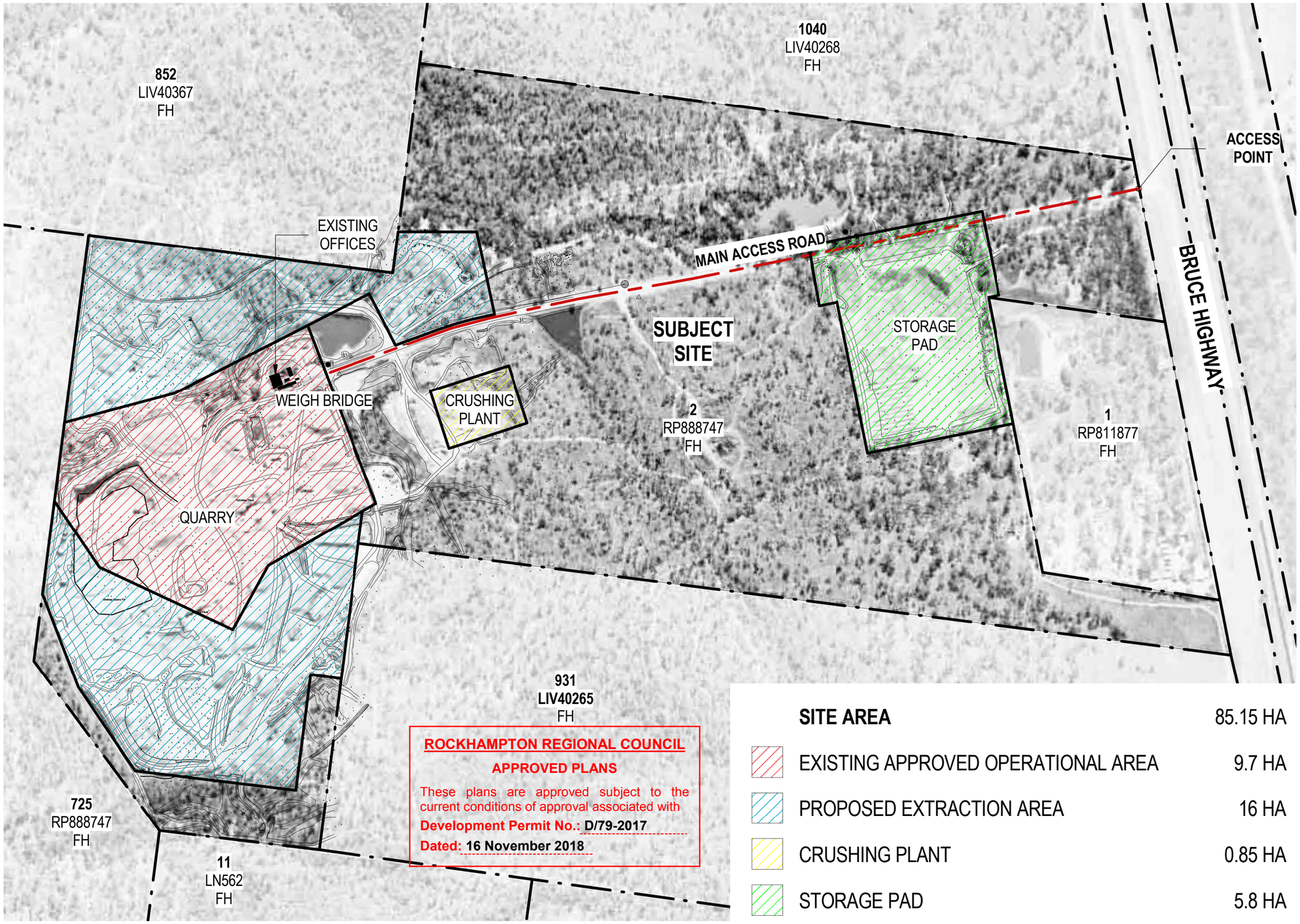


ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/79-2017

Dated: 16 November 2018

	SITE AREA	85.15 HA
	EXISTING APPROVED OPERATIONAL AREA	9.7 HA
	PROPOSED EXTRACTION AREA	16 HA
	CRUSHING PLANT	0.85 HA
	STORAGE PAD	5.8 HA

C:\Users\iAssist-User\Desktop\-Projects\GG-003\GG-003- SITE PLAN.rvt

29/06/2017 12:13:33 PM

drawing title:
SITE PLAN

drawing no: SP-002

project:
MIDGEE QUARRY

A3 DRAWING NOTED SCALES RELATE TO A3 DRAWINGS

location:
59793 BRUCE HIGHWAY, MIDGEE, QUEENSLAND, AUSTRALIA
(LOT 2 - RP888747)

client:

REVISIONS

REVISION	DESCRIPTION	DATE
1	PRELIMINARY	26/06/17
2	PRELIMINARY	29/06/17

ISSUED FOR
PRELIMINARY

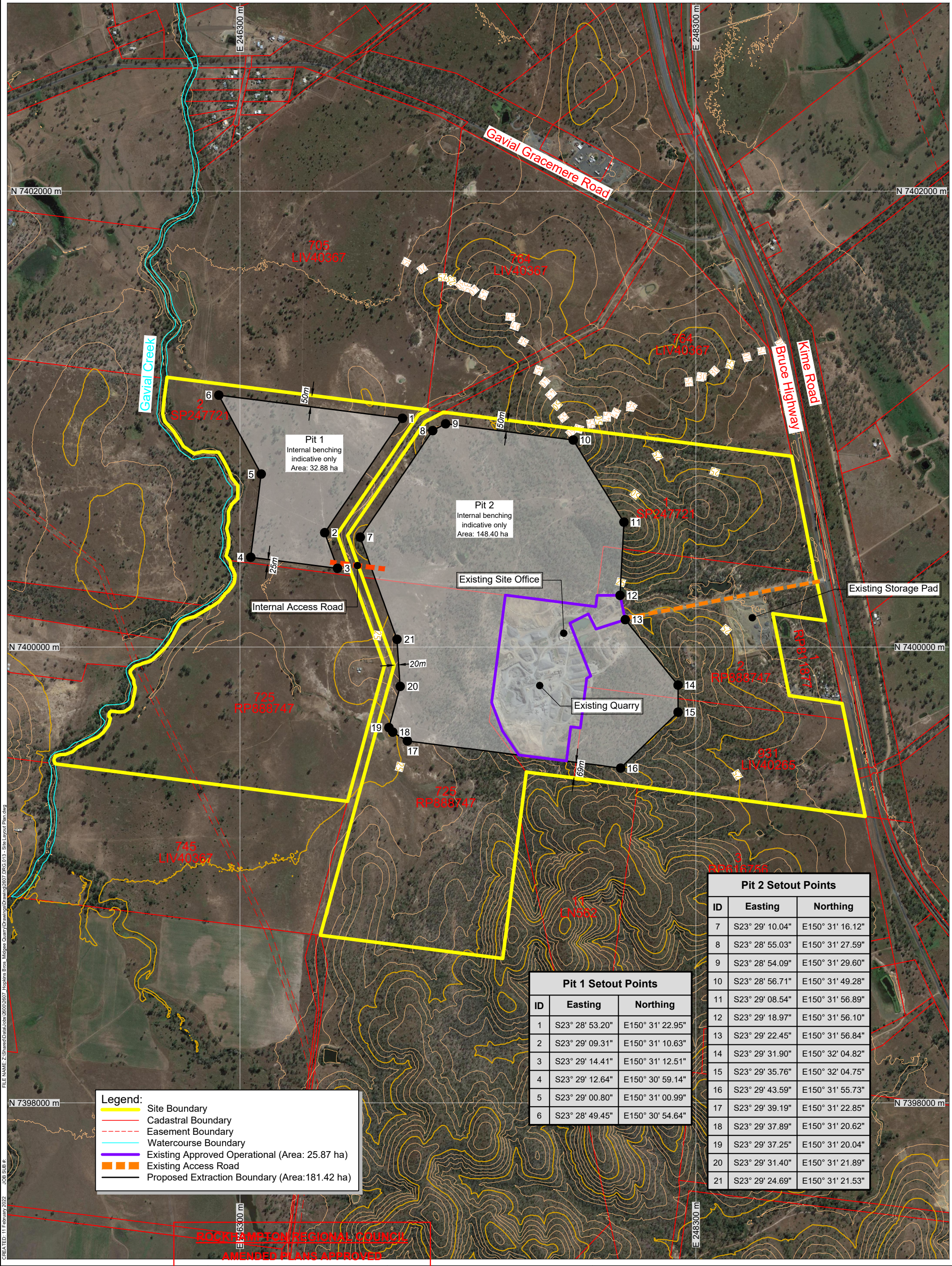
project no: GG-003

scale 1 : 5000

date JUN 17

drawn Author

rev 2



Pit 1 Setout Points		
ID	Easting	Northing
1	S23° 28' 53.20"	E150° 31' 22.95"
2	S23° 29' 09.31"	E150° 31' 10.63"
3	S23° 29' 14.41"	E150° 31' 12.51"
4	S23° 29' 12.64"	E150° 30' 59.14"
5	S23° 29' 00.80"	E150° 31' 00.99"
6	S23° 28' 49.45"	E150° 30' 54.64"

Pit 2 Setout Points		
ID	Easting	Northing
7	S23° 29' 10.04"	E150° 31' 16.12"
8	S23° 28' 55.03"	E150° 31' 27.59"
9	S23° 28' 54.09"	E150° 31' 29.60"
10	S23° 28' 56.71"	E150° 31' 49.28"
11	S23° 29' 08.54"	E150° 31' 56.89"
12	S23° 29' 18.97"	E150° 31' 56.10"
13	S23° 29' 22.45"	E150° 31' 56.84"
14	S23° 29' 31.90"	E150° 32' 04.82"
15	S23° 29' 35.76"	E150° 32' 04.75"
16	S23° 29' 43.59"	E150° 31' 55.73"
17	S23° 29' 39.19"	E150° 31' 22.85"
18	S23° 29' 37.89"	E150° 31' 20.62"
19	S23° 29' 37.25"	E150° 31' 20.04"
20	S23° 29' 31.40"	E150° 31' 21.89"
21	S23° 29' 24.69"	E150° 31' 21.53"

Legend:
- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Watercourse Boundary
- Existing Approved Operational (Area: 25.87 ha)
- Existing Access Road
- Proposed Extraction Boundary (Area:181.42 ha)

ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
8 June 2023
DATE
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/79-2017
Dated: 16 June 2023

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography: © 2021 Microsoft Corporation; © 2021 Maxar; © CNES (2021) Distribution Airbus DS
Topography: © Commonwealth of Australia (Geoscience Australia) 2015, LiDAR 5m
Cadastre: © The State of Queensland (Department of Resources) 2021
Ecosystem:
Other:

PROJECT: Midgee Quarry
CLIENT: Hopkins Brothers
TITLE: Site Layout Plan - Quarry Footprint Extension

GROUNDWORK plus
PH: +61 7 3871 0411
WWW.GROUNDWORK.COM.AU

SCALE: 1:15,000 When Printed On A3 (0 – 300m)
DRAWING NUMBER: 2607.DRG.013
REVISION:
DATE: 17 February 2022 DRAWN: MR
PRINTED: 17 February 2022 CHECKED: MB
DATUM: HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA / AHD / 56

FILE NAME: Z:\Shared\Data\Jobs\2600\2607 Hopkins Bros Midgee Quarry\Drawings\Drawing\2607.DRG.013 - Site Layout Plan.dwg
JOB SUB #:
CREATED: 11 February 2022

Department Principal:
Bryce Trevilyan
Project Contact:
Margaret Mak

TRAFFIC TRANSPORT plus

ABN: 54 619 700 239

Queensland
6 Mayneview Street, Milton Qld 4064
PO Box 1779, Milton BC, Qld 4064
P: +61 7 3871 0411

E: enquiry@ttplus.com.au

TTPlus Ref: 10569
05 December2022

Hopkins Brothers
c-/ Groundwork Plus

Attention: Megan Benham

Dear Megan,

Re: Midgee Quarry
Responses to Council's Information Request

Traffic & Transport Plus (**TTPlus**) refers to your request to provide response to Rockhampton Regional Council's (**Council**'s) "*Further Advice*" dated 28 April 2022 (**Council's Further Advice**) in relation to the proposed expansion of the Midgee Quarry located at the Bruce Highway, Midgee, QLD (**Subject Site**).

The Midgee Quarry currently enjoys a development approval and an Environmental Authority (**EA**) that allows for haulage / production of up to 1 million tonnes per annum (**Mtpa**). An asphalt plant, located within the Subject Site, has been approved to produce up to 100,000tpa. One of the existing conditions of approval is the requirement to construct an auxiliary left turn treatment – short turn lane (**AUL(S)**) at the site access on the Bruce Highway once the total material hauled from the Subject Site exceeds 0.7M tonnes (cumulative production of the existing quarry and the asphalt plant) in any 12-month period. TTPlus has been advised that the total material hauled from the Subject Site in the past financial year was approximately 140,000 – 150,000tpa; and that the annual production from the Subject Site have never exceeded 0.7Mtpa. As such, the AUL(S) condition has not yet been triggered.

There is currently no permanent asphalt plant on site, however the intention is that an asphalt plant would ultimately be delivered (either as a permanent or temporary facility).

The subject development application for the Midgee Quarry seeks approval to be permitted to produce up to 2Mtpa. The site plan of the proposed expansion of the Midgee Quarry is included in Appendix A of this advice.

The traffic-related information requests included in Council's Further Advice; and the responses to the traffic-related information requests are provided in the following sections of this advice.

ROCKHAMPTON REGIONAL COUNCIL
AMENDED PLANS APPROVED
8 June 2023
DATE
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/79-2017
Dated: 16 June 2023

1.1 Council's Further Advice information request item no.1

"Council officers have undertaken a detailed assessment of the subject development application. In accordance with section 35 of the Development Assessment Rules, Council gives further advice about the application, as detailed below:

1. *Traffic Impact Assessment (TIA) has not addressed the worst case scenario for haulage between the extractive industry site and the Rockhampton Ring Road (RRR) project. Further information is required which identifies and addresses all local government roads potentially impacted by the proposed development and operations.*

   This may include haulage involving the use of a number of Local Government roads in the South and North Rockhampton areas. Please amend the TIA to include all possible haulage routes (including council roads) that can be used to transport material from the extractive industry site to Rockhampton Ring Road (RRR) construction sites. Please provide details regarding traffic generation from the proposed development and any impact to the current traffic volumes on possible haulage routes (including council roads) from the extractive industry site to RRR construction sites.

   The traffic volume comparison must be carried out in accordance with the Guide to Traffic Impact Assessment (GTIA) requirements and the TIA must be carried out and signed by a Registered Professional Engineer of Queensland (RPEQ)."

1.2 Response to Council's Further Advice information request item no.1

In order to address the traffic-related concerns in relation to the traffic impacts associated with the proposed expansion of the quarry, an updated traffic impact assessment has been undertaken to cover a larger study area (including potential traffic impacts on Council Roads), and the results of the assessment have been presented below.

1.2.1 Trip distribution

In the previous TTPlus traffic and pavement impact assessment report dated 01 February 2022 (**TTPlus Feb Report**) it was assumed that 50% of the quarried material would be transported to the north (towards Rockhampton) and the remaining 50% of quarried material would be transported to the south. After a more detailed review of the potential catchments of the quarried material and the potential demand of the Rockhampton Ring Road (**RRR**) project, Hopkins Brothers (**HB**) has advised the following likely distributions of quarried material associated with the Midgee Quarry:

- Towards Rockhampton (north): 35%
- Towards RRR project (north-west): 20%
- Towards Gracemere (west): 10%
- Towards Mount Morgan (south-west): 5%
- Towards Gladstone / Benaraby (south / south-east): 30%

1.2.2 Transport routes

HB intends to supply material to the RRR project. Figure 1 illustrates the location of the Subject Site relative to the alignment of the RRR project. It is likely that the delivery of most of material to the RRR Project would be made on the Capricorn Highway (as illustrated on Figure 1), where the RRR Project alignment first intersects with the existing road network. A small amount of material to the RRR Project may be delivered at other locations where the RRR Project alignment intersects with the existing road network

It is noted that the Midgee Quarry is one of the closest quarries to the RRR project. The Bruce Highway and the Capricorn Highway are likely to be utilised by trucks delivering material to the RRR project regardless of if the material is supplied from the Subject Site, but likely from quarries further away (with longer transport routes).

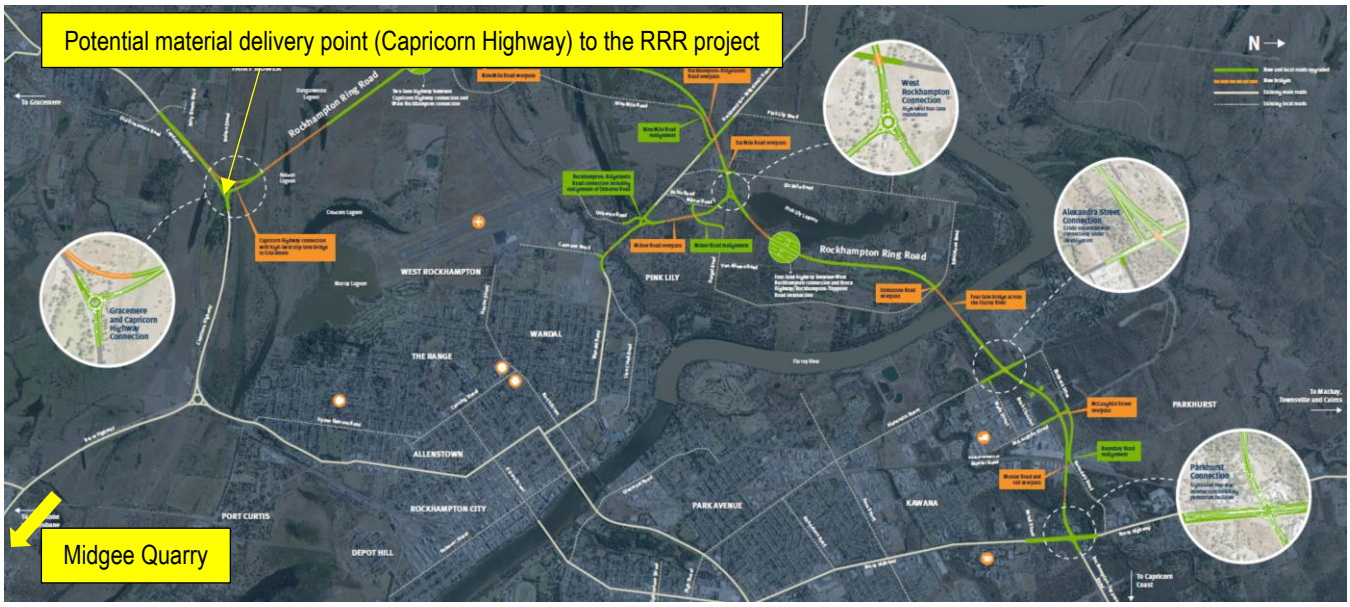


Figure 1 – Alignment of RRR project and the location of the Subject Site

Source: https://www.tmr.qld.gov.au/_/media/projects/r/rockhampton-ring-road/rrr-design-map.png [annotations added by TTPlus]

The following transport routes are proposed to be utilised; with the proposed transport routes illustrated on Figure 2.

- To / from Rockhampton (north): the Bruce Highway (north) and Rockhampton-Yeppoon Road
- To / from RRR project (north-west): the Bruce Highway (north) and the Capricorn Highway
- To / from Gracemere (west): the Bruce Highway (north) and the Capricorn Highway
- To / from Mount Morgan (south-west): the Bruce Highway (north) and the Burnett Highway
- To / from Gladstone / Benaraby (south / south-east): the Bruce Highway (south)

The heavy vehicles forecast to be used by the Midgee Quarry for haulage are predominately truck & dogs — no B-doubles and road trains will be used in the haulage of quarry material.

It is proposed to utilise the Bruce Highway, the Capricorn Highway and the Burnett Highway to deliver material to / from Gracemere (west) and to / from Mount Morgan (south-west), instead of Gavial-Gracemere Road, the reasons are listed below:

- The road widths and pavement standards of the Bruce Highway, the Capricorn Highway and the Burnett Highway are much better than Gavial-Gracemere Road's standards, and
- According to the Department of Transport and Main Roads' (**DTMR**'s) multicombination route map, the Bruce Highway, the Capricorn Highway and the Burnett Highway are suitable for the use of B-doubles, but not Gavial-Gracemere Road. Although no B-doubles and road trains will be used in the haulage of quarry material, it is considered to be safer and more suitable for the trucks associated with the quarry utilsing the higher design standard roads.

Should the Proposal be approved, suitable conditions are recommended to be included to specify the permitted transport routes for the Midgee Quarry (not utilising Gavial-Gracemere Road).

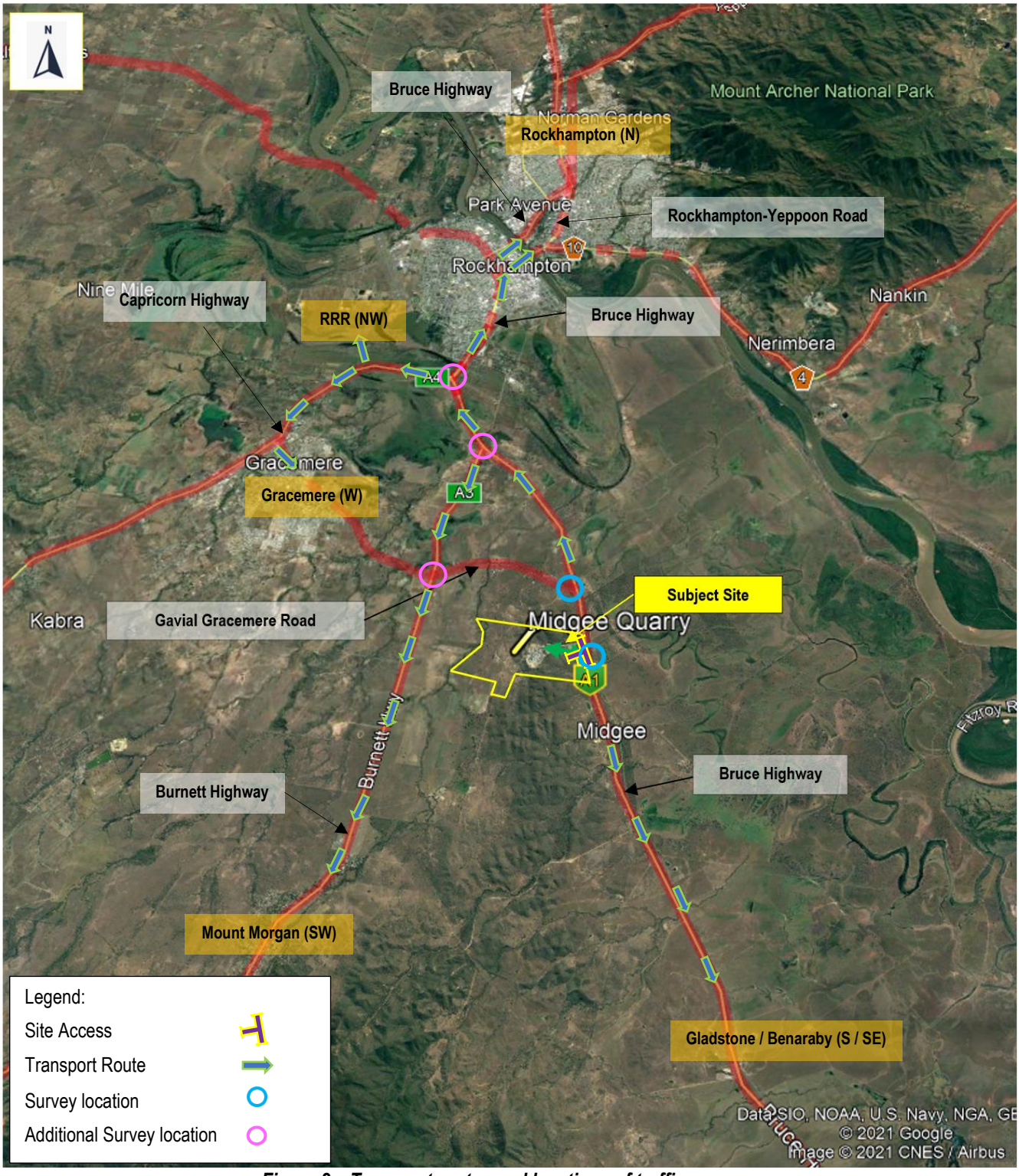


Figure 2 – Transport routes and locations of traffic surveys

Source: Google Earth [annotations added by TTPlus]
Note: The red shaded lines indicate State-controlled roads

1.2.3 Additional traffic surveys

The quarry will access the road network via the Bruce Highway, which is a State-controlled road (**SCR**). The quarry predominately utilises SCR to deliver the quarry materials, therefore the traffic impact assessment has been undertaken based on the guidelines included in DTMR's "*Guide to Traffic Impact Assessment*" (**GTIA**) (Ref.1).

GTIA states:

- "*Impact assessment area (Intersection delay) – All intersections where the development traffic exceeds 5% of the base traffic for any movement in the design peak periods in the year of opening of each stage"*;
- *"Impact assessment area (Road link capacity) – All road links where the development traffic exceeds 5% of the base traffic in either direction on the link's annual average daily traffic (AADT) in the year of opening of each stage"*, and
- *"The desired outcome is to ensure that the sum of intersection delays on base traffic in the impact assessment area does not significantly worsen (ie. does not increase average delay by more than 5% in aggregate) as a result of a development."*

Traffic surveys were undertaken at the Bruce Highway site access and the Bruce Highway / Gavial-Gracemere Road intersection on Wednesday 25 August 2021 from 6:30am to 9:30am and from 2:30pm to 6:00pm. The locations of the traffic surveys have been illustrated on Figure 2 (refer to **blue** circles).

For the purpose of considering GTIA's impact assessment area (**IAA**) (and updated trip distribution), additional traffic surveys have been undertaken on Tuesday 09 August 2022 from 6:30am to 9:30am and from 2:30pm to 6:00pm at the Burnett Highway / Gavial-Gracemere Road intersection, the Bruce Highway / Burnett Highway intersection and the Bruce Highway / Capricorn Highway intersection. The locations of the additional traffic surveys have been illustrated on Figure 2 (refer to **pink** circles).

The detailed results of the traffic surveys are included in Appendix C.

The peak hour traffic volumes observed at individual intersections have been utilised in this assessment. Figures B1 and B2 within Appendix B illustrate the 2021 and 2022 observed background AM and PM peak hour traffic volumes respectively.

[1] *"Guide to Traffic Impact Assessment", DTMR, 2018.*

1.2.4 Background traffic volumes

Background traffic data was sourced from the DTMR traffic census stations along the Bruce Highway, Gavial-Gracemere Road, the Burnett Highway, and the Capricorn Highway to assist in forecasting an appropriate background traffic growth rate. The annual average daily traffic (**AADT**) and growth rates of the nearby SCRs are listed below:

- Bruce Highway (station no. 60130), north of the Bruce Highway site access:
  - From 6,063 vehicles per day (**vpd**) in 2011 to 5,451vpd in 2021
  - Growth rate: -1.1% p.a. (compound)
- Bruce Highway (station no. 60024), north of the Bruce Highway site access:
  - From 9,993vpd in 2011 to 10,402vpd in 2021
  - Growth rate: 0.4% p.a. (compound)
- Bruce Highway (station no. 61551), south of the Bruce Highway site access:
  - From 6,133vpd in 2011 to 7,045vpd in 2021
  - Growth rate: 1.4% p.a. (compound)
- Gavial-Gracemere Road (station no. 60097):
  - From 1,136vpd in 2011 to 1,060vpd in 2021
  - Growth rate: -0.7% p.a. (compound)
- Burnett Highway (station no. 60059):
  - From 3,814vpd in 2011to 4,741vpd in 2021
  - Growth rate: 2.2% p.a. (compound)
- Capricorn Highway (station no. 60039):
  - From 16,169vpd in 2011 to 15,792vpd in 2021
  - Growth rate: -0.2% p.a. (compound)

Whilst future traffic growth can only be estimated, for the purpose of this assessment, a traffic growth rate of 2% p.a. (compound) has been adopted to estimate future background traffic volumes on the external road network proximate to the Subject Site.

For the purpose of this updated traffic and pavement impact assessment, it is assumed that the expanded quarry would start operation in 2023. Therefore, in accordance with traditional traffic engineering practice, the design year for the expanded quarry is 2033.

Figures B3 and B4 within Appendix B illustrate the 2023 and 2033 background traffic volumes during the AM and PM peak hour periods.

1.2.5 Trip generation

TTPlus has been advised that the operational hours of the haulage activities of the existing quarry (1Mtpa) are from 6:00am to 6:00pm (12 hours) from Monday to Saturday (6 days). The proposed operational hours of the expanded quarry (2Mtpa) are 24 hours and 7 days, although it would be routine for there to be a number of days where no haulage would occur.

TTPlus has been advised that the existing quarry produced approximately 140,000 – 150,000tpa in the past financial year, the trip generation associated with the existing quarry has already been included in the traffic surveys. The "additional" trip generation associated with the approved quarry (1Mtpa) on top of the trip generation associated with the existing quarry (produces 140,000 – 150,000tpa) and the "additional" trip generation associated with the approved asphalt plant (100,000tpa) should be considered as part of the base traffic volumes when assessing the traffic impacts associated with the proposed expansion of the quarry (2Mtpa). Therefore, the "additional" trip generation associated with the approved quarry (1Mtpa), the approved asphalt plant (100,000tpa) and the proposed expended quarry have been estimated and discussed below.

"Additional" truck trips associated with the approved quarry (1Mtpa)

To ensure sufficient infrastructure is in place to cater for the 'worst–case' operational scenario, the analysis has conservatively assumed that the approved quarry, the approved asphalt plant and the expanded quarry would likely generate more than the typical average hourly traffic volumes during the peak hour periods by introducing the concept of a "peak hour factor". The peak hour factor is the ratio of the absolute peak operating conditions to the average operating conditions of the critical year as modelled for the operations within the Subject Site. This represents what is considered to be the 'worst–case' peak operational scenario (ie. the appropriate design case) and accounts for all aspects of variations expected throughout each day and the year for the hauling activities of the Subject Site.

The estimated "additional" trip generation associated with the approved quarry (1Mtpa) on top of the trip generation associated with the existing quarry (assuming the production rate of the existing quarry is 140,000tpa) is outlined below.

- Maximum annual production rate: 860,000tpa [= 1,000,000 – 140,000];
- Operational days per year: 336 days*;
- Operational hours: 24 hours and 7 days;
- Average mass of material per vehicle**: 32 tonnes per vehicle;
- Peak hour factor***: 5;
- Peak hour traffic volume (IN): [860,000 ÷ 336 ÷ 24 ÷ 32 × 5] = 16.7 → 17vph, and
- Peak hour traffic volume (OUT): 17vph (assumed same as IN traffic volumes).

** Operational days per year has been advised by HB.*

***TTPlus has been advised that 32t payload truck & dogs (100%) would be used for haulage.*

****The peak hour factor is the ratio of the absolute peak operating conditions to the average operating conditions of a peak production year, as modelled for the approved quarry. This represents what is considered to be the 'worst-case' peak operational scenario and accounts for all aspects of variations expected throughout each day and the year – as the quarry is applying for 24 hours a day, 7 days a week, a higher peak hour factor than usually adopted has been assumed.*

These resultant volume forecasts are appropriately conservative for the purpose of this assessment. It is also conservatively assumed within the modelling that the development peak and the on–road peak are coincident. This 'worst–case' operational scenario is a design consideration only and is unlikely to occur as part of the actual day to day operations. The analysis methodology used is intended to ensure that sufficient infrastructure is provided in the vicinity of the site and to enable the safe and efficient operation of the surrounding road network.

"Additional" car trips associated with the approved quarry (1Mtpa)

TTPlus has been advised that there will be an additional 5 – 10 staff working at the approved quarry when production increases. Staff and visitors would generally not arrive / leave the site during the AM and PM haulage peak periods; notwithstanding this, allowances of an additional 10vph (7vph IN + 3vph OUT) during the AM peak hour period and 10vph (3vph IN + 7vph OUT) during the PM peak hour period have been included in the analysis.

This is a conservatively high allowance for staff / visitor car trips coinciding with the haulage and on–road peak periods (noting that the assumption that haulage and on–road peaks coincide is also conservative).

In the absence of more detailed information, the analysis approach adopted herein is considered to be appropriate. The "additional" trips estimated to be generated by the approved quarry are illustrated on Figure B5 within Appendix B.

"Additional" truck trips for outgoing material associated with the asphalt plant

TTPlus has been advised that a temporary mobile asphalt plant was utilised on the Subject Site and produced 40,000 tonnes for a single project, however this temporary mobile plant has now been removed. It did not operate on the survey days in August 2021 and August 2022.

The number of trucks that would likely be generated by the approved asphalt plant (which was not operational during the survey days) delivering outgoing material has been estimated by adopting the following project operational parameters:

- Maximum annual production rate: 100,000tpa;
- Operational days per year: 288 days;
- Operational hours: 6:00am to 6:00pm (from Monday to Saturday);
- Average operational hours per day: 12 hours per day;
- Average mass of material per vehicle*: 26.5 tonnes per vehicle;
- Peak hour factor: 3;
- Peak hourly traffic volume (IN): [100,000 ÷ 288 ÷ 12 ÷ 26.5 × 3] = 3.3vph → 3vph; and
- Peak hourly traffic volume (OUT): 3vph (assumed same as IN traffic volumes).

**TTPlus has been advised that 26.5t payload asphalt trucks (100%) would be used for haulage.*

***The peak hour factor is the ratio of the absolute peak operating conditions to the average operating conditions of a peak production year, as modelled for the approved asphalt plant. This represents what is considered to be the 'worst-case' peak operational scenario and accounts for all aspects of variations expected throughout each day and the year.*

TTPlus has been advised that 60% of the asphalt would be transported to the north (towards Rockhampton) and the remaining 40% of the asphalt would be transported to the south.

"Additional" truck trips for incoming material associated with the asphalt plant

The approved asphalt plant also requires the importation of raw material for production – it is assumed that ~10% of 'incoming' material is supplied internally from the quarry. Therefore, the approved asphalt plant will require the importation of up to 90,000tpa [= 100,000 × 90%] of raw material via the external road network. The raw material imported from the quarry itself would of course not impart additional load on the external road network (and in fact arguably would reduce quarry-related impacts).

The number of trucks that would likely be generated by the approved asphalt plant related to the importation of material has been estimated by adopting the following project operational parameters:

- Maximum amount of imported material: 90,000tpa;
- Operational days per year: 288 days;
- Operational hours: 6:00am to 6:00pm (from Monday to Saturday);
- Average operational hours per day: 12 hours per day;
- Average mass of material per vehicle*: 33.25 tonnes per vehicle;
- Peak hour factor: 3;
- Peak hourly traffic volume (IN): [90,000 ÷ 288 ÷ 12 ÷ 33.25 × 3] = 2.4vph → 2vph; and
- Peak hourly traffic volume (OUT): 2vph (assumed same as IN traffic volumes).

**TTPlus has been advised that 26.5t payload semi-trailers (50%) and 40.0t payload B-doubles (50%) will be used. The average mass of material per vehicle of the assumed fleet has been calculated by factoring the mass of material able to be transported by these vehicles and considering the relative proportions of them within the vehicle fleet. Therefore, the average mass of material per vehicle of the assumed fleet = [26.5t × 0.5 + 40.0t × 0.5] = 33.25 tonnes per vehicle.*

For the purpose of this assessment, HB has advised that it is likely that 60% of the incoming material associated with the approved asphalt plant would be imported via the Bruce Highway (north), and the remaining 40% of the incoming material would be imported via the Bruce Highway (south).

"Additional" car trips associated with the asphalt plant

TTPlus has been advised that there would be 3 staff working at the approved asphalt plant.

Allowances of 3vph (2vph IN + 1vph OUT) during the AM peak hour period and 3vph (1vph IN + 2vph OUT) during the PM peak hour period have been included in the analysis. As outlined earlier, this is a conservatively high allowance for staff / visitor car trips coinciding with the haulage and on-road peak periods.

The travel routes of staff / visitors associated with the approved asphalt plant are not known at this stage, however, for the purpose of this assessment, it has been assumed that 80% of the staff / visitors would travel to / from the site from / to the north, and the remaining 20% of the staff / visitors would travel from / to the south.

The "additional" trips estimated to be generated by the approved asphalt plant are illustrated on Figure B6 within Appendix B.

Truck trips associated with the expanded quarry (2Mtpa)

The estimated "additional" trip generation associated with the expanded quarry (2Mtpa) on top of the trip generation associated with the approved quarry (1Mtpa) is outlined below.

- Maximum annual production rate: 1,000,000tpa [= 2,000,000 – 1,000,000];
- Operational days per year: 336 days*;
- Operational hours: 24 hours and 7 days;
- Average mass of material per vehicle**: 32 tonnes per vehicle;
- Daily traffic volume (IN): [1,000,000 ÷ 336 ÷ 32] = 93vpd;
- Daily traffic volume (OUT): 93vpd (assumed same as IN traffic volumes);
- Peak hour factor***: 5;
- Peak hour traffic volume (IN): [1,000,000 ÷ 336 ÷ 24 ÷ 32 × 5] = 19.4 → 19vph, and
- Peak hour traffic volume (OUT): 19vph (assumed same as IN traffic volumes).

**Operational days per year has been advised by HB.*

***TTPlus has been advised that 32t payload truck & dogs (100%) would be used for haulage.*

****The peak hour factor is the ratio of the absolute peak operating conditions to the average operating conditions of a peak production year, as modelled for the expanded quarry. This represents what is considered to be the 'worst-case' peak operational scenario and accounts for all aspects of variations expected throughout each day and the year – as the quarry is applying for 24 hours a day, 7 days a week, a higher peak hour factor than usually adopted has been assumed.*

Car trips associated with the expanded quarry

TTPlus has been advised that there would be additional 5 staff working at the expanded quarry.

As noted, staff and visitors would generally not arrive / leave the site during the AM and PM haulage peak periods; notwithstanding this, allowances of additional 5vph (3vph IN + 2vph OUT) during the AM peak hour period and 5vph (2vph IN + 3vph OUT) during the PM peak hour period have been included in the analysis.

The additional trips estimated to be generated by the expanded quarry are illustrated on Figure B7 within Appendix B.

1.2.6 Base traffic volumes and design traffic volumes

For the reasons outlined earlier in this advice, the resultant traffic volume forecasts are considered to be appropriately conservative for the purpose of this assessment.

2023 base peak hour traffic volumes [**Figure B8**]
- **=** 2023 background peak hour traffic volumes [**Figure B3**]
- **+** trip generation associated with the approved quarry [**Figure B5**]
- **+** trip generation associated with the approved asphalt plant [**Figure B6**]

2033 base peak hour traffic volumes [**Figure B9**]
- **=** 2033 background peak hour traffic volumes [**Figure B4**]
- **+** trip generation associated with the approved quarry [**Figure B5**]
- **+** trip generation associated with the approved asphalt plant [**Figure B6**]

2023 design peak hour traffic volumes [**Figure B10**]
- **=** 2023 base peak hour traffic volumes [**Figure B8**]
- **+** trip generation associated with the expanded quarry [**Figure B7**]

2033 design peak hour traffic volumes [**Figure B11**]
- **=** 2033 base peak hour traffic volumes [**Figure B9**]
- **+** trip generation associated with the expanded quarry [**Figure B7**]

1.2.7 Impact assessment area (IAA)

GTIA states: "*Impact assessment area (road link capacity) – All road links where the development traffic exceeds 5% of the base traffic in either direction on the link's annual average daily traffic (AADT) in the year of opening of each stage.*"

For the purpose of considering this IAA, or zone of influence, the trips generated by the expanded quarry have been compared to the 2023 (opening year) base traffic volumes on the road network in the vicinity of the Subject Site.

The 2023 base traffic volumes, additional development traffic associated with the expanded quarry and the percentage change in base traffic volumes are summarised in Table 1.

Table 1 – Percentage Change in Base Traffic Volumes

Traffic Lane	Direction	2023 Base Traffic Volumes* (vph)		Additional Development Traffic** (vph)		% Change in Base Traffic Volume	
		AM	PM	AM	PM	AM	PM
Bruce Highway (south of the site access)	northbound	258	294	6	6	2.3%	2.0%
	southbound	292	258	6	6	2.1%	2.3%
Bruce Highway (north of the Burnett Highway)	northbound	858	410	14	15	1.6%	3.7%
	southbound	407	628	15	14	3.7%	2.2%
Burnett Highway (southwest of the Bruce Highway)	northbound	596	189	1	1	0.2%	0.5%
	southbound	165	403	1	1	0.6%	0.2%

**2023 base traffic volumes are illustrated in Figure B8.*

***Additional development traffic associated with the expanded quarry are illustrated in Figure B7.*

The additional trips generated by the expanded quarry would not exceed 5% of the base traffic beyond the Bruce Highway site access to the south and the Bruce Highway / Burnett Highway intersection to the north; accordingly, the expanded quarry would not have a significant traffic impact on the external (State and Council) road network beyond the Bruce Highway site access to the south and the Bruce Highway / Burnett Highway intersection to the north.

The percentage increase to the base traffic associated with the expanded quarry would drop below 5% within the SCR network (before reaching Council roads), therefore a detailed assessment on the Council road network is not considered to be warranted.

The detailed traffic impact assessment of the Bruce Highway site access, the Bruce Highway / Gavial-Gracemere Road intersection, the Burnett Highway / Gavial-Gracemere Road intersection and the Bruce Highway / Burnett Highway intersection has been included in a separate response to SARA's information request. The proposed improvements on SCRs have been summarised in the next section of this advice for Council's information.

It is noted that the conclusions drawn in this advice would not be affected even if the actual trip distributions are slightly different from the assumed trip distributions or the completion of the RRR project delays for a few years (the maximum production of the expanded quarry would not exceed 2Mtpa with and without the RRR project).

1.2.8 Recommended upgrading works

One of the existing conditions of approval is the requirement to construct an AUL(S) turn lane treatment at the Bruce Highway site access once the total material hauled from the Subject Site exceeds 0.7M tonnes (cumulative production of the existing quarry and the asphalt plant) in any 12-month period.

The traffic impacts associated with the expanded quarry (produces up to 2Mtpa) on the external road network have been assessed based on the guidelines included in DTMR's GTIA (Ref.1). Based on the results of the assessment, it is recommended to provide AUL(S) and CHR turn lane treatments at the Bruce Highway site access for the expanded quarry (produces up to 2Mtpa).

Timings to provide the recommended / conditioned turn lane treatments at the Bruce Highway site access are provided below.

1. Once the total material hauled from the Subject Site exceeds 0.7M tonnes, upgrade the left turn treatment to an AUL(S) turn lane treatment.
2. When the production from the quarry exceeds 1Mtpa, upgrade the right turn treatment to a CHR turn lane treatment.
3. No further turn lane treatments are required to be provided if the production of the quarry does not exceed 2 Mtpa.

2.1 Council's Further Advice information request item no.2

"Pavement Impact Assessment (PIA) has not addressed the impact on any local roads for the proposed scenarios. Further information is required addressing impacts on all relevant local government roads, for an increased output of one (1) million tonnes per annum specifically for the RRR project. All possible haulage routes (including Council roads in North and South Rockhampton areas) must be included into the RRR project scenario. The PIA must be carried out and signed by a Registered Professional Engineer of Queensland (RPEQ)"

2.2 Response to Council's Further Advice information request item no.2

DTMR's GTIA (Ref.1) states "*Pavement – All road links where the development standard axle repetitions (SARs) exceeds 5% of the base traffic in either direction on the link's SARs in the year of opening of each stage."*

The transport routes of the Midgee Quarry have been discussed in Section 1.2.2. The trucks associated with the quarry predominately utilise SCRs (not Council's Roads) to haul material, except for some local deliveries. The development generated SARs would drop below 5% of the base traffic within the SCRs network (before reaching the Council road network), therefore a pavement impact assessment for Council roads is not considered to be required.

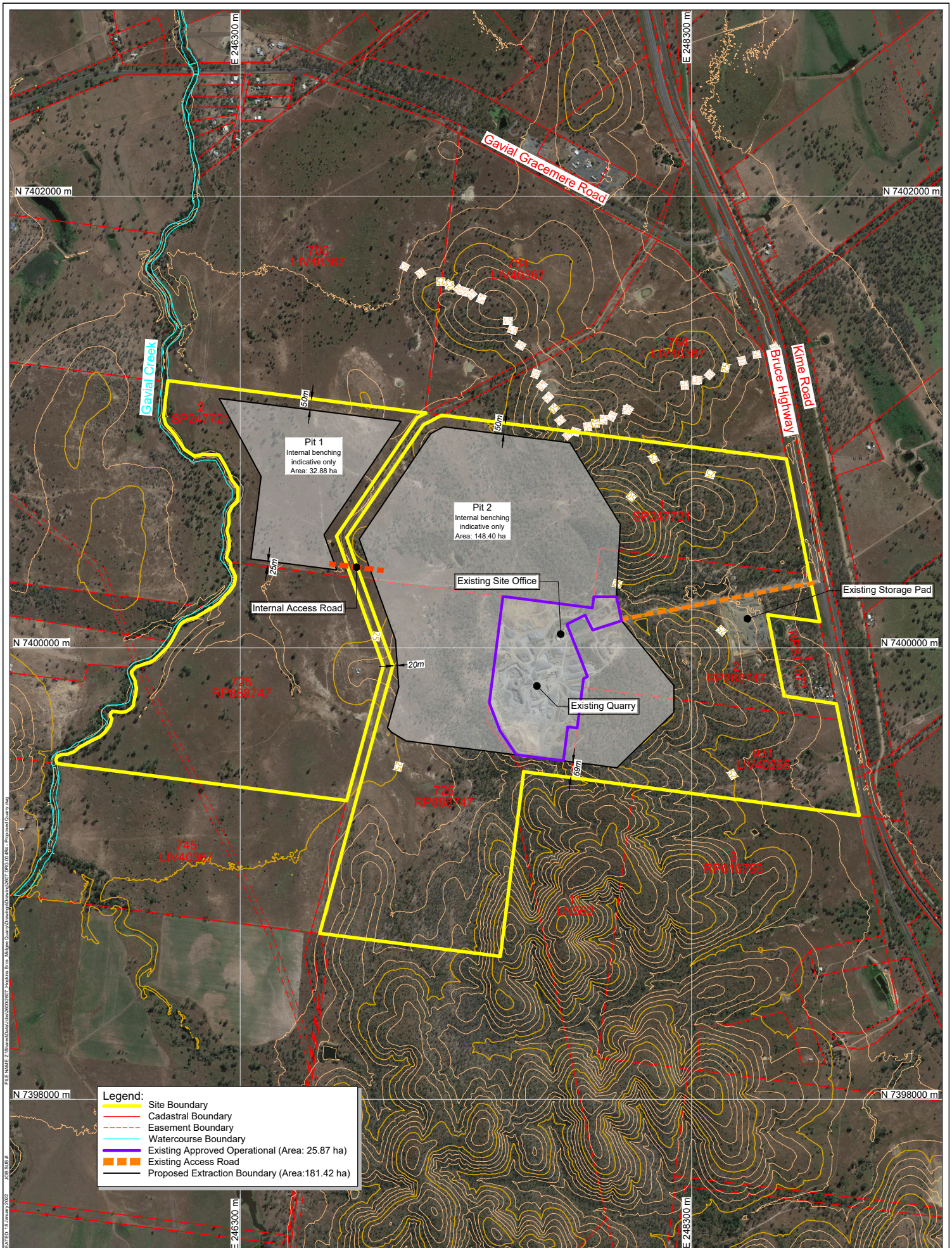
We trust that this information is of assistance. If you require any additional assistance in relation to this matter, please do not hesitate to contact the undersigned.

Yours faithfully

Noel Kay – RPEQ#26424
Traffic & Transport Plus

Appendix A

Site Plan



REV	DESCRIPTION	DATE	BY
2	Site Access Road deleted	19-11-2021	MR
3	Pit 1 revised	03-12-2021	MR
4	Pit 2 southern boundary amendments	19-01-2022	MR

Data Sources:
Photography: © 2021 Microsoft Corporation; © 2021 Maxar, © CNES (2021) Distribution Airbus DS
Topography: © Commonwealth of Australia (Geoscience Australia) 2015, LIDAR 5m
Cadastre: © The State of Queensland (Department of Resources) 2021
Ecosystem:
Other:

PROJECT: Midgee Quarry
CLIENT: Hopkins Brothers
TITLE: Proposed Quarry

GROUNDWORK plus
Ph: +61 7 3871 0411
www.groundwork.com.au

SCALE: 1:15,000 When Printed On A3 | 0 300m
DRAWING NUMBER: 2607.DRG.004
REVISION: 4
DATE: 20 January 2022 | DRAWN: JHV
PRINTED: 20 January 2022 | CHECKED: JT
DATUM: HORIZONTAL / VERTICAL / ZONE: GDA94 / MGA / AHD / 56

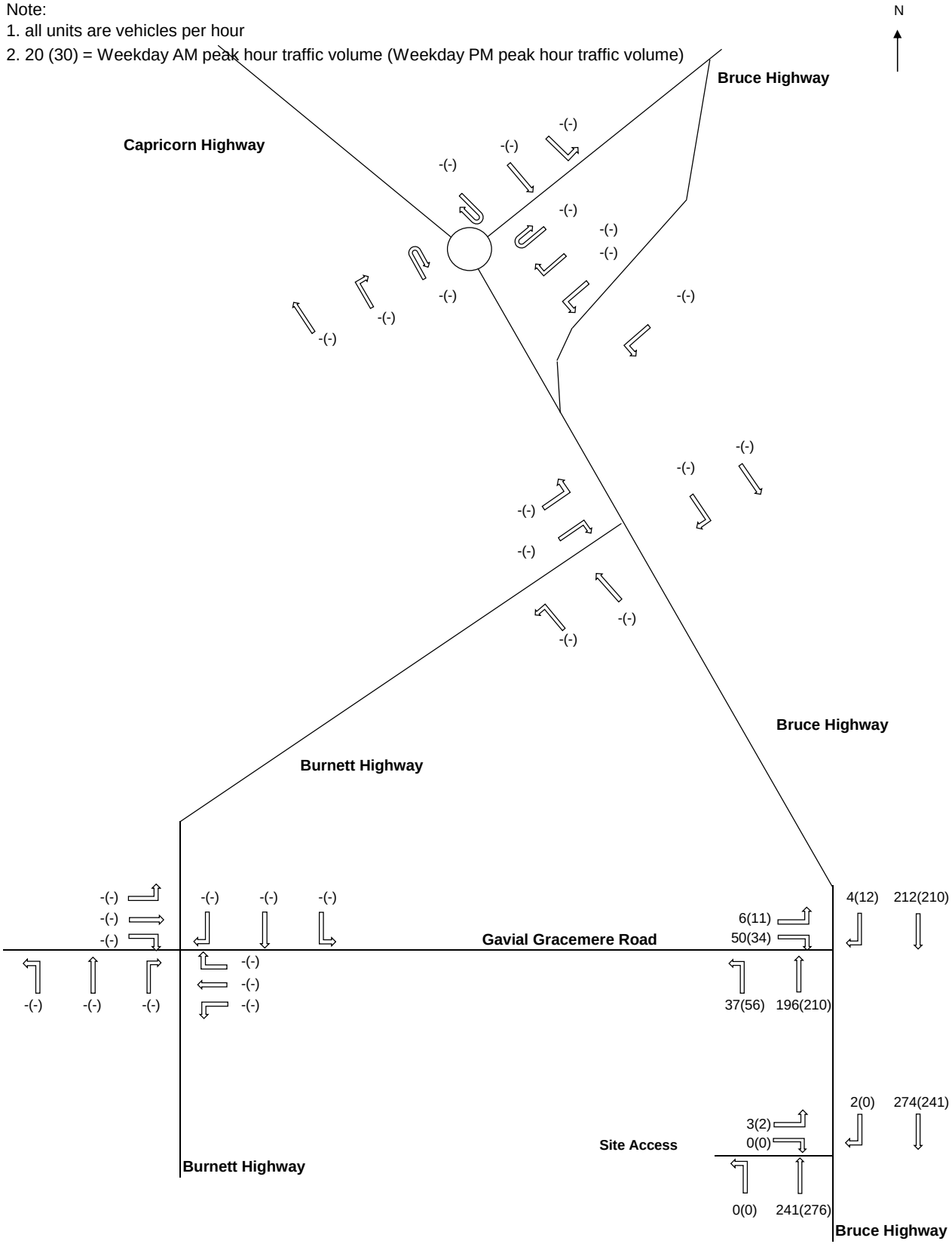
FILE NAME: Z:\Shared Data\Jobs\2600\2607 Hopkins Bros Midgee Quarry\Drawing\Drawings\2607.DRG.004 - Proposed Quarry.dwg
JOB SUB #:
CREATED: 18 January 2022

Appendix B

Traffic Volume Diagrams

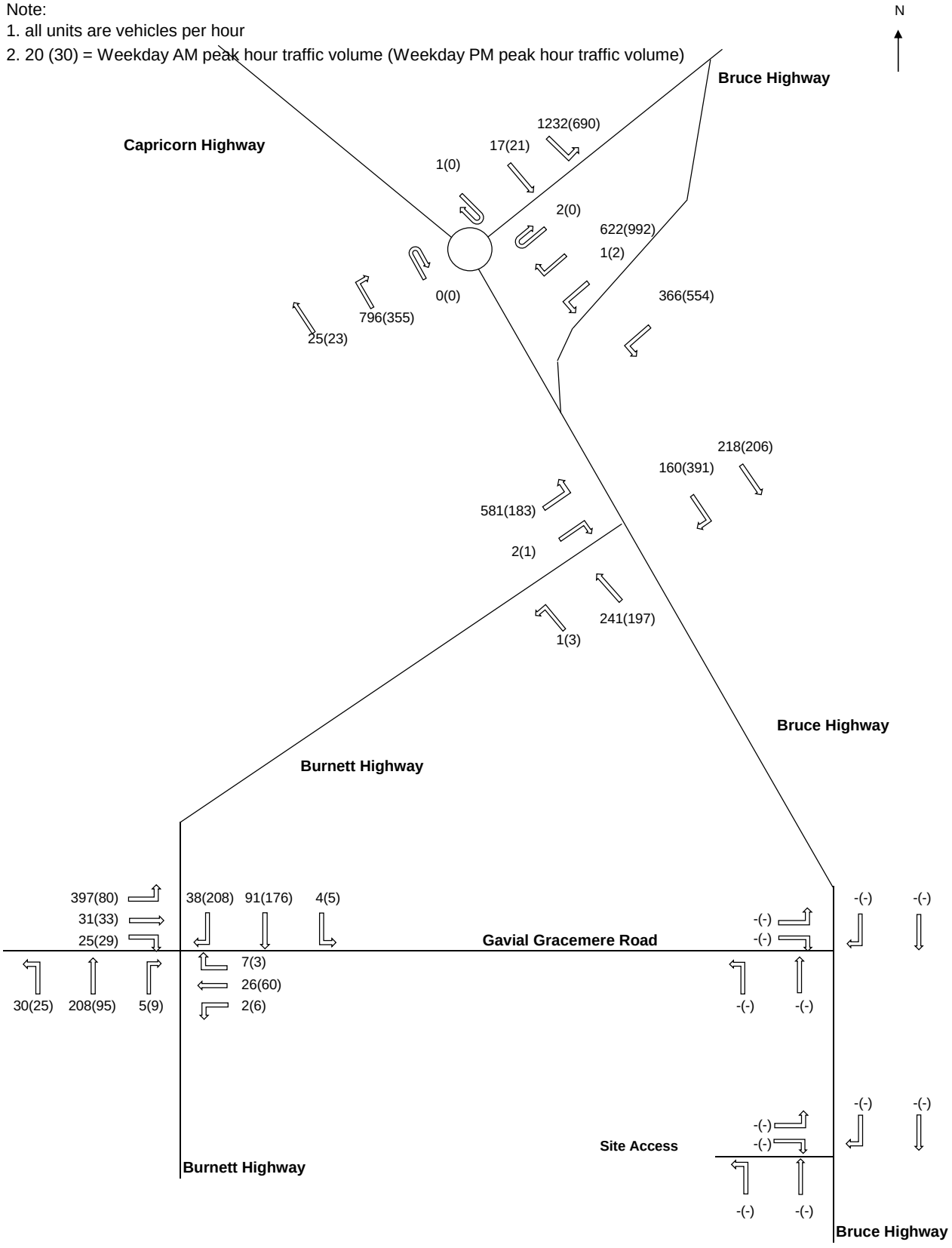
Figure B1	2021 Observed Traffic Volumes
Figure B2	2022 Observed Traffic Volumes
Figure B3	2023 Background Traffic Volumes
Figure B4	2033 Background Traffic Volumes
Figure B5	Additional Trip Generation associated with the Approved Quarry
Figure B6	Additional Trip Generation associated with the Approved Asphalt Plant
Figure B7	Additional Trip Generation associated with the Expanded Quarry
Figure B8	2023 Base Traffic Volumes (with the Approved Quarry and Asphalt Plant)
Figure B9	2033 Base Traffic Volumes (with the Approved Quarry and Asphalt Plant)
Figure B10	2023 Design Traffic Volumes (with the Expanded Quarry)
Figure B11	2033 Design Traffic Volumes (with the Expanded Quarry)

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



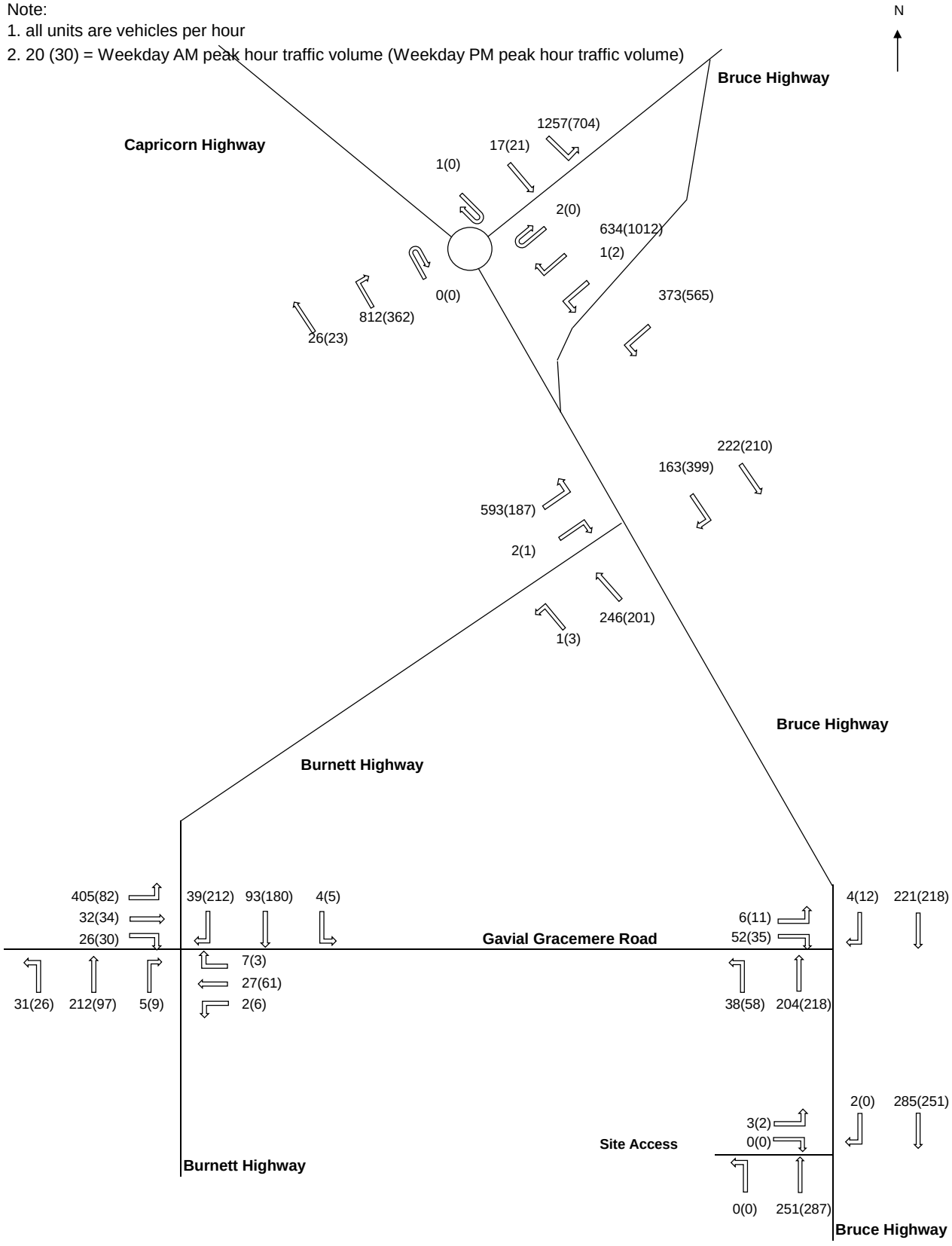
Midgee Quarry	**2021 Observed Traffic Volumes**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B1**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



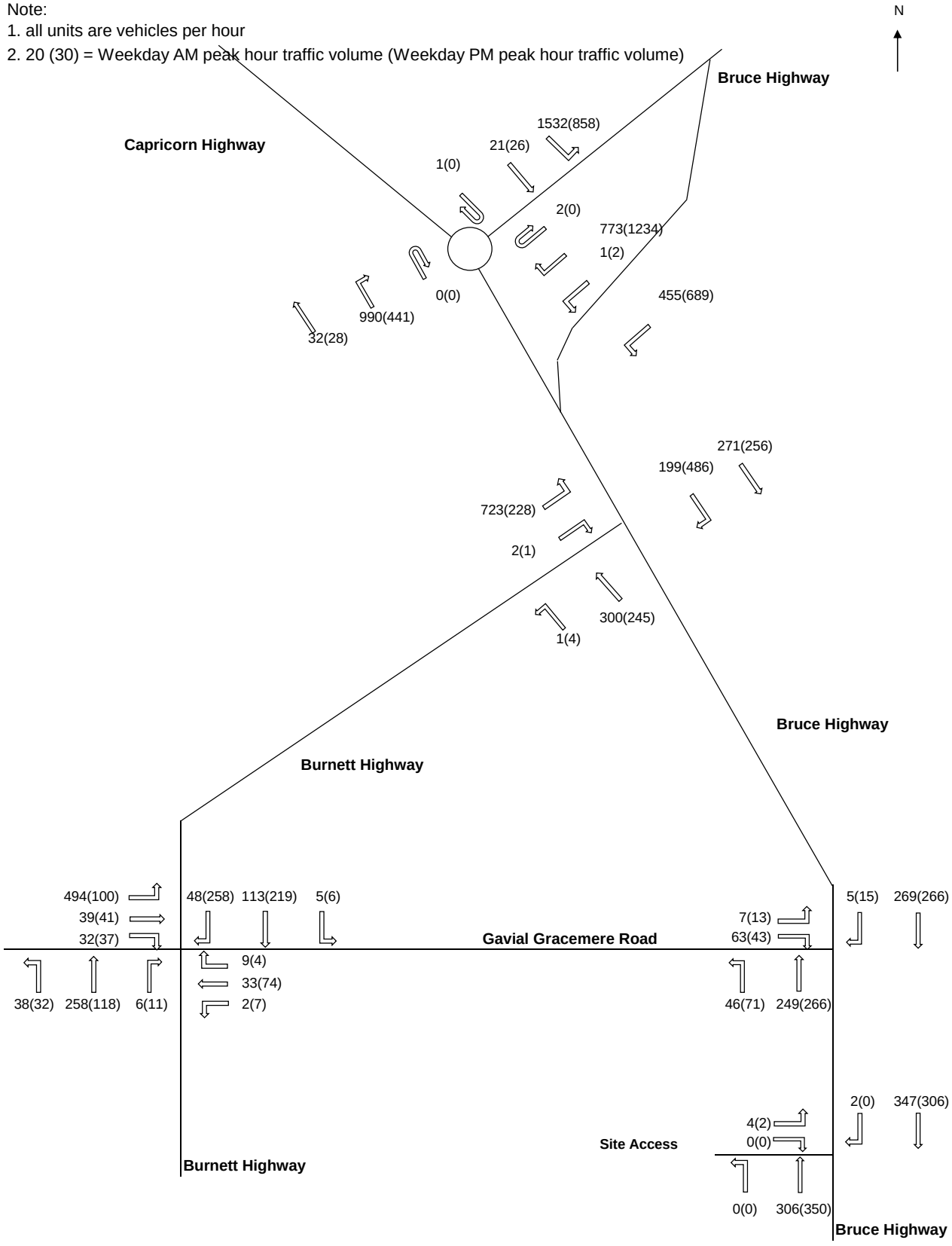
Midgee Quarry	**2022 Observed Traffic Volumes**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B2**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



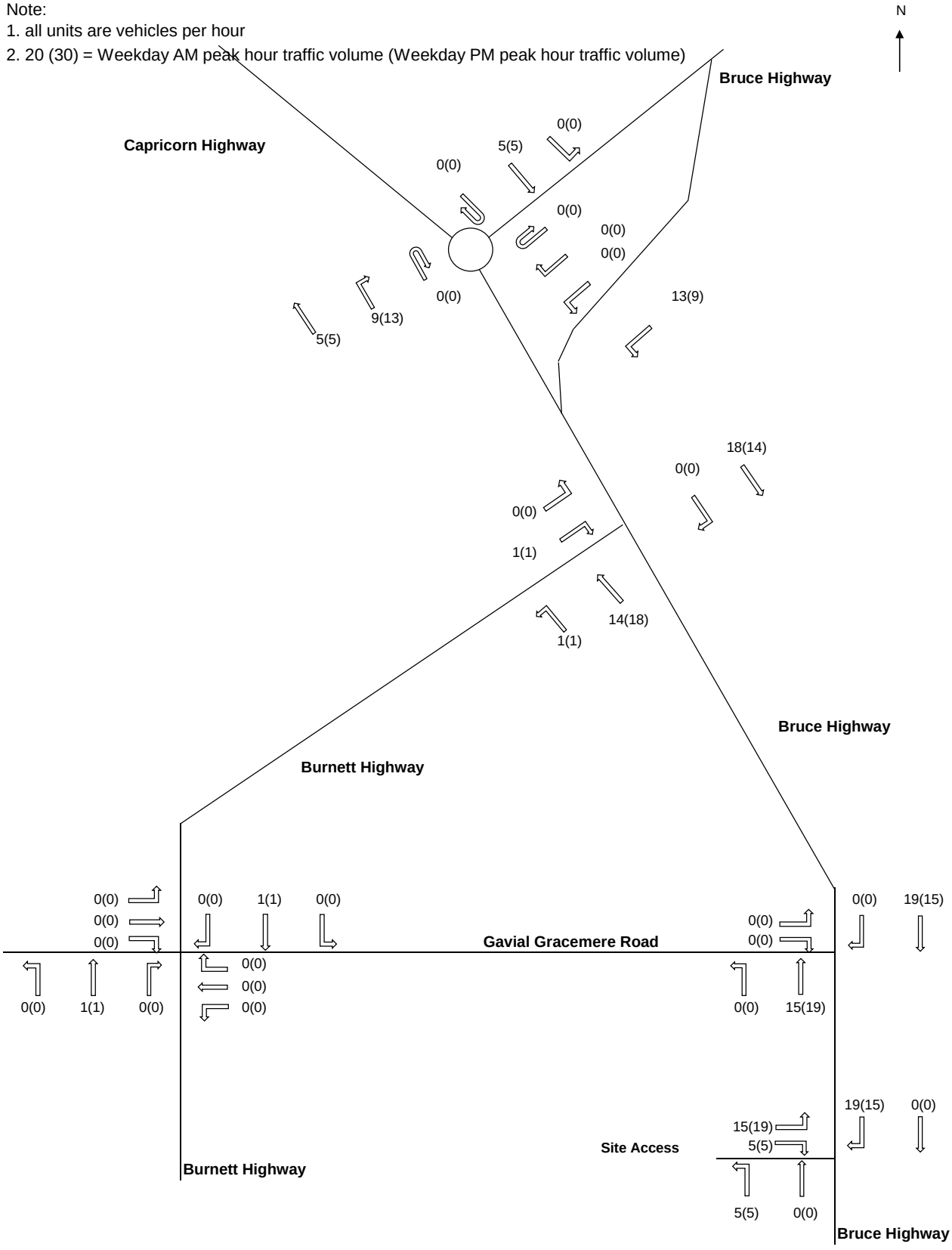
Midgee Quarry	**2023 Background Traffic Volumes**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B3**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



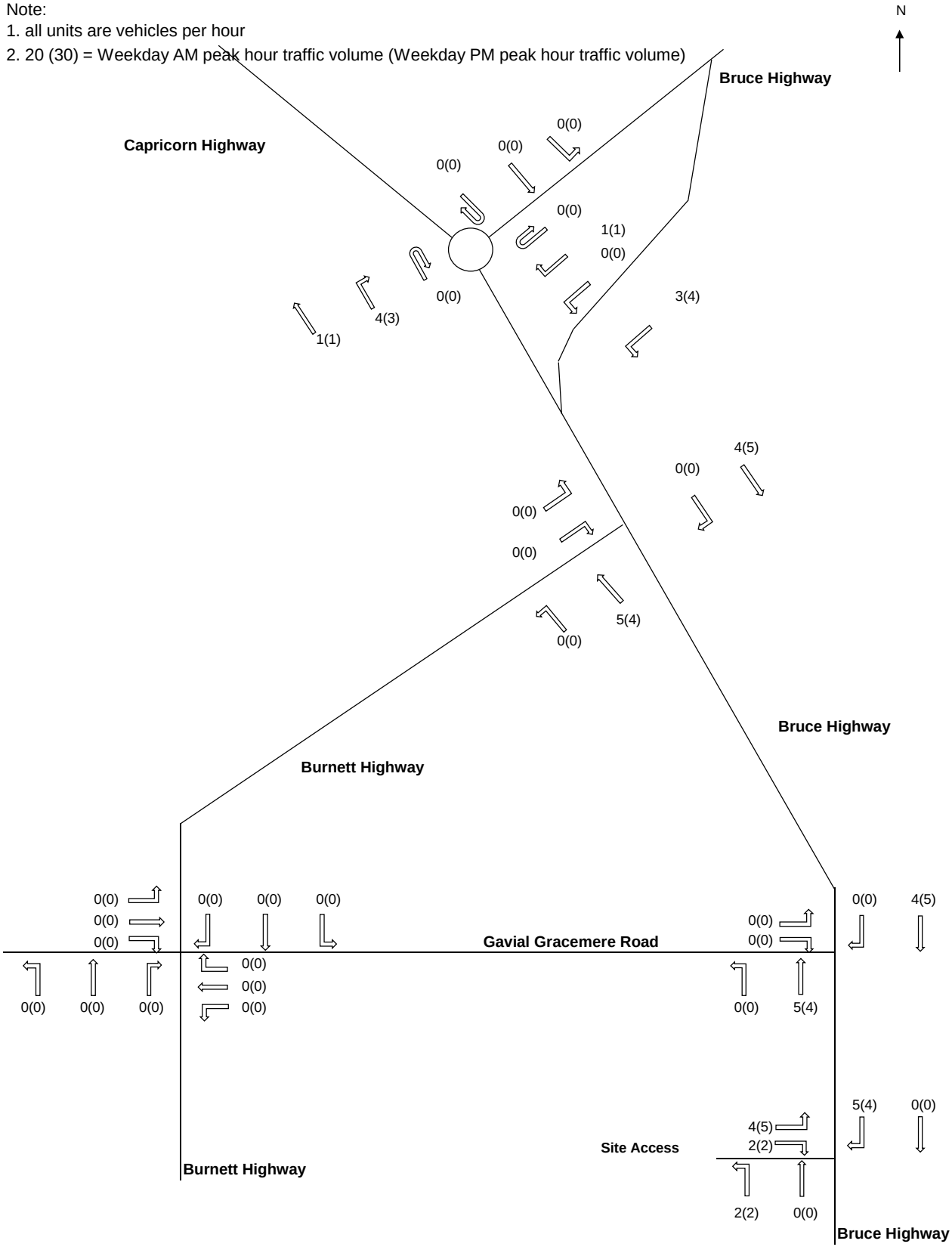
Midgee Quarry	**2033 Background Traffic Volumes**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B4**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



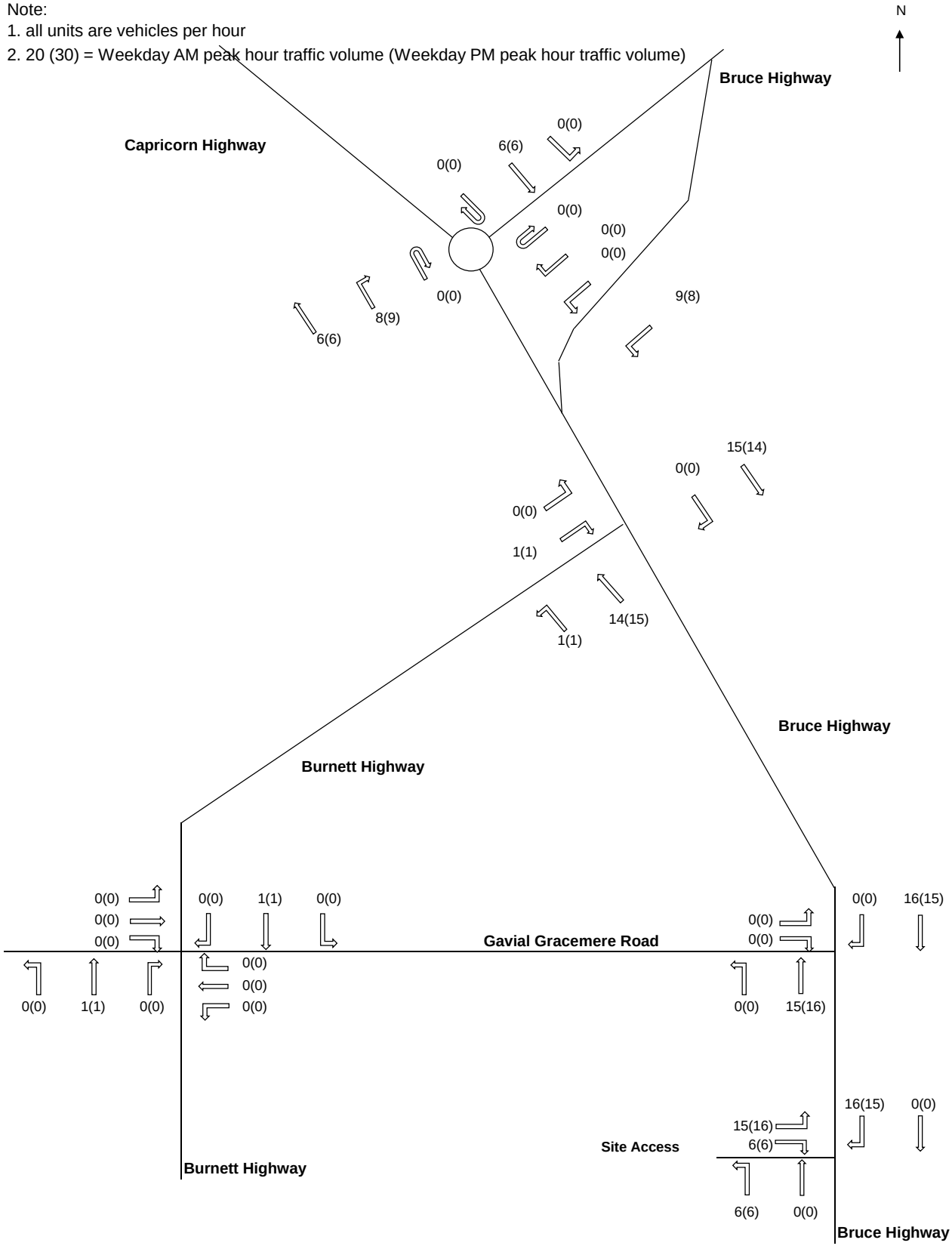
Midgee Quarry	**Additional Trip Generation associated with the Approved Quarry**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B5**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



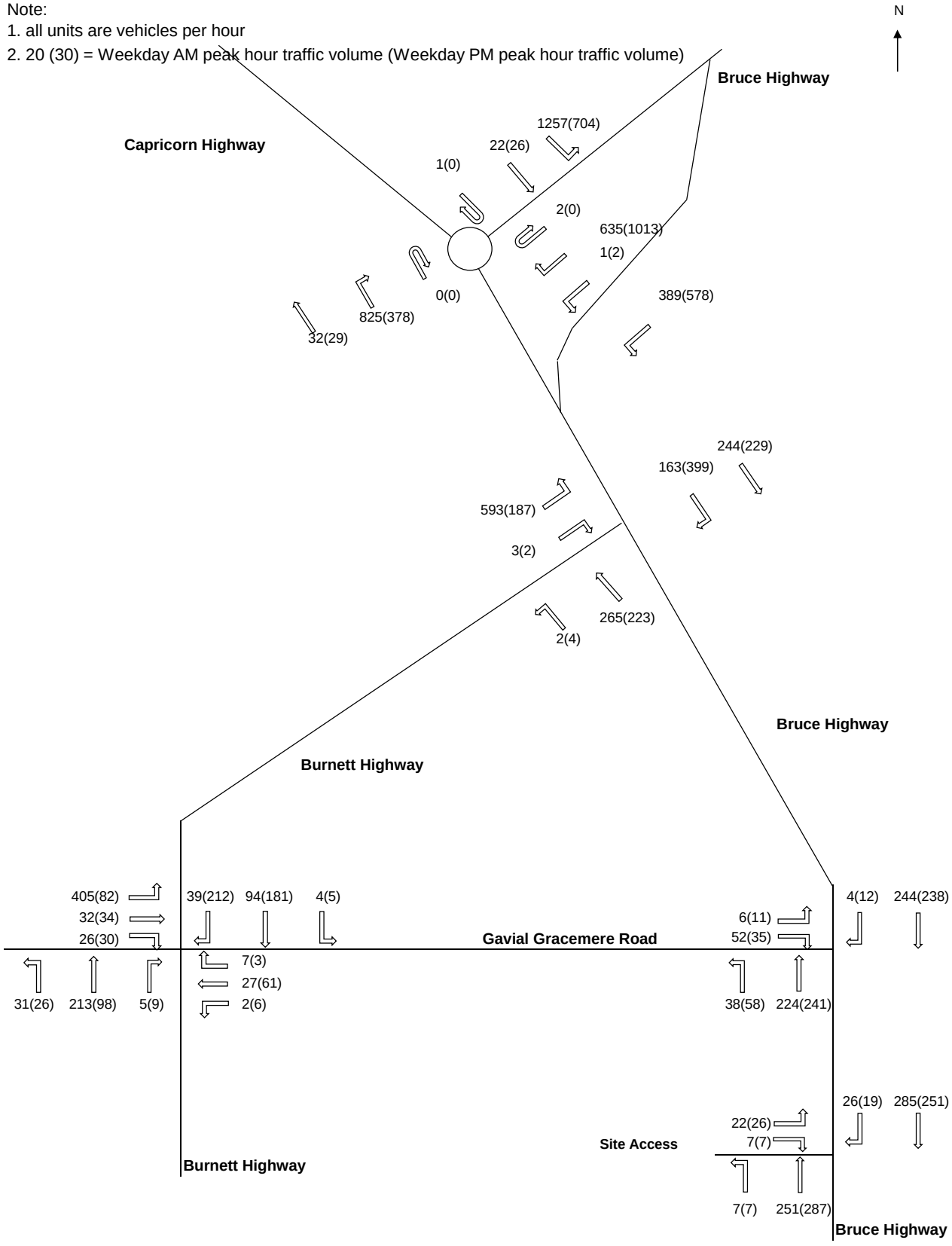
Midgee Quarry	**Additional Trip Generation associated with the Approved Asphalt Plant**	October 2022
		TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B6**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



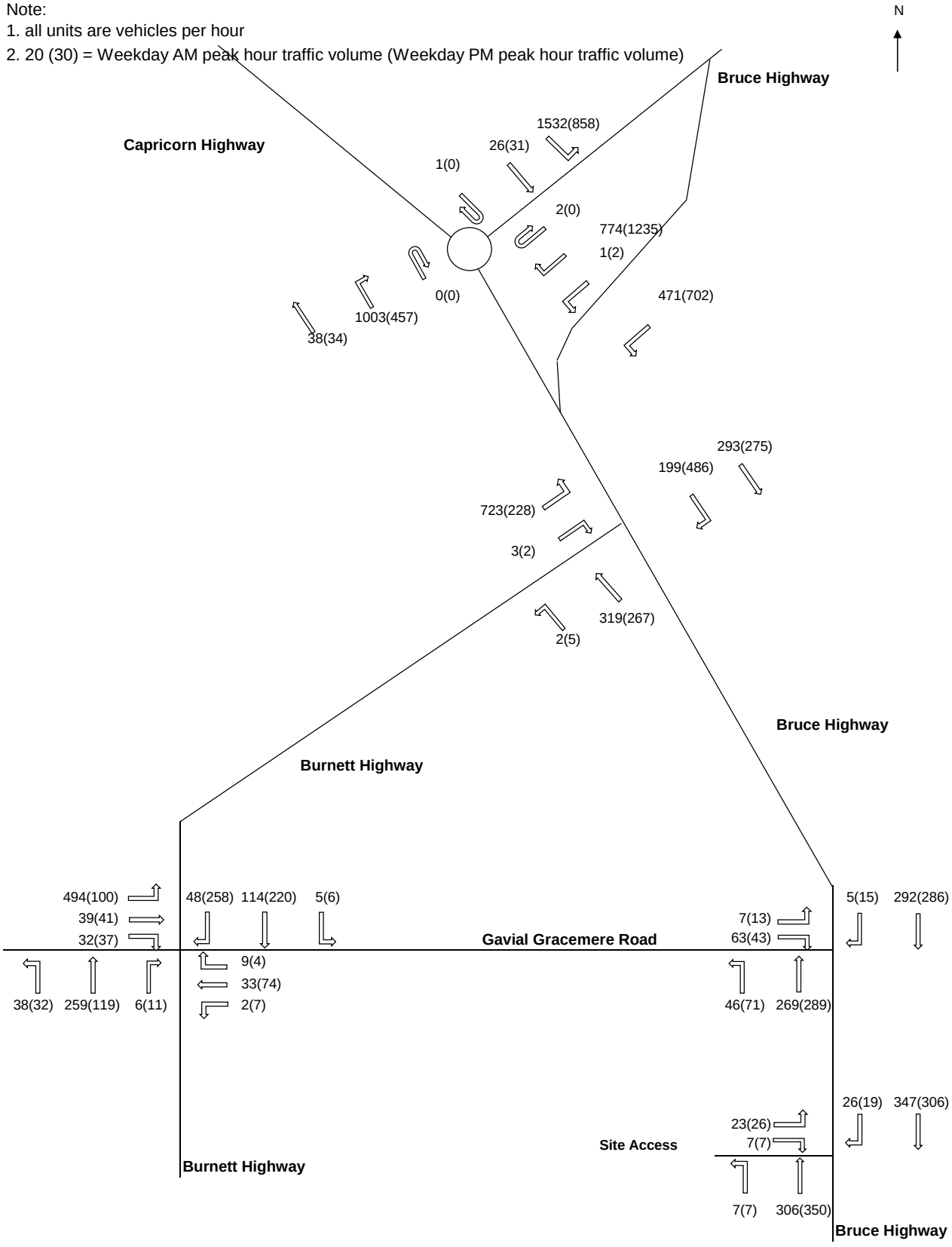
Midgee Quarry	**Additional Trip Generation associated with the Expanded Quarry**	October 2022
		TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B7**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



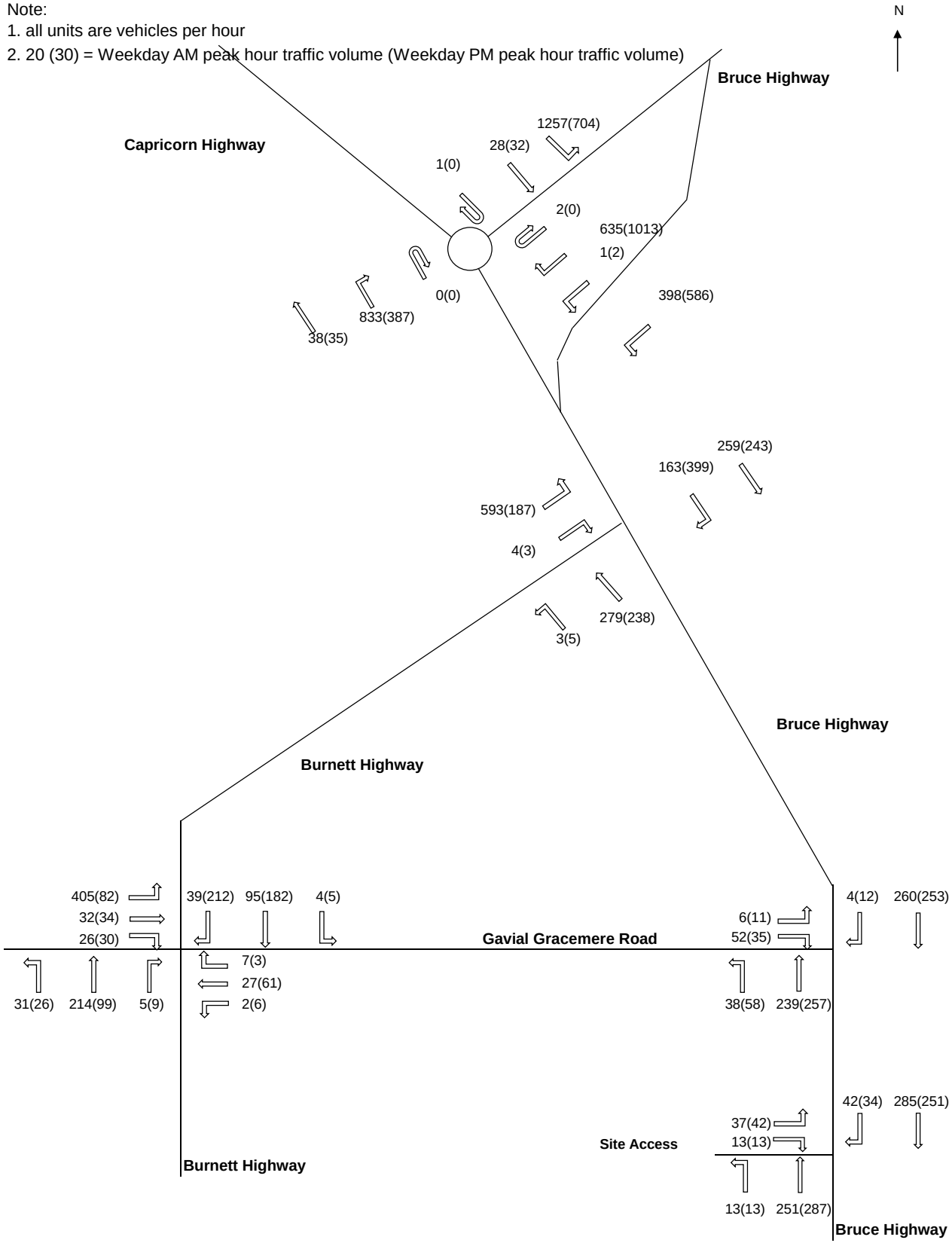
Midgee Quarry	**2023 Base Traffic Volumes (with the Approved Quarry and Asphalt Plant)**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B8**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



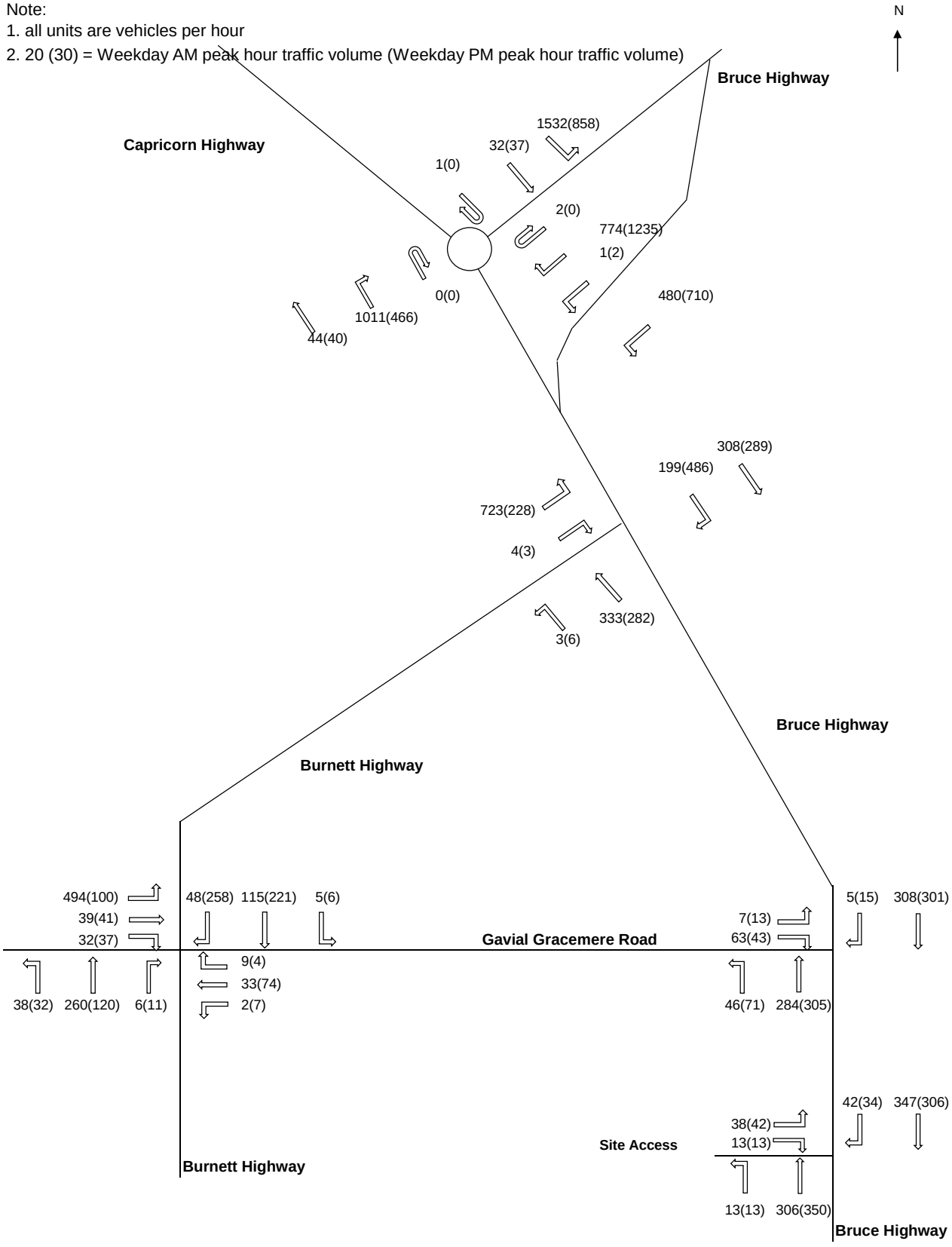
Midgee Quarry	**2033 Base Traffic Volumes (with the Approved Quarry and Asphalt Plant)**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B9**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



Midgee Quarry	**2023 Design Traffic Volumes (with the Expanded Quarry)**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B10**

Note:
1. all units are vehicles per hour
2. 20 (30) = Weekday AM peak hour traffic volume (Weekday PM peak hour traffic volume)



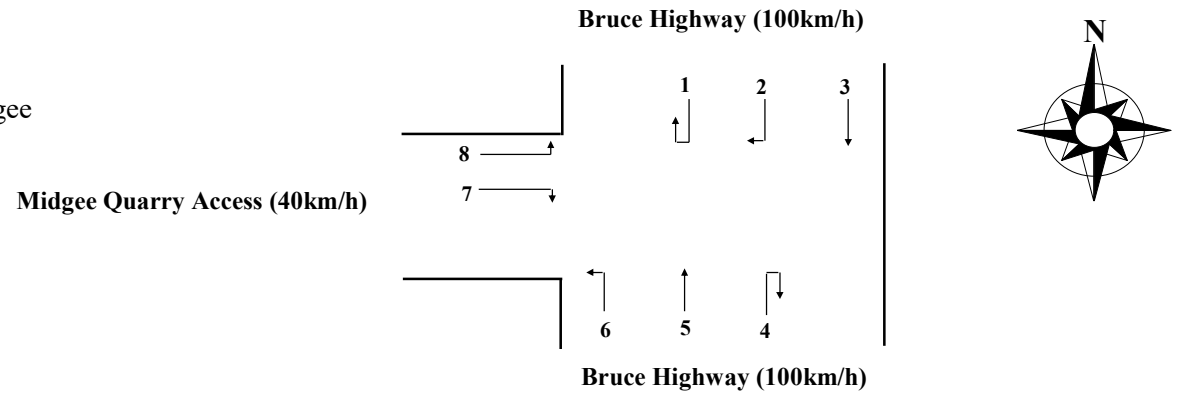
Midgee Quarry	**2033 Design Traffic Volumes (with the Expanded Quarry)**	October 2022 TTPlus Project No: 10569
	TRAFFIC TRANSPORT plus	**Figure B11**

Appendix C

Results of Traffic Surveys

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Bruce Highway/Midgee Quarry Access (Hut Road), Midgee
Day/Date: Wednesday, 25 August 2021
AM Peak: *Hour ending - 9:30 AM*
PM Peak: *Hour ending - 3:30 PM*

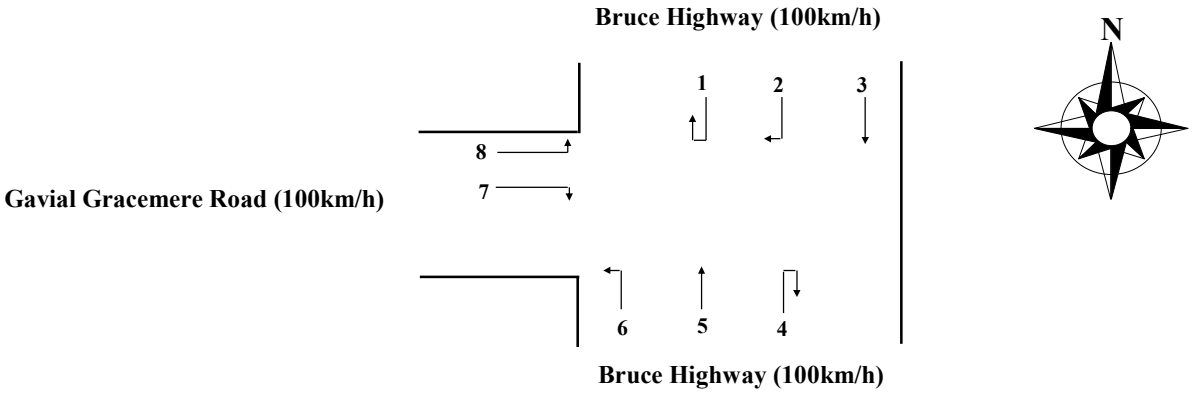


TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
6:45 AM	0	0	**0**	0	0	**0**	42	11	**53**	0	0	**0**	33	9	**42**	0	0	**0**	0	0	**0**	0	0	**0**
7:00 AM	0	0	**0**	1	1	**2**	28	12	**40**	0	0	**0**	23	12	**35**	0	0	**0**	0	0	**0**	0	0	**0**
7:15 AM	0	0	**0**	0	1	**1**	32	10	**42**	0	0	**0**	29	15	**44**	0	0	**0**	0	0	**0**	0	0	**0**
7:30 AM	0	0	**0**	0	1	**1**	39	13	**52**	0	0	**0**	36	10	**46**	0	0	**0**	0	0	**0**	0	1	**1**
7:45 AM	0	0	**0**	0	0	**0**	49	14	**63**	0	0	**0**	47	13	**60**	0	0	**0**	0	0	**0**	0	1	**1**
8:00 AM	0	0	**0**	0	0	**0**	52	13	**65**	0	0	**0**	34	15	**49**	0	0	**0**	0	0	**0**	0	0	**0**
8:15 AM	0	0	**0**	0	2	**2**	64	14	**78**	0	0	**0**	42	8	**50**	0	0	**0**	0	0	**0**	0	0	**0**
8:30 AM	0	0	**0**	0	1	**1**	44	7	**51**	0	0	**0**	44	9	**53**	0	0	**0**	0	0	**0**	0	0	**0**
8:45 AM	0	0	**0**	0	0	**0**	54	11	**65**	0	0	**0**	60	11	**71**	0	0	**0**	0	0	**0**	0	1	**1**
9:00 AM	0	0	**0**	0	0	**0**	48	15	**63**	0	0	**0**	45	6	**51**	0	0	**0**	0	0	**0**	0	0	**0**
9:15 AM	0	0	**0**	1	1	**2**	67	12	**79**	0	0	**0**	35	12	**47**	0	0	**0**	0	0	**0**	0	1	**1**
9:30 AM	0	0	**0**	0	0	**0**	55	12	**67**	0	0	**0**	57	15	**72**	0	0	**0**	0	0	**0**	0	1	**1**
3 hr Total	**0**	**0**	**0**	**2**	**7**	**9**	**574**	**144**	**718**	**0**	**0**	**0**	**485**	**135**	**620**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**5**
AM Peak	**0**	**0**	**0**	**1**	**1**	**2**	**224**	**50**	**274**	**0**	**0**	**0**	**197**	**44**	**241**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**3**

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
2:45 PM	1	0	**1**	0	0	**0**	51	11	**62**	0	0	**0**	58	14	**72**	0	0	**0**	0	0	**0**	0	0	**0**
3:00 PM	0	0	**0**	0	0	**0**	44	10	**54**	0	0	**0**	51	9	**60**	0	0	**0**	0	0	**0**	0	0	**0**
3:15 PM	0	0	**0**	0	0	**0**	55	13	**68**	0	0	**0**	75	12	**87**	0	0	**0**	0	0	**0**	1	0	**1**
3:30 PM	0	0	**0**	0	0	**0**	41	16	**57**	0	0	**0**	46	11	**57**	0	0	**0**	0	0	**0**	0	1	**1**
3:45 PM	0	0	**0**	0	0	**0**	55	15	**70**	0	0	**0**	40	16	**56**	0	0	**0**	0	0	**0**	0	0	**0**
4:00 PM	0	0	**0**	0	0	**0**	46	12	**58**	0	0	**0**	43	15	**58**	0	0	**0**	0	0	**0**	4	0	**4**
4:15 PM	0	0	**0**	0	0	**0**	47	10	**57**	0	0	**0**	37	6	**43**	0	0	**0**	0	0	**0**	2	0	**2**
4:30 PM	0	0	**0**	0	0	**0**	50	11	**61**	0	0	**0**	52	4	**56**	0	0	**0**	0	0	**0**	0	1	**1**
4:45 PM	0	0	**0**	0	0	**0**	39	16	**55**	0	0	**0**	40	10	**50**	0	0	**0**	0	0	**0**	1	0	**1**
5:00 PM	0	0	**0**	0	0	**0**	35	9	**44**	0	0	**0**	29	7	**36**	0	0	**0**	0	0	**0**	1	0	**1**
5:15 PM	0	0	**0**	0	0	**0**	44	7	**51**	0	0	**0**	47	11	**58**	0	0	**0**	0	0	**0**	0	0	**0**
5:30 PM	0	0	**0**	0	0	**0**	28	6	**34**	0	0	**0**	39	11	**50**	0	0	**0**	0	0	**0**	0	0	**0**
5:45 PM	0	0	**0**	0	0	**0**	29	14	**43**	0	0	**0**	26	8	**34**	0	0	**0**	0	0	**0**	0	0	**0**
6:00 PM	0	0	**0**	0	0	**0**	21	7	**28**	0	0	**0**	34	6	**40**	0	0	**0**	0	0	**0**	0	0	**0**
3.5 hr Total	**1**	**0**	**1**	**0**	**0**	**0**	**585**	**157**	**742**	**0**	**0**	**0**	**617**	**140**	**757**	**0**	**0**	**0**	**0**	**0**	**0**	**9**	**2**	**11**
PM Peak	**1**	**0**	**1**	**0**	**0**	**0**	**191**	**50**	**241**	**0**	**0**	**0**	**230**	**46**	**276**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**2**

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine
Location: Bruce Highway/Gavial-Gracemere Road, Midgee
Day/Date: Wednesday, 25 August 2021
AM Peak: *Hour ending - 9:15 AM*
PM Peak: *Hour ending - 4:00 PM*

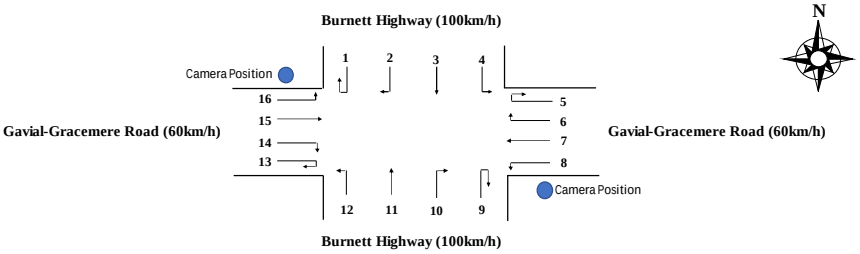


TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
6:45 AM	0	0	**0**	3	0	**3**	36	12	**48**	0	0	**0**	22	8	**30**	6	2	**8**	6	0	**6**	2	0	**2**
7:00 AM	0	0	**0**	6	0	**6**	22	12	**34**	0	0	**0**	23	12	**35**	6	0	**6**	7	2	**9**	1	0	**1**
7:15 AM	0	0	**0**	2	1	**3**	25	9	**34**	0	0	**0**	26	11	**37**	4	4	**8**	4	1	**5**	4	0	**4**
7:30 AM	0	0	**0**	1	0	**1**	33	15	**48**	0	0	**0**	30	12	**42**	7	1	**8**	10	1	**11**	2	1	**3**
7:45 AM	0	0	**0**	2	0	**2**	32	9	**41**	0	0	**0**	35	11	**46**	8	2	**10**	10	2	**12**	3	1	**4**
8:00 AM	0	0	**0**	2	0	**2**	45	14	**59**	0	0	**0**	37	13	**50**	5	1	**6**	11	1	**12**	3	0	**3**
8:15 AM	0	0	**0**	1	0	**1**	52	14	**66**	0	0	**0**	22	7	**29**	6	1	**7**	6	0	**6**	2	2	**4**
8:30 AM	0	0	**0**	1	0	**1**	42	9	**51**	0	0	**0**	38	11	**49**	14	0	**14**	9	1	**10**	0	0	**0**
8:45 AM	0	0	**0**	1	1	**2**	30	8	**38**	0	0	**0**	41	10	**51**	5	1	**6**	12	1	**13**	1	1	**2**
9:00 AM	0	0	**0**	0	0	**0**	41	13	**54**	0	0	**0**	48	7	**55**	7	0	**7**	9	3	**12**	4	0	**4**
9:15 AM	0	0	**0**	1	0	**1**	55	14	**69**	0	0	**0**	29	12	**41**	8	2	**10**	14	1	**15**	0	0	**0**
9:30 AM	0	0	**0**	0	0	**0**	40	11	**51**	0	0	**0**	52	13	**65**	2	2	**4**	4	0	**4**	1	0	**1**
3 hr Total	**0**	**0**	**0**	**20**	**2**	**22**	**453**	**140**	**593**	**0**	**0**	**0**	**403**	**127**	**530**	**78**	**16**	**94**	**102**	**13**	**115**	**23**	**5**	**28**
AM Peak	**0**	**0**	**0**	**3**	**1**	**4**	**168**	**44**	**212**	**0**	**0**	**0**	**156**	**40**	**196**	**34**	**3**	**37**	**44**	**6**	**50**	**5**	**1**	**6**

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
2:45 PM	0	0	**0**	2	0	**2**	41	10	**51**	0	0	**0**	42	13	**55**	15	2	**17**	6	0	**6**	1	0	**1**
3:00 PM	0	0	**0**	2	1	**3**	41	9	**50**	0	0	**0**	35	11	**46**	11	1	**12**	6	0	**6**	1	1	**2**
3:15 PM	0	0	**0**	3	0	**3**	38	11	**49**	0	0	**0**	56	10	**66**	13	2	**15**	11	3	**14**	1	0	**1**
3:30 PM	0	0	**0**	1	0	**1**	39	12	**51**	0	0	**0**	40	12	**52**	13	1	**14**	6	2	**8**	4	0	**4**
3:45 PM	0	0	**0**	2	1	**3**	43	16	**59**	0	0	**0**	34	13	**47**	6	3	**9**	7	0	**7**	3	0	**3**
4:00 PM	0	0	**0**	4	1	**5**	40	11	**51**	0	0	**0**	33	12	**45**	15	3	**18**	5	0	**5**	3	0	**3**
4:15 PM	0	0	**0**	1	0	**1**	43	12	**55**	0	0	**0**	33	10	**43**	4	0	**4**	8	0	**8**	8	0	**8**
4:30 PM	0	0	**0**	1	0	**1**	28	8	**36**	0	0	**0**	38	4	**42**	12	1	**13**	18	2	**20**	2	0	**2**
4:45 PM	0	0	**0**	0	0	**0**	26	14	**40**	0	0	**0**	28	8	**36**	9	0	**9**	4	1	**5**	1	0	**1**
5:00 PM	0	0	**0**	3	0	**3**	29	10	**39**	0	0	**0**	28	6	**34**	8	3	**11**	9	0	**9**	1	0	**1**
5:15 PM	0	0	**0**	0	0	**0**	28	7	**35**	0	0	**0**	37	11	**48**	6	0	**6**	11	0	**11**	1	0	**1**
5:30 PM	0	0	**0**	1	0	**1**	21	7	**28**	0	0	**0**	25	9	**34**	14	0	**14**	6	0	**6**	2	0	**2**
5:45 PM	0	0	**0**	1	0	**1**	22	12	**34**	0	0	**0**	20	10	**30**	6	0	**6**	8	0	**8**	1	0	**1**
6:00 PM	0	0	**0**	0	0	**0**	17	7	**24**	0	0	**0**	28	5	**33**	7	1	**8**	3	0	**3**	0	0	**0**
3.5 hr Total	**0**	**0**	**0**	**21**	**3**	**24**	**456**	**146**	**602**	**0**	**0**	**0**	**477**	**134**	**611**	**139**	**17**	**156**	**108**	**8**	**116**	**29**	**1**	**30**
PM Peak	**0**	**0**	**0**	**10**	**2**	**12**	**160**	**50**	**210**	**0**	**0**	**0**	**163**	**47**	**210**	**47**	**9**	**56**	**29**	**5**	**34**	**11**	**0**	**11**

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Gavial-Gracemere Road/Burnett Highway, Midgee
Day/Date: Tuesday, 9 August 2022
AM Peak: *Hour ending - 8:30 AM*
PM Peak: *Hour ending - 4:15 PM*

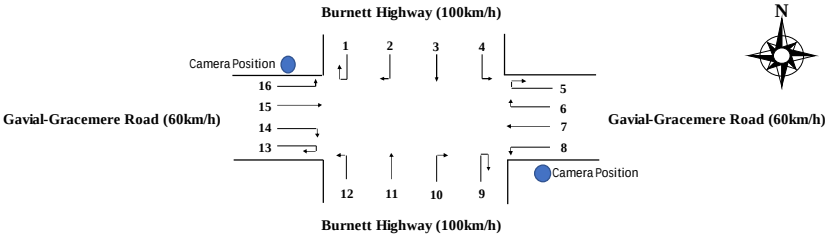


TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
6:45 AM	0	0	**0**	7	1	**8**	13	2	**15**	0	0	**0**	0	0	**0**	2	0	**2**	7	1	**8**	0	0	**0**
7:00 AM	0	0	**0**	7	0	**7**	10	3	**13**	1	0	**1**	0	0	**0**	0	0	**0**	8	0	**8**	0	0	**0**
7:15 AM	0	0	**0**	3	0	**3**	16	2	**18**	0	0	**0**	0	0	**0**	1	0	**1**	6	1	**7**	0	0	**0**
7:30 AM	0	0	**0**	3	0	**3**	15	1	**16**	0	0	**0**	0	0	**0**	1	0	**1**	7	3	**10**	0	1	**1**
7:45 AM	0	0	**0**	8	0	**8**	14	5	**19**	1	0	**1**	0	0	**0**	1	0	**1**	8	0	**8**	1	0	**1**
8:00 AM	0	0	**0**	8	0	**8**	18	2	**20**	0	0	**0**	0	0	**0**	3	0	**3**	7	0	**7**	0	0	**0**
8:15 AM	0	0	**0**	12	0	**12**	27	1	**28**	2	0	**2**	0	0	**0**	2	0	**2**	5	0	**5**	1	0	**1**
8:30 AM	0	0	**0**	10	0	**10**	22	2	**24**	1	0	**1**	0	0	**0**	1	0	**1**	6	0	**6**	0	0	**0**
8:45 AM	0	0	**0**	16	2	**18**	29	2	**31**	0	0	**0**	0	0	**0**	1	0	**1**	4	1	**5**	1	0	**1**
9:00 AM	0	0	**0**	18	0	**18**	21	3	**24**	0	0	**0**	0	0	**0**	1	0	**1**	4	1	**5**	1	0	**1**
9:15 AM	0	0	**0**	19	1	**20**	23	1	**24**	1	0	**1**	0	0	**0**	1	1	**2**	6	1	**7**	0	0	**0**
9:30 AM	0	0	**0**	15	1	**16**	25	2	**27**	1	0	**1**	0	0	**0**	0	0	**0**	5	1	**6**	1	0	**1**
3 hr Total	**0**	**0**	**0**	**126**	**5**	**131**	**233**	**26**	**259**	**7**	**0**	**7**	**0**	**0**	**0**	**14**	**1**	**15**	**73**	**9**	**82**	**5**	**1**	**6**
AM Peak	**0**	**0**	**0**	**38**	**0**	**38**	**81**	**10**	**91**	**4**	**0**	**4**	**0**	**0**	**0**	**7**	**0**	**7**	**26**	**0**	**26**	**2**	**0**	**2**

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
2:45 PM	0	0	**0**	21	0	**21**	24	1	**25**	1	0	**1**	0	0	**0**	0	0	**0**	20	3	**23**	2	1	**3**
3:00 PM	0	0	**0**	32	1	**33**	29	1	**30**	1	0	**1**	0	0	**0**	0	0	**0**	14	1	**15**	1	1	**2**
3:15 PM	0	0	**0**	37	0	**37**	38	2	**40**	0	0	**0**	0	0	**0**	0	0	**0**	7	2	**9**	0	0	**0**
3:30 PM	0	0	**0**	67	1	**68**	46	3	**49**	2	0	**2**	0	0	**0**	1	1	**2**	14	0	**14**	2	0	**2**
3:45 PM	0	0	**0**	45	0	**45**	34	1	**35**	2	0	**2**	0	0	**0**	0	0	**0**	11	1	**12**	2	0	**2**
4:00 PM	0	0	**0**	47	4	**51**	39	0	**39**	1	0	**1**	0	0	**0**	0	0	**0**	19	1	**20**	2	0	**2**
4:15 PM	0	0	**0**	42	2	**44**	52	1	**53**	0	0	**0**	0	0	**0**	1	0	**1**	14	0	**14**	0	0	**0**
4:30 PM	0	0	**0**	49	1	**50**	45	3	**48**	2	0	**2**	0	0	**0**	1	0	**1**	13	2	**15**	4	0	**4**
4:45 PM	0	0	**0**	53	1	**54**	38	1	**39**	0	0	**0**	0	0	**0**	1	0	**1**	15	1	**16**	1	0	**1**
5:00 PM	0	0	**0**	66	2	**68**	37	0	**37**	0	0	**0**	0	0	**0**	0	0	**0**	12	0	**12**	0	0	**0**
5:15 PM	0	0	**0**	49	0	**49**	59	1	**60**	1	0	**1**	0	0	**0**	0	0	**0**	11	1	**12**	1	0	**1**
5:30 PM	0	0	**0**	71	0	**71**	48	3	**51**	2	0	**2**	0	0	**0**	2	0	**2**	8	1	**9**	0	0	**0**
5:45 PM	0	0	**0**	60	0	**60**	29	3	**32**	1	0	**1**	0	0	**0**	0	0	**0**	8	1	**9**	1	0	**1**
6:00 PM	0	0	**0**	49	0	**49**	39	0	**39**	2	0	**2**	0	0	**0**	1	0	**1**	7	1	**8**	2	0	**2**
3.5 hr Total	**0**	**0**	**0**	**688**	**12**	**700**	**557**	**20**	**577**	**15**	**0**	**15**	**0**	**0**	**0**	**7**	**1**	**8**	**173**	**15**	**188**	**18**	**2**	**20**
PM Peak	**0**	**0**	**0**	**201**	**7**	**208**	**171**	**5**	**176**	**5**	**0**	**5**	**0**	**0**	**0**	**2**	**1**	**3**	**58**	**2**	**60**	**6**	**0**	**6**

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Gavial-Gracemere Road/Burnett Highway, Midgee
Day/Date: Tuesday, 9 August 2022
AM Peak: *Hour ending - 8:30 AM*
PM Peak: *Hour ending - 4:15 PM*

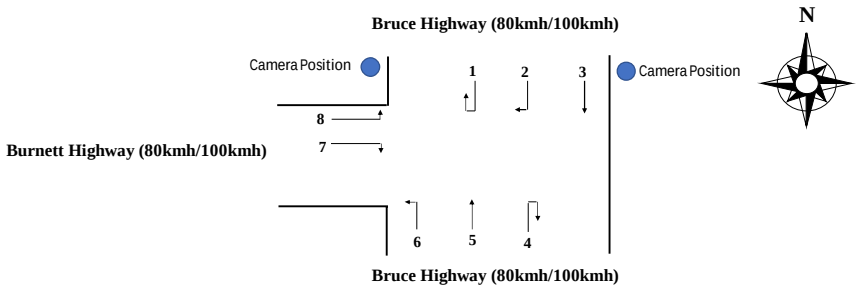


TIME (1/4 hr end)	Movement 9			Movement 10			Movement 11			Movement 12			Movement 13			Movement 14			Movement 15			Movement 16		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
6:45 AM	0	0	**0**	1	0	**1**	16	0	**16**	6	2	**8**	0	0	**0**	4	3	**7**	9	1	**10**	28	1	**29**
7:00 AM	0	0	**0**	0	0	**0**	21	1	**22**	2	0	**2**	0	0	**0**	2	1	**3**	16	1	**17**	21	0	**21**
7:15 AM	0	0	**0**	0	0	**0**	32	3	**35**	7	0	**7**	0	0	**0**	5	2	**7**	5	2	**7**	40	1	**41**
7:30 AM	0	0	**0**	0	0	**0**	48	0	**48**	0	1	**1**	0	0	**0**	2	0	**2**	5	1	**6**	50	0	**50**
7:45 AM	0	0	**0**	0	0	**0**	60	1	**61**	5	3	**8**	0	0	**0**	0	2	**2**	8	2	**10**	87	0	**87**
8:00 AM	0	0	**0**	1	0	**1**	63	2	**65**	11	0	**11**	0	0	**0**	7	1	**8**	5	3	**8**	81	0	**81**
8:15 AM	0	0	**0**	1	0	**1**	40	2	**42**	7	1	**8**	0	0	**0**	8	1	**9**	8	1	**9**	130	1	**131**
8:30 AM	0	0	**0**	1	2	**3**	37	3	**40**	3	0	**3**	0	0	**0**	6	0	**6**	4	0	**4**	96	2	**98**
8:45 AM	0	0	**0**	1	0	**1**	46	0	**46**	10	2	**12**	0	0	**0**	8	1	**9**	8	0	**8**	48	0	**48**
9:00 AM	0	0	**0**	0	0	**0**	32	1	**33**	11	1	**12**	0	0	**0**	2	1	**3**	19	2	**21**	25	0	**25**
9:15 AM	0	0	**0**	0	1	**1**	40	1	**41**	4	0	**4**	0	0	**0**	6	0	**6**	11	0	**11**	20	0	**20**
9:30 AM	0	0	**0**	2	0	**2**	26	2	**28**	5	0	**5**	0	0	**0**	3	1	**4**	11	0	**11**	16	0	**16**
3 hr Total	**0**	**0**	**0**	**7**	**3**	**10**	**461**	**16**	**477**	**71**	**10**	**81**	**0**	**0**	**0**	**53**	**13**	**66**	**109**	**13**	**122**	**642**	**5**	**647**
AM Peak	**0**	**0**	**0**	**3**	**2**	**5**	**200**	**8**	**208**	**26**	**4**	**30**	**0**	**0**	**0**	**21**	**4**	**25**	**25**	**6**	**31**	**394**	**3**	**397**

TIME (1/4 hr end)	Movement 9			Movement 10			Movement 11			Movement 12			Movement 13			Movement 14			Movement 15			Movement 16		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
2:45 PM	0	0	**0**	0	0	**0**	32	2	**34**	5	0	**5**	0	0	**0**	9	0	**9**	6	0	**6**	25	0	**25**
3:00 PM	0	0	**0**	0	0	**0**	16	1	**17**	4	0	**4**	0	0	**0**	8	1	**9**	6	2	**8**	13	2	**15**
3:15 PM	0	0	**0**	1	0	**1**	23	5	**28**	11	0	**11**	0	0	**0**	5	0	**5**	4	0	**4**	24	0	**24**
3:30 PM	0	0	**0**	2	0	**2**	34	1	**35**	10	1	**11**	0	0	**0**	8	0	**8**	5	0	**5**	19	1	**20**
3:45 PM	0	0	**0**	2	2	**4**	23	1	**24**	6	0	**6**	0	0	**0**	6	0	**6**	7	2	**9**	24	0	**24**
4:00 PM	0	0	**0**	2	1	**3**	21	0	**21**	3	0	**3**	0	0	**0**	9	2	**11**	6	2	**8**	15	1	**16**
4:15 PM	0	0	**0**	0	0	**0**	12	3	**15**	5	0	**5**	0	0	**0**	4	0	**4**	10	1	**11**	20	0	**20**
4:30 PM	0	0	**0**	0	0	**0**	26	0	**26**	6	1	**7**	0	0	**0**	6	0	**6**	8	0	**8**	16	0	**16**
4:45 PM	0	0	**0**	2	0	**2**	18	0	**18**	5	0	**5**	0	0	**0**	8	0	**8**	8	1	**9**	20	0	**20**
5:00 PM	0	0	**0**	0	0	**0**	23	1	**24**	2	1	**3**	0	0	**0**	6	0	**6**	6	3	**9**	15	1	**16**
5:15 PM	0	0	**0**	0	0	**0**	13	1	**14**	4	0	**4**	0	0	**0**	7	1	**8**	7	0	**7**	19	1	**20**
5:30 PM	0	0	**0**	0	0	**0**	10	2	**12**	1	0	**1**	0	0	**0**	6	0	**6**	4	1	**5**	15	0	**15**
5:45 PM	0	0	**0**	1	0	**1**	19	0	**19**	6	0	**6**	0	0	**0**	4	1	**5**	7	0	**7**	15	0	**15**
6:00 PM	0	0	**0**	1	0	**1**	10	0	**10**	5	1	**6**	0	0	**0**	3	0	**3**	6	2	**8**	18	1	**19**
3.5 hr Total	**0**	**0**	**0**	**11**	**3**	**14**	**280**	**17**	**297**	**73**	**4**	**77**	**0**	**0**	**0**	**89**	**5**	**94**	**90**	**14**	**104**	**258**	**7**	**265**
PM Peak	**0**	**0**	**0**	**6**	**3**	**9**	**90**	**5**	**95**	**24**	**1**	**25**	**0**	**0**	**0**	**27**	**2**	**29**	**28**	**5**	**33**	**78**	**2**	**80**

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine
Location: Bruce Highway/Burnett Highway, Midgee
Day/Date: Tuesday, 9 August 2022
AM Peak: *Hour ending - 8:45 AM*
PM Peak: *Hour ending - 4:15 PM*

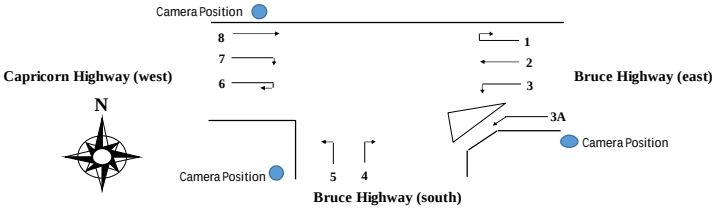


TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
6:45 AM	0	0	**0**	21	3	**24**	31	17	**48**	0	0	**0**	23	15	**38**	0	0	**0**	0	0	**0**	40	1	**41**
7:00 AM	0	0	**0**	18	3	**21**	35	7	**42**	0	0	**0**	24	13	**37**	0	0	**0**	0	0	**0**	47	1	**48**
7:15 AM	0	0	**0**	17	3	**20**	28	15	**43**	0	0	**0**	22	10	**32**	0	0	**0**	1	0	**1**	63	2	**65**
7:30 AM	0	0	**0**	19	1	**20**	45	13	**58**	0	0	**0**	18	16	**34**	2	0	**2**	0	0	**0**	91	2	**93**
7:45 AM	0	0	**0**	24	5	**29**	40	13	**53**	0	0	**0**	30	11	**41**	1	0	**1**	1	0	**1**	142	1	**143**
8:00 AM	0	0	**0**	26	2	**28**	39	10	**49**	0	0	**0**	48	12	**60**	1	0	**1**	0	0	**0**	153	2	**155**
8:15 AM	0	0	**0**	49	0	**49**	50	12	**62**	0	0	**0**	39	15	**54**	0	0	**0**	1	0	**1**	159	3	**162**
8:30 AM	0	0	**0**	31	2	**33**	42	5	**47**	0	0	**0**	60	9	**69**	0	0	**0**	0	0	**0**	158	2	**160**
8:45 AM	0	0	**0**	45	5	**50**	46	14	**60**	0	0	**0**	43	15	**58**	0	0	**0**	1	0	**1**	101	3	**104**
9:00 AM	0	0	**0**	35	4	**39**	58	11	**69**	0	0	**0**	36	14	**50**	0	0	**0**	1	0	**1**	57	1	**58**
9:15 AM	0	0	**0**	48	2	**50**	53	16	**69**	0	0	**0**	39	9	**48**	1	0	**1**	0	0	**0**	59	2	**61**
9:30 AM	0	0	**0**	42	1	**43**	70	19	**89**	0	0	**0**	45	8	**53**	0	0	**0**	0	0	**0**	48	2	**50**
3 hr Total	**0**	**0**	**0**	**375**	**31**	**406**	**537**	**152**	**689**	**0**	**0**	**0**	**427**	**147**	**574**	**5**	**0**	**5**	**5**	**0**	**5**	**1118**	**22**	**1140**
AM Peak	**0**	**0**	**0**	**151**	**9**	**160**	**177**	**41**	**218**	**0**	**0**	**0**	**190**	**51**	**241**	**1**	**0**	**1**	**2**	**0**	**2**	**571**	**10**	**581**

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
2:45 PM	0	0	**0**	56	3	**59**	48	11	**59**	0	0	**0**	53	10	**63**	0	0	**0**	0	0	**0**	58	2	**60**
3:00 PM	0	0	**0**	65	2	**67**	36	7	**43**	0	0	**0**	48	8	**56**	0	0	**0**	0	0	**0**	38	3	**41**
3:15 PM	0	0	**0**	83	4	**87**	31	9	**40**	0	0	**0**	53	18	**71**	0	0	**0**	0	0	**0**	39	5	**44**
3:30 PM	0	0	**0**	112	2	**114**	37	9	**46**	0	0	**0**	36	12	**48**	1	0	**1**	1	0	**1**	57	4	**61**
3:45 PM	0	0	**0**	77	1	**78**	36	12	**48**	0	0	**0**	39	10	**49**	0	0	**0**	0	0	**0**	45	0	**45**
4:00 PM	0	0	**0**	90	5	**95**	47	14	**61**	0	0	**0**	40	9	**49**	1	0	**1**	0	0	**0**	39	2	**41**
4:15 PM	0	0	**0**	102	2	**104**	39	12	**51**	0	0	**0**	41	10	**51**	1	0	**1**	0	0	**0**	33	3	**36**
4:30 PM	0	0	**0**	87	4	**91**	45	3	**48**	0	0	**0**	38	5	**43**	0	0	**0**	0	0	**0**	46	0	**46**
4:45 PM	0	0	**0**	105	2	**107**	33	7	**40**	0	0	**0**	25	10	**35**	0	0	**0**	2	0	**2**	37	0	**37**
5:00 PM	0	0	**0**	95	1	**96**	25	6	**31**	0	0	**0**	58	12	**70**	2	1	**3**	0	0	**0**	35	2	**37**
5:15 PM	0	0	**0**	119	1	**120**	29	20	**49**	0	0	**0**	45	11	**56**	0	0	**0**	0	0	**0**	37	2	**39**
5:30 PM	0	0	**0**	109	4	**113**	23	12	**35**	0	0	**0**	55	9	**64**	1	0	**1**	0	0	**0**	29	2	**31**
5:45 PM	0	0	**0**	96	2	**98**	32	9	**41**	0	0	**0**	37	11	**48**	0	0	**0**	0	0	**0**	34	0	**34**
6:00 PM	0	0	**0**	72	0	**72**	20	9	**29**	0	0	**0**	35	5	**40**	0	0	**0**	0	0	**0**	30	1	**31**
3.5 hr Total	**0**	**0**	**0**	**1268**	**33**	**1301**	**481**	**140**	**621**	**0**	**0**	**0**	**603**	**140**	**743**	**6**	**1**	**7**	**3**	**0**	**3**	**557**	**26**	**583**
PM Peak	**0**	**0**	**0**	**381**	**10**	**391**	**159**	**47**	**206**	**0**	**0**	**0**	**156**	**41**	**197**	**3**	**0**	**3**	**1**	**0**	**1**	**174**	**9**	**183**

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 3 **Weather:** Fine
Location: Capricorn Highway/Bruce Highway, Midgee
Day/Date: Tuesday, 9 August 2022
AM Peak: *Hour ending - 8:45 AM*
PM Peak: *Hour ending - 5:30 PM*



TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 3A			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
6:45 AM	0	0	**0**	111	17	**128**	0	0	**0**	44	10	**54**	65	11	**76**	2	5	**7**	0	0	**0**	2	6	**8**	141	3	**144**
7:00 AM	1	0	**1**	81	14	**95**	1	0	**1**	49	9	**58**	67	10	**77**	4	3	**7**	0	0	**0**	3	2	**5**	150	19	**169**
7:15 AM	0	0	**0**	91	13	**104**	0	0	**0**	52	16	**68**	73	7	**80**	1	3	**4**	0	0	**0**	3	2	**5**	132	8	**140**
7:30 AM	0	0	**0**	83	26	**109**	0	0	**0**	55	12	**67**	105	16	**121**	2	4	**6**	1	0	**1**	1	4	**5**	179	12	**191**
7:45 AM	0	0	**0**	100	7	**107**	0	0	**0**	62	11	**73**	167	6	**173**	3	5	**8**	1	0	**1**	2	3	**5**	245	14	**259**
8:00 AM	0	0	**0**	128	17	**145**	1	0	**1**	63	10	**73**	178	12	**190**	1	3	**4**	0	0	**0**	5	3	**8**	275	14	**289**
8:15 AM	0	0	**0**	132	26	**158**	0	0	**0**	92	9	**101**	200	14	**214**	3	3	**6**	0	1	**1**	1	2	**3**	330	23	**353**
8:30 AM	0	0	**0**	146	13	**159**	0	0	**0**	83	8	**91**	232	9	**241**	8	4	**12**	0	0	**0**	2	1	**3**	306	10	**316**
8:45 AM	2	0	**2**	152	8	**160**	0	0	**0**	86	15	**101**	139	12	**151**	0	3	**3**	0	0	**0**	1	2	**3**	260	14	**274**
9:00 AM	1	0	**1**	138	19	**157**	1	0	**1**	89	14	**103**	101	11	**112**	2	5	**7**	0	1	**1**	5	3	**8**	184	9	**193**
9:15 AM	0	0	**0**	140	20	**160**	0	0	**0**	106	14	**120**	94	9	**103**	3	4	**7**	0	0	**0**	2	4	**6**	149	17	**166**
9:30 AM	0	0	**0**	133	11	**144**	0	0	**0**	95	16	**111**	86	7	**93**	3	3	**6**	1	0	**1**	4	3	**7**	172	11	**183**
3 hr Total	**4**	**0**	**4**	**1435**	**191**	**1626**	**3**	**0**	**3**	**876**	**144**	**1020**	**1507**	**124**	**1631**	**32**	**45**	**77**	**3**	**2**	**5**	**31**	**35**	**66**	**2523**	**154**	**2677**
AM Peak	**2**	**0**	**2**	**558**	**64**	**622**	**1**	**0**	**1**	**324**	**42**	**366**	**749**	**47**	**796**	**12**	**13**	**25**	**0**	**1**	**1**	**9**	**8**	**17**	**1171**	**61**	**1232**

TIME (1/4 hr end)	Movement 1			Movement 2			Movement 3			Movement 3A			Movement 4			Movement 5			Movement 6			Movement 7			Movement 8		
	Light Vehicles	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Light Vehicles*	*Heavy Vehicles*	***Total***
2:45 PM	0	0	**0**	166	11	**177**	1	0	**1**	109	13	**122**	99	9	**108**	1	3	**4**	0	0	**0**	1	2	**3**	182	17	**199**
3:00 PM	0	0	**0**	203	13	**216**	0	0	**0**	101	6	**107**	96	7	**103**	4	1	**5**	1	0	**1**	2	2	**4**	160	22	**182**
3:15 PM	0	0	**0**	194	10	**204**	0	0	**0**	109	12	**121**	75	21	**96**	2	3	**5**	0	0	**0**	2	2	**4**	157	13	**170**
3:30 PM	0	0	**0**	260	21	**281**	1	0	**1**	146	8	**154**	104	16	**120**	1	0	**1**	0	1	**1**	2	2	**4**	140	16	**156**
3:45 PM	0	0	**0**	234	17	**251**	1	0	**1**	112	10	**122**	81	8	**89**	1	3	**4**	0	0	**0**	3	5	**8**	158	8	**166**
4:00 PM	0	0	**0**	214	7	**221**	0	0	**0**	135	16	**151**	84	9	**93**	2	1	**3**	1	0	**1**	1	2	**3**	114	15	**129**
4:15 PM	0	0	**0**	224	12	**236**	0	0	**0**	132	12	**144**	71	10	**81**	3	2	**5**	2	1	**3**	0	1	**1**	170	14	**184**
4:30 PM	0	0	**0**	291	12	**303**	0	0	**0**	134	7	**141**	67	3	**70**	2	3	**5**	1	0	**1**	3	0	**3**	155	12	**167**
4:45 PM	0	0	**0**	225	7	**232**	1	0	**1**	134	7	**141**	72	7	**79**	2	5	**7**	0	0	**0**	0	3	**3**	154	8	**162**
5:00 PM	0	0	**0**	237	4	**241**	0	0	**0**	114	6	**120**	85	7	**92**	2	4	**6**	0	0	**0**	3	3	**6**	167	12	**179**
5:15 PM	0	0	**0**	254	9	**263**	0	0	**0**	145	12	**157**	83	12	**95**	3	2	**5**	0	0	**0**	2	6	**8**	143	9	**152**
5:30 PM	0	0	**0**	245	11	**256**	1	0	**1**	126	10	**136**	78	11	**89**	4	1	**5**	0	0	**0**	4	6	**10**	189	8	**197**
5:45 PM	0	0	**0**	196	12	**208**	1	0	**1**	127	9	**136**	66	8	**74**	0	2	**2**	0	0	**0**	2	1	**3**	133	3	**136**
6:00 PM	0	0	**0**	166	4	**170**	1	0	**1**	80	5	**85**	76	4	**80**	0	0	**0**	0	0	**0**	2	6	**8**	111	3	**114**
3.5 hr Total	**0**	**0**	**0**	**3109**	**150**	**3259**	**7**	**0**	**7**	**1704**	**133**	**1837**	**1137**	**132**	**1269**	**27**	**30**	**57**	**5**	**2**	**7**	**27**	**41**	**68**	**2133**	**160**	**2293**
PM Peak	**0**	**0**	**0**	**961**	**31**	**992**	**2**	**0**	**2**	**519**	**35**	**554**	**318**	**37**	**355**	**11**	**12**	**23**	**0**	**0**	**0**	**9**	**18**	**27**	**653**	**37**	**690**

DETAILED STORMWATER & CONTAMINATED WATER MANAGEMENT PLAN

Midgee Quarry Expansion
Lot 2 on RP888747
59793 Bruce Highway, Midgee

for Hopeman Pty Ltd

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/79-2017

Dated: 16 November 2018

3 July 2017

File No: K3626-0006

ALL CORRESPONDENCE
PO Box 41,
Varsity Lakes Q 4227
www.knobelconsulting.com.au

GOLD COAST OFFICE
Suite 4 - 155 Varsity Parade,
Varsity Lakes Q 4227
T 07 5580 9777 | F 07 5580 9133

ROCKHAMPTON OFFICE
Level 6 - 34 East Street,
Rockhampton Q 4700
T 07 4922 5019 | F 07 5580 9133

BRISBANE OFFICE
G34B Highpoint Plaza,
240 Waterworks Road, Ashgrove Q 4060
T 07 3366 2551 | F 07 5580 9133

DOCUMENT CONTROL SHEET

Title:	DETAILED STORMWATER AND CONTAMINATED WATER MANAGEMENT PLAN
Document No:	K3626-0006
Original Date of Issue:	23 June 2017
Project Manager:	Aaron Pianta
Author:	Jamie Lee
Client:	Hopeman Pty Ltd
Client Contact:	Gideon Genade – Gideon Town Planning
Client Reference:	Midgee Quarry Expansion
Synopsis:	This *Detailed Stormwater and Contaminated Water Management Plan* describes the existing site characteristics, proposed development of the site and corresponding site drainage infrastructure and stormwater management controls to be implemented during both the construction and operational phases of the development.

Reviewed by RPEQ	Reg. No.	Signed	Date
Aaron Pianta	10423		3 July 2017

Revision/Checking History			
Revision No	**Date**	**Checked By**	**Issued By**
Draft	23 June 2017	Aaron Pianta	Jamie Lee
Original	3 July 2017	Aaron Pianta	Aaron Pianta

Distribution		
Recipient	**No of Copies**	**Method**
Gideon Genade – Gideon Town Planning	1	PDF
Rockhampton Regional Council	1	PDF

The information contained within this report is provided in good faith in the belief that no information, opinions or recommendations made are misleading. All comments and opinions given in this report are based on information supplied by the client, their agent and third parties.

CONTENTS

1.0 INTRODUCTION 1
1.1 Background 1
1.2 Scope 1
2.0 SITE DESCRIPTION 1
2.1 Location 1
2.2 Site Topography 2
2.3 Vegetation and Land Use 2
2.4 Design Rainfall 3
2.5 Proposed Development 3
3.0 SITE HYDROLOGY AND HYDRAULICS 3
3.1 Background 3
3.2 Catchment Areas 3
3.3 Preliminary Volume Calculations 3
3.3.1 Coefficient of Runoff 3
3.3.2 Rainfall Intensity 3
3.3.3 Design Volume 3
3.4 Basin Design 4
4.0 STORMWATER QUALITY ASSESSMENT 4
4.1 Background 4
4.2 Key Pollutants 4
4.3 Sediment and Erosion Controls 4
4.3.1 Context 4
4.3.2 General Design Principles 5
4.3.3 Control of Surface Water Flows 5
4.3.4 Catchment Perimeter Control of Surface Water 5
5.0 CONCLUSIONS 5

TABLES

Table 1: Site Details 1
Table 2: Rainfall Intensity Data 3
Table 3: Required Basin Volumes 4
Table 4: Key Pollutants, Construction Phase 4

FIGURES

Figure 1: Google Maps Extract **2**
Figure 2: Aerial Photograph of the Site (Google Maps) **2**

APPENDICES

Appendix A - MPA Surveying, *Detail and Contour Survey* (Ref: R16024-001)
Appendix B - Knobel Consulting Pty Ltd, Quarry Expansion - Stormwater Catchment Plan, K3626/C001/A
Appendix C - Knobel Consulting Pty Ltd, Quarry Expansion – Sediment Basin Layout Plan, K3626/BE003/A, Quarry Expansion - Sediment Basin Details Sheet 1 of 2, K3626/BE004/A &, Quarry Expansion – Sediment Basin Details Sheet 2 of 2, K3626/BE005/A.

1.0 INTRODUCTION

1.1 Background

Knobel Consulting Pty Ltd has been commissioned by Hopeman Pty Ltd to prepare a *Detailed Stormwater and Contaminated Water Management Plan* (DSWCWMP) and supporting engineering documentation for an existing Quarry situated at 59793 Bruce Highway, Midgee (the subject site).

In preparing the DSWCWMP, Knobel Consulting Pty Ltd has considered the applicable requirements for the management of stormwater quality and quality appropriate for the subject site and proposed development.

1.2 Scope

This DSWCWMP details the planning, layout and design of the stormwater management infrastructure for both the construction and operational phase of this development.

This DSWCWMP aims to:

- Establish the required performance criteria for stormwater quantity and quality management systems for the proposed development;
- Provide a design of stormwater infrastructure including stormwater quality improvement devices and stormwater quantity management controls where required; and
- Ensure stormwater runoff is conveyed from/through the site to a lawful point of discharge in accordance with QUDM and Council guidelines.

This DSWCWMP has been prepared in accordance with Rockhampton Regional Council – *Development Guidelines,* Rockhampton Region Planning Scheme 2015, Queensland Urban Drainage Manual (QUDM) and State Planning Policy (SPP) April 2016.

2.0 SITE DESCRIPTION

2.1 Location

The subject site is located at 59793 Bruce Highway, Midgee and has a total area of 85.15 ha. Site details have been summarised within Table 1 and a Google Maps extract is presented as Figure 1.

Table 1: Site Details

Owner/Developer	Property and Location	
	Lot and Property Description	Address
Hopman Pty Ltd	*Lot 2 on RP888747*	*59793 Bruce Highway, Midgee*

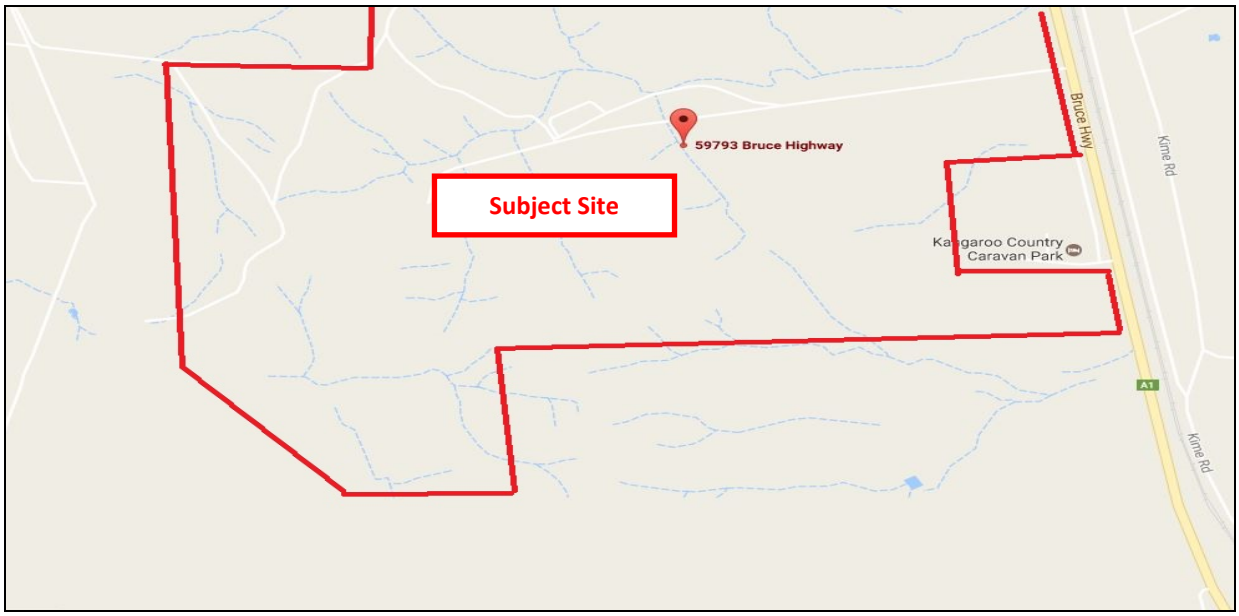


Figure 1: Google Maps Extract

2.2 Site Topography

The subject site grades in a North East direction toward the Bruce Highway. Site levels range from 61 m AHD to 9.0 m AHD. Refer to MPA Surveying, *Detail and Contour Survey* (Ref: R16024-001) included as Appendix A.

2.3 Vegetation and Land Use

The site consists of a single lot with multiple operational areas. The ground coverage is a mixture of medium vegetation, grass and bare earth. An aerial photograph is illustrated in Figure 2.

Figure 2: Aerial Photograph of the Site (Google Maps)

2.4 Design Rainfall

Rainfall intensity data has been extracted for Rockhampton from the Bureau of Meteorology (BOM) IFD program and calculated in accordance with the procedures outlined in IEAust, Australian Rainfall and Runoff. The extracted data is shown in Table 2:

Table 2: Rainfall Intensity Data

$^{2yr}I_{1hr}$:	43.2 mm/hr;
$^{2yr}I_{12hr}$:	8.19 mm/hr;
$^{2yr}I_{72hr}$:	2.32 mm/hr;
$^{50yr}I_{1hr}$:	84.5 mm/hr;
$^{50yr}I_{12hr}$:	18.0 mm/hr;
$^{50yr}I_{72hr}$:	6.17 mm/hr;
F_2:	4.23
F_{50}:	17.67
G:	0.22

2.5 Proposed Development

The subject site is an operational quarry consisting of multiple operational pits and processing areas.

3.0 SITE HYDROLOGY AND HYDRAULICS

3.1 Background

The subject site currently directs the majority of runoff through a series of holding dams before discharging to the Bruce Highway. In accordance with EPA Guidelines, stormwater runoff for all rainfall events up to a 1 in 5 year 24 hour duration rainfall event, should be captured and held onsite. The following sections define the parameters of the sites hydraulics and provide sizing volumes for the proposed basins.

3.2 Catchment Areas

The site's operational area has been broken up into smaller catchments, shown on Knobel Consulting Pty Ltd, Quarry Expansion - Stormwater Catchment Plan, K3626/C001/A included as Appendix B. The stormwater catchment plan also shows the catchment connections and corresponding basins. It should be noted that all holding basins are inter-connected.

Catchment A and Ext A are undisturbed areas that bypass the proposed holding basins and have therefore been excluded from the following calculations.

3.3 Preliminary Volume Calculations

3.3.1 Coefficient of Runoff

A coefficient of runoff (Cyear) was calculated for the site using the fraction impervious method specified in QUDM. A fraction impervious factor of 0.0 is applied based on the existing site conditions. This equates to an approximate C_{10} value of 0.70, taken from Table 4.05.3(b) (QUDM).

Applying the frequency factor of 0.95 from Table 4.05.2 (QUDM) this equates to an approximate C_5 value of 0.665.

3.3.2 Rainfall Intensity

Using extracted rainfall data from section 2.4, the corresponding 1 in 5 year 24 hour duration rainfall intensity is 7.02mm/h. This equates to a total rainfall depth of 0.1685m.

3.3.3 Design Volume

Design basin volumes have been calculated using QUDM runoff coefficients and rainfall intensity values from the BOM IFD programme for Rockhampton.

Table 3: Required Basin Volumes

Catchment ID	B	C	D	E	F	EXT B	EXT C	EXT D
Coefficient of Runoff	0.665	0.665	0.665	0.665	0.665	0.665	0.665	0.665
Area of Catchment (m^2)	75892	58979	19286	13564	83092	14250	24618	57829
Rainfall Depth (m)	0.1685	0.1685	0.1685	0.1685	0.1685	0.1685	0.1685	0.1685
Volume (m^3)	**8504**	**6609**	**2161**	**1520**	**9311**	**1597**	**2759**	**6480**
Total Volume (m^3)	**38,941**							

3.4 Basin Design

The proposed sediment basins are shown on Knobel Consulting Pty Ltd, *Quarry Expansion - Stormwater Catchment Plan, K3626/C001/A*. It should be noted that all holding basins are inter-connected and the total required storage volume has been calculated as a whole.

The combined area of basin B1-B7 is 14,822m^2. Assuming an average basin depth of 3.0m, the total storage volume of 44,466m^3 is adequate to capture and hold all stormwater runoff up to a 1 in 5 year 24 hour storm event.

For Basin Details refer to Knobel Consulting Pty Ltd, *Quarry Expansion – Sediment Basin Layout Plan, K3626/BE003/A, Quarry Expansion – Sediment Basin Details Sheet 1 of 2 Ref: K3626/BE004/A and Quarry Expansion – Sediment Basin Details Sheet 2 of 2 Ref: K3626/BE005/A* included as Appendix C.

4.0 STORMWATER QUALITY ASSESSMENT

4.1 Background

Disturbance to the existing ground has the potential to significantly increase sediment loads entering downstream drainage systems and watercourses. The following section outlines proposed sediment and erosion controls to be implemented during the construction and operational phase of the development.

4.2 Key Pollutants

During the construction phase a number of key pollutants have been identified for this development.

Table 4 illustrates the key pollutants that have been identified.

Table 4: Key Pollutants, Construction Phase

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, material off cuts.
Sediment	Exposed soils and stockpiles during earthworks and building works.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment and temporary car park areas.
Toxic Materials	Cement slurry, asphalt primer, solvents, cleaning agents, and wash waters
Acids or Alkaline substances	Acid sulphate soil, cement slurry and wash waters.

4.3 Sediment and Erosion Controls

4.3.1 Context

Stormwater that falls or flows onto the quarry site during rainfall events is likely to release sediment in disturbed areas. Sediment laden stormwater that is released from the site has the potential to cause unreasonable harm to waterways. This section outlines methods to manage and capture surface stormwater generated on the site during rainfall events and is designed to minimise sediment erosion mobilisation and erosion on the site, and any potential release of sediment from the site.

4.3.2 General Design Principles

Sediment and Erosion Controls have been designed predominantly as a "catchment perimeter control" plan. The quarry site is structured around the existing and future expansion areas. The natural topography of the site generally directs stormwater through a series of holding dams before discharging to the Bruce Highway.

4.3.3 Control of Surface Water Flows

Stormwater flows on the site must be managed in a manner that minimises the potential for sediment and erosion release within the site, and also retains contaminated water on-site to be directed to various sediment basins.

4.3.4 Catchment Perimeter Control of Surface Water

Stormwater water management within the site has been separated into distinct catchment areas, and each catchment area directs stormwater into inter connected sediment basins. Refer to Knobel Consulting Pty Ltd, Quarry Expansion - Catchment Plan, K3623/C001/A.

5.0 CONCLUSIONS

Knobel Consulting Pty Ltd has been commissioned by Hopeman Pty Ltd to prepare a *Detailed Stormwater and Contaminated Water Management Plan* (DSWCWMP) and supporting engineering documentation for Proposed Quarry Expansion situated at 59793 Bruce Highway, Midgee. The report details the planning, layout and conceptual design of the stormwater management infrastructure for both the construction and operational phases of this development.

Knobel Consulting Pty Ltd has outlined the required stormwater quality measures to be implemented during the construction phase of the development.

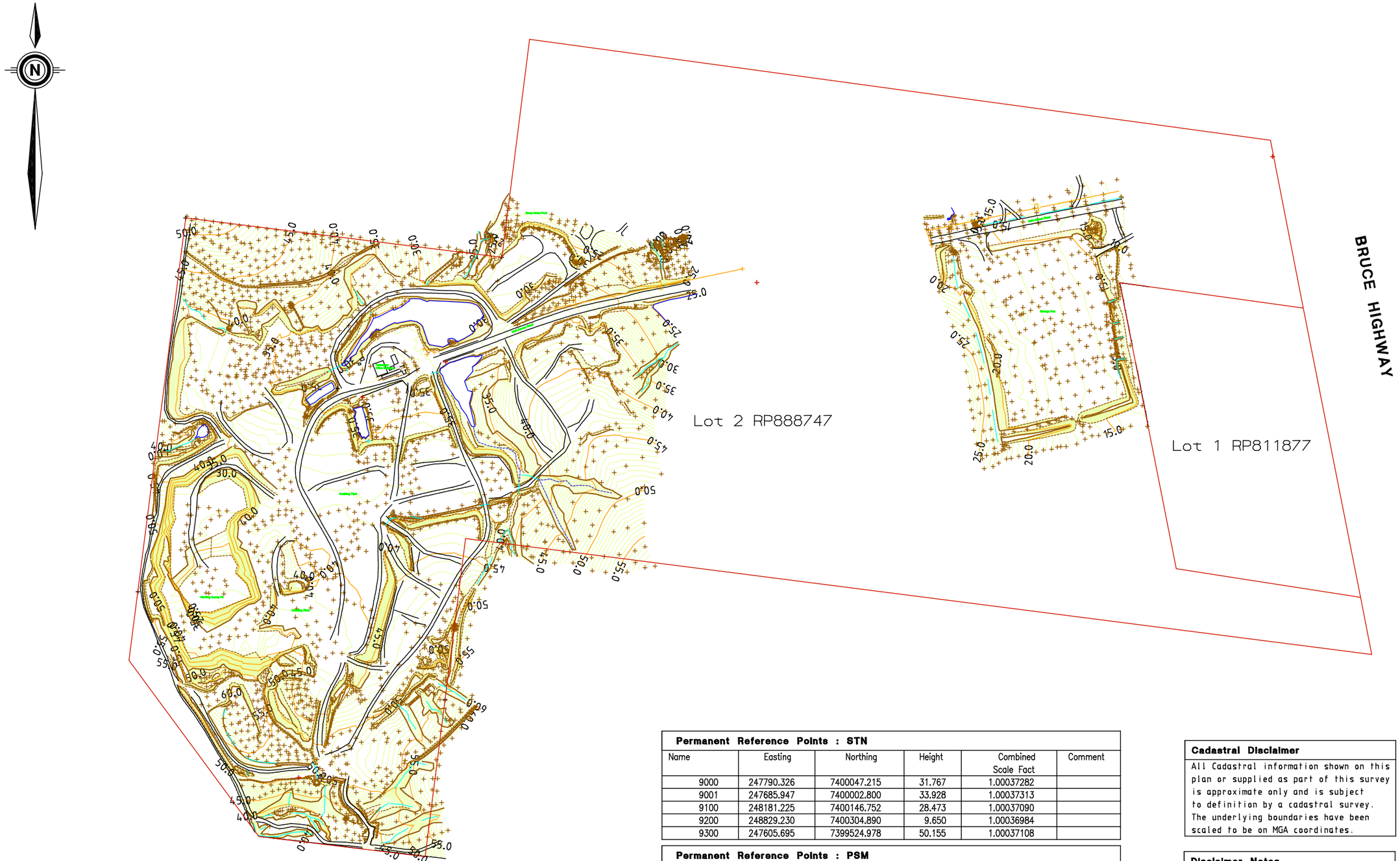
APPENDIX

A

MPA Surveying

Detail and Contour Survey

(Ref: R16024-001)



Permanent Reference Points : STN

Name	Easting	Northing	Height	Combined Scale Fact	Comment
9000	247790.326	7400047.215	31.767	1.00037282	
9001	247685.947	7400002.800	33.928	1.00037313	
9100	248181.225	7400146.752	28.473	1.00037090	
9200	248829.230	7400304.890	9.650	1.00036984	
9300	247605.695	7399524.978	50.155	1.00037108	

Permanent Reference Points : PSM

Name	Easting	Northing	Height	Combined Scale Fact	Comment
PSM134467	248799.084	7400742.120	9.568	1.00037004	

Cadastral Disclaimer

All Cadastral information shown on this plan or supplied as part of this survey is approximate only and is subject to definition by a cadastral survey. The underlying boundaries have been scaled to be on MGA coordinates.

Disclaimer Notes

Survey completed using GPS RTK
No stockpiles were surveyed
Quarry Pit walls approximate only
No trees located
Crushing Plant Equipment not located
Drainage Pipes located were visible

Rev.	Reason for Issue or Amendment	Date	Drawn	Checked	Surveyed
A	PRELIMINARY ISSUE TO CLIENT	22/6/16	KN	KN	JM

MPA SURVEYING
Head Office L6, 345 Ann St, Brisbane Q 4000 P 07 3002 2300 mpasurveying.com.au
Mackay Emerald Gladstone Brisbane Sunshine Coast ENGINEERING MINING CONSTRUCTION CADASTRAL

Project: MIDGEE QUARRY	MPA JOB NO: R16024		Scale: 1:5000(A3)	
Title: DETAIL AND CONTOUR SURVEY	Level Datum: AHD	Origin: PM 134467	Co-ord System: MGA56	
Client: REEL PLANNING	MPA Drawing No: R16024-001	Revision: A	Sheet: 1 of 1	

APPENDIX

B

Knobel Consulting Pty Ltd

Quarry Expansion - Stormwater Catchment Plan

(Ref: K3626/C001/A)

LEGEND

——·——	STORMWATER CATCHMENT BOUNDARY
→———	CATCHMENT CONNECTIONS
Ⓐ	STORMWATER CATCHMENT I.D.
B1	BASIN I.D
EXT A	EXTERNAL CATCHMENT I.D.
LPOD	LAWFUL POINT OF DISCHARGE
---6.0---	NATURAL SURFACE CONTOUR

STORMWATER CATCHMENT TABLE

STORMWATER CATCHMENT I.D.	AREA (m²)
EXT A	151528
EXT B	14250
EXT C	24618
EXT D	57829
A	14326
B	75892
C	58979
D	19286
E	13564
F	83092
B1	7605
B2	3500
B3	621
B4	829
B5	911
B6	165
B7	1191

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

ISSUE No.	DATE	AMENDMENT
A	23-06-17	ISSUED FOR DEVELOPMENT APPROVAL

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
Level 6, 34 East Street
Rockhampton City Q 4700
Phone: 07 4922 5019
Fax: 07 5580 9133
Email: admincq@knobelconsulting.com.au
PO Box 5364 Red Hill,
Rockhampton Q 4701
ABN: 33 071 435 202
W: www.knobelconsulting.com.au

CLIENT: HOPKINS BROTHERS

PROJECT: MIDGEE QUARRY EXPANSION
59793 BRUCE HIGHWAY LOT2 RP888747
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
JL	EW	AP

TITLE: QUARRY EXPANSION
STORMWATER CATCHMENT PLAN

SCALE: 1:2000 AT A1
1:4000 AT A3
0 50 100 150 200m

PROJECT NO. K3626
DWG NO. C001
ISSUE A

APPENDIX

C

Knobel Consulting Pty Ltd

Quarry Expansion – Sediment Basin Layout Plan

(Ref: K3626/BE003/A)

Quarry Expansion – Sediment Basin Details Sheet 1 of 2

(Ref: K3626/BE004/A)

Quarry Expansion – Sediment Basin Details Sheet 2 of 2

(Ref: K3626/BE005/A)

LEGEND

NATURAL SURFACE CONTOUR

CATCHMENT CONNECTIONS

NOTE:

REFER DWG BE004 FOR SEDIMENT BASIN DETAILS

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

ISSUE No.	DATE	AMENDMENT
A	23-06-17	ISSUED FOR DEVELOPMENT APPROVAL

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
Level 6, 34 East Street
Rockhampton City Q 4700
Phone: 07 4922 5019
Fax: 07 5580 9133
Email: admincq@knobelconsulting.com.au
PO Box 5364 Red Hill,
Rockhampton Q 4701
ABN: 33 071 435 202
W: www.knobelconsulting.com.au

CLIENT: HOPKINS BROTHERS

PROJECT: MIDGEE QUARRY EXPANSION
59793 BRUCE HIGHWAY LOT2 RP888747
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
JL	EW	AP

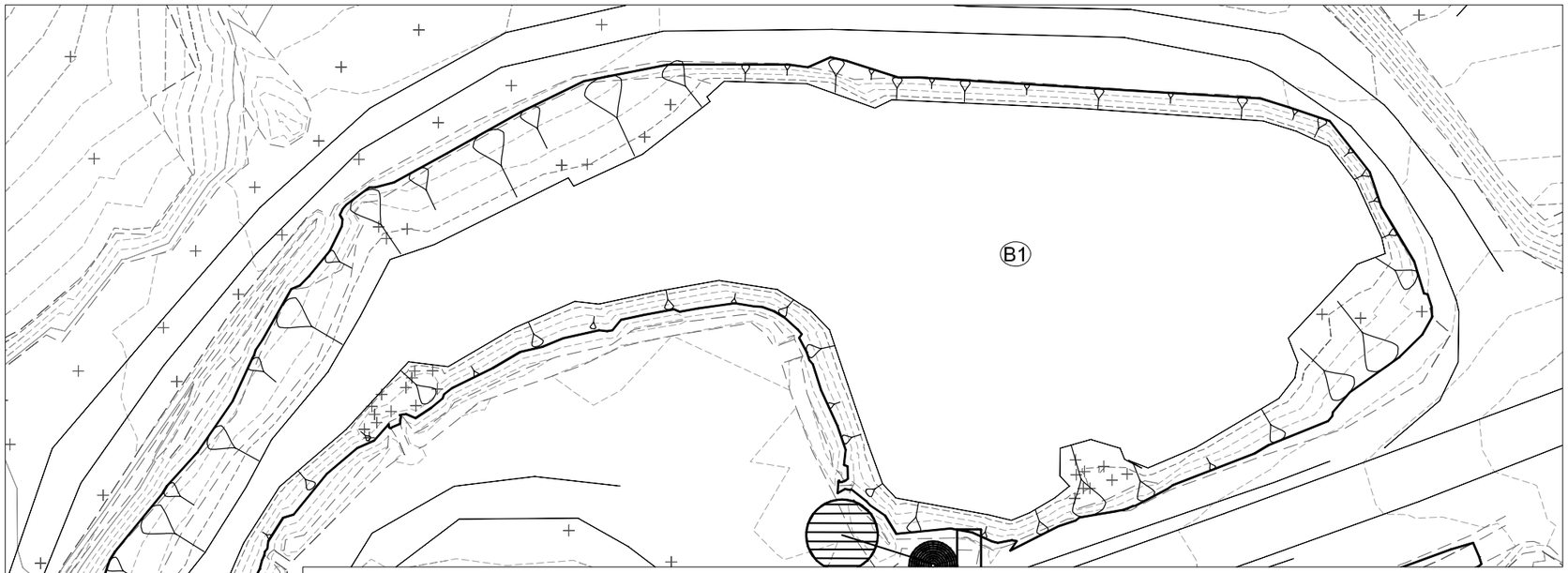
TITLE: QUARRY EXPANSION - SEDIMENT BASIN LAYOUT PLAN

SCALE: 1:1000 AT A1, 1:2000 AT A3 (0, 20, 40, 60, 80, 100m)

PROJECT NO. K3626

DWG NO. BE003

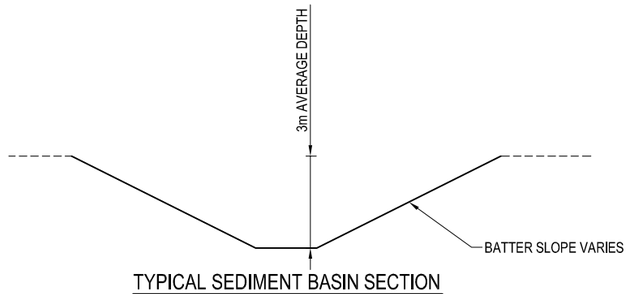
ISSUE A



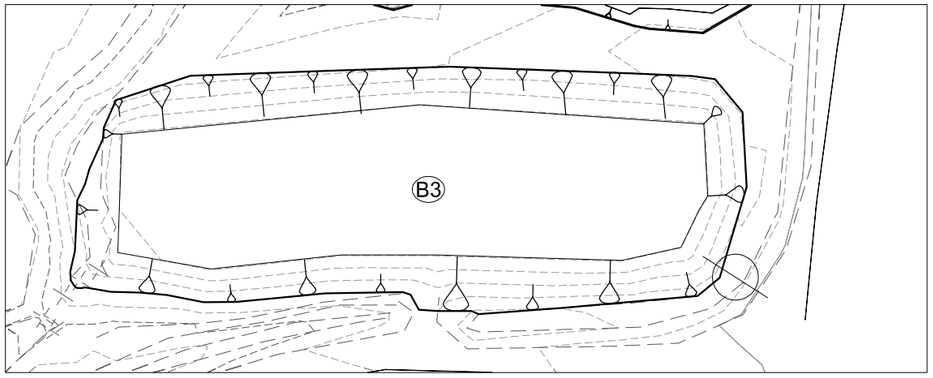
SEDIMENT BASIN 1
SCALE 1:400 AT A1

LEGEND

6.0 NATURAL SURFACE CONTOUR



TYPICAL SEDIMENT BASIN SECTION
SCALE 1:100 AT A1



SEDIMENT BASIN 3
SCALE 1:200 AT A1

SEDIMENT BASIN 2
SCALE 1:400 AT A1

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

ISSUE No.	DATE	AMENDMENT
A	23-06-17	ISSUED FOR DEVELOPMENT APPROVAL

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
Level 6, 34 East Street
Rockhampton City Q 4700
Phone: 07 4922 5019
Fax: 07 5580 9133
Email: admincq@knobelconsulting.com.au
PO Box 5364 Red Hill,
Rockhampton Q 4701
ABN: 33 071 435 202
W: www.knobelconsulting.com.au

CLIENT: HOPKINS BROTHERS

PROJECT: MIDGEE QUARRY EXPANSION
59793 BRUCE HIGHWAY LOT2 RP888747
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
JL	EW	AP

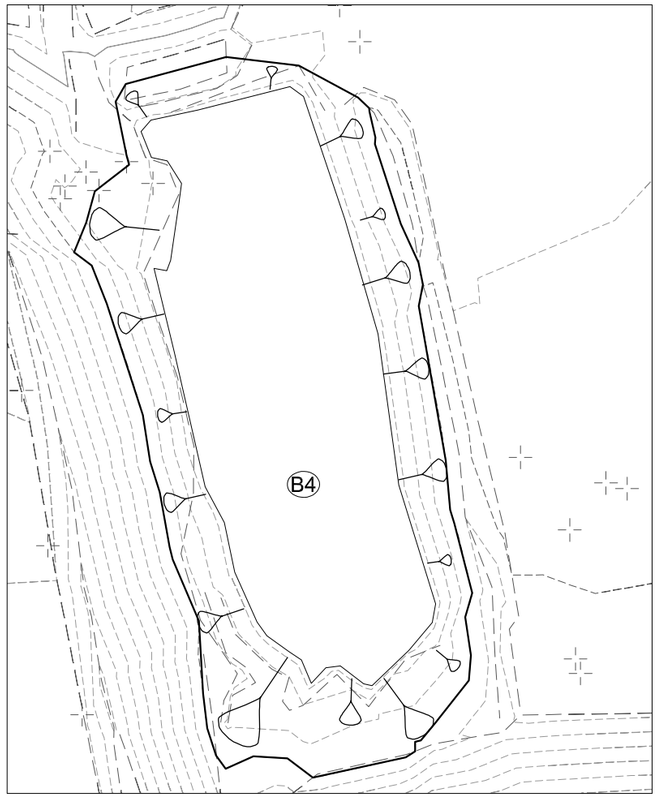
TITLE: QUARRY EXPANSION - SEDIMENT BASIN DETAILS SHEET 1 OF 2

SCALE: 1:400 AT A1, 1:800 AT A3 (0, 10, 20, 30, 40m)

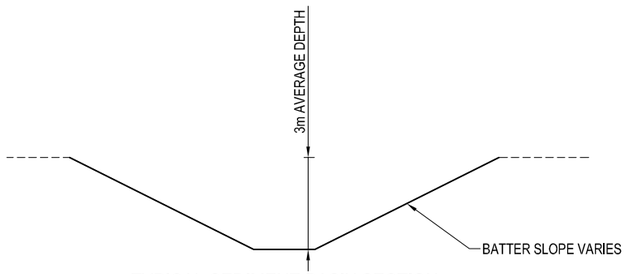
PROJECT NO.: K3626

DWG NO.: BE004

ISSUE: A



SEDIMENT BASIN 4
SCALE 1:200 AT A1

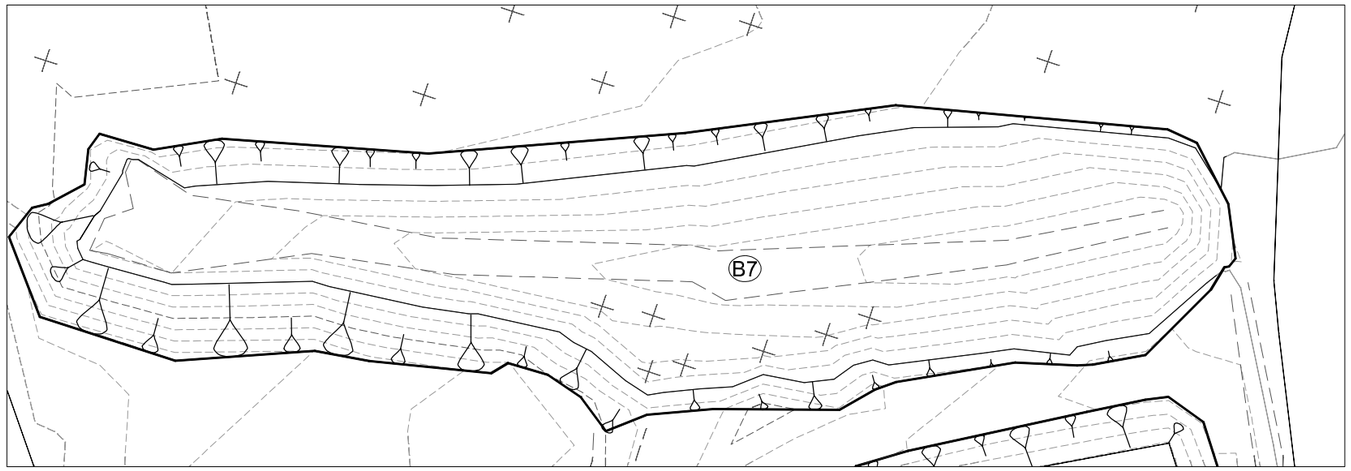


TYPICAL SEDIMENT BASIN SECTION
SCALE 1:100 AT A1

LEGEND

6.0 NATURAL SURFACE CONTOUR

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS



SEDIMENT BASIN 7
SCALE 1:200 AT A1

SEDIMENT BASIN 5
SCALE 1:200 AT A1

SEDIMENT BASIN 6
SCALE 1:100 AT A1

1:100 AT A1
1:200 AT A3
0 2 4 6 8 10m

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

ISSUE No.	DATE	AMENDMENT
A	23-06-17	ISSUED FOR DEVELOPMENT APPROVAL

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
Level 6, 34 East Street
Rockhampton City Q 4700
Phone: 07 4922 5019
Fax: 07 5580 9133
Email: admincq@knobelconsulting.com.au
PO Box 5364 Red Hill,
Rockhampton Q 4701
ABN: 33 071 435 202
W: www.knobelconsulting.com.au

CLIENT: HOPKINS BROTHERS

PROJECT: MIDGEE QUARRY EXPANSION
59793 BRUCE HIGHWAY LOT2 RP888747
MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
JL	EW	AP

TITLE: QUARRY EXPANSION - SEDIMENT BASIN DETAILS SHEET 2 OF 2

SCALE: 1:200 AT A1, 1:400 AT A3
0 5 10 15 20m

PROJECT NO. K3626

DWG NO. BE005

ISSUE A

TECHNICAL MEMORANDUM

Our Ref: K3626-0008

To: Hopeman Pty Ltd

From: Daley Curran – Knobel Consulting

Date: 7th September 2017

Re: MIDGEE QUARRY EXPANSION – 59793 BRUCE HIGHWAY, MIDGEE – STORAGE PAD

5 Year 24hr Rainfall Intensity = 7.02 mm/h
= 0.00702 m/h

C_{10} = 0.7
C_5 = 0.665

24h Rainfall Depth = 0.00702
= 0.1685m

Catchment Areas

a) 7.28ha

24hr Rainfall Volume

a) = 0.665 x 72800 x 0.1685
= 8,157m^3

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/79-2017
Dated: 16 November 2018

Peak Flow rate for Swale Calculations

Assume TC = 20min $^{20}_{5}I$ = 74mm/h

= (0.665 x 74 x 7.28) / 360
a) = 0.995m^3/s x ½ (Assume flow is split between inflow locations)
= 0.498m^3/s

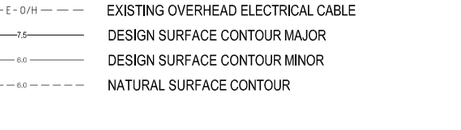
SIGNATURE:		**RPEQ No.**	10423	**DATE:**	7th September 2017
NAME:	Aaron Pianta *BEng (Hons) Civil, MIEAust, CPEng, NPER, RPEQ*				
FOR AND ON BEHALF OF:	Knobel Consulting Pty Ltd	**ACN No.**	132 010 578		

LEGEND

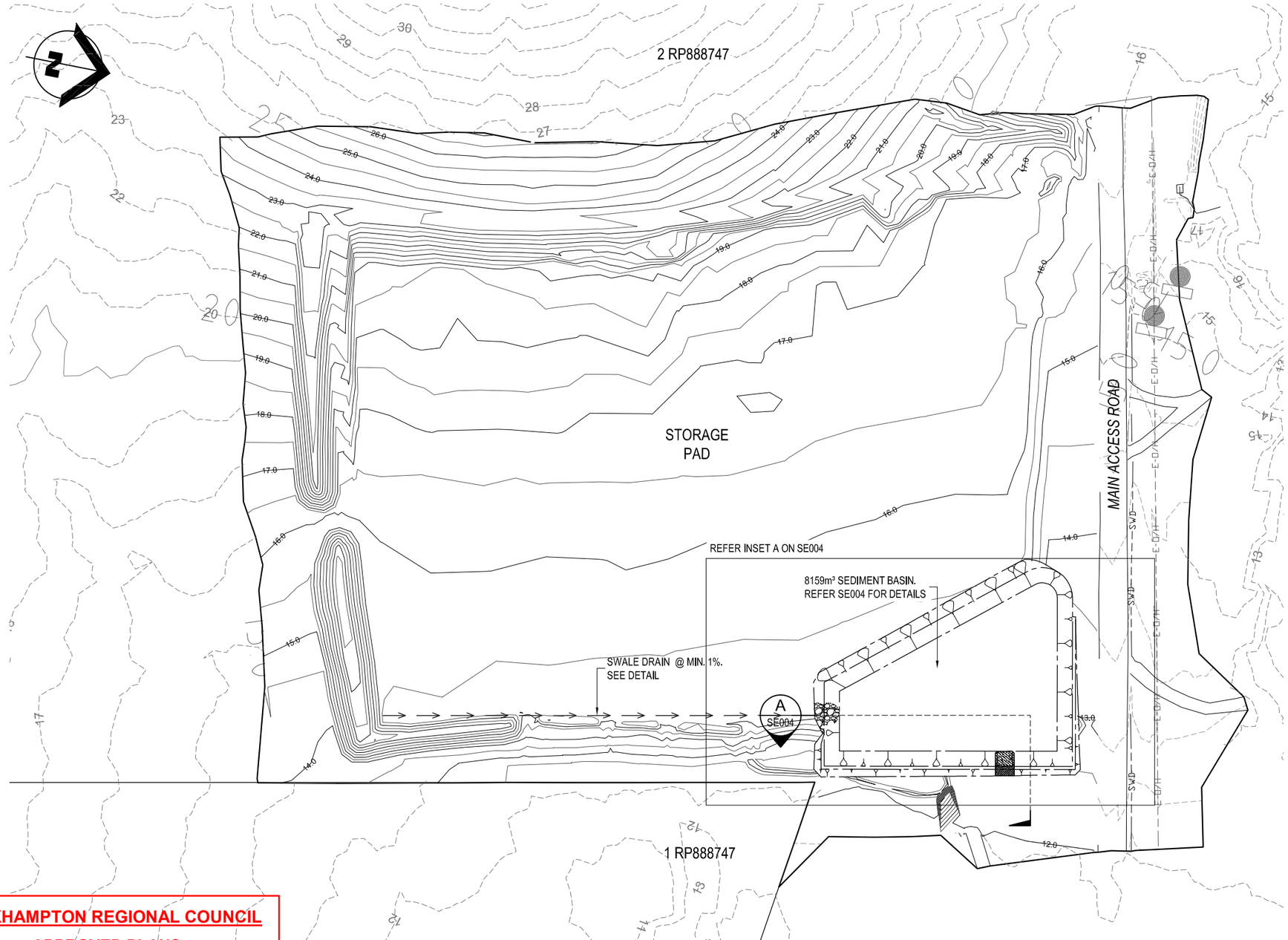
- PROPOSED SWALE - REFER DETAIL
- EXISTING STORMWATER DRAINAGE (SWD)
- EXISTING OVERHEAD ELECTRICAL CABLE (E-O/H)
- DESIGN SURFACE CONTOUR MAJOR (7.5)
- DESIGN SURFACE CONTOUR MINOR (6.0)
- NATURAL SURFACE CONTOUR (6.0)

SEDIMENT AND EROSION CONTROL NOTES

1. THE PROJECT SEDIMENT AND EROSION CONTROL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE SITE'S APPROVED STORMWATER MANAGEMENT PLAN.
2. CONSTRUCTION IS TO BE PROGRAMMED TO PROVIDE INSTALLATION OF PERIMETER LANDSCAPING / SURFACE TREATMENTS AS EARLY AS PRACTICAL.
3. THE CONTRACTOR'S WORKS PROGRAM IS TO BE REVIEWED AT THE PRESTART MEETING. ALTERATIONS TO THE PROGRAM MAY BE REQUIRED TO ENSURE SATISFACTORY EROSION AND SEDIMENT CONTROL.
4. SAFETY ISSUES MUST BE CONSIDERED AND MONITORED FOR EACH DEVICE TO THE SATISFACTION OF THE SUPERINTENDENT.
5. SEDIMENT FENCE FILTER FABRIC IS TO BE APPROVED BY THE ENGINEER. FILTER CLOTH AND SHADE CLOTH IS NOT TO BE USED.
6. SEDIMENTATION MANAGEMENT DEVICES SHALL BE INSTALLED PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES AND MAINTAINED AT A SUITABLE LEVEL/ CONDITION THROUGHOUT CONSTRUCTION.
7. SEDIMENT FENCES ARE TO BE CLEANED OUT WHEN CAPACITY IS REDUCED BY 30%.
8. DRAINAGE STRUCTURE PROTECTION IS TO BE CLEANED FOLLOWING EACH SIGNIFICANT RUNOFF PRODUCING STORM.
9. ACCESS TO THE SITE IS TO BE PROVIDED BY THE CONTRACTOR. APPROVAL IS TO BE OBTAINED FROM COUNCIL FOR THE LOCATION OF THE SITE ACCESS POINT AND WASH DOWN AREA WHICH IS TO BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD. ACCESS TO AND FROM THE SITE IS TO BE VIA THE SHAKEDOWN FACILITY ONLY. ALL VEHICLES ARE TO BE WASHED DOWN PRIOR TO LEAVING THE SITE.
10. THE CONTRACTOR SHALL PROVIDE TEMPORARY DRAINAGE CONTROLS TO DIVERT FLOW FROM UNDISTURBED AREAS AROUND DISTURBED AREAS AND DIRECT FLOW FROM DISTURBED AREAS TOWARD CONTROL DEVICES.
11. SEDIMENT TRAP WILL COLLECT SEDIMENT DURING RUN-OFF EVENTS . DEWATERING OF THIS SEDIMENT TRAP CAN ONLY OCCUR WHEN TSS IS <50MG/L AND PH IS BETWEEN 6.5 - 8.5 IN ACCORDANCE WITH IECA GUIDELINES.



SWALE DRAIN DETAIL
SCALE 1:50 AT A1



APPROVAL ISSUE
NOT FOR CONSTRUCTION UNLESS STAMPED

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/79-2017
Dated: 16 November 2018

ISSUE No.	DATE	AMENDMENT
A	29-09-17	ISSUED FOR OPERATIONAL WORKS APPROVAL

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
Level 6, 34 East Street
Rockhampton City Q 4700
Phone: 07 4922 5019
Fax: 07 5580 9133
Email: admincq@knobelconsulting.com.au
PO Box 5364 Red Hill,
Rockhampton Q 4701
ABN: 33 071 435 202
W: www.knobelconsulting.com.au

CLIENT: HOPKINS BROTHERS

PROJECT: MIDGEE QUARRY EXPANSION
STORAGE PAD AND CONCRETE CRUSHING PLANT
59793 BRUCE HIGHWAY LOT2 RP888747, MIDGEE QLD 4702

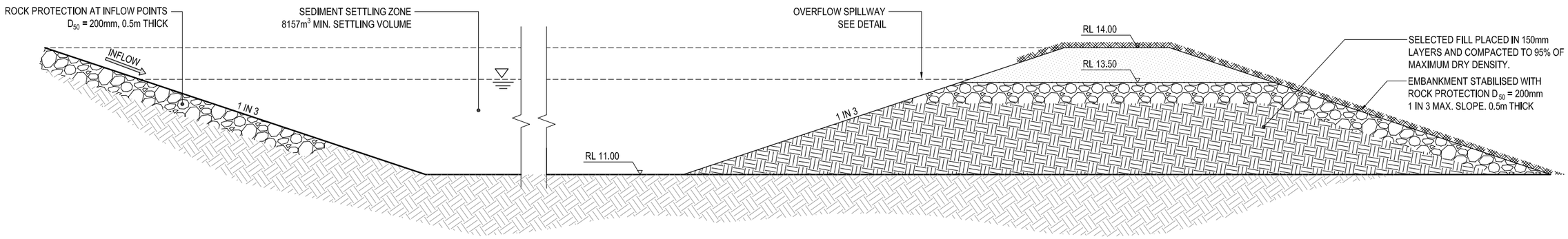
DESIGN	DRAWN	APPROVED
DC	EW	AP

A.R.PIANTA - R.P.E.Q. NUMBER 10423
SIGNED
29-09-17
DATE

TITLE: PERMANENT - SEDIMENT AND EROSION CONTROL PLAN

SCALE: 1:750 AT A1, 1:1500 AT A3 (0 15 30 45 60m)

PROJECT NO. K3626
DWG NO. SE003
ISSUE A



SECTION A
N.T.S SE003

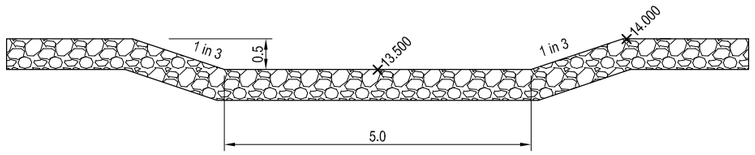
ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

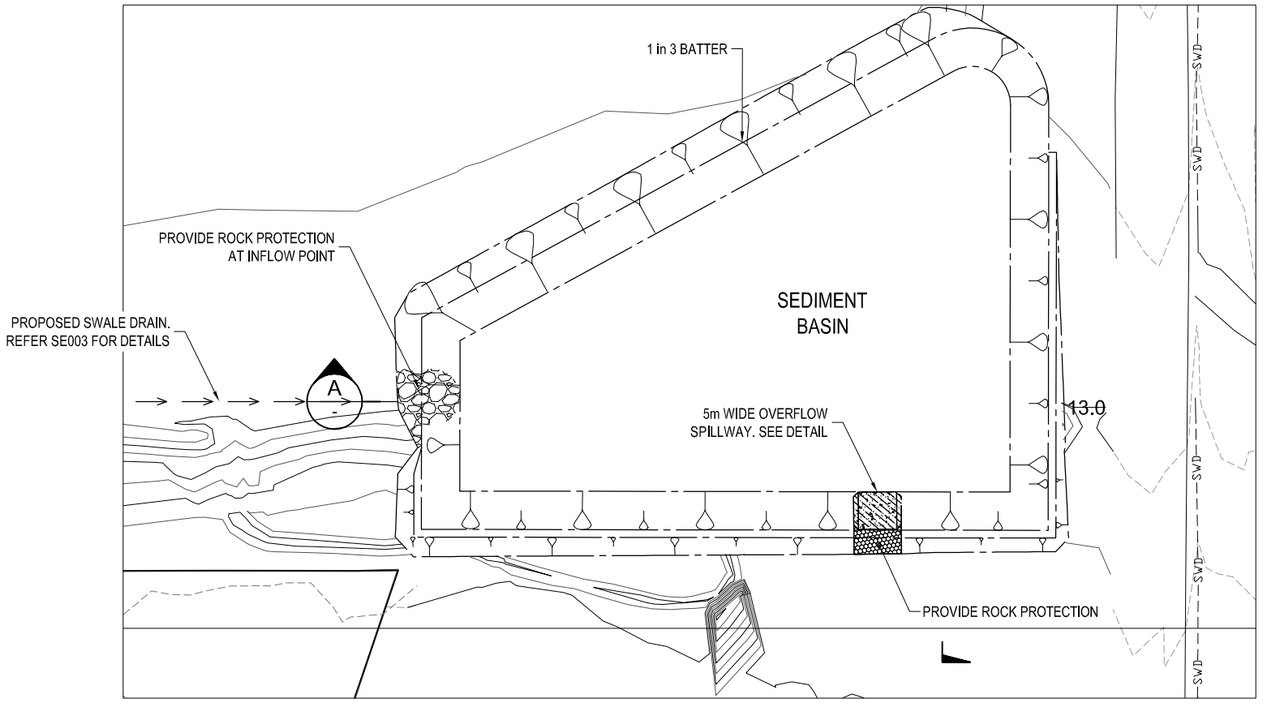
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/79-2017

Dated: 16 November 2018



SPILLWAY DETAIL
SCALE 1:50 AT A1



INSET A
SCALE 1:250 AT A1

APPROVAL ISSUE
NOT FOR CONSTRUCTION UNLESS STAMPED

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

ISSUE No.	DATE	AMENDMENT
A	29-09-17	ISSUED FOR OPERATIONAL WORKS APPROVAL

KNOBEL CONSULTING
CIVIL ENGINEERS + HYDRAULIC ENGINEERS + PROJECT MANAGERS
Level 6, 34 East Street
Rockhampton City Q 4700
Phone: 07 4922 5019
Fax: 07 5580 9133
Email: admincq@knobelconsulting.com.au
PO Box 5364 Red Hill,
Rockhampton Q 4701
ABN: 33 071 435 202
W: www.knobelconsulting.com.au

CLIENT: HOPKINS BROTHERS

PROJECT: MIDGEE QUARRY EXPANSION
STORAGE PAD AND CONCRETE CRUSHING PLANT
59793 BRUCE HIGHWAY LOT2 RP888747, MIDGEE QLD 4702

DESIGN	DRAWN	APPROVED
DC	EW	AP

A.R.PIANTA - R.P.E.Q. NUMBER 10423
SIGNED
29-09-17
DATE

TITLE: PERMANENT - SEDIMENT AND EROSION CONTROL DETAILS

SCALE: 1:250 AT A1, 1:500 AT A3 (0 5 10 15 20m)

PROJECT NO. K3626

DWG NO. SE004

ISSUE A

GROUNDWORK plus

MIDGEE QUARRY

STORMWATER MANAGEMENT PLAN

Prepared for: Hopkins Brothers Group Pty Ltd

Date: 7 February 2022

File Reference: 2607.800.001

HOPKINS BROTHERS

DOCUMENT CONTROL

PROJECT / DETAILS REPORT

Document Title:	Midgee Quarry – Stormwater Management Plan
Principal Author:	Mark Folker
Client:	Hopkins Brothers Group Pty Ltd
Reference Number:	2607.800.001

DOCUMENT STATUS

Issue	Description	Date	Author	Reviewer
1	Original Issue	7.02.22	M. Folker	M. Benham

DISTRIBUTION RECORD

Recipient	Method
Hopkins Brothers Group Pty Ltd	Electronic

GROUNDWORK PLUS
Phone: 1800 GW PLUS (1800 497 587)
Email: info@groundwork.com.au
Website: groundwork.com.au
ABN 13 609 422 791

QLD/NSW
6 Mayneview Street, Milton Qld 4064
PO 1779, Milton BC Qld 4064
Phone: +61 7 3871 0411
Fax: +61 7 3367 3317

SA/WA/NT
2/3 16 Second St, Nuriootpa SA 5355
PO Box 854, Nuriootpa SA 5355
Phone: +61 8 8562 4158

VIC/TAS
PO Box 438, Altona VIC 3018
Phone: 0437 523 282

Geotechnical Laboratory
Unit 78/109 Leitchs Road, Brendale Qld 4500
Phone: 0417 615 217

TABLE OF CONTENTS

1 Introduction 1

1.1 Overview 1

1.2 Site Details 1

1.3 Objectives of the SMP 1

1.4 Operating Conditions 2

2 Operational Procedures 4

3 Stormwater Quantity Management 8

3.1 Existing Case (including short and medium term development) 8

3.2 Future Development 8

3.2.1 Hydrologic Modelling 8

3.2.2 Peak Discharge Comparison 9

4 Stormwater Quality Management 10

4.1 Stormwater Quality Management Objective 10

4.2 Stormwater Quality Management Objective 10

5 Responsibilities 11

5.1 Monitoring Management Measures 11

5.2 Auditing and Review 11

5.3 Responsibility 11

5.4 Identification of Incident or Failure 11

6 Environmental Incidents 12

6.1 Investigation 12

6.2 Responsibility 12

7 Conclusion 13

FIGURES

Figure 1 Stormwater Management Plan (Existing) (Drawing No. 2607.DRG.006)
Figure 2 Stormwater Management Plan (Future) (Drawing No. 2607.DRG.007)

1 Introduction

1.1 Overview

Groundwork Plus have been engaged by Hopkins Brothers Group Pty Ltd (**Hopkins Brothers**) to prepare a Stormwater Management Plan (**SMP**) for the Hopkins Brothers Midgee Quarry, located at 59793 Bruce Highway, Midgee, QLD 4702 properly described as Lot 2 on RP888747 (the **site**).

The proposal includes extending the quarry footprint over four (4) parcels being 1 and 931 Bruce Highway, Midgee, Lot 725 Bruce Highway, Bouldercombe, and 33 Gavial-Gracemere Road Bouldercombe. It is also proposed to increase the extraction volumes to a maximum production limit of 2 million tonnes per annum and also to extend the hours of operation.

The SMP has been prepared to demonstrate adequate stormwater controls are in place for the existing case scenario (including the short to medium term development), and to also support a development application seeking development approval for extractive industry and an Environmental Authority (**EA**) for the following Environmentally Relevant Activities (**ERA's**) including:

- ERA 16(2)(c) – Extracting, in a year, of more than 1,000,000 tonnes;
- ERA 16(3)(c) – Screening, in a year, of more than 1,000,000 tonnes.

1.2 Site Details

The location details of the site for the activities are summarised in **Table 1 – Summary of Land**.

Table 1 – Summary of Land

Property Description	**Lot 2 RP888747**	**Lot 1 SP247721**	**Lot 931 LIV40265**	**Lot 725 RP888747**	**Lot 2 SP247721**
Address	59793 Bruce Highway, Midgee	1 Bruce Highway, Midgee	931 Bruce Highway, Midgee	Lot 725 Bruce Highway, Bouldercombe	33 Gavial-Gracemere Road, Bouldercombe
Property Size	85.15ha	117.8ha	48.967ha	195.7158ha	55.34ha

1.3 Objectives of the SMP

The scope of this SMP includes the following items:

- Demonstrate existing stormwater controls are suitable for the immediate (existing case) scenario and also adequate for the short and medium term development of the quarry;
- Operational Management Procedures to support the DA and EA sought; and
- Implementation and maintenance strategy for stormwater management measures and systems.

This SMP outlines the details and operational management procedures to be adopted in order to integrate stormwater management into daily operations. The objective of water management is to ensure that water resources are utilised efficiently on the site and the quality of water leaving the site does not impact on the environmental values downstream. The guiding principles for water management at the site are:

1. Runoff from clean catchments will be diverted around disturbed areas to the extent practicable;
2. Land disturbance will be minimised to the extent necessary;
3. Stormwater control elements will be installed prior to land disturbance and in a logical progression;
4. Water requirements will be collected on-site and recycled to the maximum practical extent; and
5. Visual monitoring and maintenance will be undertaken to confirm the effectiveness of water treatment systems, erosion and sediment control measures and also to program maintenance.
6. Commence rehabilitation of completed extraction areas as soon as practicable and in a progressive manner.

1.4 Operating Conditions

The site's existing EA (EPPR00233813) prescribes a number of conditions relating to stormwater and water quality management which are summarised in **Table 2 – Proposed Surface Water Operating Conditions** and addressed in **Section 2 – Operational Procedures**.

Table 2 – Proposed Surface Water Operating Conditions

Condition Number	***Proposed Condition Details***
Erosion Protection Measures and Sediment Control Measures	
G1	*Erosion protection measures and sediment control measures must be implemented and maintained to minimise erosion and the release of sediment.*
Stormwater Drainage	
G2	*Suitable banks and/or diversion drains must be installed and maintained so that all stormwater falling up gradient from the quarry and storage areas is diverted away from those areas.*
G3	*All waters flowing over disturbed areas must be diverted to settling ponds.*
G4	*The size of any settling pong must be sufficient to contain the run-off expected from a 1 in 5 year 24 hour storm event.*
G5	*Water velocities through temporary watercourse diversions around the works area must be maintained similar to pre-work velocities during such diversions, and must be re-instated once dredging works are completed.*

<table>
<tr><th><u>Condition Number</u></th><th><u>Proposed Condition Details</u></th></tr>
<tr><td colspan="2">Erosion Protection Measures and Sediment Control Measures</td></tr>
<tr><td>G6</td><td>Settled / treated stormwater runoff waters from those areas of the site that have drained to the final settling pond must only be released in compliance with the release limits listed in Table W1 – Contaminant Release Limits.</td></tr>
<tr><td colspan="2">Monitoring</td></tr>
<tr><td>G7</td><td>To ensure compliance with Condition G6, monitoring must be undertaken and records kept of contaminant releases to waters at the monitoring point for the parameters and not less frequently than specified in Table W1. All determinations of the quality of contaminants released must be:
- Made in accordance with methods prescribed in the latest edition of the Environmental Protection Agency Water Quality Sampling Manual; and
- Carried out on samples that are representative of the discharge.
Table W1 – Water Quality Release Criteria
<table>
<tr><th>Location</th><th>Quality Characteristic Determination</th><th>Maximum Release Limit</th><th>Monitoring Frequency</th></tr>
<tr><td rowspan="2">Outlet point of pond</td><td>Total Suspended Solids</td><td>50mg/L</td><td rowspan="2">On release from the settling pond and weekly for a continuous release event.</td></tr>
<tr><td>pH</td><td>6.0-8.5</td></tr>
</table></td></tr>
</table>

The conditions of the existing approval administered by the Department of Transport and Main Roads (**TMR**) also require the site to also meet the following conditions:

a) Stormwater management of the development must ensure no worsening or actionable nuisance to the state-controlled road.
b) Any works on the land must not:
  i. Create any new discharge points for stormwater runoff onto the state-controlled road;
  ii. Interfere with and/or cause damage to the existing stormwater drainage on the state-controlled road;
  iii. Surcharge any existing culvert or drain on the state-controlled road; and
  iv. Reduce the quality of stormwater discharge onto the state-controlled road.

It is noted that in accordance with State Code 6 - Protection of state transport networks, the development must also no result in actionable nuisance, or worsening of, stormwater, flooding or drainage impacts in a state transport corridor or state transport infrastructure.

The above requirements are addressed in **Section 3 - Stormwater Quantity Management**.

2 Operational Procedures

An overview of the proposed Operational Procedures for implementation at the site are summarised below. These are to be regularly reviewed and updated to reflect changes in quarrying practices.

Aspect	Details
Purpose	The Operational Procedures have been prepared to manage potential environmental impacts that may result from the operation in relation to stormwater management.
Risk Sources and Potential Impacts	Adverse impacts resulting from current and future operations may include the following: • Overtopping of clean water dams and/or sediment basins; • Overland flow from disturbed areas, including unsealed internal access and haulage roads; • Overland flow from topsoil, overburden, raw material and product stockpile areas; • Wastewater from processing plant; • Overland flows from storage and handling areas of oils, greases, fuels and other chemicals; • Wastewater from vehicle wash-down facility; • Construction and maintenance of carpark, roads and hardstands; • Spillage during handling of materials; and • Use and storage of oils, greases, fuels and other chemicals.
Performance Targets	The overarching performance targets for the site relating to monitoring targets will be detailed in the site EA. The proposed targets are outlined in **Section 1.4 – Operating Conditions**.
Responsibilities	The Quarry Manager will be primarily responsible for the implementation of this SMP.
Strategies/mitigation measures	***Sediment basin and clean water dam infrastructure*** The infrastructure required to manage the requirements of the EA conditions and associated performance targets are outlined in **Section 4 – Stormwater Quality Management,** comprising a number of sediment basins and associated drainage features.

The sediment basins will be operated and maintained in accordance with **Section 4 – Stormwater Quality Management** and the requirements below:

- Freeboard must be maintained in each sediment basin and clean water dam prior to rainfall events occurring to ensure adequate capture volume is available to meet EA conditions;
- All releases from the site to waters must be carried out in accordance with the nominated EA water quality limits.

Diversion of clean surface water runoff

The site is subject to upstream surface water from external catchment areas. The quarry must monitor and divert upstream catchments away from site operations wherever practical.

Any drains or bunds proposed for diversion should have greater than 80% vegetation coverage where applicable or stabilised using an alternative material (rock lined, geofabric, erosion matting etc.).

This coverage is required to be in-place at all times. Seeding of the exposed areas using approved native grass species. The grass species will be required to have the following characteristics (as per IECA 2008):

- Plants with a fibrous root system.
- Plants that primarily grow horizontal rather than upright clumping plants.
- Leguminous plants.
- Non-invasive plants.

Oil separators, and Bunding of Fuels and Chemicals

Clearly designate storage areas and do not deviate from assigned bunded areas for storage of chemicals and fuels unless a suitable secondary bund is provided. Oil separators to be provided where necessary.

Storing and handling of hazardous chemicals, corrosive substances, toxic substances, gases, dangerous goods, flammable and combustible liquids in accordance with the relevant legislative requirements and Australian Standards including but not limited to the provisions of:

- *AS 1692-2006* – Steel tanks for flammable and combustible liquids
- *AS 3780:2008* – The storage and handling of corrosive substances
- *AS 1940:2004* – The storage and handling of flammable and combustible liquid
- *AS 3833:2007* – Storage and handling of mixed classes of dangerous goods in packaged and intermediate bulk containers

	Stockpile areas Stockpiles must be: • Adequately protected from wind, rain, concentrated surface flow and excessive upslope stormwater surface flows. • Placated to direct drainage water to sediment basin systems in event of surface water runoff. • Maintained in a moist state including by use of sprinklers to minimise the risk of movement by wind.
Auditing	Stormwater management reviews are required to be carried out on a periodic bases to assess the implementation of the management strategies.
Identification of Incident or Failure	Non-compliance with the performance criteria herein will be identified by: • Lack of monitoring at the frequencies indicated in the EA. • Stormwater in treatment system exceeds capacity after rainfall event due to insufficient freeboard. • Release of contaminants from the site. • Poor vegetation establishment • Poorly maintained, damaged or failed stormwater management devices
Corrective Action	The authorised representative shall be responsible for identification of incident or failure and completion of corrective actions. Following identification of incident or failure, the source/cause is to be immediately identified and rectified with records kept preventing future incidents occurring.
Internal Reporting	A copy of all incidents and complaints will be stored at the site within the incident and complaint register.
External Reporting	Reporting of non-compliance events including discharge of contaminants from the site are to be reported in accordance with EA requirements.

An inspection and maintenance program should be implemented as detailed in **Table 3 - Inspections and Maintenance of Erosion and Sediment Control Devices**. A summary schedule of the various inspections, performance criteria and responses that shall be performed on site is shown below.

Table 3 - Inspections and Maintenance of Erosion and Sediment Control Devices

Device	Minimum Frequency	Performance Criteria	Required Actions
Sediment Basins / Cleanwater Dams	Annually, prior to wet season	• adequate freeboard volume available, excess sediments removed prior to wet season (basin should not lose more than 30% capacity)	• captured water to be reused on site and treated as required for use in operations
Inspect drainage lines including catch drains, Contour drains and diversions	Annually, prior to wet season	• erosion in areas adjacent to water conveyancing structures	• eroded areas shall be rehabilitated / rip rapped as soon as practicable
		• overtopping of water conveyancing structures (i.e. clean water diversion drains) (identified by the scouring of the drain batters perpendicular to the direction of flow)	• eroded areas shall be repaired and stabilised
Waste containers	Weekly	• waste is stored in appropriate containers • waste receptacles labelled	• ensure waste material is stored and disposed of properly and in accordance with conditions of approval
Spill response stations	Weekly and following use	• equipment is properly maintained	• maintain equipment • replace used equipment
Maintenance / refuelling area	Weekly	• fuel, oil spills	• clean up fuel spills and investigate source
		• equipment maintenance	• maintain equipment maintenance records
		• fuel storage integrity maintained	• investigate and repair potential leaks

3 Stormwater Quantity Management

3.1 Existing Case (including short and medium term development)

The existing stormwater management layout is shown on **Figure 1 – Stormwater Management Plan (Existing Layout)**. A number of sediment basins exist on site, which act as stormwater quality measures to manage stormwater runoff, as per the EA condition requirements.

It is noted that due to the progressive nature of quarry development, the footprint (size and shape) of extraction is subject to change with time. The catchment area denoted "Q1" on **Figure 1 – Stormwater Management Plan (Existing Layout)** has been considered as 'fully disturbed' to allow for the short to medium term development of the quarry.

Hence, it has been confirmed that the quarry operations can be developed to the extent of the catchment boundary "Q1" without any change to the existing stormwater controls being required. Details of the existing sediment basins including freeboard requirements to meet the EA conditions are detailed in **Section 4 – Stormwater Quality Management**.

Should the area of disturbance extend to beyond the boundaries of catchment "Q1", a revised SMP will be required to identify any additional stormwater controls needed to manage the site, in order to maintain compliance with the relevant EA stormwater management measures.

3.2 Future Development

In addition to meeting the EA requirements for the short and medium term quarry development, the proposed future quarry expansion must also demonstrate non-worsening peak discharge conditions for a range of AEP events (50% - 1%) to comply with QUDM and TMR requirements, as the site is located in proximity to state transport corridors.

3.2.1 Hydrologic Modelling

Hydrologic modelling was undertaken using DRAINS (a computer simulation program by Watercom) as shown in **Diagram 1 – DRAINS Schematic**. Site-based rainfall polynomial coefficients were obtained using the Design Rainfall Data System 2016, available on the Bureau of Meteorology's website.

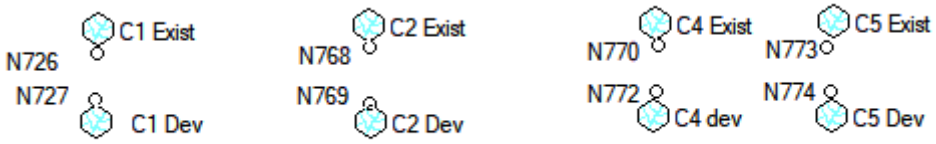


Diagram 1 – DRAINS Schematic

The IFD data is shown in **Table 4 – Intensity Frequency Duration (IFD) Data**. The existing case conditions were modelled and then compared to the future extension of the quarry footprint.

Table 4 – Intensity Frequency Duration (IFD) Data

Duration of Rainfall	Exceedance per Year (EY)						
	6EY	4EY	3EY	2EY	1EY	0.5EY	0.2EY
5 min	40.3	50.6	67.0	77.8	92.0	114	141
10 min	31.7	40.1	53.9	63.2	75.6	95.2	118
15 min	26.3	33.4	45.1	53.1	63.9	81.3	100
20 min	22.6	28.7	38.9	45.9	55.4	71.0	87.6
25 min	19.9	25.3	34.3	40.5	49.0	63.1	77.9
30 min	17.9	22.7	30.7	36.3	44.1	56.9	70.2
45 min	13.8	17.5	23.7	28.0	34.0	44.3	54.7
1.0 hour	11.4	14.3	19.4	23.0	28.0	36.6	45.2
1.5 hour	8.57	10.7	14.5	17.2	21.0	27.6	34.2
2.0 hour	6.97	8.71	11.7	13.9	17.0	22.4	27.9
3.0 hour	5.19	6.45	8.67	10.3	12.6	16.7	20.9
4.5 hour	3.85	4.77	6.41	7.60	9.34	12.4	15.6
6.0 hour	3.12	3.85	5.18	6.15	7.56	10.1	12.8
24 hour	2.32	2.86	3.84	4.56	5.63	7.58	9.66

3.2.2 Peak Discharge Comparison

A comparison of estimated peak discharge between the pre and post development scenarios is shown in **Table 5 – Peak Discharge Comparison.** Peak discharge was modelled on a 1 hour storm duration for each AEP event, as shown.

Table 5 – Peak Discharge Comparison (m3/s)

Catchment	Discharge Location	Scenario	Annual Exceedance Probability (AEP)					
			1%	2%	5%	10%	20%	50%
C1	Bruce Highway (East)	Existing Case	34.6	29.6	24.5	19.1	15.7	7.38
		Future Case	29.8	25.4	21.1	16.4	13.5	6.34
C2	Towards C5	Existing Case	29.8	25.5	21.1	16.5	13.5	6.35
		Future Case	26.9	23.0	19.1	14.9	12.2	5.74
C4	North of Quarry	Existing Case	7.92	6.77	5.61	4.37	3.59	1.69
		Future Case	2.01	1.72	1.42	1.11	0.91	0.43
C5	Gavial Creek	Existing Case	37.0	31.6	26.2	20.4	16.8	7.87
		Future Case	28.7	24.5	20.4	15.9	13.0	6.12

As demonstrated by the DRAINS modelling, there will be non-worsening of peak discharge and associated runoff for all AEP events from the 50% AEP to 1% AEP.

4 Stormwater Quality Management

4.1 Stormwater Quality Management Objective

In accordance with the EA conditions, stormwater runoff from disturbed areas, generated by (up to and including) a 24 hour storm event with an average recurrence interval of 1 in 5 years must be retained on-site, or managed to remove contaminants before release.

4.2 Stormwater Quality Management Objective

The total upper settling storage requirements for sediment basins were estimated based on the following formula (DES 2014):

Vs = A *Cv * R (1 in 5; 24hr), where:

A = Catchment Area (m^2)

Cv = Coefficient of Discharge

R = Rainfall depth (m) from 24 hour storm, and ARI of 1 in 5 years

Table 6 – Sediment Basin Storage Requirements details the sediment basin storage requirements for each stage, based on a rainfall depth (R) of 0.166m, from an adopted average intensity of 6.95mm/h (Source: Bureau of Meteorology). Details of Sediment Basin size criteria is included in **Attachment 2 – Sediment Basin Design Details**.

Table 6 – Sediment Basin Storage Requirements

Scenario	Catchment ID	Upper Settling Volume (ML)	Sediment Storage Volume (ML)	Total Volume (ML)
Existing (includes the short and medium term)	Q1	50.51	25.26	75.77
Future	Q1	197.75	98.88	296.63
	Q2	44.23	22.12	66.35

Sediment basins are to be maintained in accordance with **Section 2 – Operational Procedures**, including ensuring that sediment collected in the basins are removed whenever the basin is reduced by 30%.

Prior to commencement of each proposed development stage, detailed design of stormwater treatment systems (primary & secondary) should be undertaken to validate the suitability of clean water diversion and sediment basin systems.

5 Responsibilities

5.1 Monitoring Management Measures

The following management measures will be implemented during facility operations:

- The Quarry Manager or authorised representative is to regularly inspect the ESC management devices, particularly prior to forecasted wet weather and following major rainfall events to ensure that these devices are in good working order. All inspections are to be documented (including photos) and available on site at all times.
- The Quarry Manager shall carry out general surveillance to qualitatively assess any stormwater releases from site during discharge events.
- A surface water quality monitoring program may be implemented to assess performance from time to time. Any sampling conducted shall be undertaken by a suitability qualified person.

5.2 Auditing and Review

The effectiveness of the SMP will be reviewed as necessary (e.g. following a change in site operations) and at least once every year. The review shall take into account changes to site activities, available surface water monitoring results, any complaints, pollution incidents and any corrective actions taken.

5.3 Responsibility

The following details the responsibilities with regard to the ongoing management of stormwater at the site:

- The Quarry Manager will be responsible for the implementation of this SMP and for training of site personnel in their responsibilities in relation to this SMP.
- The Quarry Manager will be responsible for ensuring that all stormwater devices constructed on the Site have adequate free water storage capacity.
- All complaints pertaining to water quality received will be recorded in the complaints register/log maintained on-site.
- The Quarry Manager or a suitably qualified consultant will prepare water monitoring records if and when required by the regulatory authority.
- Records, including results of any monitoring program undertaken on-site, complaints or incidents will be kept on-site for a minimum of five (5) years.

5.4 Identification of Incident or Failure

An incident or failure may include, but not be limited to:

- Deterioration in surface water quality within waters discharged from site
- Receipt of a stormwater quality release complaint
- Not maintaining on-site stormwater controls or treatment devices.

Any identification of incident or failure will be recorded on site.

6 Environmental Incidents

The **Quarry Manager** will be responsible for ensuring that all employees at the Site are familiar with the procedure for incidents recording. Any employee becoming aware of an incident with actual or potential environmental implications, shall be reported to the **Quarry Manager**, or delegate immediately.

The **Quarry Manager** will notify upper management regarding any environmental incident. An Environmental Incident Report must be completed for all incidents.

Should reporting of an **environmental incident** to the relevant regulatory authority be required, this will be undertaken in accordance with the following.

When an environmental incident occurs, the **Quarry Manager** will notify administering authority via telephone and in writing.

The contact details of the administering authority are as follows:

Department of Environment and Science
Phone: 1300 130 372
Email: PollutionHotline@des.qld.gov.au

Following notification against this condition, an investigation and further reporting will be required, as per Section 6.1 and 6.2 below.

6.1 Investigation

All incidents should be investigated. The investigations should include:

- Determining what activities were being carried out at the time of the complaint/incident and any equipment involved.
- Identifying whether equipment or activities on-site were the cause of the incident or complaint.
- Determining what potential actions may be carried out to resolve the matter and/or minimise the likelihood of further impacts.

An assessment is to be conducted to determine what corrective actions are to be taken to remedy the matter and/or prevent a similar incident from occurring in the future. If monitoring is to be undertaken to investigate an incident or complaint these results should be supplied with the final report to the administering authority.

6.2 Responsibility

A written notice detailing the following information may need to be provided to the administering authority, following the initial notification**.** General information likely to be required for any further reporting to the administering authority may include the following:

- The name of the operator.
- The name and telephone number of a designated contact person.
- A description of the event.
- The results of any monitoring performed in relation to the event.
- Actions taken to mitigate any environmental harm caused by the event.
- Proposed actions to prevent a recurrence of the event.

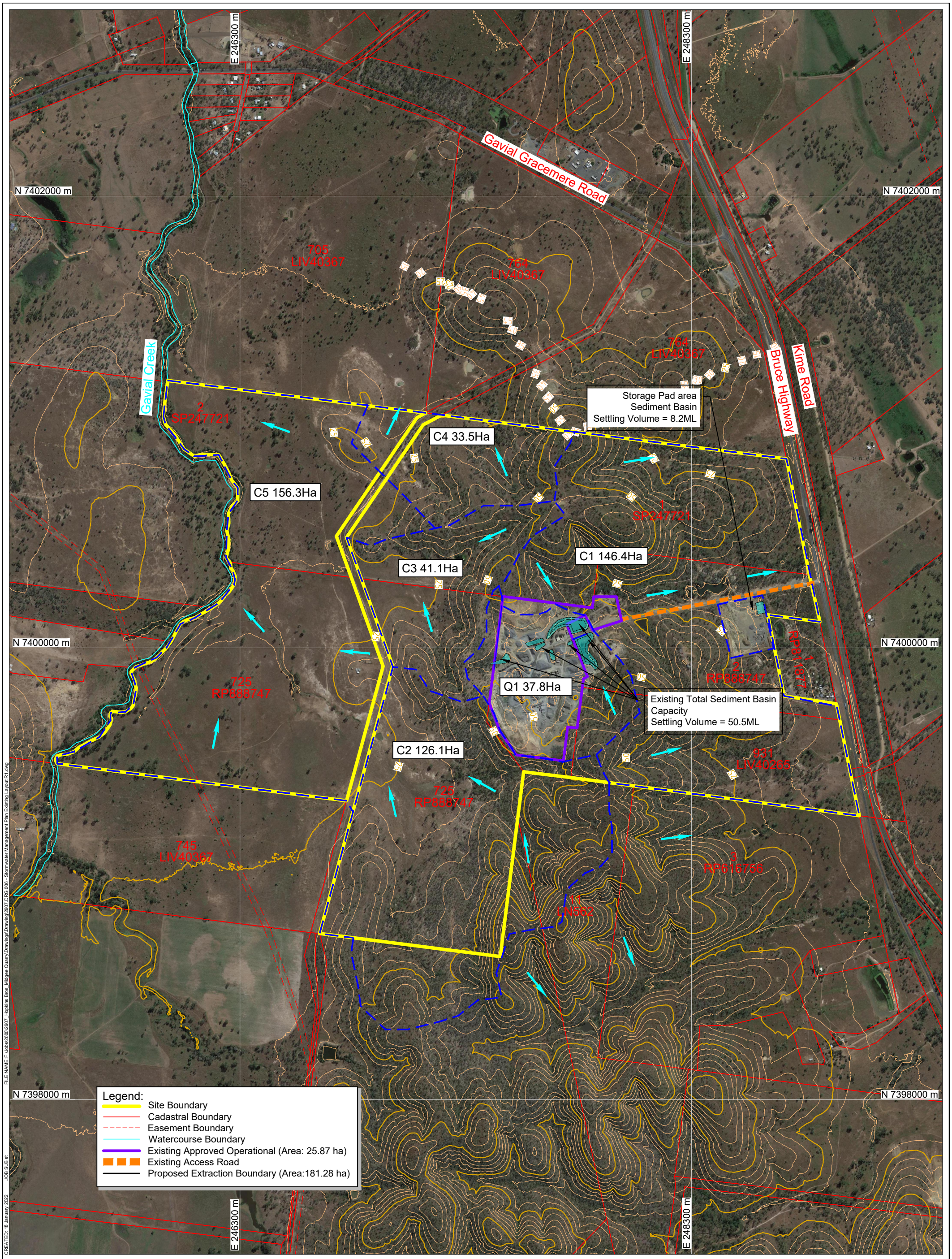
7 Conclusion

This SMP outlines the appropriate treatment measures and operational procedures to be adopted to integrate adequate stormwater management into daily operations and site activity. Specifically, this document has prepared to ensure that appropriate measures have been developed to meet the requirements of the site approval conditions, and support the extension to the quarry footprint.

Operational procedures outlined in this SMP will assist to ensure compliance as a minimum standard.

FIGURES

GROUNDWORK plus



FILE NAME: F:\Jobs\2600\2607 Hopkins Bros_Midgee Quarry\Drawings\Drawing\2607.DRG.006 - Stormwater Management Plan Existing Layout R1.dwg
JOB SUB #:
CREATED: 18 January 2022

REV	DESCRIPTION	DATE	BY
1	Extend Footprint East	16-09-2021	JHV
2	Site Access Road deleted	19-11-2021	MR
3	Pit 1 revised	03-12-2021	MR

Data Sources:
Photography: © 2021 Microsoft Corporation; © 2021 Maxar; © CNES (2021) Distribution Airbus DS
Topography: © Commonwealth of Australia (Geoscience Australia) 2015, LiDAR 5m
Cadastre: © The State of Queensland (Department of Resources) 2021
Ecosystem:
Other:

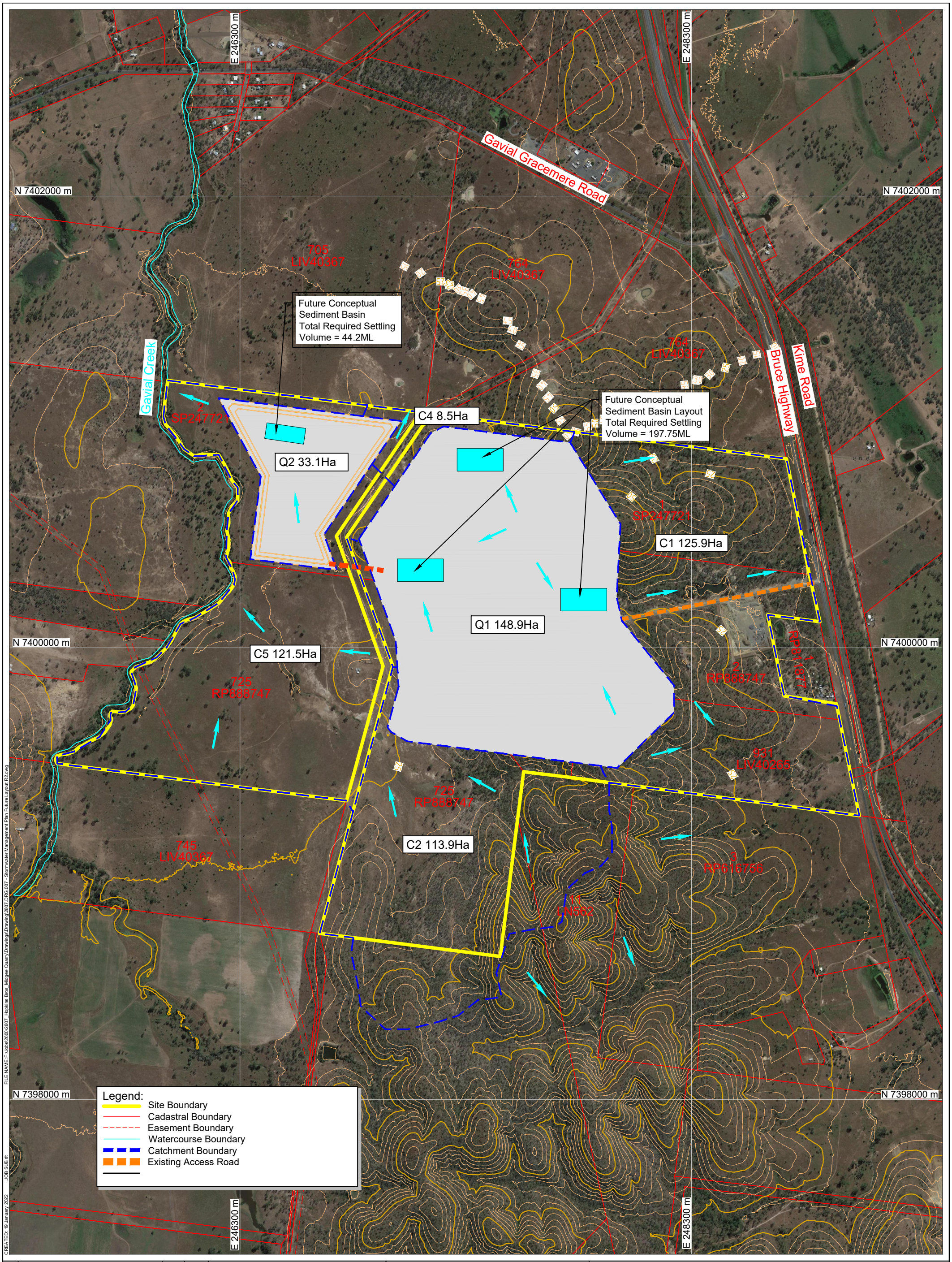
PROJECT: Midgee Quarry

CLIENT: Hopkins Brothers

TITLE: Stormwater Management Plan (Existing Layout)

GROUNDWORK plus
PH: +61 7 3871 0411
WWW.GROUNDWORK.COM.AU

SCALE: 1:15,000 When Printed On A3 — 0 — 300m
DRAWING NUMBER: 2607.DRG.006
REVISION: 1
DATE: 18 January 2022 — DRAWN: JHV
PRINTED: 20 January 2022 — CHECKED: JT
DATUM: HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA / AHD / 56



FILE NAME: F:\Jobs\2600\2607 - Hopkins Bros_Midgee Quarry\Drawings\Drawings\2607.DRG.007 - Stormwater Management Plan Future Layout R2.dwg

JOB SUB #:

CREATED: 19 January 2022

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography: © 2021 Microsoft Corporation; © 2021 Maxar; © CNES (2021) Distribution Airbus DS
Topography: © Commonwealth of Australia (Geoscience Australia) 2015, LiDAR 5m
Cadastre: © The State of Queensland (Department of Resources) 2021
Ecosystem:
Other:

PROJECT: Midgee Quarry

CLIENT: Hopkins Brothers

TITLE: Stormwater Management Plan (Future Layout)

GROUNDWORK plus
PH: +61 7 3871 0411
WWW.GROUNDWORK.COM.AU

SCALE: 1:15,000 When Printed On A3 — 0 — 300m

DRAWING NUMBER: 2607.DRG.007

REVISION: 2

DATE: 19 January 2022 | DRAWN: JHV

PRINTED: 20 January 2022 | CHECKED: JT

DATUM: HORIZONTAL / VERTICAL / ZONE
GDA94 / MGA / AHD / 56

GROUNDWORK plus

Midgee Quarry

Site Based Management Plan

Prepared for: HOPKINS BROTHERS

Date: 17 February 2022

File Reference: documents / 2607_610_001

DOCUMENT CONTROL

PROJECT / DETAILS REPORT

Document Title:	Midgee Quarry Site Based Management Plan
Principal Author:	D. Doolan
Client:	Hopkins Brothers
Reference Number:	2607_610_001

DOCUMENT STATUS

Issue	Description	Date	Author	Reviewer
1	Lodgement	17 February 2022	D. Doolan, C. Sheidler	Y. Dowling

DISTRIBUTION RECORD

Recipient	
Hopkins Brothers	Electronic x 1

GROUNDWORK PLUS
Phone: 1800 GW PLUS (1800 497 587)
Email: info@groundwork.com.au
Website: groundwork.com.au
ABN 13 609 422 791

QLD/NSW
6 Mayneview Street, Milton Qld 4064
PO 1779, Milton BC Qld 4064
Phone: +61 7 3871 0411
Fax: +61 7 3367 3317

SA/WA/NT
2/3 16 Second St, Nuriootpa SA 5355
PO Box 854, Nuriootpa SA 5355
Phone: +61 8 8562 4158

VIC/TAS
PO Box 438, Altona VIC 3018
Phone: 0437 523 282

Geotechnical Laboratory
Unit 78/109 Leitchs Road, Brendale Qld 4500
Phone: 0417 615 217

TABLE OF CONTENTS

1 Introduction 1

1.1 Background 1

1.2 Activity Overview 1

1.3 Plant and Equipment 2

1.4 Hours of Operation 3

1.5 Purpose of SBMP 3

1.6 Relevant Legislation 3

2 Policies and Procedures 4

2.1 Staff Training 4

2.2 Communication 4

2.3 Complaint Recording and Response 4

2.4 Incident Response Procedure 5

2.4.1 Overview 5

2.4.2 Incident Awareness 5

2.4.3 Notification 6

2.4.4 Investigation 6

2.5 Record Keeping 7

2.6 Monitoring 7

2.7 Periodic Review of Environmental Performance and Continual Improvement 7

2.8 Responsibilities 8

3 Potential Environmental Risks 9

3.1 Risk Assessment Methodology 9

3.2 Environmental Risk Assessment 10

4 Environmental Management Plans 23

4.1 Air Quality Management Plan 23

4.2 Water Quality Management Plan 26

4.3 Acid Sulfate Soils Management Plan 32

4.4 Hydrocarbons and Chemical Management Plan 35

4.5 Noise Management Plan 38

4.6 Blasting Management Plan 40
4.7 Waste Management Plan 42
4.8 Flora Fauna Management Plan 46
4.9 Rehabilitation Management Plans 48
4.10 Bushfire Management Plan 55
References 59

TABLES

Table 1 – Definitions of Likelihood 9
Table 2 – Definitions of Consequence 9
Table 3 – Risk Assessment Matrix 10
Table 4 – Indicative Management Option for Each Risk Assessment Rating 10
Table 5 – Identification of Potential Impacts and Risks 11
Table 6 – Air Quality Parameters 23
Table 7 – Contaminants Release Limits to Water 26
Table 8 – Inspection and Maintenance of Stormwater Control Devices 31
Table 9 – Blasting limits 40
Table 10 – Key Performance Indicators for Rehabilitation 53
Table 11 – Maintenance Schedule for Revegetation 54

DIAGRAMS

Diagram 1 – Conceptual On-Site Extractive Operations 2
Diagram 2 – Incident Response Procedure Overview 5
Diagram 3 – Spill Response Procedure 37
Diagram 4 – Waste Tracking Requirements (Paper Based System) 45
Diagram 5 – Potential Bushfire Intensity 55

FIGURES

Figure 1 Bench Treatments Schematic (Drawing No. 2607.DRG.009)
Figure 2 Batter Treatment Schematic (Drawing No. 2607.DRG.010)

ATTACHMENTS

Attachment 1 Annual Environmental Performance Review

1 Introduction

1.1 Background

Hopkins Brothers is the operator of the extractive industry operation located at 59793 Bruce Highway, Midgee, QLD 4702 on land properly described as Lot 2 RP888747. Hopkins Brothers intend to obtain an approval for an increase in extraction threshold, resulting in the following Prescribed Environmentally Relevant Activities ('ERAs') under the *Environmental Protection Regulation 2019* ('EP Reg'):

- ERA 16 Threshold (2)(c) Extracting, other than by dredging, in a year, more than 1,000,000 tonnes of material; and
- ERA 16 Threshold (3)(c) Screening, in a year, more than 1,000,000 tonnes of material.

It is also proposed to extend the quarry operation over adjacent land at 1 and 931 Bruce Highway, Midgee, Lot 725 Bruce Highway, Bouldercombe, and 33 Gavial-Gracemere Road Bouldercombe, properly described as Lot 1 on SP247721, Lot 931 on LIV40265, Lot 725 on RP888747 and Lot 2 on SP247721 (the 'site').

This Site Based Management Plan ('SBMP') describes the site operations, the potential environmental impacts of these activities, and how any potential impacts may be mitigated or managed to achieve acceptable environmental outcomes for the activity.

1.2 Activity Overview

Included as **Diagram 1 – Conceptual On-Site Extractive Operations** is an illustration of the quarry development. The quarry operations comprise of the following basic elements:

- Clearing of vegetation and stripping of topsoil and overburden via mechanical means (i.e., bulldozer or excavator).
- Stockpiling topsoil and overburden for future use as saleable general fill, incorporation into onsite rehabilitation works where required, or use in construction of stormwater controls (e.g., perimeter banks / bunds).
- Drilling and blasting rock to manageable size from the developed quarry benches to the quarry pit or bench below.
- Transferring raw material to the crushing and screening plant/stockpile area using off-road haul truck(s) loaded by an excavator or front-end loader.
- Crushing and screening raw material using a mobile crushing and screening plant.
- Stockpiling the final products before the material is sold and loaded into trucks for transportation off-site for use.
- Rehabilitating disturbed areas progressively once the terminal quarry benches have been established.

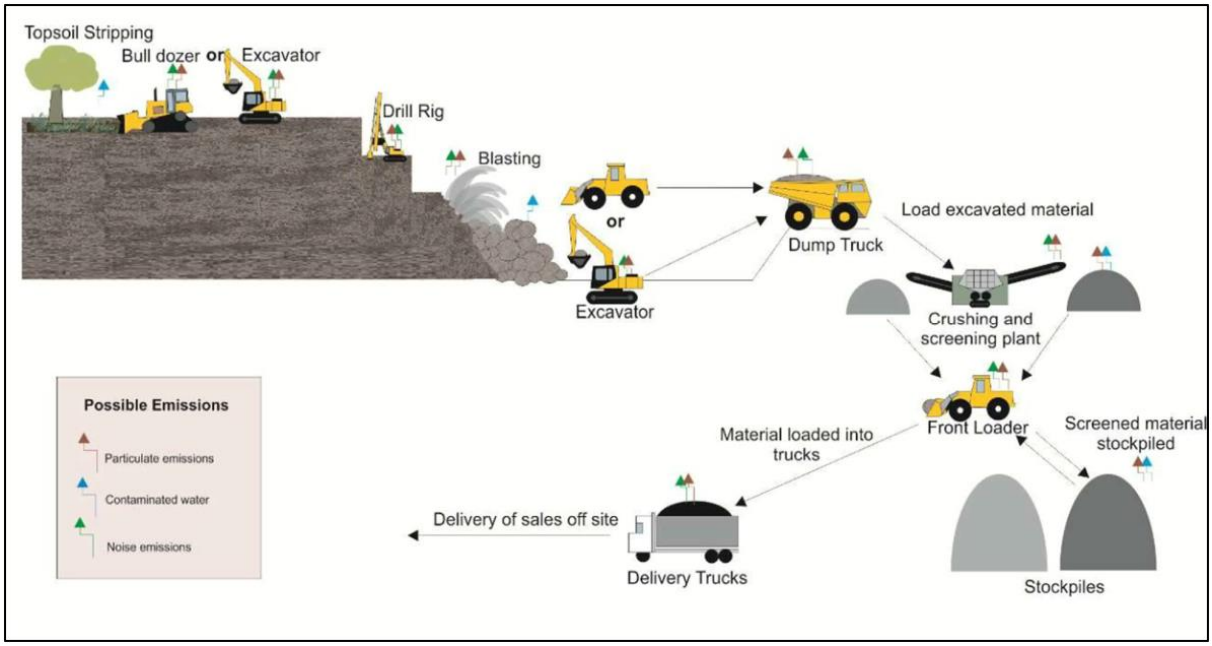


Diagram 1 – Conceptual On-Site Extractive Operations

1.3 Plant and Equipment

The operations are supported by a range of ancillary building and structures including, but not limited to:

- Site office and amenities block, car park and truck parking areas.
- Weighbridge.
- Storage container and scrap material / excess equipment area.
- Fuel storage (self-bunded transportable tank).
- Internal haul and access roads.
- Water tanks.

The number of plant and equipment deployed on-site is anticipated to vary from time-to-time to service the project demands. Types of major plant and equipment deployed on-site may include, but not limited to:

- Excavator.
- Moxy dump truck.
- Front end loader.
- Processing plant.
- Bulldozer.
- Grader.
- Water cart.
- Haul road trucks.

Equipment is generally be serviced in the field unless it is practical for the parts to be dismantled and transported off-site. Consumables (e.g., tyres, oils, and greases) will be supplied by contractors and removed (including associated packaging) for disposal off-site in accordance with the requirements of the prevailing legislation and the local authority.

1.4 Hours of Operation

It is proposed, through the Development Application, to operate the quarry 24 hours, 7 days a week. Blasting will be limited to 9am to 3pm, Monday to Friday. No blasting will occur on Sundays or public holidays.

1.5 Purpose of SBMP

This SBMP has been prepared to provide written procedures for the site activities that:

- Identify potential risks to the environment from the activity during routine operations and emergencies.
- Establish and maintain control measures that minimise the potential for environmental harm.
- Ensure plant, equipment and measures are maintained in a proper and effective condition.
- Ensure plant, equipment and measures are operated in a proper and effective manner.
- Ensure that staff are trained and aware of their obligations under the *Environmental Protection Act 1994* ('EP Act').
- Ensure that reviews of environmental performance are undertaken at least annually.

1.6 Relevant Legislation

In Queensland, the EP Act is the principal legislation for protecting the environment. The EP Act was assented on 1 December 1994 and was proclaimed on 1 March 1995. The object of the EP Act is to:

> "*protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development)*".

The EP Act imposes a General Environmental Duty on corporations, government departments and individuals, in order to meet the primary objective (s319 of the EP Act). The duty relates to the notion that everyone must take all reasonable and practicable measures to prevent or minimise environmental harm. The general environmental duty is extracted below for reference:

*"**319 General environmental duty***

1. *A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm (the **general environmental duty**).*

   Note— See section 24 (3) (Effect of Act on other rights, civil remedies etc.).

2. *In deciding the measures required to be taken under subsection (1), regard must be had to, for example—*
   a) *the nature of the harm or potential harm; and*
   b) *the sensitivity of the receiving environment; and*
   c) *the current state of technical knowledge for the activity; and*
   d) *the likelihood of successful application of the different measures that might be taken; and*
   e) *the financial implications of the different measures as they would relate to the type of activity."*

In addition, the EP Act states that it is an offence to cause environmental nuisance (s440 of EP Act), material environmental harm (s438 of EP Act), serious environmental harm (s437 of EP Act), and it is an offence to contravene a condition of an Environmental Authority (s430 of EP Act).

2 Policies and Procedures

2.1 Staff Training

All site personnel, including contractors, are to be inducted on the environmental management requirements for the site and informed of the environmental management objectives and specifics of the SBMP as well as obligations under the EP Act. Training may include awareness on impact minimisation measures, operational practices, maintenance measures, reporting, and individual responsibilities.

Site personnel are to be made aware of penalties if conditions of approval are breached and reporting requirements for incidents involving environmental nuisance and/or harm in accordance with the relevant environmental legislation. A record of all employee training is to be maintained on-site.

2.2 Communication

Communication must take place regarding environmental matters at the site between operational personnel, management, and external stakeholders. Internal communication mechanisms relating to environmental matters and potential impacts, objectives and targets, training and awareness, complaints and incidents, and suggestions for improvement may include, but shall not be limited to:

- Self-assessments and audits.
- Action requests, memos, noticeboards, etc.
- Environmental incident reporting.
- Environmental compliance monitoring and reporting.
- Inductions and environmental awareness training.
- Toolbox talks or verbal advice.
- Weekly construction meetings.
- Management reviews.
- Site meetings.

All external communications are to be undertaken by management. External communication mechanisms for environmental matters may include:

- Formal and informal correspondence with the administering authorities.
- Formal correspondence with interest groups.
- Community complaints and enquiries.

2.3 Complaint Recording and Response

All complaints received are to be reported to the Quarry Manager or delegate immediately.

The following details are to be recorded upon receipt of any complaint:

- Date and time the complaint was received.
- Name and contact details for the complainant when provided and authorised by the complainant.
- Nature of the complaint.
- Investigation undertaken.
- Conclusions formed.
- Actions taken.

The Quarry Manager is to liaise with any complainants to discuss the nature of the complaint and to determine a suitable resolution. Initial contact with the complainant is to be made within 24 hours of the complaint being received to initiate a resolution to the matter.

The administering authority may request additional monitoring to investigate any complaint of environmental nuisance received directly by the administering authority. A copy of any monitoring results must be provided to the Department (currently the Department of Environment and Science) as per the specifics of their request.

2.4 Incident Response Procedure

2.4.1 Overview

The objective of this Incident Response Procedure is to ensure that any breaches of the EA, or incidents and activities that cause or threaten to cause serious or material environmental harm, are reported, investigated, and addressed to prevent recurrence or remedy harm caused. A diagrammatic overview of incidents procedure is provided in **Diagram 2 – Incident Response Procedure Overview**. The Quarry Manager will be responsible for ensuring that all employees at the site are familiar with the procedure for incidents procedures.

Environmental harm is defined under the EP Act as:

- Any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, and includes environmental nuisance.
- May be caused by an activity—
    - whether the harm is a direct or indirect result of the activity; or
    - whether the harm results from the activity alone or from the combined effects of the activity and other activities or factors.

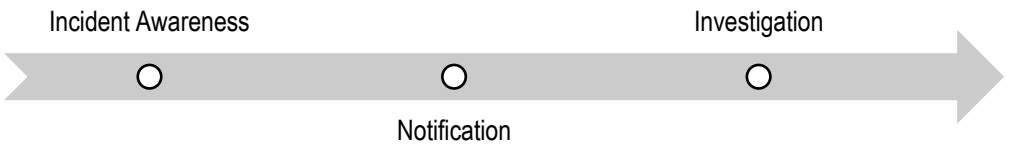


Diagram 2 – Incident Response Procedure Overview

2.4.2 Incident Awareness

When an employee becomes aware of an event resulting in the breach of an EA condition, or an incident with actual or potential environmental harm implications, the employee must report the incident to the Quarry Manager or delegate immediately (no more than 24 hours after becoming aware of the incident).

To demonstrate regard for the general environmental duty, all possible breaches of the EA should be reported to the administering authority as soon becoming aware of the matter, even if there is uncertainty as to whether a condition of the EA has been breached.

2.4.3 Notification

If the matter is an emergency, call 000.

Under Sections 320 to 320G of the EP Act, persons have a duty to notify the administering authority within 24 hours of becoming aware of any incidents or activities that cause or threaten to cause serious environmental harm or material environmental harm. In addition, the EA requires that any breach of a condition of the EA is reported no more than as soon as practicable within 24 hours of becoming aware of the breach.

The Quarry Manager must notify the administering authority via telephone and email within 24 hours of becoming aware of the incident. The contact details of the administering authority for notification purposes are as follows:

Department of Environment and Science
Phone: 1300 130 372 and select option 2 (during business hours of 8.30am to 5.00pm)
Email: PollutionHotline@des.qld.gov.au

Notification must include the following where known:

- Contact details for a site representative.
- Details of the affected land (e.g., site address, real property description, local government area, maps / plans of affected areas).
- EA reference number.
- Nature of the activity / circumstances that led to the incident.
- Timeframes for the event and when staff became aware (date and time).
- Event type (e.g., spill, fire, leaks, release, etc), source and environment affect (e.g. waterways, drains, land, etc).
- Details of any potential contaminants.
- Actions taken to resolve or remedy potential impacts.

All records of the incident or breach are to be stored at the site and made available to the administering authority upon request.

2.4.4 Investigation

All incidents are to be investigated. The investigations should include:

- Determining what activities were being carried out at the time of the incident and any equipment involved.
- Identifying whether equipment or activities on-site were the cause of the incident.
- Determining what potential actions may be carried out to resolve the matter and/or minimise the likelihood of further impacts.

Corrective action is to be implemented and an assessment conducted to determine what actions are to be taken to remedy the matter and/or prevent a similar incident from occurring.

Where monitoring is required to investigate an incident (e.g., water quality monitoring), a suitably qualified person as identified under the EP Act must be engaged to perform the monitoring and interpret any results.

2.5 Record Keeping

All environmentally relevant documentation, including approvals, corporate policies, procedures, forms, records, and reports required to be kept as per this SBMP or conditions of approval shall be available at the approved premises for a period of at least five (5) years, and must be available for inspection by an authorised person.

2.6 Monitoring

Any monitoring required by a condition of approval or by this SBMP must be carried out by a suitably qualified person(s) as defined under the EP Act.

All instruments, equipment and measuring devices used for measuring or monitoring in accordance with a condition of approval must be calibrated and appropriately operated and maintained.

All analyses of samples must be carried out by a laboratory that has National Association of Testing Authorities ('NATA') certification, or an equivalent certification, for such analyses.

2.7 Periodic Review of Environmental Performance and Continual Improvement

The SBMP has been prepared for implementation as a continuous improvement program. The following key aspects of this SBMP ensures continuous improvement results from the implementation of this SBMP.

Commitment and Environmental Policy

Senior management are to commit to environmental performance through ensuring regulatory compliance, prevention of actual or potential environmental harm, and continuous improvement.

Planning

The SBMP identifies environmental aspects associated with the site operations, such as potential impacts. SBMP outlines the environmental objectives, performance targets and management measures for each environmental aspect.

Implementation

Implementation of the SBMP outlines responsibilities, training requirements, communication procedures, and contingency plans. Hopkins Brothers will be responsible for ensuring additional implementation requirements are in place, such as preparing monitoring documentation, following procedures, and establishing communication pathways.

Checking

Monitoring of compliance will determine whether the environmental objectives are being met and will identify non-compliances. Additional actions that will check environmental performance include audits and review of the SBMP.

Review

Reviews of environmental performance are to be undertaken at least annually and should review:

- Any monitoring data produced under the conditions of the EA and any trends.
- Any non-compliances reported, or complaints received, over the preceding 12 months and actions taken to achieve compliance / resolution.
- Changes in site approval documents, legislation and standards.
- The suitability of the SBMP against the site development.
- Any measures that are proposed to be implemented over the coming 12 months to improve the environmental performance of the site.

A template for annual environmental performance reviews is included as **Attachment 1 – Annual Environmental Performance Review**.

The outcomes of all environmental performance reviews must be communicated to senior management for actioning as required.

The Quarry Manager may commission updates to this SBMP as required to ensure that it meets the operational needs of the site. Periodic review of the SBMP will ensure continuous improvement of the site environmental performance through adaption of management strategies to meet the changing needs of the site.

2.8 Responsibilities

Although responsibilities for implementation of the SBMP have been assigned to the Quarry Manager, it must be noted that the Quarry Manager may delegate these responsibilities to a nominated person where required. Prior to delegation of duties, the Quarry Manager is to ensure that the nominated person has been adequately trained in relation to the delegated duties and is aware of their responsibilities.

3 Potential Environmental Risks

3.1 Risk Assessment Methodology

The purpose of this assessment is to determine the site activities requiring ongoing management to reduce residual risk of potential environmental impacts. This risk assessment methodology has been adopted from the process for risk management as set out in Clause 6 of the *AS ISO 31000:2018 Risk management - Guidelines* (Standards Australia 2018). The risk assessment follows the following process:

- Risk identification (source activity and potential impact).
- Risk Analysis (risk level = likelihood x consequence).
- Risk Evaluation (commentary on risk / management measures proposed).

The risk treatment outlines the controls / management measures that can be implemented to reduce the level of risk to as low as reasonably possible.

The risk analysis qualitatively estimates the level of risk based on the likelihood of an environmental impact or event occurring (**Table 1 – Definitions of Likelihood**), and the consequences of the occurrence (**Table 2 – Definitions of Consequence**).

Table 1 – Definitions of Likelihood

Rating	Descriptor	Score
Rare	May occur only in exceptional circumstances	1
Unlikely	Could occur but doubtful	2
Possible	Might occur at some time in the future	3
Likely	Will probably occur	4
Almost Certain	Is expected to occur in most circumstances	5

Table 2 – Definitions of Consequence

Rating	Descriptor	Score
Negligible	Impacts not requiring any treatment or management action	1
Minor	Nuisance or insignificant environmental harm requiring minor management action	2
Moderate	Serious environmental impacts, readily manageable at low cost	3
Major	Substantial environmental impacts, manageable but at considerable cost and some disruption	4
Severe	Severe environmental impacts with major consequent disruption and heavy cost	5

The consequence and likelihood scores are plotted on the risk vs consequence matrix (**Table 3 – Risk Assessment Matrix**) and the final risk level assigned is a product of the likelihood and consequence

scores, which equals the magnitude of the impacts. The higher the risk score, the higher the priority is for management.

Table 3 – Risk Assessment Matrix

Likelihood		Consequence				
		Negligible	Minor	Moderate	Major	Severe
		1	2	3	4	5
Almost Certain	**5**	5 Medium	10 High	15 High	20 Very High	25 Very High
Likely	**4**	4 Low	8 Medium	12 High	16 High	20 Very High
Possible	**3**	3 Low	6 Medium	9 Medium	12 High	15 High
Unlikely	**2**	2 Low	4 Low	6 Medium	8 Medium	10 High
Rare	**1**	1 Low	2 Low	3 Low	4 Low	5 Medium

Table 4 – Indicative Management Option for Each Risk Assessment Rating describes the possible actions required for each risk assessment rating.

Table 4 – Indicative Management Option for Each Risk Assessment Rating

Risk Rating	Risk Rating Scores	Indicative Management Option
Very High	**17 – 25**	Manage by implementing site management and emergency procedures, plant design controls and regular monitoring.
High	**10 – 16**	Manage by implementing site management procedures, specific monitoring and may require some operation/plant design controls.
Medium	**5 – 9**	Manage by implementing specific monitoring or response procedures.
Low	**1 – 4**	Manage by routine procedures, unlikely to need specific application of resources.

3.2 Environmental Risk Assessment

Activities associated with the ERAs which have the potential to cause environmental harm and/or nuisance and the potential impacts have been identified and tabulated. The inherent risk of the impacts occurring, and the residual risk following the implementation of management strategies, has then been assessed. Refer to **Table 5 – Identification of Potential Impacts and Risks** for the assessment.

Table 5 – Identification of Potential Impacts and Risks

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
Air	• Clearing of vegetation and topsoil / overburden ahead of the extraction activity. • Excavation activities within the quarry footprint. • Storage and handling of materials within the quarry footprint. • Vehicle movements on unsealed roads and access tracks. • Cumulative impacts should an asphalt plant be established on the site.	Emission of dust to air impacting nearby sensitive receptors.	4 x 3 = 12 (**High**)	In the absence of control measures, potential incidents associated with air emissions impacting nearby sensitive receptors is scored high due to the proximity of sensitive receptors to the site, particular the haul road / access. An air quality assessment has been undertaken by Assured Environmental ('AE'), who noted that the two (2) main source contributions are the main site haul road and the screening / crushing activities in the eastern part of Pit 2. Controls will be required to address these specific contributing sources, which may include: • Paving the haul road from the Bruce Highway to the Pit Entrance. • Watering during the screening and crushing activities in Pit 2 east. Other general quarry controls will include: • Watering of haul road, access road and stockpile area at a rate of up to 2 litres/m^2/hour as required to manage emissions from unsealed roads and the stockpile area;	2 x 2 = 4 (**Low**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				• Water sprays to processing plant at transfer points, at a minimum; • Rock drill to have an appropriate dust extraction system with collector fitted to rig and/or wet drilling via water sprays; and • Management of dust emissions from stockpiles during high wind speed conditions through appropriate use of sprinklers and/or suitable water truck as required. AE (2022) confirmed that the site activities will achieve compliance with the Air Quality Objectives prescribed in the *Environmental Protection Policy (Air) 2019* ('EPP (Air')) provided the following control measures are implemented: **Section 4.1 - Air Quality Management Plan** of this SBMP contains the above measures in addition to additional controls to minimise potential for air quality impacts. Residual risk is scored low as the likelihood of an incident occurring, and its consequences, are reduced through the implementation of control measures outlined in this SBMP.	

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
Water	• Clearing of vegetation and topsoil. • Stockpiling of topsoil and overburden. • Extraction and handling of raw materials (e.g., transfer of materials, processing, blending, stockpiling, transportation).	Release of contaminated water to the receiving environment.	4 x 3 = 12 (**High**)	Stormwater runoff will interact with disturbed areas created through the development of the extraction areas. Inherent risks to off-site waters are conservatively scored high in the absence of any environmental controls to mitigate these risks. To manage potential impacts to waters from the proposed extraction area, the *Midgee Quarry: Stormwater Management Plan (Doc ref. 2610.800.001)* ('SMP') has been prepared for the site. In addition, **Section 4.2 - Water Quality Management Plan** of this SBMP contains supplementary measures to minimise impacts to waters. Provided that the management measures outlined in the SMP and SBMP are implemented, and the EA conditions complied with, the residual risk score is reduced to medium based on a possible likelihood and a moderate consequence which can be management in accordance with the measures in the SBMP and SMP. Proposed Pit 1 is located on land that is <20mAHD, and thus has the potential to contain ASS. Soil and geological mapping for the area	2 x 3 = 6 (**Medium**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				has not identified or confirmed the presence of ASS. **Section 4.3 - ASS Management Plan** has been included to provide measures to manage ASS in the event they are exposed / disturbance through site operations.	
Groundwater	• Clearing of vegetation and topsoil. • Excavation activities within the quarry footprint. • Storage and handling of materials within the quarry footprint. • Excavation within Pit 1.	Release of contaminants to groundwater.	3 x 3 = 9 (**Medium**)	No groundwater has been intercepted within the hard rock extraction areas (Pit 2) at the site. Proposed Pit 1, located adjacent to Gavial Creek will likely have shallow groundwater, as shown by the groundwater records for this area. It is not proposed to operate a wet extraction activity, and avoidance of groundwater interaction is the preferred approach by Midgee Quarry. Unmitigated, the potential for indirect impacts through release of contaminants which have the potential to be transported to groundwaters is scored medium, based on a possible likelihood and a moderate consequence. The **Section 4.2 - Water Quality Management Plan** and the SMP include measures for capture and treatment of surface waters that may interact with potential contaminants at the site that could impact groundwater. **Section 4.4 - Hydrocarbons and Chemical Management Plan** provides measures for management of	2 x 3 = 6 (**Medium**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				other potential groundwater contaminants. In addition, it is understood that extraction will be undertaken so as to not intercept groundwater within the extraction areas. Provided Midgee Quarry implement the SBMP, potential for indirect impacts to groundwater will be reduced, and the residual risk is reduced to a lower score based on a decreased likelihood of an event occurring. The risk is reduced to a lower score however remains medium, which will require ongoing management through the implementation of the SBMP.	
Noise	• Clearing of vegetation and topsoil / overburden ahead of the extraction activity. • Stripping and stockpiling of topsoil, subsoils and overburden. • Extraction and handling of materials (e.g., transfer of materials, stockpiling, transportation). • Screening and processing of the materials. • Vehicle movements on unsealed roads and access tracks. • Plant and equipment use, including reverse beepers. • Radio / UHF use.	Noise nuisance for nearby noise sensitive receptors.	4 x 3 = 12 (**High**)	In the absence of any noise management measures, the site activities have the potential to influence the noise EVs of the locality. Due to the presence of nearby sensitive receptors the inherent risk is scored high due to the proximity of sensitive receptors to the site, particular the haul road / access. **Section 4.5 - Noise Management Plan** contains the above measures as well as additional controls to minimise noise emissions from the site activities. An assessment of the potential noise impacts was undertaken by AE (2022b), who confirmed	2 x 3 = 6 (**Medium**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
	• Alarms.			that no additional mitigation measures were required to mitigate potential noise impacts to nearby sensitive receptors. Provided that Midgee Quarry implement control measures for potential noise impacts as outlined in the SBMP, and observe the EA requirements, the residual risk is reduced to medium as the likelihood and consequence of an incident involving noise nuisance is reduced through the implementation of the above measures.	
		Air blast overpressure and vibration nuisance for nearby sensitive receptors.	3 x 4 = 12 (**High**)	Blasting activities at the site inherently have the potential to cause air-blast overpressure and vibration impacts for sensitive receptors. The **Section 4.6 - Blasting Management Plan** includes measures for management of blasting activities at the site. A key measure is that only suitably experienced and qualified blasting personnel shall be employed or contracted to provide blasting services. An assessment of the potential vibration nuisance was undertaken by AE, who confirmed that no additional mitigation measures were required to potential vibration nuisance to nearby sensitive receptors.	2 x 3 = 6 (**Medium**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				Provided that the Blasting Management Plan is implemented, and only suitably qualified persons are engaged to undertake blasting activities at the site, the residual risk is reduced to a lower level as the likelihood of an incident occurring is reduced. The residual risk rating is scored medium, which will require ongoing management measure to be applied as outlined in this SBMP.	
Waste	• Vegetation clearing. • Storage and disposal of residual waste (i.e., general, and regulated waste).	Improper disposal of wastes.	3 x 4 = 12 (**High**)	Types of waste that may be generated at the quarry include, but are not necessarily limited to, the following: • Regulated wastes (e.g., batteries, oil filters, waste oil/hydrocarbons and containers, oil/water emulsions and tyres). • Scrap metal and used or faulty parts and equipment. • General waste such as food waste, packaging, and consumables. • Green waste. In the absence of control measures, potential for impacts associated with improper disposal of wastes is inherently scored high.	2 x 2 = 4 (**Low**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				Section 4.7 - Waste Management Plan details measures for management of waste at the site, with reference to the requirements of the *Waste Reduction and Recycling Act 2011* (WRR Act). Provided Midgee Quarry implement the measures outlined in the SBMP, and comply with the requirements of the EA, the residual risk of a potential incident involving waste is reduced, and the environmental objective for 'Waste' is likely to be achieved.	
Land	Handling of chemicals and fuels on-site.	Release of hydrocarbons and fuels to land.	3 x 4 = 12 (**High**)	In the absence of controls the inherent risk of handling fuels and chemicals is high due to an increased likelihood of potential release if handling and storage activities are unmanaged. **Section 4.4 - Hydrocarbons and Chemical Management Plan** provides management measures for handling and storage of hydrocarbons and chemicals to reduce the potential impacts to land associated with spills and/or leaks. Provided Midgee Quarry implements the measures outlined in the SBMP, the residual risk is reduced to a lower level as the likelihood and consequence of an incident occurring is reduced	2 x 3 = 6 (**Medium**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				through the implementation of the management measures outlined in the SBMP. The residual risk is scored medium, and ongoing management in accordance with the SBMP will be required to ensure risk is as low as reasonably possible.	
	Clearing of vegetation ahead of extraction.	Unauthorised impacts to protected species as a result of site activities.	2 x 2 = 4 (**Low**)	There are areas of mapped regulated vegetation within the site and proposed development areas. To mitigate potential impacts to mapped features at the site, the footprint of the has been designed so as to reduce the level of impact. Under the NC Act, any project activities that are required to tamper with a confirmed native animal breeding place in order to complete the scope of works must be undertaken in accordance with a Species Management	2 x 2 = 4 (**Low**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				Program approved by DES. DES provides two Species Management Program templates, depending on the identified protected animals. The "low risk of impacts" relates to protected animals classed as Least Concern under NC Act where the impacts are unlikely to affect broader population. The "high risk of impacts" relates to protected animals identified as EVNT, Special Least Concern or Least Concern Colonial Breeder species, where the broader population is at a greater risk from impacts. As breeding places for native fauna may be impacted, subject to the timing of works, it is recommended all wet areas and trees to be removed are inspected prior to removal to determine if any active animal breeding places are present and any necessary Species Management Program is obtained prior to works, as advised by DES. Inherent risks of impacts to protected species are scored low due to the proposed location of the activities in low value vegetation. To mitigate potential impacts to adjacent areas of mapped remnant vegetation, the extraction areas are to be demarcated prior to clearing. To assist with further mitigating risks to flora and fauna,	

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				Section 4.8 - Flora and Fauna Management Plan has been prepared with additional control measures. Provided that all clearing occurs within the designated extraction limits, direct impacts to adjacent areas of remnant vegetation will be avoided.	
Land	Post-closure implementation and management of the site rehabilitation.	Failure to achieve rehabilitation milestones in disturbance areas at the cessation of the activities.	3 x 4 = 12 (**High**)	**Section 4.9 – Rehabilitation Management Plan** outlines general rehabilitation requirements for the site. The life of the operation is anticipated to extend into the foreseeable future; therefore, a more detailed rehabilitation and closure plan may be required prior to cessation of the extractive industry use to reflect a land use relevant to the planning scheme in place at the time. Residual risk is reduced to a lower level as the likelihood of failure of progressive and/or final rehabilitated landforms is reduced through the implementation of the EMP and compliance with the EA conditions. With future planning and implementation of successful rehabilitation, the likelihood of failure is reduced; however, the consequence remains	2 x 3 = 6 (**Medium**)

Environmental Aspect	Potential Environmental Impact	Source Activity	Inherent Risk Rating [a]	Evaluation and Risk Treatment	Residual Risk Rating [b]
Table notes: (a) "Inherent risk" is the level of risk that exists if the impacts go unmitigated. (b) "Residual risk" is the risk that remains after implementation of the proposed control / management measures.					
				the same, which result in a residual risk rating of medium.	
Land	Bushfires	Vegetated areas within the site.	3 x 4 = 12 (**High**)	The potential for bushfires is a constant threat for all landholdings, with this risk elevated during periods of dry climatic conditions. Portions of the site are identified as being subject to very high, high, and medium potential bushfire hazard in accordance with the Bushfire Hazard Overlay mapping noted by the Rockhampton Region Planning Scheme as well as high and medium potential bushfire intensity per Queensland Spatial Catalogue data. Quarrying activities generally have available a broad range of plant and equipment that can assist in preventing and reducing potential impacts associated with bushfire events (e.g., heavy machinery, water trucks). To assist in managing potential risks associate with bushfires, **Section 4.10 – Bushfire Management Plan** of the EMP has been prepared to provide bushfire management measures for the site.	2 x 3 = 6 (**Medium**)

4 Environmental Management Plans

4.1 Air Quality Management Plan

Objective

The activity will be operated in a way that protects the environmental values of air.

Purpose

This Air Quality Management Plan has been prepared to control potential air quality impacts occurring as a result of land disturbance necessary for the site operations. The *Environmental Protection Act 1994* and the associated *Environmental Protection (Air) Policy 2019* provide the legislation and regulatory controls for management of emissions to the atmosphere.

Performance Targets

- No environmental nuisance complaints in relation to air quality impacts (i.e., unmitigated emissions of dust, odours or light) associated with the site activities.
- Dust and particulate matter emissions generated by the activities must not cause exceedances of Dust and particulate matter not exceeding the levels shown in **Table 6 – Air Quality Parameters** when measured at the sensitive receptor.

Table 6 – Air Quality Parameters

Contaminant	Measure	Target Upper Limit
Dust Deposition	Deposition rate	120 mg/m^2/day
PM_{10}	Concentration	150 µg/m^3 averaged over 24 hours
PM2.5	Concentration	50 µg/m^3 averaged over 24 hours

Management Strategies

General

- Ensure sufficient on-site water supply is available for dust suppression.
- Apply good housekeeping practices.

Work Areas / Trafficable Areas

- Limit high dust generating activities (e.g., removal of topsoil/overburden and blasting) to periods of favourable weather conditions.
- Dampen down (approx. rate of 2 litres/m^2/hour) work areas, stockpiles, access roads and other hardstand areas by water spraying when visual surveillance indicates excessive dust generation.
- Restrict vehicle movements to designated routes to the extent practicable.
- Enforce speed limits on internal roads.
- Maintain road surfaces in good condition.
- Prevent and clean up any raw material / product spillages or dust accumulation on driveways or sealed roads.
- Use dust extraction systems on drill rigs where possible, or wet down drilling via water sprays.

Processing Plant

- Use water sprays and/or dust collection systems at transfer points.
- Use shielding and/or windbreaks where possible.

4.1 Air Quality Management Plan

	• Maintain equipment in accordance with the original equipment manufacturers' specifications. • Dampen materials prior to transport/handling. **Stockpiles** • Limit the height of any stockpiles to <6m, where practicable. • Regularly water stockpiles to keep down dust emissions. • Apply additional water sprays to stockpiles during high wind conditions. **Transport of Materials** • Ensure that incoming and outgoing truckloads of materials are covered during transport. • Ensure that truck bodies and trailers leaving the premises are clean, focusing on draw bars and tail gates, to prevent material spillages causing dust nuisance and being tracked onto external roads. AE (2022a) recommend the following addition measures: • Paving the main haul road should the activity exceed any of the below: o When the quarry production reached 1.2mtpa without the asphalt plant operating; or o When the quarry production reaches 500,000 tpa with the asphalt plant at maximum daily capacity; or o When the quarry production reaches 800,000 tpa and the asphalt plant is operating at 50% capacity.
Monitoring	Daily visual surveillance must be undertaken by all employees to ensure dust generation on-site is controlled appropriately. Dust and particulate monitoring must be undertaken at the request of the administering authority in accordance with the relevant conditions of the EA. Dust and particulate monitoring must be undertaken to investigate any complaint of environmental nuisance caused by dust and/or particulate matter. When requested to undertake monitoring, monitoring results are to be provided to the administering authority following completion of the monitoring event. Monitoring shall be carried out at a place(s) relevant to the potentially affected dust sensitive place and must include: • For a complaint alleging dust nuisance, dust deposition. • For a complaint alleging adverse health effects caused by dust, the concentration per cubic metre of particulate matter with an aerodynamic diameter of less than 10 micrometre (µm) (PM10) suspended in the atmosphere over a 24hr averaging time.

4.1 Air Quality Management Plan

	The monitoring must determine the extent to which the air quality achieves the performance targets specified in **Table 6 – Air Quality Parameters**. Methods of monitoring for the specified parameters are as follows: Dust Deposition • *Australian Standard ('AS') 3580.10.1 Methods for sampling and analysis of ambient air – Determination of particulates – Deposited matter – Gravimetric method* (Standards Australia 2016). PM_{10} • *AS 3580.9.6 Determination of Suspended Particulate Matter-PM_{10} High Volume Sampler with Size Selective Inlet-Gravimetric Method* (Standards Australia 2015). • *AS 3580.9.9 Methods for sampling and analysis of ambient air Determination of suspended particulate matter – PM_{10} low volume sampler– Gravimetric method* (Standards Australia 2017). • Any alternative method of monitoring PM_{10} which may be permitted by the *Air Quality Sampling Manual* (EPA 1997) as published from time to time by the administering authority. The monitoring results must be provided within 10 business days to the administering authority upon its request. With regard to monitoring impacts associated with the haul road, specific advice will be required from a suitably qualified person relating to monitoring standards and program to assess air quality impacts arising from haul road activities.
Contingency Plan	Any complaint received in relation to dust impacts is to be managed by the Quarry Manager in accordance with **Section 2.3 - Complaint Recording and Response**. Any exceedance of the approved limits is to be reported to the administering authority in accordance with **Section 2.4 – Incident Response Procedure**, and corrective action is to be identified and undertaken in consultation with the administering authority. In the event that air quality monitoring (dust and/or particulate matter) determines an exceedance of the approved limits (noted under *Performance Targets*), the Quarry Manager may engage the services of a suitably qualified person to determine additional management strategies to mitigate impacts. Additional air quality monitoring should be undertaken as necessary to determine the effectiveness of any additional management strategies employed in response to exceedance of approved limits.

4.2 Water Quality Management Plan

Objective

The activity will be operated in a way that protects the environmental values of water.

Purpose

This Water Quality Management Plan has been prepared to control potential environmental impacts occurring as a result of land disturbance necessary for the site operation.

Performance Targets

- To ensure all prescribed water contaminants (Schedule 10 EP Reg) including sand, suspended solids, turbid waters, chemicals, lubricants, or fuels are not released from the site.
- Stormwater runoff from disturbed areas of the site, generated by (up to and including) a 24-hour storm event with an average recurrence interval of 1 in 5 years must be retained on site or managed to remove contaminants prior to release.
- An **uncontrolled release** from site should only occur under exceptional circumstances such as the site receiving a rainfall event larger than a 24-hour storm event with an ARI of 1 in 5 years.
- Water that is **controlled released** from the site is to comply with conditions of the EA.
- The only contaminants to be released to waters are treated stormwater runoff waters in accordance with the water quality criteria specified in the EA, extracted in **Table 7** for reference.

Table 7 – Contaminants Release Limits to Water

Discharge Location Monitoring Point	Measure	Minimum Release Limit	Maximum Release Limit	Monitoring Frequency
Outlet point of settling pond	pH	6.0	8.5	On release from the settling pond and weekly for a continuous release event.
	Suspended Solids (mg/L)	-	50	

Management Strategies

Stormwater management devices and controls at the site are to be implemented in accordance with the following Stormwater Management Plan.

The following provides additional management measures which are to be applied at the site.

Sediment Basins

- Sediment basins are to be constructed to contain runoff from disturbed areas, generated by (up to and including) a 24-hour storm event with an ARI (Average Recurrence Interval) of 1 in 5 years.

4.2 Water Quality Management Plan

- Sediment basins must be designed to capture sediment up to a depth of 0.5 m within the base of the pit. An indicator marker is to be installed at the base of the pit to identify the level of sediment accumulated.
- Sediment is to be removed to return the sediment basins to full capacity on a periodic basis or when the sediment level is approaching the sediment storage capacity. This material is to be excavated and managed in line with the management measures detailed in **Erosion and Sediment Control** (section below).
- Sediment must not be disposed of in a manner that will create an erosion or pollution hazard.
- Sediment basins are to be inspected during the following periods:
  - Quarterly as a minimum.
  - After each rain event, particularly focusing on the entry and exit points, if damage has occurred then make necessary repairs.
  - Prior to or immediately after periods of sustained shut down (i.e., greater than 30 days).

Erosion and Sediment Control

Site Management

- Allow stormwater to pass through the site in a controlled manner and at non-erosive flow velocities up to the specified design storm discharge.
- Minimise soil erosion resulting from rain, water flow and/or wind.
- Minimise adverse effects of sediment runoff, including safety issues.
- Prevent, or at least minimise, environmental harm resulting from work-related soil erosion and sediment runoff.
- Ensure that use of land/properties adjacent to the development are not diminished as a result of the adopted ESC measures.

Land Clearing

- Land clearing is to be undertaken in conjunction with development of each stage of the quarry and must be within the approved extraction limits.
- Bulk tree clearing must occur in a manner that minimises disturbance to existing ground cover (organic or inorganic).
- No land clearing is to be undertaken unless preceded by the installation of adequate drainage and sediment control measures, unless such clearing is required for the purpose of installing such measures, in which case, only the minimum clearing required to install such measures is to occur.
- Prior to land clearing, areas of protected vegetation, and significant areas of retained vegetation must be clearly identified for the purposes of minimising the risk of unnecessary land clearing.
- All reasonable and practicable measures must be taken to minimise the removal of, or disturbance to, those trees, shrubs and ground covers (organic or inorganic) that are intended to be retained.
- All land clearing must be undertaken in accordance with the Development Approval and applicable legislation.

4.2 Water Quality Management Plan

- Land clearing is limited to the minimum practicable extent during those periods when soil erosion due to wind, rain or surface water is possible.

Site Access

- Site exit points must be appropriately managed to minimise the risk of sediment being tracked onto sealed, public roadways.

Stockpile Management

- Adequately protect stockpiles from wind, rain, concentrated surface flow and excessive upslope stormwater surface flows.
- Located at least 5 m from any hazardous area, retained vegetation or concentrated drainage line.
- Located up-slope of an appropriate sediment control system.
- A suitable flow diversion system must be established immediately up-slope of a stockpile.
- Prior to wet season (generally from December to March) overburden / soil stockpiles should be revegetated with temporary groundcover and/or located out of concentrated stormwater flow paths.

Drainage Control

- Wherever reasonable and practicable, stormwater runoff entering the site from external areas, and non-sediment laden (clean) stormwater runoff entering a work area or area of soil disturbance, must be diverted around or through that area in a manner that minimises soil erosion and the contamination of that water for all discharges up to the specified design storm discharge.
- All reasonable and practicable measures must be implemented to control flow velocities in such a manner than prevents soil erosion along drainage paths and at the entrance and exit.
- Wherever reasonable and practicable, "clean" surface waters must be diverted away from sediment control devices and any untreated, sediment-laden waters.
- The internal drainage channel is to be constructed with silt traps. Any silt traps are to be cleared at regular intervals.

Sediment Control

- Efforts are to be employed to trap sediment within the site, and as close as practicable to its source.
- Sediment traps must be installed and operated to both collect and retain sediment.
- The potential safety risk of proposed sediment control devices to site workers, visitors and the public must be given appropriate consideration, especially those devices located within commonly accessible areas.
- All reasonable and practicable measures must be taken to prevent, or at least minimise, the release of sediment from the site.
- Suitable all-weather maintenance access must be provided to all sediment control devices.
- Sediment control devices must be de-silted and made fully operational as soon as reasonable and practicable after a sediment-producing event, whether

4.2 Water Quality Management Plan

	natural or artificial, if the device's sediment retention capacity falls below 75% of its retention capacity. • Materials, whether liquid or solid, removed from sediment control devices during maintenance or decommissioning, must be disposed of in a manner that does not cause ongoing soil erosion or environmental harm. Site Maintenance • All erosion and sediment control measures, including drainage control measures, must be maintained in proper working order at all times during their operational lives. • Sediment removed from sediment traps and places of sediment deposition must be disposed of in a lawful manner that does not cause ongoing soil erosion or environmental harm.
Monitoring	**Visual Inspections** • A summary schedule of the various inspections, performance criteria and responses that are to be performed on site is shown in **Table 8 – Inspection and Maintenance of Stormwater Control Devices.** **Water Quality Monitoring** • Prior to, and daily during, site water releases, water quality monitoring is to be carried out in accordance with the parameters of the EA. • Water quality monitoring must be in accordance with the methods prescribed in the current edition of the administering authority's *Monitoring and Sampling Manual* (DES 2018). • Water and sediment samples must be representative of the general condition of the water body or sediments. • All determinations must employ analytical practical quantification limits of sufficient sensitivity to enable comparisons to be made against water quality objectives/triggers/limits relevant to the particular water or sediment quality characteristic. • All monitoring devices must be calibrated and maintained according to the manufacturer's instruction manual.
Contingency Plan	Non-compliances may be identified by the visual inspection and through water quality monitoring. After any identification of incident or failure, the source/cause is to be immediately located and the following measures implemented (IECA (Australasia) n.d.): • Excessive sediment build-up on-site – collect and dispose of material, then amend up-slope drainage and/or erosion control measures as appropriate to reduce further occurrence. • Severe or excessive rill erosion – investigate cause, control up-slope water movement, re-profile surface, cover dispersive soils with a minimum 100 mm layer of non-dispersive soil, and stabilise with erosion control measures and vegetation as necessary. • Poor vegetation growth or soil coverage – plant new vegetation and/or mulch as required.

4.2 Water Quality Management Plan

- Sediment control failure – replace and monitor more frequently. Regular failures may mean that the sediment control location, alignment or installation may need to be amended.
- Scour / erosion of bunds will be required to be stabilised.

In the event that groundwater monitoring identifies a significant variation from baseline groundwater quality or levels, a suitably qualified person is to be engaged to determine additional management measures to be applied.

If a discharge of contaminants occurs to water or groundwater as a result of on-site operations, the administering authority must be notified, and an investigation conducted to identify appropriate action to resolve the issue to the fullest practicable extent. Refer to **Section 2.4 – Incident Response Procedure** of this SBMP for details regarding reporting of incidents.

Table 8 – Inspection and Maintenance of Stormwater Control Devices

Inspection	Minimum Frequency	Performance Criteria	Response
Drainage lines including catch drains, contour drains and diversions.	Quarterly, and prior to and following rainfall events.	• Erosion in areas adjacent to water conveyancing structures.	• Eroded areas are to be rip rapped as soon as practicable.
		• Overtopping of water conveyancing structures (identified by the scouring of the drain batters perpendicular to the direction of flow).	• The drain is to be cleaned of sediments and rip rap replaced to the original design specifications. • Rehabilitation with grasses in the catchment of the drain may be required to reduce sediment loadings of runoff.
Potential sediment storage capacity of grit traps, sediment traps and water storage areas.	Quarterly or following major rainfall events.	• Storage capacity maintained at >75%.	• Sediment/grit is to be removed from the structure.
			• Recycle excavation pit water to ensure that adequate free storage is maintained for the collection and holding of runoff.
Waste containers.	Quarterly.	• Waste is stored in appropriate containers. • Waste receptacles labelled.	• Ensure waste material is stored and disposed of properly.
Spill response stations.	Quarterly and following use.	• Equipment is properly maintained.	• Maintain equipment. • Replace used equipment.
Maintenance / refuelling area.	Quarterly.	• Fuel, oil spills.	• Clean up fuel spills and investigate source.
		• Contractor maintenance.	• Maintain contractor maintenance records.
		• Fuel storage integrity maintained.	• Investigate and repair potential leaks.

4.3 Acid Sulfate Soils Management Plan

Relevance	Acid Sulfate Soils ('ASS') are coastal and near-coastal soils, sediments or other materials containing iron sulfides. They are environmentally benign when left undisturbed in an aqueous, anoxic environment, but when exposed to oxygen the iron sulfides break down, releasing sulfuric acid and soluble iron. There are two types of ASS: **Potential Acid Sulfate Soils ('PASS')** PASS contain iron sulfides or sulfidic material which has not been exposed to air and oxidised. These soils are located in an oxygen deficient environment, typically below the water table. The field pH of these soils is typically 4 or higher, sometimes ranging into the alkaline. The sulfides/sulfidic materials oxidise once exposed to air with the potential to generate sulfuric acid, and hence pose risks to the surrounding environment through acid run-off. **Actual Acid Sulfate Soils ('ASS')** ASS are soils that contain highly acidic layers, this high acidity is a result of the oxidation of soil materials that are rich in iron sulfides. ASS soils can have field pH measurements of 4 or less in dry conditions and are typically characterised as possessing pale yellow mottling. This mottling is caused by the presence of the mineral Jarosite, a product of the oxidation of iron sulfides which generally requires a pH. ASS occur naturally over extensive areas of low-lying coastal land, predominantly below 5 metres Australian Height Datum ('AHD'). ASS has not been confirmed or identified within the extraction footprint, however a risk still exists for them to be present given the project locality.
Objective	The primary objective of this Acid Sulfate Soils Management Plan ('ASSMP') is to provide a framework to manage impacts regards to ASS and to prevent environmental harm both on and off site.
Purpose	This has been prepared to reduce the potential for risk of environmental damage caused by acidic leachate from ASS or PASS.
Performance Targets	• No release of ASS impacted site waters to the receiving environment. • Successful neutralisation of ASS material.

Strategies	**<u>Staff Awareness</u>**
	• Staff are to be made aware of the potential presence of PASS material at the site. If working in an area of ASS and PASS, it is important to be able to recognise indicators of actual acid sulfate soils to prevent further acidification of land and waterways. These indicators include:
	  o cloudy green-blue water
	  o excessively clear water
	  o iron stains
	  o poor pasture
	  o scalded soil
	  o yellow jarosite

4.3 Acid Sulfate Soils Management Plan

- 'rotten egg' smell
- waterlogged soil
- corrosion of concrete and/or steel structures
- oily-looking surface iron bacterial scum
- dark grey soils.

During Extraction (Pit 1 Only)

- Regular surveillance during earthworks to detect ASS should be undertaken.
- Regular sampling during earthworks should be undertaken for pHf / pHfox should be undertaken at a NATA accredited laboratory.
- If field test results indicate that PASS / ASS may be present, then undertake SPOCAS testing to confirm PASS / ASS and to calculate the applicable liming rate.

Stockpiling

- Testing of material stockpiled should be undertaken to determine its ASS status.
- Suspected or confirmed ASS material is to be stockpiled separately to other material and limed at the nominal liming rate.
- Suspected or confirmed ASS material is to be stockpiled at the designated stockpile area within a bunded area.
- Once stockpiled the material is to be tested to verify the ASS and liming rate requirements.

Treatment Area

A designated treatment area within the stockpiled area is to be prepared:

- The base of the pad is to be graded such that all surface water flows to one or multiple collection sumps.
- Appropriate sedimentation controls are to be constructed around each collection sump.
- The base of the treatment pad will be constructed with a low permeable base.
- A bund wall is to be constructed surrounding the treatment pad such the storm water flow outside the treatment pad is restricted from flowing into the treatment pad and storm water within the treatment pad is restricted from flowing beyond the collection sump/s.

Stormwater

- Stormwater interacting with confirmed ASS is to be retained on site.

Validation

- Following treatment, soils are to be retested to confirm they have been successfully neutralised.

Reuse

- Once stockpile validation results confirm the criteria described above has been complied with, reuse of the material on site is permitted.

4.3 Acid Sulfate Soils Management Plan

Monitoring	Where surface water and/or leachate collects within bunded treatment areas or excavations in ASS or PASS areas, the water shall be tested. Regular visual monitoring of PASS/ASS areas and surrounds shall be undertaken to identify signs of ASS oxidation. This monitoring should include detecting: • Unexplained scalding, degradation or death of surrounding vegetation. • Formation of the mineral jarosite and other acidic salts in exposed or excavated soils. • Areas of green-blue water or extremely clear water indicating high concentrations of aluminium. • Rust coloured deposits on plants and on the banks of drains, water bodies and watercourses indicating iron precipitates. • Black to very dark coloured waters indicating de-oxygenation.

4.4 Hydrocarbons and Chemical Management Plan

Objective	The activity is operated in a way that protects the environmental values of land, air and water including soils, subsoils, landforms and associated flora and fauna.
Purpose	The Hydrocarbons and Chemicals Management Plan has been prepared to control the potential for spills or leaks from chemicals and hydrocarbons associated with the site activities.
Performance Targets	• No land contamination from the site activity that would require registration on the Contaminated Land Register ('CLR'). • No serious spills of oils, greases, fuels, or other hazardous chemicals. • No preventable release of hydrocarbons and chemicals to the environment.
Management Strategies	**General** • Any chemical handling and storage must be designed and installed in accordance with the most recent edition of *AS 1940 - The storage and handling of flammable and combustible liquids* (Standards Australia 2017), as a minimum. • Safety Data Sheets ('SDS') of chemicals used on site shall be kept in a register at the site office. • Spills are to be cleaned up immediately with appropriate spill kits. Spillages must not be cleaned up in a way that releases wastes, contaminants or other materials to any stormwater drainage systems, roadside gutters or waters. • All new employees are to be inducted on the use of handling of chemicals used on-site. **Spill Kits** • Maintain appropriate spill kits and personal protective equipment at locations known to all employees (e.g., refuelling locations, mobile equipment). • Ensure employees are familiar with, and trained in, the use of proper spill clean-up procedures and always maintain a copy of the procedures at the site. • Undertake regular spill kit inventory checks to ensure sufficient materials and supplies are available in the event of a spill. **Disposal** • Hydrocarbon contaminated materials are to be appropriately disposed of at a licensed facility. • If the material is a Regulated Waste (as defined under the legislation) it must be transported and disposed of by a licensed contractor. • Oily waste materials, including liquid hydrocarbons, should be segregated from general wastes for disposal off-site by a licensed contractor. • Records are to be kept on disposal of waste for all regulated waste materials.

4.4 Hydrocarbons and Chemical Management Plan

Monitoring	Areas where handling of hydrocarbons and chemicals occur (e.g., refuelling or minor on-site servicing) shall be regularly inspected by the Quarry Manager. All employees will be responsible for the safe day to day handling, use and temporary storage of chemicals being used on-site.
Contingency Plan	In the event of any spill, implement the steps outlined in **Diagram 3 – Spill Response Procedure**. Remediation of land contamination may be required in the event of more serious incidents; however, Hopkins Brothers is to consult with a suitably qualified person to determine the nature and extent of any contamination remediation process.

SPILL RESPONSE PROCEDURE

1. INITIAL ASSESSMENT

For emergencies call 000

Advise the Site Supervisor immediately.

Assess the following:

- What is the type and volume of the spill
- What is the source?
- What PPE is required according to the SDS?
- Are third parties needed to contain and manage the spill?

2. ISOLATE

Cease work in the area immediately.

Declare the area a no go zone and cordoned off where possible.

Avoid movement of plant/equipment into the area.

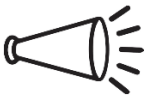
3. STOP THE SOURCE

Locate and contain the source of the spill.

Stop the spill (e.g. close valves / taps, rotate damaged / punctured drums, plug leaks or gaps).

Protect water (e.g. block drains and outlets, apply drain covers, divert spills via spill berms, sandbag or similar).
Contain the spill use temporary bunds and spill kits, or absorbent materials (e.g., clay, rags).

4. NOTIFY



If a spill threatens or causes environmental harm, Council and EPA must be notified. Refer to **Section 2.4 – Incident Response Procedure** of the EMP.

Spills within waterways pose a risk of environmental harm. Council and DES must be notified, and professional assistance sought regarding clean-up operations.

5. CLEAN UP / REMOVAL

- Remove the spill by shovels and / or earthmoving equipment.
- Move plant and equipment to allow removal of the spill.
- Dispose contaminated soils / materials off-site via an approved regulated waste transporter to a licenced disposal facility.
- Do NOT dispose of any contaminated materials on-site.
- Do NOT use water or liquids to wash the spill area.

Spills within a waterway are to be cleaned up in accordance with advice provided by third parties, including Council and DES.

6. INVESTIGATE

Investigate the cause of the spill and conduct a review of the on-site management measures to prevent a recurrence.

Carry any further notification or reporting requirements if directed to do so by DES or Council.

Diagram 3 – Spill Response Procedure

4.5 Noise Management Plan

Objective	The activity will be operated in a way that protects the environmental values of the acoustic environment.
Purpose	This Noise Management Plan has been prepared to control potential nuisance impacts that may occur as a result of noise associated with the site operations.
Performance Targets	• No environmental nuisance complaints relating to the site operations. • Noise at the site must not exceed the noise limits specified in the EA.
Management Strategies	• Mobile plant (e.g., front-end loaders, dozers, haul trucks, excavators) is to be fitted with broadband reversing alarms where possible to mitigate potential nuisance from tonal characteristics. • Stockpile areas should be designed to allow forward-in, forward-out movement of road haulage trucks to avoid a requirement for external trucks to reverse on-site. • Ensure a site layout that enables product delivery and handling in such a way that reduces the need for reversing. • Fixed engines, pumps and compressors are to be enclosed where practicable. • Ensure all site equipment, machinery and vehicles are serviced in accordance with the original equipment manufacturers' specifications as a minimum. • Ensure all modern mobile plant (e.g., front-end loaders, excavators, off-road trucks) is fitted with effective exhaust silencers. • Equipment and machinery are to be shut down when not in use. • Unnecessary revving of mobile or stationary motors and engines is to be avoided. • Ensure that equipment at the site is used for the intended purpose. • Ensure that any extraneous noises are rectified. • Maintain haul roads and hardstand surfaces in good condition (e.g., free of potholes, rills and product spillages) and with suitable grades. • Avoid the use of compression braking on product delivery trucks entering the site.
Monitoring	The Quarry Manager must: • ensure regular surveillance of the site to qualitatively assess noise generation from the operations. • initiate a noise survey when requested by the administering authority, or as otherwise deemed necessary, to investigate a noise complaint. Any monitoring must be in accordance with the most recent version of the administering authority's *Noise Measurement Manual* (DES 2020a). When required by the administering authority, noise monitoring must be undertaken, and the results notified within 14 days to the administering authority. Monitoring must include: • background noise level; • $L_{A\ 10,\ adj,\ 10\ mins}$;

4.5 Noise Management Plan

	• $L_{A\ 1,\ adj,\ 10\ mins}$; • $L_{A\ max\ adj\ T,\ 10\ mins}$; • the level and frequency of occurrence of impulsive or tonal noise; • atmospheric conditions including wind speed and direction; • effects due to extraneous factors such as traffic noise; and • location, date and time of recording.
Contingency Plan	Any compliant received regarding noise nuisance at a sensitive receptor must be recorded and investigated by the Quarry Manager in accordance with **Section 2.3 – Complaint Recording and Response**. In the event that noise monitoring determines an exceedance of the approved limits, the Quarry Manager is to notify the administering authority in accordance with **Section 2.4 – Incident Response Procedure**. Advice should be sought from a suitably qualified person as to whether additional management measures are required to minimise noise. Additional noise monitoring must be undertaken where necessary to determine the effectiveness of the additional management strategies.

4.6 Blasting Management Plan

Objective

The activity will be operated in a way that protects the environmental values of the acoustic environment.

Purpose

Blasting will be required to fragment rock to a manageable size that can be transported and fed into the on-site crushing and screening plant.

Blasting practice has the potential to generate excessive noise and vibration impacts that may cause nuisance for sensitive receptors.

Section 440ZB of the *Environmental Protection Act 1994* provides the legislation for blasting.

Performance Targets

Blasting activities must not exceed the limits for peak particle velocity and air blast specified in the EA, refer to **Table 9 - Blasting Limits,** when measured at any sensitive place or commercial place.

Table 9 – Blasting limits

Blasting criteria	Blasting limits
Airblast overpressure	115 dB (Linear) Peak for 9 out of 10 consecutive blasts initiated and not greater than 120 dB (Linear) Peak at any time.
Ground vibration peak particle velocity	5 mm/s peak particle velocity for 9 out of 10 consecutive blasts and not greater than 10 mm/s peak particle velocity at any time.

Management Strategies

- Only suitably experienced and qualified blasting personnel are to be employed or contracted to provide blasting services.
- Blasting must be carried out in accordance with the current edition of the administering authority's *Guideline: Noise and vibration from blasting* (DES 2020b) and with *AS 2187.2-2006 Explosives - Storage and use - Use of explosives* (Standards Australia 2006).
- Unless prior approval is obtained from the administering authority; blasting is only permitted during the hours of:
    - 8am to 3pm Monday to Saturday.
    - Blasting is not permitted at any time on Sundays, or public holidays.
- Handling, transport and use of explosives is to be carried out in accordance with the requirements of *AS 2187.2-2006 Explosives - Storage and use - Use of explosives* (Standards Australia 2006), and the *Mining and Quarrying Safety and Health Act 1999* ('MQSH Act') and associated Regulation.
- The maximum instantaneous charge or charge mass per delay is to be limited to the lowest possible level.
- A blast plan is to be prepared for each blast, containing blast hole layout, initiation sequence, charging, stemming type and height, charge weight and any other design element, required to inform good blasting practice.
- Blast areas are to be dampened down prior to blasting to minimise dispersion of dry and fine materials where practicable, or where it is identified as a source of potential dust nuisance.

4.6 Blasting Management Plan

Monitoring	Monitoring of blasting activities must be undertaken by a suitably qualified person in accordance with the administering authority's guideline *Noise and Vibration from Blasting* (DES 2020b) and the relevant *AS 2187.2-2006 Explosives - Storage and use - Use of explosives* (or most recent version) (Standards Australia 2006). **<u>Frequency and Location</u>** Monitoring is to be conducted around the quarry to confirm that the airblast and ground vibration levels do not exceed the criteria specified. Blasts are to be randomly selected or monitored on a fixed schedule (e.g., five continuous blasts). The method of measurement and reporting of vibration levels must comply with Appendix J of *AS 2187.2-2006 Explosives – Storage and use – Use of explosives*· (Standards Australia 2006). Measurements are to be conducted by suitably trained personnel using appropriate equipment. Equipment is to be calibrated on a regular basis in accordance with the manufacturer's recommendations or other appropriate standards. Where a nuisance complaint regarding air blast overpressure or ground vibration is received, consideration is to be given to available monitoring results and locations, and if required or advantageous, a monitor is to be installed at an appropriate location for the next five blasts to assess compliance, or when requested by the administering authority. All monitoring and reporting is to be undertaken by a person or body possessing both the qualifications and the experience appropriate to perform the required measurements.
Contingency Plan	Any compliant received regarding nuisance associated with blasting at a sensitive receptor must be recorded and investigated by the Quarry Manager in accordance with **Section 2.3 – Complaint Recording and Response**. In the event that blast monitoring determines an exceedance of the approved limits, the Quarry Manager is to notify the administering authority in accordance with **Section 2.4 – Incident Response Procedure**. Advice should be sought from a suitably qualified person as to whether additional management measures are required to minimise impacts from blast. Subsequent blasts are to be monitored to ensure effectiveness of any additional measures implemented.

4.7 Waste Management Plan

Objective	Any waste generated, transported, or received as part of carrying out the activity is managed in a way that protects all environmental values.
Purpose	This Waste Management Plan has been prepared with reference to the conditions of approval to ensure wastes produced on-site are appropriately managed. The type of wastes that may be generated at the site may include, but are not necessarily limited to the following: • Regulated wastes (e.g., batteries, oil filters, waste oil/hydrocarbons and containers, oil/water emulsions and tyres). • Scrap metal and used or faulty parts and equipment. • General waste such as food waste, packaging and consumables. • Green waste. The amount of waste generated will fluctuate over the life of the operation, therefore a record of wastes generated must be maintained in an on-site inventory. The *Waste Reduction and Recycling Act 2011* ('WRR Act') nominates a waste management hierarchy in a preferred order of adoption. The hierarchy is as follows: *(a) AVOID unnecessary resource consumption* *(b) REDUCE waste generation and disposal* *(c) RE-USE waste resources without further manufacturing* *(d) RECYCLE waste resources to make the same or different products* *(e) RECOVER waste resources, including the recovery of energy* *(f) TREAT waste before disposal, including reducing the hazardous nature of waste* *(g) DISPOSE of waste only if there is no viable alternative.*
Performance Targets	• Implement the WRR Act waste management hierarchy. • Maintain a record of any disposal of trackable wastes in accordance with the EP Reg. • No unlawful disposal of wastes on or off-site.
Management Strategies	**<u>Waste Avoidance</u>** Waste avoidance relates to preventing the generation of waste or reducing the amount of waste generated. Reasonable and practicable measures for achieving waste avoidance may include, but are not necessarily limited to: • Input substitution (using recyclable materials instead of disposable materials, for example using oil delivered in recyclable steel drums instead of non-recyclable plastic containers). • Increased efficiency in the use of raw materials, energy, water, or land (purchasing consumables in bulk (large containers) rather than in small quantities). • Improved maintenance and operation of equipment (keep equipment in good working order to reduce wear and overhaul). • Undertaking an assessment of waste minimisation opportunities from time to time.

4.7 Waste Management Plan

Waste Reuse

Waste re-use refers to re-using waste, without first substantially changing its form. Reasonable and practicable measures for reusing waste may include, but are not necessarily limited to:

- Recovering and separating solvents, metals, oil, or components or contaminants and reusing separated solvents for degreasing plant and equipment.
- Applying waste processing fines to land in a way that gives agricultural and ecological benefits (using fine sediments in rehabilitation activities).
- Using overburden for constructing bunds and landforming.
- Reusing silt/sediment on-site to the maximum practicable extent.

Waste Recycling

Waste recycling refers to treating waste that is no longer useable in its present form and using it to produce new products. Reasonable and practicable measures may include, but are not necessarily limited to:

- Recovering oils, greases, and lubricants for collection by a licensed oil recycling contractor, recovering, separating, and recycling packaging (including paper, cardboard, steel and recyclable plastics).
- Recycling used plant and equipment to the maximum practicable extent.
- Finding alternatives to disposal of non-recyclable materials (using conveyor belts for noise attenuation, mudflaps, ute tray liners).
- Providing suitable receptacles and storage areas for collection of materials for recycling.

Waste Disposal

This refers to disposing of waste which cannot otherwise be reused, recycled or used for energy recovery. Reasonable and practicable measures may include, but are not necessarily limited to:

- Regulated wastes must be transported and disposed of in accordance with the *Environmental Protection Regulation 2019*.
- Disposal to a licensed waste disposal facility (i.e., landfill or transfer station).
- Approved on-site disposal.

Waste Storage

- Waste storage containers or areas are to be provided and located at safe and convenient locations at the site.
- Each container is to be identified with the type of wastes which may be disposed of in each container.
- Each container or area is to be designed to prevent the escape of materials.

Regulated Waste

Regulated Wastes are defined in the EP Reg. Waste management areas must include a dedicated section for regulated wastes, which must be stored within sealed containers within a bunded area in accordance with Australian Standards and the following minimum requirements:

4.7 Waste Management Plan

	• All regulated wastes will be transported off-site by a suitably licensed commercial transporter with an ERA 57 Regulated Waste Transport (or equivalent) approval. • To assist in the collection and transfer of regulated wastes, designated regulated waste bins, drums and skips must be used. Where possible these regulated waste storage containers should be located at the work location where the waste is being generated and then returned to the designated regulated waste storage areas for storage prior to offsite disposal or recycling. • Dedicated regulated waste storage areas must be provided to prevent the mixing of regulated wastes with other stored material or with incompatible hazard classes. Wastes must only be deposited into designated areas within the applicable storage area. • Storage areas for regulated wastes must be constructed in accordance with AS 1940-2004 or an equivalent Australian Standard. • An inventory must be kept and maintained of all regulated waste stored. • Where possible, regulated waste stores must be lockable to prevent access by unauthorised persons. • As soon as practicable, remove and dispose of all regulated waste to a licensed waste disposal facility or recycling facility using a licenced contractor. • Medical wastes must be stored in yellow and black biohazard waste bins. Clinical waste must be bagged in yellow bags with biohazard symbols and stored in rigid-walled, leak-proof secondary containers, in a bunded area with an impervious surface. Clinical waste should be kept in a secure storage area inaccessible to unauthorised people and animals. **<u>Trackable Waste</u>** Certain regulated wastes as defined under Schedule 9 of the EP Reg are to be tracked in accordance with the requirements of Section 11 of the EP Reg. **Diagram 4 – Waste Tracking Requirements (Paper Based System)** provides an overview of the waste tracking requirements for each stakeholder in the transport and handling of trackable waste chain.
Monitoring	The Quarry Manager must undertake a monthly visual inspection to ensure the waste management hierarchy is being effectively implemented. All site personnel shall be responsible for ensuring wastes are stored and removed from the site on a regular basis (e.g., daily or weekly). The Quarry Manager shall ensure that waste treatment measures are implemented at the site. The Quarry Manager shall ensure waste receptacles are provided and the waste type identified and that temporary waste storage areas are signed; recycling bins are emptied when full and materials which may cause land contamination are not disposed of on the site. The Quarry Manager shall keep a record of regulated waste generated at the site, treatment and disposal methods, approved contractors for transporting and disposing of waste and the location of the facility for accepting the waste.
Contingency Plan	Where a non-compliance is identified, a review of the Waste Management Plan is to be undertaken to determine areas for improvement and additional staff training on waste management procedures and waste handling is to be undertaken.

4.7 Waste Management Plan

Where Hopkins Brothers becomes aware that any wastes have been inappropriately disposed of, the incident must be notified to the administering authority in accordance with **Section 2.4 – Incident Response Procedure**. If a release of contaminants occurs as a result of on-site operations and it is likely to cause serious or material environmental harm, the administering authority must be notified, and an investigation conducted to identify appropriate action to resolve the issue to the fullest practicable extent.

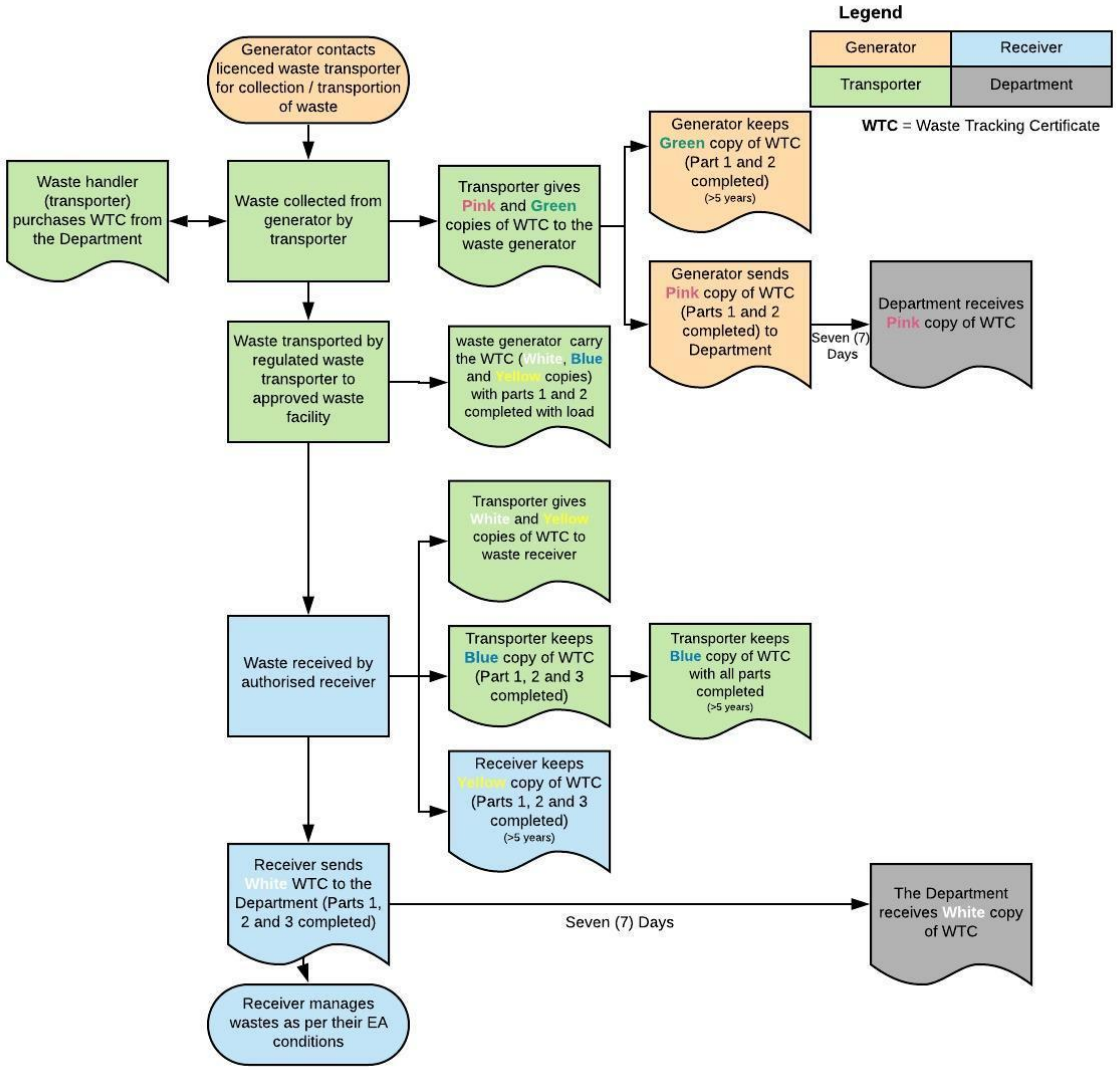


Diagram 4 – Waste Tracking Requirements (Paper Based System)

4.8 Flora Fauna Management Plan

Purpose	This Flora and Fauna Management Plan has been prepared to detail the necessary mitigation measures when undertaking this activity to prevent impacts to flora and fauna not already approved for the project.
Performance Targets	• No unapproved loss in biodiversity values over and above those impacts permitted through project approvals and implementation of Offset requirements. • No vegetation clearing outside the specified, pre-approved boundaries. • Final searches for fauna and their relocation as appropriate is to be carried out prior to all vegetation clearance. • Minimise injury or death of wildlife. • Appropriate signage to keep construction activities outside retained habitat areas. • No increase in level of weed and pest infestation as a result of construction activities. • Downstream habitats are not degraded by sediment deposition, scouring or water quality degradation. • Downstream flow changes remain within natural fluctuations.
Management Strategies	**Flora** • Prior to clearing of remnant vegetation, it is recommended that an assessment of the area is undertaken prior to work commencing to determine the presence of weed outbreaks, hollow baring trees, threatened species, communities or their habitat. Any significant areas are to be mapped, and areas not approved for clearing are to be delineated with exclusion fencing or flagging to prevent over clearing occurring. • Survey pegs or bunting flags are to be established around the full extent of each vegetation clearing stage and the total approved vegetation clearing area to ensure no over clearing or encroachment occurs. • All machinery operators are to be briefed in a toolbox talk about site specific vegetation clearing to unsure the task and associated risks are well understood. This may include the use of GPS guidance to verify clearing limits. • All machinery to be used during land clearing operations is required to be weed free prior to arriving at site. • Significant features of the landscape that could be reused on site during rehabilitation to create habitat structures are to be identified and salvaged prior to land clearing operations. • Undertake vegetation clearing in stages. • Implement measures to avoid the spill of earth and rock downslope of the development footprint into areas of retained vegetation. • Design and install temporary erosion control measures to avoid impacts on retained vegetation downslope of the development footprint. • Leave ground layer vegetation (grasses and herbs) in situ wherever possible to assist soil stability. Mulching of heavily disturbed areas can assist in reducing soil erosion. Where necessary, temporary interception devices such as hay bales or geotextile fabric fencing can be employed to slow stormwater and intercept sediment. • Non-millable vegetation can be mulched and used in rehabilitation or soil stabilisation works, provided that no weeds are incorporated into the mulch.

- Undertake regular monitoring of the health and condition of retained vegetation and habitat, and the health of significant plant specimens.

Fauna

- Limit activities to daylight hours as far as practicable, and any lighting within outdoor areas should comply with relevant Australian Standards and be of low spillage, with no or limited upward spillage.
- Vegetation clearing must be undertaken in a staged manner to allow ground dwelling and avian fauna to disperse away from areas being cleared on their own accord.
- For any approved clearing of areas that include habitat features, a spotter-catcher is to be used to assess hollows are relocate any species that are identified to be at risk during clearing operations.
- Prior to the commencement of clearing operations, the nearest wildlife carer is to be identified, and all workers made aware of native wildlife can be taken to in the unlikely event of injury.
- Habitat features such as hollows and log piles are to be salvaged, where possible, and placed in nearby (retained) habitat areas and used in the rehabilitation of the site.
- Work areas are to be checked regularly for fauna that may have entered the work area or become trapped. The sediment dam should remain fenced to exclude native fauna from watering from this area where they could potentially become trapped.
- If fauna must be relocated, a qualified spotter catcher who holds a rehabilitation permit must be engaged to handle, capture and or relocate native fauna.
- All waste receptacles are to remain sealed and covered at all times to prevent attaching native wildlife into the operational areas of the site.
- No pet animals are allowed to be brought onto the site.
- Educate the workforce on the location of significant/sensitive communities and species and potential impacts from unauthorised activities.

4.9 Rehabilitation Management Plans

Objective

The activity is operated in a way that protects the environmental values of land including soils, subsoils, landforms and associated flora and fauna.

Purpose

This Rehabilitation Management Plan has been prepared to assist with site rehabilitation.

Performance Outcomes

- Limit land disturbance to that which is necessary at any one time.
- Identify any land contamination and implement appropriate remediation or management where necessary.
- Land that has been disturbed for activities must be rehabilitated in a manner such that:
  - suitable native species of vegetation for the location are established and sustained for earthen surfaces.
  - potential for erosion is minimised.
  - the quality of water released from the site, including seepage, does not cause environmental harm.
  - potential for environmental nuisance caused by dust is minimised.
  - the water quality of any residual water body does not have potential to cause environmental harm.
  - the final landform is stable and protects public safety.
- Rehabilitation of disturbed areas must take place progressively as works are staged and new extraction areas are commenced.

Strategies

Post Quarry Land Use and Final Landform Design

The post-quarrying land use of the site must consider the Rockhampton Regional Council Planning Scheme at the time a post-quarrying land use is established. Currently, the rehabilitation plan for the site focuses on making the site safe, sustainable, and non-polluting.

Rehabilitation Activities

The following measures are to be implemented for rehabilitation activities at the site:

- Using earthmoving equipment to progressively shape and trim disturbed areas.
- Rounding or marrying the contours into the natural ground surface.
- Topsoiling and revegetating re-profiled surfaces.
- Providing access to the rehabilitated areas to allow ongoing maintenance.
- Designing landform and drainage to control erosion for the particular hydrological regime, ensuring the hydrological regime that existed prior to the development of the site is reinstated.

4.9 Rehabilitation Management Plans

- Revegetating the banks with a combination of natural regeneration, hydro-mulching, seed broadcasting, seedling planting and direct seeding.
- Undertaking appropriate weed control to prevent rehabilitated areas from being overrun with weed species.
- All compacted surfaces are to be ripped along contour lines where ground conditions and hydrology allow.

The Key Performance Indicators ('KPIs') summarised in **Table 10 – Key Performance Indicators for Rehabilitation** have been established to provide quantifiable measures for achieving the performance targets for rehabilitation. Each of the KPIs are assigned to Hopkins Brothers for completion; however, should the Hopkins Brothers require assistance to measure the achievement of these KPIs, they may engage a suitably qualified person.

Progressive Rehabilitation

Rehabilitation is to be undertaken progressively throughout the life of the operations and is to commence in each area as soon as practicable after it is no longer required for operational purposes. Progressive rehabilitation will be deemed complete when the Key Performance Indicators are achieved (refer to **Table 10 – Key Performance Indicators for Rehabilitation**).

Topsoil and Subsoil Management

The following measures should be implemented for topsoil and subsoil stripping:

- Materials should not be stripped when too wet or too dry.
- When stripped, materials should be used directly for rehabilitation to the maximum practicable extent or stockpiled and preserved for future use.
- Stockpiling of materials should not exceed a height of 2 m and should be shaped and revegetated to protect the soil from erosion and weed infestation.
- Stockpiles should be maintained in a free draining condition and long-term soil saturation should be avoided.
- Runoff waters external to the areas to be stripped should be diverted away from the working area.
- Stripping of topsoil should be limited to the minimum area necessary.

The following measures should be implemented for topsoil and subsoil spreading:

- Whenever possible, stripped materials should be directly placed on an area undergoing rehabilitation.

4.9 Rehabilitation Management Plans

- Areas to be re-spread should be shaped prior to placing materials over the re-profiled surface.
- Equipment used to spread materials should be scheduled to avoid compaction.
- Before respreading the materials, loosen the underlying substrate to break up any compacted or surface sealing and to enable keying of the two (2) materials.
- On slopes less than 3(H):1(V), loosen lightly compacted substrate, ensuring all ripping operations occur along the contour.
- Materials are to be removed from stockpiles in a manner that avoids vehicles travelling over the stockpiles.
- Materials are to be respread in the reverse sequence to its removal so that the original upper soil layer is returned to the surface to re-establish the entrapped seed content of the soil.
- Ensure all exposed substrates are covered with a minimum 150mm of suitable topsoil / subsoil to enable success of revegetation.
- After spreading materials, ensure the surface is left in a roughened state to assist moisture infiltration and inhibit soil erosion.
- Prior to any revegetation, cultivate any compacted or crusted topsoil surfaces (to a depth no greater than the depth of the materials to be spread).
- Spreading is to be immediately followed by revegetating wherever possible.
- If erosion occurs on treated surfaces, the area is to be re-spread with additional materials and revegetated.

Species Selection

The species used will need to be endemic to the surrounding areas and should be selected at the time of revegetation based on availability at local suppliers.

Weed and Pest Control

- Any materials (e.g., soil, mulch, straw) brought onto site for rehabilitation are to be inspected to ensure they are free from weeds and pests.
- Prior to the establishment of vegetation, a spraying campaign may be required to control weeds to prevent migration of weed species into areas under rehabilitation.
- Alternative methods for controlling both grass and weeds include manual weeding, burning, slashing, weed matting and mulching.
- Predation (e.g., grazing animals, birds and insects) are risks for revegetation. Depending on the situation, specific measures may be required to protect the works from predation such as fencing.

Water Bodies

Water bodies are likely to remain within the final landform, created through the final extraction void and sediment basins utilised for stormwater management during the operational phase of the quarry.

4.9 Rehabilitation Management Plans

Water bodies are to be converted to clean water storages where they are to be retained in the final landform. This can be achieved by:

- Cleaning sediment from the base of water storages.
- Battering slopes to achieve grades of no more than 3(H):1(V) where practicable.
- Ensuring that the water quality within these water storages is suitable for future use.

Hopkins Brothers is to engage a suitably qualified person to assess water quality of any residual water bodies at the site to ensure that the release parameters specified by the EA conditions, or other water quality objectives agreed with the administering authority.

Land Contamination

Prior to site closure, a contaminated land assessment by a suitably qualified person may be required. Assessment of site contamination, if required, is to be undertaken and managed in accordance with the following:

- *National Environment Protection (Assessment of Site Contamination) Measure 1999 (amended 2013)*
- *AS 4482.1-2005 - Guide to the sampling and investigation of potentially contaminated soil. Part 1 – Non-volatile and Semi-volatile compounds.*
- *AS 4482.2-2005 - Guide to the sampling and investigation of potentially contaminated soil. Part 2 – Volatile Compounds.*

Should it be identified that areas of the site have been contaminated through the operational activities, these areas are to be remediated, and validated as contaminant free, prior to site closure.

Infrastructure

Infrastructure that is to remain on-site after the surrender of the approvals may only be retained where a landowner agreement has been provided to the administering authority which clearly itemises the infrastructure that will remain, and detail the condition it is to remain in. It is anticipated that the following infrastructure would be suitable for retention:

- Utilises and services (e.g. water, electricity, telecommunications, gas).
- Access tracks and roads.

4.9 Rehabilitation Management Plans

	Plant, equipment, and buildings (including demountable and mobile infrastructure) should be removed from the final landform. A landowner's agreement is to be obtained at cessation of the rehabilitation to confirm satisfaction with the rehabilitation site and for retention of any infrastructure within the landform.
Monitoring	Hopkins Brothers must undertake a monitoring and maintenance period following the rehabilitation phase and action any remedial measures to ensure the rehabilitated landform transition to a self-sustaining state. The Quarry Manager or delegate must conduct regular inspections of any rehabilitated areas to ensure maintenance and repairs are carried out as necessary. Maintenance works may include fertilising, watering, repairs to barriers, guards and plant failure replacements, refer to **Table 11 – Maintenance Schedule for Revegetation Works**. The monitoring and management program will review the ongoing success of the rehabilitation treatment. The Quarry Manager or delegate may engage a consultant to assist with any detailed monitoring or management of rehabilitation. The key parameters to be measured as part of the rehabilitation monitoring and management program will include: • Landform stability. • Erosion and sedimentation. • Groundcover success (<70% desirable). • Vegetation species composition and density. • Water quality. • Weed presence. Final rehabilitated areas are to be visually monitored by the Quarry Manager or delegate and, where relevant, assessed by suitably qualified persons to determine the effectiveness of measures implemented.
Contingency Plan	In the event that monitoring identifies failures in the rehabilitation implementation, the following contingency measures may be used, however; these will be adapted to the particular failure identified:

4.9 Rehabilitation Management Plans

- Replacement of failed plantings to increase establishment / success rates.
- Use of fertilisers and soil ameliorants where necessary.
- Reprofiling or eroded or failed landforms.
- Application of additional topsoil where necessary to support vegetation growth.
- Impletion of additional erosion and sediment controls.
- Water quality improvements where necessary.

Table 10 – Key Performance Indicators for Rehabilitation

KPI Description	Measure(s)	Critical Timeframe
Total land disturbance at any one time is limited to that necessary to advance the quarry development.	Demarcation of limits.	Continuous review in accordance with development of the site.
Sufficient topsoil for rehabilitation has been retained.	Volume (m^3) of topsoil and subsoil retained for rehabilitation.	At implementation and completion of each development stage.
The final landform demonstrates consideration for the surrounding undisturbed areas and land zoning.	True / False.	Prior to lodgement of application for surrender.
Groundcover achieves a suitable density to protect surface soils from rain-induced erosion (DES 2014).	Groundcover at a minimum of 70% (DES 2014).	• Assessment prior to any stormwater management device reduction or removal; and, • Final assessment prior to surrender application.
Erosion rates of soil / sediment from disturbed areas associated with the extractive industry activities does not exceed natural rates experience for the locality.	Local erosion rate calculated and compared against actual site erosion rates.	Within three months of an area of the quarry no longer required for quarrying / disturbance activities (including at final stage).
Evidence that water quality of any residual water bodies complies with the water quality objectives of the EA or other agreed release parameters. Alternatively, water bodies are to be filled and stabilised with vegetation to create a clean, free-draining catchment.	Water quality objectives of EA conditions or other agreed Water Quality Objectives (e.g., Livestock Watering Guidelines).	Prior to lodgement of a surrender application for the EA.
Air quality of the final landform achieves levels consistent with adjacent undisturbed areas through establishment of the final landform.	Visual surveillance and complaints register review.	Prior to lodgement of a surrender application for the EA.

	If monitoring is required, refer to **Section 4.1 - Air Quality Management Plan** contained in the SBMP.	
Assessment confirms the slope stability of final landforms.	Slope ratio, degree, or percentage.	Prior to lodgement of application for surrender.
Landowner statement(s) obtained for: a) any retained items of extractive industry-related infrastructure; and b) satisfaction with the rehabilitated final landform.	True / False.	Prior to lodgement of application for surrender.

Table 11 – Maintenance Schedule for Revegetation

Activity	**Frequency**
Weed Control	
Site Preparation (where necessary)	One (1) treatment at least two (2) weeks prior to seeding / planting.
Ongoing weed management	Biannually or as required.
Revegetation	
Monitor performance and conduct any necessary maintenance.	• One (1) month after seeding / seedling planting. • Three (3) months after seeding / seeding planting. • Six (6) months after seeding / seedling planting. • 12 months after seeding / seedling planting. **OR** • Following significant rainfall events (e.g., >25 mm).
Replace diseased or dead plants.	As necessary following maintenance inspections.
Fertilise (if applicable)	Two (2) months after topsoil spreading or seeding.
Apply mulch (if available)	One-off around tube stock plantings
Pasture management	
Slashing and fertilising	As required.

4.10 Bushfire Management Plan

Objective	The activity will be operated in a way that minimises the risk of bushfires.
Purpose	Portions of the site are identified as being subject to very high, high, and medium potential bushfire hazard in accordance with the Bushfire Hazard Overlay mapping noted by the *Rockhampton Region Planning Scheme* as well as high and medium potential bushfire intensity per Queensland Spatial Catalogue data. This Bushfire Management Plan has been prepared to identify and manage potential impacts occurring as a result of bushfires. • The attached figure **Bushfire – Bushfire Intensity (Figure 3)** provides general guidance for potential bushfire intensity and thus areas of high concern for flammable materials.

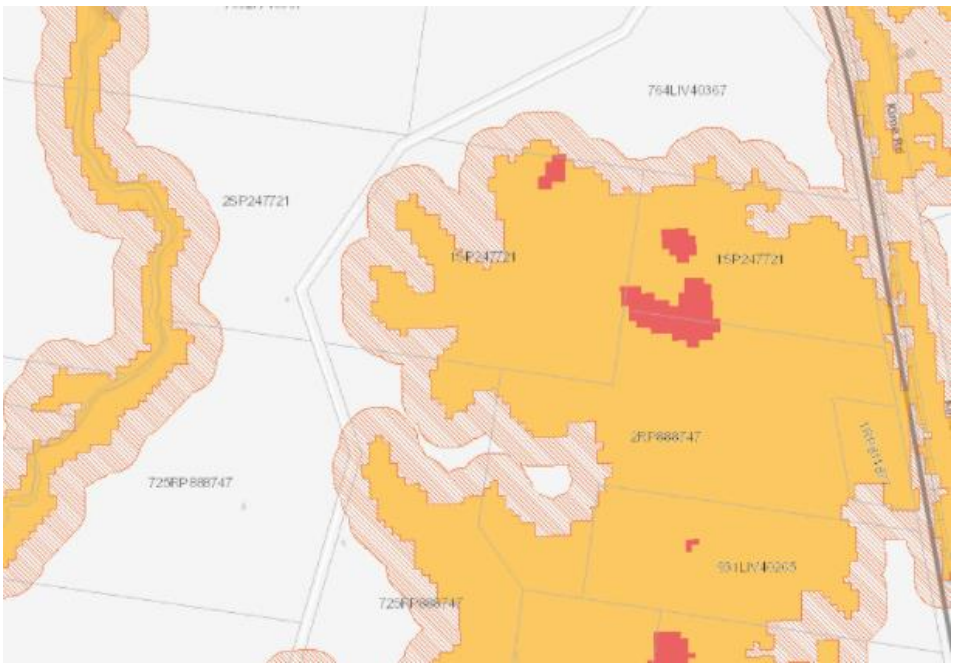


Diagram 5 – Potential Bushfire Intensity
(Figure created DAMS mapping)

Performance Outcomes	• Minimise the potential for spread of bushfires on site. • Protect the people and property from bushfire impacts. • Minimise potential impacts from bushfires on local flora and fauna.
Strategies	**<u>Risk Control</u>** • Ensure all staff on-site and other personnel are aware of evacuation procedures and the location and the use of firefighting equipment.

4.10 Bushfire Management Plan

- Ensure there is an adequate water supply on-site in the event of a fire. Water supply sources that could be used include:
    - Pit sumps and sediment basins / water storages.
    - Water truck (when on-site).
- Keep the operational areas tidy and not storing any material around the edges of the site that would increase bushfire risk.
- Maintain a site attendance register.
- Maintain a communications system with all on-site personnel.
- Maintain firebreaks in accordance with the allowable widths prescribed under the relevant legislation (in accordance with the *Planning Regulation 2017, t*he clearing is limited to the establishment and/or maintenance of necessary firebreaks to protect buildings and structures (other than fences, roads and tracks) and must be a maximum width of 20 m or 1.5 times the height of the tallest adjacent tree (whichever is the greater)).
- Ensure availability of heavy earthmoving machinery and water trucks used in quarry operations to assist in the event of major bushfires, if required.
- Consult with adjacent landowners and fire services for implementing fire control management on-site in accordance with district/area fire control plans.
- Keep relevant agencies contact numbers in the event of a fire, namely the Rockhampton Fire Station and the Gracemere No 1 or Bouldercombe Fire Warden.

Ignition Source

- Appropriate signage is to be erected near flammable and combustible areas e.g. 'No smoking, stop engine', hazard symbols (explosive, flammable, combustible).
- Any cigarette butts must be free of embers and discarded into site bins.
- Smoking is only permitted in designated smoking areas and is not allowed in work vehicles.
- Vehicles and/or plant must be turned off during refuelling.
- Refuelling is to occur only in a designated area.
- Mobile phones must be switched off when refuelling.
- Ensure welding and other hot works is undertaken in controlled areas where potential for starting a fire is minimised.

Fire Protection

- Ensure that extinguishers, fire hoses, fire blankets, sand buckets and other such equipment is regularly inspected and maintained in accordance with AS 1851-2005 (A4), Maintenance of Fire Protection Systems and Equipment (Standards Australia 2005).
- All vehicles and plant must be provided with fire protection equipment (e.g., fire extinguisher, fire blanket) that meets applicable Australian Standards.
- Staff should be trained in the correct use of fire protection equipment.
- All fire extinguishers must be clearly signed and their purpose clearly visible for the user.

4.10 Bushfire Management Plan

	Fuel Storage Areas • Fuel storage areas must be located away from vegetation and office areas as per *AS 1940 - The storage and handling of flammable and combustible liquids (*Standards Australia 2017c). • Aboveground bulk tanks and package stores are to be separated from each other as per *AS 1940 - The storage and handling of flammable and combustible liquids (*Standards Australia 2017c). • Firefighting equipment must be located within proximity to these areas. **Site Preparation and Maintenance** • Plan, create and/or maintain strategic firebreaks in order to implement hazard reduction works where necessary. • Construct and maintain perimeter fencing to prevent unauthorised access where necessary. • Incorporate fire safety management system for chemical fires for temporary buildings and on-site vehicles. • Consult with the local fire station and council prior to each bushfire season in order to re-assess the situation, site conditions and predicted bushfire conditions for the bushfire danger period ahead. • Maintain a line of contact with the fire station throughout the bushfire season. **Reduce the Hazards** • Assess fire risk each day and evacuate where necessary. • Ensure no fuel load is available around work sites. • Plan and organise for hazard reduction burns to be undertaken by the Rockhampton or Gracemere Fire Stations where necessary. • Obtain a 'Permit to Light Fire' from the local Rockhampton/Gracemere Fire Stations as required. • Preferable burn season is summer to winter and aim for a low to moderate intensity burn. • Create firebreaks around all temporary facilities and infrastructure on site.
Monitoring	• Regularly review and update the site evacuation procedures. • Ensure regular surveillance of the site, to ensure access roads, fire trails and the edges of the operational area are maintained. • All employees will be responsible for the identification and giving alarm of fires on-site or adjacent bush fires off-site. • Monitor the site, conditions, and situation in order to evaluate changes occurring on or off site, e.g., changes in infrastructure, risks and hazards, legislative and environmental changes.
Contingency Plan	Should emergency fire services be required, dial '000' or '112' from a mobile cellular device.

4.10 Bushfire Management Plan

	Contact details for the local fire station, Rockhampton Rural Fire Service, and the Nankin Fire Warden are as follows: Gracemere Fire Station 34 Bland Street Gracemere QLD 4702 Phone: 07 4927 1277 Rockhampton Rural Fire Service (volunteers) 174 Alexandra Street Kawana, North Rockhampton QLD 4701 Phone: 07 4932 8129 Gracemere No 1 Fire Warden Phone: 0400 140 672 Bouldercombe Fire Warden Phone: 0429 340 204
Monitoring	• A fauna mortality register is to be maintained to document the location and frequency of mortality and the fauna species most susceptible to injury and death, to enable on-going modifications to fauna conservation management strategies where necessary. • The condition of all site fencing is to be inspected regularly to determine maintenance requirements. • Operational areas are to be inspected daily prior to commencement of work to determine if fauna are present. If fauna are present, they are to be relocated or moved on as appropriate.
Contingency Plan	The Site Manager is to be notified immediately of any incident resulting in the harm, injury or death of a fauna species. Where a non-compliance is identified, a review of these measures is to be undertaken to determine areas for improvement. Where necessary, additional staff training or engaging an appropriately qualified third party to undertake an audit of these controls. Where an unapproved impact to flora or impacts to native fauna is identified, the incident must be notified to the relevant authorities in accordance with **Section 2.4 – Incident Response Procedure**.

References

Assured Environmental, (2022a). Noise Impact Assessment

Assured Environmental, (2022b). Air Quality Assessment

BAAM (Biodiversity Assessment and Management) (2022), *Assessment of Ecological Matters of State and Local Significance – Midgee Quarry, Rockhampton*

DES. (Department of Environment and Science). (2014). *Guideline: Rehabilitation requirements for mining resource activities.* Queensland Government: Brisbane, QLD

DES. (Department of Environment and Sciences). 2018. *Monitoring and Sampling Manual: Environmental Protection (Water) Policy*. Accessed September 30, 2021 via https://environment.des.qld.gov.au/__data/assets/pdf_file/0031/89914/monitoring-sampling-manual-2018.pdf

DES (Department of Environment and Science). (2020a). *Noise Measurement Manual.* Accessed August 30, 2021 via https://environment.des.qld.gov.au/licences-permits/pdf/noise-measurement-manual-em1107.pdf

DES (Department of Environment and Science). (2020b). *Guideline: Noise and vibration from blasting.* Accessed August 31, 2021 via https://environment.des.qld.gov.au/__data/assets/pdf_file/0028/89380/ts-gl-blasting-noise-and-vibration.pdf

DES. (Department of Environment and Sciences). (2020c) *Waste tracking guidelines*. Accessed August 31, 2021 via https://environment.des.qld.gov.au/waste/pdf/managing-wt-qld-overview.pdf

DES. (Department of Environment and Science). (2021). *Stormwater and environmentally relevant activities.* Accessed August 30, 2021 via https://environment.des.qld.gov.au/__data/assets/pdf_file/0028/89119/pr-gl-stormwater-guideline-era.pdf

EPA, (1997). (Environmental Protection Agency). (1997). *Air Quality Sampling Manual.* Environmental Protection Agency: Brisbane, Qld.

IECA (International Erosion Control Association). (n.d.). *Example site-based Stormwater Quality Management Plan*. Accessed via https://www.austieca.com.au/documents/item/362

Pastures Australia., (n.d.). Pasture Selection Tool. Accessed October 1, 2021 via https://keys.lucidcentral.org/keys/v3/pastures/queensland.htm

Queensland Globe. (2021). Accessed via https://qldglobe.information.qld.gov.au/

Queensland Spatial Catalogue. (2021). Accessed via https://qldspatial.information.qld.gov.au/catalogue/custom/index.page

Standards Australia, (1998). *AS 2659.1 – 1998: Guide to the use of sound measuring equipment – Portable sound level meters.* Standards Australia: Sydney, NSW.

Standards Australia. (2006). *AS 2187.2-Explosives - Storage and use - Use of explosives*. Standards Australia: Sydney, NSW.

Standards Australia, (2016). *AS 3580.10.1 Methods for sampling and analysis of ambient air— Determination of particulate matter— Deposited matter – Gravimetric method.* Standards Australia: Sydney, NSW.

Standards Australia, (2017). *AS 3580.9.9 Methods for sampling and analysis of ambient air— Determination of suspended particulate matter—PM_{10} low volume sampler—Gravimetric method*. Standards Australia: Sydney, NSW.

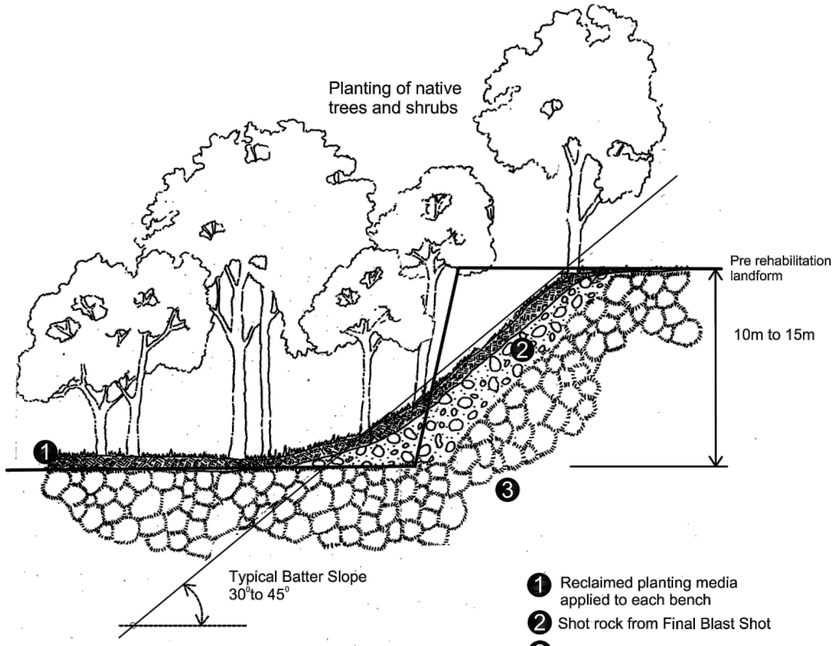
Standards Australia, (2015). *AS 3580.9.6 Methods for sampling and analysis of ambient air— Determination of suspended particulate matter—PM_{10} high volume sampler with size selective inlet – Gravimetric method*. Standards Australia: Sydney, NSW.

Standards Australia. (2017). AS *1940 - The storage and handling of flammable and combustible liquids.* Standards Australia: Sydney, NSW.

Standards Australia. (2018). *AS ISO 31000:2018 Risk management – Guidelines.* Standards Australia: Sydney, NSW.

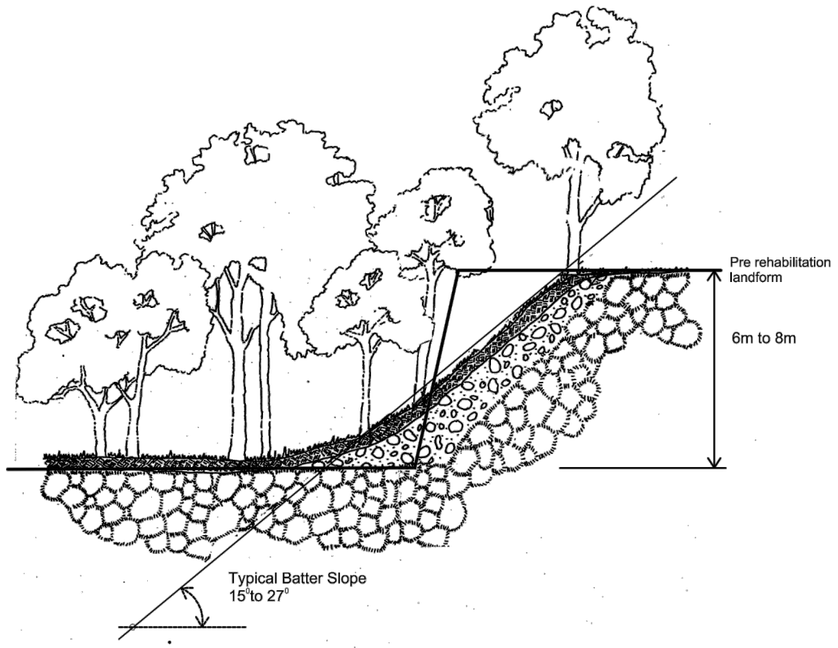
Witheridge, (2012). *Erosion and Sediment Control – A Field Guide for Construction Site Managers.* Catchments & Creeks Pty Ltd., Brisbane: Queensland

FIGURES



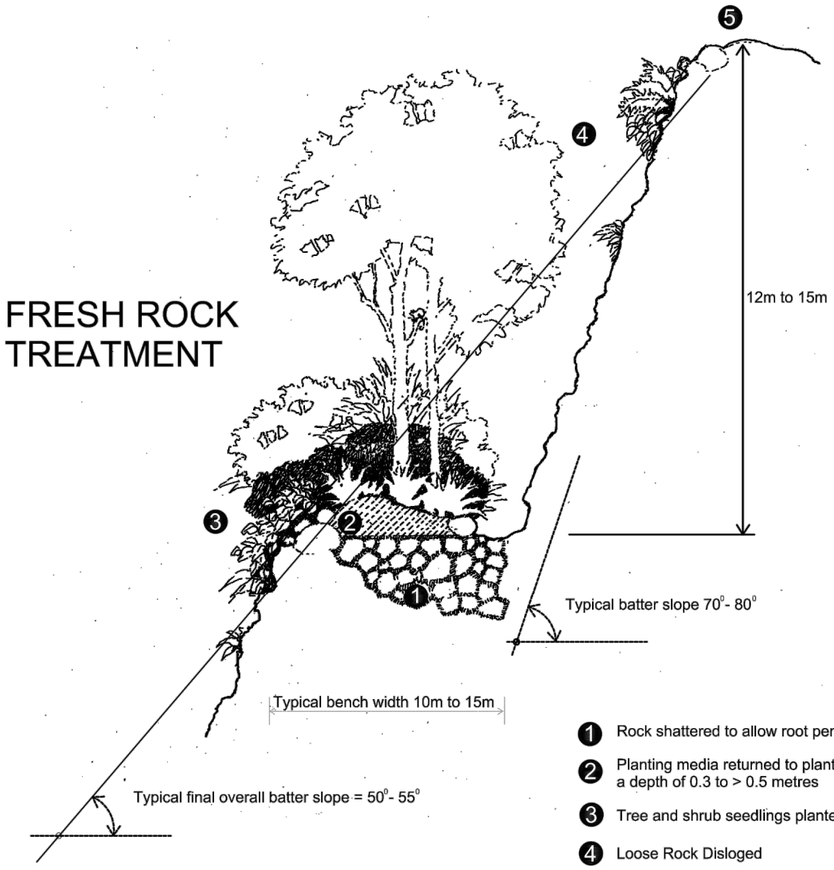
1 Reclaimed planting media applied to each bench
2 Shot rock from Final Blast Shot
3 Pre-existing sub-strata

HIGHLY TO MODERATELY WEATHERED ROCK TREATMENT



COMPLETELY WEATHERED ROCK

FRESH ROCK TREATMENT



1 Rock shattered to allow root penetration
2 Planting media returned to plant sites to a depth of 0.3 to > 0.5 metres
3 Tree and shrub seedlings planted
4 Loose Rock Disloged
5 Edge rounded with Hydraulic pick

CREATED: 7 February 2022 JOB SUB #: FILE NAME: Z:\Shared\Data\Jobs\2600\2607 - Hopkins Bros - Midgee Quarry\Drawings\Drawings\2607.DRG.009 - Batter Treatments Schematic.dwg

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography:
Topography:
Cadastre:
Ecosystem:
Other:

Legend:

PROJECT: Midgee Quarry

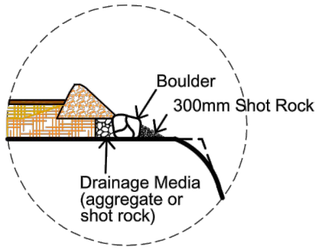
CLIENT: Hopkins Brothers

TITLE: Batter Treatments Schematic

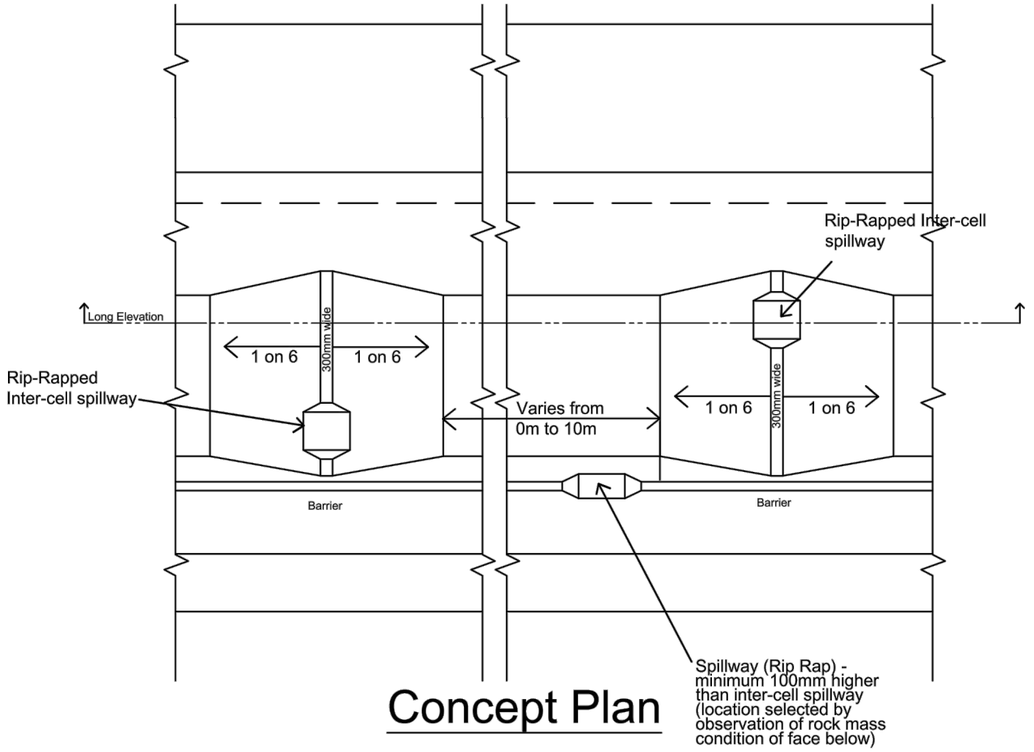
GROUNDWORK plus
PH: +61 7 3871 0411
WWW.GROUNDWORK.COM.AU

DRAWING NUMBER: 2607.DRG.009
REVISION:

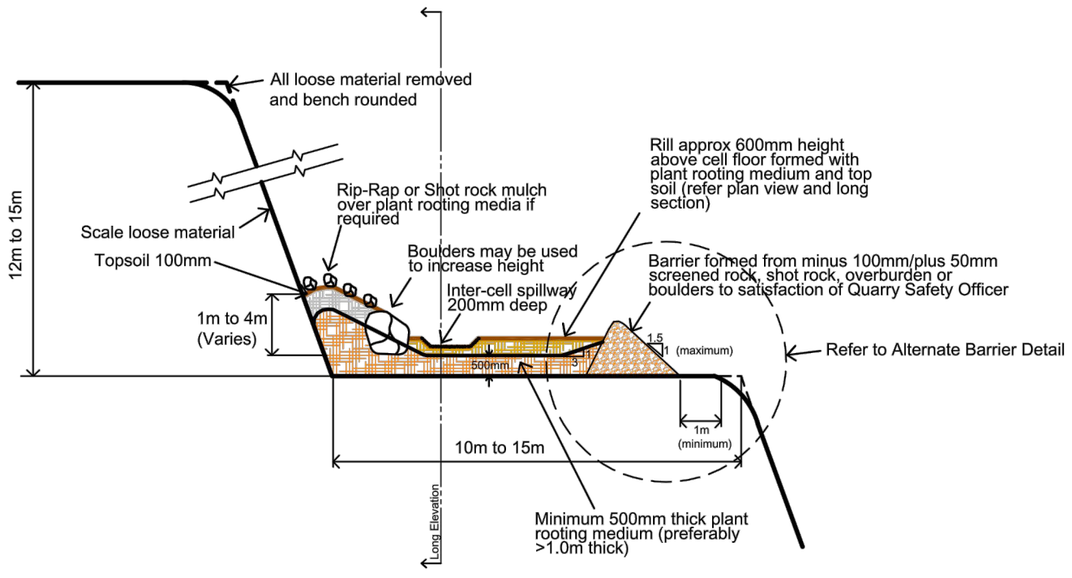
DATE: 7 February 2022 DRAWN: MR
PRINTED: 7 February 2022 CHECKED: YD
DATUM: HORIZONTAL / VERTICAL / ZONE / /



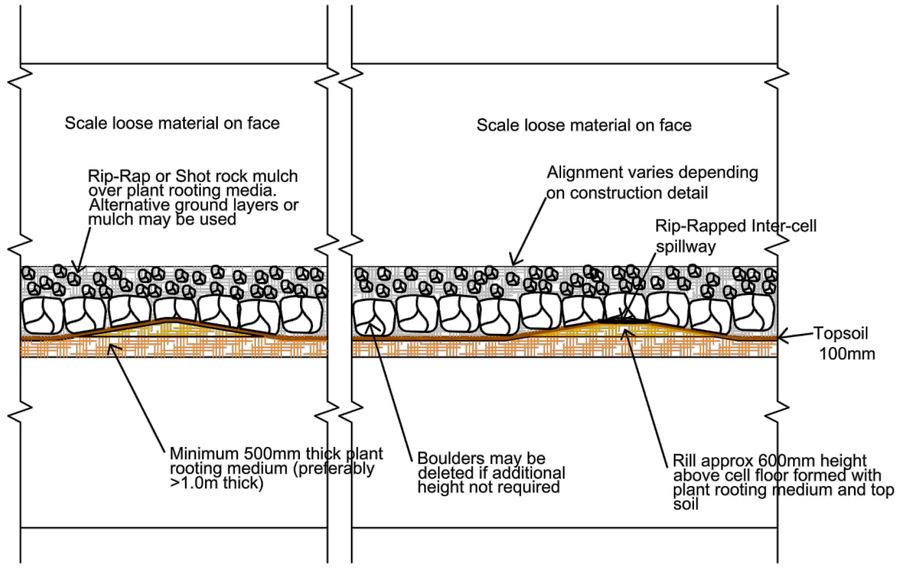
Alternate Barrier Detail



Concept Plan



Concept Cross Elevation



Concept Long Elevation

REV	DESCRIPTION	DATE	BY

Data Sources:
Photography:
Topography:
Cadastre:
Ecosystem:
Other:

Legend:

PROJECT: Midgee Quarry

CLIENT: Hopkins Brothers

TITLE: Bench Treatments Schematic

GROUNDWORK plus
PH: +61 7 3871 0411
WWW.GROUNDWORK.COM.AU

DRAWING NUMBER: 2607.DRG.010
REVISION:

DATE: 7 February 2022 | DRAWN: MR
PRINTED: 7 February 2022 | CHECKED: YD
DATUM: HORIZONTAL / VERTICAL / ZONE

CREATED: 19 October 2021 JOB SUB #: FILE NAME: Z:\Shared\Data\Jobs\2600\2607 - Hopkins Bros - Midgee Quarry\Drawings\Drawings\2607.DRG.010 - Bench Treatments Schematic.dwg

ATTACHMENTS

GROUNDWORK plus

Attachment 1

Annual Environmental Performance Review

Annual Environmental Performance Review

Site:

Date:

Reviewer:

Approvals

1. Have there been any changes to the site approvals?

   Note: consider the Environmental Authority, Development Permit, etc.

   Yes ☐ No ☐

   If yes, provide details of the change (e.g. change to Environmental Authority condition, or Development Permit condition). Include the date / reference number of the current approvals relevant to the site activities.

   _____
   _____
   _____
   _____
   _____

Environmental Monitoring

2. Has all monitoring required under the Environmental Authority been carried out?

   Yes ☐ No ☐

   If no, provide details

   _____
   _____
   _____
   _____
   _____

3. Has all monitoring required under the Site Based Management Plan (SBMP) been carried out?

   Note: Refer to Section 4. Environmental Management Plans for monitoring requirements.

Yes ☐ No ☐

If no, provide details

_____
_____
_____
_____
_____
_____

4. Were any exceedances of the approval limits recorded?

Yes ☐ No ☐

If yes, provide details.

_____
_____
_____
_____
_____
_____

5. Was the exceedance reported to the administering authority?

Yes ☐ No ☐

Provide details of any notifications to the administering authority and actions taken to address the exceedance (if any).

_____
_____
_____
_____
_____
_____

Complaints / Incidents

6. Have any complaints been received, or environmental incidents reported, over the previous 12 months?

Note: An environmental incident generally relates to an event which has caused, or threatens, serious or material environmental harm, consistent with the duty to notify of environmental harm under Division 2 of the *Environmental Protection Act 1994*.

Yes ☐ No ☐

If yes, briefly summarise the nature of the complaint and/or incident and any action taken to resolve the matter.

_____
_____
_____
_____
_____
_____

Site Operations

7. Have there been any changes to the site operations over the previous 12 months?

Yes ☐ No ☐

If yes, provide details and determine if any change to the SBMP or associated management documents are required.

_____
_____
_____
_____
_____
_____

Proposed Measures for Improved Environmental Performance

8. Are any measures proposed to be implemented over the coming 12 months to improve the environmental performance of the site?

Note: Examples of measures may include; revised stormwater management measures, changes to fuel / chemical storage, etc.

Yes ☐ No ☐

If yes, provide details and determine if any change to the SBMP or associated management documents are required.

_____

_____

_____

_____

_____