



SMEC INTERNAL REF. 30018041

**Traffic Impact
Assessment Report**

Muswellbrook Pumped Hydro Energy Storage Upper Reservoir Geotechnical Investigation

Prepared for: AGL Energy Pty Ltd
29 June 2023

Through our specialist expertise, we deliver advanced infrastructure solutions for our clients and partners.

Leveraging our 70-year history of delivering nation-building infrastructure, we provide technical expertise and advanced engineering services to resolve complex challenges.

Through our network of global specialists collaborating with local partners, we connect you with the best teams and capabilities to deliver innovative and sustainable solutions.

We're redefining exceptional

Document Control

Document Type	Traffic Impact Assessment Report
Project Title	Muswellbrook Pumped Hydro Energy Storage Upper Reservoir Geotechnical Investigation
Project Number	30018041
File Location	X:\Projects\300180\30018041 - Muswellbrook Pumped Hydro Energy Storage EIS\110 Stage 1 - Non EIS Component Deliverables\07 - Sub Consultant Studies\Traffic Management Plans
Revision Number	02

Revision History

Revision No.	Date	Prepared By	Reviewed By	Approved for Issue By
02	29/06/2023	Nahrain Haroon	Andrew Brown	Jessica Miller

Issue Register

Distribution List	Date Issued	Number of Copies
AGL Energy Pty Ltd	29/06/2023	01

SMEC Company Details

Approved by	Jessica Miller
Address	74 Hunter Street, Newcastle NSW, 2300
Phone	+61 02 9925 5532
Email	Jessica.Miller@smec.com
Website	www.smec.com
Signature	

The information within this document is and shall remain the property of:
SMEC Australia Pty Ltd

Important Notice

This report is confidential and is provided solely for the purposes of addressing all the traffic impacts associated with the Muswellbrook Pumped Hydro Energy Storage Upper Reservoir Geotechnical Investigation. This report is provided pursuant to a Consultancy Agreement between SMEC Australia Pty Limited ("SMEC") and AGL Energy Pty Ltd (AGL)AGL Energy Pty Ltd (AGL), under which SMEC undertook to perform a specific and limited task for AGLAGL. This report is strictly limited to the matters stated in it and subject to the various assumptions, qualifications and limitations in it and does not apply by implication to other matters. SMEC makes no representation that the scope, assumptions, qualifications and exclusions set out in this report will be suitable or sufficient for other purposes nor that the content of the report covers all matters which you may regard as material for your purposes.

This report must be read as a whole. The executive summary is not a substitute for this. Any subsequent report must be read in conjunction with this report.

The report supersedes all previous draft or interim reports, whether written or presented orally, before the date of this report. This report has not and will not be updated for events or transactions occurring after the date of the report or any other matters which might have a material effect on its contents, or which come to light after the date of the report. SMEC is not obliged to inform you of any such event, transaction or matter nor to update the report for anything that occurs, or of which SMEC becomes aware, after the date of this report.

Unless expressly agreed otherwise in writing, SMEC does not accept a duty of care or any other legal responsibility whatsoever in relation to this report, or any related enquiries, advice or other work, nor does SMEC make any representation in connection with this report, to any person other than AGLAGL. Any other person who receives a draft or a copy of this report (or any part of it) or discusses it (or any part of it) or any related matter with SMEC, does so on the basis that he or she acknowledges and accepts that he or she may not rely on this report nor on any related information or advice given by SMEC for any purpose whatsoever.

Contents

1.	Introduction.....	1
2.	The Proposal.....	2
2.1	Upper Reservoir Geotechnical Investigations	2
2.2	Site Location	2
2.3	Programme.....	3
2.4	Generated Traffic	3
2.5	Proposed Access Routes.....	4
3.	Existing Conditions.....	5
3.1	External Road Network	5
3.1.1	New England Highway	5
3.1.2	Sandy Creek Road	6
3.1.3	Dolahentys Road	6
3.2	TfNSW Permanent Count Site	6
3.3	Public Transport	7
4.	Impacts Assessment	8
4.1	Road Network Capacity	8
4.2	Pavement Conditions	8
4.3	Average Travel Speed	8
4.4	Property Access	8
4.5	Pedestrian and Cyclists.....	8
5.	Conclusion	9

Figures

Figure 2-1: Upper Reservoir Geotechnical Investigations Locality Map	3
Figure 2-2: Proposed Access Tracks.....	4
Figure 3-1: Surrounding Road Network (Image Source: MetroMap)	5
Figure 3-2: Daily Traffic Flow Profile by Vehicle Type.....	6
Figure 3-3: Bus Route 413.....	7
Figure 3-4: Bus Route 414.....	7

Tables

Table 2-1: Estimated Heavy and Light Vehicle Movements (one-way)	4
Table 3-1: Hourly Traffic Flows and Heavy Vehicle Percentage Along New England Highway.....	7

1. Introduction

SMEC was engaged by AGL to prepare a Statement of Environmental Effects (SEE) for the proposed geotechnical investigations (The Project), which will be submitted to Muswellbrook Shire Council under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The proposal seeks consent for geotechnical investigations at Bells Mountain, Muswellbrook for a potential future Pumped Hydro Energy Storage (PHES) scheme using land associated with and adjacent to Muswellbrook Coal Mine. The mine operator, Muswellbrook Coal Company Limited (MCC), has ceased mining operations and is undertaking rehabilitation works.

This report outlines the traffic and transport assessment undertaken to identify the potential impacts of the proposed geotechnical investigations for the upper reservoir on the road network surrounding the Muswellbrook Coal site.

2. The Proposal

2.1 Upper Reservoir Geotechnical Investigations

The geotechnical investigation works will be undertaken using a number of borehole sites and testing pits to be dug prior to construction to allow geotechnical engineers an opportunity to assess soil composition.

The proposed development specifically comprises of the following:

- Site mobilisation works and laydown area establishment;
- Augmentation and improvement of existing access tracks to facilitate safe site access;
- Creation of new access tracks involving vegetation removal;
- Borehole creation using a drilling rig, reaching depths of around 200 m – 300 m below ground surface;
- Storage of excess drilling water and cuttings in a temporary waste skip bin to be removed offsite;
- Rock core transportation and storage offsite;
- Drill stem testing at the completion of drilling whilst the drill is still in position;
- Borehole decommissioning within 28 days of completing the works either by installing a fully grouted vibrating wire piezometer and data logger, or fully grouted backfilling
- Geophysical surveys utilising seismic refraction tomography profiling

Test pits will be excavated using a track mounted excavator digging pits up to 5m deep, 1m wide and 4m long. Test pits are backfilled immediately after reaching target depth and geotechnical logging and sampling is completed

Site rehabilitation works, including:

1. Reinstating areas where a cut/fill bench was created
2. Re-seeding access tracks where tracks are not required for use after geotechnical works are complete
3. Removing all equipment and environmental controls

Minor filling around existing access tracks where the existing ground has eroded

Insitu stress measuring, undertaken progressively down the borehole whilst the drill rig is still in position

Borehole imaging, undertaken by a specialist sub-contractor, including optical and acoustic imaging and a sonic logging profile.

2.2 Site Location

The geotechnical investigation site is located within the existing Muswellbrook Coal Mine site approximately 8.8 km north-east of the town of Muswellbrook, in the Muswellbrook Local Government Area (LGA) as shown in Figure 2-1. Land use of the Project site comprises primarily Primary Production areas and Environmental Management areas.

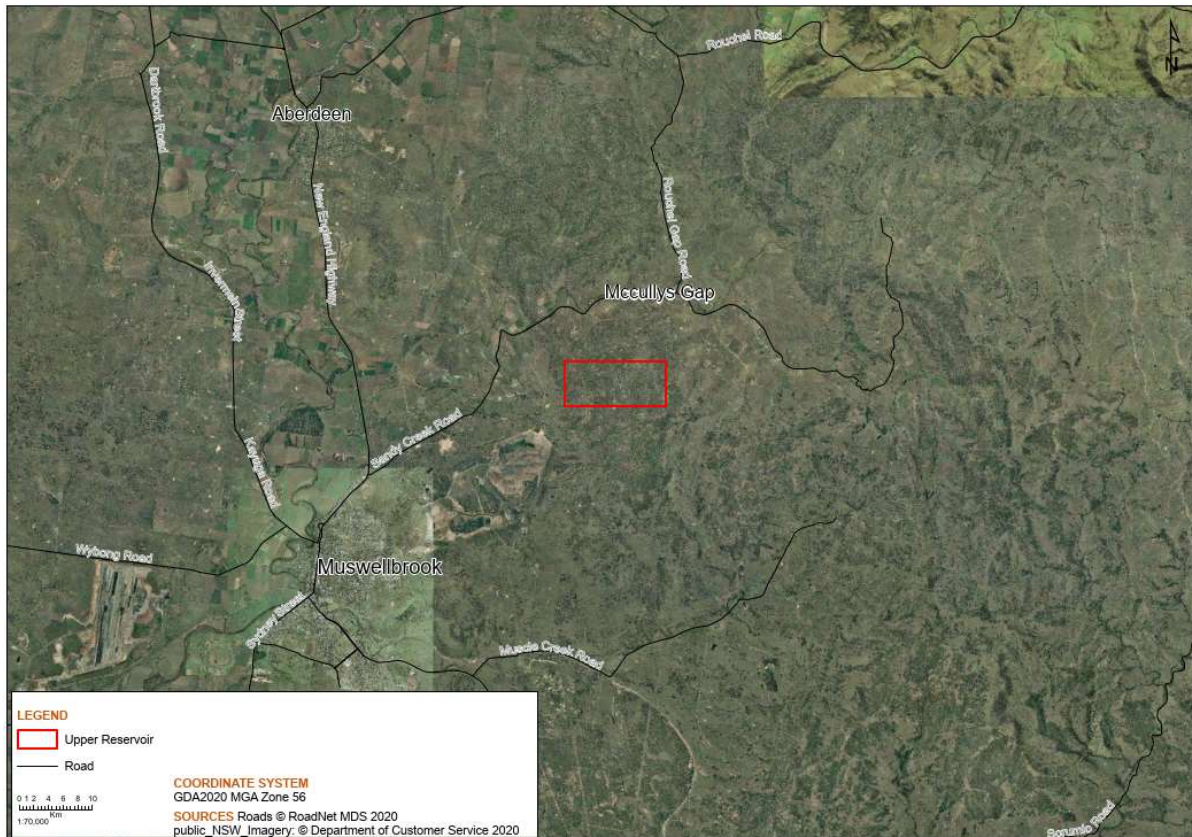


Figure 2-1: Upper Reservoir Geotechnical Investigations Locality Map

2.3 Programme

The geotechnical investigations are proposed to be carried out in 2023 however the start and end dates of the works are not known yet. The total duration of works is anticipated to be up to 12 weeks from date of commencement.

2.4 Hours of Operation

Works would be undertaken during the hours, as follows:

- 7:00am to 7:00pm Monday to Sunday
- 7:00pm to 7:00am Monday to Sunday
- No works on public holidays.

2.5 Generated Traffic

Table 2-1 shows the estimated heavy and light vehicle movements (one-way) during various stages of the proposed works. For purposes of this assessment, a worst-case scenario has been assumed, whereby the proposed geotechnical investigations for both the lower and upper reservoirs will occur in parallel, although this may not necessarily be the case depending on confirmation of final program.

Table 2-1: Estimated Heavy and Light Vehicle Movements (one-way)

Task Name	Vehicle Type	No. of one-way vehicle movements per day- Lower Reservoir	No. of one-way vehicle movements per day- Upper Reservoir	Total no. of one-way heavy vehicle movements per day
Site mobilization and demobilisation (first/ last few days)	Medium Rigid Truck	12	12	24
Geotechnical investigation works	Light Vehicles	8	8	16
	Medium Rigid Truck (water cart plus sucker truck)	4	4	8

Assuming an average 21 working hours per day, there would be 24 one-way heavy vehicle movements per day (around 1 one-way heavy vehicle movement per hour) during the site mobilisation and demobilisation phases and 8 one-way heavy vehicle movements per day (around 1 one-way heavy vehicle movements every 2 hours) during the geotechnical investigation works. In addition, the proposed works would generate 16 one-way light vehicle movements per day.

2.6 Proposed Access Routes

Proposed access to the upper reservoir site is primarily gained from the New England Highway, Sandy Creek Road, Dolahentys Road and via a private property located at 250 Dolahentys Road, McCullys Gap (Lot 167, DP752444) then dirt tracks would be used as shown in Figure 2-2.

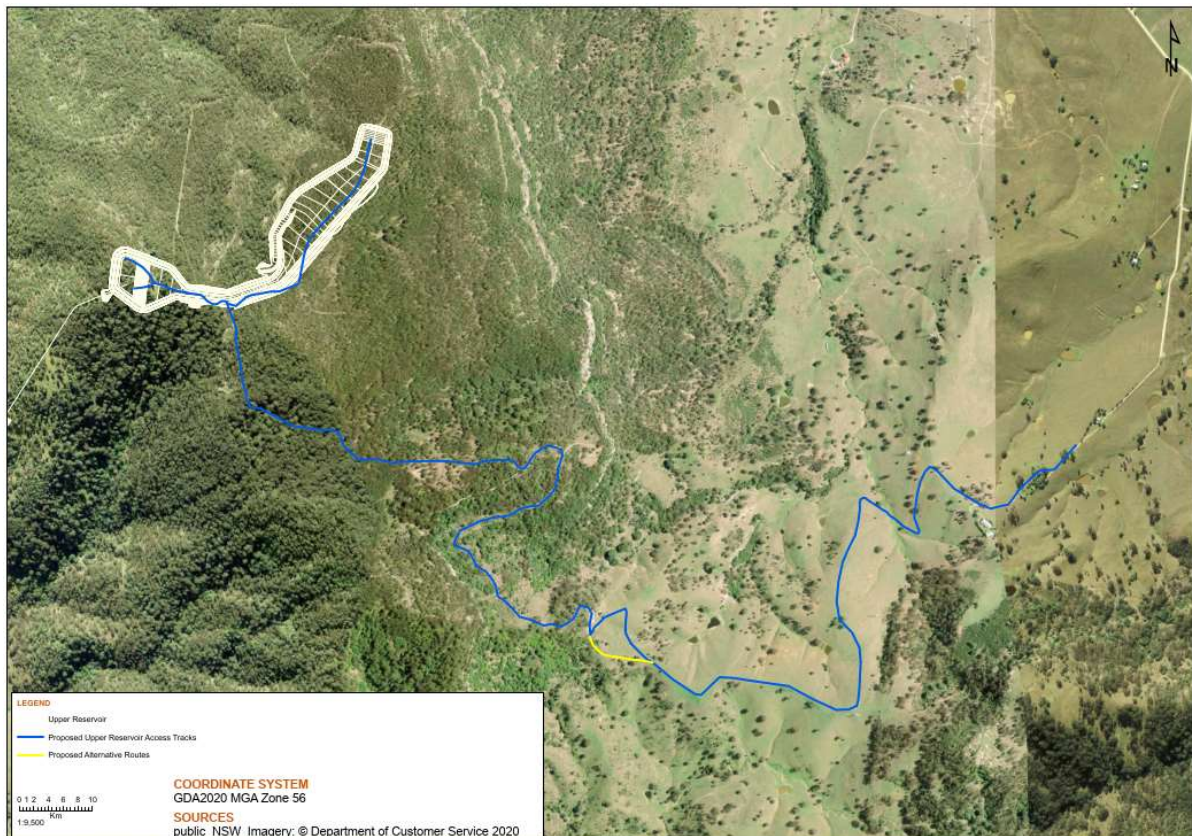


Figure 2-2: Proposed Access Tracks

3. Existing Conditions

3.1 External Road Network

Figure 3-1 shows the existing road network in the vicinity of the project which includes New England Highway, Sandy Creek Road and Dolahentys Road. New England Highway is a designated heavy vehicle route and a section of Sandy Creek Road (approximately 2 km from the intersection of New England Highway) is an approved 19m B-double route with travel conditions.

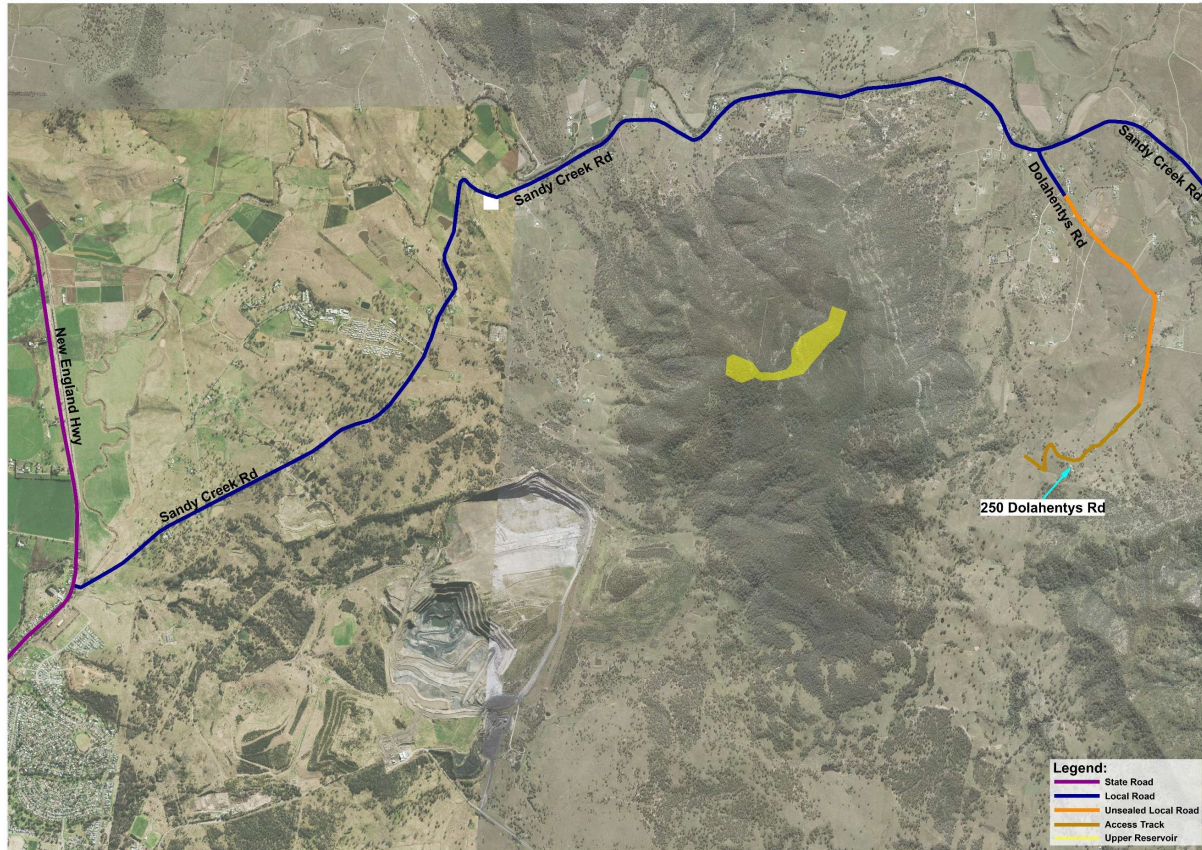


Figure 3-1: Surrounding Road Network (Image Source: MetroMap)

Dolahentys Road is unsealed for the section between Pretoria Road and the start of the access tracks. Site controls should include a speed restriction for this length.

In addition, the road is approximately 3.75m wide, therefore a two-way communications protocol is required to avoid multiple vehicles attempting to traverse the road in conflicting directions at the same time. Waiting areas would need to be provided at selected points adjacent to the access track to maintain a clear path. Further information is provided in a standalone assessment report prepared by SMEC to investigate the feasibility of proposed access tracks and to identify alternative tracks and improvements, where required.

3.1.1 New England Highway

The New England Highway (NEH) is a State Road that forms part of the inland Sydney to Brisbane road link. In the vicinity of the Project, the road is a two-lane, two-way road with a posted speed limit of 60 Km/h. An overtaking lane (approximately 125 m) is provided on the northbound carriageway at the intersection of Sandy Creek Road. Within Muswellbrook, the highway continues as Bridge Street south of Hunter Street with a posted speed limit of 50 km/h and two-lanes in each direction for most of its length. New England Highway/ Bridge Street forms the spine of the traffic network, providing direct access to the town centre and strategic trips through Muswellbrook heading to Aberdeen to the north and Singleton to the south east.

3.1.2 Sandy Creek Road

Sandy Creek Road is a two-way, two-lane road with a speed limit of 100 Km/h reduced to 60 km/h on the approach to the New England Highway. The road has an at-grade rail crossing facility located approximately 40m to the east of New England Highway.

3.1.3 Dolahentys Road

Dolahentys Road is a two-way, two-lane local road with a north-south alignment. The road intersects with Sandy Creek Road at its northern end and a private property at its southern end. Dolahentys Road is relatively narrow and unsealed for the majority of its length.

3.2 TfNSW Permanent Count Site

A permanent classified traffic counter site ID 6157 is located on New England Highway approximately 60m north of Burton's Lane. A review of traffic data for the week Monday 15th to Friday 19th November 2021 (excluding 16th November due to missing data) is presented in Figure 3-2, which shows the daily traffic volume profile in 1 hour increments by vehicle type, including light and heavy vehicles, as well as total vehicle volumes. This traffic data was used to identify AM and PM peak hour traffic volumes on New England Highway, which were used for impact assessment purposes. The identified AM and PM peaks are 08:00-09:00 and 15:00-16:00, respectively.

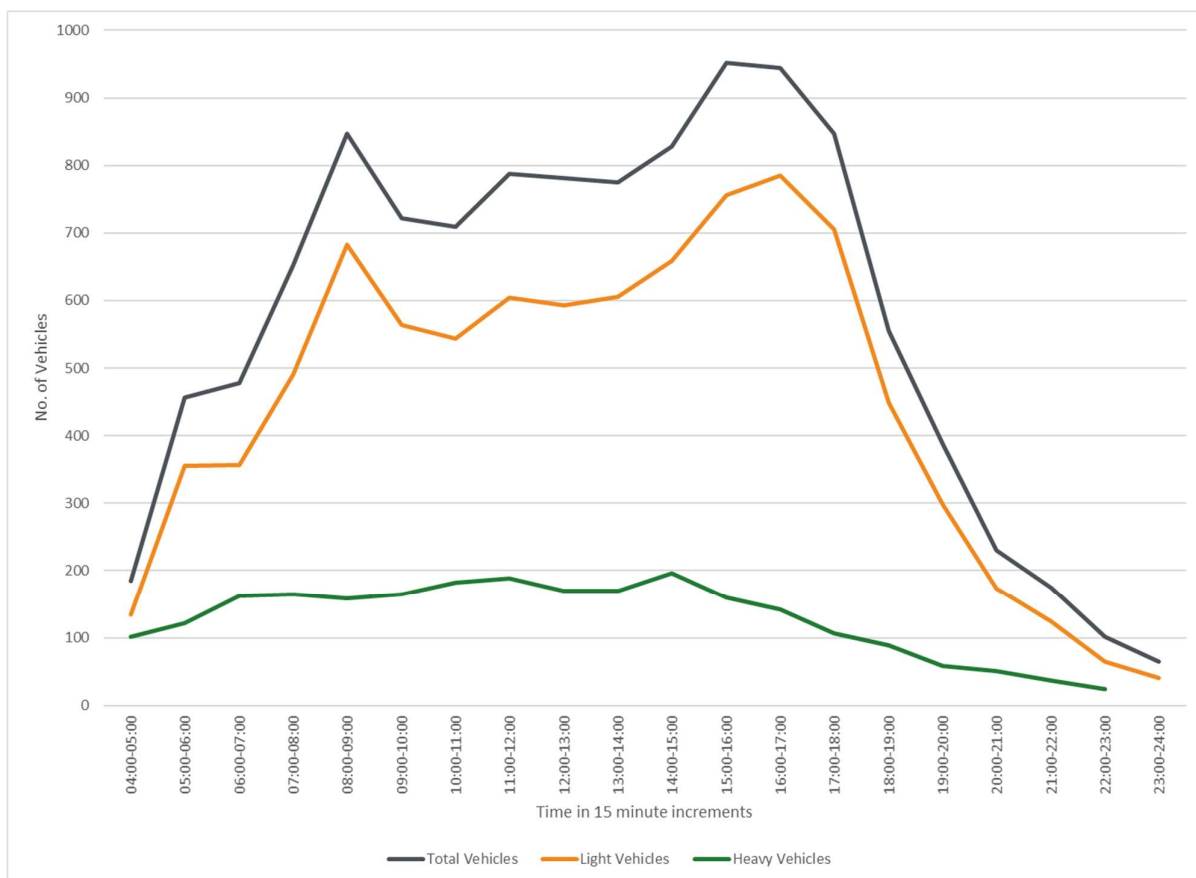


Figure 3-2: Daily Traffic Flow Profile by Vehicle Type

Table 3-1 summarises weekday peak hourly traffic volumes and the heavy vehicle percentages along New England Highway. On average, 164 heavy vehicles were recorded during the AM peak which represents 19% of the total traffic volume. In the PM peak however, there were 196 heavy vehicles which accounted for 16% of the daily traffic volume.

Table 3-1: Hourly Traffic Flows and Heavy Vehicle Percentage Along New England Highway

Date	Direction	Weekday AM peak (1 hour)		Weekday PM peak (1 hour)	
		Total	Heavy	Total	Heavy
15/11/2021	Northbound	469	92 (20%)	390	102 (21%)
	Southbound	406	64 (16%)	102	87 (21%)
	Two-way	875	156 (18%)	492	189 (21%)
17/11/2021	Northbound	424	105 (25%)	324	101 (23%)
	Southbound	400	63 (16%)	87	101 (23%)
	Two-way	824	168 (20%)	411	202 (23%)
18/11/2021	Northbound	419	101 (24%)	347	92 (21%)
	Southbound	424	70 (17%)	101	109 (22%)
	Two-way	843	171 (20%)	448	201 (21%)
19/11/2021	Northbound	417	88 (21%)	341	101 (18%)
	Southbound	427	73 (17%)	101	90 (17%)
	Two-way	844	161 (19%)	442	191 (18%)
Average	Northbound	432	97 (22%)	483	99 (21%)
	Southbound	414	68 (16%)	469	97 (21%)
	Two-way	847	164 (19%)	952	196 (16%)

3.3 Public Transport

Bus route 413 uses a section of New England Highway providing services to residents within the town centre and bus route 414 runs through Muswellbrook using New England Highway to Scone via Aberdeen, as shown in Figure 3-3 and Figure 3-4, respectively.

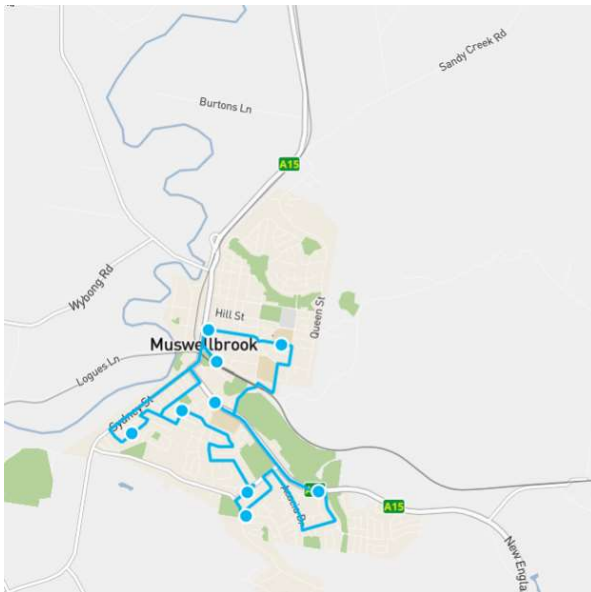


Figure 3-3: Bus Route 413

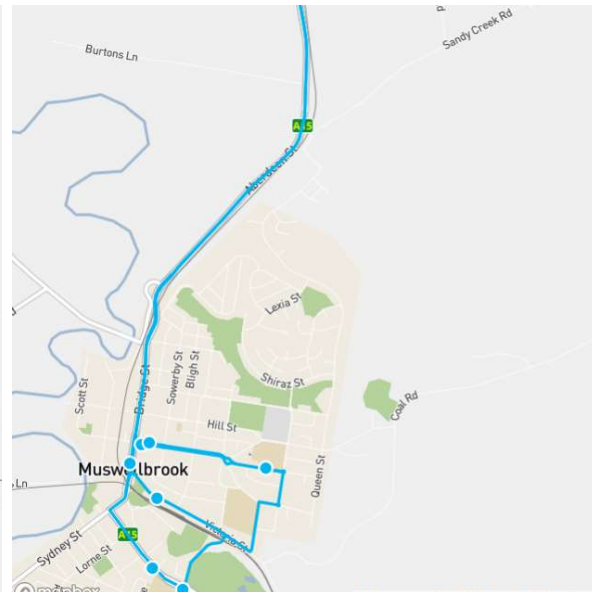


Figure 3-4: Bus Route 414

4. Impacts Assessment

4.1 Road Network Capacity

In regard to New England Highway, Project traffic would travel to site before the AM peak (08:00-09:00) and would leave the site after the PM peak (15:00-16:00). The highway is anticipated to have sufficient capacity to accommodate the additional 32 two-way light vehicle movements for the duration of the works, as well as the maximum of 48 two-way heavy vehicle movements associated with mobilisation and demobilisation. Thus, Project traffic would have minor impacts on the operation of the highway, which already carries a high proportion of heavy traffic.

Sandy Creek Road and Dolahentys Road provide local access to a number of properties and are expected to have low traffic volumes. While the capacity of these roads is able to accommodate the additional traffic generated by the Project, additional traffic on Dolahentys Road would need to be managed using speed restrictions and two-way communication protocols.

4.2 Pavement Conditions

New England Highway is a designated heavy vehicle route and the section of Sandy Creek Road (approximately 2 km from the intersection of New England Highway) is an approved 19m B-double route with travel conditions, therefore the nominal increase in heavy vehicle traffic on these roads is not expected to have any adverse impacts. In regard to Dolahentys Road, this is an unsealed gravel road between Pretoria Row and the start of the access tracks, therefore it is recommended to monitor its condition during use and repair, as necessary.

4.3 Average Travel Speed

Heavy vehicles are likely to travel at lower speeds than other vehicular traffic. The access route via Sandy Creek Road has one lane in each direction. It should be noted that very low traffic volumes are expected to use this road, as it provides local access only and the impacts of Project related traffic on average travel speed are therefore considered to be minor.

The access route via New England Highway between north of Aberdeen Street has one lane in each direction except at the interception of Sandy Creek Road, where an overtaking lane is provided on the northbound carriageway. South of Aberdeen Street, the access route carriageway varies from two to four lanes. New England Highway/ Bridge Street is a designated B-double route and there is already a high percentage of heavy vehicles using this road. The impacts on average travel speed along the highway is anticipated to be minimal.

4.4 Property Access

Existing property access will be maintained during the whole period of the works and no impacts are anticipated due to vehicle movements associated with the project.

4.5 Pedestrian and Cyclists

Active transport infrastructure is not provided along Sandy Creek Road, Dolahentys Road, or the section of New England Highway north of Aberdeen Street. Given the low volume of anticipated Project related vehicles, it is expected that the Project would have no impact on pedestrians and cyclists along these roads.

In addition, the proposed access route passes through the township of Muswellbrook where active transport infrastructure is provided along New England Highway/ Bridge Street south of Aberdeen Street. The low volume of the additional traffic generated by the project is not anticipated to impose impacts on pedestrian and cyclist movements along this section of the road.

5. Conclusion

The introduction of 48 heavy vehicle movements per day for a period of less than a week during mobilisation and demobilisation in addition to 16 light vehicle movements arriving/ leaving the site outside the AM and PM peak periods for the duration of the proposed works is anticipated to have minimal impacts on the operation of surrounding road network.



Member of the Surbana Jurong Group

SMEC

PO Box 1052, North Sydney, NSW 2059

Phone: +61 2 9925 5555

Email: sydney@smec.com

We're redefining exceptional

Through our specialist expertise, we're challenging boundaries to deliver advanced infrastructure solutions.

www.smec.com