



**EP 187**

**Appendix 11**

**Traffic Impact Assessment**

**IMP 5-1**



**EP 187 ACCESS REVIEW**  
**CARPENTARIA HWY, NORTHERN TERRITORY**  
TRAFFIC IMPACT ASSESSMENT



**CIRQA™**

## DISCLAIMER

The information and data contained within this document are the property of CIRQA Pty Ltd and copyright. This document and the information contained therein is for the use of the authorised Client noted below. The document may not be used, copied, reproduced or modified in whole or in part for any purpose other than for which it was supplied by CIRQA Pty Ltd. CIRQA Pty Ltd accepts no responsibility or liability to any other party who may use or rely upon this document or the information contained therein.

## DOCUMENT CONTROL

Report title: EP 187 Access Review - Carpentaria Highway, Northern Territory  
Traffic Impact Assessment

Project number: 23440

Client: Imperial Oil and Gas

Client contact: Adrian Gallagher (Fyfe Pty Ltd)

Version	Date	Details/status	Prepared by	Approved by
V1	18 Dec 23	For submission	TAW	BNW
V1.1	17 Jan 24	Additional info.	TAW	TAW

### CIRQA Pty Ltd

ABN 12 681 029 983

PO Box 144, Glenside SA 5065

150 Halifax Street, Adelaide SA 5000

(08) 7078 1801

[www.cirqa.com.au](http://www.cirqa.com.au)

## TABLE OF CONTENTS

1.	EXECUTIVE SUMMARY .....	1
2.	PROPOSED DEVELOPMENT .....	2
2.1	BACKGROUND DEVELOPMENT .....	2
2.2	DESCRIPTION OF ON-SITE DEVELOPMENT.....	2
2.2.1	LAND USE AND INTENSITY .....	2
2.2.2	LOCATION .....	2
2.2.3	ZONING.....	2
2.2.4	PHASING AND TIMING .....	2
3.	EXISTING AREA CONDITIONS .....	3
3.1	STUDY AREA .....	3
3.1.1	AREA OF INFLUENCE .....	3
3.1.2	AREA OF SIGNIFICANT TRANSPORTATION IMPACT .....	3
3.2	STUDY AREA LAND USE.....	4
3.2.1	EXISTING LAND USES .....	4
3.2.2	EXISTING ZONE .....	4
3.2.3	ANTICIPATED FUTURE DEVELOPMENT .....	4
3.3	SITE ACCESSIBILITY .....	4
3.3.1	AREA ROADWAY SYSTEM.....	4
3.3.2	TRAFFIC VOLUMES AND CONDITIONS.....	5
3.3.3	TRANSIT SERVICE .....	7
3.3.4	PEDESTRIANS AND CYCLISTS .....	8
4.	PROJECT TRAFFIC.....	9
4.1	PROPOSED SITE ACCESS.....	9
4.2	TRAFFIC GENERATION .....	9
4.3	TRAFFIC DISTRIBUTION & MODAL SPLIT .....	11
4.4	TRIP ASSIGNMENT .....	14
4.5	FUTURE TRAFFIC .....	14
4.6	TOTAL TRAFFIC.....	16
5.	TRANSPORTATION AND ANALYSIS .....	21

5.1	CAPACITY AND LEVEL OF SERVICE.....	21
5.1.1	CARPENTARIA HIGHWAY/PROJECT AREA ACCESS POINTS .....	21
5.2	TRANSPORTATION SAFETY.....	21
5.2.1	ROAD GEOMETRY .....	21
5.2.2	SIGHT DISTANCE.....	22
5.2.3	INTERSECTION SPACING.....	23
5.2.4	OVERSIZE OR OVERMASS VEHICLES.....	24
6.	IMPROVEMENT ANALYSIS .....	25
6.1	IMPROVEMENTS TO ACCOMMODATE EXISTING TRAFFIC.....	25
6.1.1	CARPENTARIA HIGHWAY.....	25
6.1.2	CARPENTARIA HIGHWAY/NORTH ACCESS.....	25
6.1.3	CARPENTARIA HIGHWAY/SOUTH ACCESS .....	25
6.2	IMPROVEMENTS TO ACCOMMODATE BACKGROUND TRAFFIC .....	25
6.3	IMPROVEMENTS TO ACCOMMODATE TOTAL TRAFFIC.....	26
6.3.1	CARPENTARIA HIGHWAY.....	26
6.3.2	CARPENTARIA HIGHWAY/NORTHERN ACCESS.....	28
6.3.3	CARPENTARIA HIGHWAY/SOUTHERN ACCESS .....	28
6.4	EVALUATION.....	28
7.	FINDINGS AND RECOMMENDATIONS.....	30
7.1	SITE ACCESSIBILITY .....	30
7.2	TRANSPORTATION IMPACTS .....	30
7.3	ROADWAY IMPROVEMENTS.....	31
7.3.1	CARPENTARIA HIGHWAY.....	31
7.3.2	CARPENTARIA HIGHWAY/NORTHERN ACCESS.....	31
7.3.3	CARPENTARIA HIGHWAY/SOUTHERN ACCESS .....	31
7.4	REPORTING.....	31

## APPENDIX A: DRILLING AND OPERATIONS PROGRAM

## 1. EXECUTIVE SUMMARY

CIRQA has been engaged to undertake a review of the traffic aspects associated with Imperial Oil and Gas' drilling and operations program in the McArthur Basin, McArthur, Northern Territory. Specifically, CIRQA has been requested to prepare a Traffic Impact Assessment (TIA) for inclusion within Imperial Oil and Gas' Environmental Management Plan (EMP).

The TIS analyses the traffic movements forecast to be generated by Imperial Oil and Gas' operations throughout the various phases of the project's lifecycle. Specifically, this report focuses on the external traffic impacts of the proposal, including the Carpentaria Highway access arrangements, and the suitability of the Carpentaria Highway and surrounding road network.

This report summarises the traffic review undertaken of the access arrangements. The review has been prepared in accordance with the Austroads' *"Guide to Traffic Management – Part 12: Impacts of Developments"* (including general adoption of its recommended report structure).

The subject drilling and operations program will be carried out on 'Mambaliya Rrumburriya Wuyaliya' (NT Portion 5706). Vehicle access to the project areas will be provided via two existing access points on the Carpentaria Highway.

Assessment of the turning warrants against the requirements of the Austroads' Guide indicates that formalised separate turn lanes are not warranted, and that no further upgrade to the existing intersections (beyond the existing BAL/BAR treatments) is warranted. Furthermore, the Austroads' Guide also indicates that appropriate sight distances can be established at each of the three access points.

Assessment of the additional traffic associated with the drilling and operations program indicates that up to 76 vehicle movements could be generated by Imperial Oil and Gas' drilling and operations program during its peak in August 2024. These movements will be distributed to the Carpentaria Highway via the two existing access points. Such movements will readily be accommodated at the access points and on the adjacent road network.

## **2. PROPOSED DEVELOPMENT**

### **2.1 BACKGROUND DEVELOPMENT**

Access to the project areas will be provided via existing private unsealed roadways (one to the north of the Carpentaria Highway and one to the south of the Carpentaria Highway). The roadways currently intersect with the Carpentaria Highway, providing connectivity to the broader road network.

### **2.2 DESCRIPTION OF ON-SITE DEVELOPMENT**

#### **2.2.1 LAND USE AND INTENSITY**

The proposal comprises civil and construction works associated with the operation of wells within the project areas. The works also include infrastructure including flowlines, pipelines and facilities associated with the drilling and hydraulic fracturing of wells for gas production (i.e. new groundwater bores, office, warehouse and workshop facilities, campsite etc.).

The intensity of traffic movements associated with the proposal will generally be low, albeit with infrequent higher-intensity periods. It is anticipated that the highest level of traffic generation will occur during in August 2024 during consecutive delivery of sand for hydraulic fracturing (as specified by Imperial Oil and Gas, detailed below)

#### **2.2.2 LOCATION**

The wells will be located on 'Mambaliya Rrumburriya Wuyaliya', approximately 202 km east of the Carpentaria Highway and Stuart Highway intersection, and 60 km west of Cape Crawford.

#### **2.2.3 ZONING**

The subject wells (and associated campsites) are not located within a Zone defined by the Northern Territory Planning Scheme (NTPS).

#### **2.2.4 PHASING AND TIMING**

The subject drilling and operations program is anticipated to be undertaken over an 18-month period. An indicative project schedule has been prepared by InGauge, outlining the various activities throughout the program as well as their expected commencement, duration and completion dates. A copy of the anticipated program is attached in Appendix A.

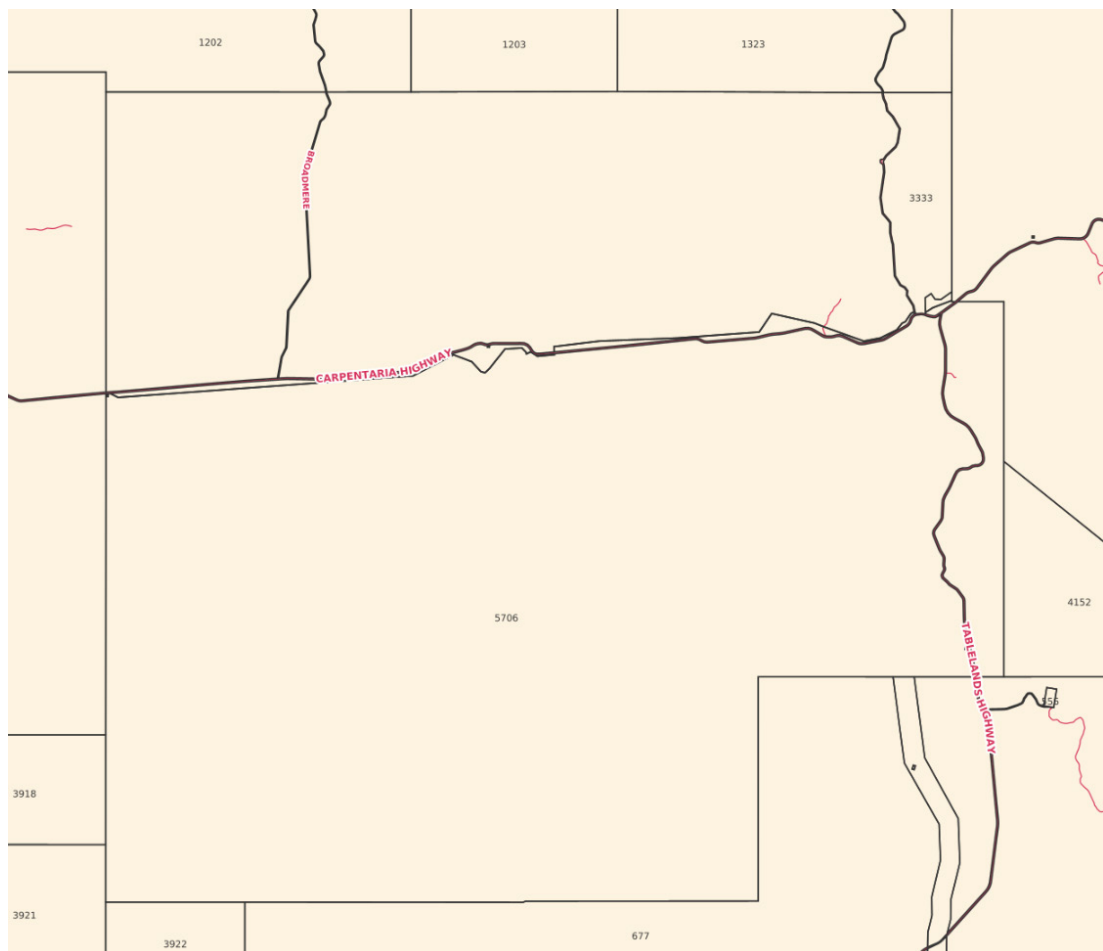
The exploration program is expected to commence in the last week of the first quarter of 2024 (upon receipt of relevant approvals and other relevant considerations), with completion expected in the last quarter of 2025.

### 3. EXISTING AREA CONDITIONS

#### 3.1 STUDY AREA

##### 3.1.1 AREA OF INFLUENCE

The study area is contained to parcel of land 5706 (referred to as NT Por 5706 or 'Mambaliya Rrumburriya Wuyaliya') and does not include adjacent/neighbouring properties. Figure 1 illustrates the subject parcel of land with regard to the adjacent road network.



*Figure 1 – The subject parcel of land (NT Por 5706) (Source: Northern Territory Government, 2023)*

##### 3.1.2 AREA OF SIGNIFICANT TRANSPORTATION IMPACT

The adjacent road network will easily accommodate the increased traffic generation associated with the subject site. The primary impact will generally be limited to the access points on Carpentaria Highway, as well as the Carpentaria Highway west of the project area (i.e. between the Stuart Highway and the southern access). Further discussion of traffic volumes and their associated impacts are provided below.



## **3.2 STUDY AREA LAND USE**

### **3.2.1 EXISTING LAND USES**

The subject parcel of land is currently used as a cattle station. The parcels of land bounding 'Mambaliya Rrumburriya Wuyaliya' are primarily cattle stations and are named as follows:

- **North**
  - NT Por 1202 ('Broadmere' – Private ownership)
  - NT Por 1203 ('Jandanku' – Aboriginal Lands)
  - NT Por 1323 (Unknown – Unregistered Crown Land)
- **East**
  - NT Por 3333 (Unknown – Private ownership)
  - NT Por 4319 ('McArthur River' – Private ownership)
  - NT Por 4152 ('Mallapunyah Springs' – Private ownership)
- **South**
  - NT Por 677 ('Mallapunyah Springs' – Private ownership)
  - NT Por 2101 ('Mallapunyah Springs' – Private ownership)
  - NT Por 3922 (Unknown – Private ownership)
- **West**
  - NT Por 702 ('Beetaloo Station' – Private ownership)
  - NT Por 3918 (Unknown – Private ownership)
  - NT Por 3921 (Unknown – Private ownership)

### **3.2.2 EXISTING ZONE**

The project areas are not located within a Zone defined by the NTPS.

### **3.2.3 ANTICIPATED FUTURE DEVELOPMENT**

Within the study area, no other development is anticipated in the near future. It is understood that other drilling programs are in the process of being undertaken within the broader area. However, the likelihood of peak traffic movements associated with the various projects aligning is considered limited.

## **3.3 SITE ACCESSIBILITY**

### **3.3.1 AREA ROADWAY SYSTEM**

Within the study area, the only public road is the Carpentaria Highway.

The Carpentaria Highway forms part of the 'Highway 1' network and is under the care and control of the Northern Territory Government. The first 50 km of the Carpentaria Highway (east of the Stuart Highway) currently comprises a sealed two-way carriageway with a single (marked) traffic lane in each direction. It is understood that this extent of two-way carriageway we recently completed in August 2023.

Furthermore, it is also understood that Exact Contracting are in the process of constructing additional two-way carriageway (with a single marked traffic lane in each direction) between chainage 50 km and 109 km. These works are anticipated to be completed in late 2024.

Upgrade works to the following 31 km (up to chainage 140 km) are anticipated to follow, with a decision to award the contract expected to be made by DIPL in the first quarter of 2024. These works are expected to be completed by June 2025 (based upon information provided by DIPL).

A contract relating to the next 35 km of the Carpentaria Highway (up to chainage 175 km) is expected to be awarded in the fourth quarter of 2024, with upgrade works complete in the fourth quarter of 2026 (based upon information provided by DIPL).

The existing (pre-upgrade) configuration of the Carpentaria Highway between the Stuart Highway and the study area generally comprises a central sealed traffic lane with unsealed shoulders on both sides. Frequent widened sealed areas (capable of facilitating two-way vehicle movements on the sealed surface) are located along the length of the Carpentaria Highway.

Furthermore, it is noted that the Carpentaria Highway (between Borroloola and the Carpentaria Highway/Tablelands Highway intersection) comprises of a continuous two-way width seal.

The Carpentaria Highway is subject to a 100 km/h speed limit.

### **3.3.2 TRAFFIC VOLUMES AND CONDITIONS**

Traffic data has been obtained from the Northern Territory Government for one primary (permanent) and two coverage counter stations along the Carpentaria Highway.

In addition, traffic data from one primary (permanent) and one coverage counter station on the Stuart Highway, plus an additional coverage counter station on the Tablelands Highway has been referenced.

The key stations and their respective locations are as follows:

- **RKVDP008** (*primary*) – Carpentaria Highway, 44 km east of the Stuart Highway;
- **RTVDC031** (*coverage*) – Carpentaria Highway, 5 km west of Tablelands Highway;
- **RTVDC033** (*coverage*) – Carpentaria Highway, 5 km east of Tablelands Highway;
- **RKVDP003** (*primary*) – Stuart Highway, 19 km north of Carpentaria Highway;
- **RKVDC023** (*coverage*) – Stuart Highway, 10 km south of Carpentaria Highway; and
- **RTVDC030** (*coverage*) – Tablelands Highway, 5 km south of Carpentaria Highway.

Traffic data (in the form of Annual Average Daily Traffic volumes) has been obtained at each of the above counter locations over a 10-year period (from 2013 to 2022 inclusive). Table 2 illustrates the Annual Average Daily Traffic (AADT) volumes recorded at the above counter stations.

*Table 1 – Yearly AADT count data from the various primary and coverage counter stations.*

Year	RKVDP008	RKVDP003	RKVDC023	RTVDC031	RTVDC033	RTVDC030
2013	73	444	365	N/A	N/A	N/A
2014	70	448	407	75	97	55
2015	73	461	405	85	N/A	N/A
2016	68	456	422	70	84	56
2017	66	454	429	N/A	N/A	N/A
2018	64	467	474	69	93	61
2019	76	470	454	N/A	N/A	N/A
2020	65	357	345	71	78	91
2021	90	542	311	N/A	N/A	N/A
2022	98	515	513	88	98	44

It should be noted that monthly (seasonal) count data is typically collected and provided for primary counter station (such as RKVDP008). However, the table containing this data appears to have been omitted from the Northern Territory Government’s latest “Annual Traffic Report 2022”. Instead, monthly (seasonal) count data from the “Annual Traffic Report 2021” (the latest data publicly available) has instead been referenced.

The data illustrates the variation in traffic volumes across the calendar year as well as the respective 'seasonal factor'. The data obtained is illustrated in Table 3.

*Table 2 –2021 monthly traffic count data (from detector RKVDP008) and respective seasonal adjustment factors*

<b>Month</b>	<b>Month Count</b>	<b>Seasonal Factor</b>
January	44	0.49
February	39	0.43
March	51	0.57
April	94	1.04
May	107	1.19
June	130	1.44
July	161	1.79
August	122	1.36
September	107	1.19
October	93	1.03
November	76	0.84
December	55	0.61
<b>AADT</b>	<b>90</b>	<b>1.00</b>

As illustrated in Table 3, traffic volumes on the Carpentaria Highway are lower during the summer months of the year (i.e. during the 'wet season'). This is due to the broader road network (i.e. the Carpentaria Highway and connecting roads beyond) being subject to varying restrictions. This can include (but is not limited to) complete road closures and staggered re-openings in order to minimise impacts to pavements and maintain road safety (i.e. open to 4WD/light vehicles, then small commercial vehicles, before full reopening). Such restrictions impact upon a number of sectors including (but not limited to) tourism, agriculture, and industry in varying degrees.

Typical restrictions enforced on the Carpentaria Highway during the 'wet season' include weight restrictions such as '100% legal axle group mass limits' (i.e. no over-mass vehicles) and restrictions on 'Gross Vehicle Masses' (GVMs) such as light vehicles only. On rare occasions (i.e. extreme weather events such as flooding), the Carpentaria Highway has been closed to all traffic movements (the Carpentaria Highway was subject to speed reductions for 70 days 2021 in varying locations, whilst it was reported to be closed entirely for a single day in 2022).

### **3.3.3 TRANSIT SERVICE**

No public transport services are provided within the vicinity of the study area.

#### **3.3.4 PEDESTRIANS AND CYCLISTS**

Given the site's remote nature, pedestrian and cyclist movements along the Carpentaria Highway would be extremely unlikely and are not expected to occur.

## 4. PROJECT TRAFFIC

### 4.1 PROPOSED SITE ACCESS

It is understood that vehicle access to the project areas will be provided via the same access points used as part of Imperial Oil and Gas' exploration program. Specifically, vehicle access to the project areas is proposed via the following existing access points:

- **North access** - a priority controlled (Give Way) T-intersection, located approximately 206 km east of the Stuart Highway. This access will provide vehicle access to the northern project area and will continue to facilitate all turning movements at the intersection. *This intersection was referred to as 'EP187' in CIRQA's previous Traffic Impact Assessment;* and
- **South access** - a priority controlled (Give Way) T-intersection, located approximately 202 km east of the Stuart Highway. This access will provide vehicle access to the souther project area and will continue to facilitate all turning movements at the intersection. *This intersection was referred to as 'SL-4' in CIRQA's previous Traffic Impact Assessment.*

### 4.2 TRAFFIC GENERATION

Forecast vehicle movements have been provided by InGauge for each item of the drilling and operations program schedule. The forecast traffic generation information provided by Imperial Oil and Gas is attached in Appendix A.

Upon review of the information provided, peak daily traffic generation associated with Imperial Oil and Gas' drilling and operations program is expected to occur in early August 2024. During this time, the following vehicle movements are expected to be generated:

- Carpentaria 6H (2/3); Drilling – 5.7 truck movements plus 1.1 light vehicle movement per day;
- Carpentaria 4H (4); HF Sand Delivery – 14 truck movements per day;
- Spread Shift – Mobilisation (*for Carpentaria 4H (4); HF*) – 6 trucks movements plus 12 light vehicle movements per day;
- Carpentaria 5H (4); HF Sand Delivery – 14 truck movements per day;
- Carpentaria 6H (2/3); HF Sand Delivery – 14 truck movements per day;
- Compressor Station; Construction – 3.3 truck movements plus 1.1 light vehicle movements per day;
- Water Treatment Facilities; Construction – 0.6 truck movements plus 1.1 light vehicle movements per day;

- Carpentaria BD; Civil Construction, Wellpad and Access – 0.6 truck movements plus 1.1 light vehicle movements per day.

Based upon the above, Imperial Oil and Gas' drilling and operations program is expected to generate a peak in the order of 59 truck movements and 17 light vehicle movements (a total of 76 vehicle movements) per day.

The forecast peak is primarily associated with sand deliveries for the HF of Carpentaria 4H, 5H and 6H occurring consecutively. Whilst the start of deliveries is expected to be staggered by approximately one (1) month, the three delivery phases overlap by approximately one month (mid-July 2024 to mid-August 2024) at which point all will be occurring consecutively. Further traffic will also be generated during this period by the mobilisation of equipment, drilling operations and general supporting construction activities, resulting in a concentrated peak in early August.

Whilst it is acknowledged that three HF sand delivery phases will overlap in July 2025, with the exception of traffic associated with the drilling of Carpentaria 8H, no other construction traffic is expected to be generated by Imperial Oil and Gas' operations (during this period, in the order of 48 truck and 8 light vehicle movements per day are expected).

Outside of these periods, general traffic volumes associated with Imperial Oil and Gas' drilling and operations program will be lower than those identified above, given the large portion of traffic generated by sand deliveries (especially during the 'wet season').

It should also be highlighted that multiple well sites will be access via a singular access on the Carpentaria Highway. Therefore, once a vehicle movement phase (such as mobilisation of a 'rig shift' or 'spread shift') is complete, the vast majority of vehicle movements will be internal within the project area. The only exception to this is when vehicles are required to shift between well sites north and south of the Carpentaria Highway, albeit this is expected to only occur one during each given phase (i.e. during the 2024 drilling program, 2024 HF program etc.). It has therefore been determined that minor traffic peak periods will occur on the Carpentaria Highway during mobilisation and demobilisation periods (associated with both drilling and HF).

In order to provide a comprehensive review of the operations and drilling program's traffic impact, analyses have been undertaken for each month throughout the project's lifecycle. It should be noted that the traffic forecast for a given month has been based upon the worst-case day within that period. This therefore provides a conservative assessment with regard to the project's potential traffic impact.

### 4.3 TRAFFIC DISTRIBUTION & MODAL SPLIT

A detailed traffic distribution has been provided by InGauge with regard to subject drilling and operations program. Specifically, the information provided identified the anticipated origin and destination of vehicle movements generated by the program for each individual phase in the project lifecycle. The detailed distribution of vehicle movements (as provided by InGauge) is attached in Appendix A.

The information also identifies that forecast vehicle movements will be distributed relatively evenly to/from the west (i.e. west of the subject site via the Carpentaria Highway and the Stuart Highway) and to/from the east (i.e. east of the subject area via the Carpentaria Highway and Tablelands Highway) over the project's lifecycle.

The modal split will vary between given sections of the Carpentaria Highway. Based on the data provided by InGauge, it is forecast that approximately 67% of vehicles travelling to/from the west will be commercial vehicles/trucks, whilst only 7% (approx.) of vehicles travelling to/from the east will be commercial vehicles. Between the Northern and Southern access points, in the order of 25% are forecast to be commercial vehicles.

All commercial vehicle movements are assumed to be 53.5 m Road Trains (A-Triples).

Based upon the above, site-related traffic volumes have been forecast along the Carpentaria Highway in three (3) key sections. The key three (3) sections and their respective relative table are as follows:

- Carpentaria Highway, west of the project area's southern access (Table 3);
- Carpentaria Highway, between the southern and northern access roadways (Table 4); and
- Carpentaria Highway, east of the project area's northern access (Table 5).



*Table 3 – Forecast traffic volumes on the Carpentaria Highway, west of the site’s southern access*

<b>Month</b>	<b>Light Vehicles</b>	<b>Heavy Vehicles</b>	<b>Total Traffic Forecast</b>
March 2024	0	0	0
April 2024	12	9	21
May 2024	12	9	21
June 2024	16	30	46
July 2024	16	42	58
August 2024	28	48	76
September 2024	20	46	66
October 2024	8	20	28
November 2024	20	11	31
December 2024	0	1	1
January 2025	0	1	1
February 2025	0	1	1
March 2025	0	1	1
April 2025	0	22	22
May 2025	12	38	50
June 2025	8	48	56
July 2025	8	48	56
August 2025	20	48	68
September 2025	16	36	52
October 2025	20	22	42
November 2025	8	2	10
December 2025	12	7	19
<b>2024 Ave. Monthly Forecast</b>	<b>13.2</b>	<b>21.6</b>	<b>34.8</b>
<b>2025 Ave. Monthly Forecast</b>	<b>8.7</b>	<b>22.8</b>	<b>34.5</b>

*Table 4 – Forecast traffic volumes on the Carpentaria Highway, between the site’s southern access and northern access*

<b>Month</b>	<b>Light Vehicles</b>	<b>Heavy Vehicles</b>	<b>Total Traffic Forecast</b>
March 2024	8	2	10
April 2024	16	2	18
May 2024	40	7	47
June 2024	32	9	41
July 2024	28	20	48
August 2024	32	21	53
September 2024	36	23	59
October 2024	40	25	65
November 2024	40	6	46
December 2024	16	0	16
January 2025	16	0	16
February 2025	8	0	8
March 2025	8	0	8
April 2025	16	4	20
May 2025	16	4	20
June 2025	8	0	8
July 2025	8	0	8
August 2025	20	6	26
September 2025	16	6	22
October 2025	20	6	26
November 2025	20	6	26
December 2025	8	0	8
<b>2024 Ave. Monthly Forecast</b>	<b>28.8</b>	<b>11.5</b>	<b>40.3</b>
<b>2025 Ave. Monthly Forecast</b>	<b>13.7</b>	<b>2.7</b>	<b>16.3</b>

*Table 5 – Forecast traffic volumes on the Carpentaria Highway, east of the site’s northern access*

<b>Month</b>	<b>Light Vehicles</b>	<b>Heavy Vehicles</b>	<b>Total Traffic Forecast</b>
March 2024	8	2	10
April 2024	24	2	26
May 2024	40	7	47
June 2024	40	6	46
July 2024	24	1	25
August 2024	24	1	25
September 2024	24	3	27
October 2024	40	4	44
November 2024	40	4	44
December 2024	16	0	16
January 2025	16	0	16
February 2025	8	0	8
March 2025	8	0	8
April 2025	24	1	25
May 2025	24	1	25
June 2025	8	0	8
July 2025	8	0	8
August 2025	8	0	8
September 2025	8	0	8
October 2025	8	0	8
November 2025	8	0	8
December 2025	8	0	8
<b>2024 Ave. Monthly Forecast</b>	<b>28.0</b>	<b>3.0</b>	<b>31.0</b>
<b>2025 Ave. Monthly Forecast</b>	<b>11.3</b>	<b>0.2</b>	<b>11.5</b>

#### **4.4 TRIP ASSIGNMENT**

As above, traffic distribution data has been provided by InGauge, inclusive of a breakdown of light and commercial vehicles. No further trip assignment of traffic forecasts is therefore required.

#### **4.5 FUTURE TRAFFIC**

The traffic data identified in Table 1 illustrates a general growth in traffic volumes on the Carpentaria Highway over the past 10-year period. Accordingly, for the purposes of this assessment, traffic volumes have been grown to account for continual road network growth.

It should however be recognised that a portion of volumes recorded on the road network would be those associated with earlier works undertaken by Imperial Oil and Gas on the subject site. Accordingly, growth of these volumes may account for a portion of 'double counting' on the surrounding road network.

Notwithstanding, for the purposes of this assessment, the general growth in traffic volumes identified by the existing dataset has been adopted.

Noting the expected completion date of the subject drilling and operations program, traffic volumes have only been extrapolated into the future up until December 2025 (the expected completion date of the subject drilling and operations works).

The forecast 'base' traffic volumes on the Carpentaria Highway are illustrated in Table 6 (i.e. traffic volumes independent of the subject drilling and operations program).

*Table 6 – Forecast ‘base’ traffic volumes on the Carpentaria Highway*

<b>Month</b>	<b>Forecast Daily Traffic Volume</b>
March 2024	60
April 2024	110
May 2024	125
June 2024	152
July 2024	188
August 2024	142
September 2024	125
October 2024	109
November 2024	89
December 2024	64
January 2025	54
February 2025	48
March 2025	62
April 2025	114
May 2025	129
June 2025	157
July 2025	194
August 2025	147
September 2025	129
October 2025	113
November 2025	92
December 2025	66
<b>2024 AADT</b>	<b>116</b>
<b>2025 AADT</b>	<b>109</b>

No other significant traffic generating development is expected to occur within the vicinity of the site during the drilling and operations program.

#### **4.6 TOTAL TRAFFIC**

Taking into account the project-related traffic forecasts identified in Section 4.3, as well as the ‘base’ traffic forecasts identified Section 4.5, total traffic volumes have been forecast on the three (3) key sections of the Carpentaria Highway.

The total traffic volumes forecast for each of the three (3) key sections are as follows:

- Carpentaria Highway, west of the project area’s southern access (Table 7);

- Carpentaria Highway, between the southern and northern access roadways (Table 8); and
- Carpentaria Highway, east of the project area’s northern access (Table 9).

*Table 7 – Total traffic volumes on the Carpentaria Highway, west of the site’s southern access*

<b>Month</b>	<b>'Base' Hwy Volume</b>	<b>Forecast Volume</b>	<b>Total Volume</b>
March 2024	60	0	60
April 2024	110	21	131
May 2024	125	21	146
June 2024	152	46	198
July 2024	188	58	246
August 2024	142	76	218
September 2024	125	66	191
October 2024	109	28	137
November 2024	89	31	120
December 2024	64	1	65
January 2025	54	1	55
February 2025	48	1	49
March 2025	62	1	63
April 2025	114	22	136
May 2025	129	50	179
June 2025	157	56	213
July 2025	194	56	250
August 2025	147	68	215
September 2025	129	52	181
October 2025	113	42	155
November 2025	92	10	102
December 2025	66	19	85
<b>2024 Ave. Monthly Forecast</b>	<b>116</b>	<b>35</b>	<b>151</b>
<b>2025 Ave. Monthly Forecast</b>	<b>109</b>	<b>32</b>	<b>140</b>

*Table 8 – Total traffic volumes on the Carpentaria Highway, between the site’s southern access and northern access*

<b>Month</b>	<b>'Base' Hwy Volume</b>	<b>Forecast Volume</b>	<b>Total Volume</b>
March 2024	60	10	70
April 2024	110	18	128
May 2024	125	47	172
June 2024	152	41	193
July 2024	188	48	236
August 2024	142	53	195
September 2024	125	59	184
October 2024	109	65	174
November 2024	89	46	135
December 2024	64	16	80
January 2025	54	16	70
February 2025	48	8	56
March 2025	62	8	70
April 2025	114	20	134
May 2025	129	20	149
June 2025	157	8	165
July 2025	194	8	202
August 2025	147	26	173
September 2025	129	22	151
October 2025	113	26	139
November 2025	92	26	118
December 2025	66	8	74
<b>2024 Ave. Monthly Forecast</b>	<b>116</b>	<b>40</b>	<b>157</b>
<b>2025 Ave. Monthly Forecast</b>	<b>109</b>	<b>16</b>	<b>125</b>

*Table 9 – Total traffic volumes on the Carpentaria Highway, east of the site’s northern access*

<b>Month</b>	<b>'Base' Hwy Volume</b>	<b>Forecast Volume</b>	<b>Total Volume</b>
March 2024	60	10	70
April 2024	110	26	136
May 2024	125	47	172
June 2024	152	46	198
July 2024	188	25	213
August 2024	142	25	167
September 2024	125	27	152
October 2024	109	44	153
November 2024	89	44	133
December 2024	64	16	80
January 2025	54	16	70
February 2025	48	8	56
March 2025	62	8	70
April 2025	114	25	139
May 2025	129	25	154
June 2025	157	8	165
July 2025	194	8	202
August 2025	147	8	155
September 2025	129	8	137
October 2025	113	8	121
November 2025	92	8	100
December 2025	66	8	74
<b>2024 Ave. Monthly Forecast</b>	<b>116</b>	<b>31</b>	<b>147</b>
<b>2025 Ave. Monthly Forecast</b>	<b>109</b>	<b>12</b>	<b>120</b>

As noted in Section 4.2, the peak traffic generation associated with Imperial Oil and Gas’ drilling and operations program is expected to occur in August 2024. Based upon the traffic volumes forecast at this time, total daily turning movement volumes have been forecast at both the southern (Figure 2) and northern (Figure 3) site access points.



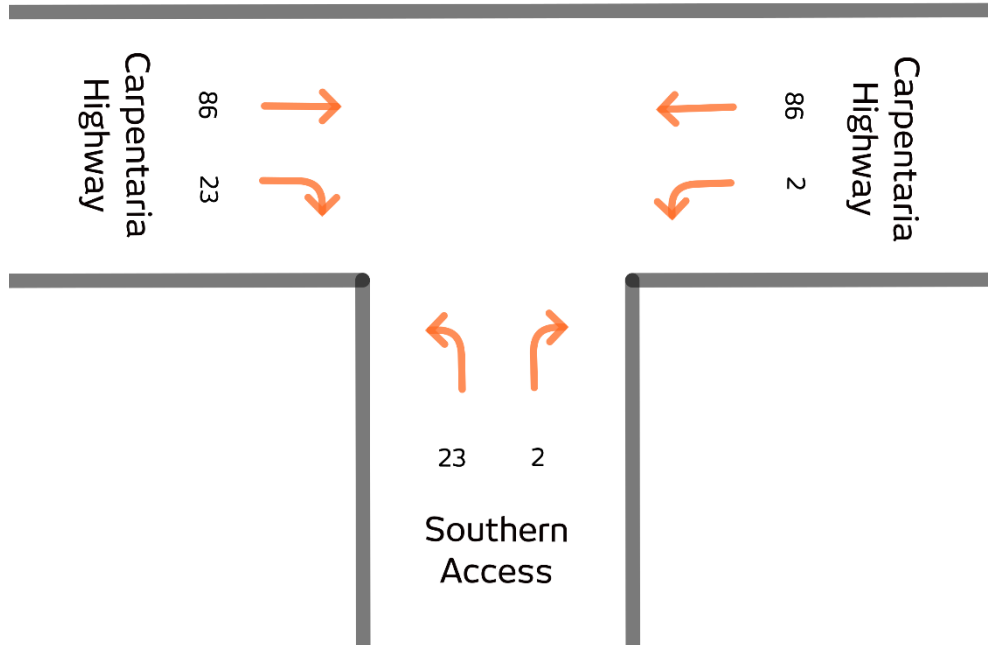


Figure 2 - Total daily traffic volumes forecast at the project area's southern access (August 2024).

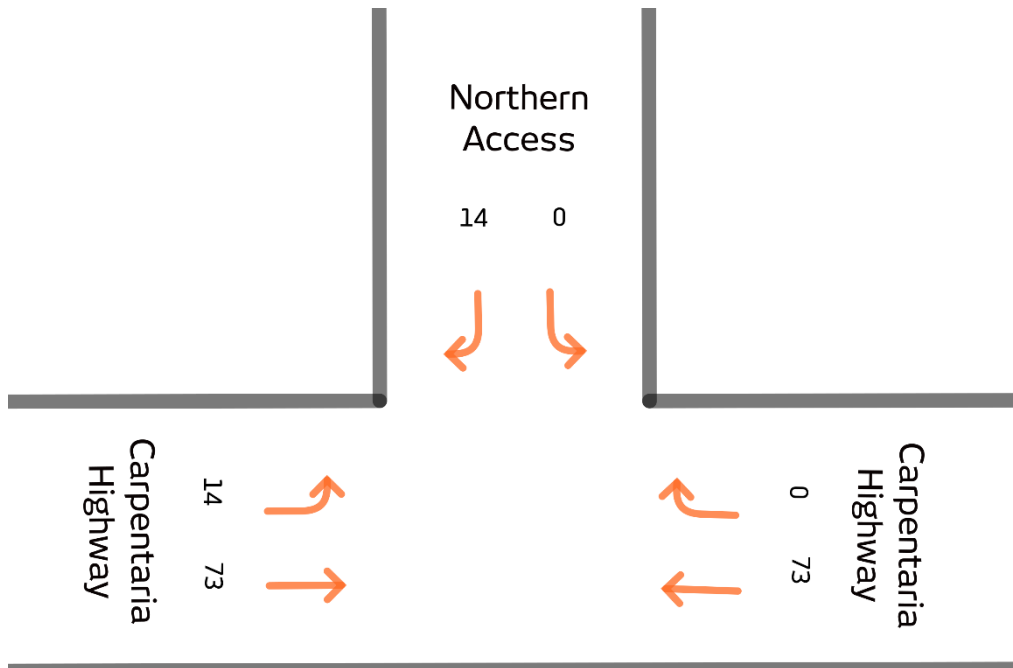


Figure 3 - Total daily traffic volumes forecast at the project area's northern access (August 2024).

## **5. TRANSPORTATION AND ANALYSIS**

### **5.1 CAPACITY AND LEVEL OF SERVICE**

#### **5.1.1 CARPENTARIA HIGHWAY/PROJECT AREA ACCESS POINTS**

Given the relatively low number of movements forecast to be associated with a given access, the existing access points will operate satisfactorily as a priority controlled (Give Way) T-intersections.

However, in order to determine if an intersection treatment is warranted, an assessment has been undertaken against the requirements of the relevant Austroads' Guidelines (Figure 2.26 (a) of the *"Guide to Traffic Management – Part 6: Intersections, Interchanges and Crossings"*).

Based upon the forecast peak hour traffic volumes (10% of the volumes identified in Figure 2 or Figure 3), the Austroads' Guide identifies that Basic Left-turn (BAL) and Basic Right-turn (BAR) treatments are required (i.e. no separated turn lanes are warranted).

It is understood that the southern and northern access points have been constructed with such treatments as part of earlier exploration works (undertaken by Imperial Oil and Gas). As such, it is therefore considered that the existing site access points are satisfactory to continue accommodating project-related traffic volumes.

### **5.2 TRANSPORTATION SAFETY**

#### **5.2.1 ROAD GEOMETRY**

As identified in Section 3.3.1, the Carpentaria Highway generally comprises a single sealed traffic lane within the centre of the roadway, with wide unsealed shoulders on both sides. The Austroads' *"Guide to Road Design – Part 3: Geometric Design"* identifies that on roads "... where traffic volumes less than 150 vehicles per day and, particularly, where terrain is open, single carriageways may be used". Such a scenario requires that "... one or both vehicles must have the outer wheels on the shoulders while passing".

As identified in Section 4.6, traffic volumes on the Carpentaria Highway are forecast to exceed 150 vehicles per day during a number of months throughout the drilling and operations program. However, taking into account the fluctuations in traffic volumes (i.e. an Annual Average Daily Traffic (AADT) volume), traffic volumes are forecast to be within the general vicinity of 150 vehicles per day.

Of particular note, the section of the Carpentaria Highway between the project area's southern and northern access points is forecast to experience the highest AADT of 157 vpd.

However, it should be highlighted that existing traffic volumes are forecast to exceed 150 vehicles per day on a number of months in a given year. It is understood that DIPL is aware of this and hence the continual upgrade of the Carpentaria Highway currently being undertaken and earmarked in the future. Further discussion in regard to the Carpentaria Highway's geometry and associated upgrade is provided in Section 6.1.1.

### **5.2.2 SIGHT DISTANCE**

A desktop sight distance assessment has been undertaken at subject access points on the Carpentaria Highway. Sight distance assessments have been undertaken based upon the requirements of Austroads' *"Guide to Road Design – Part 3: Geometric Design"* and *"Guide to Road Design – Part 4A: Unsignalised and Signalised Intersections"* for both cars and type two road trains. This is due to the differing speed environments in which the respective vehicles are permitted to travel.

Specifically, light vehicles are permitted to travel at the posted speed limit of 100 km/h and, as such, a design speed of 110 km/h has been adopted. However, with regard to road trains, such vehicles are restricted (by law and typically by a governing device installed within the vehicle) to a maximum of 90 km/h. As such, a design speed of 100 km/h has been adopted for such vehicles.

Due to the rural and remote nature of the Carpentaria Highway, an increased driver reaction time of 2.5 seconds (applicable to roads with large distances between towns and isolated features) has been adopted in the assessments.

A standard deceleration coefficient of 0.36 has been adopted for the assessment with the exception of the consideration of sight distance provisions for type two road trains (such as triple road trains), for which a deceleration coefficient of 0.26 has been adopted.

On the basis of the above, there would be a sight distance requirement of 301 m for light vehicles (based upon a design speed of 110 km/h) and 305 m for type two road trains (based upon a design speed of 100 km/h).

#### **5.2.2.1 Carpentaria Highway/North Access**

At the North Access/Carpentaria Highway intersection, the following sight distances were recorded (based upon a desktop inspection):

- **West** - in excess of 500 m; and

- **East** – in excess of 500 m.

On the basis of the available sight distances identified above, adequate sight distance will be retained at the existing North Access/Carpentaria Highway intersection for both light vehicles and type two road trains.

Further to the above, it is understood that representatives from DIPL and InGuage have previously met on-site at this access location in order to ensure that appropriate sight distances could be achieved. DIPL previously confirmed their acceptance of this access location with regard in relation to available sight distance.

#### **5.2.2.2 Carpentaria Highway/South Access**

At the South Access/Carpentaria Highway intersection, the following sight distances were recorded (based upon a desktop inspection):

- **West** - in excess of 500 m; and
- **East** – in excess of 500 m.

On the basis of the available sight distances identified above, adequate sight distance provisions will be achieved at the South Access/Carpentaria Highway intersection for both light vehicles and type two road trains.

Further to the above, it is noted that this intersection was recently approved by DIPL and subsequently constructed in 2020. Similarly to North Access, approval for this intersection would have also comprised assessment of sight distances which, noting that the intersection received approval, appears to have been accepted by DIPL. It is therefore considered that adequate sight distance is achieved and will remain acceptable to DOT.

### **5.2.3 INTERSECTION SPACING**

The Department of Infrastructure, Planning and Logistics' (DIPL's) "*Performance and Design Standards for Northern Territory Government Roads*" identifies minimum access spacings for 'rural arterial' roads (such as the Carpentaria Highway) of 1.0 km when the access points are located on opposite sides, or 2.0 km when access points are located on the same side.

#### **5.2.3.1 Carpentaria Highway/North Access**

As noted above, representatives from DIPL are understood to have previously meet with representatives from InGuage to determine the feasibility of the subject access location. It is understood that agreement between DIPL and

InGuage was reached in that the North Access complies with DIPL's access spacing requirements.

#### **5.2.3.2 Carpentaria Highway/South Access**

Again, the South Access is an existing access which was approved and constructed in 2020. The access is understood to comply with DIPL's access spacing requirements.

#### **5.2.4 OVERSIZE OR OVERMASS VEHICLES**

Imperial Oil and Gas intend to operate a small portion of oversize and/or overmass vehicles along the Carpentaria Highway. It is understood that Imperial Oil and Gas has applied to the Northern Territory Government for an 'oversize or overmass permit', and has since received a permit, to allow such vehicles to travel to/from the subject wells.

As part of the permit, it is understood that pilot/escorts will be required (in front of and behind) when the vehicle is oversize to forewarn vehicles approaching the oversize vehicle. Such requirements are common and considered to be acceptable with regard to the moving of oversize loads.

## **6. IMPROVEMENT ANALYSIS**

### **6.1 IMPROVEMENTS TO ACCOMMODATE EXISTING TRAFFIC**

#### **6.1.1 CARPENTARIA HIGHWAY**

As noted in Section 4.6, existing traffic forecasts (i.e. excluding volumes associated with Imperial Oil and Gas' subject drilling and operations program) are anticipated to exceed 150 vehicles per day on a number of months (i.e. volumes in excess of those anticipated for a two-way roadway with a single-width seal).

As outlined in Section 3.3.1, DIPL has engaged Exact Contracting to upgrade the Carpentaria Highway up to chainage 109 km to a two-lane carriageway, with future upgrade works to chainage 175 km earmarked. DIPL has not stated whether further upgrade works will be undertaken, however it would be expected that the continual (rolling) upgrades will be undertaken into the future beyond this point, eventually connecting to the existing two-lane carriageway east of the project area.

It should be noted that a basic two-lane carriageway has the ability to accommodate an AADT in the order of 500 to 1,000 vpd (based upon Table 4.5 of Austroads' *Guide to Road Design – Part 3: Geometric Design*).

Taking this into consideration, it is therefore considered that DIPL is appropriately managing the geometry of the Carpentaria Highway with respect to existing ('base') traffic volumes.

#### **6.1.2 CARPENTARIA HIGHWAY/NORTH ACCESS**

Given the low number of movements along the Carpentaria Highway, the low number of movements expected to be associated with the existing intersection (i.e. turning movements) and the intersection's configuration with BAL/BAR treatments, no upgrades are warranted to accommodate existing volumes.

#### **6.1.3 CARPENTARIA HIGHWAY/SOUTH ACCESS**

Given the low number of movements along the Carpentaria Highway, the low number of movements expected to be associated with the existing intersection (i.e. turning movements) and the intersection's configuration with BAL/BAR treatments, no upgrades are warranted to accommodate existing volumes.

### **6.2 IMPROVEMENTS TO ACCOMMODATE BACKGROUND TRAFFIC**

As noted in Section 6.1.1, DIPL is currently undertaking upgrade (carriageway widening) works along the Carpentaria Highway, with works earmarked for chainage 175 km. Additional works would be expected beyond this point, connecting through to the existing two-way seal located within the vicinity of the Carpentaria Highway/Tablelands Highway intersection.

These upgrades are considered appropriate to accommodate future traffic growth on the Carpentaria Highway.

No further improvements (apart from general road maintenance) are considered to be warranted in order to accommodate 'background traffic'.

## **6.3 IMPROVEMENTS TO ACCOMMODATE TOTAL TRAFFIC**

### **6.3.1 CARPENTARIA HIGHWAY**

As noted in Section 3.3.1, DIPL is currently undertaking continual upgrade works along the Carpentaria Highway to widen the existing single-width carriageway to a two-way width, currently accounted for up to chainage 175 km. These works are being undertaken to accommodate existing traffic on the Carpentaria Highway, as well as account for continual growth on the network (as is highlighted in Section 3.3.2).

As noted in Section 6.1.1, the widened (two-lane) carriageway will have the ability to accommodate an AADT up to in the order of 500 to 1,000 vpd upon completion.

Whilst it is acknowledged that the upgrades will not be complete upon commencement (and cease) of Imperial Oil and Gas' drilling and operations program, it is expected that the highway will be occupied by completed (two-lane) carriageway or be under roadworks traffic control through to chainage 140 km throughout the duration of the subject program.

As noted in Section 4.1, the southern access is located at chainage 202 km, thereby leaving approximately 62 km of existing single-width seal not affected by roadworks traffic control.

The National Heavy Vehicle Regulator (NHVR) recommends a maximum desirable distance of 50 km between overtaking opportunities on roads with an AADT of between 100 and 500 vehicles per day (as is forecast on the Carpentaria Highway).

It is therefore considered that this is a guideline and not a statutory requirement, subject to unique site characteristics and other relevant information (such as pending upgrade works).

West of the project area's southern access, the additional vehicle movements forecast to be generated throughout the program lifecycle increase monthly average traffic volumes beyond 100 vpd on only two months (November 2024 and November 2025). It is therefore considered that Imperial Oil and Gas' drilling

and operations program will have minimal impact on the existing road operating environment in terms of impacting upon traffic volume 'thresholds'.

Furthermore, it is reiterated that the Carpentaria Highway is earmarked for upgrade (widening) through to chainage 175 km, leaving approximately 27 km between the site's southern access and the end of the upgraded carriageway (as is known at the time of writing). It is therefore not considered that works within this section of roadway are of value or logic, noting the impending rework of this section of highway.

Whilst outside of the project lifecycle, the remaining 27 km falls well within the desirable maximum distance, as well as the recommended average distance, between overtaking opportunities as per relevant NHVR guidelines.

Between the project area's northern and southern access point, traffic volumes on the Carpentaria Highway will be concentrated, with the associated AADT higher than those both east and west of the project area. A relatively high proportion of movements along this section are forecast to be associated with Imperial Oil and Gas' operations.

In order to reduce the operational risk associated with the two-way movement of commercial vehicles along this section, it is recommended that a 'call-up' radio protocol be implemented by Imperial Oil and Gas. It is envisaged that the protocol would work using two-way radio communication (commonly fitted within construction vehicles), whereby a driver approaching the Carpentaria Highway would radio ahead to see if any project-related vehicles (light or commercial) are travelling along the subject section of the Carpentaria Highway (i.e. between the northern and southern site access points), and their relative direction of travel (i.e. eastbound or westbound).

Should no radio response be received, the driver may then proceed from the private roadway onto the Carpentaria Highway through the subject section. Should a response be received, and the direction of travel be conflicting (i.e. for example, the radioed driver is travelling westbound when the exiting driver wishes to travel east), the exiting driver would be required to wait until the vehicle has passed the alternate access.

Employment of such a system will ensure that no opposing project-related vehicles are using the subject section of the Carpentaria Highway simultaneously, thereby significantly minimising potential conflict risk.

Through initial liaison with Imperial Oil and Gas (undertaken by InGauge), it is understood that such a protocol can be readily incorporated into existing



operational requirements. It is therefore expected that such a system will be implemented, affecting all project-related travel between the two access points.

Acknowledging that a large portion of traffic along this section may also be non-project related traffic, it is also recommended that a reduced speed limit be implemented between the northern and southern access points, along with appropriate warning signage (particularly 'Trucks Entering' signage). Such measures will further assist in mitigating potential conflicts along this section of the Carpentaria Highway.

### **6.3.2 CARPENTARIA HIGHWAY/NORTHERN ACCESS**

The existing northern access intersection on the Carpentaria Highway is understood to have been constructed with BAL and BAR treatments to appropriately accommodate movements associated with the largest vehicles anticipated to access the site (53.5 m Road Trains).

The existing intersection would therefore meet (and/or exceed) the layouts shown on the Northern Territory Government's *"Guide to Rural Intersections Treatments Sheet 1 - Types 1 & 2"* (drawing no. C(S)1842-0).

### **6.3.3 CARPENTARIA HIGHWAY/SOUTHERN ACCESS**

The existing southern access intersection is understood to have been constructed with BAL and BAR treatments. Furthermore, the intersection is understood to have been designed to accommodate Road Trains up to 53.5 m in length (the largest vehicle required to use the intersection under the subject proposal). Accordingly, no further improvements are proposed to the intersection.

## **6.4 EVALUATION**

On the basis of the above, it is considered that the additional vehicle movements generated by the proposed drilling and operations program will generally be adequately accommodated with the following measure:

- an internal project-related communication protocol shall be established to assist drivers when accessing the Carpentaria Highway (including approaching from west of the southern access, or east of the northern access);
- a reduced speed limit affecting the section of the Carpentaria Highway between the northern and southern access points shall be considered (in conjunction with DIPL);
- advanced warning signage shall be considered on the Carpentaria Highway to forewarn approaching non-project related traffic of the potential increased presence of large commercial vehicles; and

- should operations be required during the 'wet season', additional work zone traffic management provisions should be implemented (for instance, reduction in the posted speed limit in the vicinity of the access points). Additional maintenance on the condition of the access points may also be required.

## **7. FINDINGS AND RECOMMENDATIONS**

### **7.1 SITE ACCESSIBILITY**

Vehicle access via the project area will be provided via two existing T-intersections on the Carpentaria Highway. The intersections were previously designed to accommodate the turn paths of heavy vehicles such as 53.5 m Road Trains and shall continue to do so. The intersections (access points) comply with the requirements of the Austroads' Guidelines in regard to turning warrants and sight distances.

### **7.2 TRANSPORTATION IMPACTS**

Based upon information provided by InGauge, the additional number of vehicle movements associated with Imperial Oil and Gas' drilling and operations program will generally be accommodated on the Carpentaria Highway. Whilst volumes are likely to exceed the theoretical 150 vpd 'limit' identified by the Austroads Guidelines, upgrade (widening) works are being undertaken by DIPL independently of the subject drilling and operations program. It is therefore considered that appropriate actions are in place to improve the operational conditions of the Carpentaria Highway.

Furthermore, the NHVR guidelines recommend desirable distances between widened two-way opportunities. Upon completion of the known upgrade works, the remaining distance to the site's westernmost access will be less than the average recommended (with respect to traffic volume). Whilst it is acknowledged that the upgrade will not be complete at the commencement of the subject program, it is anticipated that a large portion of the highway will be under roadworks traffic control (i.e. a reduced speed limit). It is therefore considered that an appropriate management strategy will already be largely in place.

Between the two site intersections, traffic impacts will be minimised and managed through the implementation of a radio 'call-up' protocol. It is understood that Imperial Oil and Gas are accepting of such a protocol being implemented, and commonly apply similar practises internally within their various site.

Additional speed limit reductions and advance warning signage shall also be considered to assist with the minimising the project's impact upon general public traffic. This shall be further considered in conjunction with DIPL.

Upon implementation of these factors, it is considered that traffic volumes associated with the proposed drilling and operations program will be readily accommodated.

Furthermore, the existing intersections treatments are considered adequate to accommodate the forecast movements associated with the drilling and operations program.

### **7.3 ROADWAY IMPROVEMENTS**

#### **7.3.1 CARPENTARIA HIGHWAY**

On-going inspections and maintenance should be undertaken to ensure the integrity of both the sealed carriageway and unsealed shoulders is of an appropriate standard in the vicinity of the three access points.

#### **7.3.2 CARPENTARIA HIGHWAY/NORTHERN ACCESS**

Refer to Section 6.3.2.

#### **7.3.3 CARPENTARIA HIGHWAY/SOUTHERN ACCESS**

Refer to Section 6.3.3.

### **7.4 REPORTING**

This report has been prepared in accordance with Austroads' *Guide to Traffic Management – Part 12: Impacts of Developments*. Specifically, this report has been prepared based upon the reporting structure outlined in Appendix C of the Austroads' Guide.

# **APPENDIX A**

## **IMPERIAL OIL AND GAS - DRILLING AND OPERATIONS PROGRAM**

### **PREPARED BY INGAUGE**

EP187 - EMP IMPS

