--	-----------------------	-------------------------	---------------------	--------------------	--------------------	---------------------

South: Capricorn Highway South						
1 L	0.80	17.3	435.6	36.12	0.607	1.110
2 T	1.03	27.8	708.8	57.62	0.813	1.838
3 R	0.83	17.9	451.7	37.76	0.630	1.159

	0.97	24.9	633.8	51.75	0.757	1.638

East: Shakespere St						
4 L	0.80	17.5	440.4	36.44	0.608	1.122
5 T	0.61	11.2	282.0	8.88	0.296	0.414
6 R	0.81	17.6	444.8	36.98	0.616	1.137

	0.77	16.5	416.0	32.16	0.560	1.012

North: Clermont Alpha Rd						
7 L	0.86	19.8	501.3	41.61	0.660	1.290
8 T	1.03	27.8	708.8	57.56	0.813	1.836
9 R	0.88	20.3	512.0	42.83	0.680	1.325

	1.01	26.5	675.2	55.03	0.790	1.749

West: Capricorn Hwy West						
10 L	0.94	24.0	608.4	50.29	0.743	1.578
11 T	0.62	11.9	300.7	8.64	0.295	0.406
12 R	0.85	19.3	486.6	40.54	0.651	1.252

	0.87	20.6	520.7	42.20	0.663	1.322

INTERSECTION:	0.96	24.4	620.5	50.48	0.745	1.598

[Go to Table Links \(Top\)](#)

Intersection Negotiation Data

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

From	To		Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	Distance
Approach	Approach	Turn	m	km/h	m	m	m	User Spec?

South: Capricorn Highway South								
	East	Right	9.0	19.4	14.2	500	118	No
	North	Thru	S	25.0	13.2	500	155	No
	West	Left	10.0	20.2	15.7	500	123	No

East: Shakespere St								
	South	Left	10.0	20.2	15.7	500	123	No
	North	Right	9.3	19.6	14.6	500	107	No
	West	Thru	S	60.0	14.7	500	214	No

North: Clermont Alpha Rd								
	South	Thru	S	25.0	13.2	500	156	No
	East	Left	10.0	20.2	15.7	500	130	No
	West	Right	9.0	19.4	14.2	500	124	No

West: Capricorn Hwy West								
	South	Right	9.3	19.6	14.6	500	125	No
	East	Thru	S	60.0	14.7	500	236	No
	North	Left	10.0	20.2	15.7	500	142	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

[Go to Table Links \(Top\)](#)

Movement Speeds and Geometric Delay

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running Overall	Geom Delay sec

South: Capricorn Highway South								
1 L	60.0	20.2	20.2	60.0			48.7	8.7
2 T	60.0	25.0	25.0	60.0			48.6	8.4
3 R	60.0	19.4	19.4	60.0			47.8	8.9

East: Shakespere St								
4 L	60.0	20.2	20.2	60.0		49.0	49.0	8.8
5 T	60.0	60.0	60.0	60.0		57.6	57.6	0.0
6 R	60.0	19.6	19.6	60.0		48.7	48.7	8.8

North: Clermont Alpha Rd								
7 L	60.0	20.2	20.2	60.0		48.6	48.6	9.0
8 T	60.0	25.0	25.0	60.0		48.6	48.1	8.4
9 R	60.0	19.4	19.4	60.0		47.8	47.0	9.1

West: Capricorn Hwy West								
10 L	60.0	20.2	20.2	60.0		49.0	49.0	9.3
11 T	60.0	60.0	60.0	60.0		57.8	57.8	0.0
12 R	60.0	19.6	19.6	60.0		48.6	48.6	9.0

"Running Speed" is the average speed excluding stopped periods.								

[Go to Table Links \(Top\)](#)

Gap Acceptance Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

		Opng	Critical Gap		Foll-up	Entry	Intra	Propn
Mov	Mov	Flow	Hdwy	Dist	Headway	HV	Bunch	Bnchd
ID	Type	pcu/h	sec	m	sec	Equiv	sec	

South: Capricorn Highway South								
1 L	Normal	12+	5.71	43.9	3.43	2.00	0.90	0.001
2 T	Normal	79+	9.56	62.4	5.15	2.00	0.60	0.004
3 R	Normal	216+	8.05	55.5	4.60	2.00	0.60	0.011

East: Shakespere St								
6 R	Normal	29	5.18	37.2	2.88	2.00	0.90	0.001

North: Clermont Alpha Rd								
7 L	Normal	17+	6.10	43.8	3.66	2.00	0.90	0.001
8 T	Normal	74+	9.56	62.4	5.15	2.00	0.60	0.004
9 R	Normal	250+	8.54	57.1	4.88	2.00	0.60	0.013

West: Capricorn Hwy West								
12 R	Normal	19	5.40	41.5	3.00	2.00	0.90	0.001

Values in this table are adjusted for heavy vehicles in the entry stream.
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Lanes

Lane Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

		Flow	Cap	Deg.	Aver.	Eff.	Q u e u e	
Lane		veh/h	veh/h	Satn	Delay	Stop	95% Back	Lane
No.				x	sec	Rate	veh	Length

South: Capricorn Highway South								
1 L		28	678	0.042	8.8	0.64	0.1	21.0T
2 TR		122	592	0.206	10.3	0.60	1.2	500.0

East: Shakespere St								
1 L		14	1625	0.008	8.8	0.66	0.0	21.0T
2 TR		6	1425	0.004	4.5	0.39	0.0	500.0

North: Clermont Alpha Rd								
1 L		3	620	0.005	9.1	0.63	0.0	21.0T
2 TR		127	580	0.220	10.5	0.60	1.3	500.0

West: Capricorn Hwy West								
1 L		19	1444	0.013	9.3	0.66	0.0	21.0T
2 TR		32	1211	0.026	8.2	0.59	0.1	500.0

T Short lane due to specification of Turn Bay								

[Go to Table Links \(Top\)](#)

Lane Flow and Capacity Information

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Dem Flow (veh/h)			Min Cap	Tot Cap	Deg. Satn	Lane Util
	Lef	Thru	Rig	Tot	veh/h	veh/h	x %
South: Capricorn Highway South							
1 L	28	0	0	28	28	678<	0.042 100
2 TR	0	108	14	122	60	592	0.206 100
East: Shakespere St							
1 L	14	0	0	14	14	1625	0.008 100
2 TR	0	3	3	6	6	1425	0.004 100
North: Clermont Alpha Rd							
1 L	3	0	0	3	3	620<	0.005 100
2 TR	0	108	19	127	60	580	0.220 100
West: Capricorn Hwy West							
1 L	19	0	0	19	19	1444	0.013 100
2 TR	0	3	28	32	32	1211	0.026 100

< Reduced capacity flow due to a short lane effect

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

[Go to Table Links \(Top\)](#)

Lane, Approach and Intersection Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff Grn (sec)	Deg Sat x	Aver. Delay sec	Longest Queue m	Shrt Lane m
	L	T	R	Tot			1st 2nd				
South: Capricorn Highway South											
1 L	28			28	19			0.042	8.8	1	21
2 TR		108	14	122	48			0.206	10.3	12	500
	28	108	14	151	43			0.206	10.0	12	
East: Shakespere St											
1 L	14			14	20			0.008	8.8	0	21
2 TR		3	3	6	20			0.004	4.5	0	500
	14	3	3	20	20			0.008	7.4	0	
North: Clermont Alpha Rd											
1 L	3			3	27			0.005	9.1	0	21
2 TR		108	19	127	48			0.220	10.5	13	500
	3	108	19	131	48			0.220	10.5	13	
West: Capricorn Hwy West											
1 L	19			19	40			0.013	9.3	0	21
2 TR		3	28	32	25			0.026	8.2	1	500
	19	3	28	51	31			0.026	8.6	1	
ALL VEHICLES											
				Total Flow	% HV			Max X	Aver. Delay	Max Queue	
				352	42			0.220	9.8	13	

Peak flow period = 30 minutes.

Queue values in this table are 95% queue (metres)

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

[Go to Table Links \(Top\)](#)

Driver Characteristics

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Satn Speed km/h	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing m	Average Queue Space m	Driver Response Time sec
South: Capricorn Highway South						
1 L	NA - Short Lane					
2 TR	24.4	708	5.08	34.43	9.90	3.62
East: Shakespere St						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
North: Clermont Alpha Rd						
1 L	NA - Short Lane					
2 TR	24.2	705	5.11	34.28	9.90	3.63
West: Capricorn Hwy West						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
Saturation Flow and Saturation Headway are derived from follow-up headway.						

[Go to Table Links \(Top\)](#)

Lane Delays

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Stop-line Delay			Delay (seconds/veh)					Geom dig	Control dic
		1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queueing		Stopd (Idle) di			
						Total dq	MvUp dqm				
South: Capricorn Highway South											
1 L	0.042	0.1	0.0	0.1	0.2	0.0	0.0	0.0	8.7	8.8	
2 TR	0.206	1.8	0.0	1.8	1.5	0.3	0.0	0.3	8.5	10.3	
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8	
2 TR	0.004	0.1	0.0	0.1	0.6	0.0	0.0	0.0	4.4	4.5	
North: Clermont Alpha Rd											
1 L	0.005	0.1	0.0	0.1	0.3	0.0	0.0	0.0	9.0	9.1	
2 TR	0.220	2.0	0.0	2.0	1.4	0.5	0.0	0.5	8.5	10.5	
West: Capricorn Hwy West											
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.3	9.3	
2 TR	0.026	0.1	0.0	0.1	0.4	0.0	0.0	0.0	8.1	8.2	
dn is average stop-start delay for all vehicles queued and unqueued											

[Go to Table Links \(Top\)](#)

Lane Queues (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Ovrfl. Queue	Back of Queue (veh)				Queue Stor.	Prob. Block	P'ile Block	Cyc-Av.	Queue
	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.042	0.0	0.0	0.0	0.0	0.1	0.05	0.0	100.0	0.0	0.0
2 TR	0.206	0.0	0.4	0.0	0.4	1.2	0.02	0.0	100.0	0.1	0.2
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.01	0.0	100.0	0.0	0.0
2 TR	0.220	0.0	0.4	0.0	0.4	1.3	0.03	0.0	100.0	0.1	0.2
West: Capricorn Hwy West											
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.026	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queues (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

	Deg.	Ovrfl.	Back of Queue (m)				Queue	Prob.	P'ile	Cyc-Av.	Queue
Lane	Satn	Queue					Stor.	Block	Block		
No.	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.042	0.0	0.3	0.0	0.3	1.0	0.05	0.0	100.0	0.0	0.0
2 TR	0.206	0.0	3.9	0.0	3.9	12.1	0.02	0.0	100.0	0.6	1.9
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.1	0.01	0.0	100.0	0.0	0.0
2 TR	0.220	0.0	4.2	0.0	4.2	12.9	0.03	0.0	100.0	0.7	2.2
West: Capricorn Hwy West											
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.026	0.0	0.4	0.0	0.4	1.1	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (veh)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.042	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.206	0.4	0.5	0.8	1.0	1.2	1.4
East: Shakespere St							
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.0
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.220	0.4	0.6	0.9	1.0	1.3	1.5
West: Capricorn Hwy West							
1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.026	0.0	0.1	0.1	0.1	0.1	0.2

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (metres)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.042	0.3	0.4	0.7	0.8	1.0	1.2
2 TR	0.206	3.9	5.2	8.0	9.7	12.1	14.0
East: Shakespere St							
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.1	0.1	0.1	0.2	0.2	0.2
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.220	4.2	5.6	8.5	10.3	12.9	14.9
West: Capricorn Hwy West							

1 L	0.013	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.026	0.4	0.5	0.8	0.9	1.1	1.3

[Go to Table Links \(Top\)](#)

Lane Stops

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	-- Effective he1	Stop he2	Rate hig	-- Overall h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq
South: Capricorn Highway South									
1 L	0.042	0.01	0.00	0.62	0.64	18.1	0.00	0.0	0.06
2 TR	0.206	0.19	0.00	0.41	0.60	73.0	0.00	0.0	0.32
East: Shakespere St									
1 L	0.008	0.00	0.00	0.66	0.66	9.1	0.00	0.0	0.00
2 TR	0.004	0.01	0.00	0.38	0.39	2.5	0.00	0.0	0.11
North: Clermont Alpha Rd									
1 L	0.005	0.01	0.00	0.61	0.63	2.0	0.00	0.0	0.08
2 TR	0.220	0.19	0.00	0.41	0.60	76.8	0.00	0.0	0.31
West: Capricorn Hwy West									
1 L	0.013	0.00	0.00	0.66	0.66	12.5	0.00	0.0	0.00
2 TR	0.026	0.02	0.00	0.58	0.59	18.7	0.00	0.0	0.08

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

Flow Rates and Demand Analysis

Movement Definitions and Flow Rates (O-D)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale Fixed	Flow Scale Var	Peak Flow Factor
South: Capricorn Highway South								
	East	3	Right	11	3	1.00	1.00	0.95
	North	2	Thru	52	56	1.00	1.00	0.95
	West	1	Left	23	5	1.00	1.00	0.95
East: Shakespere St								
	South	4	Left	11	3	1.00	1.00	0.95
	North	6	Right	3	1	1.00	1.00	0.95
	West	5	Thru	3	1	1.00	1.00	0.95
North: Clermont Alpha Rd								
	South	8	Thru	52	56	1.00	1.00	0.95
	East	7	Left	2	1	1.00	1.00	0.95
	West	9	Right	14	5	1.00	1.00	0.95
West: Capricorn Hwy West								
	South	12	Right	21	7	1.00	1.00	0.95
	East	11	Thru	2	1	1.00	1.00	0.95
	North	10	Left	11	8	1.00	1.00	0.95

Unit Time for Volumes = 60 minutes
Peak Flow Period = 30 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

[Go to Table Links \(Top\)](#)

Flow Rates (Separate Light and Heavy Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	23	5	0	0	0	0
2 T	0	0	52	56	0	0
3 R	0	0	0	0	11	3
East: Shakespere St						
4 L	11	3	0	0	0	0
5 T	0	0	3	1	0	0
6 R	0	0	0	0	3	1
North: Clermont Alpha Rd						
7 L	2	1	0	0	0	0
8 T	0	0	52	56	0	0
9 R	0	0	0	0	14	5
West: Capricorn Hwy West						
10 L	11	8	0	0	0	0
11 T	0	0	2	1	0	0
12 R	0	0	0	0	21	7
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Flow Rates (Total Vehicles and Percent Heavy)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	28	19.2	0	0.0	0	0.0
2 T	0	0.0	108	52.0	0	0.0
3 R	0	0.0	0	0.0	14	20.0
East: Shakespere St						
4 L	14	20.0	0	0.0	0	0.0
5 T	0	0.0	3	20.0	0	0.0
6 R	0	0.0	0	0.0	3	20.0
North: Clermont Alpha Rd						
7 L	3	27.0	0	0.0	0	0.0
8 T	0	0.0	108	52.0	0	0.0
9 R	0	0.0	0	0.0	19	27.0
West: Capricorn Hwy West						
10 L	19	40.0	0	0.0	0	0.0
11 T	0	0.0	3	25.0	0	0.0
12 R	0	0.0	0	0.0	28	25.0
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

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Other

Model Settings

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

* Basic Parameters:
Intersection Type: Unsignalised - Two-Way Stop Control
Driving on the left-hand side of the road
Input data specified in Metric units
Model Defaults: Standard Left
Peak Flow Period (for performance): 30 minutes
Unit time (for volumes): 60 minutes.
SIDRA Standard Delay model used

SIDRA Standard Queue model used
Level of Service based on: Delay (HCM method)
Queue percentile: 95%

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Parameters Used in Cost Calculations

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

Intersection ID: 1
Stop Sign Controlled Intersection

Pump price of fuel (\$/L)	=	1.200
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	32.00
Time value factor	=	0.60
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

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Diagnostics

Site:Capricorn Hwy/Clermont Alpha Rd 2014 With Project AM

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SIDRA INTERSECTION 5.0.2.1437

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SIDRA
INTERSECTION

DETAILED OUTPUT

Capricorn Hwy/Clermont Alpha Rd
2014 Without Project

Capricorn Hwy/Clermont Alpha Road 2014 Without Project
Stop (Two-Way)

OUTPUT TABLE LINKS



Movements

- Movement Capacity Parameters
- Movement Performance
- Fuel Consumption, Emissions and Cost (Total)
- Fuel Consumption, Emissions and Cost (Rate)
- Intersection Negotiation Data
- Movement Speeds and Geometric Delay
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Lanes

- Lane Performance
- Lane Flow and Capacity Information
- Lane, Approach and Intersection Performance
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- Lane Queues (Vehicles)
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Flow Rates and Demand Analysis

- Movement Definitions and Flow Rates (O-D)
- Flow Rates (Separate Light and Heavy Vehicles)
- Flow Rates (Total Vehicles and Percent Heavy)



Other

- Model Settings
- Parameters Used in Cost Calculations
- Diagnostics

Movements

Movement Capacity Parameters

Site: Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Demand Flow veh/h	HV %	Opposing Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Lane Util %	Deg. Satn x
South: Capricorn Highway South									
1 L	28	20.0	10+	20.0	12	672<	0.80	1792	100 0.042*
2 T	4	20.0	48+	23.6	57	172	0.80	3168	100 0.024
3 R	14	20.0	52+	24.0	62	559	0.80	3168	100 0.024
East: Shakespere St									
4 L	14	20.0	0			1625	0.80	9400	100 0.008
5 T	3	20.0	0			722	0.80	****	100 0.004
6 R	3	20.0	6	25.0	8	722	0.80	****	100 0.004
North: Clermont Alpha Rd									
7 L	3	27.0	5+	25.0	6	623<	0.80	****	100 0.005
8 T	4	27.0	53+	23.1	63	401	0.80	7519	100 0.011
9 R	3	27.0	72+	22.3	85	301	0.80	7525	100 0.010
West: Capricorn Hwy West									
10 L	3	25.0	0			1576	0.80	****	100 0.002
11 T	3	25.0	0			121	0.80	2965	100 0.026
12 R	28	25.0	17	20.0	19	1090	0.80	2968	100 0.026

* Maximum degree of saturation
< Reduced saturation flow due to a short lane effect
+ Percentage of exiting flow included in total opposing flow

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Movement Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)
South: Capricorn Highway South										
1	L	0.07	0.08	8.8	0.64	18.1	0.50	17.2	0.4	48.7
2	T	0.01	0.01	8.2	0.52	2.2	0.07	2.5	0.1	49.1
3	R	0.04	0.04	9.5	0.63	8.6	0.25	8.3	0.2	48.0
East: Shakespere St										
4	L	0.03	0.04	8.8	0.66	9.1	0.22	8.3	0.2	49.0
5	T	0.00	0.00	0.0	0.00	0.0	0.04	1.9	0.0	58.9
6	R	0.01	0.01	8.9	0.81	2.6	0.06	1.9	0.0	48.8
North: Clermont Alpha Rd										
7	L	0.01	0.01	9.0	0.64	2.0	0.06	1.9	0.0	48.8
8	T	0.01	0.01	8.5	0.52	2.2	0.07	2.5	0.1	49.0
9	R	0.01	0.01	9.9	0.65	2.0	0.06	1.9	0.0	48.0
West: Capricorn Hwy West										
10	L	0.01	0.01	8.9	0.66	2.1	0.05	1.9	0.0	49.0
11	T	0.00	0.00	0.1	0.00	0.0	0.04	1.9	0.0	57.8
12	R	0.07	0.09	9.1	0.66	18.7	0.50	17.2	0.4	48.6

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Total)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Total \$/h	Fuel Total L/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
South: Capricorn Highway South							
1	L	13.87	3.0	7.6	0.63	0.011	0.019
2	T	2.02	0.4	1.1	0.09	0.001	0.003
3	R	6.76	1.5	3.7	0.31	0.005	0.009
		22.66	4.9	12.4	1.03	0.017	0.032
East: Shakespere St							
4	L	6.64	1.4	3.6	0.30	0.005	0.009
5	T	1.14	0.2	0.5	0.01	0.001	0.001
6	R	1.54	0.3	0.8	0.07	0.001	0.002
		9.32	2.0	5.0	0.38	0.007	0.012
North: Clermont Alpha Rd							
7	L	1.63	0.4	1.0	0.08	0.001	0.002
8	T	2.15	0.5	1.2	0.10	0.002	0.003
9	R	1.66	0.4	1.0	0.08	0.001	0.003
		5.43	1.3	3.2	0.26	0.004	0.008
West: Capricorn Hwy West							
10	L	1.60	0.4	0.9	0.08	0.001	0.002
11	T	1.19	0.2	0.6	0.02	0.001	0.001
12	R	14.50	3.3	8.3	0.70	0.011	0.021
		17.29	3.9	9.8	0.79	0.013	0.025
INTERSECTION:		54.70	12.1	30.4	2.46	0.041	0.077

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Rate)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Rate \$/km	Fuel Rate L/100km	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
--------	--	-----------------------	-------------------------	---------------------	--------------------	--------------------	---------------------

South: Capricorn Highway South							
1 L	0.81	17.5	442.1	36.66	0.612	1.128	
2 T	0.80	17.2	433.3	35.02	0.590	1.093	
3 R	0.82	17.8	448.2	37.53	0.624	1.149	

	0.81	17.6	443.1	36.77	0.614	1.131	

East: Shakespere St							
4 L	0.80	17.5	440.4	36.44	0.608	1.122	
5 T	0.59	10.7	270.2	6.95	0.274	0.363	
6 R	0.81	17.6	443.4	36.85	0.614	1.133	

	0.77	16.4	413.9	31.83	0.556	1.003	

North: Clermont Alpha Rd							
7 L	0.85	19.8	500.2	41.46	0.658	1.286	
8 T	0.85	19.5	492.1	39.83	0.637	1.253	
9 R	0.87	20.1	508.3	42.57	0.673	1.316	

	0.86	19.8	499.4	41.14	0.654	1.282	

West: Capricorn Hwy West							
10 L	0.84	19.1	482.2	39.90	0.642	1.236	
11 T	0.62	11.9	300.7	8.64	0.295	0.406	
12 R	0.85	19.3	486.6	40.54	0.651	1.252	

	0.82	18.6	469.3	37.57	0.618	1.174	

INTERSECTION:	0.81	17.9	451.3	36.54	0.608	1.136	

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Intersection Negotiation Data

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

From	To		Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	Distance
Approach	Approach	Turn	m	km/h	m	m	m	User Spec?

South: Capricorn Highway South								
	East	Right	9.0	19.4	14.2	500	121	No
	North	Thru	S	25.0	13.2	500	127	No
	West	Left	10.0	20.2	15.7	500	123	No

East: Shakespere St								
	South	Left	10.0	20.2	15.7	500	123	No
	North	Right	9.3	19.6	14.6	500	107	No
	West	Thru	S	60.0	14.7	500	214	No

North: Clermont Alpha Rd								
	South	Thru	S	25.0	13.2	500	133	No
	East	Left	10.0	20.2	15.7	500	130	No
	West	Right	9.0	19.4	14.2	500	126	No

West: Capricorn Hwy West								
	South	Right	9.3	19.6	14.6	500	125	No
	East	Thru	S	60.0	14.7	500	236	No
	North	Left	10.0	20.2	15.7	500	128	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

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Movement Speeds and Geometric Delay

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running Overall	Geom Delay sec

South: Capricorn Highway South								
1 L	60.0	20.2	20.2	60.0			48.7	48.7
2 T	60.0	25.0	25.0	60.0			49.1	49.1
3 R	60.0	19.4	19.4	60.0			48.0	48.0

East: Shakespere St								
4 L	60.0	20.2	20.2	60.0		49.0	49.0	8.8
5 T	60.0	60.0	60.0	60.0		58.9	58.9	0.0
6 R	60.0	19.6	19.6	60.0		48.8	48.8	8.8

North: Clermont Alpha Rd								
7 L	60.0	20.2	20.2	60.0		48.8	48.8	9.0
8 T	60.0	25.0	25.0	60.0		49.0	49.0	7.7
9 R	60.0	19.4	19.4	60.0		48.0	48.0	9.1

West: Capricorn Hwy West								
10 L	60.0	20.2	20.2	60.0		49.0	49.0	8.9
11 T	60.0	60.0	60.0	60.0		57.8	57.8	0.0
12 R	60.0	19.6	19.6	60.0		48.6	48.6	9.0

"Running Speed" is the average speed excluding stopped periods.								

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Gap Acceptance Parameters

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

			Critical Gap				Intra	Propn
Mov	Mov	Opng	Hdwy	Dist	Foll-up	Entry	Bunch	Propn
ID	Type	Flow	sec	m	Headway	HV	Hdwy	Bnchd
		pcu/h			sec	Equiv	sec	

South: Capricorn		Highway	South					
1 L	Normal	12+	5.75	44.2	3.45	2.00	0.90	0.001
2 T	Normal	57+	7.48	50.8	4.03	2.00	0.60	0.003
3 R	Normal	62+	8.05	54.8	4.60	2.00	0.60	0.003

East: Shakespere St								
6 R	Normal	8	5.18	57.6	2.88	2.00	0.90	0.000

North: Clermont		Alpha Rd						
7 L	Normal	6+	6.10	67.9	3.66	2.00	0.90	0.000
8 T	Normal	63+	7.93	53.9	4.27	2.00	0.60	0.003
9 R	Normal	85+	8.54	56.1	4.88	2.00	0.60	0.004

West: Capricorn		Hwy West						
12 R	Normal	19	5.40	41.5	3.00	2.00	0.90	0.001

Values in this table are adjusted for heavy vehicles in the entry stream.
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Lanes

Lane Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

						Q u e u e		
Lane	Flow	Cap	Deg.	Aver.	Eff.	95% Back		Lane
No.	veh/h	veh/h	Satn x	Delay sec	Stop Rate	veh	m	Length m
South: Capricorn Highway South								
1 L	28	672	0.042	8.8	0.64	0.1	1.0	21.0T
2 TR	18	731	0.024	9.2	0.60	0.1	1.0	500.0
East: Shakespere St								
1 L	14	1625	0.008	8.8	0.66	0.0	0.0	21.0T
2 TR	6	1444	0.004	4.4	0.40	0.0	0.2	500.0
North: Clermont Alpha Rd								
1 L	3	623	0.005	9.0	0.64	0.0	0.1	21.0T
2 TR	7	702	0.010	9.1	0.58	0.1	0.4	500.0
West: Capricorn Hwy West								
1 L	3	1576	0.002	8.9	0.66	0.0	0.0	21.0T
2 TR	32	1211	0.026	8.2	0.59	0.1	1.1	500.0
T Short lane due to specification of Turn Bay								

[Go to Table Links \(Top\)](#)

Lane Flow and Capacity Information

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Dem Flow (veh/h)				Min Cap	Tot Cap	Deg. Satn	Lane Util
	Lef	Thru	Rig	Tot	veh/h	veh/h	x	%
South: Capricorn Highway South								
1 L	28	0	0	28	28	672	0.042	100
2 TR	0	4	14	18	18	731	0.024	100
East: Shakespere St								
1 L	14	0	0	14	14	1625	0.008	100
2 TR	0	3	3	6	6	1444	0.004	100
North: Clermont Alpha Rd								
1 L	3	0	0	3	3	623	0.005	100
2 TR	0	4	3	7	7	702	0.010	100
West: Capricorn Hwy West								
1 L	3	0	0	3	3	1576	0.002	100
2 TR	0	3	28	32	32	1211	0.026	100

< Reduced capacity flow due to a short lane effect

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

[Go to Table Links \(Top\)](#)

Lane, Approach and Intersection Performance

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff 1st	Grn 2nd	Deg Sat x	Aver. Delay sec	Longest Queue m	Shrt Lane m
	L	T	R	Tot								
South: Capricorn Highway South												
1 L	28			28	20				0.042	8.8	1	21
2 TR		4	14	18	20				0.024	9.2	1	500
	28	4	14	46	20				0.042	9.0	1	
East: Shakespere St												
1 L	14			14	20				0.008	8.8	0	21
2 TR		3	3	6	20				0.004	4.4	0	500
	14	3	3	20	20				0.008	7.4	0	
North: Clermont Alpha Rd												
1 L	3			3	27				0.005	9.0	0	21
2 TR		4	3	7	27				0.010	9.1	0	500
	3	4	3	11	27				0.010	9.1	0	
West: Capricorn Hwy West												
1 L	3			3	25				0.002	8.9	0	21
2 TR		3	28	32	25				0.026	8.2	1	500
	3	3	28	35	25				0.026	8.2	1	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				112	22				0.042	8.5	1	

Peak flow period = 30 minutes.

Queue values in this table are 95% queue (metres)

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

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Driver Characteristics

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Satn Speed km/h	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing m	Average Queue Space m	Driver Response Time sec
South: Capricorn Highway South						
1 L	NA - Short Lane					
2 TR	20.7	806	4.47	25.71	8.20	3.04
East: Shakespere St						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
North: Clermont Alpha Rd						
1 L	NA - Short Lane					
2 TR	22.6	794	4.53	28.46	8.62	3.16
West: Capricorn Hwy West						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					

Saturation Flow and Saturation Headway are derived from follow-up headway.

[Go to Table Links \(Top\)](#)

Lane Delays

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Stop-line Delay			Delay (seconds/veh)				Geom dig	Control dic
		1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queueing		Stopd (Idle) di		
						Total dq	MvUp dqm			
South: Capricorn Highway South										
1 L	0.042	0.1	0.0	0.1	0.2	0.0	0.0	0.0	8.8	8.8
2 TR	0.024	0.7	0.0	0.7	0.8	0.0	0.0	0.0	8.5	9.2
East: Shakespere St										
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8
2 TR	0.004	0.0	0.0	0.0	0.3	0.0	0.0	0.0	4.4	4.4
North: Clermont Alpha Rd										
1 L	0.005	0.0	0.0	0.0	0.2	0.0	0.0	0.0	9.0	9.0
2 TR	0.010	0.8	0.0	0.8	1.0	0.0	0.0	0.0	8.3	9.1
West: Capricorn Hwy West										
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	8.9
2 TR	0.026	0.1	0.0	0.1	0.4	0.0	0.0	0.0	8.1	8.2
dn is average stop-start delay for all vehicles queued and unqueued										

[Go to Table Links \(Top\)](#)

Lane Queues (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Ovrfl. Queue	Back of Queue (veh)				Queue Stor.	Prob. Block	P'ile Block	Cyc-Av.	Queue
	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.042	0.0	0.0	0.0	0.0	0.1	0.05	0.0	100.0	0.0	0.0
2 TR	0.024	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.01	0.0	100.0	0.0	0.0
2 TR	0.010	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
West: Capricorn Hwy West											
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.026	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queues (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

	Deg.	Ovrfl.	Back of Queue (m)				Queue	Prob.	P'ile	Cyc-Av.	Queue
Lane	Satn	Queue					Stor.	Block	Block		
No.	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.042	0.0	0.3	0.0	0.3	1.0	0.05	0.0	100.0	0.0	0.0
2 TR	0.024	0.0	0.3	0.0	0.3	1.0	0.00	0.0	100.0	0.0	0.1
East: Shakespere St											
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.004	0.0	0.1	0.0	0.1	0.2	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.005	0.0	0.0	0.0	0.0	0.1	0.01	0.0	100.0	0.0	0.0
2 TR	0.010	0.0	0.1	0.0	0.1	0.4	0.00	0.0	100.0	0.0	0.0
West: Capricorn Hwy West											
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.026	0.0	0.4	0.0	0.4	1.1	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Percentile (veh)					
	x	50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.042	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.024	0.0	0.1	0.1	0.1	0.1	0.1
East: Shakespere St							
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.0	0.0	0.0	0.0	0.0	0.0
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.010	0.0	0.0	0.0	0.0	0.1	0.1
West: Capricorn Hwy West							
1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.026	0.0	0.1	0.1	0.1	0.1	0.2

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Percentile (metres)					
	x	50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.042	0.3	0.4	0.7	0.8	1.0	1.2
2 TR	0.024	0.3	0.4	0.6	0.8	1.0	1.1
East: Shakespere St							
1 L	0.008	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.004	0.1	0.1	0.1	0.2	0.2	0.2
North: Clermont Alpha Rd							
1 L	0.005	0.0	0.1	0.1	0.1	0.1	0.1
2 TR	0.010	0.1	0.2	0.3	0.4	0.4	0.5
West: Capricorn Hwy West							

1 L	0.002	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.026	0.4	0.5	0.8	0.9	1.1	1.3

[Go to Table Links \(Top\)](#)

Lane Stops

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	-- Effective he1	Stop he2	Rate hig	-- Overall h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq
South: Capricorn Highway South									
1 L	0.042	0.01	0.00	0.62	0.64	18.1	0.00	0.0	0.06
2 TR	0.024	0.08	0.00	0.52	0.60	10.8	0.00	0.0	0.20
East: Shakespere St									
1 L	0.008	0.00	0.00	0.66	0.66	9.1	0.00	0.0	0.00
2 TR	0.004	0.00	0.00	0.40	0.40	2.6	0.00	0.0	0.05
North: Clermont Alpha Rd									
1 L	0.005	0.00	0.00	0.64	0.64	2.0	0.00	0.0	0.04
2 TR	0.010	0.09	0.00	0.49	0.58	4.2	0.00	0.0	0.22
West: Capricorn Hwy West									
1 L	0.002	0.00	0.00	0.66	0.66	2.1	0.00	0.0	0.00
2 TR	0.026	0.02	0.00	0.58	0.59	18.7	0.00	0.0	0.08

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

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Flow Rates and Demand Analysis

Movement Definitions and Flow Rates (O-D)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale Fixed	Flow Scale Var	Peak Flow Factor
South: Capricorn Highway South								
	East	3	Right	11	3	1.00	1.00	0.95
	North	2	Thru	3	1	1.00	1.00	0.95
	West	1	Left	23	6	1.00	1.00	0.95
East: Shakespere St								
	South	4	Left	11	3	1.00	1.00	0.95
	North	6	Right	3	1	1.00	1.00	0.95
	West	5	Thru	3	1	1.00	1.00	0.95
North: Clermont Alpha Rd								
	South	8	Thru	3	1	1.00	1.00	0.95
	East	7	Left	2	1	1.00	1.00	0.95
	West	9	Right	2	1	1.00	1.00	0.95
West: Capricorn Hwy West								
	South	12	Right	21	7	1.00	1.00	0.95
	East	11	Thru	2	1	1.00	1.00	0.95
	North	10	Left	2	1	1.00	1.00	0.95

Unit Time for Volumes = 60 minutes
Peak Flow Period = 30 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

[Go to Table Links \(Top\)](#)

Flow Rates (Separate Light and Heavy Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	23	6	0	0	0	0
2 T	0	0	3	1	0	0
3 R	0	0	0	0	11	3
East: Shakespere St						
4 L	11	3	0	0	0	0
5 T	0	0	3	1	0	0
6 R	0	0	0	0	3	1
North: Clermont Alpha Rd						
7 L	2	1	0	0	0	0
8 T	0	0	3	1	0	0
9 R	0	0	0	0	2	1
West: Capricorn Hwy West						
10 L	2	1	0	0	0	0
11 T	0	0	2	1	0	0
12 R	0	0	0	0	21	7
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Flow Rates (Total Vehicles and Percent Heavy) Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	28	20.0	0	0.0	0	0.0
2 T	0	0.0	4	20.0	0	0.0
3 R	0	0.0	0	0.0	14	20.0
East: Shakespere St						
4 L	14	20.0	0	0.0	0	0.0
5 T	0	0.0	3	20.0	0	0.0
6 R	0	0.0	0	0.0	3	20.0
North: Clermont Alpha Rd						
7 L	3	27.0	0	0.0	0	0.0
8 T	0	0.0	4	27.0	0	0.0
9 R	0	0.0	0	0.0	3	27.0
West: Capricorn Hwy West						
10 L	3	25.0	0	0.0	0	0.0
11 T	0	0.0	3	25.0	0	0.0
12 R	0	0.0	0	0.0	28	25.0
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Other

Model Settings Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

* Basic Parameters:

- Intersection Type: Unsignalised - Two-Way Stop Control
- Driving on the left-hand side of the road
- Input data specified in Metric units
- Model Defaults: Standard Left
- Peak Flow Period (for performance): 30 minutes
- Unit time (for volumes): 60 minutes.
- SIDRA Standard Delay model used

SIDRA Standard Queue model used
Level of Service based on: Delay (HCM method)
Queue percentile: 95%

[Go to Table Links \(Top\)](#)

Parameters Used in Cost Calculations

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

Intersection ID: 1
Stop Sign Controlled Intersection

Pump price of fuel (\$/L)	=	1.200
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	32.00
Time value factor	=	0.60
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

[Go to Table Links \(Top\)](#)

Diagnostics

Site:Capricorn Hwy/Clermont Alpha Rd 2014 Without Project

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SIDRA INTERSECTION 5.0.2.1437

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Project: C:\Documents and Settings\kevin_ayen\My Documents\PROJECTS\Kev's Corner\Calculations\KC Coal
Mine - Rev A.sip
8000947, URS AUSTRALIA, FLOATING

SIDRA
INTERSECTION

DETAILED OUTPUT**Capricorn Hwy/Clermont Alpha Rd
Existing**Capricorn Hwy/Clermont Alpha Road Existing
Stop (Two-Way)**OUTPUT TABLE LINKS****Movements**

- Movement Capacity Parameters
- Movement Performance
- Fuel Consumption, Emissions and Cost (Total)
- Fuel Consumption, Emissions and Cost (Rate)
- Intersection Negotiation Data
- Movement Speeds and Geometric Delay
- Gap Acceptance Parameters

**Lanes**

- Lane Performance
- Lane Flow and Capacity Information
- Lane, Approach and Intersection Performance
- Driver Characteristics
- Lane Delays
- Lane Queues (Vehicles)
- Lane Queues (Distance)
- Lane Queue Percentiles (Vehicles)
- Lane Queue Percentiles (Distance)
- Lane Stops

**Flow Rates and Demand Analysis**

- Movement Definitions and Flow Rates (O-D)
- Flow Rates (Separate Light and Heavy Vehicles)
- Flow Rates (Total Vehicles and Percent Heavy)

**Other**

- Model Settings
- Parameters Used in Cost Calculations
- Diagnostics

Movements**Movement Capacity Parameters**

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Demand Flow veh/h	HV %	Opposing Flow veh/h	Movement Adjust. Flow pcu/h	Total Cap. veh/h	Prac. Deg. Satn xp	Prac. Spare Cap. %	Lane Util %	Deg. Satn x
South: Capricorn Highway South									
1 L	21	20.0	7+	20.0	8	673<	0.80	2457	100 0.031*
2 T	3	20.0	36+	23.7	42	173	0.80	4283	100 0.018
3 R	11	20.0	39+	24.1	46	576	0.80	4278	100 0.018
East: Shakespere St									
4 L	11	20.0	0			1625	0.80	****	100 0.006
5 T	2	20.0	0			723	0.80	****	100 0.003
6 R	2	20.0	4	25.0	5	723	0.80	****	100 0.003
North: Clermont Alpha Rd									
7 L	2	27.0	3+	25.0	3	624<	0.80	****	100 0.003
8 T	3	27.0	40+	23.2	47	437	0.80	****	100 0.007
9 R	2	27.0	54+	22.4	63	291	0.80	****	100 0.007
West: Capricorn Hwy West									
10 L	2	25.0	0			1576	0.80	****	100 0.001
11 T	2	25.0	0			105	0.80	3890	100 0.020
12 R	22	25.0	13	20.0	15	1107	0.80	3906	100 0.020

* Maximum degree of saturation
< Reduced saturation flow due to a short lane effect
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Movement Performance

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Total Delay (veh-h/h)	Total Delay (pers-h/h)	Aver. Delay (sec)	Eff. Stop Rate	Total Stops	Perf. Index	Tot.Trav. Distance (veh-km/h)	Tot.Trav. Time (veh-h/h)	Aver. Speed (km/h)
South: Capricorn Highway South										
1	L	0.05	0.06	8.8	0.64	13.5	0.37	12.7	0.3	48.7
2	T	0.01	0.01	8.0	0.51	1.6	0.05	1.9	0.0	49.3
3	R	0.03	0.03	9.3	0.63	6.6	0.19	6.4	0.1	48.2
East: Shakespere St										
4	L	0.03	0.03	8.8	0.66	7.0	0.17	6.4	0.1	49.0
5	T	0.00	0.00	0.0	0.00	0.0	0.02	1.3	0.0	59.1
6	R	0.01	0.01	8.8	0.82	1.7	0.04	1.3	0.0	48.8
North: Clermont Alpha Rd										
7	L	0.01	0.01	9.0	0.65	1.4	0.04	1.3	0.0	48.8
8	T	0.01	0.01	8.3	0.52	1.6	0.05	1.9	0.0	49.2
9	R	0.01	0.01	9.7	0.65	1.4	0.04	1.3	0.0	48.2
West: Capricorn Hwy West										
10	L	0.01	0.01	8.9	0.66	1.4	0.03	1.3	0.0	49.0
11	T	0.00	0.00	0.1	0.00	0.0	0.02	1.3	0.0	58.2
12	R	0.06	0.07	9.0	0.66	14.6	0.39	13.3	0.3	48.6

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Total)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Total \$/h	Fuel Total L/h	CO2 Total kg/h	CO Total kg/h	HC Total kg/h	NOX Total kg/h
South: Capricorn Highway South							
1	L	10.26	2.2	5.6	0.47	0.008	0.014
2	T	1.51	0.3	0.8	0.07	0.001	0.002
3	R	5.19	1.1	2.8	0.24	0.004	0.007
		16.97	3.7	9.3	0.77	0.013	0.024
East: Shakespere St							
4	L	5.11	1.1	2.8	0.23	0.004	0.007
5	T	0.75	0.1	0.3	0.01	0.000	0.000
6	R	1.03	0.2	0.6	0.05	0.001	0.001
		6.89	1.5	3.7	0.29	0.005	0.009
North: Clermont Alpha Rd							
7	L	1.08	0.3	0.6	0.05	0.001	0.002
8	T	1.61	0.4	0.9	0.08	0.001	0.002
9	R	1.10	0.3	0.6	0.05	0.001	0.002
		3.79	0.9	2.2	0.18	0.003	0.006
West: Capricorn Hwy West							
10	L	1.07	0.2	0.6	0.05	0.001	0.002
11	T	0.79	0.2	0.4	0.01	0.000	0.001
12	R	11.26	2.6	6.5	0.54	0.009	0.017
		13.12	3.0	7.5	0.60	0.010	0.019
INTERSECTION:		40.77	9.0	22.7	1.84	0.031	0.057

[Go to Table Links \(Top\)](#)

Fuel Consumption, Emissions and Cost (Rate)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID		Cost Rate \$/km	Fuel Rate L/100km	CO2 Rate g/km	CO Rate g/km	HC Rate g/km	NOX Rate g/km
--------	--	-----------------------	-------------------------	---------------------	--------------------	--------------------	---------------------

South: Capricorn Highway South						
1 L	0.81	17.5	441.8	36.62	0.611	1.127
2 T	0.79	17.1	432.0	34.81	0.587	1.088
3 R	0.82	17.8	447.4	37.43	0.623	1.147

	0.81	17.6	442.6	36.70	0.613	1.129

East: Shakespere St						
4 L	0.80	17.5	440.4	36.44	0.608	1.122
5 T	0.59	10.6	268.2	6.61	0.271	0.354
6 R	0.81	17.6	443.2	36.83	0.614	1.132

	0.77	16.5	416.1	32.22	0.561	1.013

North: Clermont Alpha Rd						
7 L	0.85	19.8	499.8	41.40	0.657	1.285
8 T	0.84	19.4	490.5	39.58	0.634	1.246
9 R	0.87	20.1	507.3	42.44	0.672	1.313

	0.85	19.7	498.0	40.92	0.651	1.276

West: Capricorn Hwy West						
10 L	0.84	19.1	482.2	39.90	0.642	1.236
11 T	0.62	11.8	297.6	8.12	0.290	0.393
12 R	0.84	19.3	486.3	40.50	0.650	1.251

	0.83	18.6	470.8	37.85	0.621	1.181

INTERSECTION:	0.81	17.9	451.7	36.64	0.609	1.138

[Go to Table Links \(Top\)](#)

Intersection Negotiation Data

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

From	To		Negn Radius	Negn Speed	Negn Dist.	Appr. Dist.	Downstream	Distance
Approach	Approach	Turn	m	km/h	m	m	m	User Spec?

South: Capricorn Highway South								
	East	Right	9.0	19.4	14.2	500	121	No
	North	Thru	S	25.0	13.2	500	127	No
	West	Left	10.0	20.2	15.7	500	123	No

East: Shakespere St								
	South	Left	10.0	20.2	15.7	500	123	No
	North	Right	9.3	19.6	14.6	500	107	No
	West	Thru	S	60.0	14.7	500	214	No

North: Clermont Alpha Rd								
	South	Thru	S	25.0	13.2	500	132	No
	East	Left	10.0	20.2	15.7	500	130	No
	West	Right	9.0	19.4	14.2	500	126	No

West: Capricorn Hwy West								
	South	Right	9.3	19.6	14.6	500	126	No
	East	Thru	S	60.0	14.7	500	237	No
	North	Left	10.0	20.2	15.7	500	128	No

Downstream distance is distance travelled from the stopline until exit cruise speed is reached (includes negotiation distance). Acceleration distance is weighted for light and heavy vehicles. The same distance applies for both stopped and unstopped vehicles.

[Go to Table Links \(Top\)](#)

Movement Speeds and Geometric Delay

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Mov ID	App. Speeds		Exit Speeds		Queue Move-up		Av. Section Spd	
	Cruise	Negn	Negn	Cruise	1st Grn	2nd Grn	Running Overall	Geom Delay sec

South: Capricorn Highway South								
1 L	60.0	20.2	20.2	60.0			48.7 48.7	8.8
2 T	60.0	25.0	25.0	60.0			49.3 49.3	7.5
3 R	60.0	19.4	19.4	60.0			48.2 48.2	8.9

East: Shakespere St								
4 L	60.0	20.2	20.2	60.0		49.0	49.0	8.8
5 T	60.0	60.0	60.0	60.0		59.1	59.1	0.0
6 R	60.0	19.6	19.6	60.0		48.8	48.8	8.8

North: Clermont Alpha Rd								
7 L	60.0	20.2	20.2	60.0		48.8	48.8	9.0
8 T	60.0	25.0	25.0	60.0		49.2	49.2	7.7
9 R	60.0	19.4	19.4	60.0		48.2	48.2	9.1

West: Capricorn Hwy West								
10 L	60.0	20.2	20.2	60.0		49.0	49.0	8.9
11 T	60.0	60.0	60.0	60.0		58.2	58.2	0.0
12 R	60.0	19.6	19.6	60.0		48.6	48.6	9.0

"Running Speed" is the average speed excluding stopped periods.								

[Go to Table Links \(Top\)](#)

Gap Acceptance Parameters

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

		Opng	Critical Gap		Foll-up	Entry	Intra	Propn
Mov	Mov	Flow	Hdwy	Dist	Headway	HV	Bunch	Bnchd
ID	Type	pcu/h	sec	m	sec	Equiv	Hdwy	

South: Capricorn Highway South								
1 L	Normal	8+	5.75	42.8	3.45	2.00	0.90	0.000
2 T	Normal	42+	7.48	49.7	4.03	2.00	0.60	0.002
3 R	Normal	46+	8.05	53.7	4.60	2.00	0.60	0.002

East: Shakespere St								
6 R	Normal	5	5.18	57.6	2.88	2.00	0.90	0.000

North: Clermont Alpha Rd								
7 L	Normal	3+	6.10	67.9	3.66	2.00	0.90	0.000
8 T	Normal	47+	7.93	52.7	4.27	2.00	0.60	0.002
9 R	Normal	63+	8.54	55.2	4.88	2.00	0.60	0.003

West: Capricorn Hwy West								
12 R	Normal	15	5.40	40.2	3.00	2.00	0.90	0.001

Values in this table are adjusted for heavy vehicles in the entry stream.
+ Percentage of exiting flow included in total opposing flow

[Go to Table Links \(Top\)](#)

Lanes

Lane Performance

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

		Flow	Cap	Deg.	Aver.	Eff.	Q u e u e	
Lane		veh/h	veh/h	Satn	Delay	Stop	95% Back	Lane
No.				x	sec	Rate	veh	Length

South: Capricorn Highway South								
1 L		21	673	0.031	8.8	0.64	0.1	21.0T
2 TR		14	749	0.018	9.0	0.60	0.1	500.0

East: Shakespere St								
1 L		11	1625	0.006	8.8	0.66	0.0	21.0T
2 TR		4	1447	0.003	4.4	0.41	0.0	500.0

North: Clermont Alpha Rd								
1 L		2	624	0.003	9.0	0.65	0.0	21.0T
2 TR		5	728	0.007	8.8	0.57	0.0	500.0

West: Capricorn Hwy West								
1 L		2	1576	0.001	8.9	0.66	0.0	21.0T
2 TR		24	1212	0.020	8.3	0.60	0.1	500.0

T Short lane due to specification of Turn Bay								

[Go to Table Links \(Top\)](#)

Lane Flow and Capacity Information

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Dem Flow (veh/h)			Min Cap	Tot Cap	Deg. Satn	Lane Util
	Lef	Thru	Rig	Tot	veh/h	veh/h	x %
South: Capricorn Highway South							
1 L	21	0	0	21	21	673<	0.031 100
2 TR	0	3	11	14	14	749	0.018 100
East: Shakespere St							
1 L	11	0	0	11	11	1625	0.006 100
2 TR	0	2	2	4	4	1447	0.003 100
North: Clermont Alpha Rd							
1 L	2	0	0	2	2	624<	0.003 100
2 TR	0	3	2	5	5	728	0.007 100
West: Capricorn Hwy West							
1 L	2	0	0	2	2	1576	0.001 100
2 TR	0	2	22	24	24	1212	0.020 100

< Reduced capacity flow due to a short lane effect

The capacity value for priority and continuous movements is obtained by adjusting the basic saturation flow for heavy vehicle and turning vehicle effects. Saturation flow scale applies if specified.

[Go to Table Links \(Top\)](#)

Lane, Approach and Intersection Performance

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Demand Flow (veh/h)				%HV	Adj. Basic Satf.	Eff 1st	Grn 2nd	Deg Sat x	Aver. Delay sec	Longest Queue m	Shrt Lane m
	L	T	R	Tot								
South: Capricorn Highway South												
1 L	21			21	20				0.031	8.8	1	21
2 TR		3	11	14	20				0.018	9.0	1	500
	21	3	11	35	20				0.031	8.9	1	
East: Shakespere St												
1 L	11			11	20				0.006	8.8	0	21
2 TR		2	2	4	20				0.003	4.4	0	500
	11	2	2	15	20				0.006	7.5	0	
North: Clermont Alpha Rd												
1 L	2			2	27				0.003	9.0	0	21
2 TR		3	2	5	27				0.007	8.8	0	500
	2	3	2	7	27				0.007	8.9	0	
West: Capricorn Hwy West												
1 L	2			2	25				0.001	8.9	0	21
2 TR		2	22	24	25				0.020	8.3	1	500
	2	2	22	26	25				0.020	8.3	1	
ALL VEHICLES												
				Total Flow	% HV				Max X	Aver. Delay	Max Queue	
				83	22				0.031	8.5	1	

Peak flow period = 30 minutes.

Queue values in this table are 95% queue (metres)

Note: Basic Saturation Flows are not adjusted at roundabouts or sign-controlled intersections and apply only to continuous lanes.

[Go to Table Links \(Top\)](#)

Driver Characteristics

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Satn Speed km/h	Satn Flow veh/h	Satn Hdwy sec	Satn Spacing m	Average Queue Space m	Driver Response Time sec
South: Capricorn Highway South						
1 L	NA - Short Lane					
2 TR	20.7	806	4.47	25.69	8.20	3.04
East: Shakespere St						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					
North: Clermont Alpha Rd						
1 L	NA - Short Lane					
2 TR	22.8	797	4.52	28.55	8.62	3.15
West: Capricorn Hwy West						
1 L	NA - Short Lane					
2 TR	NA - Major Road Movement					

Saturation Flow and Saturation Headway are derived from follow-up headway.

[Go to Table Links \(Top\)](#)

Lane Delays

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Stop-line Delay			Delay (seconds/veh)				Geom dig	Control dic
		1st d1	2nd d2	Total dSL	Acc. Dec. dn	Queueing		Stopd (Idle) di		
						Total dq	MvUp dqm			
South: Capricorn Highway South										
1 L	0.031	0.0	0.0	0.0	0.2	0.0	0.0	0.0	8.8	8.8
2 TR	0.018	0.5	0.0	0.5	0.7	0.0	0.0	0.0	8.5	9.0
East: Shakespere St										
1 L	0.006	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.8	8.8
2 TR	0.003	0.0	0.0	0.0	0.2	0.0	0.0	0.0	4.4	4.4
North: Clermont Alpha Rd										
1 L	0.003	0.0	0.0	0.0	0.1	0.0	0.0	0.0	9.0	9.0
2 TR	0.007	0.6	0.0	0.6	0.8	0.0	0.0	0.0	8.2	8.8
West: Capricorn Hwy West										
1 L	0.001	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.9	8.9
2 TR	0.020	0.1	0.0	0.1	0.3	0.0	0.0	0.0	8.2	8.3
dn is average stop-start delay for all vehicles queued and unqueued										

dn is average stop-start delay for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

Lane Queues (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Ovrfl. Queue	Back of Queue (veh)				Queue Stor.	Prob. Block	P'ile Block	Cyc-Av.	Queue
	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.031	0.0	0.0	0.0	0.0	0.1	0.04	0.0	100.0	0.0	0.0
2 TR	0.018	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
East: Shakespere St											
1 L	0.006	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.003	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.003	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.007	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
West: Capricorn Hwy West											
1 L	0.001	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.020	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queues (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

	Deg.	Ovrfl.	Back of Queue (m)				Queue	Prob.	P'ile	Cyc-Av.	Queue
Lane	Satn	Queue					Stor.	Block	Block		
No.	x	No	Nb1	Nb2	Nb	95%	Ratio	%	%	Nc	95%
South: Capricorn Highway South											
1 L	0.031	0.0	0.2	0.0	0.2	0.7	0.04	0.0	100.0	0.0	0.0
2 TR	0.018	0.0	0.2	0.0	0.2	0.7	0.00	0.0	100.0	0.0	0.0
East: Shakespere St											
1 L	0.006	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.003	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
North: Clermont Alpha Rd											
1 L	0.003	0.0	0.0	0.0	0.0	0.1	0.00	0.0	100.0	0.0	0.0
2 TR	0.007	0.0	0.1	0.0	0.1	0.3	0.00	0.0	100.0	0.0	0.0
West: Capricorn Hwy West											
1 L	0.001	0.0	0.0	0.0	0.0	0.0	0.00	0.0	100.0	0.0	0.0
2 TR	0.020	0.0	0.3	0.0	0.3	0.9	0.00	0.0	100.0	0.0	0.0

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn	Percentile (veh)					
	x	50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.031	0.0	0.0	0.1	0.1	0.1	0.1
2 TR	0.018	0.0	0.0	0.1	0.1	0.1	0.1
East: Shakespere St							
1 L	0.006	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.003	0.0	0.0	0.0	0.0	0.0	0.0
North: Clermont Alpha Rd							
1 L	0.003	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.007	0.0	0.0	0.0	0.0	0.0	0.0
West: Capricorn Hwy West							
1 L	0.001	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.020	0.0	0.0	0.1	0.1	0.1	0.1

[Go to Table Links \(Top\)](#)

Lane Queue Percentiles (Distance)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1

Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	Percentile (metres)					
		50%	70%	85%	90%	95%	98%
South: Capricorn Highway South							
1 L	0.031	0.2	0.3	0.5	0.6	0.7	0.9
2 TR	0.018	0.2	0.3	0.5	0.6	0.7	0.8
East: Shakespere St							
1 L	0.006	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.003	0.0	0.1	0.1	0.1	0.1	0.2
North: Clermont Alpha Rd							
1 L	0.003	0.0	0.0	0.1	0.1	0.1	0.1
2 TR	0.007	0.1	0.1	0.2	0.2	0.3	0.4
West: Capricorn Hwy West							

1 L	0.001	0.0	0.0	0.0	0.0	0.0	0.0
2 TR	0.020	0.3	0.4	0.6	0.7	0.9	1.0

[Go to Table Links \(Top\)](#)

Lane Stops

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

Lane No.	Deg. Satn x	-- Effective he1	Stop Rate he2	Geom. Overall hig	Rate h	Total Stops H	Queue Move-up Rate hqm	Total Queue Move-ups Hqm	Prop. Queued pq
South: Capricorn Highway South									
1 L	0.031	0.01	0.00	0.63	0.64	13.5	0.00	0.0	0.05
2 TR	0.018	0.06	0.00	0.55	0.60	8.3	0.00	0.0	0.17
East: Shakespere St									
1 L	0.006	0.00	0.00	0.66	0.66	7.0	0.00	0.0	0.00
2 TR	0.003	0.00	0.00	0.41	0.41	1.7	0.00	0.0	0.04
North: Clermont Alpha Rd									
1 L	0.003	0.00	0.00	0.64	0.65	1.4	0.00	0.0	0.03
2 TR	0.007	0.06	0.00	0.51	0.57	3.0	0.00	0.0	0.19
West: Capricorn Hwy West									
1 L	0.001	0.00	0.00	0.66	0.66	1.4	0.00	0.0	0.00
2 TR	0.020	0.01	0.00	0.59	0.60	14.6	0.00	0.0	0.07

hig is the average value for all movements in a shared lane
hqm is average queue move-up rate for all vehicles queued and unqueued

[Go to Table Links \(Top\)](#)

Flow Rates and Demand Analysis

Movement Definitions and Flow Rates (O-D)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

From Approach	To Approach	Mov ID	Turn	Flow Rate LV	Flow Rate HV	Flow Scale Fixed	Flow Scale Var	Peak Flow Factor
South: Capricorn Highway South								
	East	3	Right	8	2	1.00	1.00	0.95
	North	2	Thru	3	1	1.00	1.00	0.95
	West	1	Left	17	4	1.00	1.00	0.95
East: Shakespere St								
	South	4	Left	8	2	1.00	1.00	0.95
	North	6	Right	2	0	1.00	1.00	0.95
	West	5	Thru	2	0	1.00	1.00	0.95
North: Clermont Alpha Rd								
	South	8	Thru	2	1	1.00	1.00	0.95
	East	7	Left	2	1	1.00	1.00	0.95
	West	9	Right	2	1	1.00	1.00	0.95
West: Capricorn Hwy West								
	South	12	Right	17	6	1.00	1.00	0.95
	East	11	Thru	2	1	1.00	1.00	0.95
	North	10	Left	2	1	1.00	1.00	0.95

Unit Time for Volumes = 60 minutes
Peak Flow Period = 30 minutes
Flow Rates include effects of Flow Scale and Peak Flow Factor

[Go to Table Links \(Top\)](#)

Flow Rates (Separate Light and Heavy Vehicles)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	LV	HV	LV	HV	LV	HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	17	4	0	0	0	0
2 T	0	0	3	1	0	0
3 R	0	0	0	0	8	2
East: Shakespere St						
4 L	8	2	0	0	0	0
5 T	0	0	2	0	0	0
6 R	0	0	0	0	2	0
North: Clermont Alpha Rd						
7 L	2	1	0	0	0	0
8 T	0	0	2	1	0	0
9 R	0	0	0	0	2	1
West: Capricorn Hwy West						
10 L	2	1	0	0	0	0
11 T	0	0	2	1	0	0
12 R	0	0	0	0	17	6
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Flow Rates (Total Vehicles and Percent Heavy)

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

Mov ID	Left		Through		Right	
	Total	%HV	Total	%HV	Total	%HV
Demand flows in veh/h as used by the program						
South: Capricorn Highway South						
1 L	21	20.0	0	0.0	0	0.0
2 T	0	0.0	3	20.0	0	0.0
3 R	0	0.0	0	0.0	11	20.0
East: Shakespere St						
4 L	11	20.0	0	0.0	0	0.0
5 T	0	0.0	2	20.0	0	0.0
6 R	0	0.0	0	0.0	2	20.0
North: Clermont Alpha Rd						
7 L	2	27.0	0	0.0	0	0.0
8 T	0	0.0	3	27.0	0	0.0
9 R	0	0.0	0	0.0	2	27.0
West: Capricorn Hwy West						
10 L	2	25.0	0	0.0	0	0.0
11 T	0	0.0	2	25.0	0	0.0
12 R	0	0.0	0	0.0	22	25.0
Unit Time for Volumes = 60 minutes						
Peak Flow Period = 30 minutes						
Flow Rates include effects of Flow Scale and Peak Flow Factor						

[Go to Table Links \(Top\)](#)

Other

Model Settings

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

* Basic Parameters:
Intersection Type: Unsignalised - Two-Way Stop Control
Driving on the left-hand side of the road
Input data specified in Metric units
Model Defaults: Standard Left
Peak Flow Period (for performance): 30 minutes
Unit time (for volumes): 60 minutes.
SIDRA Standard Delay model used

SIDRA Standard Queue model used
Level of Service based on: Delay (HCM method)
Queue percentile: 95%

[Go to Table Links \(Top\)](#)

Parameters Used in Cost Calculations

Site:Capricorn Hwy/Clermont Alpha Rd Existing

Intersection ID: 1
Stop Sign Controlled Intersection

Pump price of fuel (\$/L)	=	1.200
Fuel resource cost factor	=	0.50
Ratio of running cost to fuel cost	=	3.0
Average income (\$/h)	=	32.00
Time value factor	=	0.60
Light vehicle mass (1000 kg)	=	1.4
Heavy vehicle mass (1000 kg)	=	11.0
Light vehicle idle fuel rate (L/h)	=	1.350
Heavy vehicle idle fuel rate (L/h)	=	2.000

[Go to Table Links \(Top\)](#)

Diagnostics

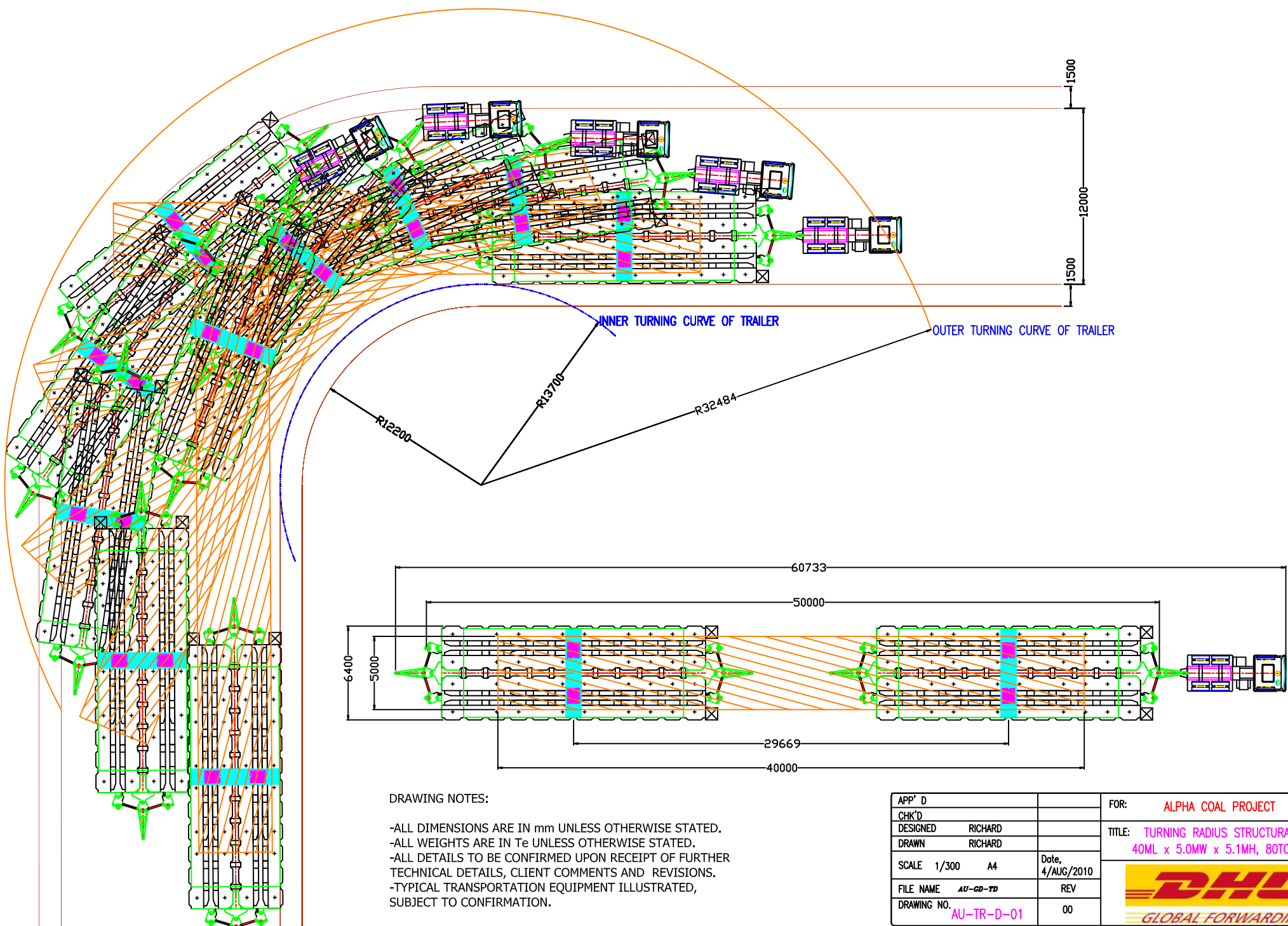
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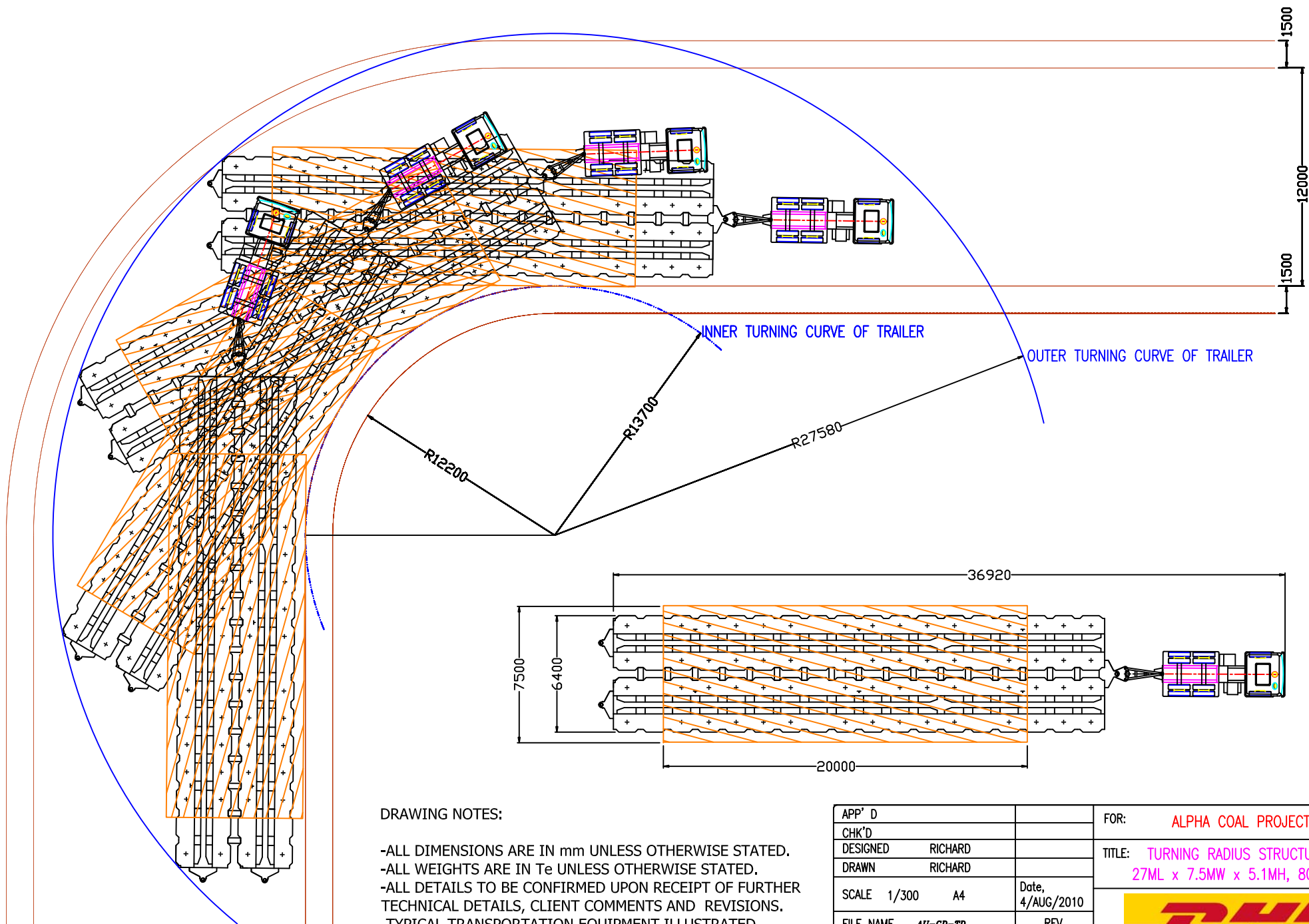
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Mine - Rev A.sip
8000947, URS AUSTRALIA, FLOATING

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INTERSECTION

Appendix B Over Dimensional Vehicle Swept Paths (provided be DHL)



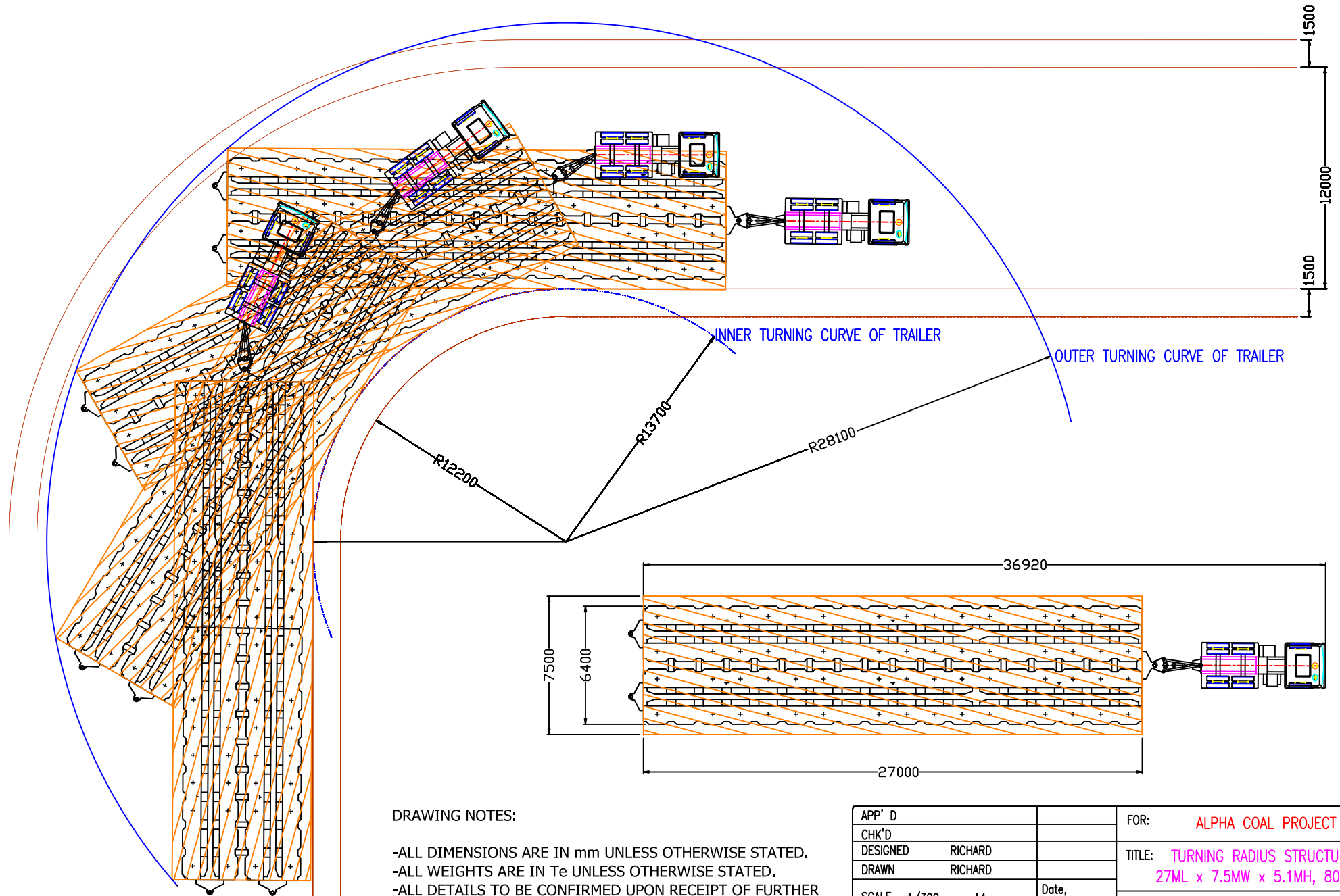


DRAWING NOTES:

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- ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
- ALL DETAILS TO BE CONFIRMED UPON RECEIPT OF FURTHER TECHNICAL DETAILS, CLIENT COMMENTS AND REVISIONS.
- TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP' D		FOR:	ALPHA COAL PROJECT
CHK'D		TITLE:	TURNING RADIUS STRUCTURAL STEEL
DESIGNED	RICHARD		27ML x 7.5MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date,	4/AUG/2010
FILE NAME	AU-CD-TD	REV	
DRAWING NO.	AU-TR-D-05	00	



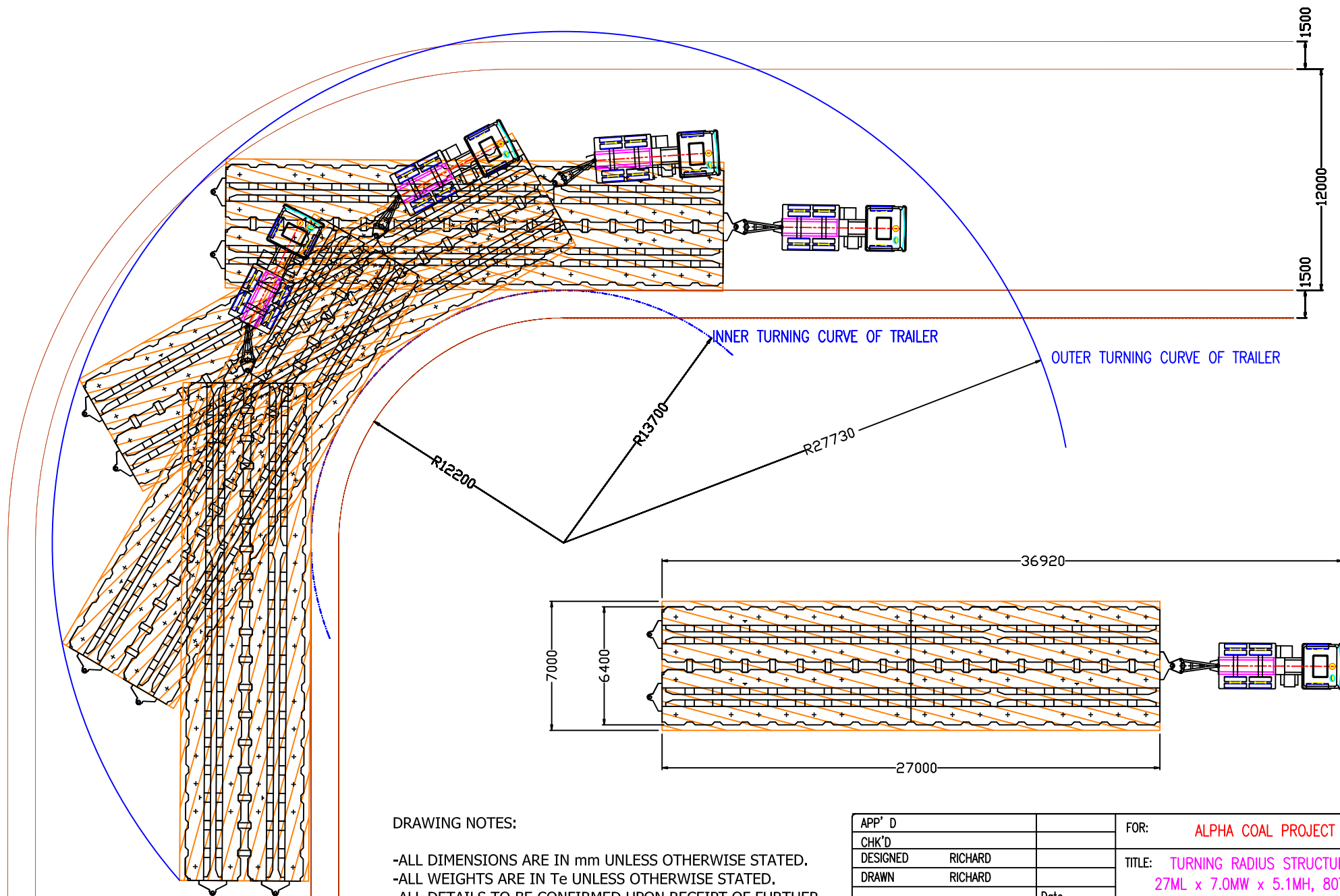


DRAWING NOTES:

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CHK'D		TITLE:	TURNING RADIUS STRUCTURAL STEEL
DESIGNED	RICHARD		27ML x 7.5MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
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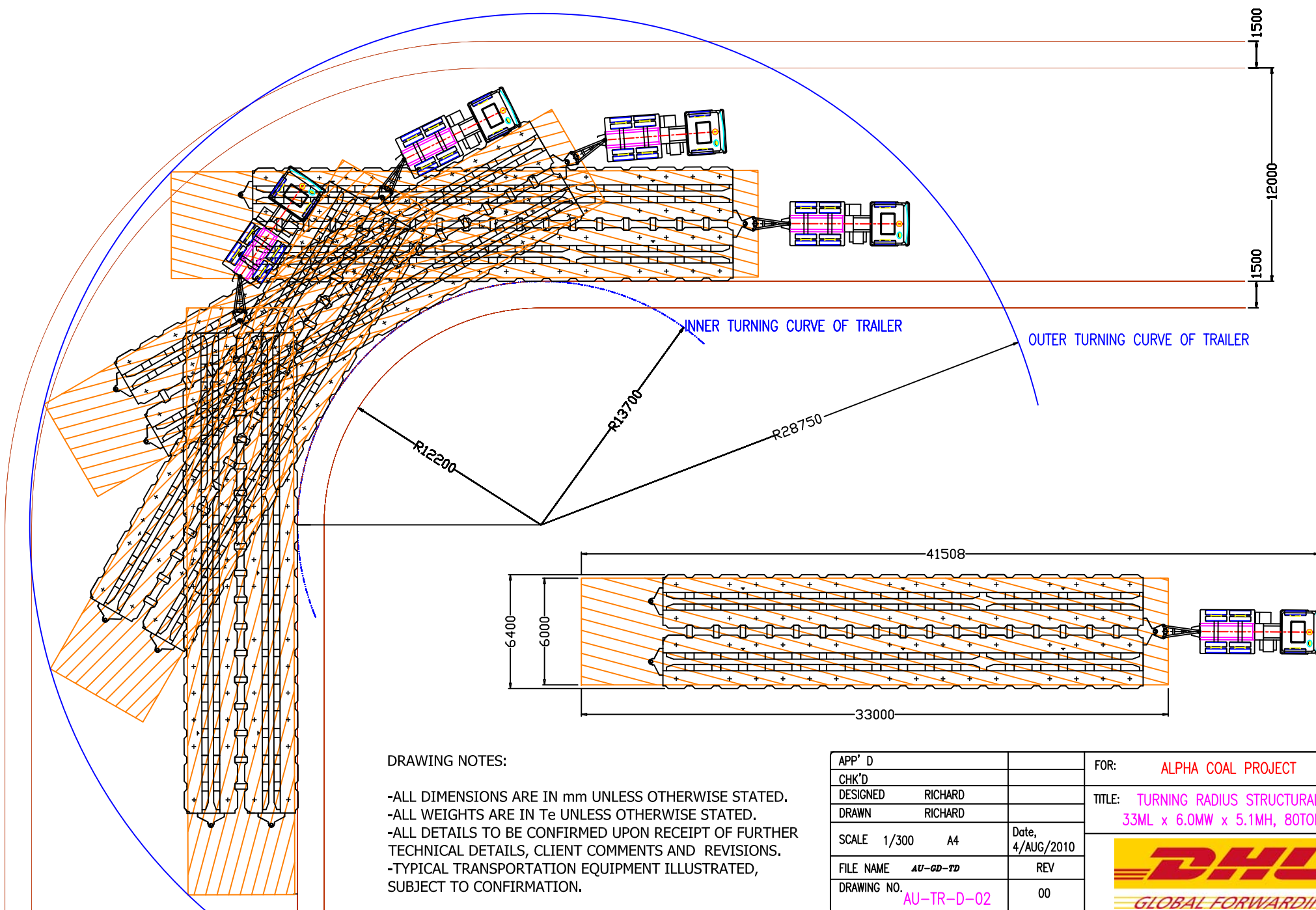


DRAWING NOTES:

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APP' D		FOR:	ALPHA COAL PROJECT
CHK'D		TITLE:	TURNING RADIUS STRUCTURAL STEEL
DESIGNED	RICHARD		27ML x 7.0MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date,	4/AUG/2010
FILE NAME	AU-CD-TD	REV	
DRAWING NO.	AU-TR-D-03	00	





DRAWING NOTES:

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- ALL WEIGHTS ARE IN Te UNLESS OTHERWISE STATED.
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- TYPICAL TRANSPORTATION EQUIPMENT ILLUSTRATED, SUBJECT TO CONFIRMATION.

APP' D		FOR:	ALPHA COAL PROJECT
CHK'D		TITLE:	TURNING RADIUS STRUCTURAL STEEL
DESIGNED	RICHARD		33ML x 6.0MW x 5.1MH, 80TONNES
DRAWN	RICHARD		
SCALE	1/300 A4	Date,	4/AUG/2010
FILE NAME	AU-CD-TD	REV	
DRAWING NO.	AU-TR-D-02	00	





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